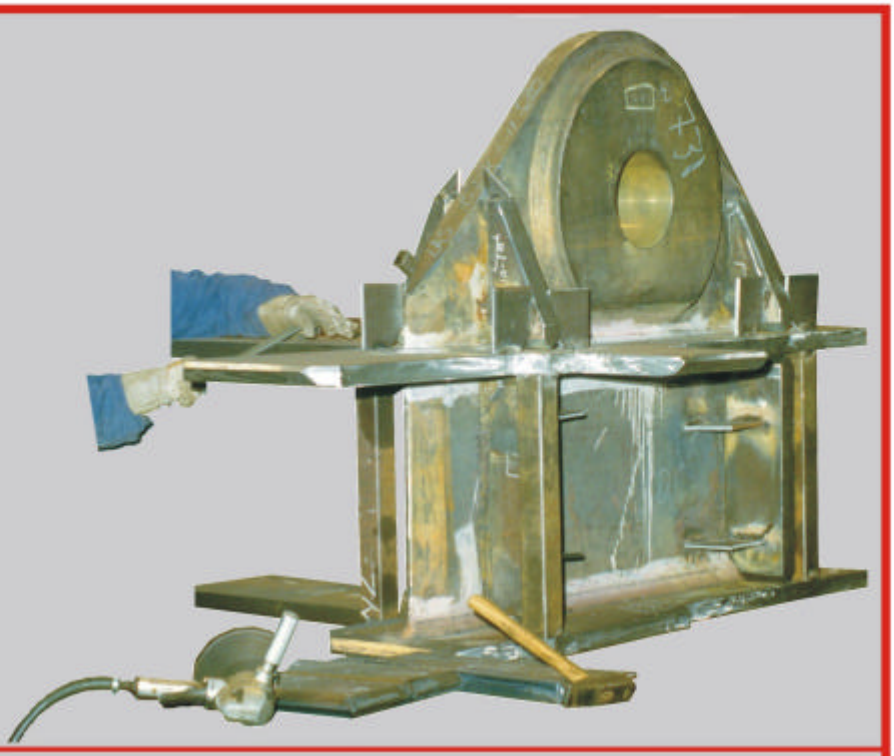
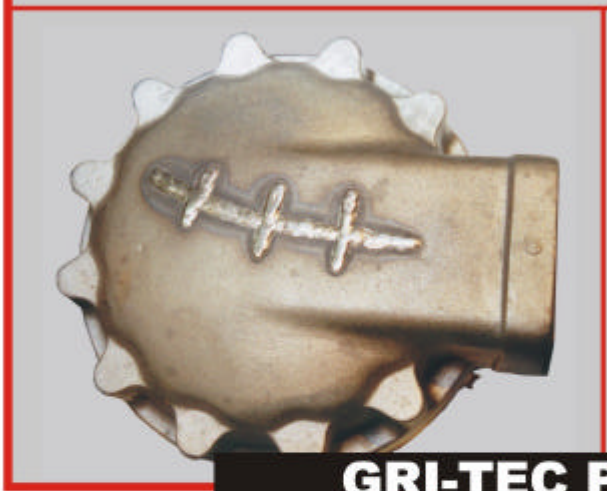
GRI-TEC Welding consumables



For Production, Repair and Maintenance Applications



GRI-TEC Product catalogue

LINCOLN ELECTRIC

FILLER MATERIALS

FOR

PRODUCTION, REPAIR

AND

MAINTENANCE APPLICATIONS

PROGRAM SUMMARY

2008 EDITION

INTRODUCTION

This catalogue contains a complete overview of the Lincoln Electric products in the ***GRI-TEC***Ô product range. Our objective is to provide complete up-to-date information that is essential to the end user.
Most European Standards for the classification of the welding consumables have been published. The option has been chosen to provide, when available, the AWS and EN classification for each product and to delete the obsolete national standards such as BS, DIN, etc. In cases where the EN standard is not yet officially published, the classification has been based on most recent provisional standards.

This catalogue contains the extended version of the product program. Not all products are available from stock. In each new edition of the relevant price book, it will be indicated on which level the specific product can be supplied. An “A” classification means standard availability from stock; the “B” classified products can be supplied within some weeks whereas a “C” product can be manufactured as “standard special” on order.

In general, the policy of The Lincoln Electric Company; the ultimate attention is given to the expectations of the customer, and this with products and services which comply to the relevant standards. The manufacture and supply of our consumable products are in compliance with a Quality Programme which has been verified and approved by certifying authorities according ISO 9001 and VdTÜV Merkblatt 1153.

Nijmegen, January 2008.

