

PRODUCT CATALOGUE

WELDING CONSUMABLES

2023

www.lincolnelectric.eu



WELDING CONSUMABLES

TABLE OF CONTENTS



General Information	5
Stick Electrodes	39
MIG/MAG Wires	113
TIG Wires	155
Flux-Cored Wires	181
Submerged Arc Consumables	243
Ceramic Backing Materials	296
Index	298

WELDING CONSUMABLES PRODUCT CATALOGUE

GENERAL INFORMATION

Chemical composition & Classification	6
EN/ISO classification	18
Welding positions	23
Cost calculations for steel constructions	
with stick electrodes	24
Ferrite in weld metal	26
Packaging and sizes	30
Sahara® ReadyPack®	33
Storage and handling	34

STICK ELECTRODES 39**Mild Steel, cellulosic**

Lincoln® 6010	40
Fleetweld® 5P+®	41

Mild Steel, rutile

Cumulo	42
Numal	43
Omnia®	44
Omnia® 46	45
Pantafix	47
Supra®	48
Universalis®	49

Mild Steel, rutile, high recovery

Ferrod® 135T	50
Ferrod® 160T	51
Ferrod® 165A	52

Mild Steel, basic

Basic 7018	53
Basic 7018P	54
Baso® 120	55
Baso® 48SP	56
Baso® G	57
Conarc® 48	59
Conarc® 49	60
Conarc® 49C	61
Conarc® 50	62
Conarc® ONE	63
Hyrod 7018	64
Hyrod 7018LT	65
Kardo	66
Lincoln® 7018-1	67
Vandal	69

Mild Steel, basic, high recovery

Conarc® L150	70
Hyrod 7028	71

Mild Steel, double coated

Lincoln® 7016/DR	72
------------------------	----

Mild Steel, pipeline applications

Pipelinex® 16P	73
Baso® 100	74
Conarc® 51	75

Low Alloy Steel, cellulosic

Lincoln® 7010	76
Lincoln® 8010	77
Pipelinex® 7P+	78
Pipelinex® 8P+	79
Shield-Arc® 70+	80
Shield-Arc® HYP+	81

Low Alloy Steel, high strength

Conarc® 60G	82
Conarc® 70G	83

Low Alloy Steel, low temperature

Kryo® 1	84
Kryo® 1-180	85
Kryo® 1P	86
Kryo® 1R	87
Kryo® 2	88
Kryo® 3	89
Kryo® 4	90

Low Alloy Steel, high temperature

SL 12G	91
SL 22G	92

Low Alloy Steel, weathering steels

Conarc® 55CT	93
--------------------	----

Stainless Steel, standard austenitic

Arosta® 304L	94
Arosta® 307	95
Arosta® 309S	96
Arosta® 316L	97
Clearosta® E 304L	98
Clearosta® E 309L	99
Clearosta® E 316L	100
Limarosta® 304L	101
Limarosta® 309S	102
Limarosta® 316L	103
LINOX 308L	104
LINOX 309L	105
LINOX 316L	106
LINOX P 308L	107
LINOX P 309L	108
LINOX P 316L	109

Aluminium

ALMN	110
ALSI 5	111
ALSI 12	112

MIG WIRES 113**Mild Steel**

LNM 25	114
Ultramag®	115
Ultramag® SG3	117
Supramig®	118
Supramig® HD	120
Supramig® Ultra	121
Supramig® Ultra HD	122

Low Alloy Steel

LNM 12	123
LNM 19	124
LNM 20	125
LNM 28	126
LNM MoNi	127
LNM MoNiVa	128
LNM MoNiCr	129
LNM Ni1	130
LNM Ni2.5	131
Pipeliner® 80Ni1	132

Stainless Steel

LNM 304LSi	133
LNM 316LSi	134
LNM 309LSi	135
LNM 347Si	136
LNM 307	137
LNM 309H	138
LNM 310	139
LNM 318Si	140
LNM 4455	141

Copper Alloys

LNM CuAl8	142
LNM CuSi3	143
LNM CuSn	144

Aluminium Alloys

SuperGlaze® MIG 4043	145
SuperGlaze® MIG 4047	146
SuperGlaze® MIG 5087	147
SuperGlaze® MIG 5183	148
SuperGlaze® MIG HD 5183	149
SuperGlaze® MIG 5356	150
SuperGlaze® MIG HD 5356	151
SuperGlaze® MIG 5556A	152
SuperGlaze® MIG 5754	153

Hardfacing

LNM 420FM	154
-----------------	-----

TIG RODS 155**Mild Steel**

LNT 24	156
LNT 25	157
LNT 26	158
LNT 27	159

Low Alloy Steel

LNT 12	160
LNT 19	161
LNT 20	162
LNT 28	163
LNT Ni1	164
LNT Ni2.5	165

Stainless Steel

LNT 304L	166
LNT 304LSi	167
LNT 316L	168
LNT 316LSi	169
LNT 309L	170
LNT 309LSi	171
LNT 347Si	172
LNT 310	173

Copper Alloys

LNT CuSi3	174
LNT CuSn6	175

Aluminium Alloys

SuperGlaze® TIG 4043	176
SuperGlaze® TIG 5183	177
SuperGlaze® TIG 5356	178
SuperGlaze® TIG 5754	179

FLUX-CORED WIRES 181**Gas-Shielded, Mild Steel**

Outershiel® 71E-H	182
Outershiel® 71M-H	183
Outershiel® 71MS-H	184
Outershiel® 71T1	185
Outershiel® T55-H	186

Gas-Shielded, Low Alloy Steel

Outershiel® 12-H	187
Outershiel® 19-H	188
Outershiel® 20-H	189
Outershiel® 500CT-H	190
Outershiel® 555CT-H	191
Outershiel® 690-H	192
Outershiel® 690-HSR	193
Outershiel® 81K2-H	194
Outershiel® 81K2-HSR	195
Outershiel® 81Ni1-H	196
Outershiel® 81Ni1-HSR	197
Outershiel® 91K2-HSR	198

Outersield® 91Ni1-HSR	199
Outersield® 101Ni1-HSR	200
Pipeliner® G60M-E	201
Pipeliner® G70M-E	202
Pipeliner® G80M-E	203

Metal-Cored Gas-Shielded, Mild Steel

Outersield® MC700	204
Outersield® MC-710-H	205
Outersield® MC710RF-H	206
Outersield® MC715-H	207

Metal-Cored Gas-Shielded, Low Alloy Steel

Outersield® MC420N-H	208
Outersield® MC555CT-H	209
Outersield® MC715NI1-H	210
Outersield® MC80D2-H	211

Gas-Shielded, Stainless Steel

Cor-A-Rosta® 304L	212
Cor-A-Rosta® P304L	213
CLEAROSTA F 304L	214
Cor-A-Rosta® 316L	215
Cor-A-Rosta® P316L	216
CLEAROSTA F 316L	217
Cor-A-Rosta® 309L	218
Cor-A-Rosta® P309L	219
CLEAROSTA F 309L	220
Cor-A-Rosta® 347	221

Gas-Shielded, Hardfacing

Lincore® 55-G	222
---------------------	-----

Self-Shielded, Mild Steel

Innershield® NR®-152	223
Innershield® NR®-203MP	224
Innershield® NR®-203 Ni1	225
Innershield® NR®-207	226
Innershield® NR®-211-MP	227
Innershield® NR®-212	228
Innershield® NR®-232	229
Innershield® NR®-233	230
Innershield® NR®-311	231
Innershield® NR®-440Ni2	232
Innershield® NS-3M	233

Self-Shielded, Low Alloy Steel

Pipeliner® NR®-208-XP	234
Pipeliner® NR®-208-P	235

Self-Shielded, Hardfacing

Lincore® 15CrMn	236
Lincore® 33	237
Lincore® 50	238
Lincore® 55	239
Lincore® 60-O	240
Lincore® M	241
Lincore® T&D	242

SUBMERGED ARC WIRES 243

Mild Steel

L50M	244
L60	245
L61	246
LNS 135	247

Low Alloy

L-70	248
LNS 133TB	249
LNS 140A	250
LNS 140TB	251
LNS 150	252
LNS 151	253
LNS 160	254
LNS 162	255
LNS 163	256
LNS 164	257
LNS 165	258
LNS 168	259

Stainless Steel

LNS 304L	260
LNS 316L	261
LNS 309L	262
LNS 347	263
LNS 307	264
LNS 4462	265

Nickel base

LNS NiCro™ 60/20	266
LNS NiCroMo 60/16	267

FLUXES 268

708GB	268
761	269
780	270
781	271
782	272
802	273
839	274
8500	275
860	277
888	279
960	281
995N	282
998N	283
P223	285
P230	286
P240	288
WTX	290
P2000	291
P2000S	293
P2007	294

TEST RESULTS

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods. Users are cautioned to confirm by qualification testing, or other appropriate means, the suitability of any welding consumable and procedure before use in the intended application.

CUSTOMER ASSISTANCE POLICY

The business of Lincoln Electric is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to enquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectriceurope.com for any updated information.

IMPORTANT INFORMATION ON OUR WEBSITE

Safety Data Sheets (SDS):

<https://www.lincolnelectric.com/en-GB/Safety-Documents-Search/Safety-Data-Sheets>

Catalogues and Brochures

<https://www.lincolnelectric.com/en-GB/Support/Download-Brochures-and-Catalogues>

Consumable TÜV Certificates:

<https://www.lincolnelectric.com/en-GB/Certificate-Center/TUV-Certificates>

STICK ELECTRODES FOR MILD STEEL

Product name	Chemical composition (typical values) in %					AWS	EN/ISO
	C	Mn	Si	S	P		
BASIC 7018	0.08	1.1	0.45	≤ 0.015	≤ 0.025	AWS A5.1	E 7018
BASIC 7018P	0.06	1.5	0.3	≤ 0.025	≤ 0.025	AWS A5.1	E 7018 H ₄
Baso® 100	0.06	1.2	0.5	≤ 0.02	≤ 0.02	AWS A5.1	E 7016-1 H ₄
Baso® 120	0.06	1.4	0.3	0.010	0.015	AWS A5.1	E 7018 H ₄ R
Baso® 148SP	0.06	0.9	0.7	≤ 0.015	≤ 0.020	AWS A5.1	E 7016-H8
Baso® G	0.07	1.2	0.4	≤ 0.010	≤ 0.020	AWS A5.1	E 7018-1 H ₄ R
Conarc® 48	0.06	1.4	0.3	0.010	0.015	AWS A5.1	E 7018-1 H ₄ R
Conarc® 49	0.09	1.1	0.6	0.010	0.015	AWS A5.1	E 7018 H ₄
Conarc® 49C	0.06	1.4	0.3	0.010	0.015	AWS A5.1	E 7018-1 H ₄ R
Conarc® 50	0.07	1.2	0.4	≤ 0.010	≤ 0.020	AWS A5.1	E 7018-1 H ₄ R
Conarc® 51	0.06	1.2	0.5	≤ 0.02	≤ 0.02	AWS A5.1	E 7016-1 H ₄
Conarc® L150	0.1	1.1	0.6	≤ 0.015	≤ 0.025	AWS A5.1	E 7028 H ₄
Conarc® ONE	0.05	1.3	0.4	0.010	0.015	AWS A5.1	E 7018-1 H ₄ R
CUMULO	0.08	0.6	0.4	-	-	AWS A5.1	E 6013
Ferrod® 135T	0.08	0.5	0.35	-	-	AWS A5.1	E 7024
Ferrod® 160T	0.1	0.9	0.45	-	-	AWS A5.1	E 7024
Ferrod® 165A	0.07	0.95	0.3	-	-	AWS A5.1	E 7024-1
Fleetweld® 5P+	0.20	0.56	0.17	-	-	AWS A5.1	E 6010
HYROD 7018	0.09	1.1	0.6	0.010	0.015	AWS	E 7018 H8
HYROD 7018LT	0.06	1.4	0.3	0.010	0.015	AWS	E 7018-1 H ₄ R
HYROD 7028	0.1	1.1	0.6	≤ 0.015	≤ 0.025	AWS	E 7028 H ₄
KARDO	0.03	0.4	0.25	0.010	0.015	AWS A5.1	E 6018 *
Lincoln® 6010	0.1	0.6	0.2	-	-	AWS A5.1	E 6010
Lincoln® 7016 DR	0.08	1.2	0.6	-	-	AWS A5.1	E 7016-H8
LINCOLN 7018-1	0.06	1.3	0.30	0.025	0.025	AWS A5.1	E 7018-1 H ₄
NUMAL	0.06	0.5	0.45	-	-	AWS A5.1	E 6013
Omnia®	0.08	0.5	0.3	≤ 0.03	≤ 0.03	AWS A5.1	E 6013
Omnia® 46	0.06	0.5	0.45	-	-	AWS A5.1	E 6013
Pantafix	0.08	0.5	0.3	≤ 0.03	≤ 0.03	AWS A5.1	E 6013
Pipeliner® 16P	0.06	1.3	0.5	0.009	0.013	AWS A5.1	E 7016-H ₄ , E 7016-1 H ₄
Supra®	0.12	0.5	0.6	-	-	AWS A5.1	E 6012
Universalis®	0.08	0.6	0.45	-	-	AWS A5.1	E 6013
VANDAL	0.08	1.2	0.4	≤ 0.015	≤ 0.020	AWS A5.1	E 7018-1 H ₄

* Nearest classification

STICK ELECTRODES FOR LOW ALLOY STEEL

Product	Chemical composition (typical values) in %											AWS	EN/ISO
	C	Mn	Si	S	P	Ni	Cr	Mo	Cu	V			
Conarc® 55CT	0.06	1.3	0.4	≤0.02	≤0.02	0.45	0.5	-	0.45	-	AWS A5.5	E 8018-G H4R	EN ISO 2590-A E 50.4 Z B 32 H5
Conarc® 60G	0.06	1.0	0.4	0.010	0.015	1.6	-	0.3	-	-	AWS A5.5	E9018M-H4	EN ISO 18275-A E 55.4 Z B 32 H5
Conarc® 70G	0.06	1.2	0.4	0.009	0.014	1.0	-	0.4	-	-	AWS A5.5	E 9018-G-H4	EN ISO 18275-A E 55.4 1NiMo B 32 H5
Kryo® 1	0.05	1.5	0.4	0.010	0.010	0.9	-	-	-	-	AWS A5.5	E 7018-G-H4R	EN ISO 2560-A E 50.6 MnTi B 32 H5
Kryo® 1-180	0.07	1.2	0.3	0.0010	0.02	0.9	-	-	-	-	-	-	EN ISO 2560-A E 50.5 1Ni B 73 H5
Kryo® 1P	0.05	1.5	0.5	0.005	0.010	0.95	-	-	-	-	AWS A5.5	E 8018-G-H4R	EN ISO 2560-A E 50.6 MnTi B 32 H5
Kryo® 1R	0.07	1.15	0.4	0.005	0.015	0.9	-	-	-	-	AWS A5.5	E 8018-C3-H4R	EN ISO 2560-A E 46.6 1Ni B 32 H5
Kryo® 2	0.05	1.6	0.3	0.01	0.015	1.5	-	-	-	-	AWS A5.5	E 9018-G-H4R	EN ISO 2560-A E 55.6 Z B 32 H5
Kryo® 3	0.05	0.7	0.3	0.01	0.015	2.5	-	-	-	-	AWS A5.5	E 8018-C1-H4	EN ISO 2560-A E 50.6 MnTi B 32 H5
Kryo® 4	0.03	0.6	0.4	0.005	0.01	3.6	-	-	-	-	AWS A5.5	E 7016-C2L H4	EN ISO 2560-A E 42.6 3Ni B 12 H5
LINCOLN® 7010	0.1	0.7	0.2	-	-	-	-	0.5	-	-	AWS A5.5	E 7010-P1	EN ISO 2560-A E 42.3 Mo C 21
LINCOLN® 8010	0.1	0.8	0.2	-	-	0.7	-	0.3	-	-	AWS A5.1	E 8010-G	EN ISO 2560-A E 46.3 1NiMo C 21
Pipeliner® 7P+	0.15	0.6	0.1	0.015	0.015	0.85	-	0.1	-	-	AWS A5.1	E 7010-P1, E 7010-G	-
Pipeliner® 8P+	0.17	0.7	0.25	0.01	0.01	0.8	-	0.2	-	-	AWS A5.5	E 8010-G, E 8010-P1	-
Shield-Arc® 70+	0.13-0.17	0.6-1.2	0.05-0.3	-	-	0.75-0.97	0.01-0.2	0.05-0.15	-	0.02-0.04	AWS A5.5	E 8010-P1, E 8010-G	-
Shield-Arc® HYP+	0.13-0.17	0.49-0.63	0.08-0.18	-	-	-	-	0.27-0.31	-	<0.01	AWS A5.5	E 7010-P1, E 7010-G	-
SL® 12G	0.05	0.8	0.6	0.010	0.020	-	-	0.55	-	-	AWS A5.5	E 7018-A1-H4R	EN ISO 3580-A E Mo B 32 H5
SL® 22G	0.06	0.8	0.6	0.010	0.020	-	0.5	0.5	-	-	AWS A5.5	E 8018-R1-H4	EN ISO 3580-A E 7 R 32 H5

* Nearest classification

STICK ELECTRODES FOR STAINLESS STEEL

Product name	Chemical composition (typical values) in %								AWS		EN/ISO	
	C	Mn	Si	S	P	Ni	Cr	Mo				
Arosta® 304L	0.02	0.8	0.8	-	-	9.7	19.5	-	AWS A5.4	E308L-16	EN ISO 3581-A	E 19 9 LR 12
Arosta® 307	0.09	5.0	0.6	-	-	8.5	18.5	-	AWS A5.4	E307-16	EN ISO 3581-A	E 18 Mn R 12
Arosta® 309S	0.02	0.8	0.8	-	-	12.5	23.5	-	AWS A5.4	E309L-16	EN ISO 3581-A	E 23 12 LR 32
Arosta® 316L	0.02	0.8	0.8	-	-	11.5	18.0	2.85	AWS A5.4	E316L-16	EN ISO 3581-A	E 19 12 3 LR 12
Clearosta® E 304L	0.03	0.8	1.00	0.01	0.025	10.0	19.5	-	AWS A5.4	E308L-17	EN ISO 3581-A	E 19 9 LR 22
Clearosta® E 309L	0.03	0.9	1.00	0.01	0.025	13.0	24.0	-	AWS A5.4	E309L-17	EN ISO 3581-A	E 23 12 LR 22
Clearosta® E 316L	0.03	0.8	1.00	0.01	0.025	10.0	19.5	2.7	AWS A5.4	E316L-17	EN ISO 3581-A	E 19 12 3 LR 22
Limarosta® 304L	0.025	0.75	0.95	-	-	9.7	19.0	-	AWS A5.4	E308L-17	EN ISO 3581-A	E 19 9 LR 12
Limarosta® 309S	0.02	0.8	1.0	-	-	12.5	23.0	-	AWS A5.4	E309L-17	EN ISO 3581-A	E 23 12 LR 32
Limarosta® 316L	0.02	0.8	1.0	-	-	11.5	18.0	2.8	AWS A5.4	E316L-17	EN ISO 3581-A	E 19 12 3 LR 12
LINOX 308L	0.025	0.9	0.8	≤0.025	≤0.030	9.5	19.8	-	AWS A5.4	E308L-17	EN ISO 3581-A	E 19 9 LR 32
LINOX 309L	≤0.040	0.9	0.9	≤0.025	≤0.025	12.2	23.5	-	AWS A5.4	E309L-17	EN ISO 3581-A	E 23 12 LR 32
LINOX 316L	0.035	0.9	0.8	≤0.025	≤0.025	12.0	19.0	2.6	AWS A5.4	E316L-17	EN ISO 3581-A	E 19 12 3 LR 32
LINOX P 308L	0.025	0.8	0.6	-	-	9.5	19.0	-	AWS A5.4	E308L-16	EN ISO 3581-A	E 19 9 LR 32
LINOX P 309L	0.025	0.8	0.6	-	-	13.0	23.5	-	AWS A5.4	E309L-16	EN ISO 3581-A	E 23 12 LR 32
LINOX P 316L	0.025	0.8	0.6	-	-	12.0	19.0	2.5	AWS A5.4	E316L-16	EN ISO 3581-A	E 19 12 3 LR 32

STICK ELECTRODES FOR ALUMINIUM ALLOYS

Product name	Chemical composition (typical values) in %								AWS	EN/ISO		
	Mn	Si	Al	Cu	Mg	Fe	Zn	Others				
ALMN	0.9-1.2	0.3 max.	bal.	0.02 max.	0.15 max	0.6 max.	0.09 max.	0.15 max.	AWS A5.3	E 3003	EN ISO 18273-A	Al 3103
AlSi12	-	12.0	bal.	-	-	-	-	-	AWS A5.3	E 4047	EN ISO 18273-A	Al 4047A
AlSi5	-	5.0	bal.	-	-	-	-	-	AWS A5.3	E 4043	EN ISO 18273-A	Al 4043A

MIG WIRES FOR MILD STEEL

Product name	Chemical composition (typical values) in %				AWS	EN/ISO
	C	Mn	Si			
LNM 25	0.08	1.1	0.6		AWS A5.18	EN ISO 14341-A
Supramig®	0.08	1.40	0.85	ER70S-3	ER70S-3	G 42 4 M21 2Si
Supramig® HD	0.08	1.40	0.85	AWS A5.18	ER70S-6	EN ISO 14341-A
Supramig® Ultra	0.08	1.70	0.85	AWS A5.18	ER70S-6	G 42 3 C1 3Si1 / G 46 4 M21 3Si1
Supramig® Ultra HD	0.08	1.70	0.85	AWS A5.18	ER70S-6	G 42 3 C1 3Si1 / G 46 4 M21 3Si1
Ultramag®	0.08	1.40	0.85	AWS A5.18	ER70S-6	G 46 3 C1 4Si1 / G 50 5 M21 4Si1
Ultramag® SG3	0.08	1.70	0.85	AWS A5.18	ER70S-6	G 42 3 C1 3Si1 / G 46 4 M20 3Si1 / G 46 4 M21 3Si1
						G 46 3 C1 4Si1 / G 46 5 M20 4Si1 / G 46 5 M21 4Si1

MIG WIRES FOR LOW ALLOY STEEL

Product name	Chemical composition (typical values) in %											AWS	EN/ISO
	C	Mn	Si	Cr	Ni	Mo	Cu	Al	Ti	S	P	V	
LNM 12	0.1	1.12	0.6	-	-	0.5	-	-	-	-	-	-	AWS A5.28
LNM 19	0.1	1.0	0.5	1.2	-	0.5	-	-	-	-	-	-	ER70S-A1
LNM 20	0.08	0.9	0.6	2.5	-	1.0	-	-	-	-	-	-	ER80S-G*
LNM MoNi	0.10	1.65	0.75	0.60	0.55	0.30	0.08	-	-	-	-	-	ER90S-G*
LNM MoNiCr	0.09	1.8	0.80	0.30	2.20	0.55	-	-	-	-	-	-	EN ISO 16834-A
LNM MoNiVa	0.08	1.7	0.44	0.23	1.35	0.3	0.25	-	-	-	-	0.08	G 62 4 M21 Mn3NiCrMo
LNM Ni1	0.09	1.2	0.6	-	0.9	-	-	-	-	-	-	-	EN ISO 16834-A
LNM Ni2.5	0.1	1.1	0.55	-	2.4	-	-	-	-	-	-	-	G 89 4 M21 Mn4Ni2CrMo
Pipeliner® 80Ni1	0.07	1.55	0.70	-	0.90	<0.01	-	<0.01	0.08	0.10	0.11	-	EN ISO 16834-A
LNM 28	0.1	1.4	0.75	-	0.8	-	0.3	-	-	-	-	-	EN ISO 14341-A
													G 46 5 M21 3Ni1
													EN ISO 14341-A
													G 46 6 M21 2Ni2
													EN ISO 14341-A
													EN ISO 14341-A
													G 3Ni1
													EN ISO 16834-A
													G 2 Mn3Ni1Cu*

MIG WIRES FOR HARDFACING APPLICATIONS

Product name	Chemical composition (typical values) in %					AWS	EN/ISO
	C	Mn	Si	Cr			
LNM 420FM	0.5	0.4	3.0	9.0	-	EN ISO 14700-A	S Fe8

* Nearest classification

MIG WIRES FOR STAINLESS STEEL

Product name	Chemical composition (typical values) in %							AWS	EN/ISO
	C	Mn	Si	Cr	Ni	Mo	Nb		
LNM 304LSi	0.02	1.9	0.8	20	10	0.1	-	AWS A5.9	EN ISO 14343-A
LNM 307	0.07	7.1	0.8	18.6	8.0	-	-	AWS A5.9	G 19 9 LSi
LNM 309H	0.08	1.8	0.4	23.6	13.2	0.1	-	AWS A5.9	EN ISO 14343-A
LNM 309LSi	0.02	1.8	0.8	23.3	13.8	0.14	-	AWS A5.9	G 18 8 Mn
LNM 310	0.1	1.7	0.45	26	21	0.1	-	ER309	-
LNM 316LSi	0.01	1.8	0.8	18.5	12.2	2.5	-	ER309LSi	G 23 12 L Si
LNM 318Si	0.05	1.4	0.7	18.6	11.7	2.5	0.7	ER310	G 25 20
LNM 347Si	0.05	1.4	0.7	19.2	9.9	0.1	0.6	ER316LSi	EN ISO 14343-A
LNM 4455	0.015	7	0.4	20	16	3.0	0.15	ER318*	G 19 12 3 LSi
								ER347Si	EN ISO 14343-A
								ER316LMn	G 19 9 NbSi
								AWS A5.9	G 20 16 3 Mn N L

MIG WIRES FOR NI-BASE ALLOYS

Product name	Chemical composition (typical values) in %							AWS	EN/ISO
	Mn	Si	Ni	Cu	Al	Zn	Sn		
LNM CuAl8	0.3	-	-	bal.	8	-	-	AWS A5.7 ERCuAl-A1	EN ISO 24373-A
LNM CuSi3	1.0	3.0	-	bal.	-	0.1	0.1	AWS A5.7 ERCuSi-A	S Cu 6100 (CuAl7)
LNM CuSn	0.2	0.3	0.1	bal.	-	-	0.8	AWS A5.7 ERCu	EN ISO 24373-A
									S Cu 6560 (Cu3Mn1)
									S Cu 1898 (CuSn1)

MIG WIRES FOR ALUMINIUM

Product name	Chemical composition (typical values) in %											AWS	EN/ISO
	Mn	Si	Cr	Cu	Al	Ti	Be	Mg	Fe	Zn	Zr		
SuperGlaze® MIG 4043	0.01	5.26	-	0.01	bal.	0.01	<0.0002	0.03	0.15	0.001	-	AWS 5.10 ER4043	EN ISO 18273-A
SuperGlaze® MIG 4047	max 0.15	11-13	-	max 0.30	bal.	-	0.0003	max 0.10	max 0.20	max 0.20	-	AWS 5.10 ER4047	S Al 4043A (AlSi5)
SuperGlaze® MIG 5087	0.7	0.06	0.07	-	bal.	0.01	0.0002	4.9	0.13	-	0.12	AWS 5.10 ER5087	EN ISO 18273-A
SuperGlaze® MIG 5183	0.65	0.03	0.10	0.001	bal.	0.01	0.0002	4.99	0.13	0.02	-	AWS 5.10 ER5183	S Al 5087 (AlMg4.5MnZr)
SuperGlaze® MIG 5356	0.12	0.05	0.08	0.03	bal.	0.15	0.0002	4.90	0.09	<0.01	-	AWS 5.10 ER5356	EN ISO 18273-A
SuperGlaze® MIG 5556A	0.6	0.05	0.08	-	bal.	0.09	0.0002	5.1	0.11	-	-	AWS 5.10 ER5556A	EN ISO 18273-A
SuperGlaze® MIG 5754	0.29	0.07	0.06	0.01	bal.	0.05	0.0004	3.0	0.13	-	-	AWS 5.10 ER5754	S Al 5556A (AlMg5Mn)
SuperGlaze® MIG-HD 5183	0.65	0.03	0.10	0.001	bal.	0.07	0.0002	4.99	0.13	0.02	-	AWS 5.10 ER5183	S Al 5754 (AlMg3)
SuperGlaze® MIG HD 5356	0.12	0.05	0.08	0.03	bal.	0.15	0.0002	4.90	0.09	<0.01	-	AWS 5.10 ER5356	EN ISO 18273-A
													S Al 5183 (AlMg4.5Mn0.7Al)
													S Al 5356 (AlMg5CrAl)

* Nearest classification

TIG RODS FOR MILD STEEL

Product name	Chemical composition (typical values) in %						AWS	EN/ISO
	C	Mn	Si	Al	Ti	Zr		
LNT 24	0.05	1.20	0.5	0.08	0.10	0.05	AWS A5.18	ER70S-2
LNT 25	0.08	1.1	0.6	-	-	-	AWS A5.18	ER70S-3
LNT 26	0.1	1.5	0.9	-	-	-	AWS A5.18	ER70S-6
LNT 27	0.1	1.5	0.9	-	-	-	AWS A5.18	ER70S-6

TIG RODS FOR LOW ALLOY STEEL

Product name	Chemical composition (typical values) in %								AWS	EN/ISO
	C	Mn	Si	Cr	Mo	Ni	Cu			
LNT 12	0.1	1.2	0.6	-	0.5	-	-	AWS A5.28	ER70S-A1	EN ISO 636-A
LNT 19	0.1	1.0	0.6	1.2	0.5	-	-	AWS A5.28	ER80S-G*	EN ISO 21952-A
LNT 20	0.08	1.0	0.6	2.5	1.0	-	-	AWS A5.28	ER90S-G*	EN ISO 21952-A
LNT 28	0.1	1.4	0.75	0.3	-	0.8	0.3	AWS A5.28	ER80S-G	-
LNT Ni1	0.1	1.2	0.6	-	-	0.9	-	AWS A5.28	ER80S-Ni 1	EN ISO 636-A
LNT Ni2.5	0.1	1.1	0.55	-	-	2.4	-	AWS A5.28	ER80S-Ni2	EN ISO 636-A

TIG RODS FOR STAINLESS STEEL

Product name	Chemical composition (typical values) in %								AWS	EN/ISO
	C	Mn	Si	Cr	Mo	Ni	Nb			
LNT 304L	0.01	1.7	0.4	20	0.1	10	-	AWS A5.9	ER308L	EN ISO 14343-A
LNT 304LSi	0.02	2.0	0.8	20	0.1	10	-	AWS A5.9	ER308LSi	EN ISO 14343-A
LNT 309L	0.01	1.65	0.5	24	0.1	13	-	AWS A5.9	ER309L	EN ISO 14343-A
LNT 309LSi	0.02	2.0	0.8	23.5	0.1	13	-	AWS A5.9	ER309LSi	EN ISO 14343-A
LNT 316L	0.01	1.5	0.5	18.5	2.7	12	-	AWS A5.9	ER316L	EN ISO 14343-A
LNT 316LSi	0.03	1.9	0.8	18.5	2.7	12.0	-	AWS A5.9	ER316LSi	EN ISO 14343-A
LNT 347Si	0.05	1.4	0.7	19.5	0.01	9.5	0.6	AWS A5.9	ER347Si	EN ISO 14343-A
LNT 310	0.10	1.7	0.5	26	0.1	21	-	AWS A5.9	ER310	EN ISO 14343-A

* Nearest classification

TIG RODS FOR CU BASE ALLOYS

Product name	Chemical composition (typical values) in %						AWS	EN/ISO	
	Mn	Si	Cu	Zn	Sn	P			
LNT CuSi3	1.0	3.0	bal.	0.1	0.1	-	AWS A5.7 ERCuSi-A	EN ISO 24373-A	S Cu 6560 (CuSi3Mn1)
LNT CuSn6	-	-	bal.	-	6.0	0.2	AWS A5.7 ERCuSn-A	EN ISO 24373-A	S Cu 5180 (CuSn6P)

TIG RODS FOR ALUMINIUM

Product name	Chemical composition (typical values) in %										AWS	EN/ISO	
	Mn	Si	Cr	Cu	Al	Ti	Be	Zn	Mg	Fe			
SuperGlaze® TIG 4043	0.009	5.01	-	0.008	bal.	0.007	0.0002	0.002	0.03	0.13	AW5.5:10 R4043	EN ISO 18273-A	S Al 4043A (AlSi5)
SuperGlaze® TIG 5183	0.65	0.03	0.10	0.001	bal.	0.07	0.0002	0.02	4.99	0.13	AW5.5:10 R5183	EN ISO 18273-A	S Al 5183 (AlMg4.5Mn0.7(Al))
SuperGlaze® TIG 5356	0.12	0.06	0.12	0.02	bal.	0.09	0.0002	0.001	4.84	0.09	AW5.5:10 R5356	EN ISO 18273-A	S Al 5356 (AlMg5Cr(Al))
SuperGlaze® TIG 5754	0.29	0.07	0.06	0.01	bal.	0.05	0.0004	-	3.0	0.13	AW5.5:10 R5754	EN ISO 18273-A	S Al 5754 (AlMg3)

GAS SHIELDED FLUX-CORED WIRES (MILD AND LOW ALLOY STEEL)

Product name	Chemical composition (typical values) in %										AWS	EN/ISO
	Gas	C	Mn	Si	P	S	Ni	Cr	Mo	Cu		
Outershield® 71E-H	M21	0.04	1.4	0.6	0.013	0.010	-	-	-	-	AWS A5.20	EN ISO 17632-A
Outershield® 71E-H	C1	0.05	1.3	0.6	0.015	0.010	-	-	-	-	AWS A5.20	EN ISO 17632-A
Outershield® 71M-H	C1	0.05	1.3	0.4	0.015	0.009	-	-	-	-	AWS A5.20	EN ISO 17632-A
Outershield® 71M-H	M21	0.05	1.47	0.5	0.015	0.009	-	-	-	-	AWS A5.20	EN ISO 17632-A
Outershield® 71M5-H	C1	0.05	1.35	0.4	0.015	0.010	0.4	-	-	-	-	EN ISO 17632-A
Outershield® 71T1	C1	0.05	1.1	0.3	0.015	0.010	-	-	-	-	AWS	EN ISO 17632-A
Outershield® MC700	M21	0.05	1.35	0.6	0.015	0.023	-	-	-	-	AWS A5.18	EN ISO 17632-A
Outershield® MC-710-H	M21	0.05	1.35	0.6	0.015	0.023	-	-	-	-	AWS A5.18	EN ISO 17632-A
Outershield® MC710RF-H	M21	0.05	1.35	0.6	0.015	0.023	-	-	-	-	AWS A5.18	EN ISO 17632-A
Outershield® MC715-H	M21	0.04	1.5	0.4	0.012	0.020	-	-	-	-	AWS A5.18	EN ISO 17632-A
Outershield® T55-H	C1	0.05	1.5	0.55	0.012	0.010	-	-	-	-	AWS A5.20	EN ISO 17632-A
Outershield® T55-H	M21	0.06	1.5	0.6	0.012	0.010	-	-	-	-	AWS A5.20	EN ISO 17632-A
Outershield® 12-H	M21	0.065	0.8	0.2	0.014	0.010	-	-	0.46	-	AWS A5.29	EN ISO 17634-A
Outershield® 19-H	M21	0.07	0.74	0.24	0.013	0.010	-	1.24	0.52	-	AWS A5.29	EN ISO 17634-A
Outershield® 500CT-H	M21	0.04	1.3	0.2	0.014	0.010	0.84	-	-	0.39	AWS A5.29	EN ISO 18276-A
Outershield® 555CT-H	M21	0.03	1.1	0.4	0.015	0.010	0.60	0.55	-	0.55	AWS A5.29	EN ISO 18276-A
Outershield® 690-H	M21	0.06	1.5	0.2	0.015	0.010	2.0	-	0.3	-	AWS A5.29	EN ISO 18276-A
Outershield® 690-HSR	M21	0.06	1.5	0.2	0.015	0.010	2.0	-	0.5	-	AWS A5.29	EN ISO 18276-A
Outershield® 81K2-H	M21	0.04	1.4	0.2	0.012	0.010	1.4	-	-	-	AWS A5.29	EN ISO 17632-A
Outershield® 81K2-HSR	M21	0.06	1.3	0.3	0.012	0.010	1.4	-	-	-	AWS A5.29	EN ISO 17632-A
Outershield® 81Ni1-H	M21	0.05	1.4	0.2	0.013	0.010	0.95	-	-	-	AWS A5.29	EN ISO 17632-A
Outershield® 81Ni1-H	M21	0.05	1.4	0.2	0.013	0.010	0.95	-	-	-	AWS A5.29	EN ISO 17632-A
Outershield® 91K2-HSR	M21	0.05	1.4	0.2	0.013	0.010	1.4	-	0.4	-	AWS A5.29	EN ISO 18276-A
Outershield® 91Ni1-HSR	M21	0.05	1.4	0.2	0.013	0.010	0.95	-	0.4	-	AWS A5.29	EN ISO 18276-A
Outershield® 101Ni1-HSR	M21	0.06	2.0	0.3	0.013	0.010	0.95	-	0.4	-	AWS A5.29	EN ISO 18276-A
Outershield® MC420N-H	M21	0.03	0.6	0.45	0.017	0.023	2.9	0.03	-	-	AWS A5.28	EN ISO 17632-A
Outershield® MC555CT-H	M21	0.03	1.3	0.4	0.015	0.020	0.55	0.55	-	0.55	AWS A5.28	EN ISO 17632-B
Outershield® MC715Ni1-H	M21	0.05	1.35	0.45	0.020	0.020	0.95	-	-	-	AWS A5.28	EN ISO 17632-A
Outershield® MC80D2-H	M21	0.06	1.45	0.54	0.010	0.010	-	-	-	-	AWS	EN ISO
Pipeliner® G60M-E	M21	0.04	1.35	0.25	0.013	0.008	0.45	-	-	-	AWS	EN ISO
Pipeliner® G70M-E	M21	0.06	1.5	0.2	0.013	0.010	0.95	-	0.15	-	AWS	EN ISO
Pipeliner® G80M-E	M21	0.06	1.4	0.3	0.013	0.010	0.95	-	0.4	-	AWS A5.29	EN ISO 17632-A

SELF-SHIELDED FLUX-CORED WIRES

Product name	Chemical composition (typical values) in %											AWS	EN/ISO
	C	Mn	Si	P	S	Ni	Cr	Al	Mo	Ti	N		
Innershield® NR®-152	0.30	0.99	0.24	0.013	0.007	-	-	1.63	-	0.003	0.051	E71T-14	EN ISO 17632-A T 42 4 1Ni Y N 1 H10
Innershield® NR®-203 Ni1	0.08	1.1	0.27	0.008	0.003	0.9	-	0.85	-	-	-	-	
Innershield® NR®-203MP	0.04-0.07	1.35-1.47	0.22-0.32	≤0.01	≤0.01	-	-	-	-	-	-	-	
Innershield® NR®-207	0.07	0.9	0.2	0.005	0.003	0.8	-	1.0	-	-	-	E71T8-K6-H16	
Innershield® NR®-211-MP	0.21	0.65	0.25	0.010	0.003	-	-	1.3	-	-	-	-	-
Innershield® NR®-232	0.18	0.65	0.27	0.006	0.004	-	-	0.55	-	-	-	-	EN ISO 17632-A T 42 2 Y N 2 H10
Innershield® NR®-233	0.16	0.65	0.21	0.010	0.003	-	-	0.60	-	-	-	-	EN ISO 17632-A T 42 3 Y N 2 H10
Innershield® NR®-311	0.27	0.4	0.08	0.007	0.005	-	-	1.5	-	-	-	-	-
Innershield® NR®-440Ni2	0.01-0.03	0.74-1.12	0.13-0.17	0.007-0.012	0.002-0.004	1.77-2.10	-	0.84-1.07	-	-	-	E71T8-Ni2-JH8	-
Innershield® NS-3M	0.23	0.45	0.25	0.006	0.006	-	-	1.40	-	-	-	E70T-4	EN ISO 17632-A T 38 Z VN 3
Pipeliner® NR®-208-XP	0.02	2.15	0.12	0.005	0.002	0.75	0.04	1.0	0.02	-	-	E81T8-G	-

GAS SHIELDED FLUX-CORED WIRES (STAINLESS STEEL)

Product name	Chemical composition (typical values) in %								AWS	EN/ISO		
	Gas	C	Mn	Si	Ni	Cr	Mo	Nb				
CLEAROSTA F 304L	M21/C1	0.03	1.3	0.7	10	19.5	-	-	AWS A5.22	E308LT1-1 / E308LT1-4	EN ISO 17633-A	T 19 9 L P C 1/M 1
CLEAROSTA F 309L	M21/C1	0.04	0.7	0.6	13	24.0	-	-	AWS A5.22	E309LT1-1/4	EN ISO 17633-A	T 23 12 L P M 1
CLEAROSTA F 316L	M21/C1	0.04	1.4	0.6	12.0	19.0	-	-	AWS A5.22	E316LT1-1/-4	EN ISO 17633-A	T 19 12 3 L P C/M 1
Cor-A-Rosta® 304L	M21/C1	0.03	1.3	0.7	10	19.5	-	-	AWS A5.22	E308LT0-1/-4	EN ISO 17633-A	T 19 9 L R C/M 3
Cor-A-Rosta® 309L	M21/C1	0.03	1.4	0.6	12.5	24	-	-	AWS A5.22	E309LT0-1/-4	EN ISO 17633-A	T 23 12 L R C/M 3
Cor-A-Rosta® 316L	M21/C1	0.03	1.3	0.5	12	19	2.7	-	AWS A5.22	E316LT0-1/ -4	EN ISO 17633-A	T 19 12 3 L R C/M 3
Cor-A-Rosta® 347	M21	0.05	1.4	0.6	10	19.5	-	0.5	AWS A5.22	E347T0-1/4	EN ISO 17633-A	T 19 9 Nb R C/M 3
Cor-A-Rosta® P304L	M21/C1	0.03	1.3	0.7	10	19.5	-	-	AWS A5.22	E308LT1-1/-4	EN ISO 17633-A	T 19 9 L P C/M 2
Cor-A-Rosta® P309L	M21/C1	0.04	1.3	0.6	12.5	24	-	-	AWS A5.22	E309LT1-1/-4	EN ISO 17633-A	T 23 12 L P C/M 2
Cor-A-Rosta® P316L	M21/C1	0.03	1.3	0.5	12	19	2.7	-	AWS A5.22	E316LT1-1/-4	EN ISO 17633-A	T 19 12 3 L P C/M 2

SELF SHIELDING FLUX CORED WIRES FOR HARDFACING APPLICATIONS

Product name	Chemical composition (typical values) in %								EN/ISO
	C	Mn	Si	Ni	Cr	Al	Mo	W	
Lincore® 15CrMn	0.4	15.0	0.25	-	16.0	-	-	-	T Fe9
Lincore® 33	0.15	2.0	0.7	-	2.0	1.6	-	-	T Fe1
Lincore® 50	2.2	1.2	1.0	-	11.0	0.6	0.5	-	-
Lincore® 55	0.45	1.4	0.55	-	5.3	1.4	0.8	-	T Fe2
Lincore® 60-0	4.2	1.6	1.3	-	25.4	0.6	-	-	-
Lincore® M	0.6	13.0	0.4	0.5	4.9	-	-	-	T Fe9
Lincore® T&D	0.65	1.5	0.8	-	7.0	1.8	1.4	1.6	-

SAW WIRES FOR MILD STEEL

Product name	Chemical composition (typical values) in %				AWS	EN/ISO
	C	Mn	Si			
L50M	0.1	1.75	0.25	AWS A5.17	EH12K	EN ISO 14171-A S3Si
L60	0.09	0.5	0.06	AWS A5.17	EL12	EN ISO 14171-A S1
L61	0.1	1.0	0.25	AWS A5.17	EM12K	EN ISO 14171-A S2Si
LNS 135	0.1	1.0	0.10	AWS A5.17	EM12K	EN ISO 14171-A S2

SAW WIRES FOR LOW ALLOY STEEL

Product name	Chemical composition (typical values) in %											AWS	EN/ISO
	C	Mn	Si	Mo	Ni	Cr	P	Ti	B	Cu	S		
L-70	0.1	0.9	0.10	0.5	-	-	-	-	-	-	-	AWS A5.23 EA1	EN ISO 14171-A S2Mo
LNS 133TB	0.08	1.55	0.25	-	-	-	-	0.15	0.015	-	-	AWS A5.23 EG	EN ISO 14171-A SZ
LNS 140A	0.1	1.0	0.10	0.5	-	-	-	-	-	-	-	AWS A5.23 EA2	EN ISO 14171-A S2Mo
LNS 140TB	0.06	1.1	0.20	0.5	-	-	-	0.13	0.02	-	-	AWS A5.23 EA2TiB	EN ISO 14171-A S2MoTiB
LNS 150	0.13	0.8	0.15	0.5	-	1.2	<0.010	-	-	-	-	AWS A5.23 EB2R	EN ISO 24598-A S Cr Mo1
LNS 151	0.10	0.6	0.12	1.0	-	2.5	<0.010	-	-	-	-	AWS A5.23 EB3R	EN ISO 24598-A S Cr Mo2
LNS 160	0.10	1.1	0.15	-	0.9	-	-	-	-	-	-	AWS A5.23 EN1	EN ISO 14171-A S2Ni1
LNS 162	0.10	1.1	0.15	-	2.2	-	-	-	-	-	-	AWS A5.23 ENi2	EN ISO 14171-A S2Ni2
LNS 163	0.11	1.0	0.25	-	0.7	0.2 max	0.2 max	-	-	0.5	0.2 max	AWS A5.23 EG	EN ISO 14171-A S2 Ni1Cu
LNS 164	0.10	1.75	0.10	0.5	0.95	-	-	-	-	-	-	AWS A5.23 EF3	EN ISO 14171-A S3Ni1Mo
LNS 165	0.08	1.4	0.20	0.2	0.95	-	-	-	-	-	-	AWS A5.23 EN5	EN ISO 14171-A S3Ni1Mo0.2
LNS 168	0.10	1.6	0.15	0.6	2.3	0.7	-	-	-	-	-	AWS A5.23 EG	EN ISO 26304-A S3Ni2.5CrMo

SAW WIRES FOR STAINLESS STEEL

Product name	Chemical composition (typical values) in %							AWS	EN/ISO
	C	Mn	Si	Mo	Ni	Cr	Nb		
LNS 304L	0.015	1.8	0.4	0.1	10	20	-	AWS A5.9	EN ISO 14343-A
LNS 307	0.07	7.0	0.6	-	8.9	19	-	AWS A5.9	EN ISO 14343-A
LNS 309L	0.01	1.8	0.4	0.07	13.8	23.4	-	AWS A5.9	EN ISO 14343-A
LNS 316L	0.015	1.75	0.4	2.75	12	18.5	-	AWS A5.9	EN ISO 14343-A
LNS 347	0.03	1.6	0.4	0.1	9.7	19.5	0.6	AWS A5.9	EN ISO 14343-A
LNS 4462	0.015	1.6	0.5	3.1	8.6	23	-	AWS A5.9	EN ISO 14343-A

SAW WIRES FOR NICKEL ALLOYS

Product name	Chemical composition (typical values) in %							AWS	EN/ISO
	C	Mn	Si	Mo	Ni	Cr	Nb		
LNS NiCr™ 60/20	0.05	0.02	0.1	8.7	65	22	3.7	AWS A5.14	EN ISO 18274
LNS NiCrMo 60/16	0.006	0.5	0.04	16	58	16	-	AWS A5.14	EN ISO 18274

EN ISO 3580-A

Classification of covered electrodes for Manual Metal Arc Welding
of creep resistant steels

SL 12 G

E Mo B 3 2 H5

H5 = max.5
H10 = max.10

Welding
positions

Current type and
recovery

Type of covering

Chemical
composition

Covered electrode

1. All positions
2. All positions except vertical down
3. Flat and horizontal-vertical butt / fillet weld
4. Flat butt and fillet weld
5. Vertical down and according to symbol 3

