



TIG RODS

manufactured and distributed by
FSH WELDING GROUP

1) UN-ALLOYED STEEL

TIG F56	TIG 70S3	AWS A5.18	ER70S-3
TIG F57	TIG 70S6	AWS A5.18	ER70S-6

2) LOW ALLOYED STEEL

TIG F61	TIG 70SA 1	AWS A5.28	ER70S-A1
TIG F63	TIG 80SB2	AWS A5.18	ER80S-B2
TIG F68	TIG 90SB3	AWS A5.28	ER90S-B3
TIG F69	TIG CrMo5	ISO 21952-A	W CrMo5Si
TIG F609	TIG 80SB8	AWS A5.28	ER80S-B8
TIG F691	TIG 90SB9	AWS A5.28	ER90S-B9
TIG F82	TIG 80SNi2	AWS A5.28	ER80S-Ni2

TIG A 60	TIG A 60	Aerospace	A 60
TIG BMS	TIG BMS	Aerospace	8CD12
TIG SCVS	TIG SCVS	Aerospace	15CDV6
TIG F66S	TIG F66S	Aerospace	25 CD4

3) STAINLESS STEEL

TIG 18/8MN	TIG 307 Si	AWS A5.9	-ER307
TIG 20/10	TIG 308L	AWS A5.9	ER308 L
TIG 20/10C	TIG 308H	AWS A5.9	ER308H
TIG 20/10T	TIG 321	AWS A5.9	ER321
TIG 20/10NB	TIG 347	AWS A5.9	ER347
TIG 20/10M	TIG 316L	AWS A5.9	ER316L
TIG 20/10MN	TIG 316MnN	AWS A5.9	ER316LMn
TIG 20/10MNB	TIG 318	AWS A5.9	ER318
TIG 20/10MNB	TIG 318 Si	AWS A5.9	ER318 Si
TIG 24/12	TIG 309L	AWS A5.9	ER309L
TIG 24/12M	TIG 309L Mo	AWS A5.9	ER309L Mo
TIG 25/20	TIG 310	AWS A5.9	ER310
TIG 29/9	TIG 312	AWS A5.9	ER312
	TIG 316H	AWS A5.9	ER316H
TIG 18/15	TIG 317L	AWS A5.9	ER317L
	TIG 347H	AWS A5.9	ER347H
TIG 20/25CU	TIG 385	AWS A5.9	ER385

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TIG 27/31CU	TIG 383	AWS A5.9	ER383
TIG M13/0	TIG 410	AWS A5.9	ER410
TIG M13/4	TIG 410NiMo	AWS A5.9	ER410NiMo
TIG F17/0	TIG 430	AWS A5.9	ER430
TIG D22/09	TIG 2209	AWS A5.9	ER2209
TIG D25/09	TIG 2509	AWS A5.9	ER2594
TIG 21/10MA	TIG 253MA	ISO 14343-A	W Z 21 10 N H
TIG 16/8M	TIG 16-8-2	AWS A5.9	ER16-8-2
TIG 17/4CU	TIG 17-4 Cu	AWS A5.9	ER630
TIG 17/4MO	TIG 17-4 Mo	ISO 14343-A	W Z 17 4 Mo
TIG 11/3M	TIG Z12CNDV12	ISO 14343-A	W Z 12 3 MoV
TIG 22/21CO	TIG N155	ISO 14343-A	W Z 22 21 3 CoWNBn

4) NICKEL ALLOYS

TIG NI22	TIG Ni22	AWS A5.14	ERNiCrMo-10
TIG NI59	TIG Ni059	AWS A5.14	~ERNiCrMo-13
TIG NI60	TIG Ni60	AWS A5.14	ERNiCu-7
TIG NI65	TIG Ni65	AWS A5.14	ERNiFeCr-1
TIG NI82	TIG Ni82	AWS A5.14	ERNiCr-3
TIG NI90	TIG Ni90	ISO 18274	S-Ni 7090 (NiCr20Co18Ti3)
TIG NI263	TIG Ni263	ISO 18274	S-Ni 7263 (NiCr20Co20Mo6Ti2)
TIG NI276	TIG Ni276	AWS A5.14	ERNiCrMo-4
TIG NI601	TIG Ni601	AWS A5.14	ERNiCrFe-11
TIG NI617	TIG Ni617	AWS A5.14	ERNiCrCoMo-1
TIG NI625	TIG Ni625	AWS A5.14	ERNiCrMo-3
TIG NI718	TIG Ni718	AWS A5.14	ERNiFeCr-2
TIG NICR80	TIG NiCr80.20	AWS A5.14	ERNiCr-6
	TIG NiTi4	AWS A5.14	ERNi-1
TIG NIW	TIG NiW	AWS A5.14	ERNiMo-3
TIG NIX	TIG NiX	AWS A5.14	ERNiCrMo-2
TIG FENI50	TIG FeNi50	Without	

5) ALUMINIUM ALLOYS

TIG AL99.7	TIG Al99.5	AWS A5.10	~ER1100
TIG ALG3	TIG AlMg3	AWS A5.10	ER5654
TIG ALG5	TIG AlMg5	AWS A5.10	ER5356
TIG ALG4M	TIG AlMg4.5Mn	AWS A5.10	ER5183
TIG ALG5M	TIG AlMg5Mn	AWS A5.10	ER5556
TIG ALG4Z2	TIG AlMg4Z2	ISO 18273	S Al Z (AlMg4Zn2)
TIG ALC6	TIG AlCu6	AWS A5.10	ER2319
TIG ALS5	TIG AlSi5	AWS A5.10	ER4043
TIG ALS12	TIG AlSi12	AWS A5.10	ER4047

6) MAGNESIUM ALLOYS

TIG AZ92A	TIG AZ92A	AWS A5.19	ER AZ92A
TIG EZ33A	TIG EZ33A	AWS A5.19	ER EZ33A

7) COPPER ALLOYS

TIG CUS	TIG Cu110	AWS A5.7	ERCu
TIG CUS6	TIG Cu114	AWS A5.7	ERCuSn-A
TIG CUS8	TIG CuSn8	ISO 24373	S Cu 5210 (CuSn8P)
TIG CUS13	TIG CuSn13	ISO 24373	S Cu 5410 (CuSn12P)
TIG CUSIL	TIG CuSi3	AWS A5.7	ERCuSi-A
TIG CUAG	TIG CuAg	ISO 24373	S Cu 1897 (CuAg1)
TIG CUA8	TIG CuAl8	AWS A5.7	ERCuAl-A1
TIG CUA8NI	TIG CuAl9Mn	ISO 24373	S Cu 6327 (CuAl8Ni2Fe2Mn2)
TIG CUA9	TIG CuAl9	AWS A5.7	ERCuAl-A2
TIG CUA9NI	TIG CuAl9Ni	AWS A5.7	ERCuNiAl
TIG CUMN13	TIG Cu118	AWS A5.7	ERCuMnNiAl
TIG CUNI10	TIG CuNi 90.10	ISO 24373	S Cu 7061 (CuNi10)
TIG CUNI30	TIG CuNi30	AWS A5.7	ERCuNi

8) TITANIUM ALLOYS

TIG T40	TIG T40	AWS A5.16	ERTi-2
	TIG T60	AWS A5.16	ERTi-4
TIG TPD0.2	TIG TPd0,2	AWS A5.16	ERTi-7
TIG TA6V4 ELI	TIG TA6V4	AWS A5.16	ERTi-5