All the information in this booklet is based on the best available knowledge at the time of printing and is subject to change without prior notice and can only be considered as suitable for general guidance.

For further information please contact Lincoln Electric, Nijmegen, The Netherlands.

CONTENTS

All the information in this booklet is based on the best available knowledge at the time of printing and subject to change without prior notice and can only be considered as suitable for general guidance.

Filler Materials

COVERED ELECTRODES	Standard coating	Acid Rutile coating
	High Recovery	Cellulosic Rutile flux coating
	Synthetic alloyed	Rutile flux coating
	Semi-synthetic alloyed	Basic flux coating
	Fully alloyed core wire	
FILLER RODS & WIRES	Solid MIG	Layer Wound
	Solid TIG	Stamped
	Flux Cored	Rutile and Basic flux fill
	Metal Cored	Metal powder flux fill
SUB ARC FLUXES	Fused	Various
	Agglomerated	Basicity

GENERIC NAMES -

AN EXPLANATION

GRICON	For general structural steels, shipbuilding steels, boiler quality steels, tube steels, fine grained structural steels
GRIDUCT	For fine grained and low alloy structural steels, weatherproof steels, cryogenic steels
GRITHERM	For welding creep resistant, heat and scale resistant base materials
GRINOX	For CrNi and CrNiMo austenitic steels, corrosion resistant steels, cold tenacious steels, non-magnetic steels
GRINI	For nickel and nickel alloys
GRICU	For copper and copper alloys
GRICAST	For cast iron
GRIDUR	For wear-resistant hardfacing and surfacing applications
GRILUMIN	For aluminum and aluminum alloys

Storage and Handling Recommandations

Storage

All welding consumables, stored in their original undamaged packaging, require controlled warehouse conditions to prevent excessive moisture absorption.
No temperature and humidity requirements are applicable for electrodes in Sahara ReadyPacks, providing that vacuum is present in undamaged packs.

The following warehouse storage conditions are recommended.

	Covered electrodes	Solid wires	Flux Cored Wires	Welding Fluxes
Temperature [°C] Relative humidity [%]	15 – 25 max. 60		15 – 25 max. 60	15 – 25 max. 70
Temperature [°C] Relative humidity [%]	25 – 35 max. 50		25 – 35 max. 40	25 – 35 max. 70

Handling

In all cases the products shall be protected against contamination of moisture, dirt and dust.
During interruption of the production process for more than 8 hours, covered electrodes, wire spools and coils shall be stored in their packaging or plastic bag under the conditions as mentioned above.

Note:
A full description of the Storage and Handling Recommendations per group of welding consumables is available upon request.

GRICON Rutile covered electrodes

PRODUCT Diameter [mm]	**CLASSIFICATION** **ISO 2560-A** **AWS A5.1**	**DESCRIPTION**
GRICON 4 2.5 – 3.2 – 4.0	E 38 0 RC 11 E6012	Good positional electrode excellent for vertical down welding
GRICON 33 2.0 – 2.5 3.2 – 4.0	E 42 0 RC 11 E6013	M & R applications. Good in all positions. Ideal for low open circuit mains transformers.
GRICON 39 2.5 – 3.2	E 42 2 RB 12 E6013	Rutile-basic all position electrode except vertical down. Excellent for root welding in pipes in 5G up (PF) position.
GRICON 8A 2.0 – 2.5 3.2 – 4.0	E 42 0 RR 12 E6013	Rutile coated electrode especially for down hand welding and horizontal-vertical fillets with a very smooth bead appearance.
GRICON 17 3.2 – 4.0 – 5.0	E 42 0 RR 73 E7024	Rutile coated, high efficiency electrode with 160% recovery ideal for fillet welds, in flat and horizontal positions. Self releasing slag.

NOTES:

GRICON / GRIDUCT Basic covered electrodes

PRODUCT Diameter [mm]	**CLASSIFICATION** **ISO 2560-A** **EN 757** **AWS A5.1**	**DESCRIPTION**
GRICON 43 2.5 – 3.2 4.0 – 5.0	E 46 3 B 32 H10 E7018-1 H8	Basic/rutile coating makes this electrode ideal on AC especially low OCV transformers. Good for welding vertically up with excellent slag detachability.
GRICON 15 2.5 – 3.2 4.0 – 5.0	E 42 5 B 32 H5 E7018-1 H4R	Fully basic type for use on DC giving a very low hydrogen controlled deposit. High elongation and good toughness make it suitable for sub-zero temperatures to –50°C. Used for welding fine grained and constructional steels. Proven offshore electrode. Excellent for pipe welding on site applications. Up on request available in vacuum sealed units for site applications. $H_{DM} \leq 3$ ml/100 g.
GRIDUCT 1 2.5 – 3.2 – 4.0	E 55 4 1NiMo B 32 H5 E9018-G H4R	Basic coated nickel-molybdenum alloyed electrode for high strength and difficult to weld high carbon steels. Very tough at sub-zero temperatures.
GRIDUCT 17 2.5 – 3.2 – 4.0	E 69 5 Z B 32 H5 E11018M H4	Basic coated hydrogen controlled electrode suitable for high strength temper hardened fine grained steels. Tough at sub-zero temperatures.