Symbol	Recovery	Current type
1	≤ 105	AC + DC
2		DC
3	> 105 ≤ 125	AC + DC
4		DC

A	Acid	RC	Rutlo-cellulosic
C	Cellulosic	RA	Rutlo-acid
R	Rutile	RB	Rutlo-basic
RR	Rutile, thick coated	B	Basic

Symbol	Cr	Mo	V	Others
Mo	-	0.40-0.70	-	-
MoV	0.30-0.60	0.8-1.20	0.25-0.60	-
CrMo0.5	0.40-0.65	0.40-0.65	-	-
CrMo1	0.9-1.40	0.45-0.70	-	-
CrMo1L	0.9-1.40	0.45-0.70	-	C<0.05
CrMoV1	0.9-1.30	0.90-1.30	0.10-0.35	-
CrMo2	2.0-2.6	0.90-1.30	-	-
CrMo2L	2.0-2.6	0.90-1.30	-	C<0.05
CrMo5	4.0-6.0	0.40-0.70	-	-
CrMo9	8.0-10.0	0.90-1.20	0.15	Ni ≤ 1.0
CrMo9.1	8.0-10.5	0.80-1.20	0.15-0.30	Ni 0.40-1.0
				Nb 0.03-0.10
				W 0.02-0.07
CrMoW12	10.0-12.0	0.80-1.20	0.20-0.40	Ni ≤ 0.8
				W 0.40-0.60
Z		Other		

EN ISO 3581-A

Classification of covered electrodes for Manual Metal Arc Welding
of stainless and heat-resisting steels

Limarosta 316L

E 19 12 3 L R 1 2

Welding
positions

Current type and
recovery

Chemical
composition

Covered electrode

Type of covering

1. All positions
2. All positions except vertical down
3. Flat and horizontal-vertical butt / fillet weld
4. Flat butt and fillet weld
5. Vertical down and according to symbol 3

Symbol	Recovery	Current type
1	≤ 105	AC + DC
2		DC
3	> 105 ≤ 125	AC + DC
4		DC
5	> 125 ≤ 160	AC + DC
6		DC

R	Rutile	RB	Rutlo-basic
---	--------	----	-------------

	C	Mn	Cr	Ni	Mo	Other
Martensitic/ferritic						
13	0.12	1.5	11-14	-	-	-
13.4	0.06	1.5	11-14	3-5	0.4-1	-
17	0.12	1.5	16-18	-	-	-
Austenitic						
19.9	0.08	2.0	18-21	9-11	-	-
19.9 L	0.04	2.0	18-21	9-11	-	-
19.9 Nb	0.08	2.0	18-21	9-11	-	Nb
19.12.2	0.08	2.0	17-20	10-13	2-3	-
19.12.3 L	0.04	2.0	17-20	10-13	2-3	-
19.12.3 Nb	0.08	2.0	17-20	10-13	2-3	Nb
19.13.4 N L	0.04	1-5	17-20	12-15	3-4	0.20N
Austenitic/Ferritic, high corrosion resistance						
22.9.3 N L	0.04	2.5	21-24	7-10	2-4	(1) (2)
25.7.2 N L	0.04	2.0	24-28	6-8	1-3	0.20N (3) (4)
25.9.3 Cu N L	0.04	2.5	24-27	7-10	2-4	(5) (6)
25.9.4 N L	0.04	2.5	24-27	8-10	2-4	(7) (8)
Fully austenitic, high corrosion resistance						
18.15.3 L	0.04	1-4	16-19	14-17	2-3	(9)
18.16.5 N L	0.04	1-4	17-20	15-19	3-5	0.20N (10)

	C	Mn	Cr	Ni	Mo	Other
Fully austenitic, high corrosion resistance (cont.)						
20.25.5 Cu N L	0.04	1-4	19-22	24-27	4-7	(4)
20.16.3 Mn N L	0.04	5-8	18-21	15-18	2-3	0.20N (11)
25.22.2 N L	0.04	1-5	24-27	20-23	2-3	0.20N (12)
7.31.4 Cu L	0.04	2-5	26-29	30-33	3-4	(13)
Special						
18.8 Mn	0.20	45-75	17-20	7-10	-	(14)
18.9 MnMo	0.04-1.4	3-5	18-21	9-11	0.5-1	(15)
20.10.3	0.10	2.5	18-21	9-12	1-3	(16)
23.12 L	0.04	2.5	22-25	11-14	-	(17)
23.12 Nb	0.10	2.5	22-25	11-14	-	Nb
23.12.2 L	0.04	2.5	22-25	11-14	2-3	-
29.9	0.15	2.5	27-31	8-12	-	-
Heat resisting						
16.8.2	0.08	2.5	14-16	7-9	1-2	(18)
19.9 H	0.04-0.08	2.0	18-21	9-11	-	(19)
25.4	0.15	2.5	24-27	4-6	-	(20)
22.12	0.06-0.20	1-5	20-23	10-13	-	(21)
25.20	0.06-0.20	1-5	23-27	18-22	-	(22)
25.20 H	0.35-0.45	2.5	23-27	18-22	-	(23)
18.36	0.25	2.5	14-18	33-37	-	(24)

- (1) Nb
(2) 0.10 - 0.25N
(3) 0.10 - 0.20N, 1.5Cu, 1.0W
(4) 1.2Cu
(5) 0.7-1.5Cu

EN ISO 2560-A

Classification of covered electrodes for Manual Metal Arc Welding
of non alloyed and fine grain steels

Kryo 1

E 50 6 Mn1Ni B 3 2 H5 H_{DM} (ml/100g)

Z = no requirem.
A = +20°C
0 = 0°C
2 = -20°C
3 = -30°C
4 = -40°C
5 = -50°C
6 = -60°C

H5 = max.5
H10 = max.10
H15 = max.15

Welding positions

Current type and recovery

Type of covering

Chemical composition

Minimum impact of
avg. 47 Joule at

Min. yield strength
(N/mm²)

Covered electrode

1. All positions
2. All positions except vertical down
3. Flat and horizontal-vertical butt / fillet weld
4. Flat butt and fillet weld
5. Vertical down and according to symbol 3

Symbol	Recovery	Current type
1	≤ 105	AC + DC
2		DC
3	>105 ≤ 125	AC + DC
4		DC
5	> 160	AC + DC
6		DC

A	Acid	RC	Rutile-cellulosic
C	Cellulosic	RA	Rutile-acid
R	Rutile	RB	Rutile-basic
RR	Rutile thick coated	B	Basic

Symbol	Yield	Tensile	A ₅
35	≥ 355	440-570	≥ 22%
38	≥ 390	470-600	≥ 20%
42	≥ 420	500-640	≥ 20%
46	≥ 460	530-680	≥ 20%
50	≥ 500	560-720	≥ 18%

Symbol	Mn	Ni	Mo
Mo	2,0	-	-
MnMo	1,4	-	0,3-0,6
1Ni	1,4	0,6-0,12	-
2Ni	1,4	1,8-2,6	-
3Ni	1,4	2,6-3,8	-
Mn1Ni	>1,4-2,0	0,6-0,12	-
1NiMo	1,4	0,6-0,12	0,3-0,6
Z		Other	

EN-ISO 18275-A

Classification of covered electrodes for Manual Metal Arc Welding
of high strength steels

Conarc 70G

E 55 4 1NiMo B 3 2 H5 T

Stress relieved 1h / 560-600°C

H_{DM} (ml/100g)

H5 = max.5
H10 = max.10

Welding positions

Current type and recovery

Type of covering

Chemical composition

Minimum impact of
avg. 47 Joule at

Min. yield strength
(N/mm²)

Covered electrode

1. All positions
2. All positions except vertical down
3. Flat and horizontal-vertical butt / fillet weld
4. Flat butt and fillet weld
5. Vertical down and according to symbol 3

Symbol	Recovery	Current type
1	≤ 105	AC + DC
2		DC
3	>105 ≤ 125	AC + DC
4		DC
5	> 160	AC + DC
6		DC

A	Acid	RC	Rutile-cellulosic
C	Cellulosic	RA	Rutile-acid
R	Rutile	RB	Rutile-basic
RR	Rutile thick coated	B	Basic

Symbol	Yield	Tensile	A ₅
55	≥ 550	610-780	≥ 18%
62	≥ 620	690-890	≥ 18%
69	≥ 690	760-960	≥ 17%
79	≥ 790	880-1080	≥ 16%
89	≥ 890	980-1180	≥ 15%

Symbol	Mn	Ni	Cr	Mo
MnMo	1,4-2,0	-	-	0,3-0,6
Mn1Ni	1,4-2,0	0,6-1,2	-	-
1NiMo	<1,4	0,6-1,2	-	0,3-0,6
1,5NiMo	<1,4	1,2-1,8	-	0,3-0,6
2NiMo	<1,4	1,8-2,6	-	0,3-0,6
Mn1NiMo	1,4-2,0	0,6-1,2	-	0,3-0,6
Mn2NiMo	1,4-2,0	1,8-2,6	-	0,3-0,6
Mn2NiCrMo	1,4-2,0	1,8-2,6	-	0,3-0,6
Mn2NiCrMo	1,4-2,0	1,8-2,6	0,3-0,6	0,3-0,6
Mn2Ni1CrMo	1,4-2,0	1,8-2,6	0,6-1,0	0,3-0,6
Z		Other		

EN ISO 14341-A

Classification of solid wires and deposits for MIG/MAG Welding
of non alloy and fine grain steels

G 42 4 M 2Si

LNM 25

Z = no requirement.
A = +20°C
0 = 0°C
2 = -20°C
3 = -30°C
4 = -40°C
5 = -50°C
6 = -60°C

Chemical composition

Symbol	Si	Mn	Ni	Mo
0				
2Si	0,50-0,80	0,90-1,30	0,15	0,15
3Si1	0,70-1,00	1,30-1,60	0,15	0,15
4Si1	0,80-1,20	1,60-1,90	0,15	0,15
3Si2	1,00-1,30	1,30-1,60	0,15	0,15
		Al		Ti + Zr
2Ti	0,40-0,80	0,90-1,40	0,05-0,20	0,05-0,25
3Ni1	0,50-0,90	1,00-1,60	0,80-1,50	0,15
2Ni2	0,40-0,80	0,80-1,40	2,10-2,70	0,15
2Mo	0,30-0,70	0,90-1,30	0,15	0,40-0,60
4Mo	0,50-0,80	1,70-2,10	0,15	0,40-0,60
			Al	
2Al	0,30-0,50	0,90-1,30	0,15	0,35-0,75

Type of shielding gas

M = M2 mixed shielding gas (without helium)
C = 100 CO₂

Minimum impact of avg. 47 Joule at

Min. yield strength (N/mm²)

Symbol	Yield	Tensile	A ₅
35	≥ 355	440-570	≥ 22%
38	≥ 380	470-600	≥ 20%
42	≥ 420	500-640	≥ 20%
46	≥ 460	530-680	≥ 20%
50	≥ 500	560-720	≥ 18%

Solid wire for GMAW-process

EN ISO 636-A

Classification of rods, wires and deposits for Tungsten Inert Gas
Welding of non alloy and fine grain steels

W 46 3 3Si

LNT 25

Chemical composition

Symbol	Si	Mn	Ni	Mo
0				
2Si	0,50-0,80	0,90-1,3		
3Si1	0,70-1,00	1,30-1,60		
4Si1	0,80-1,20	1,60-1,90		
			Al	Ti + Zr
2Ti	0,40-0,80	0,90-1,40	0,05-0,20	0,05-0,25
3Ni1	0,50-0,90	1,00-1,60	0,80-1,50	
2Ni2	0,40-0,80	0,80-1,40	2,10-2,70	
2Mo	0,30-0,70	0,90-1,30		0,40-0,60

Minimum impact of
avg. 47 Joule at

Z = no requirement.
A = +20°C
0 = 0°C
2 = -20°C
3 = -30°C
4 = -40°C
5 = -50°C
6 = -60°C

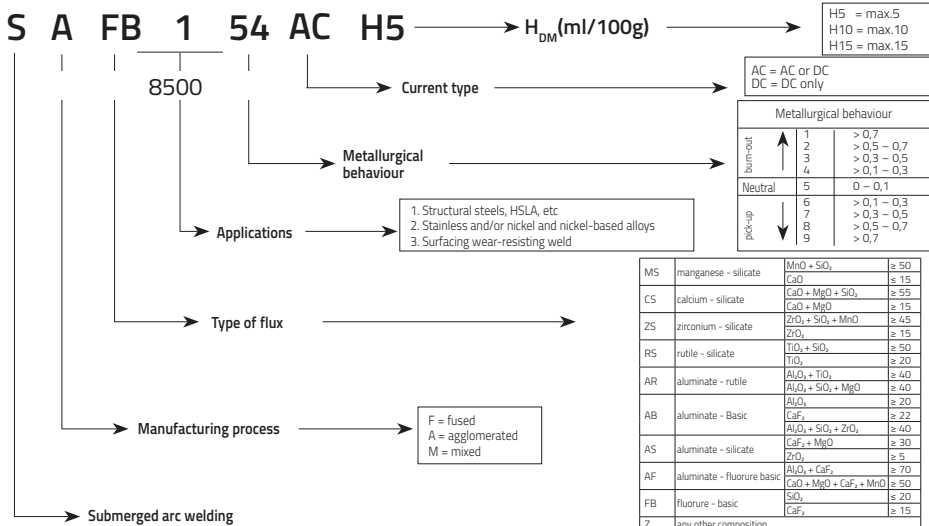
Min. yield strength (N/mm²)

Symbol	Yield	Tensile	A ₅
35	≥ 355	440-570	≥ 22%
38	≥ 380	470-600	≥ 20%
42	≥ 420	500-640	≥ 20%
46	≥ 460	530-680	≥ 20%
50	≥ 500	560-720	≥ 18%

GTAW-process, wire and weld metal

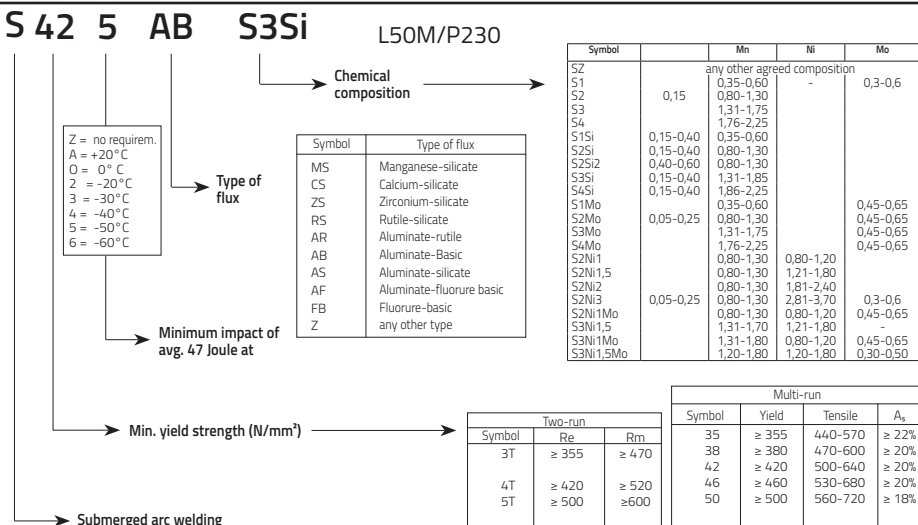
EN ISO 14174

Classification of flux for submerged arc welding



EN ISO 14171-A

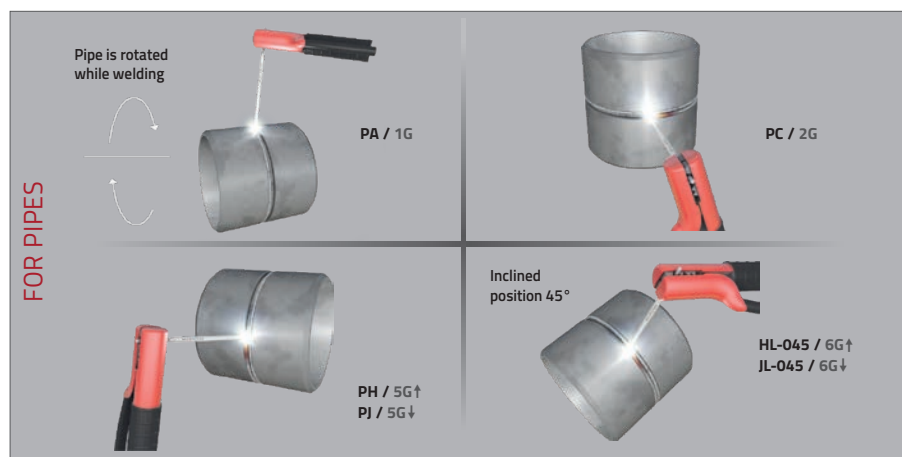
Classification of wire and wire/flux combinations for submerged arc welding of non alloy and fine grain steels



Some welding engineers prefer to use the standard AWS/ASME terminology for welding positions – some use a general description – some use a mixture of both!

It is useful in describing welding procedures if we all understand each other. This chart shows the basic AWS/ASME (and BS EN) welding positions, together with the outline descriptions. The AWS/ASME positions are described in ASME IX and the European terminology is used in BS EN 287-1 and defined in ISO 6947.

ASME (BS EN) POSITIONS



Type	Field of application	Deposit in cm ³ per electrode		
		Ø 3.2	Ø 4.0	Ø 5.0
Ferrod 135T Ferrod 160T	High recovery electrodes for fillet welds and horizontal V- and X-welds. Smooth weld appearance. High welding speed through high recovery of 135, 160 %	4.7	7.1 8.5	11.6 14.2
Ferrod 165A	As Ferrod 160T. Higher welding speed. 160% recovery. Impact properties at -20 °C	5.1	8.5	12.7
Universalis	Rutile type, especially for down hand fillet welding and filling in structural steel. Very smooth appearance.	2.7 ¹ 3.5 ²	3.9 ¹ 5.1 ²	
Cumulo	All positions fillet welding and filling f.i. for pipe welding (except vertical-down)	2.5	3.5	
Pantafix	Rutile all position electrode for most widely application. General construction, pipe welding, including vertical-down.	2.4	3.4	
Omnia	General purpose all position electrode. Low open circuit, small diameters for hobby market.	2.4/2.4	3.4/3.4	
Supra	All position rutile, excellent vertical down properties. Shipbuilding repairs.	2.4	3.3	4.9
Kardo	Basic electrode, low yield, low tensile, high impact.	3.0	4.4	
Baso 48SP	Rutile-basic electrode, excellent weldability, start and restart.	3.0	5.3	
Baso 100	Basic electrode for welding under difficult conditions	2.5 ¹	3.7 ¹	8.0
Baso 120	Basic electrode, 120% efficiency, for fast filling in all positions in difficult construction work	2.9 ¹ 3.9 ²	4.0 ¹ 5.8 ²	9.1
Baso G	Basic DC(arc) electrode, 120% efficiency, for fast filling in all positions.	3.0 ¹ 3.9 ²	4.5 ¹ 5.8 ²	9.1
Conarc 48	Basic electrode, 130% efficiency, Very good notch toughness at low temperatures.	3.2 ¹	4.9 ¹ 6.1 ²	
Conarc 49C	Basic electrode, 115% efficiency. Very good notch toughness at low temperatures.	2.8	4.2 ¹ 6.1 ²	8.5
Conarc 51	Basic electrode. All positions. Very good notch toughness at low temperatures	2.2	3.4	9.8
Conarc L150	Basic electrode for horizontal fillet welds and filling. 150% efficiency	4.9	7.5	11.6

Arc time in seconds per electrode

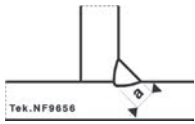
Ø 3.2	Ø 4.0	Ø 5.0
75	65	68
85	92	86
	90	78
57 ¹	55 ¹	
69 ²	69 ²	
66	62	
66	72	
59/65	59/72	
64	66	77
84	79	
75	95	
62 ¹	64 ¹	91
62 ¹	63 ¹	
74 ²	85 ²	99
70 ¹	75 ¹	
79 ²	96 ²	114
67 ¹	83 ¹	95 ²
65	75 ¹	
	100 ²	90
51	70	86
62	71	104

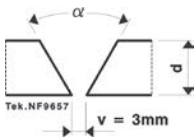
Note: the percentage of duty cycle depends on practical conditions, and may vary between 15-45%

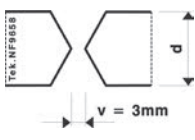
1) L = 350mm

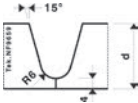
2) L = 450mm

Weld metal volume per meter

Fillet size "a" (mm)	Theoretical content (cm ³)	Formula: (a ² x L) "a" (mm)
3	9	
3.5	12.3	
4	16	
4.5	20.3	
5	25	
5.5	30.3	
6	36	
8	64	
10	100	

Thickness "t" (mm)	Theoretical content (cm ³)			Formula: V50° : d (0.466d + v) L V60° : d (0.577d + v) L V70° : d (0.700d + v) L
	V50°	V60°	V70°	
6	35	39	43	
8	54	61	69	
10	77	88	100	
12	103	119	137	
14	133	155	179	
16	167	196	227	
18	205	241	281	
20	246	291	340	

Thickness "t" (mm)	Theoretical content (cm ³)			Formula: X50° : d (0.233d + v) L X60° : d (0.228d + v) L X70° : d (0.350d + v) L
	V50°	V60°	V70°	
14	88	98	111	
16	108	122	138	
18	129	147	167	
20	153	175	200	
25	220	255	294	
30	300	349	405	
35	390	458	534	
40	493	581	680	

Thickness "t" (mm)	Theoretical content (cm ³)	Formula: ((d-10) ² x 0,27 + 12d - 73)
20	194	
25	288	
30	395	
35	516	
40	650	

DETERMINATION OF WELDING COSTS

weld content deposit per electrode	=	number of electrodes
price per electrode x number	=	costs of electrodes
number of electrodes x arc time	=	total arc time
total arc time x 100 percentage duty cycle	=	total work time
total work time x hourly wage	=	wage costs
costs of electrodes + wage costs	=	total costs

Ferrite Number

To facilitate international communication (specifications, certifications), the internationally accepted term Ferrite Number (FN) has been introduced to indicate a delta-ferrite content in stainless steel weld metal.

The Ferrite Number is often used as an indicator of resistance to weld metal hot cracking. This aspect and other engineering properties have been correlated with the FN value of the weld metal. For various service conditions the following typical levels reflect good experiences:

- fully austenitic weld metal:
- high corrosion resistance in severe oxidising and reducing acidic and chloride containing media: FN < 0.5
- fully austenitic CrNiMoN weld metal, non-magnetic: FN < 0.5
- low ferrite CrNiN and CrNiMoN weld metal, cryogenic applications: FN 3-6 or < 0.5
- general purpose stainless steel weld metal with corrosion resistance and high resistance to hot cracking and microfissures: FN 6-15
- buffer layer of austenitic/ferritic weld deposits for dissimilar joints and buffer layers in clad steel: FN 15-35
- austenitic/ferritic weld metal with high stress and pitting corrosion resistance as well as a balanced structure for toughness and corrosion: FN 30-70

Control of welding of constructions often requires the determination of the Ferrite Number (FN)

Ferrite Measurement

An internationally accepted standardised method to determine the ferrite content is based upon an arbitrarily defined relationship between a magnetic force and weld ferrite content. This is necessary because an absolute and correct determination of the ferrite content is not available as a result of inherent inaccuracy of metallographic examination and the nonexistence of a calibration method for the absolute ferrite content in stainless steel. The attracting force between a defined permanent magnet and weld metal, containing delta-ferrite is measured by means of a torsion balance. The values are in fact compared with the values obtained in measurements using the same magnet, attracting a carbon steel base plate with a non magnetic copper coating of a specified thickness. A calibration method provides the necessary linear relation. The principles are accepted as the international standard ISO 8249 and AWS A4.2-91. The European Standardization will adopt the ISO standard.

The range in the revised standards has been extended to 100FN (originally 0-28FN).

Coated thickness standards are available from the "U.S. National Institute of Standards and Technology" (NIST). A precision torsion balance or the commercially available "Magne Gage" (fig.3) are suitable for the determination of the Ferrite Number under laboratory conditions (horizontal position). A permanent magnet of defined dimensions and magnetic strength, according ISO 8249, shall be used.

Secondary standards for the checking and calibration of field equipment in the range 0-100FN are available from NIST.

Calculation of ferrite content

The ferrite content is estimated on the basis of calculation, using the as deposited weld metal chemical composition.

The Cr- and Ni-equivalent is plotted in diagrams, based on the metallographic studies, such as:

- the Schaeffler Diagram¹⁾, published in 1949, is considered as most suitable for a general picture of weld metal structures for a wide range of compositions, but not accurate for ferrite containing austenitic weld metals;
- the DeLong Diagram (1973)²⁾, widely used up to 1985, for a limited range of CrNi (Mo, N)-stainless steel weld metal grades;
- the WRC 1992 Constitution Diagram (1992), published by Kotecki and Siewert (1992)³⁾ has been based upon the WRC 1988 Constitution Diagram, earlier published by Siewert, McCowan and Olson⁴⁾ as a result of a review and of more than 950 weld metal sample analyses and FN determinations (including data from Lincoln Electric). For this diagram, a better accuracy has been reported due to the accurate determination of the effect of Mn, Si, C, N and Nb.
- Also reference is made to the ESPY Diagram⁵⁾ for the calculation of the ferrite content.

¹⁾⁻⁵⁾ See References, p. 29

Application of Ferrite Diagrams

The various ferrite diagrams are suitable to estimate the Ferrite Number in weld metal. Ongoing verifications indicate that the new WRC 1992 Constitution Diagram provides the best estimate. The old Schaeffler diagram still provide useful information in a wide range of weld metal compositions. It provides guidelines for dissimilar joints and welding clad steel, calculation of composition and position of the diluted weld metal.

The following pages contain a reprint of a combination of the Schaeffler and the WRC 1992 Constitution Diagram (fig. 1) and the standard WRC 1992 Constitution Diagram on full scale (fig. 2). In using these diagrams for the estimation of weld metal structure, one should always take into account the effects of different welding conditions (temperature/time-cycles, welding parameters, surface effects) which usually influence FN values, compared with measurements on all weld metal deposit samples.

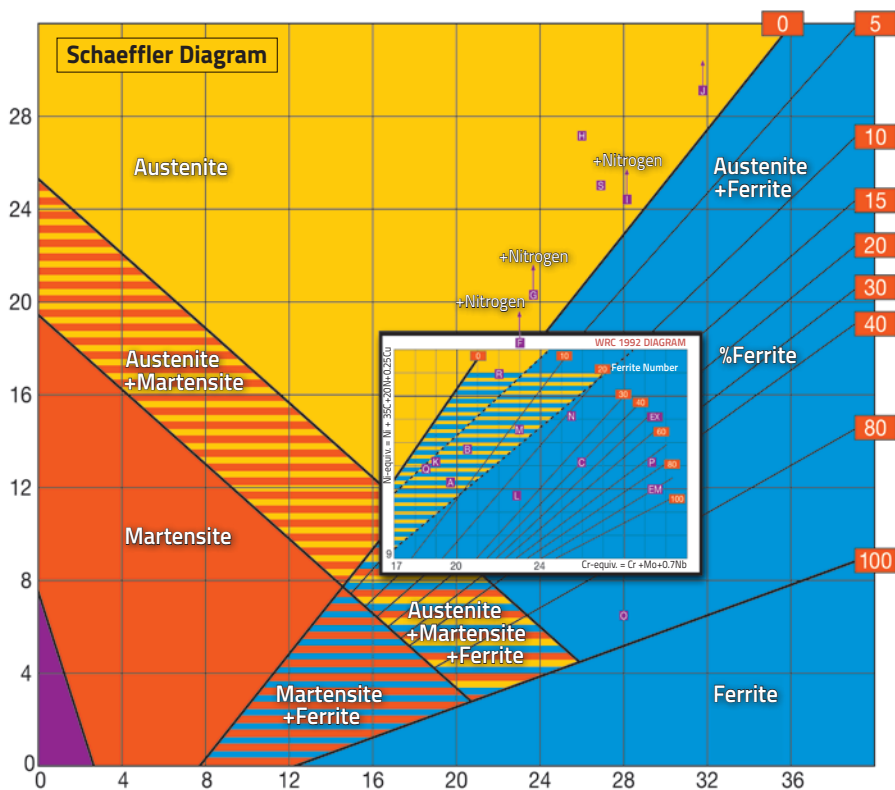


Fig. 1 Combined Schaeffler / WRC 1992 Constitution Diagram

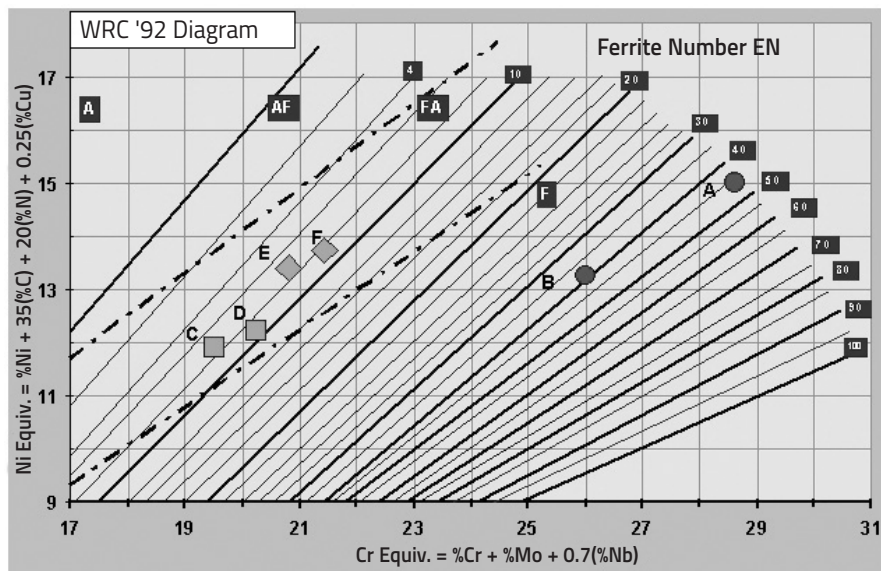


Fig. 2 WRC 1992 Constitution Diagram

Position of welding consumables

The position of representative Lincoln Electric Europe welding consumables (table 1) has been marked in the combined Schaeffler-WRC 1992 Diagram (figure 1) and in the original WRC Diagram.

Table 1 Cr- and Ni-equivalent, calculated according Schaeffler and the WRC'92 Constitution Diagram

Ident	Product	WRC'92		Schaeffler		Ident	Product	WRC'92		Schaeffler	
		Cr-eq	Ni-eq	Cr-eq	Ni-eq			Cr-eq	Ni-eq	Cr-eq	Ni-eq
A	Jungo Zeron® 100X	28.6	15.0	29.1	10.5	I	Jungo 4500	25.0	27.3	26.4	26.2
B	Jungo 4462	26.0	13.3	26.9	10.9	J	Jungo 4465	27.2	25.7	28.1	25.2
C	Arosta 304L	19.5	11.9	20.6	11.0	K	NiCro 31/27	30.5	33.2	31.7	32.0
D	Arosta 347	20.3	12.2	21.4	11.3	L	Arosta 309S	23.6	14.2	24.6	13.3
E	Arosta 316L	20.8	13.4	22.0	12.5	M	Arosta 309Mo	25.4	14.5	26.7	13.5
F	Arosta 318	21.5	13.8	22.7	12.8	N	Arosta 307	17.8	13.3	18.7	14.2
G	Arosta 4439	22.6	21.3	23.8	18.2	O	Arosta 329	25.4	8.6	27.2	7.4
H	Jungo 4455	23.0	19.9	23.5	20.3	P	Limarosta 312	28.8	13.9	30.3	12.7

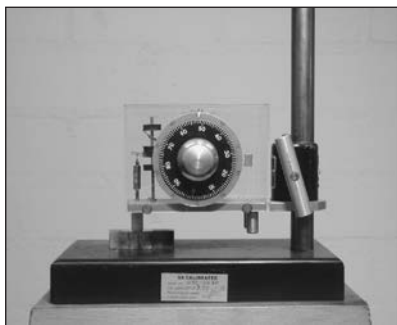


Fig. 3 Magne Gage

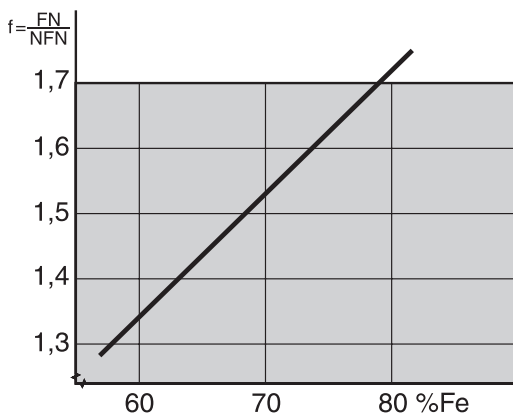


Fig. 4 Iron content versus factor f

Ferrite Number versus Ferrite Content

The Ferrite Number is not equal to the volumetric ferrite content (%). Although an absolute ferrite content can not be measured accurately, a reasonable estimate of the ferrite content can be made by dividing the Ferrite Number by the factor f (% ferrite = FN / f) which is dependant of the iron content in the weld metal as shown in figure 4.

Limitations

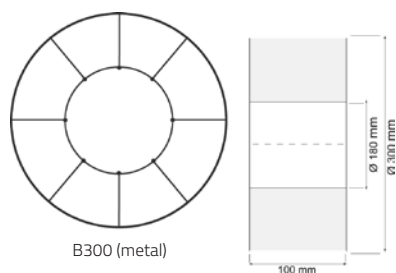
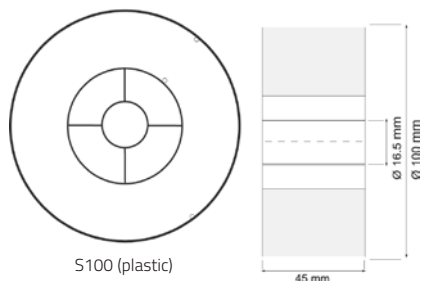
With the practice of measuring the Ferrite Number or ferrite content, welding conditions deviating from the standardised conditions have always to be taken into account. Furthermore, comparison tests showed that the accuracy between measurements in various laboratories may show differences up to +/- 10%.

Lincoln Electric laboratories

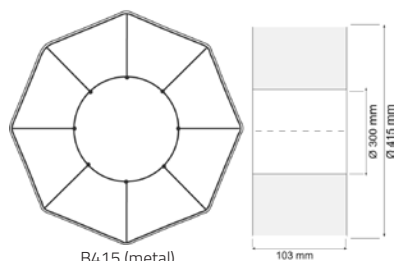
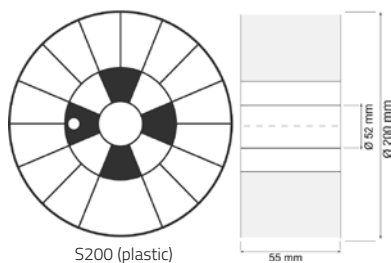
Since 1966 the Lincoln Electric R&D departments have always been involved in the international development of ferrite determinations. The laboratories are equipped with calibrated Magne Gages and on site measurement equipment. Primary coating thickness standards and secondary standards are available for contract calibration work.

References

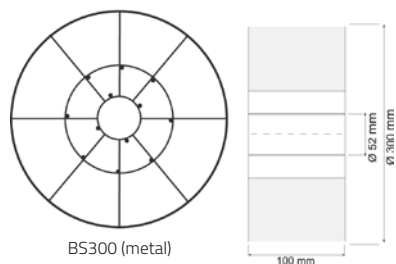
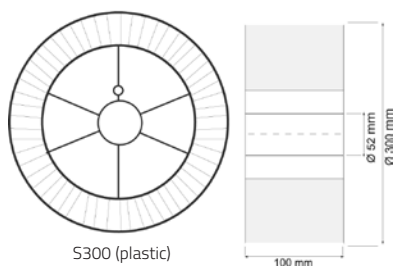
- 1) Schaeffler A.E., Metal Progress 56 (1949) p680-680s
- 2) DeLong W.T., Welding Journal 53 (1974) p273s-286s
- 3) Kotecki D.J., Siewert T.A., Welding Journal (1992) p171s-178s
- 4) Siewert T.A., McCowan C.N., Olson D.L., Welding Journal (1988) p289s-298s
- 5) Espy R.H., Welding Journal 61 (1982) p149s-156s



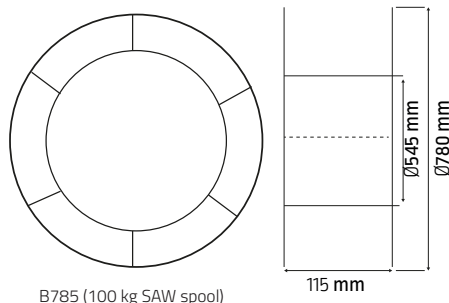
Adaptor : 2158341



Adaptor : K299 (axis 25mm)
K1504-1 (axis 50mm)

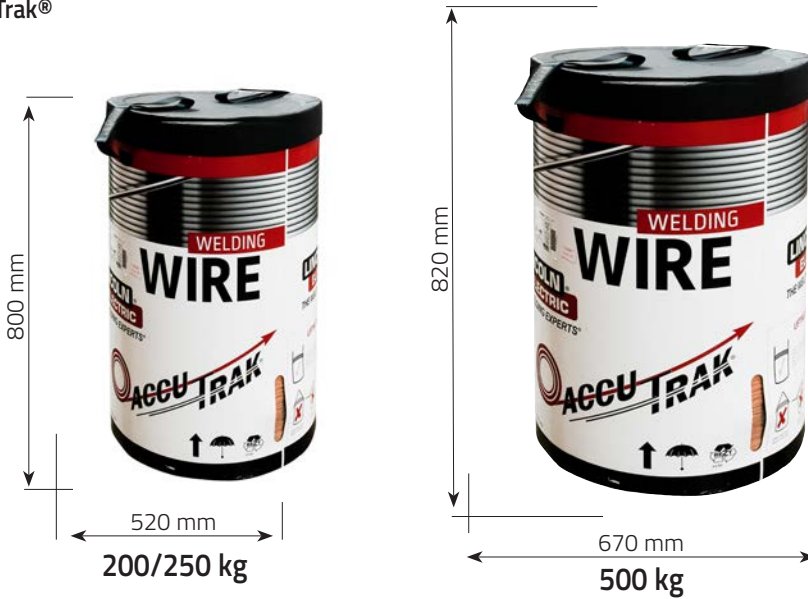


Adaptor : K10158
K10158-1 (plastic)



Adaptor : K10410

AccuTrak®



FEATURES

- Drum structure done in resistant fiber carton
- Specifically designed retaining for easy pay off
- Approved Integrated Lifting Belts
- No hood needed
- Recyclable

Gem-Pak™



FEATURES

- Tangle Free - Prevents tangling and improves feedability
- Easy to Set-up - No external payoff devices required.
- Corrugated Cardboard Pallet - Fork-lift ready mini-pallet comes attached to the box for maximum portability and is 100% recyclable.

Wire Capacity (kg): 136



350 & 400 kg
SPEED FEED DRUMS



600 kg
SPEED FEED DRUMS



300/600/1000 kg
ACCUTRAK® DRUMS

DRUMS	350 kg Speed Feed	400 kg Speed Feed	600 kg Speed Feed	300 kg Accutrak	600 kg Accutrak	1000 kg Accutrak
Wire Diameter (mm)	1.6 to 4.8			1.6 to 2.0	1.6 to 2.4	1.6 to 4.8
Wire grade	All including mild steel and low alloy					
Pallet load (kg)	1400	800	600	600	600	1000
Pallet dimension (mm) LxWxH	1160 x 1160 x 1030	1200 x 800 x 1030	720 x 720 x 1051	1200 x 800 x 1030	720 x 720 x 1051	1000 x 1000 x 1000
Drum dimension (mm) Diameter x H	580 x 890		720 x 720 x 1051	580 x 890	720 x 720 x 1051	1000 x 1000 x 1000
Nb of pallets/container	14	N/A	35	N/A	35	20
Nb of drums/pallets	4	2	1	2	1	1
Turntable	AD1329-13		USE21000558	-	-	-
Overseas transportation	yes	N/A	yes	N/A	yes	yes



300/350 kg
METAL REEL



1000/1200 kg
LIFTABLE COIL

COILS	300/350 kg	1000/1200 kg
Wire Diameter (mm)	1.6 to 4.8	1.6 to 4.8
Wire grade	All including mild steel and low alloy	
Dimensions (mm)	760x280	800x800x1125
Pallet load (kg)	900/1050	1000/1200
Pallet dimension (mm) - LxWxH	1200x800x1000	800x800
Nb of pallets/container	10	12
Nb of units/pallets	3	1
Adaptor/turntable	-	21000558
Overseas transportation	yes	yes

Sahara ReadyPack®: Warehouse and quiver in pocket format

Electrodes in Sahara ReadyPack® really save time and money. For these electrodes there is no need to store in a conditioned warehouse or to use redry ovens and quivers. This innovation on an industrial scale has been a success for many years now. Millions of the well known Sahara ReadyPack® have been consumed in ship building, chemical industry and in offshore projects. The moisture resistant vacuum packaging fits well with the advantages of the remarkable EMR-Sahara® concept. EMR-Sahara® covered electrodes are designed to be low in moisture and show a very low moisture absorption. The internationally (IIV) agreed moisture resistance test demonstrates that the electrodes remain, after exposure during 24 hours at 27°C and 70% R.H., below a maximum hydrogen content of 5 ml/100g which is the criterium to call the electrodes MR: moisture resistant. Even more important is the fact that the electrodes can be consumed from an opened Sahara ReadyPack® within 12 hours, and still prove to produce a weld deposit with a very low in hydrogen content (HDM < 5 ml/100g). For a number of EMR-Sahara® electrodes the maximum HDM level is even 3 ml/100g.

A Sahara ReadyPack® actually replaces the functions of a conditioned warehouse and a redry oven, all in pocket format. Storage in a conditioned warehouse is no longer needed; most efficient is a small storage room at the job site. The use of a redry oven is not recommended. Up to the moment you open the Sahara ReadyPack®, and during the following period of 12 hours, EMR-Sahara® electrodes keep their initial quality. The convenient packages are easily carried to the welding place. The content of one or two package is usually good for one working day. A real cost saving is demonstrated in many cases, mainly because maintenance of quivers and quality control on redrying procedures is no longer needed. Not to mention the loss of unproductive time in transportation from the redry oven to the job site. The reliable Sahara ReadyPack® has indeed set a trend in the welding industry.

Properties of the Sahara ReadyPack® and its content, the EMR-Sahara® (basic) electrodes in summary:

- Diffusible hydrogen level HDM less than 5 ml/100g; a new generation provides even less than 3 ml/100g
- Low moisture pick-up of the EMR-Sahara electrode coating; 12 hours after opening of the Sahara ReadyPack® still provides electrodes with a hydrogen content of maximum 5 and 3 ml/100g respectively
- Storage does not need a conditioned warehouse
- Intermediate storage in a dry cabinet or quiver is not needed, even not recommended
- No mix-up of electrodes, as may happen with electrodes outside the packaging for redrying
- A most efficient handling procedure; cost savings can easily be calculated.

The range of electrodes in the Sahara ReadyPack®

Currently the following moisture resistant very low hydrogen electrodes (basic EMR-Sahara® electrodes) can be supplied in Sahara ReadyPack®:

Type	H _{DM} max. 5 ml/100 g	H _{DM} max. 3 ml/100 g
Baso G		*
Conarc 49C		*
Conarc 51		*
Conarc L150	*	
Kardo		*
Conarc 55CT		*
Conarc 60G		*
Conarc 70G		*
Conarc 80		*
Conarc 85		*
SL12G	*	
SL19G	*	
SL20G	*	
SL22G	*	

Type	H _{DM} max. 5 ml/100 g	H _{DM} max. 3 ml/100 g
Kryo 1		*
Kryo 1P		*
Kryo 1-180		*
Kryo 2		*
Kryo 3		*
Kryo 4		*
Arosta 304L		
Arosta 316L		
Arosta 4462		
Jungo 4462		
Limarosta 304L		
Limarosta 309S		
Limarosta 312		
Limarosta 316L		
Nyloid 2		

1. Scope

Covered arc welding electrodes, manufactured by Lincoln Electric Europe, delivered in their original packaging.

The packaging consists of either:

- A cardboard boxes in outer carton;
- B foil protected cardboard boxes in outer carton;
- C plastic (PE) boxes with sealed cap, suitable for reclosing;
- D hermetically sealed metal tin (LINC CAN™) in outer carton;
- E hermetically vacuum sealed aluminium foil packs Sahara ReadyPack® (SRP) in outer carton.;
- F hermetically vacuum sealed foil packs (Protech®, VPMD- Vacuum Pack Medium, VPMC- Vacuum pack Micro) in outer carton.

Electrode grades	Packaging type					
	A	B	C	D	E	F
Mild steel	X	X	X	X		X
Low alloy high strength steel		X		X		X
Low temperature fine grain steel		X		X	X	X
Creep resistant steel		X				X
Stainless steel		X	X	X	X	X
Duplex and Superduplex stainless steel		X				X
Nickel base electrodes			X			X
Hardfacing-; maintenance and repair electrodes			X			

2. Storage

2a. Storage of electrodes in cardboard boxes requires humidity and temperature controlled storage areas.

General recommended storage conditions include:

- temperature 17-27°C, relative humidity ≤60%
- temperature 27-37°C, relative humidity ≤50%.
- electrode boxes may be stored in layers to a maximum of 7.

2b. Plastic boxes require storage conditions suitable to cardboard boxes

2c. No temperature and humidity requirements are applicable for electrodes in Linc-Can Mini-Pack and Sahara ReadyPacks, providing that (vacuum) seal is present in undamaged packs.

General recommended storage conditions include:

- Sahara ReadyPacks & Mini-Pack in outer cartons may be stored in layers to a maximum of 7;
- Linc Can in outer boxes may be stored in layers to a maximum of 5;
- Prevent damage and heating above 60°C for Linc-Can and Sahara ReadyPacks;
- Prevent damage and heating above 40°C for Mini-Pack.

3. Handling

3a. Re-drying and subsequential holding, as recommended in table 1, is required for products in the following conditions

- rutile electrodes, being humidified for any reason;
- basic low hydrogen electrodes in cardboard boxes;
- basic low hydrogen electrodes, returned from shop floor or damaged Sahara ReadyPacks, Mini-Pack or Linc Can;
- stainless steel and Ni-base electrodes after long and unknown storage conditions (deviating from recommendations);
- Wearshield electrodes in plastic (PE) boxes, stored for more than 1 year under conditions as described under section 2a. or earlier when the condition deviates from those recommended.

3b. Electrodes in Sahara ReadyPack and Linc-Can can be used without re-drying, providing that vacuum or seal is present in the undamaged packaging. The electrodes can be consumed in the as received condition, direct from the packaging within a period of 8 hours after opening under the conditions of ≤35°C and ≤90% RH, with the electrodes remaining in the opened packaging and protected against excessive conditions as condensation, rain, etc. This time can be extended to 12 hours under the conditions of ≤27°C and ≤70% RH. Once opened Linc-Cans should be closed during welding operations using the plastic lid that is supplied with the tin. If vacuum or seal is not present, the electrodes shall follow the re-dry and holding procedure as recommended in table 1 for the EMR-Sahara® Range. Electrodes in Mini-Pack can be used without re-drying, provided that the vacuum is present in the undamaged packaging. The electrodes can be consumed in the as received condition, direct from the packaging within a period of 4 hours after opening under the conditions of ≤35°C and ≤90% RH, with the electrodes remaining in the opened packaging and protected against excessive conditions as condensation, rain, etc.

REDRYING AND HOLDING RECOMMENDATIONS

The re-drying time / temperature listed in Table 1, is a general guideline. Specific individual re-drying instructions on the product label may differ.