9) COBALT ALLOYS			
TIG CO1	TIG Co1	AWS A5.21	ERCoCr-C
TIG CO6	TIG Co6	AWS A5.21	ERCoCr-A
TIG CO12	TIG Co12	AWS A5.21	ERCoCr-B
TIG CO21	TIG Co21	AWS A5.21	ERCoCr-E
TIG CO25	TIG Co25	EN 14700	S Co1
TIG FICO25	TIG FICO25	EN 14700	S Z Co1
TIG FICO31	TIG Co31	EN 4327	CoCr26Ni11W8
TIG FICO188	TIG Co188	EN 3888	CoCr22Ni22W15
TIG FICO414	TIG Co414	AFNOR	KC 29NW
TIG FICO694	TIG Co694	EN 4326	CoCr28W20Ni5V1
TIG FICO918	TIG Co918	AFNOR	KC 20NTa
TIG FICOT800	TIG CoT800	AFNOR	KD 28C
10) HARDFACING – MAINTENANCE & REPAIR			
TIG 819 BS	TIG 819 BS**	EN 14700	S Fe3
TIG BMS	TIG B.M.S.**	EN 14700	S Fe1
TIG MV5S	TIG MV5S	EN 14700	S Fe4
TIG MARVAL 18S	TIG MARVAL 18 S	EN 14700	S Fe5
TIG MARVAL X12S	TIG MARVAL X 12 S	EN 14700	S Z Fe7
	TIG M.V.S.	EN 14700	S Fe4
TIG SMV3S	TIG S.M.V3S**	EN 14700	S Fe3
TIG HB25	TIG R250B	EN 14700	S Fe1
TIG HB35	TIG R350B	EN 14700	S Fe2
TIG HB50	TIG R500B	EN 14700	S Fe2
TIG HB60	TIG R600B	EN 14700	S Fe6
TIG HBF17	TIG HBCrMo17-1	EN 14700	S Fe8
TIG HBC62	TIG HBC62	EN 14700	S Fe4
TIG HCUBE	TIG CuBe2	EN 14700	S Z Cu1



TIG F56

Old reference: TIG 70S3

Classification

AWS A5.18 : ER70S-3
ISO 636-A : W2Si

Material N° : 1.5112

Description & Applications

GTAW rods to weld low alloyed standard construction / boiler steels like S235 to S355 and P235 to P310.

Main applications: For general metal constructions, in the automobile industry, blacksmithing, ship building etc. Advise in piping systems, for root passes and high quality assemblies...

Typical Chemical Composition (%)

C	Si	Mn	Cu	P	S	Fe
0.07	0.65	1.1	0.2	<0.02	<0.02	Rem.

All Weld Metal Mechanical Properties

R _e (MPa)	R _m (MPa)	A ₅ (%)	KV (J)	
460	560	26	+20°C	150
			-20°C	90
			-50°C	50

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Nitrogen / H ₂ : 3-6 l/min

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TIG F57

Old reference: TIG 70S6

Classification

AWS A5.18 : ER70S-6
ISO 636-A : W3Si1

Material N° : 1.5125

Description & Applications

GTAW rods to weld low alloyed standard construction / boiler steels like S235-S355, P235-P355, S255N-S420N.

Main applications: For general metal constructions, in the automobile industry, blacksmithing, ship building etc.

Base material:

Construction steels for general use , Tube steels, Ship steels

EN- Designation	S185 – S355 P235 – P355	L210 – L360
Ship steels	Quality A and B	
ASTM	A285 grade C A442 grade 55, 60	A414 grade C, D, E, F A515 grade 55, 60, 65

Typical Chemical Composition (%)

C	Si	Mn	P	S	Fe
0.07	0.85	1.45	<0.02	<0.015	Rem.

All Weld Metal Mechanical Properties

R _e (MPa)	R _m (MPa)	A ₅ (%)	KV (J)	
470	560	26	+20°C	120
			-20°C	90
			-40°C	60

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Nitrogen / H ₂ : 3-6 l/min

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TIG F61

Old reference: TIG 70SA1

Classification

AWS A5.28 : ER70S-A1

ISO 636-A : W 2Mo

Description & Applications

GTAW rods for welding creep resisting steels (alloyed Mo) used at temperatures up to 500°C. Good resistance to Hydrogen attacks (chemical installations).

Main applications: For piping systems, boilers...

Base materials

Aciers de construction et aciers résistant au fluage / température

EN	ASTM
16Mo3	A161/A209/A250 gr T1 ;A335 gr P1
P355GH	A537 Cl1; A414 gr G ; A612
S420N – S460N	A572 grade 65 , A633 grade E
S500N	A225 grade C , A517 grade...
P460N	A225 grade C
S420NL - S500NL	A633 grade E, A225 grade C , A517 grade
P420NH - P500NH	A633 grade E, A225 grade C , A517 grade

Typical Chemical Composition (%)

C	Si	Mn	Mo	Cu	P	S	Fe
0.09	0.6	1.2	0.5	0.15	0.01	0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
520	630	26	+20°C 200

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Nitrogen /H ₂ : 3 - 6 l/min

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TIG F63

Old reference: TIG 80SB2

Classification

AWS A5.28 : ER80S-B2
ISO 21952-A : W Z CrMo1Si

Material N° : 1.7339

Description & Applications

GTAW rods to weld heat and creep resistant Cr/Mo steels applied at service temperatures up to 550°C.

Main applications: petrochemical industry, chemical industry.

Base materials:

Steels and pipes for boiler and pressure vessels:

NF A 36-206	:	15D3 - 18MD4 -05 -15CD2.05 - 15 CD4.05
DIN 17155	:	13 CrMo 4.4 - 15CrMo3 - 13CrMoV42
DIN 1681	:	GS 22 CrMo5.4 – GS 22 Mo4
ASTM	:	A537 - A299 A355 GrP11 u. P12

Heat treatable steels:

NF A 35-551	:	18CD4 - 16CM5
NF A 35-552	:	25CD4
DIN 17210	:	25CrMo4

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	Cu	P	S	Fe
0.1	0.5	0.6	1.3	0.5	0.2	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _e (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
490	590	25	+20°C 200

After PWHT at 700°C/1h

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Nitrogen / H ₂ : 3-6 l/min

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TIG F68

Old reference: TIG 90SB3

Classification

AWS A5.28 : ER90S-B3
ISO 21952-A : W Z CrMo2Si

Material N° : 1.7384

Description & Applications

GTAW rods for welding creep resisting steels (alloyed with Cr and Mo) used in service up to 600°C (including 2% Cr- 1% Mo castings). High resistance to H2S...

Main applications: For overheaters, valve bodies, pipes, boilers, hydrocrackers.

Base materials:

Steels and pipes for boiler and pressure vessels:

NF A 36-206	: 15CD4-05 – 10CD9-10
DIN 17155 and 17245	: 10 Cr Mo 9.10 – 10 Cr Si Mo V7
	: 24 CrMo V55 – 12 Cr Mo 9.10 GS 12 Cr MO 9.10...
BS	: 1501 Gr 622 to 1504 Gr 622, BS 359 Gr 622/640 1503 Gr 660, 1504Gr 660
ASTM	: A 387 GrD – A 335 GrP 22 – A 213 GrT 22, T36

Nuance Vallourec: Chromesco 3

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	Cu	P	S	Fe
0.1	0.6	0.6	2.4	1.0	0.2	<0.015	<0.015	Rem.

All Weld Metal Mechanical Properties

R _e (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
550	630	22	+20°C 180
After PWHT 700°C/1h			

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Nitrogen / H ₂ : 3-6 l/min

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TIG F69

Old reference: TIG CrMo5

Classification

AWS A5.9 : ER502

ISO 21952-A : W CrMo5Si

AWS A5.28 : ER80SB-6

Description & Applications

GTAW rod for welding of creep resisting steels used in the chemical industry and in thermal power plants. Good resistance against steam and hot gases.