NOTES:

GRINOX Stainless Steel covered electrodes

PRODUCT Diameter [mm]	**CLASSIFICATION** **EN 1600** **AWS A5.4**	**DESCRIPTION**
GRINOX 202 2.5 – 3.2 – 4.0	E 19 9 L R 12 E308L-16	Rutile-basic all position stainless steel electrode for welding AISI 304L or equal base materials. Fully alloyed core wire.
GRINOX 502 1.6 - 2.0 - 2.5 3.2 - 4.0 - 5.0	E 19 9 L R 12 E308L-17	Rutile (basic) coated stainless steel electrode for welding AISI 304L or equal base materials. Fully alloyed core wire. Especially for down hand and fillet welding. The GRINOX 502 has a unique coating which is insensitive to atmospheric humidity. Easy de-tachable slag that will not 'fly off' when cooling. The weld metal will contain very low carbon content where appropriate. The electrodes are easy to use, and will produce a very low heat input in to the base material when used correctly.
GRINOX 507 2.5 - 3.2 4.0 - 5.0	E 19 9 Nb R 12 E347-16	Rutile-basic all position stainless steel electrode for welding AISI 321 and 347 or equal base materials. Fully alloyed core wire.
GRINOX 210 2.0 - 2.5 3.2 4.0 - 5.0	E 19 12 3 L R 12 E316L-16	Rutile-basic all position stainless steel electrode for welding AISI 316L or equal base materials. Fully alloyed core wire.
GRINOX 510 1.6 - 2.0 - 2.5 3.2 - 4.0 - 5.0	E 19 12 3 L R 12 E316L-17	Rutile (basic) coated stainless steel electrode for welding AISI 316L or equal base materials. Fully alloyed core wire. Especially for down hand and fillet welding. The GRINOX 510 has a unique coating which is insensitive to atmospheric humidity. Easy de-tachable slag that will not 'fly off' when cooling. The weld metal will contain very low carbon content where appropriate. The electrodes are easy to use, and will produce a very low heat input in to the base material when used correctly.
GRINOX 514 2.0 - 2.5 3.2 - 4.0	E 19 12 3 Nb R 12 E318-16	Rutile-basic all position stainless steel electrode for welding AISI 316Ti and 316Cb or equal base materials. Fully alloyed core wire.

GRINOX Duplex stainless steel electrodes

PRODUCT Diameter [mm]	**CLASSIFICATION** **EN 1600** **AWS A5.4**	**DESCRIPTION**
GRINOX 62 **2.5 – 3.2** **4.0 – 5.0**	E 22 9 3 N L R 32 E2209-16	Rutile-basic coated electrode for joint welding of ferritic-austenitic high alloy steels i.e. Duplex steels either together or in combination with plain carbon and low alloy steels. Excellent weldability. Up on request available in vacuum sealed units for site applications.
GRINOX 33 **2.5 – 3.2 – 4.0**	E 22 9 3 N L B 22 E2209-15	Basic coated electrode for duplex stainless steel welding. Excellent weldability for filling as well root runs in pipe. High resistance to pitting and stress corrosion. Good toughness and CTOD values in offshore applications. Up on request available in vacuum sealed units for site applications.