Table 1. Covered electrode re-dry times and temperatures

Electrode product groups	Re-drying time (h)*	Temp. (°C)	Holding
Mild steel: - rutile E6013 - rutile E6012, E7024	0.5-1h 1-2h	70-80 100-120	Cabinet 10-20°C above ambient temperature
- basic, low hydrogen (HDM <8 ml/100g) - basic, very low hydrogen*	2-6h 2-6h	250-375 325-375	a. Holding oven max. one year at 120-180°C b. Quiver max. 10h at RT-125°C (see illustration fig. 1) c. Plastic (PE) box max. 2 weeks workshop conditions
Low alloy: - basic, very low hydrogen**	2-6h	325-375	
Hardfacing-; maintenance & repair electrodes			
Stainless steel: - non EMR-SAHARA electrodes - EMR-SAHARA range	1-6h 1-6h	200-300 125-300	Holding oven unlimited time at 75-125°C quiver max. 10h at RT-125°C
Ni-base	1-6h	200-300	

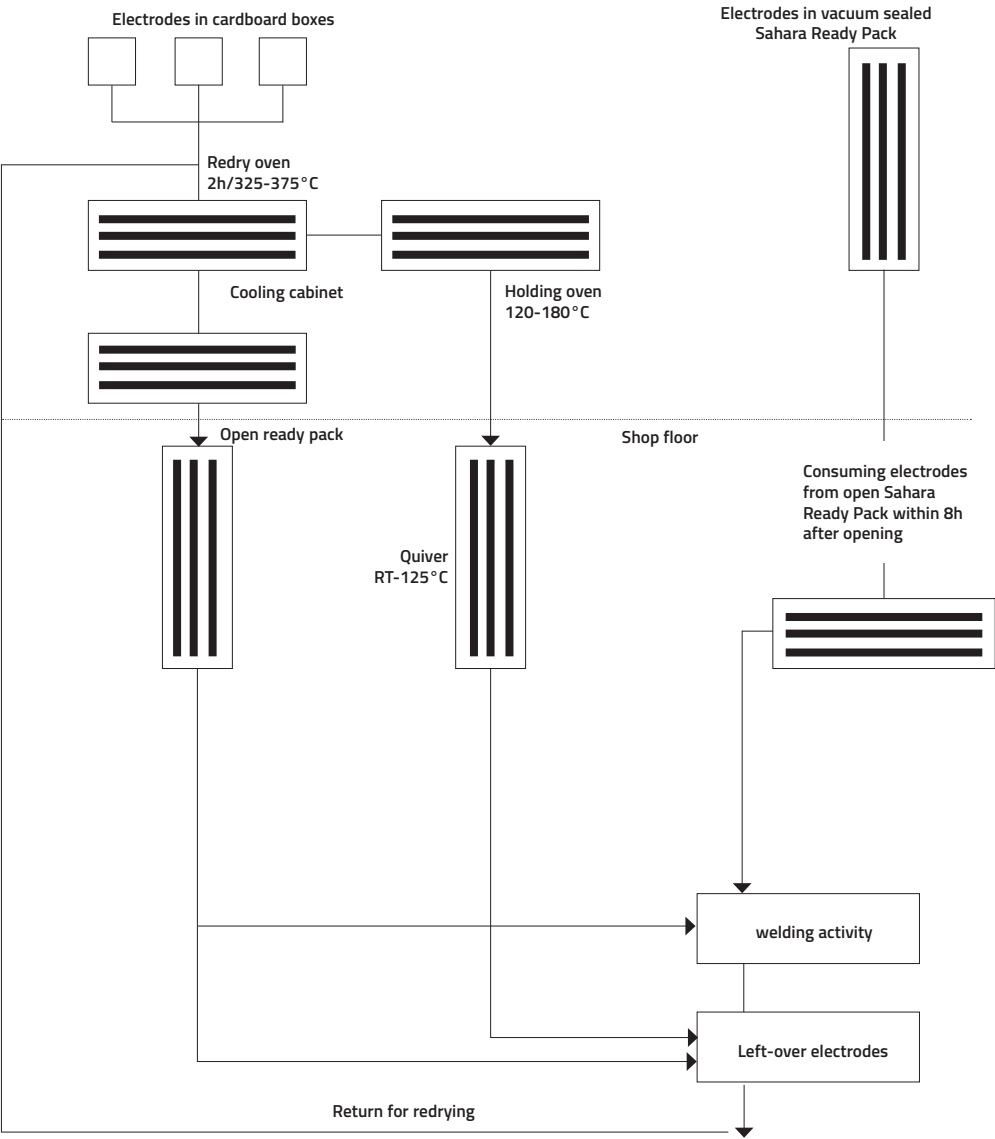
* Re-drying can be repeated twice within the indicated max. time of 6h. Re-drying of electrodes should be carried out by taking them out of the packaging and place the electrodes in approx. 3 cm thick layers in a temperature controlled air-circulation oven.

** If these EMR-SAHARA, vacuum packing electrodes are re--dried a maximum content HDM of ≤5ml/100g is valid.

4. Deteriorated product

Covered electrodes that have suffered from serious water and moisture contamination, or have been exposed to the atmosphere over long periods of time cannot be restored in their original condition and should be discarded.

Figure 1:
Recommended handling procedure of EMR-SAHARA® electrodes after removal either from a regular cardboard box or vacuum sealed Sahara ReadyPack®



FLUX-CORED WIRES

1. Scope

Tubular cored wires with the following trade names are supplied in various spooling and packaging

Product family	Packaging
Gas shielded mild steel and low alloyed flux and metal cored wires.	- spool in plastic bag in cardboard box - spool in Al/PE vacuum packaging in cardboard outer box - spool in plastic protection on pallet - Accutrak® drums - spool in cardboard box or plastic bucket or hermetically sealed cans - spool in plastic bag in cardboard box

2. Storage

Exposure to a humid environment with only a relative thin plastic foil shall be prevented.

Tubular wire, packed in the original foil and cardboard box or drum require controlled warehouse conditions such as:

- temperature 17-27°C, relative humidity: ≤60%;

- temperature 27-37°C, relative humidity: ≤50%.

INNERSHIELD wires in plastic buckets or in hermetically sealed cans and OUTERSHIELD as well as COR-A-ROSTA in Al/PE bags under vacuum, if applicable, do not require measures against moisture pick-up. Damage of the packaging shall be prevented.

3. Handling

3a. OUTERSHIELD, INNERSHIELD xxx-H types and COR-A-ROSTA

Spools outside the protective packaging allow exposure to normal workshop conditions during ≤72 hours.

Drums fitted with the original lid or recommended drum hood allow exposure to normal workshop conditions during 2 weeks

3b. INNERSHIELD, non xxx-H types:

Spools outside the protective packaging allow 2 weeks exposure to normal workshop conditions.

In all cases the products require protection against contamination with moisture, dirt and oil products. During interruption of the production process for more than 8 hours, wire spools shall be stored in their plastic bag in the above-mentioned storage conditions.

4. Deteriorated product

Cored electrode products that are rusty, have suffered from serious water and moisture contamination, or have been exposed to the atmosphere over long periods of time cannot be restored in their original condition and should be discarded.

MIG WIRES & TIG RODS

1. Scope

Solid wires and rods can be supplied in various packaging units in tubes, spools and drums.

2. Storage

Exposure to a humid environment shall be prevented.

The following storage conditions are recommended.

Solid wire in the original packaging require controlled warehouse conditions such as:

- temperature 17-27°C, relative humidity ≤60%

- temperature 27-37°C, relative humidity ≤50%

3. Handling

Rods and spools outside the protective packaging allow 2 weeks of exposure to normal workshop conditions.

In all cases, the products require protection against contamination with moisture, dirt and oil products.

During interruption of the production process for more than 8 hours, wire spools shall be stored in their plastic bag in the above mentioned storage conditions. Damage of packaging should be avoided

4. Deteriorated product

Products that are oxidized, have suffered from serious water and moisture contamination, or have been exposed to the atmosphere over long periods, cannot be restored in their original condition and should be discarded.

FLUX**1. Scope**

Welding fluxes are supplied in plastic bags, bulk bags, Sahara ReadyBags, Drybags, Bigbag Dry and metal drums

2. Storage

The following storage conditions are recommended:

Welding fluxes, packed in plastic bags, require controlled warehouse conditions such as:

- temperature 17-27 °C, relative humidity: ≤60%

- temperature 27-37 °C, relative humidity: ≤50%

Product in metal drums, Sahara ReadyBags, Drybags and Bigbag Dry does not require special storage conditions but rust and damage of the packaging shall be prevented.

3. Handling

Product characteristics as specified for the original condition, are retained if the product is treated in accordance with the following recommendations:

Packaging	Storage conditions	
	0-6 months, temperature ≤37 °C or rel. humidity <50%	>6 months or temperature >37 °C or relative humidity 50-90%*
Plastic bags	use as is**	redry 1-2h / 300-375 °C
Sahara ReadyBag / Drybag / Bigbag Dry	use as is	use as is
Metal drums	use as is	use as is

* if storage conditions include a relative humidity over 90% the flux may have been deteriorated so that re-drying becomes ineffective.

** if a severe application is considered (HAZ or weld metal hardness HV10 >350, heavy restraint, etc.)

re-drying 1-2h / 300-375 °C is recommended.

For MIL800-H, MIL800-HPNi and 842-H fluxes Follow all previous procedures, with the following changes:

- Set temperature between 120°-205°C.
- For ovens in which heating rods are inserted into the flux, do not let the temperature of flux adjacent to the rods exceed 205°C. Re-drying is carried out with the product removed from the original packaging and treated in an oven with an even temperature. It is recommended to have either an oven atmosphere circulation over a maximum flux height of 3 cm or to have the flux moving. The re-drying operation can be repeated to a maximum of 4 times. Re-dried flux and flux handled in the welding operation, shall be kept dry, preferably at a temperature of 50-120 °C above ambient temperature, time unlimited.

4. Deteriorated product

Welding fluxes that have suffered from serious water and moisture contamination, or have been exposed to the atmosphere over long periods of time cannot be restored in their original condition and should be discarded

5. Recycling

Non consumed flux collected from the weld shall be cleaned from slag, metal and/or other contamination. Damage of the flux by heavy impingement in the transport system shall be prevented. Prevent separation of the different grain fraction in cyclones or in "dead" corners. Add new flux in the hopper in a circulation system before a level of 25% of the full hopper is reached.

SHELF LIFE FOR ALL CONSUMABLES

Shelf life indicates how long our goods can be stocked at customer's premises and is not an integration to warranty.

Shelf life for all consumables is 3 years, with two exceptions described below, provided storage and handling conditions are met,

- for consumables with vacuum packing, shelf life can be extended to 5 years

- for Al (alloy) consumables, the shelf life is limited to 1 year.

Individual products might have a longer shelf life, but as standards or formulas might change, we do not extend shelf life.

MMA CONSUMABLES

STICK ELECTRODES

MILD STEEL, CELLULOSIC

Lincoln® 6010	40
Fleetweld® 5P+®	41

MILD STEEL, RUTILE

Cumulo	42
Numal	43
Omnia®	44
Omnia® 46	45
Pantafix	47
Supra®	48
Universalis®	49

MILD STEEL, RUTILE HIGH RECOVERY

Ferrod® 135T	50
Ferrod® 160T	51
Ferrod® 165A	52

MILD STEEL, BASIC

Basic 7018	53
Basic 7018P	54
Baso® 120	55
Baso® 48SP	56
Baso® G	57
Conarc® 48	59
Conarc® 49	60
Conarc® 49C	61
Conarc® 50	62
Conarc® ONE	63
Hyrod 7018	64
Hyrod 7018LT	65
Kardo	66
Lincoln® 7018-1	67
Vandal	69

MILD STEEL, BASIC, HIGH RECOVERY

Conarc® L150	70
Hyrod 7028	71

MILD STEEL, DOUBLE COATED

Lincoln® 7016/DR	72
------------------------	----

MILD STEEL, PIPELINE APPLICATIONS

Pipeliner® 16P	73
Baso® 100	74
Conarc® 51	75

LOW ALLOY STEEL, CELLULOSIC

Lincoln® 7010	76
Lincoln® 8010	77
Pipeliner® 7P+	78
Pipeliner® 8P+	79
Shield-Arc® 70+	80
Shield-Arc® HYP+	81

LOW ALLOY STEEL, HIGH STRENGTH

Conarc® 60G	82
Conarc® 70G	83

LOW ALLOY STEEL, LOW TEMPERATURE

Kryo® 1	84
Kryo® 1-180	85
Kryo® 1P	86
Kryo® 1R	87
Kryo® 2	88
Kryo® 3	89
Kryo® 4	90

LOW ALLOY STEEL, HIGH TEMPERATURE

SL 12G	91
SL 22G	92

LOW ALLOY STEEL, WEATHERING STEELS

Conarc® 55CT	93
--------------------	----

STAINLESS STEEL, STANDARD AUSTENITIC

Arosta® 304L	94
Arosta® 307	95
Arosta® 309S	96
Arosta® 316L	97
Clearosta® E 304L	98
Clearosta® E 309L	99
Clearosta® E 316L	100
Limarosta® 304L	101
Limarosta® 309S	102
Limarosta® 316L	103
LINOX 308L	104
LINOX 309L	105
LINOX 316L	106
LINOX P 308L	107
LINOX P 309L	108
LINOX P 316L	109

ALUMINIUM

ALMN	110
ALSI 5	111
ALSI 12	112

MMA CONSUMABLES STICK ELECTRODES

Lincoln® 6010

TOP FEATURES

- Used for root and hot passes as well as filling and capping up to X52 Grades
- Also used for root passes on higher-strength pipe steels, up to X80
- When root pass welding, negative polarity is recommended
- Excellent weldability in all positions

CLASSIFICATION

AWS A5.1 E 6010
EN ISO 2560-A E 38 3 C 21

CURRENT TYPE

DC+/DC-

WELDING POSITIONS

All positions

APPROVALS

ABS	LR	DNV	TÜV
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si
0.1	0.6	0.2

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -30°C
Typical values	AW	≥380	470-560	≥24	≥47

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	40-80
3.2 x 350	60-110
4.0 x 350	90-140
5.0 x 350	110-170

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CAN	555	9.0	627257
3.2x350	CAN	355	9.5	627258
4.0x350	CAN	237	9.5	627259
5.0x350	CAN	158	9.5	627260

Fleetweld® 5P+

TOP FEATURES

- Deep arc penetration
- Light slag with minimal arc interference
- Excellent vertical and overhead capability

TYPICAL APPLICATIONS

- Cross country and in-plant pipe welding
- Steel with moderate surface contaminants
- Square edge butt welds
- Welding on galvanized and specially coated steels

CLASSIFICATION

AWS A5.1 E6010

CURRENT TYPE

DC+

WELDING POSITIONS

All positions

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si
0.20	0.56	0.17

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -29°C/-30°C
Required: AWS A5.1	AW	min. 330	min. 430	min. 22	min. 27
EN ISO		min. 420	500-640	min. 20	min. 47
Typical values		471	586	24	56

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 300	40-70
3.2 x 350	65-130
4.0 x 350	90-175
5.0 x 350	140-225

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.4x300	CAN	-	22.7	ED010283, ED032564
3.2x350	CAN	-	22.7	ED010278, ED032565
4.0x350	CAN	-	22.7	ED010285, ED032566
4.8x350	CAN	-	22.7	ED010281

CUMULO

TOP FEATURES

- Excellent for pipe welding and construction work
- Smooth side wall wetting
- Good X-ray soundness

CLASSIFICATION

AWS A5.1 E 6013
EN ISO 2560-A E 38 0 R 12

CURRENT TYPE

AC/DC-

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	TÜV
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si
0.08	0.6	0.4

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					0°C	10°C
Required: AWS A5.1		min. 330	min. 430	min. 17	not specified	
EN ISO		min. 380	470-600	min. 20	min. 47	
Typical values	AW	≥ 420	500-600	≥ 24	≥ 60	≥ 47

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	70-95
3.2 x 350	100-135
4.0 x 350	130-190

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOH	114	2.1	588601-1
3.2x350	CBOX	155	4.8	588602-1
4.0x350	CBOX	105	4.8	588603-1

NUMAL

TOP FEATURES

- Applicable for "clean" structural steel
- Smaller diameters excellent for hobby market
- Very suitable for low open circuit voltage transformers (min. OCV 42 V)

CLASSIFICATION

AWS A5.1 E 6013
EN ISO 2560-A E 38 0 R 11

CURRENT TYPE

AC/DC-

WELDING POSITIONS

All positions

APPROVALS

ABS	LR	BV	DNV
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si
0.06	0.5	0.45

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) 0°C
Required: AWS A5.1		min. 331	min. 414	min. 17	not specified
EN ISO		min. 420	500-640	min. 20	min. 47
Typical values	AW	430	480	26	60

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	70-90
3.2 x 350	90-125
4.0 x 350	140-190

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.0x300	CBOX	405	4.2	609257
2.5x350	CBOH	110	2.1	609179-1
	CBOX	250	4.8	609175
3.2x350	CBOH	75	2.3	609180-1
	CBOX	175	5.3	609176
4.0x350	CBOX	102	5.0	609303

Omnia®

TOP FEATURES

- Excellent all positional operating characteristics, especially vertically-down and the arc characteristics ensures reliable penetration
- Good gap bridging and easy striking and restriking

CLASSIFICATION

AWS A5.1 E6013
EN ISO 2560-A E 38 0 RC 11

CURRENT TYPE

AC/DC-

WELDING POSITIONS

All positions

APPROVALS

ABS	LR	BV	DNV
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.08	0.5	0.3	≤ 0.03	≤ 0.03

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Required: AWS A5.1		min. 330	min. 430	min. 17	not specified
EN ISO		min. 380	470-600	min. 22	min. 60

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-85
3.2 x 350	90-130
4.0 x 350	140-180

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOH	127	2.1	588683-1
3.2x350	CBOX	156	4.4	588684-1
4.0x350	CBOX	105	4.5	588685-1

Omnia® 46

TOP FEATURES

- Suitable for general construction work
- Smaller diameters excellent for hobby market
- Very suitable for low open circuit voltage transformers (min. OCV 42 V)

CLASSIFICATION

AWS A5.1 E6013
EN ISO 2560-A E 42 0 R 11

CURRENT TYPE

AC/DC-

WELDING POSITIONS

All positions

APPROVALS

ABS	LR	BV	DNV	TÜV
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si
0.06	0.5	0.45

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) 0°C
Required: AWS A5.1		min. 330	min. 430	min. 17	not specified
EN ISO		min. 420	500-640	min. 20	min. 47
Typical values	AW	460	540	27	65

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.0 x 300	50-60
2.5 x 350	70-90
3.2 x 350	90-125
3.2 x 450	100-135
4.0 x 350	140-190
4.0 x 450	150-200
5.0 x 450	180-240

Omnia® 46

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
1.6x250	LINCPACK	140	0.8	599993-1
2.0x300	LINCPACK	94	1.0	609068
	CBOX	374	4.0	609059-1
2.5x300	CBOX	250	4.2	609060-I
2.5x350	LINCPACK	52	1.0	609070
	CBOH	110	2.1	800358-1
	CBOX	250	4.8	609060
3.2x350	LINCPACK	33	1.0	609093
	CBOH	75	2.3	800372-1
	CBOX	175	5.3	609061
3.2x450	CBOX	150	6.2	609062
4.0x350	CBOX	102	5.0	609063
4.0x450	CBOX	93	5.9	609064
5.0x450	CBOX	56	5.8	609065

MMA

Pantafix

TOP FEATURES

- Medium thick rutile-cellulosic coated MMA electrode for structural steelwork
- Suitable on primer painted and slightly rusted parts, as there is a high tolerance to impurities.
- Suitable for welding galvanised steel components.
- Excellent all positional operating characteristics, especially vertically-down and the arc characteristics ensures reliable penetration.
- Good gap bridging and easy striking and restriking

CLASSIFICATION

AWS A5.1 E6013
EN ISO 2560-A E 38 0 RC 11

CURRENT TYPE

AC/DC-

WELDING POSITIONS

All positions

APPROVALS

ABS	BV	DNV
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.08	0.5	0.3	≤ 0.03	≤ 0.03

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20 °C
Required: AWS A5.1		min. 330	min. 430	min. 17	not specified
EN ISO		min. 380	470-600	min. 22	min. 60

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-85
3.2 x 350	90-130
4.0 x 350	140-180

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOH	127	2.1	588691-1
3.2x350	CBOX	156	4.4	588692-1
4.0x350	CBOX	105	4.5	588693-1

Supra®

TOP FEATURES

- Excellent on painted or rustcovered steel
- Recommended for bridging wide gaps
- Weldable in all positions with one current setting

CLASSIFICATION

AWS A5.1E 6012

EN ISO 2560-AE 38 0 RC 11

CURRENT TYPE

AC/DC-

WELDING POSITIONS

All position, except vertical down

APPROVALS

LR	BV	DNV	TÜV	DB
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si
0.12	0.5	0.6

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) 0°C
Required: AWS A5.1		min. 330	min. 430	min. 17	not specified
EN ISO		min. 380	470-600	min. 20	min. 47
Typical values	AW	470	550	23	56

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	70-90
3.2 x 350	95-130
4.0 x 350	130-170
5.0 x 350	170-250

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOH	110	2.1	588694-1
3.2x350	CBOX	165	4.8	588695-1
4.0x350	CBOX	115	4.9	588696-1
5.0x350	CBOX	74	4.9	588697-1

Universalis®

TOP FEATURES

- Self releasing slag
- Very smooth appearance
- Smaller sizes (2.0 & 2.5 mm) most versatile for thin plate material

CLASSIFICATION

AWS A5.1 E 6013
EN ISO 2560-A E 42 0 RR 12

CURRENT TYPE

AC/DC-

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	TÜV
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si
0.08	0.6	0.45

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) 0°C
Required: AWS A5.1		min. 330	min. 430	min. 17	not specified
EN ISO		min. 420	500-640	min. 20	min. 47
Typical values	AW	480	560	26	50

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	65-90
3.2 x 350	100-140
3.2 x 450	100-140
4.0 x 450	150-195

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOH	105	2.1	588699-1
3.2x350	CBOX	125	4.3	588700-1
3.2x450	CBOX	118	5.7	588701-1
4.0x450	CBOX	78	5.6	588702-1

Ferrod® 135T

TOP FEATURES

- High welding speed
- Smooth weld appearance
- Self releasing slag

CLASSIFICATION

AWS A5.1 E7024
EN ISO 2560-A E 38 0 RR 53

CURRENT TYPE

AC/DC-

WELDING POSITIONS

Flat/Horizontal

APPROVALS

ABS	BV	TÜV
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si
0.08	0.5	0.35

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) 0°C
Required: AWS A5.1		min. 400	min. 490	min. 17	not specified
EN ISO		min. 380	470-600	min. 20	47
Typical values	AW	460	530	25	54

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
3.2 x 450	130-150
4.0 x 450	180-200
5.0 x 450	275-300

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
4.0x450	CBOX	70	5.9	588677-1
5.0x450	CBOX	45	5.8	588678-1

Ferrod® 160T

TOP FEATURES

- Very high welding speed
- Smooth weld appearance, very good slag release
- High recovery (160% for 3.2 and 4.0 mm electrodes, and 180% for 5.0 mm electrodes)

CLASSIFICATION

AWS A5.1 E7024
EN ISO 2560-A E 42 0 RR 73

CURRENT TYPE

AC/DC-

WELDING POSITIONS

Flat/Horizontal

APPROVALS

ABS	BV	DNV	TÜV
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si
0.1	0.9	0.45

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) 0°C
Required: AWS A5.1		min. 400	min. 490	min. 17	not specified
EN ISO		min. 420	500-640	min. 20	min. 47
Typical values	AW	≥ 420	510-610	≥ 22	≥ 47

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
3.2 x 450	105-140
4.0 x 450	160-220
5.0 x 450	240-320

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
3.2x450	CBOX	76	5.4	588679-1
4.0x450	CBOX	51	5.5	588680-1
5.0x450	CBOX	39	5.8	588681-1

Ferrod® 165A

TOP FEATURES

- 160% recovery, high welding speed
- Good X-ray soundness
- Even in narrow gaps and rusty materials easy slag release

CLASSIFICATION

AWS A5.1 E7024-1
EN ISO 2560-A E 42 2 RA 73

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

Flat/Horizontal

APPROVALS

ABS	LR	DNV	TÜV
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si
0.07	0.95	0.3

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-10°C	-18°C/-20°C
Required: AWS A5.1		min.400	min. 490	min. 22		min. 27
EN ISO		min.420	500-640	min. 20		min. 47
Typical values	AW	475	520	26	70	67

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
3.2 x 450	125-155
4.0 x 450	140-235
5.0 x 450	210-330

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
3.2 x 450	CBOX	90	4.7	599534-1
4.0 x 450	CBOX	60	6.0	599541-1
5.0 x 450	CBOX	40	5.9	599596-1

BASIC 7018

TOP FEATURES

- Recovery 120%
- Excellent weldability even in positional welding
- Good impact values down to -40°C

CLASSIFICATION

AWS A5.1 E 7018
EN ISO 2560-A E 42 4 B 42 H5

CURRENT TYPE

DC+; DC-

WELDING POSITIONS

All position, except vertical down

APPROVALS

LR	BV	DNV	TÜV	DB
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	HDM
0.08	1.1	0.45	≤ 0.025	≤ 0.015	4 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -40°C
Required: AWS A5.1		min. 400	min. 490	min. 22	
EN ISO		min. 420	500-640	min. 20	min. 47
Typical values	AW	≥ 430	510-610	≥ 24	≥ 70
	600°Cx1h	≥ 420	500-600	≥ 22	≥ 70

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	65-90
3.2 x 350	120-140
3.2 x 450	120-140
4.0 x 350	160-190
4.0 x 450	160-190
5.0 x 450	210-230

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOX	180	4.0	588655-1
3.2x350	CBOX	112	4.0	588656-1
3.2x450	CBOX	117	5.5	588657-1
4.0x350	CBOX	79	4.0	588658-1
4.0x450	CBOX	81	5.5	588659-1
5.0x450	CBOX	55	5.5	588660-1

BASIC 7018P

TOP FEATURES

- High quality welding and 120% recovery deliver high productivity
- Excellent weldability, suitable for positional welding
- Good impact values down to -40°C

CLASSIFICATION

AWS A5.1 E 7018 H4
EN ISO 2560-A E 42 4 B 4 2 H5

CURRENT TYPE

DC+; AC

WELDING POSITIONS

All position, except vertical down

APPROVALS

DNV

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.06	1.5	0.3	≤0.025	≤0.025

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -50°C
Typical values	AW	≥430	490-550	≥24	≥47

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	65-90
3.2 x 350	100-140
3.2 x 450	100-140
4.0 x 350	140-190
4.0 x 450	140-190
5.0 x 450	190-250
5.0 x 450	190-250

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOX	185	4.1	629400
3.2x350	CBOX	120	4.2	619401, 629401
	CBOX	120	5.5	619402
3.2x450	CBOX	120	5.5	629402
4.0x350	CBOX	85	4.3	629403
4.0x450	CBOX	85	5.8	619404, 629404
5.0x350	CBOX	55	4.3	619406, 629406
5.0x450	CBOX	55	5.5	619405, 629405

Baso® 120

TOP FEATURES

- Recovery 120%
- Excellent weldability even on AC in all positions
- Good impact values down to -30°C

CLASSIFICATION

AWS A5.1 E7018 H4R
EN ISO 2560-A E 42 3 B 12 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	TÜV
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	HDM
0.06	1.4	0.3	0.015	0.010	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-20°C	-50°C	-46°/-50°C
Required: AWS A5.1		min. 400	min. 490	min. 22			min. 27
EN ISO		min. 460	530-680	min. 20		min. 47	
Typical values	AW	480	580	28	200	170	100

AW = As welded

Suitable for both As Welded and Stress Relieve (PWHT) conditions

CTOD value at -10°C > 0.25mm

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-90
3.2 x 350	90-140
3.2 x 450	90-140
4.0 x 350	120-160
4.0 x 450	120-160
5.0 x 450	160-240
5.0 x 450	160-240

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOH	110	2.0	570496-1
	VPMD	110	2.0	570496-2
3.2x350	VPMD	53	2.0	570526-2
	CBOX	108	4.0	570526-1
3.2x450	CBOH	52	2.5	587920-1
	CBOX	108	5.2	570519-1
4.0x350	VPMD	37	2.0	570625-2
	CBOH	37	2.6	587937-1
4.0x450	VPMD	37	2.6	587937-2
	CBOX	50	5.3	570748-1

Baso® 48SP

TOP FEATURES

- Excellent welding performance and highly stable and directional arc
- Very good gap bridging and ideally suited for root passes and positional welding
- Weldable on AC and DC
- Stable arc, also at low amperage
- Popular at welding schools

CLASSIFICATION

AWS A5.1 E7016-H8
EN ISO 2560-A E 38 3 B 12 H10

CURRENT TYPE

AC/DC+

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	TÜV
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.06	0.9	0.7	≤ 0.020	≤ 0.015

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					+20 °C	-30 °C
Typical values	AW	≥ 380	470-600	25	150	60

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	55-95
3.2 x 350	80-150
3.2 x 450	95-150
4.0 x 350	120-190
4.0 x 450	120-190

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	SRP	44	0.9	571837-2
	CBOH	100	2.0	570977-1
3.2x350	SRP	51	1.7	571844-2
	CBOH	55	1.8	570984-1
3.2x450	CBOH	55	2.3	570991-1
4.0x350	SRP	27	1.4	571851-2
	CBOH	40	2.0	571857-1
4.0x450	CBOH	40	2.6	571004-1

Baso® G

TOP FEATURES

- Designed for works highly strained at static and dynamic loadings and service temperature down to -50°C
- Excellent welding characteristics in all positions except vertical down position.
- Very low spatter in both DC and AC, with a high deposition rate
- Low moisture absorption properties ensure extra low diffusible hydrogen level in the weld metal (< 4ml/100g).
- Good slag release and flat bead appearance

CLASSIFICATION

AWS A5.1 E7018-1 H4R
EN ISO 2560-A E 42 5 B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	TÜV	DB
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	HDM
0.07	1.2	0.4	≤0.020	≤0.010	<4 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					+20°C	-47°C	-50°C
Required: AWS A5.1		min. 400	min. 490	min. 22		min. 27	
EN ISO		min. 420	500-640	min. 20			min. 47
Typical values	AW	≥430	575	≥24	200		≥90
	620°C x 1h	≥420	565	≥22	200		≥90

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.0 x 300	35-55
2.5 x 350	55-90
3.2 x 350	75-120
3.2 x 450	75-120
4.0 x 350	120-180
4.0 x 450	120-180
5.0 x 450	160-240

Baso® G

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	SRP	60	1.4	511819-1
	CBOH	86	2.0	570823-1
	VPMD	86	2.0	521819
3.2x350	SRP	50	1.8	511918-1
	VPMD	52	1.9	521918
	CBOX	110	4.0	570762-1
3.2x450	SRP	50	2.4	511925-1
	VPMD	52	2.5	521919
	VPMD	116	5.5	570763-1
4.0x350	SRP	28	1.5	511901-1
	CBOX	81	4.2	570779-1
4.0x450	VPMD	37	2.5	521888
	CBOX	81	5.5	570816-1
	SRP	21	2.1	511857-1
5.0x450	CBOX	56	5.5	570786-1

MMA

Conarc® 48

TOP FEATURES

- Recovery 130%
- Excellent weldability on DC+ in all positions, especially overhead and vertical up
- Excellent impact toughness down to -40°C
- Excellent X-ray soundness

CLASSIFICATION

AWS A5.1 E7018-1 H4R
EN ISO 2590-A E 46 4 B 42 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All position, except vertical down

APPROVALS

DNV

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	HDM
0.06	1.4	0.3	0.015	0.010	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-20°C	-50°C	-46°/-50°C
Required: AWS A5.1		min. 400	min. 490	min. 22			min. 27
EN ISO		min. 460	530-680	min. 20		min. 47	
Typical values	AW	480	580	28	200	170	100

AW = As welded

Suitable for both As Welded and Stress Relieve (PWHT) conditions

CTOD value at -10°C > 0.25mm

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.0 x 300	50-80
2.5 x 350	60-90
3.2 x 350	80-130
3.2 x 450	80-130
4.0 x 350	120-160
4.0 x 450	120-160
5.0 x 450	190-270

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.0x300	CBOH	130	1.6	503609-1
2.5x350	CBOH	110	2.0	503616-1
3.2x450	CBOX	108	5.2	503630-1
4.0x450	CBOX	80	5.6	503652-1
5.0x450	CBOX	50	5.3	503661-1

Conarc® 49

TOP FEATURES

- Almost no spatter, nice wetting and full weld pool control
- One current setting for all positions possible
- Perfect welding and 120% recovery contributes to high productivity

CLASSIFICATION

AWS A5.1 E7018 H4
EN ISO 2560-A E 46 3 B 42 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	RINA	TÜV
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	HDM
0.09	1.1	0.6	0.015	0.010	4 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-20 °C	-30 °C	-40 °C
Required: AWS A5.1		min. 400	min. 483	min. 22		min. 27	27
EN ISO		min. 460	530-680	min. 20		min. 47	
Typical values	AW	480	560	28	140	120	80

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	70-80
3.2 x 350	110-130
4.0 x 450	140-180
5.0 x 450	160-240

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	VPMD	90	2.0	609271-1
	CBOX	190	4.1	609266-1
3.2x350	VPMD	55	2.0	609272-1
	CBOX	118	4.3	609267-1
3.2x450	VPMD	55	2.4	609277-1
4.0x350	VPMD	40	2.1	609273-1
	CBOX	85	4.6	609268-1
4.0x450	VPMD	40	2.7	609274-1
	CBOX	85	5.8	609269-1
5.0x450	CBOX	55	5.7	609270-1

Conarc® 49C

TOP FEATURES

- Reliable impact toughness -40°C, good CTOD at -10°C
- The off-shore electrode when Ni-alloying is not allowed
- 100 - 120% recovery

CLASSIFICATION

AWS A5.1 E7018-1 H4R
EN ISO 2560-A E 46 4 B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	TÜV	DB
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	HDM
0.06	1.4	0.3	0.015	0.010	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-20°C	-50°C	-46°/-50°C
Required: AWS A5.1		min. 400	min. 490	min. 22			min. 27
EN ISO		min. 460	530-680	min. 20		min. 47	
Typical values	AW	480	580	28	200	170	100

AW = As welded

Suitable for both As Welded and Stress Relieve (PWHT) conditions. CTOD value at -10°C > 0.25mm

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	55-80
3.0 x 350	70-110
3.2 x 350	80-130
4.0 x 350	120-160
4.0 x 450	120-160
5.0 x 450	180-240

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	SRP	70	1.3	511420-1
	CBOH	110	2.0	509236-1
3.2x350	SRP	50	1.9	511437-1
	CBOX	108	4.0	509243-1
3.2x450	SRP	50	2.4	511475-1
	CBOX	108	5.2	509250-1
4.0x350	SRP	28	1.5	511505-1
	CBOX	80	4.3	509359-1
4.0x450	SRP	28	2.0	511536-1
	CBOX	80	5.6	509366-1
5.0x450	SRP	23	2.4	511529-1
	CBOX	50	5.3	509465-1

Conarc® 50

TOP FEATURES

- Good impact values down to -50°C
- Basic very low hydrogen electrode
- Excellent for general purpose welding

CLASSIFICATION

AWS A5.1 E7018-1 H4R
EN ISO 2560-A E 46 5 B 3 2 H5

CURRENT TYPE

AC/DC+

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.07	1.2	0.4	≤0.020	≤0.010

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -50°C
Typical values	AW	≥430	510-600	≥24	≥90
	SR:1h/620°C	≥420	500-590	≥22	≥90

AW = As welded; SR = Stress relieved

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	65-90
3.2 x 350	120-140
3.2 x 450	120-140
4.0 x 350	160-190
4.0 x 450	160-190
5.0 x 450	180-230

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	VPMD	100	2.0	619260
	CBOX	203	4.0	619241
3.2x350	VPMD	55	1.9	629261
	CBOX	112	4.0	619242
3.2x450	VPMD	52	2.4	629263
	CBOX	116	5.5	619243
4.0x450	VPMD	35	2.3	629264
	CBOX	83	5.5	619245
5.0x450	VPMD	22	2.3	629265
	CBOX	55	5.5	619246

Conarc® ONE

TOP FEATURES

- Reliable impact toughness -40°C, good CTOD at -10°C
- The off-shore electrode when Ni-alloying is not allowed
- 115 - 120% recovery

CLASSIFICATION

AWS A5.1 E7018-1 H4R
EN ISO 2560-A E 42 5 B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	RINA
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	HDM
0.05	1.3	0.4	0.015	0.010	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)			
					-20°C	-40°C	-46°C	-50°C
Required: AWS A5.1		min. 400	min. 490	min. 22			min. 27	
EN ISO		min. 420	500-640	min. 20		min. 47		
Typical values	AW	480	575	28	200	120	100	80

AW = As welded

CTOD value at -10°C > 0.25mm

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-100
3.2 x 450	90-145
4.0 x 450	110-160
5.0 x 450	160-250

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	VPMD	90	2.1	573574-1
	CBOX	180	4.3	573536-1
3.2x450	VPMD	55	2.6	573581-1
	CBOX	115	5.5	573543-1
4.0x450	VPMD	40	2.7	573598-1
	CBOX	80	5.4	573550-1
5.0x450	VPMD	25	2.6	573605-1
	CBOX	55	5.6	573567-1

HYROD 7018

TOP FEATURES

- Almost no spatter, nice wetting and full weld pool control
- One current setting for all positions possible
- Perfect welding and 120% recovery contributes to high productivity

CLASSIFICATION

AWS E7018 H8
EN ISO 2560-A E 42 3 B 32 H10

WELDING POSITIONS

All position, except vertical down

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	HDM
0.09	1.1	0.6	0.015	0.010	4 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-20 °C	-30 °C	-40 °C
Required: AWS A5.1		min. 400	min. 483	min. 22		min. 27	27
EN ISO		min. 460	530-680	min. 20		min. 47	
Typical values	AW	480	560	28	140	120	80

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-95
3.2 x 450	110-130
4.0 x 450	140-180
5.0 x 450	160-240

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOX	190	4.1	599206-1
3.2x450	CBOX	118	5.2	599213-1
4.0x450	CBOX	85	5.8	599220-1
5.0x450	CBOX	55	5.7	599237-1

HYROD 7018LT

TOP FEATURES

- The weld metal diffusible hydrogen content conforms to low hydrogen, < 5 ml/100g deposited weld metal.
- Impact toughness down to - 40 °C.
- Weld metal recovery:~120%.

CLASSIFICATION

AWS E7018-1 H4R
EN ISO 2560-A E 46 4 B 32 H5

WELDING POSITIONS

All position, except vertical down

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	HDM
0.06	1.4	0.3	0.015	0.010	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-20 °C	-50 °C	-46 °/-50 °C
Required: AWS A5.1		min. 400	min. 490	min. 22			min. 27
EN ISO		min. 460	530-680	min. 20		min. 47	
Typical values	AW	480	580	28	200	170	100

AW = As welded

Suitable for both As Welded and Stress Relieve (PWHT) conditions

CTOD value at -10 °C > 0.25mm

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
3.2 x 450	80-130
4.0 x 450	120-160

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
3.2x450	CBOX	108	5.2	597523-1
4.0x450	CBOX	80	5.6	597530-1

KARDO

TOP FEATURES

- Low yield and ultimate tensile strength, high impact toughness
- Buffer layer electrode for internally clad stainless steel
- HDM< 3 ml/100g

CLASSIFICATION

AWS A5.1 E 6018 *
EN ISO 2560-A E 35 2 B 32 H5

* According to classification 1966

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	HDM
0.03	0.4	0.25	0.015	0.010	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -18°C/-20°C
Required: AWS A5.1		min. 331	min. 414	min. 22	min. 27
EN ISO		min. 355	440-570	min. 22	
Typical values	AW	390	450	28	>200

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-80
3.2 x 350	90-120
4.0 x 350	120-160

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5 x 350	SRP	TBD	0.0	541762-1
3.2 x 350	SRP	TBD	0.0	541779-1
4.0 x 350	SRP	TBD	0.0	541755-1

LINCOLN 7018-1

TOP FEATURES

- Excellent for general purpose welding
- Good impact values down to -46°C
- Shall be welded in AC and DC+/- mode

CLASSIFICATION

AWS A5.1 E7018-1 H4
EN ISO 2560-A E 42 4 B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.06	1.3	0.30	0.025	0.025

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -50°C
Typical values	AW	≥430	490-550	≥24	≥47

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	65-95
3.2 x 350	100-135
3.2 x 450	85-135
4.0 x 350	110-210
4.0 x 450	110-210
5.0 x 450	170-240

MMA

LINCOLN 7018-1

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	BOX	90	2.0	629181
	VPMD	90	2.0	619181
	CBOX	185	4.1	619036, 629036
3.2x350	BOX	55	1.9	629182
	VPMD	55	1.9	619182
	CBOX	120	4.2	619038, 629038
3.2x450	BOX	55	2.5	629225
	VPMD	55	2.5	619225
	CBOX	120	5.5	619040, 629040
4.0x350	BOX	40	2.0	629183
	VPMD	40	2.0	619183
	CBOX	85	4.3	619044, 629044
4.0x450	BOX	40	2.7	629226
	VPMD	40	2.7	619226
	CBOX	85	5.8	619045, 629045
5.0x450	CBOX	55	5.5	619049, 629049

MMA

VANDAL

TOP FEATURES

- Smooth and stable arc.
- Well suited for positional welding (particularly vertical and overhead).
- Good slag removal even in narrow gaps.

CLASSIFICATION

AWS A5.1 E 7018-1 H4
EN ISO 2560-A E 42 4 B 3 2 H5

CURRENT TYPE

AC/DC+

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	RINA
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.08	1.2	0.4	≤0.020	≤0.015

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -50°C
Typical values	AW	≥420	510-610	≥24	≥90

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	65-95
3.2 x 450	85-135
4.0 x 450	110-210
5.0 x 450	170-240

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5 x 350	CBOH	90	1.9	619167
	VPMD	90	1.9	619184
3.2 x 350	CBOH	55	1.9	619168
	VPMD	55	1.9	619300
3.2 x 450	CBOH	55	2.4	619169
	VPMD	55	2.4	619207
4.0 x 450	CBOH	40	2.7	619171
	VPMD	40	2.7	619208
5.0 x 450	CBOH	25	2.6	619172

Conarc® L150

TOP FEATURES

- Self releasing slag
- Suitable for welding primer painted components
- ~165% recovery
- Excellent weldability on AC and DC
- Free of cracks and good X-ray quality
- ISO-V toughness down to -40°C.