Main applications: High temperature exchangers, piping...

Base materials:

Steels and pipes for boiler and pressure vessels:

EN	:	17 CrMo 3 5 – 12 CrMo 19 5 – G X12 CrMo5
Mat. N°	:	1.7332 ; 1.7362 ; 1.7363
ASTM	:	A387 Gr 5Cl1 et 2 – A199 Gr T5 – A182 Gr F5 – A213 G T5 A335 Gr P5 – A336 Gr F5 – A369 GrF5 – A217 Gr C5
EN	:	17 CrMo 3 5 – 12 CrMo 19 5 – G X12 CrMo5

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe
0.08	0.4	0.5	5.6	0.1	0.55	0.15	<0.02	<0.02	Rem.

All Weld Metal Mechanical Properties

R _e (MPa)	R _m (MPa)	A ₅ (%)
500	620	20
After PWHT at 730°C/2h		

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Nitrogen / H ₂ : 3-6 l/min

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TIG F609

Old reference: TIG 80SB8

Classification

AWS A5.28 : ER80S-B8

ISO 21952-A : W CrMo9Si

Description & Applications

GTAW rods for welding creep resisting steels of similar chemical composition used at service temperatures up to 600°C. Deposit resisting to temperature and creep up to 600°C. Highly resistant to hot gas and overheated steam.

Main applications: For power plants, heat exchangers, tubes, steam boilers...

Base materials

	EN	ASTM
1.7386	X12CrMo9-1	A187 Gr F9 ; A336 Gr F9
1.7386	X12CrMo9-1	A335 Gr P9
1.7386	X12CrMo9-1	A199 / A200 / A213 Gr T9
1.7389	GX12CrMo10-1	A217 C12

Steels and pipes for boiler and pressure vessels

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	Cu	P	S	Fe
0.07	0.4	0.5	9.0	1.0	0.2	<0.015	<0.015	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
530	670	24	+20°C 150
After PWHT 760°C/2h			

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Nitrogen / H ₂ : 3-6 l/min

Pre-heating and interpass temperature: 200-300°C. Post weld heat treatment is advised at 760°C during 2 hours and then cooled slowly (55°C/h) up to 580°C, following by air cooling to room temperature.

ind.10



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TIG F691

Old reference: TIG 90SB9

Classification

AWS A5.28 : ER90S-B9

ISO 21952-A : W CrMo91

Description & Applications

GTAW rods for welding creep resisting steels of similar chemical composition (known as P91) used at service temperatures up to 650°C. Deposit resisting to temperature and creep up to 650°C. Highly resistant to hot gas and overheated steam.

Main applications: For power plants, heat exchangers, tubes, steam boilers...

Base materials

Plates and pipes for boiler and pressure vessels

Mat. N°	EN	ASTM
1.7386	X12CrMo9-1	A187 Gr F9; A336 Gr F9; A335 Gr P9
1.4903	X10CrMoVNb9-1	A199 gr. T91; A335 gr. P91; A213 gr T91

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	V	Nb	N	P	S
0.09	0.25	0.6	8.8	0.65	0.95	0.03	0.2	0.06	0.05	0.002	0.007

All Weld Metal Mechanical Properties

$R_{p0.2}$ (MPa)	R_m (MPa)	A_5 (%)
650	750	18
After PWHT 760°C / 2h		

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Nitrogen /H ₂ : 3 - 6 l/min

Preheating and interpass temperature: 200-300°C. post weld heat treatment is advised at 760°C/2h, slow cooling (80°C/h) up to 300°C. Then, slow cooling at still air.

ind.11



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TIG F82

Old reference: TIG 80SNi2

Classification

AWS A5.28 : ER80S-Ni2

ISO 636-A : W2Ni2

Description & Applications

Filler metal rod for GTAW welding under shielding gas for fine grain construction steels and nickel alloyed steels. Resistant to low temperature down to -60°C. Good characteristics of cold toughness.

Main applications: For liquid gas distribution pipes, tanks, off shore, and petro-chemistry.

Base materials

High strength steels, fine grain construction steels, cold tough:

EN	Material N°	ASTM
12Ni9	1.5635	
14Ni6	1.5622	A352 gr. LC2
13MnNi6-3 1.6217	1.6217	
S/P275-S/P420		A516 / A255 / A299 / A333 / A350
P235T1/2-P355N		A369 / A210/ A106
L210-L485		
S255 - S550		A516 / A255 / A333 / A350 / A612 / A714

Typical Weld Metal Composition (%)

C	Si	Mn	Ni	Mo	P	S	Fe
0.08	0.6	1.1	2.5	0.05	<0.02	<0.02	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)	
530	620	26	-20°C	130
			-40°C	80
			-60°C	50

Weld Current & Instructions

Welding mode	Shielding gas
TIG = -	Ar : 6-12 l/min Back shielding: Nitrogen /H ₂ : 3 - 6 l/min

ind.12



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TIG A 60

Classification

AIR 9117 : A 60

Description & Applications

GTAW rod for welding of steels such as XC18S, E26, E36...

Typical Chemical Composition (%)

C	Si	Mn	Cu	P	S	Si+Al+Ti	Fe
<0.12	0.6	1.0	0.2	<0.02	<0.02	<0.90	Rem.

All Weld Metal Mechanical Properties

R _e (MPa)	R _m (MPa)	A ₅ (%)
380	550	24

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Nitrogen / H ₂ : 3-6 l/min

ind.10



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TIG BMS

Classification

AIR 9117 : 8CD12

Description & Applications

Solid rod for TIG welding of steels such as 15CrMoV6, 25CrMo4, 35CrMo4, 20CrMo12... Product of high purity for welding without micro-porosity.

Also used for build up of tool steels.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	P	S	Fe
0.06	0.7	1.1	2.7	1.0	<0.015	<0.015	Rem.

All Weld Metal Mechanical Properties

R _e (MPa)	R _m (MPa)	A ₅ (%)	Hardness
440	570	24	~36 HRC
After PWHT 730°C/2h			

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Nitrogen / H ₂ : 3-6 l/min

Preheating of work-pieces: ~250°C. Post weld heat treatment: 730°C/2h.

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TIG MV5S

Classification

DIN 8555 : MSG-3-GZ-60-P

EN 14700 : S Fe4

Description & Applications

Solid rod for TIG welding and hardfacing. Resistant to temperatures up to 550°C. Product of high purity for welding without microporosity. Mainly used for build up on equipments stressed by high impact and abrasion.

Main applications: Moulds for plastic injections, cold working stools, shredder hammers

Typical Chemical Composition (%)

C	Cr	Mo	V	W	Fe
0.5	5.0	1.3	0.4	1.3	Rem.

All Weld Metal Mechanical Properties

Hardness
60 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

Pre-heating at 300-400°C of massive parts. Maintain temperature during welding and cold slowly.

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TIG SCVS

Classification

AIR 9117 : 15CDV6

Description & Applications

Solid rod for TIG welding of steels such as 15CrMoV6, 25CrMo4, 35CrMo4, 20CrMo12... Product of high purity for welding without microporosity. Also used for hardfacing of tool steels.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	V	P	S	Fe
0.14	0.15	1.0	1.4	0.9	0.25	<0.02	<0.02	Rem.

All Weld Metal Mechanical Properties

R _e (MPa)	R _m (MPa)	A ₅ (%)	Hardness
930	1080-1280	10	42 HRC
Depending on heat treatment	Depending on heat treatment		

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Nitrogen / H ₂ : 3-6 l/min

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TIG F66S

Classification

AIR 9117 : 25CD4

Description & Applications

Solid rod for TIG welding of steels such as 25CrMo4, 35CrMo4, 20CrMo12... Product of high purity for welding without microporosity.
Also used for hardfacing of tool steels.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	Ni	P	S	Fe
0.23	0.2	0.7	1.2	0.2	0.15	<0.02	<0.02	Rem.