GRINOX stainless steel buffer electrodes

PRODUCT Diameter [mm]	**CLASSIFICATION** **EN 1600** **AWS A5.4**	**DESCRIPTION**
GRINOX 73 2.5 - 3.2 4.0 - 5.0	E 23 12 L R 32 E309L-17	Rutile (basic) coated electrode for cladding, joining of dissimilar steels, ferritic and martensitic alloys. The GRINOX 73 has a unique coating which is insensitive to atmospheric humidity. Easy detachable slag that will not 'fly off' when cooling. The weld metal will contain very low carbon content where appropriate. The electrodes are easy to use, and will produce a very low heat input in to the base material when used correctly.
GRINOX 53 2.5 - 3.2 - 4.0	E 23 12 2 L R 32 E309LMo-16	Rutile-basic coated 23Cr-12Ni all position electrode with addition of molly for cladding, joining & dissimilar applications.
GRINOX 29 2.0 - 2.5 - 3.2 4.0 - 5.0	E 29 9 R 12 E312-17	The most versatile electrode for repair welding, dissimilar steel welding, difficult-to-weld steels and hard facing. The weld metal is scale resistant up to 1000°C, wear resistant, corrosion and heat resistant. A rutile (basic) coated electrode with excellent weldability and slag release. Weldable on AC – DC. Deposit weld metal with austenitic-ferritic structure. The GRINOX 29 has a unique coating which is insensitive to atmospheric humidity. Easy detachable slag that will not 'fly off' when cooling. The weld metal will contain very low carbon content where appropriate. The electrodes are easy to use, and will produce a very low heat input in to the base material when used correctly.
GRINOX 126 2.5 - 3.2 4.0 - 5.0	E 18 8 Mn R 53 E307-26*	Rutile -basic coated high deposition electrode, synthetic, 160% metal recovery. Higher welding current can be used. Suitable for build up layers in hard facing applications.

GRITHERM heat resistant stainless electrodes

PRODUCT Diameter [mm]	**CLASSIFICATION** **EN 1600** **AWS A5.4**	**DESCRIPTION**
GRITHERM 44 2.5 - 3.2 - 4.0	E 22 12 R 32* E309-16	Rutile-basic 309 alloy with increased carbon content for applications up to 1050°C. Especially developed for high temperature applications like industrial furnaces.
GRITHERM 46 2.5 - 3.2 - 4.0	E 25 20 R 12 E310-16	A rutile-basic electrode for heat resistant steels. The weld metal comprises of fully austenitic chrome nickel steel scale resistant up to 1200°C. Weldable in all positions except vertical down on AC and DC.
GRITHERM 47 2.5 - 3.2 - 4.0	E 25 20 B 12 E310-15*	Basic version of GRITHERM 46.

NOTES:

GRINI Nickel base covered electrodes

PRODUCT Diameter [mm]	**CLASSIFICATION ISO 14172 (EN) AWS A5.11M**	**DESCRIPTION**
GRINI 5 2.5 - 3.2 - 4.0	E Ni 4060 (E NiCu30Mn3Ti) E NiCu-7	Basic coated all position electrode for joint welding and build-up welding of nickel-copper alloys with up to 30% copper (Monel). Cladding steels & joining of dissimilar materials (steel to copper, copper alloys, nickel-copper alloys).
GRINI 7 2.5 - 3.2 4.0 - 5.0	E Ni 6182 (E NiCr15Fe6Mn*) E NiCrFe-2*	Special basic coating for welding nickel alloys, cryogenic nickel steels and joint between dissimilar materials. Weld metal comprises a nickel-chrome-iron alloy for operating temperatures from –269°C to +815°C. Scale resistance up to 1000°C and creep resistant up to 815°C.
GRINI 207 2.5 - 3.2 - 4.0	E Ni 6182 (E NiCr15Fe6Mn) E NiCrFe-3	Application same as GRINI 7 but confirms directly to the AWS/ASME classification E NiCrFe-3.
GRINI 209 2.5 - 3.2 - 4.0	E Ni 6625 (E NiCr22Mo9Nb) E NiCrMo-3	Special coated electrode for welding of alloy 625, alloy 800, 800H, 800HT and alloy X750. Excellent for welding cryogenic nickel steels (5% and 9% Ni-steel). Suitable for super austenitic stainless steels such as alloy S31254 as well as dissimilar joints.

NOTES:

GRICU Copper & GRILUMIN Aluminum base covered electrodes

PRODUCT Diameter [mm]	CLASSIFICATION DIN 1733 AWS A5.6	DESCRIPTION
GRICU 1 3.2 - 4.0 - 5.0	EL-CuMn 2 E Cu*	A basic coated electrode for welding of pure copper and other commercial copper grades.
GRICU 8 3.2 - 4.0	N.A. E CuMnNiAl	Basic coated electrode of the 'Alu-Bronze' type but with 12% extra Mn, Fe and Ni. • It can be used for hard facing on steel, cast steel and cast iron. • GRICU 8 is corrosion resistant. • High resistance to cavitation. • Ideal for building up shafts. • Typical applications are; valve seats, stirrers, ship shafts and propellers. To prevent hot cracking, avoid too much base metal dilution.
GRICU 11 3.2 - 4.0	EL-CuSn 7* E CuSn-A*	A basic graphite coating which is AC weldable. For use on 6% tin bronze. The deposit is corrosion resistant with good mechanical properties.
GRICU 12 3.2 - 4.0	EL-CuSn 13 N.A.	Basic electrode for 12% tin bronze. DC only. Ideal for joint and build up welding on tin bronzes, multi-component tin bronzes and red brass e.g. shafts, friction bearings, liners, slide valves, bronze fittings.
PRODUCT	**CLASSIFICATION** **ISO 18273** **AWS A5.3**	**DESCRIPTION**
GRILUMIN 14 (AlSi 5) 2.5 - 3.2 - 4.0	Al 4043A* E 4043	Aluminum-silicon electrode with a special coating for welding of malleable, cast alloys and dissimilar aluminum alloys e.g. oil baths, gear housing and cylinder heads.