TYPICAL APPLICATIONS

- Shipyards

CLASSIFICATION

AWS A5.1 E7028 H4
EN ISO 2560-A E 42 4 B 53 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

Flat/Horizontal

APPROVALS

ABS	BV	DNV	TÜV	DB
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.1	1.1	0.6	≤0.025	≤0.015

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -18°C/-20°C
Required: AWS A5.1		min. 400	min. 490	min. 22	min. 27
EN ISO		min. 420	500-610	min. 20	min. 47
Typical values	AW	≥420	510-610	≥26	
	600°C x 2h	≥420	500-600	≥26	

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
3.2 x 450	140-160
4.0 x 450	175-220

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
3.2x450	SRP	30	1.9	554557-1
4.0x450	SRP	23	2.3	554509-1

HYROD 7028

TOP FEATURES

- Self releasing slag
- Suitable for welding primer painted components
- ~165% recovery
- Excellent weldability on AC and DC
- Free of cracks and good X-ray quality
- ISO-V toughness down to -40°C

CLASSIFICATION

AWS E 7028 H4
EN ISO 2560-A E 42 4 B 53 H5

WELDING POSITIONS

Flat/Horizontal

TYPICAL APPLICATIONS

- Shipyard

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.1	1.1	0.6	≤0.025	≤0.015

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-18°C/-20°C	-40°C
Required: AWS A5.1		min. 400	min. 490	min. 22	min. 27	
EN ISO		min. 420	500-610	min. 20	min. 47	
Typical values	AW	≥420	510-610	≥26		≥80
	600°C x 2h	≥420	500-600	≥26		≥80

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
3.2 x 350	140-160
4.0 x 450	175-220

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
3.2 x 350	SRP	30	1.5	597066-1
4.0 x 450	SRP	23	2.3	597073-1

Lincoln® 7016 DR

TOP FEATURES

- Excellent welding performance and highly stable and directional arc
- Very good gap bridging and ideally suited for root passes and positional welding
- Weldable on AC and DC
- Stable arc, also at low amperage
- Popular at welding schools

CLASSIFICATION

AWS A5.1 E7016-H8
EN ISO 2560-A E 42 2 B 1 2 H10

CURRENT TYPE

AC/DC+

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	HDM
0.08	1.2	0.6	5 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					+20 °C	-30 °C
Typical values	AW	≥ 380	470-600	26	≥ 150	≥ 60

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-90
3.2 x 350	95-150
3.2 x 450	95-150
4.0 x 350	140-190

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOX	200	3.9	829275
3.2x350	CBOX	125	4.1	829276
3.2x450	CBOX	125	5.3	829277
4.0x450	CBOX	80	5.2	829278

Pipeliner® 16P

TOP FEATURES

- DC- (DCEN) is the recommended polarity for root pass welding on pipe

CLASSIFICATION

AWS A5.1 E7016-H4, E7016-1 H4

CURRENT TYPE

AC/DC+

WELDING POSITIONS

All position, except vertical down

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.06	1.3	0.5	0.013	0.009

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-29 °C / -30 °C	-40 °C
Required: AWS A5.1		min. 400	min. 490	min. 22	min. 27	
Typical values	AW	470	590	26	120	90

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	55-105
3.2 x 350	75-135
4.0 x 350	120-170

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5 x 350	CAN	-	4.5	ED033835
	CAN	-	22.7	ED030916
3.2 x 350	CAN	-	4.5	ED033836
	CAN	-	22.7	ED030917
4.0 x 450	CAN	-	22.7	ED030918

Baso® 100

TOP FEATURES

- Designed for pipe welding in position, excellent for general purpose welding
- Very thin coating to improve joint access when root pass welding
- Good side wall wetting
- Impact toughness down to -30°C
- Popular at welding schools

CLASSIFICATION

AWS A5.1 E7016-1 H4
EN ISO 2560-A E 42 5 B 12 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	TÜV
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.06	1.2	0.5	≤0.02	≤0.02

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -29°/-30°C
Required: AWS A5.1		min. 400	min. 490	min. 22	min. 27
EN ISO		min. 420	500-640	min. 20	min. 47
Typical values	AW	≥420	500-640	26	≥110
	620°C x 1h	≥390	500-620	≥22	≥110

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-90
3.2 x 350	80-130
4.0 x 350	125-170

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOH	110	2.1	570175-1
3.2x350	CBOX	140	4.4	570182-1
4.0x350	CBOX	95	4.4	570298-1

Conarc® 51

TOP FEATURES

- Designed for pipe welding in position with very thin coating to improve joint access when root pass welding
- Outstanding penetration and stable arc
- Excellent impact at - 50 °C
- Matching NACE requirements
- Efficiency 100%

CLASSIFICATION

AWS A5.1 E7016-1 H4
EN ISO 2560-A E 42 5 B 12 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	TÜV
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.06	1.2	0.5	≤0.02	≤0.02

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -29°/-30°C
Required: AWS A5.1		min. 400	min. 490	min. 22	min. 27
EN ISO		min. 420	500-640	min. 20	min. 47
Typical values	AW	≥420	500-640	26	≥110
	620°C x 1h	≥390	500-620	≥22	≥110

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-90
3.2 x 350	80-130
3.2 x 450	80-120
4.0 x 350	125-170
4.0 x 450	125-170
5.0 x 450	170-240

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	SRP	69	1.3	511567-1
	CBOH	110	2.1	509816-1
3.2x350	SRP	56	1.7	511581-1
	CBOX	140	4.4	509823-1
3.2x450	SRP	56	2.2	509892-1
4.0x450	SRP	28	1.6	509908-1
5.0x450	SRP	25	2.2	511628-1

LINCOLN® 7010

TOP FEATURES

- Used for root and hot passes as well as filling and capping up to X60 grades
- When root pass welding, negative polarity is recommended
- Excellent weldability in all positions

CLASSIFICATION

AWS A5.5 E 7010-P1
EN ISO 2560-A E 42 3 Mo C 21

CURRENT TYPE

DC+/DC-

WELDING POSITIONS

All positions

APPROVALS

ABS	LR	DNV	TÜV
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Mo
0.1	0.7	0.2	0.5

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	AW	≥420	500-640	≥22	≥60

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	40-80
3.2 x 350	60-110
4.0 x 350	90-140
5.0 x 350	110-170

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CAN	555	9.0	627261
3.2x350	CAN	355	9.5	627262
4.0x350	CAN	237	9.5	627263
5.0x350	CAN	158	9.5	627264

MMA

LINCOLN® 8010

TOP FEATURES

- Used for root and hot passes as well as filling and capping up to X70 grades
- Clearly visible weld puddle for improved control and weldability
- Excellent weldability in all positions

CLASSIFICATION

AWS A5.1 E 8010-G
EN ISO 2560-A E 46 3 1NiMo C 21

CURRENT TYPE

DC+

WELDING POSITIONS

All positions

APPROVALS

ABS	LR	DNV	TÜV
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Ni	Mo
0.1	0.8	0.2	0.7	0.3

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	AW	≥485	570-680	≥22	≥60

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
3.2 x 350	60-110
4.0 x 350	90-140
5.0 x 350	110-170

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
3.2x350	CAN	355	9.5	627266
4.0x350	CAN	238	9.5	627267
5.0x350	CAN	156	9.5	627268

Pipeliner® 7P+

TOP FEATURES

- Root pass welding of up to X80 grade pipe
- Hot, fill and cap pass of up to X65 grade pipe
- Vertical down welding
- Meets NACE MR0175 for sour gas applications
- Test data available for SSC (NACE TM0177)
- Cellulosic electrode

CLASSIFICATION

AWS A5.1 E7010-P1, also meets E7010-G

CURRENT TYPE

DC+

WELDING POSITIONS

All positions

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	Mo
0.15	0.6	0.1	0.015	0.015	0.85	0.1

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
Required: AWS A5.1		min. 415	min. 490	min. 22	-29°C	-40°C
Typical values	AW	470	570	24	80	70

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
3.2 x 350	65-130
4.0 x 350	100-165
5.0 x 450	130-210

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
3.2 x 350	CAN	-	22.7	ED031611
4.0 x 350	CAN	-	22.7	ED031612
5.0 x 350	CAN	-	22.7	ED031613

Pipelin[®] 8P+

TOP FEATURES

- High productivity in vertical down and out-of-position pipe welding
- Deep penetration
- Clean, visible weld puddle
- Meets NACE MR0175 for sour gas applications
- Test data available for SSC (NACE TM0177)
- Cellulosic electrode

CLASSIFICATION

AWS A5.5 E8010-G, E8010-P1

CURRENT TYPE

DC+

WELDING POSITIONS

All positions

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Ni	Mo	P	S
0.17	0.7	0.25	0.8	0.2	0.01	0.01

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-29°C	-40°C	-46°C
Required: AWS A5.5		min. 460	min. 550	min. 19	min. 27		
Typical values	AW	495	590	24	80	60	50

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
3.2 x 350	65-120
4.0 x 350	100-165
5.0 x 350	130-210

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
3.2 x 350	CAN	-	22.7	ED030826
4.0 x 350	CAN	-	22.7	ED030827
5.0 x 350	CAN	-	22.7	ED030828

Shield-Arc® 70+

TOP FEATURES

- Light slag for minimal arc interference
- Deep penetration
- Clean, visible weld puddle
- Superior puddle control

CLASSIFICATION

AWS A5.5 E8010-P1, E8010-G

CURRENT TYPE

DC+

WELDING POSITIONS

All positions

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Ni	Cr	Mo	V
0.13-0.17	0.6-1.2	0.05-0.3	0.75-0.97	0.01-0.2	0.05-0.15	0.02-0.04

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-29 °C	-40 °C	-46 °C
Required: AWS A5.5		min. 460	min. 550	min. 19			
Typical values	AW	460-620	585-680	24	75		60

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
3.2 x 355	75-130
4.0 x 355	90-185
4.8 x 355	140-225

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
3.2 x 350	CAN	-	22.7	ED012841
4.0 x 350	CAN	-	22.7	ED012849
4.8 x 350	CAN	-	22.7	ED012845

Shield-Arc® HYP+

TOP FEATURES

- Light slag for minimal arc interference
- Deep penetration
- Clean, visible weld puddle
- Superior puddle control

CLASSIFICATION

AWS A5.5 E7010-P1, E7010-G

CURRENT TYPE

DC+

WELDING POSITIONS

All positions

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Mo	V
0.13-0.17	0.49-0.63	0.08-0.18	0.27-0.31	<0.01

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-20°C	-29°C
Required: AWS A5.5		min. 415	min. 490	min. 22		min. 27
Typical values	AW	435-525	525-635	24		50

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
3.2 x 355	75-130
4.0 x 355	90-185
4.8 x 355	140-225

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
3.2 x 350	CAN	-	22.7	ED029511
4.0 x 350	CAN	-	22.7	ED029513
4.8 x 350	CAN	-	22.7	ED029509

Conarc® 60G

TOP FEATURES

- Good impact values down to -51°C
- DC welding preferred
- 115 - 120% recovery

CLASSIFICATION

AWS A5.5 E9018M-H4
EN ISO 18275-A E 55 4 Z B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	TÜV
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	Mo	HDM
0.06	1.0	0.4	0.015	0.010	1.6	0.3	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-20°C	-40°C	-51°C
Required: AWS A5.5		540-620*	min. 620	min. 24			min. 27
EN ISO		min. 550	610-780	min. 18		min. 47	
Typical values	AW	600	670	25		98	
	SR:1h/620°C	550	640	24	90		40

AW = As welded; SR = Stress relieved

* Diameter 2.5 mm max 655 MPa

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-100
3.2 x 350	80-130
4.0 x 350	120-180
5.0 x 450	160-240

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	SRP	62	1.4	523614-1
3.2x350	SRP	50	1.9	523652-1
4.0x350	SRP	28	1.5	523645-1
5.0x450	SRP	23	2.4	523638-1

Conarc® 70G

TOP FEATURES

- Good impact values down to -40°C
- DC welding preferred
- 115 - 120% recovery

CLASSIFICATION

AWS A5.5 E9018-G-H4
EN ISO 18275-A E 55 4 1NiMo B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

DNV	TÜV
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	Mo	HDM
0.06	1.2	0.4	0.014	0.009	1.0	0.4	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-20°C	-40°C	-46°C
Required: AWS A5.5		min. 530	min. 620	min. 17	not specified		
EN ISO		min. 550	610-780	min. 18		min. 47	
Typical values	AW	600	655	24		90	60
	SR:15h/580°C	550	640	24	90		50

AW = As welded; SR = Stress relieved

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-100
3.2 x 350	80-130
4.0 x 350	120-180
5.0 x 450	160-240

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	SRP	64	1.2	523706-1
3.2x350	SRP	50	1.9	523737-1
4.0x350	SRP	28	1.5	523713-1
4.0x450	SRP	28	2.0	523744-1
5.0x450	SRP	23	2.4	523720-1

Kryo® 1

TOP FEATURES

- Excellent mechanical properties (impact down to -60°C)
- Good CTOD down to -10°C
- Extremely low hydrogen content
- 110 - 120% recovery
- Weldable on AC and DC

CLASSIFICATION

AWS A5.5 E7018-G-H4R
EN ISO 2560-A E 50 6 Mn1Ni B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	TÜV	DB
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	HDM
0.05	1.5	0.4	0.010	0.010	0.9	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-20 °C	-60 °C
Required: AWS A5.5		min. 390	min. 480	min. 22	not specified	
EN ISO		min. 500	560-720	min. 18		min. 47
Typical values	AW	550	640	24	150	90
	SR:580°C/15	460	550	24		90

AW = As welded; SR = Stress relieved

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	55-80
3.0 x 350	70-110
3.2 x 350	80-140
3.2 x 450	80-140
4.0 x 350	120-170
4.0 x 450	120-170
5.0 x 450	180-240

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	SRP	70	1.3	524383-1
3.2x350	SRP	50	1.9	524390-1
3.2x450	SRP	10	0.5	515725-1
	SRP	50	2.4	524437-1
4.0x350	SRP	28	1.5	524468-1
4.0x450	SRP	28	2.0	524499-1
5.0x450	SRP	22	2.4	524475-1

Kryo® 1-180

TOP FEATURES

- Extremely low hydrogen content
- Approx. 175% recovery, easy slag release, weldable on AC and DC
- Filling horizontal V- and X-grooves

CLASSIFICATION

EN ISO 2560-A E 50 5 1Ni B 73 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

LR	DNV	TÜV	DB
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	HDM
0.07	1.2	0.3	0.02	0.0010	0.9	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-40°C	-50°C
Required: AWS A5.5		min. 460	min. 550	min. 19	not specified	
EN ISO		min. 500	560-720	min. 18		min. 47
Typical values	AW	550	640	26	90	60
	SR:600°C/4h	540	620	24	100	85

AW = As welded; SR = Stress relieved

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
3.2 x 450	130-160
4.0 x 450	170-240
5.0 x 450	250-300

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
3.2x450	SRP	27	1.7	524765-1
4.0x450	SRP	23	2.3	524734-1
5.0x450	SRP	19	2.7	524772-1

Kryo® 1P

TOP FEATURES

- Excellent mechanical properties (impact down to -60°C)
- Good CTOD at -10°C
- Extremely low hydrogen content
- 112 - 120% recovery
- Weldable on AC and DC

CLASSIFICATION

AWS A5.5 E 8018-G-H4R
EN ISO 2560-A E 50 6 Mn1Ni B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	BV	DNV	TÜV	DB
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	HDM
0.05	1.5	0.5	0.010	0.005	0.95	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-40°C	-60°C
Required: AWS A5.5		min. 460	min. 550	min. 19	not specified	
EN ISO		min. 500	560-720	min. 18		min. 47
Typical values	AW	550	640	24	140	80
	SR:580°C/15h	460	550	24	150	90

AW = As welded; SR = Stress relieved

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	55-85
3.2 x 350	80-145
3.2 x 450	80-145
4.0 x 350	120-185
4.0 x 450	120-185
5.0 x 450	180-270

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	SRP	70	1.3	519211-1
3.2x350	SRP	50	1.9	519181-1
3.2x450	SRP	50	2.4	519273-1
4.0x350	SRP	28	1.5	519198-1
4.0x450	SRP	28	2.0	519280-1
5.0x450	SRP	22	2.4	519204-1

Kryo® 1R

TOP FEATURES

- Excellent mechanical properties (impact down to -60°C)
- Weldable on AC and DC
- Extremely low hydrogen content

CLASSIFICATION

AWS A5.5 E 8018-C3-H4R
EN ISO 2560-A E 46 6 1Ni B 32 H5

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	TÜV
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	HDM
0.07	1.15	0.4	0.015	0.005	0.9	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-40°C	-60°C
Required: AWS A5.5		470-550	550	min. 24		47
EN ISO 2560-A		460	530-680	min. 20		
Typical values	AW	520	585	24	140	115

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	SRP	70	1.4	524809-1
3.2x350	SRP	50	1.8	524816-1
4.0x350	SRP	28	1.5	524823-1

Kryo® 2

TOP FEATURES

- Excellent impact toughness at -60°C
- Good CTOD at -15°C
- Extremely low hydrogen content

CLASSIFICATION

AWS A5.5 E 9018-G-H4R
EN ISO 2560-A E 55 6 Z B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	HDM
0.05	1.6	0.3	0.015	0.01	1.5	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-40 °C	-50 °C	-60 °C
Required: AWS A5.5		min. 530	min. 620	min. 17	not specified		
EN ISO		min. 550	610-780	min. 18			min. 47
Typical values	AW	570	650	22	140	110	60
	SR:620°C/1h	530	620	22			

AW = As welded; SR = Stress relieved

CTOD value at -10°C > 0.25 mm

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	55-85
3.2 x 450	80-140
4.0 x 450	120-170

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5 x 350	SRP	TBD	0.0	524642-1
3.2 x 450	SRP	TBD	0.0	524659-1
4.0 x 450	SRP	TBD	0.0	524666-1

Kryo® 3

TOP FEATURES

- 115 - 120% recovery
- Excellent impact toughness down to -80°C
- Good CTOD at -10°C
- Extremely low hydrogen content

CLASSIFICATION

AWS A5.5 E8018-C1-H4
EN ISO 2560-A E 50 6 Mn1Ni B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

LR	TÜV
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	HDM
0.05	0.7	0.3	0.015	0.01	2.5	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-60°C	-80°C
Required: AWS A5.5	SR*	min. 460	min. 550	min. 19	min. 27	
EN ISO		min. 460	530-680	min. 20		min. 47
Typical values	AW	520	600	26	120	60
	SR:620°C/1h	500	590	29	90	

AW = As welded; SR = Stress relieved

CTOD value at -10°C > 0.25 mm

SR* = 605±14°C/1h

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	55-80
3.2 x 350	80-140
3.2 x 450	80-140
4.0 x 350	120-170
4.0 x 450	120-170
5.0 x 450	180-240

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
3.2x350	SRP	50	1.9	524604-1
3.2x450	SRP	50	2.4	524543-1
4.0x350	SRP	28	1.5	524574-1

Kryo® 4

TOP FEATURES

- Excellent impact toughness down to -80 °C in as welded condition and -100 °C after PWHT
- Extremely low hydrogen content
- Shall be used in AC or DC+/- mode.

CLASSIFICATION

AWS A5.5 E7016-C2L H4
EN ISO 2560-A E 42 6 3Ni B 12 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	HDM
0.03	0.6	0.4	0.01	0.005	3.6	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-80 °C	-101 °C
Required: AWS A5.5	PWHT*	min. 390	min. 480	min. 25		min. 27
EN ISO	AW	min. 380	470-600	min. 20	47	
Typical values	AW	490	570	30	90	
	PWHT*	420	510	30	120	90

AW = As welded

* 605±14 °C/1h

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-90
3.2 x 350	80-140
4.0 x 350	
4.0 x 450	

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5 x 350	SRP	TBD	0.0	524970-1
3.2 x 350	SRP	TBD	0.0	524932-1
4.0 x 350	SRP	TBD	0.0	524949-1
4.0 x 450	SRP	TBD	0.0	524916-1

SL® 12G

TOP FEATURES

- Service temperature from -40 up to 500°C
- DC-welding preferred
- 115 - 120% recovery

CLASSIFICATION

AWS A5.5 E7018-A1-H4R
EN ISO 3580-A E Mo B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

DNV	TÜV	DB
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Mo	HDM
0.05	0.8	0.6	0.020	0.010	0.55	2 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					+20°C	-20°C
Required: AWS A5.5	SR(1)	min. 390	min. 490	min. 25	not specified	
EN ISO	SR(2)	min. 355	min. 510	min. 22	min. 47	
Typical values	SR(3)	560	620	25	140	50
	AW	550	610	25	160	70

AW = As welded

Stress relieved: SR(1) = 620±14°C/1h, SR(2) = 570-620°C/1h, SR(3) = 620°C/1h

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-90
3.2 x 350	80-130
4.0 x 350	120-180
5.0 x 450	160-240

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	SRP	67	1.4	523973-1
	CBOH	94	2.0	516999-1
3.2x350	SRP	50	1.9	524017-1
	CBOX	108	4.0	516968-1
4.0x350	SRP	28	1.5	524000-1
	CBOX	80	4.3	516975-1
5.0x450	CBOX	50	5.3	516982-1

SL® 22G

TOP FEATURES

- Maximum service temperature 550 °C
- AC/DC electrode + or -. DC welding by preference.
Root pass in open joints, electrode negative preferable
- 115 - 120% recovery

CLASSIFICATION

AWS A5.5 E 8018-B1-H4
EN ISO 3580-A E Z B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

TÜV

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Cr	Mo	HDM
0.06	0.8	0.6	0.020	0.010	0.5	0.5	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					+20 °C	-10 °C
Required: AWS A5.5	SR(1)	min. 460	min. 550	min. 19	not specified	
Typical values	SR(2)	570	640	24	180	110

Stress relieved: SR(1) = 690±14 °C/1h, SR(2) = 730 °C/1h

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	60-90
3.2 x 350	80-130
4.0 x 350	120-180
5.0 x 450	160-220

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	SRP	63	0.0	524246-1
3.2x350	SRP	50	0.0	524284-1
4.0x350	SRP	28	0.0	524277-1

Conarc® 55CT

TOP FEATURES

- Excellent mechanical properties (impact down to -40°C)
- Suitable for positional welding and welding with an inverter power source.
- Very low diffusible hydrogen content.
- The weld deposit has a very similar appearance to Cor-Ten A steel.

CLASSIFICATION

AWS A5.5 E 8018-G H4R
EN ISO 2590-A E 50 4 Z B 32 H5

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	Cu	Cr
0.06	1.3	0.4	≤0.02	≤0.02	0.45	0.45	0.5

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-18°C	-40°C
Required: AWS A5.5		min. 460	min. 550	min. 19	min. 27	
EN ISO 2560-A	AW	min. 500	560-720	min. 18		≥47
Typical values		≥500	560-720	≥23		100

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	55-85
3.2 x 350	80-145
4.0 x 350	120-185
5.0 x 450	180-270

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5 x 350	SRP	TBD	0.0	523522-1
3.2 x 350	SRP	TBD	0.0	523539-1
4.0 x 350	SRP	27	1.9	523546-1

DEVIATIONS: CHEMICAL COMPOSITION

Mn = 1.4-1.9% AWS: Mn = 0.50-1.30%
Si = 0.15-0.60% AWS: Si = 0.35-0.80%
Cr = 0.1% AWS: Cr = 0.45-0.70%
Ni = 0.7-1.0% AWS: Ni = 0.40-0.80%
Cu = 0.3-0.5% EN: Cu max. 0.3%

Arosta® 304L

TOP FEATURES

- Excellent corrosion resistance in oxidizing environments such as nitric acid
- High resistance to intergranular corrosion
- Smooth bead appearance
- Easy slag release
- Strong electrode coating
- Weldable on AC and DC

CLASSIFICATION

AWS A5.4 E308L-16
EN ISO 3581-A E 19 9 L R 12

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

BV	TÜV
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
0.02	0.8	0.8	19.5	9.7	4-10

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					+20 °C	-20 °C	-196 °C
Required: AWS A5.4		not specified	min. 520	min. 35	not specified		
EN ISO		min. 320	min. 510	min. 30	not specified		
Typical values	AW	440	580	43	70	60	24

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.0 x 300	30-50
2.5 x 350	40-75
3.2 x 350	60-110
4.0 x 350	80-150
5.0 x 350	140-220

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.0x300	CBOH	80	0.0	527520-1
2.5x350	SRP	69	1.4	530087-1
	CBOH	105	2.1	527537-1
3.2x350	SRP	56	1.8	530063-1
	CBOX	130	4.1	527834-1
4.0x350	CBOX	83	4.4	527940-1
5.0x350	CBOX	50	4.1	528053-1

Arosta® 307

TOP FEATURES

- Especially developed for steels difficult to weld, such as armour plates and austenitic high Mn-steels
- Often used as a buffer layer in hardfacing applications
- Weldable on AC and DC+ polarity

CLASSIFICATION

AWS A5.4 E307-16
EN ISO 3581-A E 188 Mn R 12

CURRENT TYPE

AC/DC+

WELDING POSITIONS

All position, except vertical down

APPROVALS

TÜV	DB
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
0.09	5.0	0.6	18.5	8.5	0

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					+20°C	-60°C
Required: AWS A5.4		not specified	min. 590	min. 30	not specified	
EN ISO		min. 350	min. 500	min. 25	not specified	
Typical values	AW	450	650	35	110	75

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	70-80
3.2 x 350	90-120
4.0 x 350	110-140

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOH	97	2.1	527391-1
3.2x350	CBOX	130	4.4	527407-1
4.0x350	CBOX	86	4.5	527414-1

Arosta® 309S

TOP FEATURES

- For welding stainless steel to mild steel and root runs in clad steel
- Applicable for root passes in N alloyed AISI 304LN steels
- Excellent weldability and self releasing slag
- High resistance to embrittlement
- Weldable on AC and DC+ polarity

CLASSIFICATION

AWS A5.4 E 309L-16
EN ISO 3581-A E 23 12 L R 32

CURRENT TYPE

AC/DC+

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	BV	TÜV
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
0.02	0.8	0.8	23.5	12.5	12-20

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					+20°C	-20°C	-120°C
Required: AWS A5.4		not specified	min. 520	min. 30	not specified		
EN ISO		min. 320	min. 510	min. 25	not specified		
Typical values	AW	480	560	40	60	50	40

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	40-75
3.2 x 350	60-110
4.0 x 350	80-150
5.0 x 350	140-220

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOH	100	2.0	528374-1
3.2x350	SRP	56	1.9	528367-1
	CBOX	125	4.2	528381-1
4.0x350	CBOX	84	4.2	528497-1

Arosta® 316L

TOP FEATURES

- Molybdenum level min. 2.7%
- High resistance to general and intergranular corrosion
- Smooth weld appearance
- Easy slag release
- Strong electrode coating

CLASSIFICATION

AWS A5.4 E316L-16
EN ISO 3581-A E 19 12 3 L R 12

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS	LR	BV	DNV	TÜV	DB
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	Mo	FN (acc.WRC 1992)
0.02	0.8	0.8	18.0	11.5	2.85	4-10

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					+20°C	-20°C	-120°C
Required: AWS A5.4		not specified	min. 490	min. 30	not specified		
EN ISO 3581-A		min. 320	min. 510	min. 25	not specified		
Typical values	AW	450	580	39		60	40

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
1.5 x 250	20-40
2.0 x 300	30-50
2.5 x 350	40-75
3.2 x 350	60-110
4.0 x 350	80-150
5.0 x 350	140-220

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
1.5 x 250	PE Tube	145	0.0	529159-1
2.0x300	CBOH	170	1.9	529173-1
2.5x350	SRP	10	0.2	515236-1
	SRP	69	1.4	530001-1
	CBOH	100	2.0	529180-1
3.2x350	SRP	56	1.8	530032-1
	CBOX	130	4.3	529487-1
4.0x350	CBOX	84	4.5	529593-1
5.0x350	CBOX	50	4.1	529708-1

Clearosta® E 304L

TOP FEATURES

- Suitable for root pass
- Lower porosity, good striking and restriking
- Excellent slag removal

CLASSIFICATION

AWS A5.4E308L-17

EN ISO 3581-AE 19 9 L R 22

CURRENT TYPE

DC+

WELDING POSITIONS

Flat/Horizontal

APPROVALS

DNV	TÜV
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	P	S	FN (acc.WRC 1992)
0.03	0.8	1.00	19.5	10.0	0.025	0.01	5-10

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	AW	≥420	≥520	≥35	≥50

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 300	70-90
3.2 x 350	100-120
4.0 x 350	140-160
5.0 x 350	190-210

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x300	VPMD	90	1.7	710001
3.2x350	VPMD	55	1.9	710002
4.0x350	VPMD	40	2.1	710003
5.0x350	VPMD	20	1.6	710004

MMA

Clearosta® E 309L

TOP FEATURES

- Suitable for root pass
- Lower porosity, good striking and restriking
- Excellent slag removal

CLASSIFICATION

AWS A5.4 E 309L-17
EN ISO 3581-A E 23 12 L R 22

CURRENT TYPE

DC+

WELDING POSITIONS

Flat/Horizontal

APPROVALS

DNV	TÜV
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	P	S	FN (acc.WRC 1992)
0.03	0.9	1.00	24.0	13.0	0.025	0.01	8-15

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	AW	≥420	≥520	≥35	≥50

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 300	70-90
3.2 x 350	100-120
4.0 x 350	140-160
5.0 x 350	190-210

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x300	VPMD	90	1.8	710005
3.2x350	VPMD	55	2.0	710006
4.0x350	VPMD	40	2.2	710007
5.0x350	VPMD	20	1.7	710008

Clearosta® E 316L

TOP FEATURES

- Suitable for root pass
- Lower porosity, good striking and restriking
- Excellent slag removal

CLASSIFICATION

AWS A5.4 E316L-17
EN ISO 3581-A E 19 12 3 L R 22

CURRENT TYPE

DC+

WELDING POSITIONS

Flat/Horizontal

APPROVALS

DNV	TÜV
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	Mo	P	S	FN (acc.WRC 1992)
0.03	0.8	1.00	19.5	10.0	2.7	0.025	0.01	5-10

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	AW	≥420	≥520	≥35	≥50

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 300	70-90
3.2 x 350	100-120
4.0 x 350	140-160
5.0 x 350	190-210

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x300	VPMD	90	1.7	710009
3.2x350	VPMD	55	2.0	710010
4.0x350	VPMD	40	2.1	710011
5.0x350	VPMD	20	1.7	710012

Limarosta® 304L

TOP FEATURES

- Mirror like bead appearance
- Self releasing slag
- Excellent side wall wetting, no undercut
- High resistance to porosity
- Weldable on AC and DC

CLASSIFICATION

AWS A5.4 E308L-17
EN ISO 3581-A E 19 9 L R 12

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

LR	DNV	TÜV	DB
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
0.025	0.75	0.95	19.0	9.7	4-10

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					+20°C	-20°C
Required: AWS A5.4		not specified	min. 520	min. 35	not specified	
EN ISO		min. 320	min. 510	min. 30	not specified	
Typical values	AW	440	600	45	75	60

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.0 x 300	35-50
2.5 x 350	45-80
3.2 x 350	80-115
4.0 x 450	100-155
5.0 x 450	150-220

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.0x300	CBOH	150	1.8	557312-1
2.5x350	CBOH	92	2.0	557329-1
3.2x350	CBOX	120	4.2	557367-1
4.0x450	CBOX	85	5.8	557398-1
5.0x450	CBOX	50	5.3	557404-1

Limarosta® 309S

TOP FEATURES

- Self releasing slag
- Excellent side wall wetting, no undercut, mirror like bead appearance
- High resistance to porosity

CLASSIFICATION

AWS A5.4 E 309L-17
EN ISO 3581-A E 23 12 L R 32

CURRENT TYPE

AC/DC+

WELDING POSITIONS

All position, except vertical down

APPROVALS

LR	DNV	TÜV	DB
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
0.02	0.8	1.0	23.0	12.5	10-20

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					+20°C	-20°C
Required: AWS A5.4		not specified	min. 520	min. 30	not specified	
EN ISO		min. 320	min. 510	min. 25	not specified	
Typical values	AW	440	600	40	55	50

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.0 x 300	35-55
2.5 x 350	45-80
3.2 x 350	80-115
4.0 x 350	100-155
5.0 x 350	150-220

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.0x300	CBOH	150	1.8	557527-1
2.5x350	SRP	65	1.4	539684-1
	CBOH	90	2.0	557534-1
3.2x350	SRP	52	1.8	539714-1
	CBOX	120	4.2	557565-1
4.0x450	SRP	28	1.9	539691-1
	CBOX	81	5.6	557589-1
5.0x450	CBOX	50	5.4	557596-1

MMA

Limarosta® 316L

TOP FEATURES

- Molybdenum level min. 2.7%
- Mirror like bead appearance
- Self releasing slag
- Good side wall fusion, no undercut
- High resistance to porosity

CLASSIFICATION

AWS A5.4 E316L-17
EN ISO 3581-A E 19 12 3 L R 12

CURRENT TYPE

AC/DC(+/-)

WELDING POSITIONS

All position, except vertical down

APPROVALS

LR	DNV	TÜV	DB
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	Mo	FN (acc.WRC 1992)
0.02	0.8	1.0	18.0	11.5	2.8	4-10

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					+20°C	-20°C	-105°C
Required: AWS A5.4		not specified	min. 490	min. 30	not specified		
EN ISO		min. 320	min. 510	min. 25	not specified		
Typical values	AW	450	580	40	70	60	40

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
1.5 x 250	20-40
2.0 x 300	35-50
2.5 x 350	45-80
3.2 x 350	80-115
4.0 x 450	100-155
5.0 x 450	150-220

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.0x300	CBOH	150	1.7	557435-1
2.5x350	SRP	65	1.4	539912-1
	CBOH	90	2.0	557442-1
3.2x350	SRP	52	1.8	539943-1
	CBOX	120	4.2	557466-1
4.0x450	SRP	28	1.9	539929-1
	CBOX	81	5.5	557497-1
5.0x450	SRP	22	2.4	539936-1
	CBOX	52	5.6	557503-1

LINOX 308L

TOP FEATURES

- Smooth weld appearance
- Minimum spatter and high resistance to porosity
- Good side wall wetting, no undercut

CLASSIFICATION

AWS A5.4 E 308L-17
EN ISO 3581-A E 19 9 L R 32

CURRENT TYPE

AC/DC+

WELDING POSITIONS

Flat/Horizontal

APPROVALS

ABS							
+							

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	P	S	FN (acc.WRC 1992)
0.025	0.9	0.8	19.8	9.5	≤0.030	≤0.025	5-10

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	AW	≥320	≥520	≥35	≥60

AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.0 x 300	CBOH	150	1.7	620163
	VPMD	150	1.7	620166
2.5 x 300	VPMD	90	1.7	620203
2.5 x 350	CBOH	90	2.0	620140
	VPMD	90	2.0	620152
3.2 x 350	CBOH	55	1.9	620141
	VPMD	55	1.9	620153
4.0 x 450	CBOH	40	2.8	620142
	VPMD	40	2.8	620154
5.0 x 450	VPMD	20	2.1	620155

MMA

LINOX 309L

TOP FEATURES

- Smooth weld appearance
- Minimum spatter and high resistance to porosity
- Good side wall wetting, no undercut

CLASSIFICATION

AWS A5.4 E 309L-17
 EN ISO 3581-A E 23 12 L R 32

CURRENT TYPE

AC/DC+

WELDING POSITIONS

Flat/Horizontal

APPROVALS

ABS

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	P	S	FN (acc.WRC 1992)
≤0.040	0.9	0.9	23.5	12.2	≤0.025	≤0.025	5-20

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	AW	≥400	≥520	≥30	≥47

AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5x350	CBOH	90	2.0	620144
	VPMD	90	2.0	620156
3.2x350	CBOH	55	2.0	620145
	VPMD	55	2.5	620157
4.0x450	CBOH	40	2.9	620147
	VPMD	40	3.3	620158

MMA

LINOX 316L

TOP FEATURES

- Smooth weld appearance
- Minimum spatter and high resistance to porosity
- Good side wall wetting, no undercut

CLASSIFICATION

AWS A5.4 E 316L-17
EN ISO 3581-A E 19 12 3 L R 32

CURRENT TYPE

AC/DC+

WELDING POSITIONS

Flat/Horizontal

APPROVALS

ABS

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	Mo	P	S	FN (acc.WRC 1992)
0.035	0.9	0.8	19.0	12.0	2.6	≤0.025	≤0.025	44839

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	AW	≥350	≥510	≥30	≥50

AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.0x300	CBOH	150	1.7	620165
	VPMD	150	1.7	620168
2.5x300	VPMD	90	1.7	620202
2.5x350	CBOH	90	2.0	620148
	VPMD	90	2.0	620159
3.2x350	CBOH	55	2.0	620149
	VPMD	55	2.0	620160
4.0x450	CBOH	40	2.8	620150
	VPMD	40	3.1	620161
5.0x450	VPMD	20	2.2	620162

LINOX P 308L

TOP FEATURES

- All positional welding including fixed pipework
- Smooth weld appearance
- Minimum spatter and high resistance to porosity

CLASSIFICATION

AWS A5.4 E 308L-16
EN ISO 3581-A E 19 9 L R 32

CURRENT TYPE

AC/DC+

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
0.025	0.8	0.6	19.0	9.5	3-10

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -100°C
Required: AWS A5.4		not specified	min. 520	min. 35	
EN ISO		min. 310	min. 510	min. 30	
Typical values	AW	450	590	45	35

AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.0x300	CBOH	150	1.6	620172
	VPMD	150	1.6	620176
2.5x350	CBOH	95	1.8	620173
	VPMD	95	1.8	620177
3.2x350	CBOH	55	1.7	620174
	VPMD	55	1.7	620178
4.0x450	CBOH	40	2.6	620175
	VPMD	40	2.6	620179

LINCOLN P 309L

TOP FEATURES

- All positional welding including fixed pipework
- Smooth weld appearance
- Minimum spatter and high resistance to porosity

CLASSIFICATION

AWS A5.4 E 309L-16
EN ISO 3581-A E 23 12 L R 32

CURRENT TYPE

AC/DC+

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS					
+					

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
0.025	0.8	0.6	23.5	13.0	8-20

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -20 °C
Required: AWS A5.4		not specified	min. 520	min. 30	not specified
EN ISO		min. 320	min. 510	min. 25	not specified
Typical values	AW	495	595	41	45

AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5 x 350	CBOH	95	1.9	620180
	VPMD	95	1.9	620183
3.2 x 350	CBOH	55	1.9	620181
	VPMD	55	1.9	620184
4.0 x 450	VPMD	40	2.7	620185

MMA

LINOX P 316L

TOP FEATURES

- All positional welding including fixed pipework
- Smooth weld appearance
- Minimum spatter and high resistance to porosity

CLASSIFICATION

AWS A5.4 E 316L-16
EN ISO 3581-A E 19 12 3 L R 32

CURRENT TYPE

AC/DC+

WELDING POSITIONS

All position, except vertical down

APPROVALS

ABS

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni	Mo	FN (acc.WRC 1992)
0.025	0.8	0.6	19.0	12.0	2.5	3-10

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					+20 °C	-105 °C
Required: AWS A5.4		not specified	min. 520	min. 30	not specified	
EN ISO		min. 320	min. 510	min. 25	not specified	
Typical values	AW	480	580	41	70	40

AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.0x300	CBOH	150	1.7	620186
	VPMD	150	1.7	620191
2.5x350	CBOH	95	1.9	620187
	VPMD	95	1.9	620192
3.2x350	CBOH	60	2.0	620188
	VPMD	60	2.0	620193
4.0x450	CBOH	40	2.7	620189
	VPMD	40	2.7	620194

ALMN

TOP FEATURES

- Good weldability
- No porosity

CLASSIFICATION

AWS A5.3 E3003
EN ISO 18273-A Al 3103

CURRENT TYPE

DC+

WELDING POSITIONS

All position, except vertical down

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Al	Mn	Si	Zn	Fe	Cu	Mg	Others
bal.	0.9-1.2	0.3 max.	0.09 max.	0.6 max.	0.02 max.	0.15 max	0.15 max.

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	AW	40	110	20

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	40-70
3.2 x 350	60-90

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5 x 350	CAN	-	2.0	809718
3.2 x 350	CAN	-	2.0	800579

MMA

AlSi5

TOP FEATURES

- Good weldability, no porosity
- Shall be welded in DC+ mode

CLASSIFICATION

AWS A5.3 E 4043
EN ISO 18273-A Al 4043A

CURRENT TYPE

DC+

WELDING POSITIONS

All position, except vertical down

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Al	Si
bal.	5.0

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	AW	90	160	15

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	40-70
3.2 x 350	60-90
4.0 x 350	80-120

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5 x 350	CAN	-	2.0	800593
3.2 x 350	CAN	-	2.0	800609

MMA

AlSi12

TOP FEATURES

- Also applicable as surfacing electrode
- Good weldability, no porosity
- Applicable when Al-properties are unknown

CLASSIFICATION

AWS A5.3 E 4047
EN ISO 18273-A Al 4047A

CURRENT TYPE

DC+

WELDING POSITIONS

All position, except vertical down

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Al	Si
bal.	12.0

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	AW	80	180	5

AW = As welded

OUTPUT RANGE

Diameter x Length (mm)	Current range (A)
2.5 x 350	40-70
3.2 x 350	60-90
4.0 x 350	80-120

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Electrodes/pack	Net weight/pack (kg)	Item number
2.5 x 350	CAN	-	2.0	800623
3.2 x 350	CAN	-	2.0	800630
4.0 x 350	CAN	-	2.0	800647

GMAW CONSUMABLES

MIG/MAG WIRES



MILD STEEL

LNM 25	114
Ultramag®	115
Ultramag® SG3	117
Supramig®	118
Supramig® HD	120
Supramig® Ultra	121
Supramig® Ultra HD	122

LOW ALLOY STEEL

LNM 12	123
LNM 19	124
LNM 20	125
LNM 28	126
LNM MoNi	127
LNM MoNiVa	128
LNM MoNiCr	129
LNM Ni1	130
LNM Ni2.5	131
Pipelinier® 80Ni1	132

STAINLESS STEEL

LNM 304LSi	133
LNM 316LSi	134
LNM 309LSi	135
LNM 347Si	136
LNM 307	137
LNM 309H	138
LNM 310	139
LNM 318Si	140
LNM 4455	141

COPPER ALLOYS

LNM CuAl8	142
LNM CuSi3	143
LNM CuSn	144

ALUMINIUM

SuperGlaze® MIG 4043	145
SuperGlaze® MIG 4047	146
SuperGlaze® MIG 5087	147
SuperGlaze® MIG 5183	148
SuperGlaze® MIG HD 5183	149
SuperGlaze® MIG 5356	150
SuperGlaze® MIG HD 5356	151
SuperGlaze® MIG 5556A	152
SuperGlaze® MIG 5754	153

HARDFACING

LNM 420FM	154
-----------------	-----

GMAW CONSUMABLES MIG/MAG WIRES

LNМ 25

TOP FEATURES

- Stable arc and excellent feedability
- Excellent mechanical properties
- Used mainly in single pass welding

TYPICAL APPLICATIONS

- General fabrication
- Automotive

CLASSIFICATION

AWS A5.18 ER70S-3
EN ISO 14341-А G 42 4 M21 2Si

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂
C1 Active gas 100% CO₂

APPROVALS

ABS	LR	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.08	1.1	0.6

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -40° C
Typical values	M21	AW	450	540	26	150

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
0.8	SPOOL (B300)	16.0	E08K016P1E01
1.0	SPOOL (B300)	16.0	E10K016P1E01
	DRUM	250.0	E10D250E1S01
1.2	SPOOL (B300)	16.0	E12K016P1E01
	DRUM	250.0	E12D250E1S01

Ultramag®

TOP FEATURES

- Good performances in terms of feedability and weldability
- Stable arc and low spatter
- High productivity

TYPICAL APPLICATIONS

- General Contructions
- Heavy Fabrication
- Infrastructures
- Automotive

CLASSIFICATION

AWS A5.18	ER70S-6
EN ISO 14341-A	G42 3 C1 3Si1 / G46 4 M20 3Si1 / G46 4 M21 3Si1

SHIELDING GASES (ACC. EN ISO 14175)

M21	Mixed gas Ar+ >15-25% CO ₂
M20	Mixed gas Ar+ >5-15% CO ₂
C1	Active gas 100% CO ₂

APPROVALS

ABS	LR	DNV	TÜV	DB	CE
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.08	1.40	0.85

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-30° C	-40° C
Typical values	M21	AW	470	570	24		170
	C1	AW	450	550	25	71	130

* AW = As welded

Ultramag®

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)
0.6	SPOOL (S200)	5.0
	SPOOL (S300)	15.0
0.8	SPOOL (S200)	5.0
	SPOOL (S300)	15.0
	SPOOL (B300)	16.0
	SPOOL (BS300)	16.0
	DRUM	250.0
0.9	DRUM	250.0
1.0	SPOOL (S200)	5.0
	SPOOL (S300)	15.0
	SPOOL (B300)	16.0, 18.0
	SPOOL (BS300)	16.0
	DRUM	250.0, 500.0
1.2	SPOOL (S200)	5.0
	SPOOL (S300)	15.0
	SPOOL (B300)	16.0, 18.0
	SPOOL (BS300)	16.0
	DRUM	250.0, 500.0
1.4	DRUM	500.0
1.6	SPOOL (B300)	16.0
	SPOOL (BS300)	16.0
	DRUM	250.0, 500.0

MIG/MAG

Ultramag® SG3

TOP FEATURES

- Good performances in terms of feedability and weldability
- Stable arc and low spatter
- High productivity

TYPICAL APPLICATIONS

- General Contructions
- Heavy Fabrication
- Infrastructures
- Automotive

CLASSIFICATION

AWS A5.18 ER70S-6
EN ISO 14341-A G46 3 C1 4Si1 / G46 5 M20 4Si1 / G46 5 M21 4Si1

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂
M20 Mixed gas Ar+ >5-15% CO₂
C1 Active gas 100% CO₂

APPROVALS

ABS	LR	DNV	TÜV	DB	CE
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.08	1.70	0.85

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-40°C	-50°C
Typical values	M21	AW	490	590	25		90
	C1	AW	480	570	26	180	

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)
0.8	SPOOL (S300)	15.0
	SPOOL (B300)	16.0
	SPOOL (BS300)	16.0
	DRUM	250.0, 500.0
1.0	SPOOL (S300)	15.0
	SPOOL (B300)	16.0
	SPOOL (BS300)	16.0
	DRUM	250.0, 500.0
1.2	SPOOL (B300)	16.0, 18.0
	SPOOL (BS300)	16.0
1.6	DRUM	250.0, 500.0
	DRUM	250.0

Supramig®

TOP FEATURES

- Excellent feedability and very consistent welding performance
- Tight and stable arc with extremely low spatter
- Smooth bead profile and best appearance
- Available in all packagings from spools to drums

TYPICAL APPLICATIONS

- General Contructions
- Heavy Fabrication
- Infrastructures
- Automotive
- Robotics

CLASSIFICATION

AWS A5.18 ER70S-6
EN ISO 14341-A G42 3 C1 3Si1 / G46 4 M21 3Si1

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂
C1 Active gas 100% CO₂

APPROVALS

ABS	BV	DNV	TÜV	DB	CWB	CE
+	+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.08	1.40	0.85

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-30° C	-40° C
Typical values	M21	AW	480	570	28		120
	C1	AW	440	550	29	70	95

* AW = As welded

MIG/MAG

Supramig®

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)
0.8	SPOOL (S200)	5.0
	SPOOL (S300)	15.0
	SPOOL (B300)	16.0
	DRUM	250.0
0.9	DRUM	250.0
1.0	SPOOL (S200)	5.0
	SPOOL (S300)	15.0
	SPOOL (B300)	16.0, 18.0
	SPOOL (BS300)	16.0
	DRUM	250.0, 500.0
1.2	SPOOL (S200)	5.0
	SPOOL (S300)	15.0
	SPOOL (B300)	16.0, 18.0
	SPOOL (BS300)	16.0
	DRUM	250.0, 500.0
1.4	DRUM	250.0
1.6	SPOOL (S300)	15.0
	SPOOL (B300)	16.0
	DRUM	250.0

MIG/MAG

Supramig® HD

TOP FEATURES

- Excellent feedability and very consistent welding performance
- Self releasing silicate islands
- Tight and stable arc with extremely low spatter
- Deep root penetration and improved fatigue life

TYPICAL APPLICATIONS

- General Contructions
- Heavy Fabrication
- Infrastructures
- Automotive
- Robotics

CLASSIFICATION

AWS A5.18 ER70S-6
EN ISO 14341-1 G42 3 C1 3Si1 / G46 4 M21 3Si1

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂
C1 Active gas 100% CO₂

APPROVALS

ABS	BV	DNV	RINA	TÜV	DB	CWB	CE
+	+	+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.08	1.40	0.85

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)
Typical values	M21	AW	480	570	28	-30 °C -40 °C
	C1	AW	440	550	29	70 95

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)
0.8	SPOOL (B300)	16.0
	SPOOL (S300)	15.0
1.0	SPOOL (B300)	16.0
	SPOOL (BS300)	16.0
	DRUM	250.0, 500.0
	SPOOL (S300)	15.0
1.2	SPOOL (B300)	16.0
	SPOOL (BS300)	16.0
	DRUM	250.0, 500.0
	SPOOL (B300)	16.0
1.32	SPOOL (BS300)	16.0
	DRUM	250.0, 500.0
	SPOOL (B300)	16.0
1.6	DRUM	250.0

Supramig® Ultra

TOP FEATURES

- Excellent feedability and very consistent welding performance
- Tight and stable arc with extremely low spatter
- Smooth bead profile and best appearance
- Available in all packagings from spools to drums

TYPICAL APPLICATIONS

- General Contructions
- Heavy Fabrication
- Infrastructures
- Automotive
- Robotics

CLASSIFICATION

AWS A5.18 ER70S-6
EN ISO 14341-A G46 3 C1 4Si1 / G50 5 M21 4Si1

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂
C1 Active gas 100% CO₂

APPROVALS

ABS	BV	DNV	TÜV	DB	CE
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.08	1.70	0.85

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						-20 °C	-40 °C	-50 °C
Typical values	M21	AW	500	600	25	80	110	70
	C1	AW	480	590	26	120	140	

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)
0.8	SPOOL (B300)	16.0
	SPOOL (S200)	5.0
1.0	SPOOL (S300)	15.0
	SPOOL (B300)	16.0, 18.0
	SPOOL (BS300)	16.0
	DRUM	250.0, 450.0, 500.0
	SPOOL (S300)	15.0
1.2	SPOOL (B300)	16.0, 18.0
	SPOOL (BS300)	16.0, 18.0
	DRUM	250.0, 500.0
	SPOOL (S300)	15.0
1.4	DRUM	250.0
	DRUM	250.0, 500.0
1.6	DRUM	250.0, 500.0
2.0	DRUM	500.0

Supramig® Ultra HD

TOP FEATURES

- Excellent feedability and very consistent welding performance
- Self releasing silicate islands
- Tight and stable arc with extremely low spatter
- Deep root penetration and improved fatigue life

TYPICAL APPLICATIONS

- General Contructions
- Heavy Fabrication
- Infrastructures
- Automotive
- Robotics

CLASSIFICATION

AWS A5.18 ER70S-6
EN ISO 14341-1 A G46 3 C1 4Si1 / G50 5 M21 4Si1

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂
C1 Active gas 100% CO₂

APPROVALS

ABS	BV	DNV	TÜV	DB	CE
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.08	1.70	0.85

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)
Typical values	M21	AW	500	600	25	-20° C 80 110
	C1	AW	480	590	26	-40° C 120 140

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)
1.0	SPOOL (B300)	16.0
	SPOOL (B5300)	16.0
	DRUM	250.0, 500.0
1.2	SPOOL (S200)	5.0
	SPOOL (S300)	15.0
	SPOOL (B300)	16.0, 18.0
	SPOOL (B5300)	16.0, 18.0
	DRUM	250.0, 500.0
1.32	SPOOL (B300)	16.0
	SPOOL (B5300)	16.0
	DRUM	250.0, 500.0
1.4	SPOOL (B300)	16.0
	DRUM	250.0, 500.0

LNМ 12

TOP FEATURES

- Used for welding low alloy creep resistant ferritic steels and fine grained steels
- Ideal for low temperature applications in the as welded condition with service temperatures in range -30°C to +500°C
- Recommended for welding 0.5% Mo low-alloy steels and for high strength steels.

TYPICAL APPLICATIONS

- Oil & Gas
- Thermal Power
- Petrochemical
- Chemical

CLASSIFICATION

AWS A5.28 ER70S-A1
EN ISO 14341-A G 46 3 M21 2Mo
EN ISO 21952-A G MoSi

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂
C1 Active gas 100% CO₂

APPROVALS

TÜV	CE
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Mo
0.1	1.12	0.6	0.5

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20°C	-20°C
Typical values	M21	AW	503	606	24	130	74

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
0.8	SPOOL (B300)	15.0	580914
1.0	SPOOL (B300)	15.0	581133
1.2	SPOOL (B300)	15.0	580921

LNM 19

TOP FEATURES

- Also suitable where some resistance to hydrogen attack by sulphur bearing crude oil is required
- Excellent mechanical characteristics.
- Can also be used to weld 0.9% Cr and 0.5% Mo steels.