All Weld Metal Mechanical Properties

R _e (MPa)	R _m (MPa)	A ₅ (%)	Hardness
750	880-1080	12	46 HRC
Depending on heat treatment	Depending on heat treatment		

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Nitrogen / H ₂ : 3-6 l/min

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TIG 18/8MN

Old reference: TIG 307Si

Classification

ISO 14343-A : W 18 8 Mn
AWS A5.9 : ~ ER307

Material.N° : 1.4370

Description & Applications

Solid rod for TIG welding and overlaying on manganese steel, high sulphur and phosphorus contain steels. Also used for joining dissimilar steels as construction steels to stainless steels, as well as for cushion layers prior hardfacing, for repairing of pieces submitted to shocks or wear.

Main applications: Civil engineering, cimenteries...

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe
0.09	0.9	7.0	19.0	8.5	0.1	0.08	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
450	650	40	+20°C 120

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG 20/10

Old reference: TIG 308L

Classification

ISO 14343-A : W 19 9 L
AWS A5.9 : ER308L

Material.N° : 1.4316

Description & Applications

Solid low carbon rod for TIG welding of stainless steels (304L, 304, 347, 321...). The TIG process is particularly suited for welding of piping systems, works of fine thinness equal or inferior than 3 mm and for penetration passes.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	P	S	Fe
0.015	0.42	1.8	19.5	9.8	<0.02	<0.015	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)	
430	600	38	+20°C	150
			-196°C	50

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG 20/10C

Old reference: TIG 308H

Classification

ISO 14343-A : W 19 9 H
AWS A5.9 : ER308H

Material.N° : 1.4948

Description & Applications

Solid low carbon rod for TIG welding of stainless steels (type 304H, 308H, 321H, and 347H). This type is generally reserved for creep-resistant pieces and oxidation resistance of working temperatures between 400° to 750° C.

The TIG process is particularly suited for welding of piping systems, works of fine thinness equal or inferior than 3 mm and for penetration passes.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	P	S	Fe
0.05	0.4	1.8	19.9	9.7	<0.02	<0.015	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)	FN
380	580	35	+20°C 100	6

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG 20/10T

Old reference: TIG 321

Classification

ISO 14343-A : W Z 19 9 Ti
AWS A5.9 : ER321

Material N° : 1.4541

Description & Applications

Solid rod for TIG welding of stabilised stainless steels (321...) or low carbon content stainless steels (304L...). Good intergranular resistant corrosion. The TIG process is particularly suited for welding of piping systems, works of fine thinness equal or inferior than 3 mm.

Main applications: Aeronautical industry.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	Ti	P	S	Fe
0.03	0.5	1.5	18.0	10.5	0.3	0.3	0.2	<0.03	<0.02	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
460	630	35	+20°C 110

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG 20/10NB

Old reference: TIG 347

Classification

ISO 14343-A : W 19 9 Nb
AWS A5.9 : ER347

Material.N° : 1.4551

Description & Applications

Solid rod for TIG welding of stabilised stainless steels (347, 321...) or low carbon content stainless steels (304L...). Good intergranular resistant corrosion.

The TIG process is particularly suited for welding of piping systems, works of fine thinness equal or inferior than 3 mm and for penetration passes.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Nb	Cu	P	S	Fe
0.045	0.4	1.5	19.4	9.3	0.1	0.6	0.1	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
490	660	35	+20°C 140

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG 20/10M

Old reference: TIG 316L

Classification

ISO 14343-A : W 19 12 3 L
AWS A5.9 : ER316L

Material.N° : 1.4430

Description & Applications

Low carbon solid rod for TIG welding of stabilised stainless steels (316, 316L...) stabilised or not. Service temperature from -120°C up to +400°C. The TIG process is particularly suited for welding of piping systems, works of fine thinness equal or inferior than 3 mm and for penetration passes.

Main applications: Applied in the chemical and petrochemical industries, refineries, food industries...

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe
0.02	0.45	1.8	18.6	12.4	2.8	0.08	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
410	610	35	+20°C 140 -196°C 45

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG 20/10MN

Old reference: TIG 316MnN

Classification

ISO 14343-A : W 20 16 3 Mn L
AWS A5.9 : ER316LMn

Material N° : 1.4455

Description & Applications

Rod for Gas Tungsten Arc Welding, designed to weld austenitic stainless like 316L grade. Non-magnetic and free of ferrite on weld deposit. Mainly used for cryogenic applications.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	N	Fe
0.02	0.5	7.0	20.0	16.0	3.0	0.15	<0.02	<0.01	0.15	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
500	650	30	+20°C 140 -196°C 95

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon or Nitrogen: 3-6 l/min

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TIG 20/10MNB

Old reference: TIG 318

Classification

ISO 14343-A : W 19 12 3 Nb
AWS A5.9 : ER318

Material.N° : 1.4576

Description & Applications

Low carbon solid rod for TIG welding of stabilised stainless steels (318, 316Ti...). Good intergranular resistant corrosion. Service temperature from -120°C up to +400°C. The TIG process is particularly suited for welding of piping systems, works of fine thinness equal or inferior than 3 mm and for penetration passes.

Main applications: Applied in the petrochemical industries and for sea water applications...

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Nb	Cu	P	S	Fe
0.04	0.4	1.7	19.6	11.5	2.6	0.6	0.2	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
400	620	35	+20°C 120

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG 20/10MNBS

Old reference: TIG 318Si

Classification

ISO 14343-A : W 19 12 3 Nb Si
AWS A5.9 : ER318 type

Material N° : 1.4576

Description & Applications

Low carbon solid rod for TIG welding of stabilised stainless steels (318, 316Ti...). Good intergranular resistant corrosion. Service temperature from -120°C up to +400°C. The TIG process is particularly suited for welding of piping systems, works of fine thinness equal or inferior than 3 mm and for penetration passes.

Main applications: Applied in the petrochemical industries and for sea water applications...

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Nb	Cu	P	S	Fe
0.04	0.85	1.7	19.6	11.5	2.6	0.6	0.2	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
400	620	35	+20°C 120

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG 24/12

Old reference: TIG 309L

Classification

ISO 14343-A : W 23 12 L
AWS A5.9 : ER309L

Material.N° : 1.4332

Description & Applications

Solid rod for TIG welding of stainless steels (309, 309L...). Well adapted for welding of dissimilar steels. Its high ferrite content allows for greater dilution without risk of cracking. Also suitable for welding high temperature steels and as buffer layer before hardfacing.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe
0.015	0.4	1.8	23.2	13.8	0.1	0.08	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)	
420	620	35	+20°C	140
			-60°C	70

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG 24/12M

Old reference: TIG 309LMo

Classification

ISO 14343-A : W 23 12 2 L
AWS A5.9 : ~ER309LMo

Material N° : 1.4459

Description & Applications

Rod for Gas Tungsten Arc Welding for joining of stainless steels, 23 Cr - 12 Ni - 2 Mo type, used to weld on 316L stainless steels and for dissimilar joints between construction / mild steels and stainless steels. Used for intermediate layer for a 316L type cladding and buffer layer before hardfacing. Highly crack resistant. Highly corrosion resistance.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe	FN
0.015	0.55	1.5	21.5	14.5	2.6	0.1	<0.02	<0.01	Rem.	~ 12

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
400	600	35	20°C 120

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon or Nitrogen/H ₂ : 3 - 6 l/min

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TIG 25/20

Old reference: TIG 310

Classification

ISO 14343-A : W 25 20
AWS A5.9 : ER310

Material.N°: 1.4842

Description & Applications

Solid rod for TIG welding of similar austenitic steels (310...). Well adapted for welding of dissimilar steels.