GRICAST Nickel base cast iron electrodes

PRODUCT Diameter [mm]	**CLASSIFICATION** **EN ISO 1071** **AWS A5.15**	**DESCRIPTION**
GRICAST 31 2.5 - 3.2 - 4.0	E C NiFe-Cl 1 ENiFe-Cl	With Bi-metal core wire. Very strong and crack resistant all purpose electrode. Gives a pulsating arc on DC - . For use on AC or DC-. Double metal core wire (Ni-Fe) prevents overheating of the electrode. Suitable for all kinds of cast iron.
GRICAST 3 2.5 - 3.2 - 4.0	E C NiFe-Cl 1 ENiFe-Cl	Similar to GRICAST 31 without the Bi-metal core wire and the pulsing arc. Good weldability on DC+ or AC.
GRICAST 62 2.5 - 3.2 - 4.0	E C NiFe-2 1 ENiFe-Cl*	NiFeMn alloy with Bi-metal core wire. This electrode is designed for maximum possible strength and ductility in the weld deposit. Achieves up to 20% elongation. Normal NiFe electrodes achieve 10-12% elongation. Can be used for multi-layer welding.
GRICAST 1 2.5 - 3.2 4.0 - 5.0	E C Ni-Cl 1 ENi-Cl	Special coating gives a pulsating arc on DC - . For use on AC or DC. The coating helps to overcome blow holes on oily or greasy surfaces. The deposit has good machinability. Suitable for all kinds of cast iron.
GRICAST 11 2.5 - 3.2	E C Ni-Cl 1 ENi-Cl	Similar to the GRICAST 1.
GRICAST 6 2.5 - 3.2 - 4.0	E C NiCu-B 1 ENiCu-B	Rebuilding of small miscasting and repair welding of sand holes in FC and FCD qualities by cast iron cold welding. The GRICAST 6 deposit is more of a color match than Ni or NiFe weld deposits.

GRIDUR hard facing covered electrodes

PRODUCT ALLOY STRUCTURE	**CLASSIFICATION DIN 8555 AWS A5.13**	**HARDNESS**	**APPLICATION**
GRIDUR 3 Martensitic MnCr 3.2 - 4.0	E 1-UM-350 -	350-370 HB 37 HR_C	Impact and pressure resistant. Typical applications are; rails, rollers, couplings, track wheels, wheel crowns and rope winches.
GRIDUR 6 Martensitic CrSi 3.2 - 4.0	E 6-UM-60-GPS -	58 HR_C	Impact, abrasion resistant, shockproof. Good edge holding qualities, ideal for cold working tools. Basic coating.
GRIDUR 7 Martensitic CrSi 2.5 - 3.2 4**.0** - 5.0	E 6-UM-60-GPS -	58 HR_C	Similar to GRIDUR 6 with 120% metal recovery. For Metal to Impact applications.
GRIDUR 46 Martensitic CrSi 3.2 - 4.0 - 5.0	E 6-UM-60-GP -	57-62 HR_C	High output rutile electrode with 180% recovery. Tough abrasion – impact resistant.
GRIDUR 34 Low iron NiMoCrW 2.5 - 3.2 - 4.0	E 23-UM-200-CKPTZ ENiCrMo-5* (A5.11M)	225-400 HB	High temperature strength resistance to corrosion and heat. Ideal for drop forging. Dies and hot work tool steels.
GRIDUR 36 Martensitic – Ledeburitic MoCrWV 2.5 - 3.2 - 4.0	E 4-UM-60-S EFe6*	57-62 HR_C	Very good edge holding quality on high speed steel with good red hardness (tool & die).
GRIDUR 61 Martensitic with special carbides 3.2 - 4.0	E 3-UM-60-T -	57-62 HR_C	Heat resistant, good edge holding, impact resistant. Not susceptible to cracking, especially suitable for tool steel i.e. SKD11, for extremely wear resistant hard facings. Weld metal comprises hard alloy with special carbides.