TYPICAL APPLICATIONS

- Oil & Gas
- Thermal Power
- Pressure vessels
- Chemical
- Boilers, plates, tubes steels

CLASSIFICATION

AWS A5.28 ER80S-G*
EN ISO 21952-A G CrMo1Si

* Nearest classification ER80S-B2

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂
C1 Active gas 100% CO₂
M13 Mixed gas Ar+ 0.5-3% O₂

APPROVALS

TÜV	CE
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Mo
0.1	1.0	0.5	1.2	0.5

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	M21	PWHT 700°C/1h	530	635	23	160

* PWHT = Post Weld Heat Treatment

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (B300)	15.0	581089
1.2	SPOOL (B300)	15.0	581065

LNМ 20

TOP FEATURES

- Deposit insensitive to cracking.
- Good radiographic quality.

TYPICAL APPLICATIONS

- Oil & Gas
- Thermal Power
- Pressure vessels
- Chemical
- Boilers, plates, tubes steels

CLASSIFICATION

AWS A5.28 ER90S-G*
EN ISO 21952-A G CrMo2Si

*Nearest classification ER90S-B3

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂
C1 Active gas 100% CO₂
M13 Mixed gas Ar+ 0.5-3% O₂

APPROVALS

CE				
+				

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Mo
0.08	0.9	0.6	2.5	1.0

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	M21	PWHT 690°C/1h	560	680	20	100

* PWHT = Post Weld Heat Treatment

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (B300)	15.0	581164
1.2	SPOOL (B300)	15.0	581157

MIG/MAG

LNМ 28

TOP FEATURES

- Due to the alloying system, it can also be used for welding of high yield strength steels.
- Contains a small percentage of copper to help preventing further oxidation of the weld bead
- Excellent mechanical characteristics and resistance to corrosion.

TYPICAL APPLICATIONS

- Infrastructures
- Transmission towers, barriers, ducting, chimneys
- Exhaust Systems

CLASSIFICATION

AWS A5.28 ER 80S-G
EN ISO 16834-A G Z Mn3Ni1Cu*

*Nearest classification

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂
C1 Active gas 100% CO₂

APPROVALS

DB	DNV	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Cu
0.1	1.4	0.75	0.8	0.3

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)
Typical values	M21	AW	570	620	25	-20°C -40°C

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (B300)	16.0	S10K016PCE01, S10K016PCX01
1.2	SPOOL (B300) DRUM	16.0 250.0	S12K016PCE01 S12D250ECS01

LNМ MoNi

TOP FEATURES

- The weld metal contains less than 1% Ni conforming to NACE requirement.
- For welding high yield strength steels.

TYPICAL APPLICATIONS

- Infrastructures
- Earthmoving
- Cranes
- Structural Steels

CLASSIFICATION

AWS A5.28 ER100S-G
EN ISO 16834-A G 62 4 M21 Mn3NiCrMo

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂

APPROVALS

CE	
+	

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Cr	Mo	Cu
0.10	1.65	0.75	0.55	0.60	0.30	0.08

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						-20 °C	-40 °C	-60 °C
Typical values	M21	AW	635	770	19	100	90	70

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (B300)	15.0	580822
1.2	SPOOL (B300)	15.0	580839

MIG/MAG

LNM MoNiVa

TOP FEATURES

- Excellent mechanical properties.
- For low temperature applications down to -40°C.
- Low heat inputs are recommended to obtain optimum joint mechanical properties.

TYPICAL APPLICATIONS

- Infrastructures
- Earthmoving
- Cranes
- Structural Steels

CLASSIFICATION

AWS A5.28 ER110S-G
EN ISO 16834-A G 69 4 M21 Mn3Ni1CrMo

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂

APPROVALS

TÜV	DB	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Cr	Mo	V	Cu
0.08	1.7	0.44	1.35	0.23	0.3	0.08	0.25

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -40°C
Typical values	M21	AW	710	790	20	70

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
0.8	SPOOL (BS300)	15.0	581218
1.0	SPOOL (B300)	16.0	S10K016PME01
	DRUM	250.0	S10D250EMS01
1.2	SPOOL (S300)	15.0	S12P015PMC01
	SPOOL (B300)	16.0	S12K016PME01
	DRUM	250.0	S12D250EMS01
1.4	DRUM	250.0	S14D250EMS01

LNM MoNiCr

TOP FEATURES

- Excellent mechanical properties.
- Up to 890 MPa yield strength steels
- Can be used for low temperature applications up to -40°C.

TYPICAL APPLICATIONS

- Infrastructures
- Earthmoving
- Cranes
- Structural Steels

CLASSIFICATION

AWS A5.28 ER120S-G
EN ISO 16834-A G 89 4 M21 Mn4Ni2CrMo

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂

APPROVALS

CE					
+					

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Cr	Mo
0.09	1.8	0.80	2.20	0.30	0.55

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-40°C	-60°C
Typical values	M21	AW	>890	950	>15	70	>50

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
0.8	SPOOL (BS300)	15.0	580584
1.0	SPOOL (BS300)	15.0	580587
1.2	SPOOL (BS300)	15.0	580594

MIG/MAG

LNM Ni1

TOP FEATURES

- Ideal for low temperature applications.
- The weld metal contains less than 1% Ni conforming to NACE requirements
- Stable arc and excellent feedability

TYPICAL APPLICATIONS

- LNG
- Cryogenic Applications
- Pipelaying

CLASSIFICATION

AWS A5.28 ER80S-Ni1
EN ISO 14341-A G 46 5 M21 3Ni1

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂

APPROVALS

TÜV	DB	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni
0.09	1.2	0.6	0.9

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)
Typical values	M21	AW	480	580	30	-60°C 60 -20°C

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (BS300)	15.0	582468
1.2	SPOOL (BS300)	15.0	582482

LNM Ni2.5

TOP FEATURES

- Ideal for low temperature applications.
- Excellent mechanical characteristic both when welded and after stress relieving.
- High impact value at low temperature (-60 °C as welded and -90 °C after stress relieving 15h/580 °C)

TYPICAL APPLICATIONS

- LNG
- Cryogenic Applications

CLASSIFICATION

AWS A5.28 ER80S-Ni2
EN ISO 14341-A G46 6 M21 2Ni2

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂

APPROVALS

CE			
+			

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni
0.1	1.1	0.55	2.4

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -60 °C
Typical values	M21	AW	490	580	24	85

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (BS300)	15.0	580372
1.2	SPOOL (BS300)	15.0	583632

MIG/MAG

Pipeliner® 80Ni1

TOP FEATURES

- Root pass capability up to X100 and hot, fill and cap pass up to X80 grade pipe
- Impact toughness capable of exceeding 69 - 95 J (51 - 70 ft·lbft) at -50°C (-58°F)
- Q2 Lot® - Certificate showing actual deposit chemistry available online
- Excellent wire placement for narrow groove welding
- ProTech® packaging system

TYPICAL APPLICATIONS

- Root pass welding on up to X100 grade pipe
- Hot, fill and cap pass welding on up to X80 grade pipe
- Pipeline
- Offshore

CLASSIFICATION

AWS A5.28 ER80S-G
EN ISO 14341-A G 3Ni1

SHIELDING GASES (ACC. EN ISO 14175)

C1 Active gas 100% CO₂
M20/M21 Mixed gas 75-95% Ar/Balance CO₂

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	P	S	Ni	Mo	Ti	Al
0.07	1.55	0.70	0.11	0.10	0.90	<0.01	0.08	<0.01

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-29°C	-50°C
Required: AWS A5.28				min. 550			
	C1	AW	600	665	28	80	45
	M20	AW	650	730	27	110	70

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL	4.5	ED033119
	SPOOL	15.0	ED033121
1.2	SPOOL	4.5	ED033122
	SPOOL	15.0	ED033120

LNM 304LSi

TOP FEATURES

- The low carbon reduces the propensity to intergranular carbide precipitation, which increases the resistance to intergranular corrosion without the use of stabilizers.
- The increased silicon content results in increased weld pool fluidity to give a smooth deposit appearance.
- Better weldability and appearance

TYPICAL APPLICATIONS

- Pipework
- Plates fabrication
- Vessel construction
- Cladding

CLASSIFICATION

AWS A5.9 ER308LSi
EN ISO 14343-A G 19 9 LSi

SHIELDING GASES (ACC. EN ISO 14175)

M12 Mixed gas Ar+ 0.5-5% CO₂
M13 Mixed gas Ar+ 0.5-3% O₂

APPROVALS

DNV	TÜV	DB	CE
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.02	1.9	0.8	20	10	0.1

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20 °C	-40 °C
Typical values	M12	AW	394	568	40	85	41

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
0.8	SPOOL (S200)	5.0	581381
	SPOOL (BS300)	15.0	581386
0.9	SPOOL (BS300)	15.0	581392
	SPOOL (S200)	5.0	581391
1.0	SPOOL (BS300)	15.0	581393
	DRUM	200.0	581285
	DRUM	250.0	581287
1.2	SPOOL (BS300)	15.0	581409
	DRUM	250.0	581362
1.6	SPOOL (BS300)	15.0	581416

LNМ 316LSi

TOP FEATURES

- The higher Si level results in a smooth weld bead shape and even appearance with excellent toe blending particularly in fillet welds.
- The weld metal has a high resistance to pitting and crevice corrosion by non-oxidising acids.
- Used for applications with service temperatures <400°C.

TYPICAL APPLICATIONS

- Pipework
- Plates fabrication
- Shipbuilding
- Cladding

CLASSIFICATION

AWS A5.9 ER316LSi
EN ISO 14343-A G 19 12 3 LSi

SHIELDING GASES (ACC. EN ISO 14175)

M12 Mixed gas Ar+ 0.5-5% CO₂
M13 Mixed gas Ar+ 0.5-3% O₂

APPROVALS

DNV	TÜV	DB	CE
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.01	1.8	0.8	18.5	12.2	2.5

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						+20°C	-120°C	-196°C
Typical values	M12	AW	452	580	30	150	70	44

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
0.8	SPOOL (S200)	5.0	580631
	SPOOL (BS300)	15.0	581423
	SPOOL (S300)	15.0	581426
0.9	SPOOL (BS300)	15.0	581428
1.0	SPOOL (S200)	5.0	580440
	SPOOL (BS300)	15.0	581430
	DRUM	250.0	581263
1.2	SPOOL (BS300)	15.0	581447
	DRUM	250.0	581270

LNM 309LSi

TOP FEATURES

- The weld metal has a delta-ferrite content of ~12% resulting in a high resistance to hot cracking.
- The increased silicon content results in increased weld pool fluidity to give a smooth deposit appearance.
- Also used for the welding of clad steels where service temperatures are below 300°C.

TYPICAL APPLICATIONS

- General fabrication
- Transport
- Process Industries

CLASSIFICATION

AWS A5.9 ER309LSi
EN ISO 14343-A G 23 12 L Si

SHIELDING GASES (ACC. EN ISO 14175)

M12 Mixed gas Ar+ 0.5-5% CO₂
M13 Mixed gas Ar+ 0.5-3% O₂

APPROVALS

DNV	TÜV	DB	CE
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.02	1.8	0.8	23.3	13.8	0.14

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20°C	-20°C
Typical values	M12	AW	436	582	37	87	80

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
0.8	SPOOL (BS300)	15.0	581669
0.9	SPOOL (BS300)	15.0	581770
1.0	SPOOL (BS300)	15.0	595789
	SPOOL (S300)	15.0	595792
	DRUM	250.0	581708
1.2	SPOOL (BS300)	15.0	595796
	SPOOL (S300)	15.0	595794
	DRUM	250.0	581710
1.6	SPOOL (BS300)	15.0	581706

LNМ 347Si

TOP FEATURES

- The weld metal has a high resistance to corrosive media at service temperatures <400 °C.
- Resistant to intergranular corrosion.
- The increased silicon content results in increased weld pool fluidity to give a smooth deposit appearance.

TYPICAL APPLICATIONS

- Process Industries
- Pharmaceutical Equipment
- High Temperature Stainless Applications

CLASSIFICATION

AWS A5.9 ER347Si
EN ISO 14343-A G 19 9 NbSi

SHIELDING GASES (ACC. EN ISO 14175)

M12 Mixed gas Ar+ 0.5-5% CO₂
M13 Mixed gas Ar+ 0.5-3% O₂

APPROVALS

TÜV	DB	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo	Nb
0.05	1.4	0.7	19.2	9.9	0.1	0.6

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20 °C	-196 °C
Typical values	M12	AW	460	650	35	100	40

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (BS300)	15.0	581249
	DRUM	250.0	581257
1.2	SPOOL (BS300)	15.0	581256
	DRUM	250.0	581258

LNM 307

TOP FEATURES

- The increased silicon content promotes weld pool fluidity resulting in a smoother weld deposit.
- Useful in case of difficult weldability.
- Often used as a buffer layer for hardfacing applications

TYPICAL APPLICATIONS

- Hardfacing
- Exhaust Systems
- Dissimilar joints
- Quenched and tempered steels

CLASSIFICATION

AWS A5.9 ER307*
EN ISO 14343-A G 18 8 Mn

*Nearest classification

SHIELDING GASES (ACC. EN ISO 14175)

M12 Mixed gas Ar+ 0.5-5% CO₂
M13 Mixed gas Ar+ 0.5-3% O₂

APPROVALS

TÜV	DB	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni
0.07	7.1	0.8	18.6	8.0

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	M12	AW	400	630	40	80

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
0.8	SPOOL (BS300)	15.0	581901
1.0	SPOOL (BS300)	15.0	581904
	DRUM	250.0	581959
1.2	SPOOL (BS300)	15.0	581911
	DRUM	250.0	581914

LNМ 309H

TOP FEATURES

- High resistance to oxidation up to 1050°C
- High carbon content

TYPICAL APPLICATIONS

- Furnaces Fabrication

CLASSIFICATION

AWS A5.9 ER309

SHIELDING GASES (ACC. EN ISO 14175)

M12 Mixed gas Ar+ 0.5-5% CO₂
M13 Mixed gas Ar+ 0.5-3% O₂

APPROVALS

CE					
+					

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.08	1.8	0.4	23.6	13.2	0.1

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	M12	AW	400	640	35	110

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (BS300)	15.0	595765

MIG/MAG

LNM 310

TOP FEATURES

- High temperature ductility and excellent resistance to oxidation at working temperatures <1000°C.
- The weld deposit is fully austenitic
- Excellent corrosion resistance even when hot.

TYPICAL APPLICATIONS

- Petrochemical
- Heat Exchangers
- Hot water boilers
- Furnaces Fabrication

CLASSIFICATION

AWS A5.9 ER310
EN ISO 14343-A G 25 20

SHIELDING GASES (ACC. EN ISO 14175)

M12 Mixed gas Ar+ 0.5-5% CO₂
M13 Mixed gas Ar+ 0.5-3% O₂

APPROVALS

CE

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.1	1.7	0.45	26	21	0.1

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	M12	AW	355	610	35	110

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (B5300)	15.0	595871
1.2	SPOOL (B5300)	15.0	581935

LNM 318Si

TOP FEATURES

- High resistance to intergranular corrosion and general corrosion conditions
- The increased silicon results in increased weld pool fluidity to give a smooth deposit appearance.
- The presence of the stabilizer improves resistance to precipitation of chromium carbides.

TYPICAL APPLICATIONS

- Fabrication of pipes, plates, vessels

CLASSIFICATION

AWS A5.9 ER318*
EN ISO 14343-A G 19 12 3 NbSi

*Nearest classification

SHIELDING GASES (ACC. EN ISO 14175)

M12 Mixed gas Ar+ 0.5-5% CO₂
M13 Mixed gas Ar+ 0.5-3% O₂

APPROVALS

TÜV	DB	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo	Nb
0.05	1.4	0.7	18.6	11.7	2.5	0.7

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	M12	AW	410	630	35	100

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (BS300)	15.0	596014
1.2	SPOOL (BS300)	15.0	582246

LNM 4455

TOP FEATURES

- Not susceptible for hot cracking

TYPICAL APPLICATIONS

- Non-magnetic applications
- Cryogenic Applications
- LNG

CLASSIFICATION

AWS A5.9 ER316LMn
EN ISO 14343-A G 20 16 3 Mn N L

SHIELDING GASES (ACC. EN ISO 14175)

M12 Mixed gas Ar+ 0.5-5% CO₂
M13 Mixed gas Ar+ 0.5-3% O₂

APPROVALS

TÜV	CE
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo	Nb
0.015	7	0.4	20	16	3.0	0.15

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -196 °C
Typical values	M12	AW	400	600	30	50

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (BS300)	15.0	692125
1.2	SPOOL (BS300)	15.0	692129

LNM CuAl8

TOP FEATURES

- Used for welding galvanized steel sheets and components in the automobile industry.
- It is an iron-free aluminum bronze, which composition offers a very high resistance to sea water-corrosion and to the most commonly used acids in any concentrations and at a wide range of operating temperatures.
- High erosion resistance.

TYPICAL APPLICATIONS

- Automotive components
- Galvanized Steels

CLASSIFICATION

AWS A5.7 ERCuAl-A1
EN ISO 24373-A S Cu 6100 (CuAl7)

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ 0.5-95% He

APPROVALS

CE	
+	

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Cu	Al	Mn
bal.	8	0.3

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Hardness (HB)
Typical values	I1	AW	185	430	30	95

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (B300)	12.0	582871
	DRUM	200.0	582875
1.2	SPOOL (B300)	12.0	581478
	DRUM	200.0	581480

LNМ CuSi3

TOP FEATURES

- This wire is frequently used for joining in artistic foundries, for welding galvanized sheets and even as a steel cladding.
- It is also suitable for surfaces subject to corrosion.
- Used also for MIG brazing where a very small active component is suggested in the shielding gas.

TYPICAL APPLICATIONS

- Cladding
- Brazing
- Automotive

CLASSIFICATION

AWS A5.7

ERCuSi-A

EN ISO 24373-A

S Cu 6560 (CuSi3Mn1)

SHIELDING GASES (ACC. EN ISO 14175)

I1

Inert gas Ar (100%)

I3

Inert gas Ar+ 0.5-95% He

APPROVALS

CE	
+	

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Cu	Sn	Mn	Si	Zn
bal.	0.1	1.0	3.0	0.1

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Hardness (HB)	Impact ISO-V (J) +20 °C
Typical values	I1	AW	120	350	40	95	60

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
0.8	SPOOL (S200)	5.0	587012
	SPOOL (BS300)	12.0	587029
1.0	SPOOL (BS300)	12.0	587036
1.2	SPOOL (BS300)	12.0	587039

LNМ CuSn

TOP FEATURES

- Solid wire for welding of copper
- Widely used in oven soldering.

CLASSIFICATION

AWS A5.7

ERCu

EN ISO 24373-A

S Cu 1898 (CuSn1)

SHIELDING GASES (ACC. EN ISO 14175)

I1

Inert gas Ar (100%)

I3

Inert gas Ar+ 0.5-95% He

APPROVALS

CE	
+	

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Cu	Mn	Si	Sn	Ni
bal.	0.2	0.3	0.8	0.1

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Hardness (HB)
Typical values	I1	AW	100	220	60	35

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (B300)	12.0	580945

MIG/MAG

SuperGlaze® MIG 4043

TOP FEATURES

- Designed for welding heat-treatable base alloys and more specifically the 6XXX series alloys
- Lower melting point and more fluidity than the 5XXX series filler alloys
- Low sensitivity to weld cracking with the 6XXX series base alloys

TYPICAL APPLICATIONS

- For welding 6XXX alloys, and most casting alloys
- Automotive components such as frame and drive shafts
- Bicycle frames

CLASSIFICATION

AWS A5.10 ER4043
EN ISO 18273-A S Al 4043A (AlSi5)

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ 0.5-95% He
Flow rate 14.2-23.6 l/min

APPROVALS

TÜV	DB	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Cu	Mn	Mg	Zn	Ti	Be
bal.	5.26	0.15	0.01	0.01	0.03	0.001	0.01	<0.0002

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	20-40	120-165	3-18

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL	7.0	ED701753, ED701754
	SPOOL	7.3	ED702747
1.2	SPOOL	7.3	ED702748
	DRUM	136.0	ED036610
1.6	SPOOL	7.0	ED701755
	DRUM	136.0	ED036611

SuperGlaze® MIG 4047

TOP FEATURES

- Substitute for 4043 to increase Silicon in weld metal
- Minimize hot cracking to produce higher fillet weld shear strength
- Cosmetic appearing welds
- Lower melting point and higher fluidity than 4043 wires

TYPICAL APPLICATIONS

- Automotive components
- Heat Exchangers
- Body panels
- Brazing of aluminum sheets, extrusions and castings

CLASSIFICATION

AWS A5.10 ER4047
EN ISO 18273-A S Al 4047 (AlSi12)

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
Argon/Helium Mixtures
Flow rate 14.2-23.6 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Cu	Mn	Mg	Zn	Be
bal.	11-13	max. 0.8	max. 0.30	max. 0.15	max. 0.10	max. 0.20	0.0003

Notes: Unspecified elements should not exceed a total of 0.15%

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	60-80	130-190	5-20

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1,2	SPOOL	7.3	EDS28415
	DRUM	136.0	ED036613
1,6	DRUM	136.0	ED036612

SuperGlaze® MIG 5087

TOP FEATURES

- Designed to meet the tensile strength requirements of high magnesium alloys
- For base metals with a max. of 5% Mg
- The presence of Zirconium produces a fine-grained weld metal structure
- Reduced tendency of solidification cracking in highly restrained welds

TYPICAL APPLICATIONS

- Marine
- Cryogenic Applications
- Shipbuilding
- Automotive
- Railway Industry

CLASSIFICATION

AWS A5.10 ER5087
EN ISO 18273-A S Al 5087 (AlMg4,5MnZr)

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ 0.5-95% He
Flow rate 14.2-23.6 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Mn	Mg	Cr	Ti	Zr	Be
bal.	0.06	0.13	0.7	4.9	0.07	0.01	0.12	0.0002

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	125-140	275-300	17-30

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL	7.3	ED703574

SuperGlaze® MIG 5183

TOP FEATURES

- Designed for applications where higher strength is required
- For 5083 and 5456 base materials
- Excellent corrosion resistance ideal for Ship building and marine applications

TYPICAL APPLICATIONS

- Marine fabrication and repair
- Cryogenic tanks
- Shipbuilding
- Bicycle frames
- Railing industry

CLASSIFICATION

AWS A5.10 ER5183
EN ISO 18273-A S Al 5183 (AlMg4.5Mn0.7(A))

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
 Argon/Helium Mixtures
Flow rate 14.2-23.6 l/min

APPROVALS

ABS	LR	BV	DNV	RINA	TÜV	DB	CE
+	+	+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Be
bal.	0.03	0.13	0.001	0.65	4.99	0.10	0.02	0.07	0.0002

Notes: Unspecified elements should not exceed a total of 0.15%

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	125-165	270-290	16-25

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1,0	SPOOL	7.0	ED701901
1,2	SPOOL	7.0	ED701758
	DRUM	136.0	ED034791
1,6	SPOOL	7.0	ED701759
	DRUM	136.0	ED034792

MIG/MAG

SuperGlaze® MIG HD 5183

TOP FEATURES

- Designed for heavy duty applications
- Reduced shavings and improved feedability
- Used on 5083 and 5456 base materials
- Also used on most 5XXX and 6XXX base materials
- Excellent corrosion resistance for marine applications

CLASSIFICATION

AWS A5.10 ER5183
EN ISO 18273-A S Al 5183 (AlMg4.5Mn0.7(A))

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ 0.5-95% He
Flow rate 14.2-23.6 l/min (for Argon)

APPROVALS

ABS	LR	BV	RINA	TÜV	DB	CE
+	+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Be
bal.	0.03	0.13	0.001	0.65	4.99	0.10	0.02	0.07	0.0002

Notes: Unspecified elements should not exceed a total of 0.15%

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	125-165	270-290	16-25

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1,2	SPOOL	7.0	ED703798
	SPOOL	7.3	ED704105
1,6	SPOOL	7.0	ED703800

SuperGlaze® MIG 5356

TOP FEATURES

- General purpose filler alloy for 5XXX and 6XXX series alloys
- The most widely used welding alloy
- High strength filler metal

TYPICAL APPLICATIONS

- Shipbuilding
- Railway Industry
- Automotive
- Storage tanks
- Power Industry

CLASSIFICATION

AWS A5.10 ER5356
EN ISO 18273-A S Al 5356 (AlMg5Cr(A))

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
Argon/Helium Mixtures
Flow rate 14.2-23.6 l/min

APPROVALS

ABS	LR	BV	DNV	RINA	CWB	TÜV	DB	CE
+	+	+	+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Be
bal.	0.05	0.09	0.03	0.12	4.90	0.08	<0.01	0.15	0.0002

Notes: Unspecified elements should not exceed a total of 0.15%

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	110-120	240-296	17-26

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
0,8	SPOOL	7.0	ED701762
	SPOOL	2.0	ED703753
1,0	SPOOL	7.0	ED701763
	SPOOL	7.3	ED702736
	SPOOL	2.0	ED702755
	SPOOL	7.0	ED701764
1,2	SPOOL	7.3	ED702737
	DRUM	136.0	ED034550
1,6	SPOOL	7.0	ED701765
	SPOOL	7.3	ED702738

SuperGlaze® MIG HD 5356

TOP FEATURES

- Designed for heavy duty applications
- Reduced shavings and improved feedability
- General purpose filler alloy for welding 5XXX series alloys

TYPICAL APPLICATIONS

- Shipbuilding
- Railway Industry
- Automotive
- Storage tanks
- Power Industry

CLASSIFICATION

AWS A5.10 ER5356
EN ISO 18273-A S Al 5356 (AlMg5Cr(A))

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ 0.5-95% He
Flow rate 14.2-23.6 l/min (for Argon)

APPROVALS

ABS	LR	BV	RINA	TÜV	DB	CE
+	+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Be
bal.	0.05	0.09	0.03	0.12	4.90	0.08	<0.01	0.15	0.0002

Notes: Unspecified elements should not exceed a total of 0.15%

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	110-120	240-296	17-26

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1,2	SPOOL	7.0	ED703770
1,6	SPOOL	7.0	ED703804

SuperGlaze® MIG 5556A

TOP FEATURES

- High Magnesium alloyed wire
- The elements are controlled to obtain increased weld strength over the 5356 alloy
- Good ductility and improved crack resistance
- High Corrosion resistance for Marine applications

TYPICAL APPLICATIONS

- Marine
- Aircraft
- Military Industry
- Storage tanks

CLASSIFICATION

AWS A5.10 ER5556A
EN ISO 18273-A S Al 5556A (AlMg5Mn)

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
Argon/Helium Mixtures
Flow rate 14.2-23.6 l/min

APPROVALS

CE							
+							

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Mn	Mg	Cr	Ti	Be
bal.	0.05	0.11	0.6	5.1	0.08	0.09	0.0002

Notes: Unspecified elements should not exceed a total of 0.15%

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	125-140	275-300	15-17

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1	SPOOL	7.3	ED703762
1.6	SPOOL	7.3	ED702986

MIG/MAG

SuperGlaze® MIG 5754

TOP FEATURES

- Magnesium alloyed aluminium for welding of alloys with a maximum of 3.5%
- Good corrosion resistance and excellent colour match after anodizing
- Suitable for a wide range of applications in general construction and structural industry

TYPICAL APPLICATIONS

- General Construction
- Structural Industry

CLASSIFICATION

AWS A5.10	ER5754
EN ISO 18273-A	S Al 5754 (AlMg3)

SHIELDING GASES (ACC. EN ISO 14175)

I1	Inert gas Ar (100%)
I3	Inert gas Ar+ 0.5-95% He
Flow rate	14.2-23.6 l/min

APPROVALS

TÜV	CE
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Cu	Mn	Mg	Cr	Ti	Be
bal.	0.07	0.13	0.01	0.29	3.0	0.06	0.05	0.0004

Notes: Unspecified elements should not exceed a total of 0.15%

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	70-80	180-200	15-20

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1,0	SPOOL	7.0	ED701766
1,2	SPOOL	7.0	ED701767

LNM 420FM

TOP FEATURES

- High resistance against corrosion, abrasion and impact deformation. Hardness approximately 55-60HRc
- Weld deposits can be used at service temperatures <450°C with a minimal loss of abrasion resistance. The as deposited weld metal can be shaped or profiled by grinding.
- Ferritic and martensitic structure

TYPICAL APPLICATIONS

- Hardfacing
- Repair
- Earthmoving

CLASSIFICATION

EN ISO 14700-A S Fe8

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂

APPROVALS

CE

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Cr	Si
0.5	0.4	9.0	3.0

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Hardness (HRc)
Typical values
aprox. 60

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (B300)	15.0	604047
1.2	SPOOL (B300)	15.0	604054

**MILD STEEL**

LNT 24.....	156
LNT 25.....	157
LNT 26	158
LNT 27.....	159

LOW ALLOY STEEL

LNT 12.....	160
LNT 19.....	161
LNT 20.....	162
LNT 28.....	163
LNT Ni1	164
LNT Ni2.5	165

STAINLESS STEEL

LNT 304L.....	166
LNT 304LSi	167
LNT 316L.....	168
LNT 316LSi	169
LNT 309L.....	170
LNT 309LSi	171
LNT 347Si	172
LNT 310.....	173

COPPER ALLOYS

LNT CuSi3.....	174
LNT CuSn6	175

ALUMINIUM

SuperGlaze® TIG 4043.....	176
SuperGlaze® TIG 5183.....	177
SuperGlaze® TIG 5356.....	178
SuperGlaze® TIG 5754.....	179

GTAW
CONSUMABLES
TIG RODS

LNT 24

TOP FEATURES

- Stable Arc
- Smooth bead appearance

TYPICAL APPLICATIONS

- Galvanized Steels
- General Construction

CLASSIFICATION

AWS A5.18 ER70S-2

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

CE	
+	

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ti	Zr	Al
0.05	1.20	0.5	0.10	0.05	0.08

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-20° C	-30° C
Typical values	I1	550	620	23	≥ 47J	≥ 27J

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
2,4	PE Tube	5.0	580210

TIG

LNT 25

TOP FEATURES

- Excellent mechanical and toughness properties for low temperature applications, down to -40°C.
- Stable Arc
- Good feedability

TYPICAL APPLICATIONS

- General fabrication
- Thermal Power

CLASSIFICATION

AWS A5.18 ER70S-3
EN ISO 636-A W 42 5 W2Si

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

TÜV	DB	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.08	1.1	0.6

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-20°C	-50°C
Typical values	I1	AW	450	560	26	170	100

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,6	PE Tube	5.0	T16T005R1S00
2,0	PE Tube	5.0	T20T005R1S00
2,4	PE Tube	5.0	T24T005R1S00
3,0	PE Tube	5.0	T30T005R1S00
3,2	PE Tube	5.0	T32T005R1S00

TIG

LNT 26

TOP FEATURES

- Excellent mechanical and toughness properties for low temperature applications, down to -50 °C.
- Smooth bead appearance

TYPICAL APPLICATIONS

- General Constructions

CLASSIFICATION

AWS A5.18 ER70S-6
EN ISO 636-A W 42 5 3Si1

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

TÜV	DB	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.1	1.5	0.9

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						-20 °C	-30 °C	-50 °C
Typical values	I1	AW	460	580	26	170	170	120

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,6	PE Tube	5.0	T16T005R6S00
2,0	PE Tube	5.0	T20T005R6S00
2,4	PE Tube	5.0	T24T005R6S00
3,2	PE Tube	5.0	T32T005R6S00

TIG

LNT 27

TOP FEATURES

- Excellent mechanical and toughness properties for low temperature applications, down to -50 °C.
- Smooth bead appearance

TYPICAL APPLICATIONS

- General Constructions

CLASSIFICATION

AWS A5.18 ER70S-6
EN ISO 636-A W 46 5 4Si1

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.1	1.5	0.9

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						-20 °C	-30 °C	-50 °C
Typical values	I1	AW	460	580	26	170	170	120

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,6	PE Tube	5.0	T16T005R3S00
2,0	PE Tube	5.0	T20T005R3S00
2,4	PE Tube	5.0	T24T005R3S00
3,2	PE Tube	5.0	T32T005R3S00

LNT 12

TOP FEATURES

- Used for welding low alloy creep resistant ferritic steels and fine grained steels
- Ideal for low temperature applications in the as welded condition with service temperatures in range -20°C to +500°C

TYPICAL APPLICATIONS

- Chemical
- Petrochemical
- Oil & Gas
- Thermal Power

CLASSIFICATION

AWS A5.28 ER70S-A1
EN ISO 636-A W 46 3 2Mo
EN ISO 21952-A W MoSi

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

DNV	TÜV	DB	CE
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Mo
0.1	1.2	0.6	0.5

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20°C	-20°C
Typical values	I1	AW	635	670	22	170	110

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1.6	PE Tube	5.0	604245
2.0	PE Tube	5.0	604269
2.4	PE Tube	5.0	604283
3.0	PE Tube	5.0	604306

LNT 19

TOP FEATURES

- Excellent mechanical characteristics.
- Also suitable where some resistance to hydrogen attack by sulphur bearing crude oil is required

TYPICAL APPLICATIONS

- Oil & Gas
- Thermal Power
- Pressure vessels
- Chemical
- Boilers, plates, tubes steels

CLASSIFICATION

AWS A5.28 ER80S-G*

EN ISO 21952-A W CrMo1Si

* Nearest classification ER80S-B2

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

TÜV	CE
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Mo
0.1	1.0	0.6	1.2	0.5

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	I1	PWHT 700°C/1h	540	640	22	250

* PWHT = Post Weld Heat Treatment

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
2,0	PE Tube	5.0	604344
2,4	PE Tube	5.0	604368
3,0	PE Tube	5.0	604382

LNT 20

TOP FEATURES

- Deposit insensitive to cracking.
- Also suitable for the welding of 1¼Cr½Mo steels where improved resistance to hydrogen attack or corrosion by sulphur is required.

TYPICAL APPLICATIONS

- Oil & Gas
- Thermal Power
- Pressure vessels
- Chemical
- Boilers, plates, tubes steels

CLASSIFICATION

AWS A5.28 ER90S-G*
EN ISO 21952-A W CrMo2Si
* Nearest classification ER90S-B3

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

TÜV	CE
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Mo
0.08	1.0	0.6	2.5	1.0

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	I1	PWHT 700°C/1h	560	640	22	140

* PWHT = Post Weld Heat Treatment

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
2,0	PE Tube	5.0	600247
2,4	PE Tube	5.0	605563
3,0	PE Tube	5.0	600587

TIG

LNT 28

TOP FEATURES

- The addition of Ni and Cu to the weld metal provides increased resistance to atmospheric corrosion compared to conventional C-Mn steels
- Copper percentage help preventing further oxidation of the weld bead
- Excellent mechanical characteristics and resistance to corrosion.

TYPICAL APPLICATIONS

- Infrastructures
- Weather Resisting Steels

CLASSIFICATION

AWS A5.28 ER80S-G

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

CE	
+	

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Cu
0.1	1.4	0.75	0.8	0.3

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -20° C
Typical values	I1	AW	570	620	26	80

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
2,4	PE Tube	5.0	606324

LNT Ni1

TOP FEATURES

- The weld metal contains less than 1% Ni conforming to NACE requirements
- Ideal for low temperature applications.

TYPICAL APPLICATIONS

- Cryogenic Applications
- Pipelaying
- LNG

CLASSIFICATION

AWS A5.28 ER80S-Ni 1
EN ISO 636-A W 42 6 3Ni1

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

TÜV	CE
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni
0.1	1.2	0.6	0.9

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -60° C
Typical values	I1	AW	480	580	30	60

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,6	PE Tube	5.0	600162
2,0	PE Tube	5.0	605112
2,4	PE Tube	5.0	605136
3,0	PE Tube	5.0	605235

TIG

LNT Ni2.5

TOP FEATURES

- Excellent mechanical characteristic both when welded and after stress relieving.
- High impact value at low temperature (-60°C as welded and -90°C after stress relieving 15h/580°C)
- Ideal for low temperature applications.

TYPICAL APPLICATIONS

- Cryogenic Applications
- Pipelaying
- LNG

CLASSIFICATION

AWS A5.28 ER80S-Ni2
EN ISO 636-A W 46 6 2Ni2

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

CE

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni
0.1	1.1	0.55	2.4

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-62°C	-90°C
Typical values	I1	AW	525	605	28	280	133

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
2,0	PE Tube	5.0	600216
2,4	PE Tube	5.0	600223
3,0	PE Tube	5.0	605211

TIG

LNT 304L

TOP FEATURES

- The low carbon content reduces the propensity to intergranular carbide precipitation, which increases the resistance to intergranular corrosion without the use of stabilizers.
- The weld metal provides good corrosion resistance properties to intergranular attack from a range of liquid media at service temperatures up to 300°C.
- Excellent mechanical strength and corrosion resistance.

TYPICAL APPLICATIONS

- Pipework
- Petrochemical
- Nuclear Power generation

CLASSIFICATION

AWS A5.9 ER308L
EN ISO 14343-A W 19 9 L

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

CE					
+					

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.01	1.7	0.4	20	10	0.1

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20°C	-196°C
Typical values	I1	AW	472	692	34	120	91

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,2	PE Tube	5.0	595460
1,6	PE Tube	5.0	595468
2,0	PE Tube	5.0	595470
2,4	PE Tube	5.0	595475
3,2	PE Tube	5.0	595482

TIG

LNT 304LSi

TOP FEATURES

- The low carbon content reduces the propensity to intergranular carbide precipitation, which increases the resistance to intergranular corrosion without the use of stabilizers.
- The increased silicon content results in increased weld pool fluidity to give a smooth deposit appearance.
- Better weldability and appearance

TYPICAL APPLICATIONS

- Pipework
- Plates fabrication
- Shipbuilding

CLASSIFICATION

AWS A5.9 ER308LSi
EN ISO 14343-A W 19 9 LSi

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

DNV	TÜV	DB	CE
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.02	2.0	0.8	20	10	0.1

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20 °C	-196 °C
Typical values	I1	AW	467	622	37	147	67

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,0	PE Tube	5.0	580174
1,2	PE Tube	5.0	580198
1,6	PE Tube	5.0	582512
2,0	PE Tube	5.0	582796
2,4	PE Tube	5.0	582802
3,2	PE Tube	5.0	583045

LNT 316L

TOP FEATURES

- The weld metal has a high resistance to crevice corrosion by oxidising acids.
- Excellent mechanical and chemical characteristics.
- Suitable for welding or hard-facing stainless steels with the same chemical composition

TYPICAL APPLICATIONS

- Pipework
- Petrochemical
- Nuclear Power generation

CLASSIFICATION

AWS A5.9 ER316L
EN ISO 14343-A W 19 12 3 L

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

CE		
+		

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.01	1.5	0.5	18.5	12	2.7

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						+20 °C	-120 °C	-196 °C
Typical values	I1	AW	400	620	35	100	80	40

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,2	PE Tube	5.0	601020
1,6	PE Tube	5.0	582239
2,0	PE Tube	5.0	600807
2,4	PE Tube	5.0	582499
3,2	PE Tube	5.0	582437

TIG

LNT 316LSi

TOP FEATURES

- The higher Si level results in a smooth weld bead shape and even appearance with excellent toe blending particularly in fillet welds.
- The weld metal has a high resistance to pitting and crevice corrosion by non-oxidising acids.
- Used for applications with service temperatures <400°C.

TYPICAL APPLICATIONS

- Pipework
- Plates fabrication
- Shipbuilding

CLASSIFICATION

AWS A5.9 ER316LSi
EN ISO 14343-A W 19 12 3 LSi

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

DNV	TÜV	DB	CE
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.03	1.9	0.8	18.5	12.0	2.7

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20°C	-196°C
Typical values	I1	AW	484	624	32	100	82

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,0	PE Tube	5.0	580259
1,2	PE Tube	5.0	580235
1,6	PE Tube	5.0	583915
2,0	PE Tube	5.0	583922
2,4	PE Tube	5.0	582819
3,2	PE Tube	5.0	583571

LNT 309L

TOP FEATURES

- The weld metal has a delta-ferrite content of ~12% resulting in a high resistance to hot cracking.
- Also used for the welding of clad steels where service temperatures are below 300 °C.
- 300 °C maximum operating temperature.

TYPICAL APPLICATIONS

- Pipework
- Petrochemical
- Nuclear Power generation

CLASSIFICATION

AWS A5.9 ER309L
EN ISO 14343-A W 23 12 L

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

CE					
+					

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.01	1.65	0.5	24	13	0.1

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	390	600	35

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,6	PE Tube	5.0	582240
2,0	PE Tube	5.0	582242
2,4	PE Tube	5.0	582245

TIG

LNT 309LSi

TOP FEATURES

- Also used for the welding of clad steels where service temperatures are below 300 °C.
- The weld metal has a delta-ferrite content of ~12% resulting in a high resistance to hot cracking.
- The increased silicon content results in increased weld pool fluidity to give a smooth deposit appearance.

TYPICAL APPLICATIONS

- General fabrication
- Cladding

CLASSIFICATION

AWS A5.9 ER309LSi
EN ISO 14343-A W 23 12 LSi

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

DNV	TÜV	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.02	2.0	0.8	23.5	13	0.1

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -120 °C
Typical values	I1	AW	400	600	35	65

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,2	PE Tube	5.0	606008
1,6	PE Tube	5.0	604405
2,0	PE Tube	5.0	604566
2,4	PE Tube	5.0	604641
3,2	PE Tube	5.0	604665

LNT 347Si

TOP FEATURES

- The weld metal has a high resistance to corrosive media at service temperatures <400°C.
- The presence of niobium reduces the propensity of intergranular chromium carbide precipitation and thus reduces the susceptibility to intergranular corrosion.
- The increased silicon content results in increased weld pool fluidity to give a smooth deposit appearance.

TYPICAL APPLICATIONS

- Process Industries
- High Temperature Stainless Applications

CLASSIFICATION

AWS A5.9 ER347Si
EN ISO 14343-A W 19 9 Nb Si

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

TÜV	DB	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo	Nb
0.05	1.4	0.7	19.5	9.5	0.01	0.6

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	0.2% Proof strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20°C	-196°C
Typical values	I1	AW	400	650	35	80	45

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,6	PE Tube	5.0	600664
2,0	PE Tube	5.0	600671
2,4	PE Tube	5.0	600678
3,2	PE Tube	5.0	600695

LNT 310

TOP FEATURES

- High temperature ductility and excellent resistance to oxidation at working temperatures <1000°C.
- The weld deposit is fully austenitic
- Excellent corrosion resistance even when hot.

TYPICAL APPLICATIONS

- Heat Exchangers
- Hot water boilers
- Fabrication of furnaces

CLASSIFICATION

AWS A5.9 ER310
EN ISO 14343-A W 25 20

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)

APPROVALS

CE

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.1	1.7	0.5	26	21	0.1

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Typical values	I1	AW	360	600	35	100

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,6	PE Tube	5.0	604773
2,0	PE Tube	5.0	604790
2,4	PE Tube	5.0	604797
3,2	PE Tube	5.0	603295

TIG

LNT CuSi3

TOP FEATURES

- This wire is frequently used for joining in artistic foundries, for welding galvanized sheets and even as a steel cladding.
- It is also suitable for surfaces subject to corrosion.