Also suitable for welding high temperature resistant steels till about 1000°C.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe
0.1	0.45	1.7	26.0	20.5	0.1	0.1	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)	
380	580	40	+20°C	170
			-196°C	60

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG 29/9

Old reference: TIG 312

Classification

ISO 14343-A : W 29 9
AWS A5.9 : ER312

Material.N° : 1.4337

Description & Applications

Solid rod for TIG welding of dissimilar steels with an austenitic-ferritic stainless steel deposit. Well adapted for steels difficult to weld as tool steels, Mn steels, spring steels... Metal deposit highly resistant to cracks, suitable for buffer layers before hardfacing and for building up cutting tools.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe
0.1	0.4	1.8	30.2	9.3	0.15	0.1	<0.02	<0.02	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
520	730	25	+20°C 100

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG 316H

Classification

AWS A5.9 : ER316H

ISO 14343-A : W 19 12 3 H

Description & Applications

Rod for Gas Tungsten Arc Welding, with increased carbon and approx. 5% ferrite designed to weld 17/12/2 (316H) stainless steels as well as stabilized grades used for high temperature service up to 750°C.

Main applications: In petrochemical industries, tanks, heat exchangers, piping systems.

Base materials

Stainless steels for general use:

UNS	Alloy	EN 10088	Mat. N°
S31600	316	X5CrNiMo17 12 2	1.4401
S31609	316H	X6CrNiMoN17 132	1.4919
S31635	316Ti	X10CrNiMoTi18 12	1.4573
S31640	316Cb	X6NiCrMoNb17 12 2	1.4580
J92920	316H		

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe	FN
0.05	0.4	1.7	18.5	11.5	2.1	0.05	0.02	0.01	Rem.	~ 5

All Weld Metal Mechanical Properties

$R_{p0.2}$ (MPa)	R_m (MPa)	A_5 (%)
> 380	> 580	> 30

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon or Nitrogen / H ₂ : 3-6 l/min

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TIG 18/15

Old reference: TIG 317L

Classification

AWS A5.9 : ER317L
UNS : S31783

ISO 14343-A : W 18 15 3 L

Description & Applications

Rod for Gas Tungsten Arc Welding low carbon stainless steel composition with about 3,5%Mo. For welding and cladding on austenitic Cr-Ni-Mo stainless and clad plates. Compared to 316L-grades the higher Mo-content provides better general corrosion resistance, especially to crevice and pitting corrosion in chloride containing solutions.

Main applications: Used in the chemical and petrochemical industries, in refineries, in the food industries and for ship building to weld pipes, tanks...

Base materials

Stainless steels for general use:

UNS	Alloy	EN 10088	Material N°	UGINE
S31603	316L	X2CrNiMo17-12-2	1.4404	UGINOX 18-11 ML
S31653	316LN	X2CrNiMoN17-13-3	1.4429	UGINOX 17-10 M
S31700	317	X5CrNiMo17-13-3	1.4449	
S31703	316LMO	X2CrNiMo18-14-3	1.4435	UGINOX 18-13 MS
S31703	317L	X2CrNiMo 18-15-4	1.4438	

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe	FN
0.01	0.4	1.4	18.8	13.6	3.5	0.10	<0.03	<0.02	Rem.	~ 10

All Weld Metal Mechanical Properties

$R_{p0.2}$ (MPa)	R_m (MPa)	A_5 (%)
> 380	> 580	> 30

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding :Argon or Nitrogen /H ₂ : 3 - 6 l/min

Ind.11



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TIG 347H

Classification

AWS A5.9 : ER347 (347H)

ISO 14343-A : W 19 9 Nb

Description & Applications

Rod for Gas Tungsten Arc Welding, Niobium / Columbium stabilized 18%Cr-8%Ni type stainless steel rod with increased Carbon, suited to weld Ti or Nb stabilized stainless steels, used for high temperature service.

Base materials

Stainless steels for high temperature services:

UNS	Alloy	EN 10088	Material N°
S30409	304H	X6CrNi18-10	1.4948
S32109	321H	X8CrNiTi18-10	1.4878
S34709	347H	X7CrNiNb18-10	1.4912

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	Nb	P	S	FN
0.05	0.45	1.7	19.5	9.1	0.2	0.1	0.65	<0.03	<0.02	~10

All Weld Metal Mechanical Properties

$R_{p0.2}$ (MPa)	R_m (MPa)	A_5 (%)
>380	>580	>30

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon or Nitrogen /H ₂ : 3-6 l/min

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TIG 20/25CU

Old reference: TIG 385

Classification

ISO 14343-A : W 20 25 5 Cu L
AWS A5.9 : ER385

Material N° : 1.4519

Description & Applications

Very low carbon content solid rod for TIG welding of totally austenitic stainless steels (Uranus B6*, 904L...). Very good resistance to attacks by phosphoric and sulphuric acids. High resistance against pitting and stress corrosion in chloride containing media.

The TIG process is particularly suited for welding of piping systems, works of fine thinness equal or inferior than 3 mm and for penetration passes.

* Trademark of CREUSOT LOIRE

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe
0.01	0.4	1.8	20.0	25.0	4.5	1.5	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)	
350	550	36	+20°C	120
			-196°C	80

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

ind.10



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TIG 27/31CU

Old reference: TIG 383

Classification

AWS A5.9 : ER383

ISO 14343-A : W 27 31 4 Cu L

Description & Applications

Very low carbon content GTAW rod for joining of totally austenitic stainless steels (Uranus B28, Sanicro 28...). Very good resistance to attacks by phosphoric and sulphuric acids. High resistance against pitting and stress corrosion in chloride containing media.

TIG welding is particularly recommended for piping systems, root penetration and for thin thickness plates.

Sanicro is a trade name of Sandvik, Uranus is a trade name of Creusot Loire Industries

Base materials

UNS	Aciers	EN 10088	N°d'alliage	UGINE / CLI
N08028	28	X1NiCrMoCu31-27-4	1.4563	URANUS B28
N08904	904L	X1NiCrMoCu25-20-5	1.4539	URANUS B6

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe
0.01	0.15	1.8	27.0	31.0	3.5	1.0	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
350	550	35	+20°C 100

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon/Nitrogen : 3-6 l/min

ind.09

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TIG M13/0

Old reference: TIG 410

Classification

ISO 14343-A : W 13
AWS A5.9 : ER410

Material N° : 1.4009

Description & Applications

Solid rod for TIG welding stainless steels (403, 405, 416...). Resistant to atmosphere corrosion, water corrosion and light acids.
Mainly applied in welding and hardfacing of piping systems, working at service temperature < 450°C.

Typical Chemical Composition (%)

C	Si	Mn	Cr	P	S	Fe
0.10	0.3	0.5	13.0	<0.03	<0.02	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
250	450	15	+20°C 90

After PWHT at 750°C/2h

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

ind.10



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TIG M13/4

Old reference: TIG 410NiMo

Classification

AWS A5.9 : ER410NiMo
ISO 14343-A : W 13 4

Material N° : ~ 1.4351

Description & Applications

GTAW rod for repair and construction welding of martensitic Cr-Ni steels with a similar composition. These steels / castings are used for hydraulic turbines, pumps, valve bodies, compressor parts... Soft fusion, slag easy to remove, nice aspect of weld bead.