GRISHIELD & GRINOX flux cored wires

PRODUCT Diameter [mm]	**CLASSIFICATION** **EN 758 / 12073** **AWS A5.20 / 29 / 22**	**DESCRIPTION**
GRISHIELD F-71	T 46 3 P M 1 H5 E71T-1 MJ H4	Rutile flux cored wire with high impact values at low temperature. Ideal for positional & flat welding. Operating temperature to –40°C on low and medium alloyed carbon steels.
GRISHIELD F-104	T 46 3 M M 2 H5 E70C-6M H4	All position Metal cored with high efficiency (up to 97%) on low and medium carbon steels. Very good wire for use with robotics. Special designed for down hand welding
GRISHIELD F-5	T 42 4 B M 2 H5 T 42 4 B C 2 H5 E71T-5 MJ H4 E71T-5 J H4	A fully basic flux cored wire for critical applications. Excellent radiographic quality weld deposit and high impact values as well as ductility.
GRISHIELD F-18	T 50 5 1Ni P M 2 H5 E81T1-Ni1 MJ H4	Rutile 1% nickel flux cored wire for welding steels for low temperature service. Ideal in all positions. Weld metal comprises of nominal 1% Nickel for operating temperature from –60°C to +450°C. Proven offshore pedigree.
GRINOX FCW-308L	T 19 9 L R C 3 / M 3 E308LT0-1 / -4	Rutile flux cored wire for welding AISI 304L base metal or equal.
GRINOX FCW-316L	T 19 12 3 L R C 3 / M3 E316LT0-1 / -4	Rutile flux cored wire for welding AISI 316L base metal or equal.
GRINOX FCW-309L	T 23 12 L R C 3 / M 3 E309LT0-1 / -4	Rutile flux cored wire for welding dissimilar joints stainless to carbon steels.

Corresponding welding consumables

COVERED ELECTRODES			GTAW (T) / GMAW (S) WIRES		
Mild steel Rutile	**AWS A5.1**	**EN 499**		**AWS A5.18**	**EN 1668**
GRICON 4	E6012	E 38 0 RC 11			
GRICON 33	E6013	E 42 A RC 11			
GRICON 39	E6013	E 42 2 RB 12	GRIDUCT T-4	ER70S-3	W 42 5 W2Si
GRICON 8A	E6013	E 42 0 RR 12			
GRICON 17	E7024	E 42 0 RR 73			
Basic	**AWS A5.1**	**EN 499**		**A5.18 / A5.28**	**EN 1668 / EN 440**
GRICON 43	E7018-1 H8	E 46 3 B 32 H10	GRIDUCT T-4	ER70S-3	W 42 5 W2Si
GRICON 15	E7018-1 H4R	E 42 5 B 32 H5	GRIDUCT T- / S-KEMO	ER70S-A1	G 46 3 M G2Mo
High Strength	**AWS A5.5**	**EN 757**		**AWS A5.28**	**EN 12534**
GRIDUCT 1	E9018-G H4R	E 55 4 1NiMo B 32 H5	-	-	-
GRIDUCT 17	E11018M H4	E 69 5 Z B 32 H5	GRIDUCT S-FK5	ER 100S-G	G 69 4 M Mn3Ni1CrMo
Low Temperature	**AWS A5.5**	**EN 499**		**AWS A5.28**	**EN 440**
-			GRIDUCT S-HETTA	ER 80S-Ni2	G 46 6 M G2Ni2
Creep Resistant	**AWS A5.5**	**EN 1599**		**AWS A5.28**	**EN 12070**
-			GRITHERM T-3 / S-3	ER 70S-A1	W MoSi / G MoSi
-			GRITHERM T-5 / S-5	ER 80S-B2*	W / G CrMo1Si
-			GRITHERM T-7	ER 90S-B3*	W CrMo2Si
STAINLESS STEEL					
General purpose	**AWS A5.4**	**EN 1600**		**AWS A5.9**	**EN 12072**
GRINOX 202	E308L-16	E 19 9 L R 12	GRINOX T- / S-R2LC	ER 308LSi	W / G 19 9 L Si
GRINOX 502	E308L-17	E 19 9 L R 12			
GRINOX 507	E347-16	E 19 9 Nb R 12	GRINOX T-R2E / S-R2E	ER 347Si	W / G 19 9 Nb Si
GRINOX 210	E316L-16	E 19 12 3 L R 12	GRINOX T- / S-R4LC	ER 316LSi	W / G 19 12 3 L Si
GRINOX 510	E316L-17	E 19 12 3 L R 12			
GRINOX 514	E318-16	E 19 12 3 Nb R 12	GRINOX T-R4E / S-R4E	ER 318*	W / G 19 12 3 Nb Si
-			GRINOX T-66	-	W 18 16 5 N L*
-			GRINOX T-51 / S-51	-	W / G 20 16 3 Mn L
-			GRINOX T-65	ER 385	W 20 25 5 Cu L
GRINOX 62	E2209-16	E 22 9 3 N L R 32	GRINOX T-62 / S-62	ER 2209	W / G 22 9 3 N L
GRINOX 33	E2209-15	E 22 9 3 N L B 22			