TYPICAL APPLICATIONS

- Cladding
- Brazing
- Automotive

CLASSIFICATION

AWS A5.7 ERCuSi-A
EN ISO 24373-A S Cu 6560 (CuSi3Mn1)

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ 0.5-95% He

APPROVALS

CE				
+				

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Cu	Sn	Mn	Si	Zn
bal.	0.1	1.0	3.0	0.1

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Hardness (HB)	Impact ISO-V (J) +20°C
Typical values	I1	AW	120	350	40	95	60

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1.6	PE Tube	2.5	604694
2.0	PE Tube	2.5	604698
2.4	PE Tube	2.5	604721

LNT CuSn6

TOP FEATURES

- Good electrical conductivity
- Excellent corrosion resistance

TYPICAL APPLICATIONS

- Copper Tin Alloys

CLASSIFICATION

AWS A5.7 ERCuSn-A
EN ISO 24373-A S Cu 5180 (CuSn6P)

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ 0.5-95% He

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Cu	Sn	P
bal.	6.0	0.2

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Hardness (HB)	Impact ISO-V (J) +20°C
Typical values	I1	AW	150	260	20	75	80

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
2.0	PE Tube	2.5	605022
2.4	PE Tube	2.5	605039

TIG

SuperGlaze® TIG 4043

TOP FEATURES

- Use on many weldable cast and wrought aluminium alloys
- Generally recommended for welding 5052, any 6XXX series alloys and castings
- Alloy embossed on each rod for easy identification

TYPICAL APPLICATIONS

- Bicycle frames
- Pressure vessels

CLASSIFICATION

AWS A5.10 R4043
EN ISO 18273-A S Al 4043A (AlSi5)

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
Argon/Helium Mixtures
Flow rate 14.2-23.6 l/min

APPROVALS

TÜV	DB	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Cu	Mn	Mg	Zn	Ti	Be
bal.	5.01	0.13	0.008	0.009	0.03	0.002	0.007	0.0002

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	20-40	120-165	3-18

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,6	CARTON BOX	5.0	ED701957
2,0	CARTON BOX	5.0	ED702537
2,4	CARTON BOX	5.0	ED701958
3,2	CARTON BOX	5.0	ED701959
4,0	CARTON BOX	5.0	ED702783

SuperGlaze® TIG 5183

TOP FEATURES

- Designed for applications where higher strength is required
- For 5083 and 5654 base materials
- Excellent corrosion resistance ideal for Ship building and marine applications

TYPICAL APPLICATIONS

- Marine
- Shipbuilding
- Cryogenic tanks
- Bicycle frames
- Railway Industry

CLASSIFICATION

AWS A5.10 R5183
EN ISO 18273-A S Al 5183 (AlMg4.5Mn0.7(A))

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ 0.5-95% He
Flow rate 14.2-23.6 l/min

APPROVALS

TÜV	DB	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Be
bal.	0.03	0.13	0.001	0.65	4.99	0.10	0.02	0.07	0.0002

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	125-165	270-290	16-25

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,6	CARTON BOX	5.0	ED701963
2,0	CARTON BOX	5.0	ED702566
2,4	CARTON BOX	5.0	ED701965
3,2	CARTON BOX	5.0	ED701964
4,0	CARTON BOX	5.0	ED702517

SuperGlaze® TIG 5356

TOP FEATURES

- Aluminium-magnesium alloy for use on many weldable cast and wrought aluminium alloys
- Excellent for color matching after anodizing
- Alloy embossed on each rod for easy identification
- General purpose filler alloy for 5XXX and 6XXX series alloys
- High strength filler metal

TYPICAL APPLICATIONS

- Architectural structures
- Armored vehicles
- Gun mount bases

CLASSIFICATION

AWS A5.10 R5356
EN ISO 18273-A S Al 5356 (AlMg5Cr(A))

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ 0.5-95% He
Flow rate 14.2-23.6 l/min

APPROVALS

TÜV	DB	CE
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Be
bal.	0.06	0.09	0.02	0.12	4.84	0.12	0.001	0.09	0.0002

Notes: Unspecified elements should not exceed a total of 0.15%

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	110-120	240-296	17-26

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,6	CARTON BOX	5.0	ED701966
2,0	CARTON BOX	5.0	ED702518
2,4	CARTON BOX	5.0	ED702387
3,2	CARTON BOX	5.0	ED701967
4	CARTON BOX	5.0	ED702585

SuperGlaze® TIG 5754

TOP FEATURES

- Magnesium alloyed aluminium for welding of alloys with a maximum of 3.5% Mg
- Good corrosion resistance and excellent colour match after anodizing
- Suitable for a wide range of applications in general construction and structural industry

TYPICAL APPLICATIONS

- General Construction
- Structural Industry

CLASSIFICATION

AWS A5.10 R5754
EN ISO 18273-A S Al 5754 (AlMg3)

SHIELDING GASES (ACC. EN ISO 14175)

I1 Inert gas Ar (100%)
I3 Inert gas Ar+ 0.5-95% He
Flow rate 14.2-23.6 l/min

APPROVALS

TÜV	CE
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

Al	Si	Fe	Cu	Mn	Mg	Cr	Ti	Be
bal.	0.07	0.13	0.01	0.29	3.0	0.06	0.05	0.0004

Notes: Unspecified elements should not exceed a total of 0.15%

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values	I1	AW	70-80	180-200	15-20

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Diameter x Length (mm)	Packaging	Weight (kg)	Item number
1,6	CARTON BOX	5.0	ED703743
2,0	CARTON BOX	5.0	ED703744
2,4	CARTON BOX	5.0	ED703745
3,2	CARTON BOX	5.0	ED703746

FCAW-G & FCAW-S CONSUMABLES

FLUX-CORED WIRES

GAS-SHIELDED, MILD STEEL

Outershield® 71E-H	182
Outershield® 71M-H	183
Outershield® 71MS-H	184
Outershield® 71T1	185
Outershield® T55-H	186

GAS-SHIELDED, LOW ALLOY STEEL

Outershield® 12-H	187
Outershield® 19-H	188
Outershield® 20-H	189
Outershield® 500CT-H	190
Outershield® 555CT-H	191
Outershield® 690-H	192
Outershield® 690-HSR	193
Outershield® 81K2-H	194
Outershield® 81K2-HSR	195
Outershield® 81Ni1-H	196
Outershield® 81Ni1-HSR	197
Outershield® 91K2-HSR	198
Outershield® 91Ni1-HSR	199
Outershield® 101Ni1-HSR	200
Pipeliner® G60M-E	201
Pipeliner® G70M-E	202
Pipeliner® G80M-E	203

METAL-CORED GAS-SHIELDED, MILD STEEL

Outershield® MC700	204
Outershield® MC-710-H	205
Outershield® MC710RF-H	206
Outershield® MC715-H	207

METAL-CORED GAS-SHIELDED, LOW ALLOY STEEL

Outershield® MC420N-H	208
Outershield® MC555CT-H	209
Outershield® MC715Ni1-H	210
Outershield® MC80D2-H	211

GAS-SHIELDED, STAINLESS STEEL

Cor-A-Rosta® 304L	212
Cor-A-Rosta® P304L	213
CLEAROSTA F 304L	214
Cor-A-Rosta® 316L	215
Cor-A-Rosta® P316L	216
CLEAROSTA F 316L	217
Cor-A-Rosta® 309L	218
Cor-A-Rosta® P309L	219
CLEAROSTA F 309L	220
Cor-A-Rosta® 347	221

GAS-SHIELDED, HARDFACING

Lincore® 55-G	222
---------------------	-----

SELF-SHIELDED, MILD STEEL

Innershield® NR®-152	223
Innershield® NR®-203MP	224
Innershield® NR®-203 Ni1	225
Innershield® NR®-207	226
Innershield® NR®-211-MP	227
Innershield® NR®-212	228
Innershield® NR®-232	229
Innershield® NR®-233	230
Innershield® NR®-311	231
Innershield® NR®-440Ni2	232
Innershield® NS-3M	233

SELF-SHIELDED, LOW ALLOY STEEL

Pipeliner® NR®-208-XP	234
Pipeliner® NR®-208-P	235

SELF-SHIELDED, HARDFACING

Lincore® 15CrMn	236
Lincore® 33	237
Lincore® 50	238
Lincore® 55	239
Lincore® 60-O	240
Lincore® M	241
Lincore® T&D	242

FCAW-G
& FCAW-S
CONSUMABLES
FLUX-CORED
WIRES

Outershield® 71E-H

TOP FEATURES

- Rutile flux cored wire for high quality welding with M21 gas
- Excellent operator appeal due to superior welding characteristics
- Superior product consistency with optimal alloy control
- H4 class in 1.6mm diameter
- Full out-of-position capability with high deposition rates

CLASSIFICATION

AWS A5.20E71T-1M-JE71T-1C-H4

EN ISO 17632-A T 46 3 P M 1 H5T 42 0 P C 1 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All

SHIELDING GASES (ACC. EN ISO 14175)

M21Mixed gas Ar+ (>15-25%) CO₂

C1Active gas 100% CO₂

Gas flow15-25l/min

APPROVALS

ABS	LR	BV	DNV	RINA	RMRS
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	HDM
M21	0.04	1.4	0.6	0.013	0.010	3 ml/100 g
C1	0.05	1.3	0.6	0.015	0.010	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)			
						0 °C	-20 °C	-30 °C	-40 °C
Required: AWS A5.20			min. 400	min. 480	min. 22				min. 27
EN ISO 17632-A			min. 460	530-680	min. 20			min. 47	
Typical values	M21	AW	570	620	25		90	65	40
	C1	AW	520	575	24	80			

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	5.0	900125
	SPOOL (B300)	16.0	900118N, 900156N
	SPOOL (S300)	16.0	900149N, 900149NE
	DRUM	200.0	900297
	SPOOL (S300)	16.0	900262N, 900262NE
1.6	SPOOL (S300)	16.0	

Outershield® 71M-H

TOP FEATURES

- Specially developed for welding with 100% CO₂ and optimised for Ar/CO₂ mix gas; smooth arc with low spatter
- Good mechanical properties (CVN > 47) at -30 °C for CO₂)
- Perfect root pass welding on ceramic backing
- High current capacity, especially in positional welding
- Stable mechanical properties over the wider range of heat input

CLASSIFICATION

AWS A5.20 E71T-1/9C-H4 / E71T-1/9M-H4
EN ISO 17632-A T 46 3 P C 1 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
C1 Active gas 100% CO₂
Gas flow 15-25 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	HDM
C1	0.05	1,3	0.4	0.015	0.009	3 ml/100 g
M21	0.05	1,47	0.5	0.015	0.009	4 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)
Required: AWS A5.20			min. 400	min. 480	min. 22	
EN ISO 17632-A			min. 460	530-680	min. 20	min. 47
Typical values	M21	AW	595	650	26	80
	C1	AW	530	590	25	70

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.0	SPOOL (S200)	5.0	900770N
	SPOOL (S200)	5.0	900707
1.2	SPOOL (B300)	16.0	900700N, 900728N
	SPOOL (S300)	16.0	900728NE
	DRUM	200.0	900798
1.6	SPOOL (B300)	16.0	900735N
	SPOOL (S300)	16.0	900742N, 900742NE

Outershield® 71MS-H

TOP FEATURES

- Excellent operator appeal due to superior welding characteristics.
- Perfect root pass welding on ceramic backing. .
- Outstanding mechanical properties (CVN > 47J at -40°C).

CLASSIFICATION

EN ISO 17632-A T 46 4 P C 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

C1 Active gas 100% CO₂
Flow rate 15-25 l/min

APPROVALS

ABS	DNV
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Ni	Si	P	S	HDM
C1	0.05	1.35	0.4	0.4	0.015	0.010	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -40° C
Required: AWS A5.20			min. 400	min. 480	min. 22	
EN ISO 17632-A			min. 460	530-680	min. 20	min. 47
Typical values	C1	AW	540	610	25	75

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	5.0	900507
	SPOOL (B300)	16.0	900500N
	SPOOL (S300)	16.0	900528N
	DRUM	200.0	900598
1.6	SPOOL (S300)	16.0	900542N

FCAW

Outershield® 71T1

TOP FEATURES

- Rutile gas shielded flux cored wire designed and qualified for CO₂ shielding gas. Good operator appeal due to welding characteristics slag system
- Stable behavior in root passing on ceramic backing
- CVN > 47J at -20°C
- Suitable for primed plates

CLASSIFICATION

AWS E71T1-C-H8
EN ISO T 42 2 P C 2 H10

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

C1 Active gas 100% CO₂
Gas flow 15-25l/min

APPROVALS

Shielding gas	ABS	DNV	LRS	RINA
C1	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S
C1	0.05	1.1	0.3	0.015	0.010

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -20°C
Required: AWS A5.20			min. 400	490-660	min. 22	min. 27
EN ISO 17632-A			min. 420	500-640	min. 20	min. 47
Typical values	C1	AW	550	580	25	60

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	5.0	900907
	SPOOL (B300)	16.0	900914N
	SPOOL (S300)	16.0	900928N
1.6	SPOOL (S300)	16.0	900942N

Outershield® T55-H

TOP FEATURES

- All position gas shielded basic flux cored wire
- Good weldability, also vertical up (3G)
- Exceptional mechanical properties (CVN >47J) at -50 °C

CLASSIFICATION

AWS A5.20 E71T-5C-JH4
E71T-5M-JH4
EN ISO 17632-A T 42 4 B C 2 H5
T 42 4 B M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
C1 Active gas 100% CO₂
Gas flow 15-25l/min

APPROVALS

ABS	LR	BV	DNV	RINA	DB
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	HDM
C1	0.05	1.5	0.55	0.012	0.010	3 ml/100 g
M21	0.06	1.5	0.6	0.012	0.010	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						-20 °C	-40 °C	-50 °C
Required: AWS A5.20			min. 400	min. 480	min. 22		min. 27	
EN ISO 17632-A			min. 420	500-640	min. 20		min. 47	
Typical values	M21	AW	480	570	27	130	85	60
		SR: 15h/580 °C	425	570	27		80	

* AW = As welded; SR = Stress relieved

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	4.5	942231
	SPOOL (B300)	16.0	941609N
1.6	SPOOL (B300)	16.0	941549N

FCAW

Outershield® 12-H

TOP FEATURES

- Superior weldability, low spatter, good bead appearance
- Outstanding operator appeal
- Superior product consistency with optimal alloy control
- Excellent wire feeding

CLASSIFICATION

AWS A5.29 E 81T1-A1M-H4
EN ISO 17634-A T MoL P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

APPROVALS

TÜV

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Mo	HDM
M21	0.065	0.8	0.2	0.014	0.010	0.46	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20°C	-20°C
Required: AWS A5.29		SR = 620 ± 15°C/1h	min. 470	550-690	min. 19	not specified	
EN ISO 17634-A		SR = 570-620°C/1h	min. 355	min. 510	min. 22	min. 47	
Typical values	M21	SR = 1h/620°C	540	600	27	160	79

* SR = Stress relieved

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (B300)	16.0	943009N

Outershield® 19-H

TOP FEATURES

- Superior weldability, low spatter, good bead appearance
- Outstanding operator appeal
- Superior product consistency with optimal alloy control
- Excellent wire feeding

CLASSIFICATION

AWS A5.29 E 81T1-B2M-H4
EN ISO 17634-A T CrMo1 P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

APPROVALS

TÜV								
+								

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Cr	Mo	HDM
M21	0.07	0.74	0.24	0.013	0.010	1.24	0.52	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20°C	-20°C
Required: AWS A5.29		SR = 690 ± 15°C/1h	min. 470	550-690	min. 19	not specified	
EN ISO 17634-A		SR = 660-700°C/1h	min. 355	min. 510	min. 22	min. 47	
Typical values	M21	SR = 1h/690°C	545	635	21	150	80

* SR = Stress relieved

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (B300)	16.0	943016N

FCAW

Outershield® 20-H

TOP FEATURES

- Superior weldability, low spatter, good bead appearance
- Outstanding operator appeal
- Superior product consistency with optimal alloy control
- Excellent wire feeding

CLASSIFICATION

AWS A5.29 E 91T1-B3M-H4
 EN ISO 17634-A T CrMo2 P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
 Flow rate 15-25 l/min

APPROVALS

TÜV								
+								

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Cr	Mo	HDM
M21	0.07	0.75	0.21	0.013	0.008	2.23	1.09	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20 °C	-20 °C
Required: ISO 17634-A		SR = 690 ± 15 °C/1h	min. 540	620-760	min. 17	not specified	
EN ISO 17634-A		SR = 690-750 °C/1h	min. 400	min. 500	min. 18	min. 47	
Typical values	M21	SR = 1h/690 °C	570	680	19	150	60

* SR = Stress relieved

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S300)	16.0	943025N

FCAW

Outershield® 500CT-H

TOP FEATURES

- For welding in all positions
- Superior weldability, low spatter, good bead appearance
- Outstanding operator appeal

CLASSIFICATION

AWS A5.29 E81T1-GM
EN ISO 18276-A T 50 5 Z P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	Cu	HDM
M21	0.04	1.3	0.2	0.014	0.010	0.84	0.39	4 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -50°C
Required:			min. 470	550-690	min. 19	
EN ISO 18276-A			min. 500	560-720	min. 18	min. 47
Typical values	M21	AW	580	610	23	80

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (B300)	16.0	942781N

FCAW

Outershield® 555CT-H

TOP FEATURES

- For welding in all positions
- Superior weldability, low spatter, good bead appearance
- Outstanding operator appeal
- Exceptional mechanical properties (CVN >47J at -50°C)

CLASSIFICATION

AWS A5.29 E81T1-W2M-J
EN ISO 18276-A T555T1-1MA-NCC1-UH5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	Cr	Cu	HDM
M21	0.03	1.1	0.4	0.015	0.010	0.60	0.55	0.55	4 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-40°C	-50°C
Required:			min. 470	550-690	min. 19	min. 27	
EN ISO 18276-A			min. 460	550-740	min. 17		min. 47
Typical values	M21	AW	600	660	20	140	100

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (B300)	16.0	942789N

Outershield® 690-H

TOP FEATURES

- All position gas shielded rutile flux cored wire, for high strength steel grades like grade S690
- Outstanding operator appeal
- Excellent mechanical properties (CVN >50J) at -40°C

CLASSIFICATION

AWS A5.29 E111T1-K3M-JH4
EN ISO 18276-A T 69 4 Z P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	Mo	HDM
M21	0.06	1.5	0.2	0.015	0.010	2.0	0.3	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						-30°C	-40°C	-46°C
Required: AWS A5.29			min. 680	760-900	min. 15	min. 27		
EN ISO 18276-A			min. 690	770-940	min. 17		min. 47	
Typical values	M21	AW	780	810	18	85	80	65

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	4.5	942415
	SPOOL (B300)	16.0	942422N
	SPOOL (S300)	16.0	942453EN
1.6	SPOOL (S300)	16.0	942447N

FCAW

Outershield® 690-HSR

TOP FEATURES

- All position gas shielded rutile flux cored wire, for high strength steel grades like grade S690
- Specific design for stress relieved applications, guaranteed impact properties after PWHT
- Excellent mechanical properties (CVN >50J at -40 °C)

CLASSIFICATION

AWS A5.29 E 111T1-K3M-J
EN ISO 18276-A T 69 4 Z P M 2 H5 T

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	Mo	HDM
M21	0.06	1.5	0.2	0.015	0.010	2.0	0.5	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-30 °C	-40 °C
Required: AWS A5.29			min. 680	760-900	min. 15	min. 27	
EN ISO 18276-A			min. 690	770-940	min. 157		min. 47
Typical values	M21	AW	740	790	17	9	70
		SR: 1h/580 °C, 3G up - V60 °	720	770	20		60

* AW = As welded; SR = Stress relieved

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	4.5	942818
	SPOOL (B300)	16.0	942804N

Outershield® 81K2-H

TOP FEATURES

- Rutile flux cored gas shielded 1.5% Ni, Ti and B alloyed flux cored wire with very good impact toughness down to -60°C.
- Best in class consumable for welding of wind mill foundations and applications in offshore oil and gas and structural segments. Superior weldability, low spatter, good bead appearance.
- Exceptional mechanical properties (CVN >80J at -60°C).
- Superior product consistency with optimal alloy control
- Can be applied for applications requiring CTOD testing.

CLASSIFICATION

AWS A5.29 E81T1-K2M-J
EN ISO 17632-A T 50 6 1.5Ni P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

APPROVALS

LR	DNV	RINA
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	HDM
M21	0.04	1.4	0.2	0.012	0.010	1.4	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						-40°C	-50°C	-60°C
Required: AWS A5.29			min. 470	550-690	min. 19	min. 27		
EN ISO 17632-A			min. 500	560-720	min. 18			min. 47
Typical values	M21	AW	590	630	23	130	100	80

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (B300)	16.0	941395N
	SPOOL (S300)	16.0	941272N, 941494N

FCAW

Outershield® 81K2-HSR

TOP FEATURES

- Specific design for stress relieved applications, guaranteed impact properties after PWHT
- Superior weldability, low spatter, good bead appearance and outstanding operators appeal
- Exceptional mechanical properties (CVN >80J at -60°C)
- Superior product consistency with optimal alloy control

CLASSIFICATION

AWS A5.29 E81T1-K2M-J
EN ISO 17632-A T 50 6 1.5Ni P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	HDM
M21	0.06	1.3	0.3	0.012	0.010	1.4	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						-40°C	-50°C	-60°C
Required: AWS A5.29			min. 470	550-690	min. 19	min. 27		
EN ISO 17632-A			min. 500	560-720	min. 18			min. 47
Typical values	M21	AW	590	630	23	140	100	80
		SR 1h/600°C, 3G up - V45°	570	620	23			85

* AW = As welded; SR = Stress relieved

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (B300)	16.0	943207N

Outershield® 81Ni1-H

TOP FEATURES

- Best in class rutile flux cored wire for positional welding with very good impact toughness at -50 °C.
- Outstanding operator appeal. Optimal solution for welding of wind mill foundations, oil and gas industry and structural applications.
- Superior product consistency with optimal alloy control.
- Can be applied for applications requiring CTOD testing.
- Meets NACE MR-0175 requirements,

CLASSIFICATION

AWS A5.29 E81T1-Ni1M-J
EN ISO 17632-A T 50 5 1Ni P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

APPROVALS

LR	BV	DNV	RINA	RMRS	CWB
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	HDM
M21	0.05	1.4	0.2	0.013	0.010	0.95	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-40 °C	-50 °C
Required: AWS A5.29			min. 470	550-690	min. 19	min. 27	
EN ISO 17632-A			min. 500	560-720	min. 18		min. 47
Typical values	M21	AW	530	600	24	90	60

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	4.5	942316
	SPOOL (B300)	16.0	941357N, 941358N, 941359N
	SPOOL (S300)	16.0	941378N
	DRUM	200.0	942317
2.0	SPOOL (S300)	16.0	941381N

Outershield® 81Ni1-HSR

TOP FEATURES

- Specific design for stress relieved applications, guaranteed impact properties after PWHT
- Superior weldability, low spatter, good bead appearance
- Outstanding operator appeal. Optimal solution for wind mill foundations, oil and gas segment, structural and pipeline applications.
- Exceptional mechanical properties (CVN >47) at -50°C)
- Can be applied for applications requiring CTOD testing.

CLASSIFICATION

AWS A5.29 E81T1-Ni1M-J
EN ISO 17632-A T 55 4 1NiMo P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

APPROVALS

LR	BV	DNV	TÜV	DB
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	HDM
M21	0.05	1.4	0.2	0.013	0.010	0.95	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-40°C	-50°C
Required: AWS A5.29			min. 470	550-690	min. 19	min. 27	
EN ISO 17632-A			min. 500	560-720	min. 18		min. 47
Typical values	M21	AW	530	600	24	90	60
		SR: 1h/600°C, 3G up - V45°	525	590	25		70

* AW = As welded; SR = Stress relieved

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (B300)	16.0	942699N
	SPOOL (S300)	16.0	942719N
1.6	SPOOL (S300)	16.0	942767N

Outershield® 91K2-HSR

TOP FEATURES

- Outershield 91K2-HSR is low alloyed rutile flux cored wire and provides significant value for industry segments such as nuclear, pipelines and pressure vessels. Specific design for stress relieved applications, guaranteed impact properties after PWHT.
- Superior weldability, low spatter, good bead appearance and outstanding operators appeal
- Exceptional mechanical properties
- Superior product consistency with optimal alloy control
- Excellent wire feeding
- Specific design to withstand high heat input procedures

CLASSIFICATION

AWS A5.29 E91T1-GM
 EN ISO 18276-A T 55 4 1NiMo P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
 Flow rate 15-25 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	Mo	HDM
M21	0.05	1.4	0.2	0.013	0.010	1.4	0.4	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -40 °C
Required: AWS A5.29			min. 540	620-760	min. 17	
EN ISO 18276-A			min. 550	642-820	min. 18	min. 47
Typical values	M21	AW	640	700	19	60

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	5.0	943211
	SPOOL (S300)	15.0	ED034116N
	SPOOL (B300)	16.0	943212N
	SPOOL (S300)	16.0	943210N

Outershield® 91Ni1-HSR

TOP FEATURES

- Outstanding mechanical properties and purity of weld metal.
- Good weldability, also vertical up (3G)
- Exceptional mechanical properties (CVN >47) at -50°C)
- Superior product consistency with optimal alloy control

CLASSIFICATION

AWS A5.29 E91T1-GM
EN ISO 18276-A T 55 4 1NiMo P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	Mo	HDM
M21	0,05	1,4	0,2	0,013	0,010	0,95	0,4	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -40°C
Required: AWS A5.29			min. 540	620-760	min. 17	
EN ISO 18276-A			min. 550	640-820	min. 18	min. 47
Typical values	M21	AW	640	700	19	60

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S300)	16.0	942673N

Outershield® 101Ni1-HSR

TOP FEATURES

- Rutile micro alloyed flux-cored wire for welding in all positions, special of high carbon containing low alloy high strength steels such as SAE 4130
- Specific design for stress relieved applications. Outstanding operator appeal.
- Excellent mechanical properties (CVN >50J at -40°C).
- Superior product consistency with optimal alloy control. Good wire feeding.
- Meets NACE MR-0175 requirements.

TYPICAL APPLICATIONS

- Offshore
- Stress relief
- Pipeline

CLASSIFICATION

AWS A5.29 E101T1-G H4

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ >15-25% CO₂
Flow rate 15-25 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	Mo
M21	0.06	2.0	0.3	0.013	0.010	0.95	0.4

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-40°C	-50°C
Required: AWS A5.29			min. 610	830	min. 16		min. 27
Typical values	M21	AW	750	810	17	60	40
		SR	690	780	18		50

* AW = As welded; SR = Stress relieved: 4h/645°C

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S300)	15.0	ED034210N

FCAW

Pipeliner® G60M-E

TOP FEATURES

- All positional rutile flux cored wire for mechanized and semi-automatic welding with increased deposition rate (kg/h)
- Easy to remove slag reduces cleaning time and improves operating factor
- Concentrated and deeply penetrating arc helps to achieve optimal quality of welds
- Focused and clearly visible arc column offers easier welding and reduces operator training time
- Stable mechanical properties over a wide range of heat input, CVN > 47J at -40°C
- Very low hydrogen (HDM <4 ml/100g) and long term resistance against moisture pick-up in vacuum sealed packaging

CLASSIFICATION

AWS E71T1/9-M-J
EN ISO T 46 4 P M1 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Gas flow 15-25l/min

APPROVALS

Shielding gas	ABS
M21	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Ni	P	S	HDM
M21	0.04	1.35	0.25	0.45	0.013	0.008	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						-20°C	-30°C	-40°C
Required: AWS A5.20			min. 400	min. 480	min. 22			
EN ISO 17632-A			min. 460	530-680	min. 20			min. 47
Typical values	M21	AW	485	540	23	135	120	85

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	5.0	944225

Pipelin[®]er G70M-E

TOP FEATURES

- All positional rutile flux cored wire for mechanized and semi-automatic welding with increased deposition rate (kg/h)
- Designed for pipeline applications. Easy to remove slag reduces cleaning time and improves operating factor
- Concentrated and deeply penetrating arc helps to achieve optimal quality of welds
- Focused and clearly visible arc column offers easier welding and reduces operator training time
- Stable mechanical properties, CVN > 47J at -50°C
- Very low hydrogen (HDM <4 ml/100g) and long term resistance against moisture pick-up in vacuum sealed packaging

CLASSIFICATION

AWS

E81T1-GM-H4

EN ISO

T 50 5 Z P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All

SHIELDING GASES (ACC. EN ISO 14175)

M21

Mixed gas Ar+ (>15-25%) CO₂

Gas flow

15-25l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Ni	P	S	Mo
M21	0.06	1.5	0.2	0.95	0.013	0.010	0.15

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						-20°C	-40°C	-50°C
Required: AWS A5.29			min. 470	550-690	min. 19			
EN ISO 17632-A			min. 500	560-720	min. 18			min. 47
Typical values	M21	AW	580	630	23	100	90	70

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	4.5	944252
	SPOOL (B300)	16.0	944238N

FCAW

Pipelin[®]er G80M-E

TOP FEATURES

- Flux cored wire for mechanised and semi-automatic welding with increased deposition rate (kg/h).
- Perfect bead profile for fill and cap passes.
- Easy to remove, reduces cleaning time and improves operating factors.
- Focused and clearly visible arc column offers easier welding and reduces operator training time.
- A concentrated and deeply penetrating arc helps to achieve optimal quality of welds.
- Very low hydrogen (HDM <4 ml/100g) and long term resistance against moisture pick-up in vacuum sealed packaging.

CLASSIFICATION

AWS A5.29 E91T1-GM
EN ISO 17632-A T 55 4 1NiMo P M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Gas flow 15-25l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Ni	P	S	Mo
M21	0.06	1.4	0.3	0.95	0.013	0.010	0.4

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -40°C
Required: AWS A5.29			min. 540	620-760	min. 19	
EN ISO 17632-A			min. 550	640-820	min. 18	min. 47
Typical values	M21	AW	695	740	21	65

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	4.5	944253

Outershield® MC700

TOP FEATURES

- Very few silicates, virtually no spatter, fast travel speed, excellent wire feeding
- Superior product consistency with optimal alloy control

CLASSIFICATION

AWS A5.18 E70C-6M H48
EN ISO 17632-A T 46 2 M M 2 H10

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	HDM
M21	0.05	1.35	0.6	0.015	0.023	5 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-20 °C	-30 °C
Required: AWS A5.18			min. 400	min. 480	min. 22		min. 27
EN ISO 17632-A			min. 460	530-680	min. 20	min. 47	
Typical values	M21	AW	475	560	24	75	45

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (B300)	16.0	900206N

FCAW

Outershield® MC-710-H

TOP FEATURES

- High efficiency Metal Cored Wire for welding with M21 gas
- Excellent arc characteristics provides outstanding operator appeal
- Regular welds with very little silicates
- Superior product consistency with optimal alloy control

CLASSIFICATION

AWS A5.18 E70C-6M H4
EN ISO 17632-A T 46 3 M M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

APPROVALS

ABS	LR	BV	DNV	RINA	RMRS	TÜV	DB
+	+	+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	HDM
M21	0.05	1.35	0.6	0.015	0.023	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						-20 °C	-30 °C	-40 °C
Required: AWS A5.18			min. 400	min. 480	min. 22			
EN ISO 17632-A			min. 460	530-680	min. 20		min. 47	
Typical values	M21	AW	495	570	26	90	60	
	M21	SR: 15h/580 °C	430	530	28		105	75

* AW = As welded; SR = Stress relieved

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	5.0	900307
	SPOOL (B300)	16.0	900300N
	SPOOL (S300)	16.0	900356N, 900356NE
	DRUM	200.0	900398, 941922, 941922N
1.4	SPOOL (B300)	16.0	900328N
	DRUM	200.0	900391
1.6	SPOOL (B300)	16.0	900314N, 900370N
	SPOOL (S300)	16.0	900370NE
	DRUM	200.0	900384, 941924
	REEL	270.0	941692

Outershield® MC710RF-H

TOP FEATURES

- Very few silicates, virtually no spatter, fast travel speed, excellent wire feeding
- Superior on scaled plate, good resistance to porosity
- Very good mechanical properties (CVN >47J at -30°C)
- Superior product consistency with optimal alloy control

CLASSIFICATION

AWS A5.18 E70C-6M H4
EN ISO 17632-A T 46 3 M M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

APPROVALS

ABS	LR	BV	DNV	TÜV	DB
+	+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	HDM
M21	0.05	1.35	0.6	0.015	0.023	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-20°C	-30°C
Required: AWS A5.18			min. 400	min. 480	min. 22		min. 27
EN ISO 17632-A			min. 460	530-680	min. 20		min. 47
Typical values	M21	AW	495	570	26	90	60

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	5.0	901307
	SPOOL (B300)	16.0	901300, 901301
1.4	SPOOL (B300)	16.0	901328

Outershield® MC715-H

TOP FEATURES

- Few silicates and virtually no spatter, fast travel speed, excellent wire feeding.
- Excellent arc characteristics give outstanding operator appeal.
- Excellent mechanical properties (CNV >47) at -40°C
- Depending on application good alternative for basic flux cored wires

CLASSIFICATION

AWS A5.18 E70C-6M H4
EN ISO 17632-A T 46 4 M M2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

APPROVALS

BV	DNV	RINA	DB
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S
M21	0.04	1.5	0.4	0.012	0.020

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)
Required: AWS A5.18			min. 400	min. 480	min. 22	
EN ISO 17632-A			min. 460	530-680	min. 20	min. 47
Typical values	M21	AW	480	580	27	120 110

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (B300)	16.0	900402N
	SPOOL (S300)	16.0	900401N, 900429NE
	DRUM	200.0	900492, 941930
1.4	SPOOL (B300)	16.0	900408N
	DRUM	200.0	900491
1.6	SPOOL (B300)	16.0	900415N
	SPOOL (S300)	16.0	900470N
	DRUM	200.0	941932

Outershield® MC420N-H

TOP FEATURES

- High resistance to porosity
- Designed to withstand normalizing treatment (4h 900 °C)
- Mechanical properties after normalizing meet base material requirements

CLASSIFICATION

AWS A5.28 E70C-GM H4
EN ISO 17632-A T 38 Z Z M M 2 H5

CURRENT TYPE

DC+

WELDING POSITIONS

All

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Cr	Ni	HDM
M21	0.03	0.6	0.45	0.017	0.023	0.03	2.9	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -50°C
Typical values	M21	N = 900°C/4h	353	493	32	57

* N = Normalising

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.6	SPOOL (S300)	16.0	943327N
	DRUM	200.0	943314
2.0	DRUM	200.0	943316

Outershield® MC555CT-H

TOP FEATURES

- Excellent mechanical properties (CVN >47J at -40°C)
- Superior product consistency with optimal alloy control

CLASSIFICATION

AWS A5.28 E81T1-W2M-J
EN ISO 17632-B T554T15-OMA-NCC1-UH5

CURRENT TYPE

DC+

WELDING POSITIONS

All except vertical down

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Gas flow 15-25 l/min

APPROVALS

TÜV

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	Cr	Cu	HDM
M21	0.03	1.3	0.4	0.015	0.020	0.55	0.55	0.55	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
						-30°C	-40°C	-50°C
Required: AWS A5.28			min. 470	min. 550	min. 19	min. 27		
EN ISO 17632-B			min. 460	550-740	min. 17		min. 47	
Typical values	M21	AW	650	680	22	80	70	60

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (B300)	16.0	942792N
	SPOOL (S300)	16.0	942793N

FCAW

Outershield® MC715NI1-H

TOP FEATURES

- Virtually no spatter, high travel speed and excellent wire feeding
- Excellent mechanical properties (CVN >47J at -50°C)
- Superior product consistency with optimal alloy control

CLASSIFICATION

AWS A5.28 E70C-6M H4
EN ISO 17632-A T 46 5 1Ni M M 2 H5

CURRENT TYPE

DC+

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
Flow rate 15-25 l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	Ni	HDM
M21	0.05	1.35	0.45	0.020	0.020	0.95	3 ml/100 g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-40°C	-50°C
Required: AWS A5.28			min. 470	min. 550	min. 24	min. 27	
EN ISO 17632-A			min. 460	530-680	min. 20		min. 47
Typical values	M21	AW	530	600	25	100	80

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (B300)	16.0	941939N
	SPOOL (S300)	16.0	941938N
	DRUM	200.0	941941
1.6	SPOOL (S300)	16.0	941945N

FCAW

Outershield® MC80D2-H

TOP FEATURES

- High efficiency metal cored wire for heavy fabrication applications with increased strength and 0.5% Mo
- Excellent arc characteristics provides outstanding operator appeal
- Regular welds with very little silicates

CLASSIFICATION

AWS E80T15-M21G2-G
EN ISO T 55 3 T15 0 M21 G

CURRENT TYPE

DC+

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
C1 Active gas 100% CO₂

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	P	S	HDM
M21	0.06	1.45	0.54	0.010	0.010	3 ml/100 g

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (5300)	16.0	941948
1.6	DRUM	200.0	941950

Cor-A-Rosta® 304L

TOP FEATURES

- Stable arc, low spatter and good slag removal
- Improved quality of welds, higher current density coming from the nature of cored wires eliminates typical disadvantages of GMAW and SMAW welding
- Reduced welding cost compared to GMAW
- Very good weld appearance and regularity, optimal slag system helps to achieve best results.

CLASSIFICATION

AWS A5.22 E308LT0-1/-4
EN ISO 17633-A T 19 9 L R C/M 3

CURRENT TYPE

DC+

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
C1 Active gas 100% CO₂
Gas flow 15-25 l/min

APPROVALS

LR	DNV	TÜV
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
M21/C1	0.03	1.3	0.7	19.5	10	8

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20 °C	-110 °C
Required: AWS A5.22			not specified	min. 520	min. 35		
EN ISO 17633-A			min. 320	min. 510	min. 30		
Typical values	M21/C1	AW	400	560	42	80	40

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S300)	15.0	585155

FCAW

Cor-A-Rosta® P304L

TOP FEATURES

- Stable arc, low spatter and good slag removal
- Improved quality of welds, higher current density coming from the nature of cored wires eliminates typical disadvantages of GMAW and SMAW welding
- Reduced welding cost compared to GMAW

CLASSIFICATION

AWS A5.22 E308LT1-1/-4
EN ISO 17633-A T 19 9 L P C/M 2

CURRENT TYPE

DC+

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
C1 Active gas 100% CO₂
Gas flow 15-25l/min

APPROVALS

TÜV

+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
M21/C1	0.03	1.3	0.7	19.5	10	8

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20 °C	-110 °C
Required: AWS A5.22			not specified	min. 520	min. 35		
EN ISO 17633-A			min. 320	min. 510	min. 30		
Typical values	M21/C1	AW	400	560	42	80	40

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S300)	15.0	585179

FCAW

CLEAROSTA F 304L

TOP FEATURES

- Reduced exposure of welders to welding fumes.
- High alloyed rutile flux cored wire with fast freezing slag for the welding of 308 corrosion resistant Cr Ni-steels.
- Bright appearance of weld metal
- Reduced welding fume (up to -40%).
- Reduced emission of hexavalent Cr content (up to -60%).

CLASSIFICATION

AWS A5.22 E308LT1-1 / E308LT1-4
EN ISO 17633-A T 19 9 L P C 1/M 1

CURRENT TYPE

DC+

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
C1 Active gas 100% CO₂
Gas flow 15-25 l/min

APPROVALS

LR	BV	TÜV
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
M21/C1	0.03	1.3	0.7	19.5	10	3-12

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-20 °C	-196 °C
Typical values	M21/C1	AW	≥350	≥520	≥35	≥40	≥27

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (BS300)	15.0	710013

Cor-A-Rosta® 316L

TOP FEATURES

- Improved quality of welds, higher current density coming from the nature of cored wires eliminates typical disadvantages of GMAW and SMAW welding
- Reduced welding cost compared to GMAW
- Very good weld appearance and regularity, optimal slag system helps to achieve best results.

CLASSIFICATION

AWS A5.22 E316LT0-1/ -4
 EN ISO 17633-A T 19 12 3 L R C/M 3

CURRENT TYPE

DC+

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
 C1 Active gas 100% CO₂
 Gas flow 15-25l/min

APPROVALS

LR	TÜV
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Cr	Ni	Mo	FN (acc.WRC 1992)
M21/C1	0.03	1.3	0.5	19	12	2.7	8

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20°C	-110°C
Required: AWS A5.22			not specified	min. 485	min. 30		
EN ISO 17633-A			min. 320	min. 510	min. 25		
Typical values	M21/C1	AW	440	580	38	70	40

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S300)	15.0	585308

FCAW

Cor-A-Rosta® P316L

TOP FEATURES

- Improved quality of welds, higher current density coming from the nature of cored wires eliminates typical disadvantages of GMAW and SMAW welding
- Reduced welding cost compared to GMAW
- Very good weld appearance and regularity, optimal slag system helps to achieve best results.

CLASSIFICATION

AWS A5.22 E316LT1-1/-4
EN ISO 17633-A T 19 12 3 L P C/M 2

CURRENT TYPE

DC+

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
C1 Active gas 100% CO₂
Gas flow 15-25l/min

APPROVALS

ABS	DNV	TÜV
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Cr	Ni	Mo	FN (acc.WRC 1992)
M21/C1	0.03	1.3	0.5	19	12	2.7	6

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20°C	-110°C
Required: AWS A5.22			not specified	min. 485	min. 30		
EN ISO 17633-A			min. 320	min. 510	min. 20		
Typical values	M21/C1	AW	440	580	38	70	40

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	5.0	585353
	SPOOL (S300)	15.0	585322

CLEAROSTA F 316L

TOP FEATURES

- The weld metal is resistant to intergranular corrosion up to 400°C, and non-scaling up to 800°C.
- Exhibits outstanding, almost spatter-free, welding properties with very easy slag removal from fillet welds, even in acute angles
- The reduced welding fume (up to -40%) and the lower hexavalent Cr content (up to -60%) of the fume contribute to an improved working environment in the workshop, for all workers. Advantageous in confined spaces and with limited fume extraction systems.
- CLEARINOX F 316 L-PF is used for welding in the horizontal (PD), overhead (PE) and vertical-up (PF) positions.

CLASSIFICATION

AWS A5.22 E316LT1-1/-4
EN ISO 17633-A T 19 12 3 L P C/M 1

CURRENT TYPE

DC+

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
C1 Active gas 100% CO₂
Gas flow 15-25 l/min

APPROVALS

LR	BV	DNV	TÜV	DB
+	+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
M21/C1	0.04	1.4	0.6	19.0	12.0	5-10

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-20°C	-196°C
Typical values	M21/C1	AW	≥320	≥510	≥30	≥47	≥27

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (BS300)	15.0	710015

Cor-A-Rosta® 309L

TOP FEATURES

- for welding stainless to mild steel and buffer layers in clad steel
- Excellent weldability and self releasing slag
- High resistance to embrittlement

CLASSIFICATION

AWS A5.22 E309LT0-1/-4
EN ISO 17633-A T 23 12 LR C/M 3

CURRENT TYPE

DC+

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
C1 Active gas 100% CO₂
Gas flow 15-25l/min

APPROVALS

LR	TÜV
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
M21/C1	0.03	1.4	0.6	24	12.5	15

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20°C	-110°C
Required: AWS A5.22			not specified	min. 520	min. 30		
EN ISO 17633-A			min. 320	min. 510	min. 25		
Typical values	M21/C1	AW	445	560	36	45	40

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S300)	15.0	585209

FCAW

Cor-A-Rosta® P309L

TOP FEATURES

- for welding stainless to mild steel and buffer layers in clad steel
- Excellent weldability and self releasing slag
- High resistance to embrittlement

CLASSIFICATION

AWS A5.22 E309LT1-1/-4
EN ISO 17633-A T 23 12 LP C/M 2

CURRENT TYPE

DC+

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
C1 Active gas 100% CO₂
Gas flow 15-25l/min

APPROVALS

ABS	LR	DNV	TÜV
+	+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
M21/C1	0.04	1.3	0.6	24	12.5	15

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						+20°C	-110°C
Required: AWS A5.22			not specified	min. 520	min. 30		
EN ISO 17633-A			min. 320	min. 510	min. 20		
Typical values	M21/C1	AW	445	560	36	45	40

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S200)	5.0	585285
	SPOOL (S300)	15.0	585223

CLEAROSTA F 309L

TOP FEATURES

- Advantageous in confined spaces and with limited fume extraction systems
- It exhibits outstanding, almost spatter-free, welding properties and produces finely rippled flat and smooth welds which are free of undercut
- Very easy slag removal
- Due to its fast-freezing slag, it can be used for welding in the horizontal (PD), overhead (PE) and vertical-up (PF) positions.

CLASSIFICATION

AWS A5.22 E309LT1-1/4
EN ISO 17633-A T 23 12 L P M 1

CURRENT TYPE

DC+

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
C1 Active gas 100% CO₂
Gas flow 15-25l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Cr	Ni	FN (acc.WRC 1992)
M21/C1	0.04	0.7	0.6	24.0	13	10-20

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
						-20°C	-60°C
Typical values	M21/C1	AW	≥320	≥520	≥30	≥40	≥27

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (BS300)	15.0	710014

Cor-A-Rosta® 347

TOP FEATURES

- For Ti or Nb stabilized 304 or equivalent steels
- Excellent resistance in oxidizing environments such as nitric acid
- High resistance to intergranular corrosion

CLASSIFICATION

AWS A5.22 E347T0-1/4
EN ISO 17633-A T 19 9 Nb R C/M 3

CURRENT TYPE

DC+

SHIELDING GASES (ACC. EN ISO 14175)

M21 Mixed gas Ar+ (>15-25%) CO₂
C1 Active gas 100% CO₂
Gas flow 15-25l/min

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Shielding gas	C	Mn	Si	Cr	Ni	Nb	FN (acc.WRC 1992)
M21	0.05	1.4	0.6	19.5	10	0.5	5

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) +20°C
Required: AWS A5.22			not specified	min. 520	min. 30	
EN ISO 17633-A			min. 350	min. 550	min. 25	
Typical values	M21	AW	435	600	42	90

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.2	SPOOL (S300)	15.0	585544

Lincore® 55-G

TOP FEATURES

- To be used on carbon steel and low alloy steel
- Unlimited layers with proper preheat and interpass temperatures and procedures
- Produces a deposit which resists metal-to-metal wear and mild abrasion

TYPICAL APPLICATIONS

- Brake, Bucket, Crane, Crush, Cut
- Drag, Drive, Drum, Extrusion, Hammer
- Ingot, Kiln, Loader, Logging, Mill
- Mine Car, Mix, Open Hearth, Plate, Power Generation
- Rail, Roll, Shovel, Sinter, Teeth, Tractor, Wheel

CLASSIFICATION

EN ISO T Fe2

WELDING POSITIONS

All

SHIELDING GASES (ACC. EN ISO 14175)

75-90% Argon /
Balance CO₂

98% Argon / 2%
O₂

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Shielding gas	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Typical values					

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.3	SPOOL	11.3	ED037409
	SPOOL	4.5	ED036444
1.1	SPOOL	11.3	ED028176
	DRUM	227.0	ED031475
1.3	DRUM	227.0	ED037410
	SPOOL	11.3	ED028177
1.6	DRUM	90.0	ED037525
	DRUM	113.3	ED036653
	DRUM	227.0	ED032661

Innershield® NR®-152

TOP FEATURES

- Designed for high speed welding of specially coated steels
- Soft, consistent arc
- Porosity resistant
- Excellent overlapping capabilities
- Ideal for robotic applications

TYPICAL APPLICATIONS

- Single pass welding on thicknesses from 0.8 mm - 4.8 mm (0.030 - 3/16 in)
- Spot or short intermittent welds
- Continuous welding on galvanized or zinc coated carbon steel
- Automotive
- Transportation

CLASSIFICATION

AWS A5.36 E71T-14
E71T14S

CURRENT TYPE

DC -

WELDING POSITIONS

All

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Al	Ti	N
0.30	0.99	0.24	0.013	0.007	1.63	0.003	0.051

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)
Required: AWS A5.20		not specified	480	not specified	not specified
Typical values	AW		525**		

* AW = As welded

** Flat tensile test specimen

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.1	SPOOL	11.3	EDS01702
	DRUM	227.0	ED028123
1.6	DRUM	227.0	ED029066
1.7	COIL	22.7	ED012186

FCAW

Innershield® NR®-203MP

TOP FEATURES

- Designed to handle poor fit-up on heavy wall tubes and gaps up to 9.5 mm (3/8 in) with 6.4 mm (1/4 in) offset
- Fast freezing slag with excellent wash-in
- Root bead capability without back-up bars

TYPICAL APPLICATIONS

- General plate fabrication, including bridge fabrication, hull plate and stiffener welding on ships and barges
- Storage tanks
- Structural welding
- Offshore welding in TKY joints

CLASSIFICATION

A5.36 E71T-8-JH8
E71T8-A4-CS3-H8

CURRENT TYPE

DC -

WELDING POSITIONS

All

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S
0.04-0.07	1.35-1.47	0.22-0.32	≤0.01	≤0.01

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-29 °C	-40 °C
Required: AWS A5.36		min. 400	480-655	22		27
Typical values	AW	415-440	510-545	29-33	75-203	68-224

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.7	SPOOL	11.3	ED030640
2.0	COIL	6.4	ED021604

FCAW

Innershield® NR®-203 Ni1

TOP FEATURES

- Designed to produce a nickel bearing weld deposit
- Capable of producing weld deposits with impact toughness exceeding 27 J at -29°C
- Color match on weathering steels
- Handles poor fit-up
- Root bead capability

TYPICAL APPLICATIONS

- Roundabout groove welds on heavy wall tubular construction
- Offshore
- Bridges and other structural components made from weathering steels
- Structural fabrication
- NACE applications

CLASSIFICATION

A5.29/A5.36 E71T8-Ni1-H16
E71T8-A2-Ni1-H16
EN ISO 17632-A T 42 4 1Ni Y N 1 H10

CURRENT TYPE

DC -

WELDING POSITIONS

All

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	Al
0.08	1.1	0.27	0.008	0.003	0.9	0.85

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -29°C
Required: AWS A5.29		min. 400	480-620	20	27
Typical values	AW	465	540	26	115

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.0	COIL	6.4	ED012385
	COIL	22.7	ED012386

Innershield® NR®-207

TOP FEATURES

- Vertical down hot, fill and cap passes on standard cross-country pipelines and arctic grade pipe
- Recommended for API grades X42 up to undermatching X70
- High deposition rates

TYPICAL APPLICATIONS

- Standard cross-country pipelines
- Arctic grade pipe up to undermatched X70

CLASSIFICATION

AWS A5.29 E71T8-K6-H16
E71T8-A2-K6-H16

CURRENT TYPE

DC-

WELDING POSITIONS

All

APPROVALS

BV	DNV	TÜV
+	+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Al	Ni
0.07	0.9	0.2	0.005	0.003	1.0	0.8

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -29°C
Required: AWS A5.29		min. 400	480-620	20	27
Typical values	AW		535	25	110

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.7	COIL	6.4	ED016312
2.0	COIL	6.4	ED012438

Innershield® NR®-211-MP

TOP FEATURES

- Versatile welding capability on a variety of base materials
- High operator appeal and good bead appearance
- Easy slag removal
- Fast freezing characteristics accommodate poor fit-up

TYPICAL APPLICATIONS

- Sheet or thin gauge metal
- Galvanized sheet metal
- Robotic/hard automation
- General fabrication
- 5/16" maximum plate thickness for 0.045" and smaller diameters. 1/2" maximum plate thickness for 0.068 - 3/32" diameters.