Base materials

Martensitic stainless steels and castings:

UNS	Alloy	EN/ Symbol	Material N°
J91540	CA6-NM	G-X5CrNi13-4	1.4313
S41500		X3CrNiMo13-4	1.4313
		G-X4CrNi13-4	1.4317
		G-X5CrNiMo13-4	1.4407
		X3CrNiMo13-4	1.4413
		G-X4CrNiMo13-4	1.4414

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe
0.02	0.45	0.5	12.3	4.2	0.5	0.08	<0.03	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
750	840	19	+20°C 120
After PWHT 580°C / 8h			

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon/Nitrogen : 3-6 l/min

Ind.10



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TIG F17/0

Old reference: TIG 430

Classification

ISO 14343-A : W 17
AWS A5.9 : ER430

Material.N° : 1.4016

Description & Applications

Solid rod for TIG welding of stainless steels with 17% Chromium content. Good oxidation resistant up to 900°C also in sulfurous gases, used for chimneys as well as for sea water applications,...

Main applications: Surfacing of fittings and valves.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe
0.05	0.4	0.5	16.5	0.3	0.1	0.08	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
300	450	15
After PWHT 760°C/2h		

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG D22/09

Old reference: TIG 2209

Classification

ISO 14343-A : W 22 9 3 NL
AWS A5.9 : ER2209

Material N° : 1.4462

Description & Applications

Very low carbon content solid rod for TIG welding Duplex steels (austenitic-ferritic microstructure). Resistant in chloride containing media against pitting corrosion as well as crevice and stress corrosion.

Main applications: For pumps, vessels, piping systems etc. attacked by chloride containing solutions. But also for impellers and other components which require high strength combined with corrosion attack.

Base materials:

UNS	Alloy	EN 10088	Material N°	CLI
S31803		X2CrNiMoN22-5-3	1.4462	URANUS 45N
S32304	35N	X2CrNi23-4	1.4362	URANUS 35N
S32900	329	X3CrNiMoN27-5-2	1.4460	

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	N ₂	P	S	Fe
0.012	0.5	1.7	23.0	8.8	3.2	0.14	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
600	760	26	+20°C 150 -50°C 120

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG D25/09

Old reference: TIG 2509

Classification

AWS A5.9 : ER2594
ISO 14343-A : W 25 9 4 N L

UNS : S32750

Description & Applications

Very low carbon content solid GTAW rod for joining Duplex and Super Duplex Stainless Steels (austenitic-ferritic microstructure). Resistant in chloride containing media against pitting corrosion as well as crevice and stress corrosion. Pitting index (PREN): > 40.

Main applications: For pumps, vessels, piping systems etc. attacked by chloride containing solutions. But also for impellers and other components which require high strength combined with corrosion attack.

Base materials

UNS	Alloy	EN 10088	Material N°	CLI
S31803		X2CrNiMoN22-5-3	1.4462	URANUS 45
S32304	35N	X2CrNi23-4	1.4362	URANUS 35N
S32550	52N	G-X2CrNiMoCuN26 6 3	1.4517	URANUS 52N
	52N+	X2CrNiMoCuN25-6-3	1.4507	URANUS 52N+
S32750	2507	X2CrNiMoN25-7-4	1.4410	
S32760	100	X2CrNiMoCuWN25-7-4	1.4501	URANUS 70N
S32900	329	X3CrNiMoN27-5-2	1.4460	

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	N ₂	P	S	Fe
0.012	0.5	0.6	25.5	9.2	4.0	0.25	<0.03	<0.015	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
630	820	25	+20°C 130 -40°C 90

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon/Nitrogen : 3-6 l/min

ind.11



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TIG 20/10MA

Old reference: TIG 253MA

Classification

ISO 14343-A : W Z 21 10 N H

Material N° : ~1.4835

Description & Applications

Rod for Gas Tungsten Arc Welding with an austenitic stainless steel deposit resisting to scaling and oxidation up to 1100°C.

Main applications: Ovens, thermal equipment for heat treatment, chemical installations.

Base materials

UNS	Alloy	EN 10095	Material N°	UGINE
		X15CrNiSi20-12	1.4828	UGINOX R 20-12
		X12CrNi22-12	1.4829	
S30815	253MA	X8CrNiSiN21-11	1.4893	
		X9CrNiSiN21-11-2	1.4835	

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	N	P	S	Fe	FN
0.08	1.5	0.5	21.0	10.0	0.15	<0.02	<0.01	Rem.	~5

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
450	650	38	+20°C 120

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon or Nitrogen / H ₂ : 3-6 l/min

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TIG 16/8M

Old reference: TIG 16-8-2

Classification

ISO 14343-A : W 16 8 2

AWS A5.9 : ER16-8-2

Description & Applications

Solid rod with low ferrite content for TIG welding similar steels, 316H, used at high temperature (up to 650/700°C).

Main applications: Distillation column in petrochemical or incineration industry

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Cu	P	S	Fe
0.1	0.45	2.1	16.5	8.6	2.0	<0.2	<0.03	<0.02	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

ind.10



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TIG 17/4CU

Old reference: TIG 17-4 Cu

Classification

ISO 14343-A : W Z 17 4 Cu
AWS A5.9 : ER630

AMS : 5825

Description & Applications

Solid rod for TIG welding similar steels in aeronautical industry.

Main applications: Repairing of turbine discs, turbine blades.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Cu	Nb	P	S	Fe
0.03	0.5	0.6	16.0	5.0	3.5	0.2	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

ind.10



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TIG 17/4MO

Old reference: TIG 17-4Mo

Classification

ISO 14343-A : W Z 17 4 Mo

Description & Applications

Solid rod for TIG welding and repairing steels of similar chemical composition.

Main applications: Repairing of Pelton* turbine.

* Trademark of Aubert & Duval

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	P	S	Fe
0.05	0.3	0.9	16.0	4.4	1.0	<0.03	<0.02	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

Preheating of work-pieces at 100-150°C. Maintain temperature during welding and then slow cooling at still air. Annealing is advised at 580-620°C/4-8h.

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TIG 11/3M

Old reference: TIG Z12CNDV12

Classification

ISO 14343-A : W Z 12 3 MoV

Description & Applications

Solid rod for TIG welding and repairing steels of similar chemical composition.

Main applications: Repairing of turbine blades.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	V	N ₂	P	S	Fe
0.12	0.3	0.7	11.8	2.7	1.7	0.3	0.03	<0.035	<0.025	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

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TIG 22/21CO

Old reference: TIG N155

Classification

ISO 14343-A : W Z 22 21 3 CoWNbN

AMS : 5794

Description & Applications

Solid rod for TIG welding of similar alloys. Good resistance to heat and corrosion.

Main applications: For turbines and in aeronautical industry.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Co	W	Nb	N ₂	Fe
0.1	0.4	1.5	22.0	21.0	3.2	20.0	2.8	1.0	0.15	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon / Nitrogen : 3-6 l/min

ind.10



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TIG NI22

Old reference: TIG Ni22

Classification

AWS A5.14 : ERNiCrMo-10

Material N°: 2.4635

ISO 18274 : S-Ni6022 (NiCr21Mo13Fe4W3)

Description & Applications

Nickel alloy with high content of Cr and Mo for GTAW, which gives it exceptional corrosion resistance. It is particularly recommended for welding of C 276, C 22, other highly corrosion resistant Ni-alloys and special stainless steels.

Main applications: Works well in different environments, de-pollution (absorbers, chimneys), sea water and fertiliser, flue gas desulphurisation.