NOTES:

Corresponding welding consumables

COVERED ELECTRODES STAINLESS STEEL			GTAW (T) / GMAW (S) WIRES		
Buffer Alloys	**AWS A5.4**	**EN 1600**		**AWS A5.9**	**EN 12072**
GRINOX 73	E309L-17	E 23 12 L R 32	GRINOX T-73 / S-45	ER 309LSi	W / G 23 12 L Si
GRINOX 53	E309LMo-16	E 23 12 2 L R 32	-	-	-
GRINOX 29	E312-17	E 29 9 R 12	-	-	-
GRINOX 126	E307-26*	E 18 8 Mn R 53	GRINOX T- / S-AS 15NK	ER307*	W / G 18 8 Mn
Heat resisting	**AWS A5.4**	**EN 1600**		**AWS A5.9**	**EN 12072**
-			GRITHERM S-49	-	G 25 4
GRITHERM 44	E309-16	E 22 12 R 32*	GRITHERM S-45	ER 309LSi	G 23 12 L Si
GRITHERM 46	E310-16	E 25 20 R 12	GRITHERM T-47 / S-47	ER 310	W / G 25 20
GRITHERM 47	E310-15*	E 25 20 B 12			
Nickel(alloy)	**AWS A5.11M**	**ISO 14172**		**AWS A5.14**	**ISO 18274**
-			GRINI T- / S-NICKEL	ER Ni1	S Ni 2061
GRINI 5	E NiCu-7	E Ni 4060	GRINI T- / S-NiCu	ER NiCu-7	S Ni 4060
GRINI 7	E NiCrFe-2*	E Ni 6182	GRINI T- / S-NCF 9	ER NiCr-3	S Ni 6082
GRINI 207	E NiCrFe-3	E Ni 6182			
GRINI 209	E NiCrMo-3	E Ni 6625	GRINI T-209 / S-209	ER NiCrMo-3	S Ni 6625
Copper(alloy)	**AWS A5.6**	**DIN 1733**		**AWS A5.7**	**DIN 1733 / EN 14640**
GRICU 1	E Cu*	EL-CuMn 2	GRICU T-SICU / S-SICU	ER Cu	S Cu 1898 (CuSn1)
GRICU 8	E CuMnNiAl	-	GRICU S-AlBz 30	ER CuMnNiAl	-
GRICU 11	E CuSn-A*	EL-CuSn 7*	GRICU T- / S-SnBz 6	ER CuSn-A	S Cu 5180 (CuSn6P)
GRICU 12	-	EL-CuSn 13	-	-	-
			GRICU T- / S-AlBz 26	-	S Cu 6327 (CuAl8Ni2)
			GRICU T-SIMA / S-SIMA	ER CuSi-A	SG-CuSi3
			GRICU T- / S-CuNi 70/30	ER CuNi	SG-CuNi30Fe
			GRICU S-AlBz 8	ER CuAl-A1	SG-CuAl8
Aluminium(alloy)	**AWS A5.3**	**ISO 18273**		**AWS A5.10**	**ISO 18273**
			GRILUMIN T-Al 99.5 Ti	ER 1100*	-
			GRILUMIN T-Al 99.8	ER 1100	Al 1080A*
			-	-	-
			GRILUMIN T- / S-AlMg 3	-	AL 5754
			GRILUMIN T- / S-AlMg 5	ER 5356	Al 5356
			GRILUMIN T- / S-5183	ER 5183	Al 5183
			GRILUMIN T- / S-MG 45	-	Al 5087
GRILUMIN 14	E 4043	Al 4043A*	GRILUMIN T- / S-AlSi 5	ER 4043	Al 4043A
			GRILUMIN T-AlSi 12	ER 4047	Al 4047A
CAST IRON	**AWS A5.15**	**EN ISO 1071**			
GRICAST 31	E NiFe-CI	E C NiFe-CI 1			
GRICAST 3	E NiFe-CI	E C NiFe-CI 1			
GRICAST 62	E NiFe-CI*	E C NiFe-2 1			
GRICAST 1	E Ni-CI	E C Ni-CI 1			
GRICAST 11	E Ni-CI	E C Ni-CI 1			
GRICAST 6	E NiCu-B	E C NiCu-B 1			