CLASSIFICATION

A5.20/A5.36 E71T-11
E71T11-AZ-CS3

CURRENT TYPE

DC-

WELDING POSITIONS

All

APPROVALS

LR	BV
+	+

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Al
0.21	0.65	0.25	0.010	0.003	1.3

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)
Required: AWS A5.20		min. 400	480	20	not specified
Typical values	AW	450	610	22	

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
0.8	SPOOL	4.5	ED033130
0.9	SPOOL	4.5	ED016354
	SPOOL	11.3	ED030637
	DRUM	227.0	ED029838
1.1	SPOOL	4.5	ED016363
	SPOOL	11.3	ED030638
	DRUM	227.0	ED029028
1.7	COIL	6.4	ED012506
	SPOOL	11.3	ED030641
	COIL	22.7	ED012507
2.0	COIL	6.4	ED012508
	SPOOL	11.3	ED030645
	COIL	22.7	ED012509
2.4	COIL	22.7	ED013869

FCAW

Innershield® NR®-212

TOP FEATURES

- Accommodates a wide range of mild steels
- Fast freeze characteristics accommodate poor fit-up
- Smooth arc performance
- Ease of use

TYPICAL APPLICATIONS

- Single or multiple pass welding on up to 19 mm (3/4 in) thicknesses
- Truck bodies, tanks, hoppers, racks and scaffolding
- General fabrication
- Robotics

CLASSIFICATION

AWS E71TG-G-H16
E71TG-AZ-G-H16

WELDING POSITIONS

All

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.1	SPOOL	4.5	ED026090
	SPOOL	11.3	ED030639
1.7	SPOOL	3.6	ED037028
	COIL	6.4	ED027803
	SPOOL	11.3	ED030642
	COIL	6.4	ED027794
2.0	SPOOL	11.3	ED030646
	COIL	22.7	ED026858

FCAW

Innershield® NR®-232

TOP FEATURES

- High deposition rates for out-of-position welding
- Penetrating arc
- Fast freezing, easy to remove slag system
- Meets AWS D1.8 seismic lot waiver requirements
- Notes: AWS D1.8 structural steel seismic supplement test data can be found at the Lincoln Electric Certificate Center.

TYPICAL APPLICATIONS

- Structural fabrication, including those subject to seismic requirements
- General plate fabrication
- Hull plate and stiffener welding on ships and barges
- Machinery parts, tanks, hoppers, racks and scaffolding

CLASSIFICATION

A5.20/A5.36 E71T-8-H16
E71T8-A2-CS3-H16
EN ISO 17632-A T 42 2 Y N 2 H10

CURRENT TYPE

DC -

WELDING POSITIONS

All

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Al
0.18	0.65	0.27	0.006	0.004	0.55

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-20 °C	-29 °C
Required: AWS A5.20		min. 400	480	22		27
Typical values	AW	490	590	26	65	47-75

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.7	COIL	6.1	ED012518
	SPOOL	11.3	ED030643
	COIL	22.7	ED012519
1.8	COIL	6.1	ED012522, ED030232
	SPOOL	11.3	ED030644, ED030949
	COIL	22.7	ED012523
2.0	COIL	6.1	ED012525
	SPOOL	11.3	ED030647
	COIL	22.7	ED012526

FCAW

Innershield® NR®-233

TOP FEATURES

- Enhanced Feedability – New design increases wire stiffness to aid feedability and promotes smooth arc transfer
- Wire Snap-Off – Easy to break off wire end without tools for better re-strike
- Meets AWS D1.8 requirements for Demand Critical Welds – Three lot tests available at www.lincolnelectric.com/D1.8 to meet AWS D1.8 lot waiver requirements
- Effortless Operability – Welders of all skill levels benefit from the easy to control arc and forgiving weld puddle even out of position

TYPICAL APPLICATIONS

- Seismic structural steel erection and fabrication
- General structural steel erection and fabrication
- Ship and barge fabrication
- Vertical up and overhead fillets and groove welds

CLASSIFICATION

A5.20/A5.36 E71T-8-H8
E71T8-A2-CS3-H8
EN ISO 17632-A T 42 3 Y N 2 H10

CURRENT TYPE

DC -

WELDING POSITIONS

All

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Al
0.16	0.65	0.21	0.010	0.003	0.60

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -29°C
Required: AWS A5.20		min. 400	480	22	27
Typical values	AW	440	570	26	40

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.6	SPOOL	5.7	ED030933
	SPOOL	11.3	ED030934, ED031576, ED036576
1.8	SPOOL	11.3	ED031030
2.0	SPOOL	11.3	ED033024, ED033039, ED036577

FCAW

Innershield® NR®-311

TOP FEATURES

- High deposition rates and fast travel speeds
- Easy slag removal
- Optimal toe wash-in
- Deep penetration
- High resistance to cracking

TYPICAL APPLICATIONS

- Recommended for fillet, lap and butt welds on 3.2 mm (1/8 in) and thicker steel, including some low alloy steels
- Horizontal butt welds, such as column-to-column structural connections
- General fabrication
- Assembly welding

CLASSIFICATION

A5.20/A5.36 E70T-7
E70T7-AZ-CS3

CURRENT TYPE

DC -

WELDING POSITIONS

Flat/Horizontal

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Al
0.27	0.4	0.08	0.007	0.005	1.5

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Required: AWS A5.20		min. 400	480	22
Typical values	AW	430	590	25

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.0	COIL	6.4	ED014464
	SPOOL	11.3	ED030649
	COIL	22.7	ED014459
2.4	COIL	22.7	ED012629
	DRUM	272.0	ED012628
2.8	COIL	22.7	ED012632
	REEL	272.0	ED012633

FCAW

Innershield® NR®-440Ni2

TOP FEATURES

- Premium Offshore Weldability – designed to provide optimal weldability in narrow TKY joints and poor fit up conditions
- Excellent Toe Wash-In – expect fast travel speeds and a flat bead face when using vertical-up or vertical-down welding techniques
- Low Temperature Impact Toughness – meets ABS 4YSA and AWS J classification
- Low Diffusible Hydrogen Levels – meets H8 diffusible hydrogen requirements over a range of humidity levels
- ProTech® Packaging – hermetically sealed packaging for moisture resistance
- Q2 Lot – certificate showing actual deposit chemistry and mechanical properties per lot available online

CLASSIFICATION

AWS E71T8-Ni2-JH8
E71T8-A4-Ni2-H8

CURRENT TYPE

DC -

WELDING POSITIONS

All

TYPICAL APPLICATIONS

- Offshore

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Al	Ni	HDM
0.01-0.03	0.74-1.12	0.13-0.17	0.007-0.012	0.002-0.004	0.84-1.07	1.77-2.10	5 ml/100g

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -40°C
Required: AWS A5.29		min. 400	480-655	min. 22	
EN ISO 17632-A	AW	400-485	490-570	22-36	215-460
Typical values					

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.0	COIL	6.4	ED033827

FCAW

Innershield® NS-3M

TOP FEATURES

- Very high deposition rates
- Increased resistance to hydrogen cracking and porosity
- Soft, low penetrating arc for minimal base material admixture

TYPICAL APPLICATIONS

- Open groove welds
- Machinery bases and heavy equipment repair
- Installing wear plates
- 6.4 - 12.7 mm (1/4 - 1/2 in) single pass fillet and lap welds

CLASSIFICATION

AWS E70T-4
E70T4-AZ-CS3
EN ISO 17632-A T 38 Z V N 3

CURRENT TYPE

DC+

WELDING POSITIONS

Flat/Horizontal

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Al
0.23	0.45	0.25	0.006	0.006	1.40

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)
Required: AWS A5.20		460	530-670	22
Typical values	AW	470	640	27

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.0	COIL	6.4	ED012739
	COIL	22.7	ED012740
2.4	COIL	22.7	ED012736
	DRUM	272.0	ED012735
3.0	COIL	22.7	ED012732
	DRUM	272.0	ED012731

FCAW

Pipeliner® NR®-208-XP

TOP FEATURES

- Vertical down hot, fill and cap pass welding of up to X80 grade pipe
- Capable of producing weld deposits with impact toughness exceeding 122 J at -40°C
- ProTech® hermetically sealed packaging

TYPICAL APPLICATIONS

- Hot, fill and cap pass welding of up to X80 grade pipe
- Cold temperature cross country pipe applications

CLASSIFICATION

AWS E81T8-G
E81T8-A4-K12

CURRENT TYPE

DC-

WELDING POSITIONS

All except vertical up

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	P	S	Ni	Cr	Mo	Al
0.02	2.15	0.12	0.005	0.002	0.75	0.04	0.02	1.0

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -29°C
Required: AWS A5.29		min. 470	500-690	min. 19	
Typical values	AW	495	570	27	200

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.7	COIL	6.4	ED036650
2.0	COIL	6.4	ED031968

Pipeliner® NR®-208-P

TOP FEATURES

- Vertical down hot, fill and cap pass welding of up to X80 grade pipe
- Designed to meet 27 J (20 ft-lbf) @ 0 °C (32 °F) in pipe applications
- ProTech® hermetically sealed packaging
- Designed to accommodate applications requiring Nickel content of 1% max
- Excellent operator appeal for pipe applications

TYPICAL APPLICATIONS

- Hot, fill and cap pass welding of up to X80 grade pipe
- Warm weather cross country pipe welding applications

CLASSIFICATION

AWS E81T8-G

WELDING POSITIONS

All except vertical up

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.0	COIL	6.4	ED032890

Lincore® 15CrMn

TOP FEATURES

- Can be used in open arc mode for joining austenitic manganese steel to carbon steel, low alloy steel, austenitic , or stainless steel
- Unlimited layers with proper preheat and interpass temperatures and procedures
- Can be used as a build-up layer before capping with abrasion resistant alloys

TYPICAL APPLICATIONS

- Bar, Bucket, Crush, Cut
- Drag, Dredge, Hammer, Mix
- Open Hearth, Plate, Power Generation, Pump, Rail
- Roll, Screen, Shovel, Teeth, Wheel

CLASSIFICATION

EN ISO T Fe9

CURRENT TYPE

DC+

WELDING POSITIONS

Flat/Horizontal

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr
0.4	15.0	0.25	16.0

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Condition	Typical hardness values
As deposited	18-22 HRc (210-235 HB)
Work hardened	40-50 HRc (375-490 HB)

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.6	SPOOL	15.0	ED037492
2.0	SPOOL	11.3	ED031126
	COIL	22.7	ED022060
2.7	COIL	22.7	ED022061
2.8	DRUM	56.0	ED022068

ADDITIONAL INFORMATION

- All work-hardened base material and previously deposited material should be removed prior to applying a new deposit, since such areas are prone to embrittlement and possible cracking.
- No preheat is required on austenitic manganese steels although a preheat of between 150-200°C may be necessary on carbon and low steels to prevent heat affected zone cracking.
- Narrow stringer beads are preferred to avoid excessive heat build up in the base material. High heat input welds and interpass temperatures above 260°C causes manganese carbide precipitation resulting in embrittlement.
- There is no definite limitation to the number of passes that may be deposited, however, it is good practise to peen each pass immediately after welding to minimise internal stresses and possible distortion and cracking.
- Lincore 15CrMn deposits work harden rapidly making them difficult to machine. For best results carbide or ceramic cutting tools and rigid tooling should be used. Grinding can also be successfully employed.
- For applications involving severe impact and abrasion, a build-up of Lincore 15CrMn coupled with a single pass of Wearshield 60 or Lincore 60-O should be employed.
- The Lincore 15CrMn deposit can not be cut using the oxy-fuel process due to the high chromium content, however, plasma arc and air carbon arc processes are appropriate.

Lincore® 33

TOP FEATURES

- Build-up deposit on carbon steel and low alloy steel base metals
- Unlimited layers
- Delivers tough machinable deposits for build-up or final overlay intended for metal-to-metal wear

TYPICAL APPLICATIONS

- Build-up deposit on carbon steel and low alloy steel base metals

CLASSIFICATION

EN ISO T Fe1

CURRENT TYPE

DC+

WELDING POSITIONS

Flat/Horizontal

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Al
0.15	2.0	0.7	2.0	1.6

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Layer	Typical hardness values
1	21-30 HRc (230-290 HB)
2	26-32 HRc (260-300 HB)
3	28-34 HRc (250-330 HB)

Welded on Mild Steel Plate (12mm)

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.1	SPOOL	11.3	ED031116
1.6	SPOOL	11.3	ED031117
	COIL	6.4	ED011237
2.0	SPOOL	11.3	ED031118
	COIL	22.7	ED011238
2.8	COIL	22.7	ED011240

ADDITIONAL INFORMATION

- All work-hardened base material should be removed prior to applying Lincore 33 to prevent embrittlement and cracking.
- Preheat and postweld heat treatment is not generally necessary on C/Mn steels, however, preheat up to 260°C may be necessary on high carbon steels or large complex or restrained components.
- The deposited weld metal can be machined to exact dimensions using high speed or carbide cutting tools.
- There is no limit to the deposit build-up with this electrode.

Lincore® 50

TOP FEATURES

- Can be used on low carbon, medium carbon, low alloy, manganese and stainless steels
- Limited to 4 layers
- Delivers an abrasion resistant deposit, even under conditions of moderate impact
- Larger wire diameter sizes may be used for the submerged arc process

TYPICAL APPLICATIONS

- Auger, Bar, Blade, Bucket, Bulldozer, Coal Mining
- Concrete, Crush, Cut/Teeth, Drag, Dredge, Hammer/Crush
- Hoist, Kiln, Mine Car/Wheel, Mix, Pipe Bend, Pipeline, Plate
- Power Generation, Pulverize, Pump, Roll/Hammer, Scrape/Cut, Screen
- Shovel, Shred/Hammer, Slag, Tamper, Teeth, Tractor

CURRENT TYPE

DC+

WELDING POSITIONS

Flat/Horizontal

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Al	Mo
2.2	1.2	1.0	11.0	0.6	0.5

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Layer	Typical hardness values
1	34-41 HRC (320-380 HB)
2	44-53 HRC (415-530 HB)
3	48-56 HRC (460-584 HB)

Welded on Mild Steel Plate (12mm)

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.1	SPOOL	4.5	ED037270
	SPOOL	11.3	ED031123
1.6	SPOOL	4.5	ED037261
	SPOOL	11.3	ED031124
	COIL	22.7	ED020829
2.0	SPOOL	11.3	ED031125
	COIL	22.7	ED017825
2.8	COIL	22.7	ED011275
	DRUM	56.0	ED011274

ADDITIONAL INFORMATION

- All work-hardened base material and previously deposited hardfacing material should be removed prior to applying a new deposit, since such areas are prone to embrittlement and possible cracking.
- Areas that contain irregularities such as cracks and deep gouges can be repaired locally using Wearshield BU30 or Wearshield 15CrMn prior to hardfacing with Lincore 50.
- Preheat is not necessary when surfacing austenitic substrates such as stainless steels and manganese steels, although the interpass temperature should be limited to about 260°C for manganese steels.
- For low alloy and carbon carbon steels a preheat of 200°C is usually sufficient, but is dependent on material thickness and chemistry.

Lincore® 55

TOP FEATURES

- To be used on carbon steel, low alloy steel and manganese steel
- Unlimited layers with proper preheat and interpass temperatures and procedures
- Delivers a deposit which resists metal-to-metal rolling or sliding wear as well as mild abrasion

TYPICAL APPLICATIONS

- Bark removing, Blade, Blower, Brake, Crane, Crush
- Drag, Drive, Drum, Excavate, Extrusion, Hammer
- Ingot, Kiln, Loader, Logging, Mill, Mine Car
- Mix, Open Hearth, Plate, Power Generation, Rail, Roll
- Shovel, Sinter, Teeth, Tractor, Wheel

CLASSIFICATION

EN ISO T Fe2

CURRENT TYPE

DC+

WELDING POSITIONS

Flat/Horizontal

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Al	Mo
0.45	1.4	0.55	5.3	1.4	0.8

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Layer	Typical hardness values
1	50-59 HRc
2	50-59 HRc

Welded on Mild Steel Plate (12mm)

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.1	SPOOL	4.5	ED037254
	SPOOL	11.3	ED031120
1.6	SPOOL	11.3	ED031121
	COIL	6.4	ED011277
2.0	SPOOL	11.3	ED031122
	COIL	22.7	ED011278
2.8	COIL	22.7	ED011280
	DRUM	227.0	ED037695

ADDITIONAL INFORMATION

- All work-hardened base material and previously deposited material should be removed prior to applying a new deposit, since such areas are prone to embrittlement and possible cracking.
- A preheat of up to 250°C is necessary to prevent cracking in situations of high restraint and/or heavy thicknesses. Interpass temperatures between 150 - 300°C do not adversely effect deposit hardness.
- The deposit thickness is usually limited to 2 layers on high carbon or alloy steels and/or situations of high restraint and heavy sections due to the risk of cracking. Higher preheat and interpass temperatures coupled with slow cooling will minimise the risk of cracking.
- The deposited weld metal is not machinable by conventional methods although the deposit can be shaped by grinding.
- The deposit can be softened by annealing at 875°C for one hour and slow cooling (air cool 22- 43HRc, furnace cool 15-17HRc). The hardness can be restored by heating at 875°C followed by water quenching (50-59HRc).
- The component should then be tempered at 150-200°C for one hour (54-59HRc) to retain some toughness.

Lincore® 60-0

TOP FEATURES

- To be used on carbon, low alloy, manganese and stainless steels and cast iron
- Deposit is limited to two layers
- Deposits feature higher alloy levels than to resist both abrasion and moderate impact

CURRENT TYPE

DC+

WELDING POSITIONS

Flat/Horizontal

TYPICAL APPLICATIONS

- Bucket lips
- Crusher hammers
- Ore chutes
- Dozer blades
- Ripper Teeth

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Al
4.2	1.6	1.3	25.4	0.6

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Layer	Typical hardness values
1	55 - 60 HRC
2	58 - 60 HRC

Welded on Mild Steel Plate (12mm)

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.1	SPOOL	4.5	ED037262
	SPOOL	11.3	ED031131
1.6	SPOOL	4.5	ED037263
	SPOOL	11.3	ED031132
2.0	SPOOL	11.3	ED031133
	COIL	22.7	ED019887
	DRUM	227.0	ED037493
	COIL	22.7	ED019888

ADDITIONAL INFORMATION

- When welding with Lincore 60-0 stringer beads should be employed. Weaving is not advised since wide weaves generally increase the check crack spacing which can result in deposit spalling.
- Preheat is not necessary when surfacing austenitic substrates such as stainless steels and manganese steels, although the interpass temperature should be limited to about 260°C for manganese steels. For low alloy and high carbon steels a preheat of 200°C is necessary to prevent heat affected zone cracking.
- The weld metal is not machinable or forgeable and it readily check cracks. The deposit thickness is usually limited to 2 layers, as excessive build-up will result in chipping and fragmentation.
- For applications requiring build-ups in excess of 2 layers, buttering layers of Lincore 33, Wearshield BU30 or RepTec 126.
- Alternatively, a preheat of 650°C can be used to eliminate the formation of check cracks.

FCAW

Lincore® M

TOP FEATURES

- Recommended for build-up and repair of Hadfield-type austenitic manganese materials as well as carbon and low alloy steels
- Unlimited layers with proper preheat and interpass temperatures and procedures
- Deposit resists severe impact as well as moderate abrasion

TYPICAL APPLICATIONS

- Bar, Bucket, Crush, Cut, Drag, Dredge
- Hammer, Mill, Mix, Open Hearth, Plate
- Power Generation, Pump, Rail, Roll
- Screen, Shovel, Teeth, Wheel

CLASSIFICATION

EN ISO T Fe9

CURRENT TYPE

DC+

WELDING POSITIONS

Flat/Horizontal

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Ni
0.6	13.0	0.4	4.9	0.5

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Condition	Typical hardness values
As deposited	18-28 HRc
Work hardened	30-48 HRc

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.1	SPOOL	11.3	ED031128
1.6	SPOOL	11.3	ED031129
2.0	SPOOL	11.3	ED031130
	COIL	22.7	ED011160
2.8	COIL	22.7	ED011164
	DRUM	56.0	ED011163
	DRUM	272.0	ED011162

ADDITIONAL INFORMATION

- All work-hardened base material and previously deposited material should be removed prior to applying a new deposit, since such areas are prone to embrittlement and possible cracking.
- No preheat is required on austenitic manganese steels although a preheat of between 150-200°C may be necessary on carbon and low steels to prevent heat affected zone cracking.
- Narrow stringer beads are preferred to avoid excessive heat build up in the base material. High heat input welds and interpass temperatures above 260°C causes manganese carbide precipitation resulting in embrittlement.
- There is no definite limitation to the number of passes that may be deposited, however, it is good practise to peen each pass immediately after welding to minimise internal stresses and possible distortion and cracking.
- Lincore M deposits work harden rapidly making them difficult to machine. For best results carbide or ceramic cutting tools and rigid tooling should be used. Grinding can also be successfully employed.

Lincore® T&D

TOP FEATURES

- Delivers a deposit similar to H12 tool steel
- For build-up of tool steel dies and edges, or applying wear resistance surface on carbon or low alloy steels
- To be used on carbon steel, low alloy steel or tool steel

CURRENT TYPE

DC+

WELDING POSITIONS

Flat/Horizontal

TYPICAL APPLICATIONS

- Punch Dies, Rail, Mill, Brake/Drum, Bar, Pulverizer, Bucket, Crane
- Shear Blades, Teeth, Drag/Bucket/Teeth, Cut/Teeth, Drive Sprocket, Extrusion, Gears, Idlers, Kiln, Mine Car/Wheel
- Ore, Power Shovel, Pulp/paper, Pump, Scarrier/Teeth, Auger, Power Generation, Tractor

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

C	Mn	Si	Cr	Al	Mo	W
0.65	1.5	0.8	7.0	1.8	1.4	1.6

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Layer	Typical hardness values
1	48 - 55 HRC
2	55 - 65 HRC

Welded on Mild Steel Plate (12mm)

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.6	SPOOL	11.3	ED031134

ADDITIONAL INFORMATION

- A preheat and interpass temperature of 325°C, or higher (up to 540°C), are necessary to avoid cracking. It is important to ensure that an adequate "soak" is achieved prior to the welding operation.
- After welding, the component should be covered and slow cooled down to room temperature. Once cooled, the weldment should be post weld heat treated to temper the martensite and toughen the deposit.
- Tempering at 540°C normally produces the optimum combination of hardness and toughness.
- The deposited weld metal is not machinable by conventional methods although the deposit can be shaped by grinding.
- Annealing at 850°C for several hours and slow cooling will reduce the hardness to approximately 30HRC. This deposit can be readily machined. Rehardening is achieved by heating to about 1200°C for several hours to dissolve all carbides and homogenise the steel, followed by air cooling and tempering.
- Lincore T&D cannot be cut by the oxy-fuel processes. Plasma arc and air-carbon arc processes can be used to both cut and gouge the weld deposit. Preheat temperatures similar to those for welding may be necessary to prevent cracking along the cut edge.

SUBMERGED ARC WELDING CONSUMABLES

SAW WIRES & FLUXES



SAW WIRES

MILD STEEL

L50M244

L60245

L61246

LNS 135.....247

LOW ALLOY STEEL

L-70248

LNS 133TB.....249

LNS 140A250

LNS 140TB.....251

LNS 150.....252

LNS 151.....253

LNS 160.....254

LNS 162.....255

LNS 163.....256

LNS 164.....257

LNS 165.....258

LNS 168.....259

STAINLESS STEEL

LNS 304L.....260

LNS 316L.....261

LNS 309L.....262

LNS 347263

LNS 307264

LNS 4462265

NICKEL ALLOYS

LNS NiCro™ 60/20.....266

LNS NiCroMo 60/16267

FLUXES

708GB268

761.....269

780.....270

781.....271

782.....272

802.....273

839.....274

8500275

860.....277

888.....279

960.....281

995N.....282

998N.....283

P223285

P230286

P240288

WTX290

P2000291

P2000S.....293

P2007294

SUBMERGED
ARC WELDING
CONSUMABLES
SAW WIRES
& FLUXES

L50M

TOP FEATURES

- A low carbon, high manganese, medium silicon electrode primarily designed to be used in multirun conditions
- Capable of producing weld deposits with impact properties exceeding 27 J at -62°C when used with fluxes such as 8500™, P240 or Lincoweld®842-H in As Welded and after post weld heat treatment conditions
- Actual (Type 3.1) certificates for each lot of wire showing chemical composition are available

CLASSIFICATION

AWS A5.17 EH12K
EN ISO 14171-A S3Si

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.1	1.75	0.25

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.6	SPOOL	25.0	FL50M-16-25VCI
	REEL	300.0	107241, FL50M-16-300
	DRUM	600.0	FL50M-16-600AC
2.0	SPOOL	25.0	FL50M-2-25VCI
	DRUM	300.0	FL50M-2-300AC
	DRUM	350.0	FL50M-2-350
	DRUM	400.0	FL50M-2-400
2.4	SPOOL	25.0	FL50M-24-25VCI
	SPOOL	100.0	FL50M-24-100
	REEL	300.0	FL50M-24-300
	DRUM	400.0	FL50M-24-400
	DRUM	600.0	FL50M-24-600AC
	COIL	1000.0	FL50M-24-1T
3.2	SPOOL	25.0	FL50M-32-25VCI
	SPOOL	100.0	FL50M-32-100
	REEL	300.0	FL50M-32-300
	DRUM	350.0	FL50M-32-350
	DRUM	400.0	FL50M-32-400
	DRUM	600.0	FL50M-32-600SF
	COIL	1000.0	FL50M-32-1T
	DRUM	1000.0	FL50M-32-1000
4.0	SPOOL	25.0	FL50M-4-25VCI
	SPOOL	100.0	FL50M-4-100
	REEL	300.0	FL50M-4-300
	DRUM	350.0	FL50M-4-350
	DRUM	400.0	FL50M-4-400
	DRUM	600.0	FL50M-4-600SF
	COIL	1000.0	FL50M-4-1T
	DRUM	1000.0	FL50M-4-1000
4.8	SPOOL	25.0	FL50M-48-25VCI

SAW

L60

TOP FEATURES

- A low carbon, low manganese, low silicon general purpose electrode
- Provides the lowest hardness and is best suited for use with the Lincoln active fluxes
- Excellent choice when welding on oily plates.

CLASSIFICATION

AWS A5.17 EL12
EN ISO 14171-A S1

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.09	0.5	0.06

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.6	SPOOL	25.0	FL60-16-25VCI
2.0	SPOOL	25.0	FL60-2-25VCI
	REEL	230.0	106893
	DRUM	350.0	107029
	DRUM	400.0	FL60-2-400
2.4	SPOOL	25.0	FL60-24-25VCI
	REEL	230.0	106886
	DRUM	400.0	FL60-24-400
	DRUM	600.0	FL60-24-600AC
	DRUM	1000.0	FL60-24-1000
3.2	SPOOL	25.0	FL60-32-25VCI
	SPOOL	100.0	FL60-32-100
	DRUM	400.0	FL60-32-400
	DRUM	1000.0	FL60-32-1000
4.0	SPOOL	25.0	FL60-4-25VCI
	SPOOL	100.0	FL60-4-100
	REEL	300.0	104752
	DRUM	350.0	FL60-4-350
	DRUM	400.0	FL60-4-400
	DRUM	600.0	FL60-4-600SF

L61

TOP FEATURES

- Industry standard for submerged arc welding applications
- A low carbon, medium manganese, low silicon general purpose submerged arc electrode
- A good choice for a wide range of applications with single or multiple pass subarc welding

CLASSIFICATION

AWS A5.17 EM12K
EN ISO 14171-A S2Si

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.1	1.0	0.25

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.6	SPOOL	25.0	FL61-16-25VCI
	DRUM	250.0	FL61-16-250
	DRUM	350.0	FL61-16-350
	DRUM	600.0	FL61-16-600AC
2.0	SPOOL	25.0	FL61-2-25VCI
	SPOOL	100.0	FL61-2-100
	DRUM	300.0	FL61-2-300AC
	REEL	300.0	FL61-2-300
	DRUM	350.0	FL61-2-350
	DRUM	500.0	FL61-2-500
	DRUM	600.0	FL61-2-600AC
	DRUM	1000.0	FL61-2-1000
2.4	SPOOL	25.0	FL61-24-25VCI
	REEL	300.0	FL61-24-300
	DRUM	350.0	FL61-24-350
	DRUM	400.0	FL61-24-400
	COIL	1000.0	FL61-24-1T
3.2	DRUM	1000.0	FL61-24-1000
	SPOOL	25.0	FL61-32-25VCI
	SPOOL	100.0	FL61-32-100
	REEL	300.0	FL61-32-300
	DRUM	350.0	105506
	DRUM	400.0	FL61-32-400
	DRUM	600.0	FL61-32-600SF
	COIL	1000.0	FL61-32-1T
4.0	DRUM	1000.0	FL61-32-1000
	SPOOL	25.0	FL61-4-25VCI
	SPOOL	100.0	FL61-4-100, FL61-4-100E
	REEL	300.0	FL61-4-300
	DRUM	350.0	105438
	DRUM	400.0	FL61-4-400
	DRUM	600.0	FL61-4-600SF
	COIL	1000.0	FL61-4-1T
4.8	DRUM	1000.0	FL61-4-1000
	SPOOL	25.0	FL61-48-25VCI
	SPOOL	100.0	FL61-48-100

SAW

LNS 135

TOP FEATURES

- Generate a soft weld metal deposit in combination with neutral fluxes
- Used on 355MPa grade or below
- Good behavior on oily plates

CLASSIFICATION

AWS A5.17 EM12K
 EN ISO 14171-A S2

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si
0.1	1.0	0.10

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.4	SPOOL	25.0	LNS135-24-25VCI
3.2	SPOOL	25.0	LNS135-32-25VCI
4.0	SPOOL	25.0	LNS135-4-25VCI
	DRUM	400.0	LNS135-4-400

SAW

L-70

TOP FEATURES

- A low carbon, medium manganese, low silicon, 1/2% molybdenum wire used for single or multiple pass welds
- A standard choice for pipe fabrication and other limited pass applications
- Actual (Type 3.1) certificates for each lot of wire showing chemical composition are available

CLASSIFICATION

AWS A5.23 EA1
EN ISO 14171-A S2Mo

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Mo
0.1	0.9	0.10	0.5

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.0	SPOOL	25.0	FL70-2-25VCI
	DRUM	400.0	FL70-2-400
2.4	SPOOL	25.0	FL70-24-25VCI
	SPOOL	25.0	FL70-32-25VCI
3.2	SPOOL	100.0	FL70-32-100
	DRUM	350.0	FL70-32-350
	DRUM	600.0	FL70-32-600SF
	COIL	1000.0	FL70-32-1T
4.0	SPOOL	25.0	FL70-4-25VCI
	SPOOL	100.0	FL70-4-100
	DRUM	350.0	FL70-4-350
	DRUM	600.0	FL70-4-600SF
	COIL	1000.0	FL70-4-1T
4.8	SPOOL	25.0	FL70-48-25VCI
	SPOOL	100.0	FL70-48-100

LNS 133TB

TOP FEATURES

- High Manganese and microalloying elements to optimize impact toughness in 2-run technique at low temperature
- Molybdenum free composition to limit the secondary hardening phenomena
- Suitable for pipe grade up to X90

CLASSIFICATION

AWS A5.23 EG
EN ISO 14171-A SZ

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ti	B
0.08	1.55	0.25	0.15	0.015

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
4.0	SPOOL	25.0	LNS133TB-4-25VCI
	DRUM	350.0	LNS133TB-4-350
	REEL	350.0	LNS133TB-4-350R
	DRUM	600.0	LNS133TB-4-600SF
	COIL	1000.0	LNS133TB-4-1T
4.8	DRUM	350.0	LNS133TB-48-350

LNS 140A

TOP FEATURES

- A low carbon, medium manganese, low silicon, 0.5% molybdenum wire used for single or multiple pass welds
- A standard choice for pipe fabrication and other limited pass applications
- Actual (Type 3.1) certificates for each lot of wire showing chemical composition are available

CLASSIFICATION

AWS A5.23 EA2
EN ISO 14171-A S2Mo

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Mo
0.1	1.0	0.10	0.5

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.0	SPOOL	25.0	LNS140A-2-25VCI
	REEL	300.0	LNS140A-2-300
	DRUM	350.0	LNS140A-2-350
	DRUM	400.0	107036
	DRUM	600.0	LNS140A-2-600AC
2.4	SPOOL	25.0	LNS140A-24-25VCI
	DRUM	400.0	LNS140A-24-400
3.2	SPOOL	25.0	LNS140A-32-25VCI
	SPOOL	100.0	LNS140A-32-100
	DRUM	350.0	105407
	DRUM	400.0	LNS140A-32-400
	DRUM	600.0	LNS140A-32-600SF
	COIL	1000.0	106725, LNS140A-32-1T
	DRUM	1000.0	LNS140A-32-1000
4.0	SPOOL	25.0	LNS140A-4-25VCI
	SPOOL	100.0	LNS140A-4-100
	DRUM	200.0	107159
	DRUM	350.0	105346, 105414
	DRUM	400.0	LNS140A-4-400
	DRUM	600.0	LNS140A-4-600SF
	COIL	1000.0	LNS140A-4-1T
	DRUM	1000.0	LNS140A-4-1000
4.8	SPOOL	25.0	LNS140A-48-25VCI
	SPOOL	100.0	LNS140A-48-100
	DRUM	300.0	LNS140A-48-300
	DRUM	600.0	LNS140A-48-600SF
	COIL	1000.0	LNS140A-48-1T

SAW

LNS 140TB

TOP FEATURES

- 0.5%Mo and microalloying elements to optimize impact toughness in 2-run technique at low temperature
- Suitable for limited passes applications
- Suitable for pipe grade up to X90

CLASSIFICATION

AWS A5.23 EA2TiB
 EN ISO 14171-A S2MoTiB

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Mo	Ti	B
0.06	1.1	0.20	0.5	0.13	0.02

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.4	SPOOL	25.0	LNS140TB-24-25VCI
	SPOOL	25.0	LNS140TB-32-25VCI
3.2	DRUM	600.0	LNS140TB-32-600SF
	COIL	1000.0	LNS140TB-32-1T
	SPOOL	25.0	LNS140TB-4-25VCI
4.0	SPOOL	100.0	LNS140TB-4-100E
	REEL	350.0	LNS140TB-4-350R
	DRUM	400.0	LNS140TB-4-400
	DRUM	600.0	LNS140TB-4-600SF
	COIL	1000.0	LNS140TB-4-1T
	SPOOL	25.0	LNS140TB-48-25VCI
4.8	DRUM	300.0	LNS140TB-48-300
	COIL	1000.0	LNS140TB-48-1T

LNS 150

TOP FEATURES

- For maximal operating temperature of 550°C
- Low bruscato factor
- Actual (Type 3.1) certificates for each lot of wire showing chemical composition are available

CLASSIFICATION

AWS A5.23EB2R

EN ISO 24598-AS Cr Mo1

TYPICAL APPLICATIONS

- Creep resistant steel

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Mo	Cr	P
0.13	0.8	0.15	0.5	1.2	<0.010

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.6	SPOOL	25.0	LNS150-16-25VCI
	SPOOL	25.0	LNS150-2-25VCI
2.0	DRUM	350.0	LNS150-2-350
	DRUM	600.0	LNS150-2-600AC
2.4	SPOOL	25.0	LNS150-24-25VCI
	SPOOL	25.0	LNS150-32-25VCI
3.2	COIL	1000.0	LNS150-32-1T
	DRUM	1000.0	LNS150-32-1000
4.0	SPOOL	25.0	LNS150-4-25VCI
	DRUM	400.0	LNS150-4-400

LNS 151

TOP FEATURES

- For maximal operating temperature of 600°C
- Low bruscato factor
- Actual (Type 3.1) certificates for each lot of wire showing chemical composition are available

CLASSIFICATION

AWS A5.23 EB3R
EN ISO 24598-A S Cr Mo2

TYPICAL APPLICATIONS

- Creep resistant steel
- Can be used with low basicity index flux for single pass fillet welds dedicated to fin to tube welding for heat exchangers (waterwalls as an example).

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Mo	P	Cr
0.10	0.6	0.12	1.0	<0.010	2.5

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.4	SPOOL	25.0	596681
3.2	SPOOL	25.0	596694

LNS 160

TOP FEATURES

- 1%Nickel addition
- Optimum results in multipass technique
- Comply with NACE requirement

CLASSIFICATION

AWS A5.23 ENi1
EN ISO 14171-A S2Ni1

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni
0.10	1.1	0.15	0.9

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.4	SPOOL	25.0	LNS160-24-25VCI
3.2	SPOOL	25.0	LNS160-32-25VCI
4.0	SPOOL	25.0	LNS160-4-25VCI

LNS 162

TOP FEATURES

- 2% Ni bearing electrode
- Excellent impact toughness at -60 °C
- Recommended for multirun technique in combination with basic fluxes

CLASSIFICATION

AWS A5.23 ENi2
EN ISO 14171-A S2Ni2

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni
0.10	1.1	0.15	2.2

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.0	REEL	300.0	LNS162-2-300
2.4	SPOOL	25.0	LNS162-24-25VCI
3.2	SPOOL	25.0	LNS162-32-25VCI
4.0	SPOOL	25.0	LNS162-4-25VCI
	DRUM	350.0	LNS162-4-350

LNS 163

TOP FEATURES

- Contains Nickel and Cu to be compatible with weathering steels
- For Cor-ten steels and equivalent
- Recommended with P240 and P230 fluxes

CLASSIFICATION

AWS A5.23 EG
EN ISO 14171-A S2 Ni1Cu

TYPICAL APPLICATIONS

- Weathering steel structure

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Cu	Cr	S	P
0.11	1.0	0.25	0.7	0.5	0.2 max	0.2 max	0.2 max

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.0	DRUM	400.0	LNS163-2-400
2.4	DRUM	350.0	LNS163-24-350
	DRUM	400.0	LNS163-24-400
3.2	SPOOL	25.0	LNS163-32-25VCI
4.0	SPOOL	25.0	LNS163-4-25VCI
	SPOOL	100.0	LNS163-4-100
	DRUM	400.0	LNS163-4-400

LNS 164

TOP FEATURES

- Deliver a high strength and low temperature fracture toughness weld metal
- Compatible with NACE requirement on Ni content
- Actual (Type 3.1) certificates for each lot of wire showing chemical composition are available

CLASSIFICATION

AWS A5.23 EF3
 EN ISO 14171-A S3Ni1Mo

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Mo
0.10	1.75	0.10	0.95	0.5

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.4	SPOOL	25.0	LNS164-24-25VCI
	DRUM	350.0	LNS164-24-350
3.2	SPOOL	25.0	LNS164-32-25VCI
	DRUM	400.0	LNS164-32-400
4.0	SPOOL	25.0	LNS164-4-25VCI
	DRUM	350.0	LNS164-4-350
	DRUM	600.0	LNS164-4-600SF
4.8	SPOOL	25.0	LNS164-48-25VCI

LNS 165

TOP FEATURES

- 1% bearing Nickel and 0.2% Molybdenum wire to combine high strength and high toughness properties
- Impact toughness properties down to -60°C
- Actual (Type 3.1) certificates for each lot of wire showing chemical composition are available
- Comply with NACE requirement

CLASSIFICATION

AWS A5.23ENi5

EN ISO 14171-AS3Ni1Mo0,2

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Mo
0.08	1.4	0.20	0.95	0.2

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.0	SPOOL	25.0	LNS165-2-25VCI
	SPOOL	25.0	LNS165-24-25VCI
2.4	SPOOL	100.0	LNS165-24-100
	DRUM	350.0	LNS165-24-350
3.2	SPOOL	25.0	LNS165-32-25VCI
4.0	SPOOL	25.0	LNS165-4-25VCI
	SPOOL	100.0	LNS165-4-100
	DRUM	1000.0	LNS165-4-1000
4.8	SPOOL	25.0	LNS165-48-25VCI

LNS 168

TOP FEATURES

- For 690MPa yield strength base material
- Recommended with P230 and P240 fluxes
- Good impacts down to -40°C

CLASSIFICATION

AWS A5.23EG

EN ISO 26304-A S3Ni2.5CrMo

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Mo	Cr
0.10	1.6	0.15	2.3	0.6	0.7

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.4	SPOOL	25.0	597028
3.2	SPOOL	25.0	597059
	REEL	300.0	LNS168-32-300
4.0	SPOOL	25.0	598216

LNS 304L

TOP FEATURES

- High resistance to intergranular corrosion and oxidizing environments

CLASSIFICATION

AWS A5.9 ER308L
EN ISO 14343-A S 19 9 L

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.015	1.8	0.4	20	10	0.1

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.0	SPOOL	25.0	LNS304L-2-25VCI
2.4	SPOOL	25.0	LNS304L-24-25VCI
3.2	SPOOL	25.0	LNS304L-32-25VCI
4.0	SPOOL	25.0	LNS304L-4-25VCI

LNS 316L

TOP FEATURES

- High resistance to intergranular corrosion and general corrosion conditions
- The 2-3% molybdenum improve pitting corrosion resistance of the weld deposit
- Precision layer wound spool

CLASSIFICATION

AWS A5.9 ER316L
EN ISO 14343-A S 19 12 3 L

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo
0.015	1.75	0.4	18.5	12	2.75

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.4	SPOOL	25.0	LNS316L-24-25VCI
3.2	SPOOL	25.0	LNS316L-32-25VCI
4.0	SPOOL	25.0	LNS316L-4-25VCI

LNS 309L

TOP FEATURES

- Designed to be used primarily with basic fluxes that recover nearly all of the wire chromium in the deposit
- Reduced carbon level (0.03% max) that offers increased resistance to inter-granular corrosion

CLASSIFICATION

AWS A5.9 ER309L
EN ISO 14343-A S 23 12 L

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Cr	Mo
0.01	1.8	0.4	13.8	23.4	0.07

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.4	SPOOL	25.0	LNS309L-24-25VCI
3.2	SPOOL	25.0	LNS309L-32-25VCI
4.0	SPOOL	25.0	LNS309L-4-25VCI

LNS 347

TOP FEATURES

- The addition of niobium reduces intergranular corrosion in severe operating conditions
- Niobium stabilized stainless steel electrodes used for the welding of types 347 and 321 stainless and stainless clad steels
- Recommended with P2000 flux

CLASSIFICATION

AWS A5.9 ER347
EN ISO 14343-A S 19 9 Nb

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Cr	Mo	Nb
0.03	1.6	0.4	9.7	19.5	0.1	0.6

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.4	SPOOL	25.0	LNS347-24-25VCI
3.2	SPOOL	25.0	LNS347-32-25VCI
4.0	SPOOL	25.0	LNS347-4-25VCI

LNS 307

TOP FEATURES

- Self hardening wire
- Typically used on difficult-to-weld steels such as armour plates
- Recommended with P2000 and P2007 fluxes

CLASSIFICATION

AWS A5.9ER307

EN ISO 14343-A S 18 8 Mn

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni
0.07	7.0	0.6	19	8.9

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.4	SPOOL	25.0	LNS307-24-25VCI
3.2	SPOOL	25.0	LNS307-32-25VCI
4.0	SPOOL	25.0	LNS307-4-25VCI

LNS 4462

TOP FEATURES

- For duplex stainless steel

CLASSIFICATION

AWS A5.9 ER2209
EN ISO 14343-A S 22 9 3 N L

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Cr	Mo	N
0.015	1.6	0.5	8.6	23	3.1	0.16

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
2.4	SPOOL	25.0	598797
3.2	SPOOL	25.0	598780
4.0	SPOOL	25.0	598781

SAW

LNS NiCro 60/20

TOP FEATURES

- Used for joining and wire cladding
- Corrosion resistant in a large range of media/conditions
- Recommended with P2007 flux on 9%Ni LNG tank application

CLASSIFICATION

AWS A5.14ERNiCrMo-3

EN ISO 18274S Ni 6625

TYPICAL APPLICATIONS

- LNG Tank welding

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Cr	Ni	Mo	Nb	Fe
0.05	0.02	0.1	22	65	8.7	3.7	0.1

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.6	SPOOL	25.0	598717
2.0	SPOOL	25.0	598718
2.4	SPOOL	25.0	598803

LNS NiCrMo 60/16

TOP FEATURES

- Matches C276 chemistry
- Low sensitivity to hot cracking
- Recommended with P2007 flux on 9%Ni LNG tank application

CLASSIFICATION

AWS A5.14

EN ISO 18274

ERNiCrMo-4

S Ni 6276

TYPICAL APPLICATIONS

- LNG Tank welding

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, WIRE

C	Mn	Si	Ni	Cr	Mo	W	Fe
0.006	0.5	0.04	58	16	16	3.6	5.8

PACKAGING AND AVAILABLE SIZES

Wire diameter (mm)	Packaging	Weight (kg)	Item number
1.6	SPOOL	25.0	598377
2.4	SPOOL	25.0	598384

708GB

TOP FEATURES

- Smooth bead appearance
- Initially design for gas bottle welding
- Very suitable as well for high speed fillet weld

CLASSIFICATION

Flux	EN ISO 14174: S A AR 1 99 AC H10	
Flux/wire	EN ISO 14171-A	AWS A5.17
708GB / L-60	S 42 0 AR S1	F7A0 - EL12
708GB / L-61	S 42 0 AR S2Si	F7A0 - EM12K

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S
L-60	0.08	1.4	0.75	0.023	0.02
L-61	0.09	1.6	0.9	0.023	0.02

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -18°C
L-60	MR	440	570	33	30
L-61	MR	490	630	30	50

* MR = Multi-Run

FLUX CHARACTERISTICS

Current type	DC(+/-)/AC
Solidification speed	High
Basicity (Boniszewski)	0.65
Density (kg/dm³)	1.3
Grain size (ISO 14174)	2 - 20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
PE BAG	25.0	111552

761

TOP FEATURES

- Manganese alloying and carbon reducing flux designed to provide superior crack resistance
- Slow freezing slag for a wide, flat weld
- Excellent resistance to cracking in single pass applications
- Also available in fine and coarse grain versions

CLASSIFICATION

Flux	EN ISO 14174: S A CS/MS 1 88 AC EN H5		
Flux/wire	EN ISO 14171-A: MR	EN ISO 14171-A: TR	AWS A5.17 / A5.23
761 / L-60	S 38 2 CS/MS S1		F7A2-EL12
761 / L-61	S 42 2 CS/MS S2Si	S 4T 0 CS/MS S2Si	F7A2-EM12K
761 / LNS 140A	S 46 0 CS/MS S2Mo	S 4T 2 CS/MS S2Mo	F8A0-EA2-G
761 / L-70	S 46 0 CS/MS S2Mo	S 4T 2 CS/MS S2Mo	F8A0-EA1-G

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Mo
L-60	0.05	1.5	0.7	<0.03	<0.025	
L-61	0.07	1.7	0.9	<0.03	<0.025	
LNS 140A (L-70)	0.06	1.7	0.8	<0.03	<0.025	0.4

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					0°C	-20°C
L-60	MR	380	500	28	80	50
L-61	MR	470	560	28	100	50
L-61	TR	>420	>540		65	
LNS 140A (L-70)	MR	480	600		80	40
LNS 140A (L-70)	TR	>440	>540		100	55

* MR = Multi-Run; TR = Two-Run

FLUX CHARACTERISTICS

Current type	DC(+/-)/AC
Basicity (Boniszewski)	0.8
Solidification speed	Low, viscous slag
Density (kg/dm ³)	1.2
Grain size (ISO 14174)	761: 1-16 / 761-CG: 1-20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
PE BAG	25.0	111040, FX761-25
SRB BAG	25.0	FX761-25-C-SRB, FX761-25SRB
DRUM	250.0	111842, 111880

780

TOP FEATURES

- Fast freezing slag for easy removal and minimized spilling on circumferential welds
- Excellent bead shape and slag removal
- Good resistance to moisture contamination for reduced porosity
- Also available in fine and coarse grain versions

CLASSIFICATION

Flux	EN ISO 14174: S A AR/AB 1 78 AC H5		
Flux/wire	EN ISO 14171-A: MR	EN ISO 14171-A: TR	AWS A5.17 / A5.23
780 / L-60	S 42 0 AR/AB S1	S 4T 0 AR/AB S1	F7A0-EL12
780 / L-61	S 42 0 AR/AB S2Si	S 4T 2 AR/AB S2Si	F7A2-EM12K
780 / LNS 140A		S 4T 2 AR/AB S2Mo	F8A2-EA2-G
780 / L-70		S 4T 2 AR/AB S2Mo	F8A2-EA1-G

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Mo
L-60	0.07	1.4	0.6	<0.03	<0.025	
L-61	0.07	1.6	0.7	<0.03	<0.025	
LNS 140A (L-70)	0.07	1.6	0.6	<0.03	<0.025	0.4