Base materials

UNS	Alloy	DIN	Material N°
N06022	C-22	NiCr21Mo14W	2.4602
N10276	C-276	NiMo16Cr15W	2.4819
N06455	C-4	NiMo16Cr16Ti	2.4610
N06625	625	NiCr22Mo9Nb	2.4856
N08825	825	NiCr21Mo	2.4858
N08926	254SMo	X1NiCrMoCuN25 20 6	1.4529

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	W	Fe	P	S	Ni
0.01	0.05	0.1	21.4	13.2	3.0	3.0	<0.01	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
480	740	42	20°C 180

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon: 3-6 l/min

ind.08



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TIG NI59

Old reference: TIG Ni059

Classification

ISO 18274 : S-Z (NiCr25Mo15)

AWS A5.14 : ~ERNiCrMo-13

Description & Applications

Nickel alloy for TIG welding with high content of Cr and Mo, which gives it exceptional corrosion resistance. It is particularly recommended for cladding of carbon steels and for welding of C 276, C 22, alloy 59, other highly corrosion resistant Ni-alloys and special stainless steels.

Works well in different environments, de-pollution (absorbers, chimneys), sea water and fertiliser, flue gas desulphurisation.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	Fe	Al	P	S	Ni
0.01	0.05	0.1	25.0	15.0	0.2	0.1	<0.01	<0.01	Rem.

All Weld Metal Mechanical Properties

$R_{p0.2}$ (MPa)	R_m (MPa)	A_5 (%)
420	740	30

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.10



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TIG NI60

Old reference: TIG Ni60

Classification

ISO 18274 : S-Ni 4060 (NiCu30Mn3Ti)

AWS A5.14 : ERNiCu-7

Description & Applications

Solid rod for TIG welding of "Monel" alloy for components for chemical and petrochemical installations, for sea water and off shore applications. Excellent resistance against corrosion. Recommended for steels/ Copper-Nickel or steels/Copper/Copper Nickel alloys assemblies.

Main applications: Chemical industries, ship building, desalination equipments...

* Trademark of Inco Alloys

Base materials:

UNS	Alloy	DIN	Material N°
C70600	CuNi90/10	CuNi10Fe1Mn	2.0872
C71500	CuNi70/30	CuNi30Mn1Fe	2.0882
N04400	400	NiCu30Fe	2.4360
N05500	K-500	NiCu30Al	2.4375

Typical Chemical Composition (%)

C	Si	Mn	Fe	Ti	Cu	P	S	Ni
0.03	0.4	3.5	0.6	2.2	29.0	<0.01	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
320	510	38	+20°C 180

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.10



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TIG NI65

Old reference: TIG Ni65

Classification

ISO 18274 : S-Ni 8065 (NiFe30Cr21Mo3) AWS A5.14 : ERNiFeCr-1

Description & Applications

Solid rod for TIG welding of Nickel-Iron-Chromium-Molybden alloys which has a good resistance to oxidizing and reducing acids like sulphuric and phosphoric acid as well as sea water.

Base materials: Alloy 825, UNS N08825, NiCr21Mo, 2.4858.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	Fe	Cu	Ti	P	S	Ni
0.02	0.2	0.6	20.5	3.2	30.0	1.8	0.9	<0.01	<0.01	41.0

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

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TIG NI82

Old reference: TIG Ni82

Classification

ISO 18274 : S-Ni 6082 (NiCr20Mn3Nb)

AWS A5.14 : ERNiCr-3

Description & Applications

Solid rod for TIG welding of high nickel content alloys like Inconel 600* or Incoloy 800*. High resistance at low temperatures on steels of 5% and 9% Ni. Used in the construction of equipment submitted to oxidizing and corrosive attacks at high temperatures.

* Trade mark INCO ALLOYS

Typical Chemical Composition (%)

C	Si	Mn	Cr	Fe	Nb	Ti	P	S	Ni
0.03	0.2	3.2	20.5	2.0	2.3	0.3	<0.01	<0.01	Rem.

All Weld Metal Mechanical Properties

$R_{p0.2}$ (MPa)	R_m (MPa)	A_5 (%)	KV (J)
430	670	42	+20°C 160 -196°C 100

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.12



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TIG NI90

Old reference: TIG Ni90

Classification

ISO 18274 : S-Ni 7090 (NiCr20Co18Ti3)

Description & Applications

Solid rod for TIG welding of alloys like NIMONIC 80A and 90.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Fe	Ti	Co	Al	Cu	Ni
<0.13	0.3	0.5	20.0	1.0	2.5	16.0	1.5	0.1	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.10



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TIG NI263

Old reference: TIG Ni263

Classification

ISO 18274 : S-Ni 7263 (NiCr20Co20Mo6Ti2)

Description & Applications

Solid rod for TIG welding of NIMONIC 263 alloy.

Main applications: Aeronautical industry.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Fe	Mo	Co	Ti	Al	Ni
0.05	0.25	0.05	20.0	0.7	5.9	20.0	2.15	0.5	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
	630	12	

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.10



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TIG NI 276

Old reference: TIG Ni276

Classification

ISO 18274 : S-Ni 6276 (NiMo16Cr15Fe6W4) AWS A5.14 : ERNiCrMo-4

Description & Applications

Solid rod for TIG welding base material of similar composition like NiMo16Cr15W, UNS N10276, alloys C-276 and others. Excellent resistance in oxide, chloride, acid and saline environments. TIG Ni276 is appropriate for lining sheet plates.

Main applications: Equipment of de-pollution, piping systems in chemical industry...

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	Fe	W	Ni
0.01	0.05	0.4	16.0	16.0	6.0	3.5	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
480	780	35	+20°C 100

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

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TIG NI601

Old reference: TIG Ni601

Classification

ISO 18274 : S-Ni 6601 (NiCr23Fe15Al)

AWS A5.14 : ERNiCrFe-11

Description & Applications

Solid rod for TIG welding of similar Nickel-Chrom-Iron-Aluminum alloys. Used in the construction of equipments submitted to high temperature up to 1150°C.
Preferred process: GTAW.

Main applications: Furnaces, heat treatment equipments.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Fe	Al	Cu	Co	P	S	Ni
0.05	0.2	0.5	23.0	14.0	1.3	0.1	0.3	<0.01	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

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Classification

ISO 18274 : S-Ni6617 (NiCr22Co12Mo9)
AWS A5.14 : ERNiCrCoMo-1

Material N° : 2.4627
DIN 1736 : SG-NiCr22Co12Mo

Description & Applications

Solid GTAW rod for joining and repairing of high temperature alloys used at operation temperatures up to 1100°C.

Main applications: Construction of gas turbines, combustion chambers, ovens, thermal equipment for heat treatment, petrochemical installation.

Base materials

UNS	Alloy	DIN	Material N°
N08810	800H	X5NiCrAlTi3120	1.4958
	DS	X8NiCrSi3818	1.4862
N06601	601	NiCr23Fe	2.4851
N06617	617	NiCr23Co12Mo	2.4663

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	Co	Fe	Al	Ti	Ni
0.07	0.2	0.5	22.0	8.5	11.2	0.9	1.0	0.4	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
>450	>750	>30	+20°C >110

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.08



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TIG NI625

Old reference: TIG Ni625

Classification

ISO 18274 : S-Ni 6625 (NiCr22Mo9Nb) AWS A5.14 : ERNiCrMo-3

Description & Applications

Solid rod for TIG welding of high nickel alloys as well as for special austenitic stainless steels. Used in the construction of equipment submitted to oxidizing and corrosive attacks. Excellent resistance to pitting, crevice and stress corrosion cracking in the presence of chlorides. Highly resistant at low temperatures, therefore also applied to weld 9% Ni steels.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	Fe	Nb	P	S	Ni
0.01	0.15	0.1	22.0	8.7	0.3	3.6	<0.01	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
520	790	40	+20°C 160 -196°C 100