NOTES:

Corresponding welding consumables

COVERED ELECTRODES			GTAW (T) / GMAW (S) WIRES		
SMAW electrodes	**AWS**	**DIN 8555**			**DIN 8555**
GRIDUR 3	-	E 1-UM-350	GRIDUR S-350		MSG 2-GZ-350
GRIDUR 6	-	E 6-UM-60-GPS			
GRIDUR 7	-	E 6-UM-60-GPS	GRIDUR S-600		MSG 6-GZ-60 PS
GRIDUR 46	-	E 6-UM-60-GP			
GRIDUR 34	A5.11M: ENiCrMo-5*	E 23-UM-200-CKPTZ			
GRIDUR 36	A5.13: EFe6*	E 4-UM-60-S			
GRIDUR 61	-	E 3-UM-60-T			
Hard facing			**OXY-FUEL GAS WELDING**		
Flux Cored Wires	**EN 14700**	**DIN 8555**	**Rods**	**AWS A5.2**	**EN 12536**
GRIDUR F-29W	T Z Fe8	MF5-GF–350-P*	GRIDUCT G-KEMO	R 65*	O IV
GRIDUR F-32W (M)	-	MF5–GF–40–P*	GRIDUCT G-V1	R 45*	O I
GRIDUR F-37W	-	MF5–GF–45–P*	GRIDUCT G-V2	R 60*	O II
GRIDUR F-40W (MH)	-	MF5–GF–45–P*	GRIDUCT G-V20	R 60*	O III
GRIDUR F-46W (H)	-	MF6–GF–50–P*	GRITHERM G-3	R 65*	O IV
GRIDUR F-49W (HH)	-	MF6–GF–55– P*	GRITHERM G-5	R 65*	O V
GRIDUR F-600	-	MSG6–GF–60–PS	GRICU G- / T-SiNi		SG-CuAg (DIN 1733)
FLUX CORED WIRES					
Mild / Low Alloy	**AWS A5.20 / A5.29**	**EN 758**	**High Alloy**	**AWS A5.22**	**EN 12073**
GRISHIELD F-71	E71T-1 MJ H4	T 46 3 P M 1 H5	GRINOX FCW-308L	E308LT0-1 / -4	T 19 9 L R C 3 / M 3
GRISHIELD F-104	A5.18: E70C-6 M H4	T 42 3 M M 2 H5	GRINOX FCW-316L	E316LT0-1 / -4	T 19 12 3 L R C 3 / M 3
GRISHIELD F-5	E71T-5 MJ H4	T 42 4 B M 2 H5	GRINOX FCW-309L	E309LT0-1 / -4	T 23 12 L R C 3 / M 3
	E71T-5 J H4	T 42 4 B C 2 H5			
GRISHIELD F-18	E81T1-Ni1 MJ H4	T 50 5 1Ni P M 2 H5			
SAW WIRES					
Mild Steel	**AWS A5.17**	**EN 756**			
UP L S2	EM 12	S2			
UP L S3	EH 12 K	S3 Si			
Low Alloy	**AWS A5.23**	**EN 756**	**High Alloy**	**AWS A5.9**	**EN 12072**
UP L S2Mo	EA1	S2 Mo	UP L 19.9L	ER 308L	S 19 9 L
UP L S2CrMo1	EB2	S CrMo1 (EN 12070)	UP L 19.12.3L	ER 316L	S 19 12 3 L
UP L S1CrMo2	EB3	S CrMo2 (EN 12070)	UP L 19.12.3Nb	ER 318	S 19 12 3 Nb
UP L S2Ni2	ENi2	S2Ni2	UP L 19.9.NbL	ER 347	S 19 9 Nb
LUP 80Y	EF3*	S3Ni1Mo	UP L 20.16.3Mn8NL		S 20 16 3 Mn L
SAW FLUX					
Fused	**AWS**	**EN 760**	**Aglo**	**AWS**	**EN 760**
LW 250	-	S F MS 1 78 AC H5	LW 610	-	S A AR/AB 1 78 AC H5
LW 280	-	S F CS 1 65 AC H5	LW 610-F	-	S A AR/AB 1 76 AC H5
LW 320	-	S F AB 1 58 AC H5	LW 642	-	S A AB 1 56 AC H5
LW 725	-	S A AB/AR 2 69 AC H5	LW 642-F	-	S A CS 1 75 AC H5

NOTES:

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