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					0 °C	-20 °C
L-60	MR	>420	510	28	50	
L-61	TR	>420	>540	28		50
LNS 140A (L-70)	TR	>420	>550	25		60

* MR = Multi-Run; TR = Two-Run

FLUX CHARACTERISTICS

Current type	DC(+/-)/AC
Basicity (Boniszewski)	0.7
Solidification speed	High
Density (kg/dm³)	1.4
Grain size (ISO 14174)	780: 1-20 / 780-CG: 2-20 / 780-FG: 1-16

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
PE BAG	25.0	110562, 110579, FX780-25
SRB BAG	25.0	FX780-25SRB
DRUM	250.0	111781

781

TOP FEATURES

- Features fast follow characteristics that allow for uniform welds at high speeds without undercut or voids
- Recommended for high speed, limited pass welding on clean plate and sheet steel
- Good wetting action

CLASSIFICATION

Flux	EN ISO 14174: S A ZS 1 87 AC H5	
Flux/wire	EN ISO 14171-A: TR	AWS A5.17 / A5.23
781 / L-60		F7A0-EL12
781 / L-61	S 4 T 0 ZS S2Si	F7A0-EM12K
781 / L-50M	S 4 T 2 ZS S3Si	
761 / LNS 140A	S 4 T 2 ZS S2Mo	

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Mo
L-61	0.05	1.3	0.9	<0.03	<0.02	
L-50M (LNS 133U)	0.06	1.6	1.0	<0.03	<0.02	
LNS 140A (L-70)	0.06	1.3	0.9	<0.03	<0.02	0.4

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Impact ISO-V (J) -20°C
L-61	TR	>420	>540	50
L-50M (LNS 133U)	TR	>450	>560	60
LNS 140A (L-70)	TR	>490	>580	65

* TR = Two-Run

FLUX CHARACTERISTICS

Current type	DC(+/-)/AC
Basicity (Boniszewski)	0.7
Solidification speed	Fast, fluid slag
Density (kg/dm ³)	1.5
Grain size (ISO 14174)	1 -16

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
SRB BAG	25.0	FX781-25SRB
DRUM	250.0	110050

782

TOP FEATURES

- Recommended for high speed fillet weld
- Excellent slag detachability
- Available in standard and fine grain size

CLASSIFICATION

Flux	EN ISO 14174: S A AR/AB 1 76 AC H5		
Flux/wire	EN ISO 14171-A: MR	EN ISO 14171-A: TR	AWS A5.17 / A5.23
782 / L-60	S 42 0 AR/AB S1	S 4T A AR/AB S1	
782 / LNS 135		S 4T 0 AR/AB S2	F7AZ-EM12
782 / L-61	S 46 0 AR/AB S2Si	S 4T 0 AR/AB S2Si	F7AZ-EM12K
782 / L-50M	S 46 0 AR/AB S3Si	S 4T 2 AR/AB S3Si	
782 / LNS 140A		S 4T 2 AR/AB S2Mo	

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Mo
L-60	0.07	1.0	0.6	<0.03	<0.025	
LNS 135	0.07	1.15	0.7	<0.03	<0.025	
L-61	0.07	1.15	0.8	<0.03	<0.025	
L-50M (LNS 133U)	0.06	1.7	1.0	<0.03	<0.025	
LNS 140A (L-70)	0.07	1.2	0.7	<0.03	<0.025	0.4

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Impact ISO-V (J)	
				0°C	-20°C
L-60	TR	>420	>520	45	
LNS 135	TR	>420	>520	55	
L-61	TR	>420	>520	60	
L-50M (LNS 133U)	TR	>460	>550	65	50
LNS 140A (L-70)	TR	>460	>600	70	50

* MR = Multi-Run; TR = Two-Run

FLUX CHARACTERISTICS

Current type	DC/AC
Basicity (Boniszewski)	0.4
Solidification speed	High
Density (kg/dm³)	1.4
Grain size (ISO 14174)	782: 1-20 / 782-FG: 1-16

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
PE BAG	25.0	111033, FX782-25-F
BAG	500.0	FX782-500-F

802

TOP FEATURES

- Neutral hardfacing flux
- Excellent slag removal even with high interpass temperature
- Compatible with a wide range of wire grade
- First recommended flux for any hardfacing subarc application

CLASSIFICATION

Flux | EN ISO 14174: S A CS 3 55 DC H5

Flux/wire

Hardfacing solid and flux cored wire

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	Cr	Ni	Mo	V	W
LINCORE 102W	0.28	1.5	0.4	6.5		1.0	0.15	1.0
LINCORE 423L	0.15	1.2	0.4	11.5	2.0	1.0	0.15	
LINCORE 423Cr	0.15	1.2	0.4	13.5	2.0	1.0	0.15	

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Hardness: HRC in 6 layers hardfacing application after 2 hours postweld tempering at					
	AW*	426°C	482°C	538°C	593°C	649°C
LINCORE 102W	51	50	50	51	40	35
LINCORE 423L	43	42	46	38	33	32
LINCORE 423Cr	46	45	46	38	34	32

* AW = As welded

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
SRB BAG	25.0	FX802-25

839

TOP FEATURES

- Suitable for mild steel, low alloy and standard stainless steel grades
- Excellent bead finishing appearance with stainless grades
- Suitable as the one flux workshop solution

CLASSIFICATION

Flux	EN ISO 14174: S A FB 1 66 AC H5
Flux/wire	AWS A5.17 / A5.23
839/L60	F6A2-EL12
839/LNS135	F6A4-EM12
839/L-61	F7A5-EM12K / F6P6-EM12K
839/L-50M	F7A6-EH12K / F7P8-EH12K
839/LNS140A	F7A4-EA2-A2
839/LNS164	F9A0-EF3-F3 / F9P4EF3-F3

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Mo	Ni
L-60	0.04	0.85	0.2	<0.01	<0.01		
LNS 135	0.05	1.2	0.2	<0.015	<0.01		
L-61	0.07	1.2	0.3	<0.015	<0.01		
L-50M	0.07	1.7	0.3	<0.015	<0.01		
LNS 140A (L-70)	0.06	1.2	0.2	<0.015	<0.01	0.45	
LNS 164	0.07	1.7	0.3	<0.015	<0.01	0.45	0.80

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)			
					-20 °C	-40 °C	-50 °C	-60 °C
L-60	AW	390	470	30	100			
LNS 135	AW	410	490		100	50		
L-61	AW	440	530	29	130	80		
L-61	SR	400	510	31		115	65	
L-50M (LNS 133U)	AW	470	570	28		100		
L-50M (LNS 133U)	SR	415	520	29		140		110
LNS 140A (L-70)	AW	460	560	26		80		
LNS 164	AW	650	710	20	50			
LNS 164	SR	590	670	24	100	65		

* AW = As welded; SR = Stress relieved

FLUX CHARACTERISTICS

Current type	DC/AC
Basicity (Boniszewski)	2.4
Solidification speed	Medium
Density (kg/dm³)	1.2
Grain size (ISO 14174)	2 - 20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
SRB BAG	25.0	FX839-25

8500

TOP FEATURES

- Capable of providing impact properties necessary for thick weld joints from root to cap pass
- Operates well on AC and multiple arcs with good resistance to nitrogen porosity
- Capable of producing weld deposits with impact properties exceeding 27 J at -62 °C

CLASSIFICATION

Flux	EN ISO 14174: S A FB 1 54 AC H5		
Flux/wire	EN ISO 14171-A: MR	EN ISO 14171-A: TR	AWS A5.17 / A5.23
8500 / L-61	S 38 4 FB S2Si	S 4T 0 FB S2Si	F7A6/F6P8-EM12K
8500 / L-50M	S 42 6 FB S3Si	S 4T 2 FB S3Si	F7A6/F7P8-EH12K
8500 / LNS 140A	S 42 4 FB S2Mo		F8A6-EA2-A2
8500 / LNS 160	S 42 5 FB S2Ni1*		F7A8/P8-ENi1-Ni1
8500 / LNS 162	S 42 6 FB S2Ni2*		F7A8/P8-ENi2-Ni2
8500 / LNS 165 (LA85)	S 50 6 FB S3Ni1Mo0.2		F8A8/F7P8-ENi5-Ni5
8500 / LNS T55	S 50 4 FB TZ		

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Mo	Ni
L-61	0.08	1.0	0.2	<0.02	<0.015		
L-50M (LNS 133U)	0.07	1.4	0.3	<0.02	<0.015		
LNS 140A (L-70)	0.08	0.9	0.2	0.03	<0.025	0.4	
LNS 160	0.07	1.0	0.1	0.02	0.015		0.95
LNS 162	0.08	1.0	0.1	0.02	0.015		2.0
LNS 165 (LA 85)	0.07	1.3	0.2	0.02	0.015	0.2	0.9
LNS T55	0.08	1.7	0.7	<0.015	<0.015		

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-20 °C	-40 °C	-60 °C
L-61	MR	420	510	28	150	100	50
L-50M (LNS 133U)	MR	450	540	28		110	
L-50M (LNS 133U)	SR	>420	>500	30		150	
LNS 140A (L-70)	MR	440	540	28		55	
LNS 160	AW	430	510	30		150	60
LNS 160	SR	400	510	30		150	90
LNS 162	AW	470	560			150	70
LNS 162	SR	450	530			150	100
LNS 165 (LA 85)	AW	530	600	25		120	50
LNS 165 (LA 85)	SR	480	580	30		120	60
LNS T55	AW	530	620		120	80	
LNS T55	SR	500	570			70	

* MR = Multi-Run; TR = Two-Run; AW = As welded; SR = Stress relieved

8500

FLUX CHARACTERISTICS

Current type	DC/AC
Basicity (Boniszewski)	2.8
Solidification speed	Medium
Density (kg/dm³)	1.3
Grain size (ISO 14174)	2 - 20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
SRB BAG	25.0	FX8500-25SRB
DRUM	250.0	FX8500-250

860

TOP FEATURES

- Industry standard for submerged arc welding applications
- Excellent operating characteristics in a variety of general welding applications.
- Capable of producing weld deposits with impact toughness exceeding 27 J at -40°C with L-61 wire

CLASSIFICATION

Flux	EN ISO 14174: S A AB 1 56 AC H5		
Flux/wire	EN ISO 14171-A: MR	EN ISO 14171-A: TR	AWS A5.17 / A5.23
860 / L-60	S 35 2 AB S1		F6A2-EL12
860 / LNS 135	S 35 2 AB S2	S 3T 0 AB S2	F6A2-EM12
860 / L-61	S 38 2 AB S2Si	S 3T 0 AB S2Si	F7A2-EM12K
860 / L-50M	S 42 2 AB S3Si		F7A2/F7P2-EH12K
860 / L-70	S 46 2 AB S2Mo	S 4T 2 AB S2Mo	F7A2-EA1-A2
860 / LNS 140A	S 46 2 AB S2Mo	S 4T 2 AB S2Mo	F7A2-EA2-A2
860 / LNS 163	S 42 2 AB S2Ni1Cu		F7A4-EG-G
860 / LNS T55	S 50 2 AB TZ		F7A2/F7P4-EC1

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Mo
L-60	0.05	1.0	0.25	<0.025	<0.020	
LNS 135	0.06	1.3	0.3	<0.025	<0.020	
L-61	0.10	1.2	0.3	<0.025	<0.020	
L-50M (LNS 133U)	0.07	1.7	0.5	<0.025	<0.020	
LNS 140A (L-70)	0.05	1.3	0.3	<0.025	<0.020	0.4
LNS T55	0.06	1.8	0.7	<0.020	<0.015	

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					0°C	-20°C
L-60	AW	360	480	30	80	50
LNS 135	AW	390	490	33	100	50
L-61	AW	430	510	32	100	60
L-61	SR	400	505	32		115
L-50M (LNS 133U)	AW	460	530	28	120	80
L-50M (LNS 133U)	SR	420	520			115
LNS 140A (L-70)	AW	520	570	26		70
LNS 140A (L-70)	SR	510	580	30		50
LNS T55	AW	520	610			70
LNS T55	SR	470	560			70
LNS 163	AW	460	540	27		55

* AW = As welded; SR = Stress relieved

860

FLUX CHARACTERISTICS

Current type	DC/AC
Basicity (Boniszewski)	1.1
Solidification speed	High
Density (kg/dm³)	1.4
Grain size (ISO 14174)	1 – 16

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
PE BAG	25.0	FX860-25
SRB BAG	25.0	FX860-25SRB
DRUM	250.0	111828

888

TOP FEATURES

- Designed for deep groove slag removal in critical applications
- Low H4 diffusible hydrogen levels

CLASSIFICATION

Flux	EN ISO 14174: S A FB 1 66 AC H5	
Flux/wire	EN ISO 14171-A: MR	AWS A5.17 / A5.23
888 / L-61	S 38 5 FB S2Si	F7A6-EM12K
888 / L-50M	S 42 6 FB S3Si	F7A8/F7P8-EH12K
888 / LNS 140A	S 46 4 FB S2Mo	F8A4-EA2-A2
888 / L-70	S 46 4 FB S2Mo	F8A4-EA1-A2
888 / LNS 160	S 42 5 FB S2Ni1*	F7A8/P8-ENi1-Ni1
888 / LNS 162	S 42 6 FB S2Ni2*	F7A8/F7P8-ENi2-Ni2
888 / LNS 164	S 50 4 FB S3Ni1Mo	F9A6/F9P4-EF3-F3
888 / LNS 165	S 50 4 FB S3Ni1Mo0.2	F8A6/F7P8-ENi5-Ni5
888 / LNS 150	S 50 2 FB CrMo1	F7P4-EB2R-B2
888 / LNS 151		F8P4-EB3R-B3

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Ni	Mo	Cr
L-61	0.08	1.05	0.37	<0.02	<0.015			
L-50M (LNS 133U)	0.07	1.45	0.55	<0.02	<0.015			
LNS 140A (L-70)	0.07	1.0	0.35	<0.02	<0.015		0.4	
LNS 160	0.07	1.2	0.4	<0.02	<0.015	0.95		
LNS 162	0.07	1.1	0.4	<0.02	<0.015	2.0		
LNS 164	0.08	1.7	0.5	<0.02	<0.01	0.9	0.5	
LNS 165	0.06	1.50	0.5	<0.02	<0.015	0.97	0.2	
LNS 150	0.07	0.90	0.5	<0.02	<0.015		0.55	1.35
LNS 151	0.06	0.85	0.3	<0.02	<0.015		0.93	2.15

888

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)			
					-20 °C	-40 °C	-50 °C	-60 °C
L-61	AW	415	515	31		35	100	
L-50M (LNS 133U)	AW	480	580	29			90	60
L-50M (LNS 133U)	SR	430	550	31		105		65
LNS 160	AW	470	550	26		115		
LNS 160	SR	410	510	27		160		120
LNS 162	AW	500	580	25		100		55
LNS 162	SR	440	550	25		160		120
LNS 164	AW	650	750	21		65		30
LNS 164	SR	610	700	23		65		30
LNS 165	AW	530	620	26		70		40
LNS 165	SR	495	595	27				70
LNS 150	SR	420	580	26	100			
LNS 151	SR	530	645	23		45		

* AW = As welded; SR = Stress relieved

FLUX CHARACTERISTICS

Current type	AC/DC
Basicity (Boniszewski)	2.3
Solidification speed	High
Grain size (ISO 14174)	2 - 20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
SRB BAG	25.0	FX888-25SRB

960

TOP FEATURES

- Versatile flux
- High current carrying capacity
- For both single -run and multi-run techniques with moderate weld metal properties requirements
- Also available in coarse grain version

CLASSIFICATION

Flux	EN ISO 14174: S A AB 1 66 AC H5		
Flux/wire	EN ISO 14171-A: MR	EN ISO 14171-A: TR	AWS A5.17 / A5.23
960 / L-61	S 38 2 AB S2Si	S 3T 2 AB S2Si	F7A2-EM12K
960 / L-50M	S 38 2 AB S3Si	S 3T 2 AB S3Si	F7A2-EH12K
960 / LNS 163	S 42 4 AB S2Ni1Cu		F7A4-EG-G

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Cu	Ni
L-61	0.07	1.3	0.4	<0.03	<0.025		
L-50M (LNS 133U)	0.07	1.6	0.6	<0.03	<0.025		
960 / LNS 163	0.06	1.4	0.35	<0.03	<0.025	0.4	0.6

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)	
					-20°C	-40°C
L-61	AW	420	510	28	50	
L-50M (LNS 133U)	AW	440	530	28	70	
LNS 163	AW	460	540	27		55

* AW = As welded

FLUX CHARACTERISTICS

Current type	DC/AC
Basicity (Boniszewski)	1.0
Solidification speed	High
Density (kg/dm ³)	1.4
Grain size (ISO 14174)	2-20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
PE BAG	25.0	111996, FX960-25
SRB BAG	25.0	FX960-25SRB
DRUM	250.0	111835
BIG BAG	1000.0	FX960-1T

995N

TOP FEATURES

- A nitrogen limiting flux designed for seam welding of pipes
- Recommended for automatic single pass/2-run welding with up to five arcs
- Very high current capacity

CLASSIFICATION

Flux	EN ISO 14174: S A AB 1 67 AC H5	
Flux/wire	EN ISO 14171-A: TR	AWS A5.23
995N / LNS 140A	S 4T 2 AB S2Mo	
995N / LNS 140TB	S 5T 5 AB S2MoTiB	F9TA6G-EA2TiB
995N / LNS 133TB		F9TA6G-EG

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	Base material	C	Mn	Si	P	S	Mo	Ti	B	N
LNS 140A (L-70)	X65	0.07	1.45	0.3	<0.025	<0.025	0.2	-	-	0.005
LNS 140TB (LA-81)	X80	0.06	1.6	0.35	<0.025	<0.025	0.2	0.015	0.002	0.004

Remark: the chemical composition from butt welds in pipe depends on the chemical composition of base material.
Proced: tandem AC/AC application on X65 plate 12.7 mm thick.

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)				Hardness
					-20°C	-40°C	-50°C	-60°C	
Procedure 1									
LNS 140A (L-70)	TR	580	680	30	95	65			230
LNS 140TB (LA-81)	TR	630	700	27	115	75	50		235
Procedure 2									
LNS 140TB (LA-81)	TR	600	720	25	100	65		45	220-235
Procedure 3									
LNS 133TB	TR	600	700	27		120		90	

Remark: the mechanical properties from butt welds in pipe depends on the chemical composition of base material.
Procedure 1: tandem in 12.5mm X65; Procedure 2: multiwire weld (4/5 wires) in 19-25mm X65; Procedure 3: AWS test plate

* TR = Two-Run

FLUX CHARACTERISTICS

Current type	DC/AC
Basicity (Boniszewski)	1.3
Solidification speed	Medium
Density (kg/dm³)	1.0
Grain size (ISO 14174)	2 -20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
PE BAG	25.0	111218
SRB BAG	25.0	111220
SRB BIG BAG	1000.0	FX995N-1TSRB
BIG BAG	1200.0	111712

FLUXES

998N

TOP FEATURES

- Suitable for both seam and spiral pipe welds
- Recommended for automatic single pass/2-run welding with up to five arcs
- Very high current capacity

CLASSIFICATION

Flux	EN ISO 14174: S A AB 1 67 AC H5	
Flux/wire	EN ISO 14171-A: TR	AWS A5.23
998N / LNS 140A	S 4T 2 AB S2Mo	
998N / LNS140TB	S 5T 5 AB S2MoTiB	F9TA6-G-EA2TiB
998N / LNS133TB		F9TA6-G-EG

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	Base material	C	Mn	Si	P	S	Mo	Ti	B	N
LNS 140TB (LA-81)	X65	0.067 / 0.076	1.41 / 1.51	0.28 / 0.34	0.017 / 0.020	0.003 / 0.004	0.22 / 0.27	0.024 / 0.034	0.0028 / 0.0036	0.005 / 0.01
LNS 140TB (LA-81)	X80	0.045 / 0.06	1.6 / 1.64	0.35 / 0.4	0.016 / 0.017	0.004 / 0.005	0.3 / 0.35	0.031 / 0.034	0.0029 / 0.0032	0.005 / 0.006

Remark: the chemical composition from butt welds in pipe depends on the chemical composition of base material.
 Proced1: triple arc application on X65 plate 15.9 mm thick; Proced2: tandem applications on X80 plate 12.7mm thick.

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)				Hardness
					-20°C	-40°C	-50°C	-60°C	
Procedure 1									
LNS 140A (L-70)	AW	570	680	27					230
LNS 140TB (LA-81)	AW	610	700	27	115	75	50		235
Procedure 2									
LNS 140TB (LA-81)	AW	640	730	24	160	120	90	70	220-235
Procedure 3									
LNS 133TB	TR	610	730	26			120	80	

Remark: the mechanical properties from butt welds in pipe depends on the chemical composition of base material.
 Procedure 1: tandem in 12.5mm X65; Procedure 2: multiwire weld (4/5 wires) in 19-25mm X65; Procedure 3: AWS test plate

* AW = As welded; TR = Two-Run

998N

FLUX CHARACTERISTICS

Current type	DC/AC
Basicity (Boniszewski)	1.3
Solidification speed	Fast
Density (kg/dm³)	1.3
Grain size (ISO 14174)	2 -20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
PE BAG	25.0	112047
SRB BAG	25.0	112023, 112054
SRB BIG BAG	1000.0	112061

P223

TOP FEATURES

- Excellent choice for Spiral mills application
- Compatible with a large range of pipe diameters
- Up to 3 arcs configuration

CLASSIFICATION

Flux	EN ISO 14174: S A AB 1 67 AC H5	
Flux/wire	EN ISO 14171-A: TR	AWS A5.17 / A5.23
P223 / L-61	S 4T 2 AB S2Si	F7A4-EM12K
P223 / L-50M	S 4T 2 AB S3Si	F7A5-EH12K
P223 / LNS 140A	S 4T 4 AB S2Mo	F8A4-EA2-A2
P223 / LNS 133TB		F8TA4G-EG

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Mo
L-61	0.08	1.4	0.2	<0.02	<0.015	
L-50M (LNS 133U)	0.07	1.7	0.3	<0.02	<0.015	
LNS 140A (L-70)	0.08	1.4	0.2	0.03	<0.025	0.4

Remark: the chemical composition from butt welds in pipe depends on the chemical composition of base material.

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Impact ISO-V (J)	
				-20°C	-40°C
L-61	TR	450	550	60	
L-50M (LNS 133U)	TR	470	570	80	
LNS 140A (L-70)	TR	500	600		50
LNS 133TB	TR	510	610		60

* TR = Two-Run

FLUX CHARACTERISTICS

Current type	DC/AC
Basicity (Boniszewski)	1.6
Solidification speed	High
Density (kg/dm³)	1.2
Grain size (ISO 14174)	2 -20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
PE BAG	25.0	110364, 111774
SRB BAG	25.0	FXP223-25SRB
BIG BAG	1250.0	FXP223-1250

P230

TOP FEATURES

- Versatile and robust flux behavior
- Low hydrogen content
- Good impact values in two run and multirun technique with the related wire chemistry

CLASSIFICATION

Flux	EN ISO 14174: S A AB 1 67 AC H5		
Flux/wire	EN ISO 14171-A: MR	EN ISO 14171-A: TR	AWS A5.17 / A5.23
P230 / LNS 135	S 38 4 AB S2	S 4T 2 AB S2	F7A4/F7P6-EM12
P230 / L-61	S 38 4 AB S2Si		F7A4/F6P5-EM12K
P230 / L-50M	S 46 5 AB S3Si		F7A5/F7P5-EH12K
P230 / LNS 140A	S 46 4 AB S2Mo	S 4T 4 AB S2Mo	F8A4-EA2-G
P230 / L-70	S 46 4 AB S2Mo	S 4T 4 AB S2Mo	F8A4-EA1-G
P230 / LNS 160	S 46 4 AB S2Ni1*		F7A8/F7P8-ENi1-Ni1
P230 / LNS 162	S 46 6 AB S2Ni2*		F7A8/F7P8-ENi2-Ni2
P230 / LNS T55	S50 4 AB Tz		F7A4/F7P5-EC1

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Mo	Ni
L-61	0.06	1.4	0.4	<0.03	<0.02		
LNS 135	0.07	1.4	0.25	<0.03	<0.02		
L-50M (LNS 133U)	0.08	1.7	0.5	<0.03	<0.02		
LNS 140A (L-70)	0.07	1.4	0.3	<0.03	<0.02	0.5	
LNS 160	0.07	1.4	0.3	<0.03	<0.02		0.9
LNS 162	0.08	1.2	0.3	<0.03	<0.02		2.0
LNS T55	0.07	1.8	0.8	0.02	0.015		

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-20°C	-40°C	-60°C
LNS 135	AW	400	500	30	50		
L-61	AW	450	520	30	100		
L-61	SR	400	490	30	140	80	
L-50M (LNS 133U)	AW	480	580	30		80	
L-50M (LNS 133U)	SR	460	540	28		70	
LNS 140A (L-70)	MR	540	620	28	70		
LNS 140A (L-70)	TR		620			60	
LNS 160	AW	490	570	28		120	45
LNS 160	SR	430	550	28		140	75
LNS 162	AW	500	590	28		120	50
LNS 162	SR	460	570	28		150	80
LNS T55	AW	540	630	28	90	60	
LNS T55	SR	520	610	28	80	50	

* MR = Multi-Run; TR = Two-Run; AW = As welded; SR = Stress relieved

P230

FLUX CHARACTERISTICS

Current type	DC/AC
Basicity (Boniszewski)	1.6
Solidification speed	High
Density (kg/dm³)	1.2
Grain size (ISO 14 174)	2 -20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
SRB BAG	25.0	FXP230-25SRB

P240

TOP FEATURES

- Highly basic flux , low hydrogen level and good slag detachability
- Suitable for single or multiple wire welding
- Offshore recommended product.

CLASSIFICATION

Flux	EN ISO 14174: S A FB 1 55 AC H5	
Flux/wire	EN ISO 14171-A: MR	AWS A5.17 / A5.23
P240 / L-61	S 42 4 FB S2Si	F7A6-EM12K
P240 / L-50M	S 46 6 FB S3Si	F7A8/P8-EH12K
P240 / LNS 160	S 46 6 FB S2Ni1*	F7A10/P10-ENi1-Ni1
P240 / LNS 162	S 46 6 FB S2Ni2*	F7A10/P10-ENi2-Ni2
P240 / LNS 165 (LA-85)	S 50 6 FB S3Ni1Mo0.2	F8A8/P8-ENi5-Ni5
P240 / LNS 168	S 69 4 FB S3NiCr2.5Mo	F10A5-EM2-M2

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Mo	Ni	Cr
L-61	0.08	1.0	0.35	< 0.010	< 0.010			
L-50M (LNS 133U)	0.08	1.6	0.35	< 0.020	< 0.015			
LNS 160	0.08	1.0	0.25	< 0.020	< 0.015		0.9	
LNS 162	0.08	1.0	0.25	< 0.020	< 0.015		2.0	
LNS 165	0.08	1.3	0.35	< 0.020	< 0.015	0.15	0.9	
LNS 168	0.08	1.5	0.4	< 0.015	< 0.015	0.4	2.4	0.3

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)			
					-20°C	-40°C	-50°C	-60°C
L-61	AW	440	530	30	115	75		
L-50M (LNS 133U)	AW	460	560	28				0
L-50M (LNS 133U)	SR	420	540	28				40
LNS 160	AW	470	550	28				80
LNS 160	SR	430	490	32				100
LNS 162	AW	480	560	26				100
LNS 162	SR	460	530	30				140
LNS 165	AW	520	600	25				60
LNS 165	SR	510	580	24				60
LNS 168	AW	720	800	20			55	

* AW = As welded; SR = Stress relieved

P240

FLUX CHARACTERISTICS

Current type	DC/AC
Basicity (Boniszewski)	3.0
Density (kg/dm³)	1.1
Grain size (ISO 14 174)	1 - 16

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
SRB BAG	25.0	FXP240-25SRB

WTX

TOP FEATURES

- Excellent bead profile
- High current carrying capacity
- Designed for onshore windtower fabrication
- Mainly used with L61 and L70 wires

CLASSIFICATION

Flux	EN ISO 14174: S A AB 1 57 AC H5		
Flux/wire	EN ISO 14171-A: MR	EN ISO 14171-A: TR	AWS A5.17 / A5.23
WTX™/ L-61	S 42 4 AB S2Si		F7A8-EM12K
WTX™/L-61 (SR)	S 38 5 AB S2Si		F6P8-EM12K
WTX™/ LNS 140A	S 50 2 AB S2Mo	S 5T 4 AB S2Mo	F8A4-EA2-A2

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	P	S	Mo
L-61	0.06	1.63	0.25	0.02	0.01	-
LNS 140A	0.05	1.39	0.17	0.02	0.01	0.45

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-20 °C	-40 °C	-60 °C
L-61	AW-MR	445	525	31	150		35
L-61	PWHT-MR	395	490	35	150		
LNS 140A	AW-MR	530	595	24	60		
LNS 140A	AW-TR	575	640	24		75	

* MR = Multi-Run; TR = Two-Run; AW = As welded; PWHT = 620 °C/1H

FLUX CHARACTERISTICS

Basicity (Boniszewski)	1.4
Density (kg/dm³)	1.2
Grain size (ISO 14174)	2-20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
SRB BAG	25.0	FXWTX-25SRB

P2000

TOP FEATURES

- Stainless steel welding flux
- Excellent slag detachability
- Recommended for duplex and stabilized grades
- Moisture resistant packaging

CLASSIFICATION

Flux	EN ISO 14174: S A AF2 5643 DC H5	
Wire	EN ISO 14343-A	AWS A5.9/A5.9M
LNS 304L	S 19 9 L	ER308L
LNS 309L	S 23 12 L	ER309L
LNS 316L	S 19 12 3 L	ER316L
LNS 4462	S 22 9 3 N L	ER2209
LNS 318	S 19 12 3 Nb	ER318
LNS 347	S 19 9 Nb	ER347
LNS Zeron® 100X	S 25 9 4 N L	ER2594
LNS 4455	S 20 16 3 Mn L	ER316LMn
LNS 4500	S 20 25 5 Cu L	ER385
LNS 304H	S 19 9 H	ER308H
LNS 307	S 18 8 Mn	ER307*
Wire	EN ISO 18274	AWS A5.14/ A5.14M
LNS NiCro 60/20	S Ni 6625	ERNiCrMo-3
LNS NiCroMo 60/16	S Ni 6276	ERNiCrMo-4
LNS NiCro 70/19	S Ni 6082	ERNiCr-3

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	Cr	Ni	Mo	N	Nb	Cu	W	FN
LNS 304L	0.015	1.5	0.5	19	10						08-10
LNS 309L	0.015	1.5	0.5	23	13						10-20
LNS 316L	0.015	1.5	0.5	18	12	2.5					08-10
LNS 4462	0.015	1.5	0.5	22	8	3.0	0.1				40-60
LNS 318	0.04	1.5	0.5	19	11	2.5		0.5			08-10
LNS 347	0.03	1.4	0.5	19	10			0.6			08-10
LNS Zeron® 100X	0.03	0.6	0.5	25	9.5	3.6	0.2		0.7	0.6	30-60
LNS NiCro 60/20	0.006	0.1	0.4	21.5	64.5	8.7		3.8			
LNS 4455	0.025	6	0.5	18.5	15	2.6	0.15				
LNS 4500	0.03	1.5	0.6	19	25	4.1			1.2		

P2000

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)			
					20 °C	-20 °C	-40 °C	-196 °C
LNS 304L	AW	380	550	35		80		
LNS 309L	AW	425	580	33			80	
LNS 316L	AW	425	560	33				50
LNS 4462	AW	550	800	27			50	
LNS Zeron® 100X	AW	670	880	21		70	45	
LNS NiCro 60/20	AW	520	780	40				100
LNS 347	AW	470	620	30	90			35
LNS 4455	AW	360	640	30				

* AW = As welded

FLUX CHARACTERISTICS

Current type	DC+/-
Basicity (Boniszewski)	1.6
Solidification speed	High
Density (kg/dm³)	1.2
Grain size (ISO 14174)	2 -20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
SRB BAG	25.0	FXP2000-25SRB

P2000S

TOP FEATURES

- Chromium compensating stainless steel flux
- Recommended for dissimilar welding
- Moisture resistant packaging

CLASSIFICATION

Flux	EN ISO 14174: S A AF2 7681 DC H5	
Wire	EN ISO 14343-A	AWS A.59/A5.9M
LNS 309L	S 24 12 L	ER309L
LNS 4462	S 22 9 3 N L	ER2209
LNS Zeron® 100X	S 25 9 4 N L	ER2594

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	Cr	Ni	Mo	N	Cu	W	FN
LNS 309L	0.015	1.5	0.5	25	13					15-20
LNS 4462	0.015	1.5	0.5	24	8	3.0	0.1			40-60
LNS Zeron® 100X	0.02	0.5	0.4	26	9	3.7	0.2	0.7	0.6	30-60

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J) -40 °C
LNS 309L	450	600	33	80
LNS 4462	700	850	27	50
LNS Zeron® 100X	670	880	25	45

FLUX CHARACTERISTICS

Current type	DC(+/-)
Basicity (Boniszewski)	1.6
Solidification speed	High
Density (kg/dm³)	1.2
Grain size (ISO 14174)	1-16

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
SRB BAG	25.0	FXP2000S-25SRB

P2007

TOP FEATURES

- Stainless steel welding flux suitable for all stainless steel grades except Duplex and stabilized grades.
- Optimum operability in 2G position.
- Suitable in AC current

CLASSIFICATION

Flux	EN ISO 14174: S A AF2 5643 AC H5	
Wire	EN ISO 14343-A	AWS A5.9/A5.9M
LNS 304L	S 19 9 L	ER308L
LNS 309L	S 24 12 L	ER309L
LNS 316L	S 19 12 3 L	ER316L
LNS 4455	S 20 16 3 Mn L	ER316LMn
LNS 4500	S 20 25 5 Cu L	ER385
LNS 304H	S 19 9 H	ER308H
LNS 307	S 18 8 Mn	ER307*
Wire	EN ISO 18274	AWS A5.14/ A5.14M
LNS NiCro 60/20	S Ni 6625	ERNiCrMo-3
LNS NiCroMo 60/16	S Ni 6276	ERNiCrMo-4
LNS NiCro 70/19	S Ni 6082	ERNiCr-3

CHEMICAL COMPOSITION (WEIGHT %), TYPICAL, ALL WELD METAL

Wire grade	C	Mn	Si	Cr	Ni	Mo	N	Nb	Cu	FN
LNS 304L	0.015	1.5	0.5	19	10					08-10
LNS 309L	0.015	1.5	0.5	23	13					10-20
LNS 316L	0.015	1.5	0.5	18	12	2.5				08-10
LNS NiCro 60/20	0.006	0.1	0.4	21.5	64.5	8.7		3.8		
LNS 4455	0.025	6	0.5	18.5	15	2.6	0.15			
LNS 4500	0.03	1.5	0.6	19	25	4.1			1.2	

MECHANICAL PROPERTIES, TYPICAL, ALL WELD METAL

Wire grade	Condition*	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Impact ISO-V (J)		
					-20°C	-40°C	-196°C
LNS 304L	AW	390	550	35	80	75	40
LNS 309L	AW	400	580	33		70	
LNS 316L	AW	400	560	33	75	70	45
LNS NiCro 60/20	AW	520	780	40			100

* AW = As welded

P2007

FLUX CHARACTERISTICS

Current type	DC(+/-)
Basicity (Boniszewski)	1.6
Solidification speed	High
Density (kg/dm³)	1.2
Grain size (ISO 14 174)	2 -20

PACKAGING AND AVAILABLE SIZES

Packaging	Weight (kg)	Item number
SRB BAG	25.0	FXP2007-25SRB

BENEFITS

For a well-made welding bead:

- Without copper contamination
- Without risk of burn through in the first pass position (used as a support)
- Without re-welding
- Without risk of lack of fusion
- No turning of the work piece
- Bigger root thickness permits higher welding current for the hot pass
- An increase in first pass deposit rate
- Wide root gap
- Total penetration without turning the parts to be welded
- Total penetration of joints difficult to access in reverse position
- Smooth profile of the root pass

For a well-made weld preparation before welding:

- Ideal to compensate for variations in preparation of sheet edge backlashes
- Easy to use (adhesive/metallic support)
- Simplify chamfering preparations

For higher productivity:

- Without gouging operation
- Without grinding operation
- Provides time saving and high quality
- Easy-to-use slats technique

KERALINE has a very low moisture absorption rate and a high melting point, allowing use at high welding intensity, up to 600A.



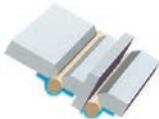
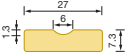
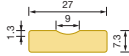
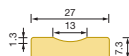
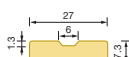
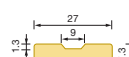
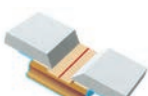
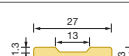
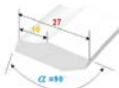
The selection of KERALINE slat types for different welding processes

	MMA	TIG	MIG/MAG	SAW
KERALINE TA 1	–	✓	✓	–
KERALINE TA 2	–	✓	✓	–
KERALINE TA 3	✓	–	✓	–
KERALINE TF 1	–	✓	✓	–
KERALINE TF 2	–	✓	✓	–
KERALINE TF 3	✓	–	✓	–
KERALINE TR 1	✓	–	✓	–

	MMA	TIG	MIG/MAG	SAW
KERALINE TR 2	✓	–	✓	–
KERALINE TR 3	✓	–	✓	–
KERALINE TR 4	✓	–	✓	–
KERALINE TR 5	✓	–	✓	–
KERALINE TR 6	✓	–	✓	–
KERALINE TM 1	✓	✓	✓	✓
KERALINE TM 2	✓	✓	✓	✓

The selection of KERALINE slat types for different supports, shapes and dimensions

	Type	Item number	Dimensions (mm)	3D diagram	Application	Packing
Ceramic-on-metallic support	KERALINE TM1-13 mm	W000010403				600 mm / piece 10 pieces per bag (6 meters) 7 bags/carton (42 meters)
	KERALINE TM2-18 mm	W000010404				600 mm / piece 9 pieces per bag (5.4 meters) 5 bags/carton (27 meters)

Ceramic-on-aluminium tape	Type	Item number	Dimensions (mm)	3D diagram	Application	Packing
	KERALINE TR1-6 mm	W000010397	 Ø 6			600 mm / piece 50 pieces per bag (30 meters) 5 bags/carton (150 meters)
	KERALINE TR2-7 mm	W000010398	 Ø 7			600 mm / piece 20 pieces per bag (12 meters) 8 bags/carton (96 meters)
	KERALINE TR3-8 mm	W000010399	 Ø 8			600 mm / piece 20 pieces per bag (12 meters) 7 bags/carton (84 meters)
	KERALINE TR4-9 mm	W000010400	 Ø 9			600 mm / piece 20 pieces per bag (12 meters) 5 bags/carton (60 meters)
	KERALINE TR5-12 mm	W000010401	 Ø 12			600 mm / piece 15 pieces per bag (9 meters) 5 bags/carton (45 meters)
	KERALINE TR6-15 mm	W000010402	 Ø 15			
	KERALINE TA1-6 mm	W000010391				600 mm / piece 10 pieces per bag (6 meters) 6 bags/carton (36 meters)
	KERALINE TA2-9 mm	W000010392				
	KERALINE TA3-13 mm	W000010393				
	KERALINE TF1-6 mm	W000010394				
	KERALINE TF2-9 mm	W000010395				600 mm / piece 10 pieces per bag (6 meters) 6 bags/carton (36 meters)
	KERALINE TF3-13 mm	W000010396				
	KERALINE TJ10 T FULL PENETRATION	W000262368				600 mm / piece 10 pieces per bag (6 meters) 6 bags/carton (36 meters)
	SET OF CERAMIC BACKING RAD 150	W000275493				16 pieces /Circle 18 Circles/carton (18 meters)
	SET OF CERAMIC BACKING RAD 200	W000275532				4 pieces/Segment 20 Segments / SET 12 Sets/carton (12 meters)
	SET OF CERAMIC BACKING RAD 100	W000404095				12 pieces /Circle 22 Circles/carton (22 meters)

0-9

761.....	269
780.....	270
781.....	271
782.....	272
802.....	273
839.....	274
860.....	277
888.....	279
960.....	281
8500.....	275
708GB.....	268
995N.....	282
998N.....	283

A

ALMN.....	110
ALSI 12.....	112
ALSI 5.....	111
Arosta® 304L.....	94
Arosta® 307.....	95
Arosta® 309S.....	96
Arosta® 316L.....	97

B

Basic 7018.....	53
Basic 7018P.....	54
Baso® 100.....	74
Baso® 120.....	55
Baso® 48SP.....	56
Baso® G.....	57

C

CLEAROSTA F 304L.....	214
CLEAROSTA F 309L.....	220
CLEAROSTA F 316L.....	217
Clearosta® E 304L.....	98
Clearosta® E 309L.....	99
Clearosta® E 316L.....	100
Conarc® 48.....	59
Conarc® 49.....	60
Conarc® 49C.....	61
Conarc® 50.....	62
Conarc® 51.....	75
Conarc® 55CT.....	93
Conarc® 60G.....	82
Conarc® 70G.....	83
Conarc® L150.....	70
Conarc® ONE.....	63
Cor-A-Rosta® 304L.....	212
Cor-A-Rosta® 309L.....	218
Cor-A-Rosta® 316L.....	215
Cor-A-Rosta® 347.....	221
Cor-A-Rosta® P304L.....	213

Cor-A-Rosta® P309L.....	219
Cor-A-Rosta® P316L.....	216
Cumulo.....	42

F

Ferrod® 135T.....	50
Ferrod® 160T.....	51
Ferrod® 165A.....	52
Fleetweld® 5P+®.....	41

H

Hyrod 7018.....	64
Hyrod 7018LT.....	65
Hyrod 7028.....	71

I

Innershield® NR®-152.....	223
Innershield® NR®-203 Ni1.....	225
Innershield® NR®-203MP.....	224
Innershield® NR®-207.....	226
Innershield® NR®-211-MP.....	227
Innershield® NR®-212.....	228
Innershield® NR®-232.....	229
Innershield® NR®-233.....	230
Innershield® NR®-311.....	231
Innershield® NR®-440Ni2.....	232
Innershield® NS-3M.....	233

K

Kardo.....	66
Kryo® 1.....	84
Kryo® 1-180.....	85
Kryo® 1P.....	86
Kryo® 1R.....	87
Kryo® 2.....	88
Kryo® 3.....	89
Kryo® 4.....	90

L

L50M.....	244
L60.....	245
L61.....	246
L-70.....	248
Limarosta® 304L.....	101
Limarosta® 309S.....	102
Limarosta® 316L.....	103
Lincoln® 6010.....	40
Lincoln® 7010.....	76
Lincoln® 7016/DR.....	72
Lincoln® 7018-1.....	67
Lincoln® 8010.....	77
Lincore® 15CrMn.....	236
Lincore® 33.....	237
Lincore® 50.....	238
Lincore® 55.....	239
Lincore® 55-G.....	222

Lincore® 60-O.....	240
Lincore® M.....	241
Lincore® T&D.....	242
LINOX 308L.....	104
LINOX 309L.....	105
LINOX 316L.....	106
LINOX P 308L.....	107
LINOX P 309L.....	108
LINOX P 316L.....	109
LNM 12.....	123
LNM 19.....	124
LNM 20.....	125
LNM 25.....	114
LNM 28.....	126
LNM 304LSi.....	133
LNM 307.....	137
LNM 309H.....	138
LNM 309LSi.....	135
LNM 310.....	139
LNM 316LSi.....	134
LNM 318Si.....	140
LNM 347Si.....	136
LNM 420FM.....	154
LNM 4455.....	141
LNM CuAl8.....	142
LNM CuSi3.....	143
LNM CuSn.....	144
LNM MoNi.....	127
LNM MoNiCr.....	129
LNM MoNiVa.....	128
LNM Ni1.....	130
LNM Ni2.5.....	131
LNS 133TB.....	249
LNS 135.....	247
LNS 140A.....	250
LNS 140TB.....	251
LNS 150.....	252
LNS 151.....	253
LNS 160.....	254
LNS 162.....	255
LNS 163.....	256
LNS 164.....	257
LNS 165.....	258
LNS 168.....	259
LNS 304L.....	260
LNS 307.....	264
LNS 309L.....	262
LNS 316L.....	261
LNS 347.....	263
LNS 4462.....	265
LNS NiCrMo 60/16.....	267
LNS NiCr™ 60/20.....	266

LNT 12.....	160
LNT 19.....	161
LNT 20.....	162
LNT 24.....	156
LNT 25.....	157
LNT 26.....	158
LNT 27.....	159
LNT 28.....	163
LNT 304L.....	166
LNT 304LSi.....	167
LNT 309L.....	170
LNT 309LSi.....	171
LNT 310.....	173
LNT 316L.....	168
LNT 316LSi.....	169
LNT 347Si.....	172
LNT CuSi3.....	174
LNT CuSn6.....	175
LNT Ni1.....	164
LNT Ni2.5.....	165
N	
Numal.....	43
O	
Omnia®.....	44
Omnia® 46.....	45
Outershield® 101Ni1-HSR.....	200
Outershield® 12-H.....	187
Outershield® 19-H.....	188
Outershield® 20-H.....	189
Outershield® 500CT-H.....	190
Outershield® 555CT-H.....	191
Outershield® 690-H.....	192
Outershield® 690-HSR.....	193
Outershield® 71E-H.....	182
Outershield® 71M-H.....	183
Outershield® 71MS-H.....	184
Outershield® 71T1.....	185
Outershield® 81K2-H.....	194
Outershield® 81K2-HSR.....	195
Outershield® 81Ni1-H.....	196
Outershield® 81Ni1-HSR.....	197
Outershield® 91K2-HSR.....	198
Outershield® 91Ni1-HSR.....	199
Outershield® MC420N-H.....	208
Outershield® MC555CT-H.....	209
Outershield® MC700.....	204
Outershield® MC-710-H.....	205
Outershield® MC710RF-H.....	206
Outershield® MC715-H.....	207
Outershield® MC715Ni1-H.....	210
Outershield® MC80D2-H.....	211
Outershield® T55-H.....	186

P

P2000.....	291
P2000S.....	293
P2007.....	294
P223.....	285
P230.....	286
P240.....	288
Pantafix.....	47
Pipelinex® 16P.....	73
Pipelinex® 7P+.....	78
Pipelinex® 80Ni1.....	132
Pipelinex® 8P+.....	79
Pipelinex® G60M-E.....	201
Pipelinex® G70M-E.....	202
Pipelinex® G80M-E.....	203
Pipelinex® NR®-208-P.....	235
Pipelinex® NR®-208-XP.....	234

S

Shield-Arc® 70+.....	80
Shield-Arc® HYP+.....	81
SL 12G.....	91
SL 22G.....	92
SuperGlaze® MIG 4043.....	145
SuperGlaze® MIG 4047.....	146
SuperGlaze® MIG 5087.....	147
SuperGlaze® MIG 5183.....	148
SuperGlaze® MIG 5356.....	150
SuperGlaze® MIG 5556A.....	152
SuperGlaze® MIG 5754.....	153
SuperGlaze® MIG HD 5183.....	149
SuperGlaze® MIG HD 5356.....	151
SuperGlaze® TIG 4043.....	176
SuperGlaze® TIG 5183.....	177
SuperGlaze® TIG 5356.....	178
SuperGlaze® TIG 5754.....	179
Supra®.....	48
Supramig®.....	118
Supramig® HD.....	120
Supramig® Ultra.....	121
Supramig® Ultra HD.....	122

U

Ultramag®.....	115
Ultramag® SG3.....	117
Universalis®.....	49

V

Vandal.....	69
-------------	----

W

WTX.....	290
----------	-----

Handwriting practice area with horizontal dotted lines.

Handwriting practice area with horizontal dotted lines.

Handwriting practice area with horizontal dotted lines.



www.lincolnelectric.eu