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.10



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TIG Ni718

Old reference: TIG Ni718

Classification

ISO 18274 : S-Ni 7718 (NiFe19Cr19Nb5Mo3) AMS : 5832
AWS A5.14 : ERNiFeCr-2

Description & Applications

Solid rod for TIG welding of alloys like INCONEL 718, X750, for structural hardening, for high mechanical resistance up to 700°C.
Also used for hardfacing of hot working tools.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	Ni	Nb	Al	Ti	Fe
0.04	0.2	0.2	19.0	3.0	52.0	5.0	0.5	0.9	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.10



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TIG NICKR80

Old reference: TIG FINICRO 80.20

Classification

ISO 18274 : S-Ni 6076 (NiCr20)
EN 4329 NiCr20

AWS A5.14 : ERNiCr-6
AMS 5676

Description & Applications

Solid rod for TIG welding of alloy like Brightray, Inconel 600, Incoloy DS and Nimonic 75.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Fe	Cu	P	S	Ni
0.1	0.2	0.5	20.0	0.5	0.1	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
	> 560 MPa	> 25	

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

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Classification

ISO 18274 : S-Ni 2061 (NiTi3)

AWS A5.14 : ERNi-1

Description & Applications

Solid rod for TIG welding of Nickel alloys like Ni 200 and 201, UNS N02200 and N02201, Ni99.2 and LC-Ni99. Lining of steel; welding of steel to Nickel and Nickel-Copper alloys.

Base materials:

UNS	Alloy	DIN	Material N°
N02200	200	Ni99.2	2.4066
N02201	201	LC-Ni99	2.4068
N02205	205	LC-Ni99.6	2.4061
		Ni99.6	2.4060

Typical Chemical Composition (%)

C	Si	Mn	Fe	Ti	Cu	P	S	Ni
0.02	0.2	0.3	0.1	3.3	0.1	<0.01	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
350	540	40	+20°C 250

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

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TIG NIW

Old reference: TIG NiW

Classification

ISO 18274 : S-Ni 1004 (NiMo25Cr5Fe5) AMS : 5786
AWS A5.14 : ERNiMo-3

Description & Applications

Solid rod for TIG welding of dissimilar alloys known as HASTELLOY W®.

Used in the aeronautical industry for reparation and maintenance of engines.

® Trade mark of Haynes alloys

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	Fe	W	P	S	Ni
0.03	0.2	0.4	5.0	24.0	6.0	0.03	<0.01	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.10



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TIG NIX

Old reference: TIG NiX

Classification

ISO 18274 : S-Ni 6002 (NiCr21Fe18Mo9) AMS : 5798
AWS A5.14 : ERNiCrMo-2

Description & Applications

Solid rod for TIG welding, popularly known as HASTELLOY X®. Nickel Base alloy generally used for turbines and engines. Best compromise between resistance to oxidation and mechanical characteristics at high temperature.

Main applications: Aeronautical industry (combustion chamber, etc).

® Trade mark of Haynes alloys

Typical Chemical Composition (%)

C	Si	Mn	Cr	Fe	Mo	Co	W	Al	Cu	Ni
0.07	0.3	0.6	22.0	19.3	8.5	1.0	0.8	0.3	0.25	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
420	680	23

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

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TIG FENI50

Old reference: TIG FeNi50

Classification

Without

Description & Applications

Solid rod for TIG welding and reparation of nodular cast iron, either cold or after moderate heating. The deposit has a colour very similar to cast iron. Can be machined. TIG FeNi50 is also used for heterogeneous assembly of cast iron with steel.

Base materials:

Nodular cast iron

ASTM	DIN	NFA
A536 Grade 60-80	GGG-40 à GGG-60	FGS 400-12 à FGS 600-3
	GTS-35 à GTS-65	MN350-10 à MN650-3

Typical Chemical Composition (%)

C	Si	Mn	Ni	P	S	Fe
0.03	0.6	0.7	55.0	<0.015	<0.015	43.0

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
290	320	10

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

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TIG AL99.7

Old reference: TIG Al99.5

Classification

AWS A5.10 : ~ER1100
ISO 18273 : S Al 1070 (Al99.7)

Material N° : 3.0259

Description & Applications

Solid rod for TIG welding of pure Aluminium and similar composition alloys. Often used for its excellent electrical conductivity or for its high resistance against certain corrossions.

Base materials:

Alloy	DIN	Material N°
1080A	Al 99.5	3.0255
1050A	Al 99.7	3.0275
1100	Al 99.7	3.0285
3004-3005	Al 99	3.0205
3303		

Typical Chemical Composition (%)

Si	Fe	Cu	Zn	Mn	Al
0.03	0.13	0.001	0.01	0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
70	100	30

Welding Current & Instructions

Welding mode	Shielding Gas
TIG ~	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG ALG3

Old reference: TIG AlMg3

Classification

AWS 5.10 : ~ER5654
ISO 18273 : S Al 5754 (AlMg3)

Material N° : 3.3536

Description & Applications

Solid rod for TIG welding of Aluminium alloys with up to 3% Mg. Very often used in marine construction for their excellent resistance to salt water corrosion and other types of construction.

Base materials:

Alloy	DIN	Material N°
3004	Al Mg1	3.3315
3005	Al Mg2.5	3.3523
3303	Al Mg3	3.3535
5005	Al Mg Si0.5	3.3206

Typical Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Zn	Ti	Al
0.05	0.13	0.002	0.15	3.1	0.01	0.08	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
120	250	22

Welding Current & Instructions

Welding mode	Shielding Gas
TIG ~	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG ALG5

Old reference: TIG AlMg5

Classification

AWS A5.10 : ER5356
ISO 18273 : S Al 5356 (AlMg5Cr)

Material N° : 3.3556

Description & Applications

Solid rod for TIG welding of Aluminium alloys with more than 3% Mg, up to 5 % of Mg. Very often used in marine construction for their excellent resistance to salt water corrosion and for their very good mechanical characteristics, but also in the railway sector for the welding of wagons to transport phosphate, and also in the road sector for trucks and tractors.

Base materials:

DIN	:	Al Mg5; Al Mg4, 5
Material N°	:	3.3555; 3.3345
Alloy	:	5056; 5083; 5086; 5454; 5754; 6005A

Typical Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Zn	Ti	Cr	Al
0.05	0.13	0.002	0.15	4.8	0.01	0.13	0.1	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
120	280	30

Welding Current & Instructions

Welding mode	Shielding Gas
TIG ~	Ar : 5-10 l/min Argon / He : 5-10 l/min

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TIG ALG4M

Old reference: TIG AlMg4.5Mn

Classification

AWS A5.10 : ER5183
ISO 18273 : S Al 5183 (AlMg4.5Mn0.7)

Material N° : 3.3548

Description & Applications

Solid rod for gas protected welding of Aluminium-Magnesium alloys of similar composition. The deposit shows due to the addition of Mn superior mechanical resistance compared to Al Mg 5.

Base materials:

High strength Aluminium alloys:

DIN	:	AlMg4.5Mn; AlMg4Mn; AlZnMgCu1.5
Alloy	:	5083; 5086; 5454; 5754; 7020
Material N°	:	3.3547; 3.3545; 3.4365

Typical Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Zn	Ti	Cr	Al
0.1	0.15	0.02	0.7	4.8	0.02	0.10	0.1	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
130	310	30

Welding Current & Instructions

Welding mode	Shielding Gas
TIG ~	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG ALG5M

Old reference: TIG AlMg5Mn

Classification

AWS A5.10 : ER5556

ISO 18273 : S Al 5556A (AlMg5Mn)

Description & Applications

Solid rod for TIG welding of Aluminium alloy AG5MC. High mechanical characteristic.

Main applications: For diverse construction such as armament to boiler-making.

Typical Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Zn	Ti	Cr	Al
0.2	0.4	0.01	0.7	5.2	0.02	0.1	0.1	Rem.

All Weld Metal Mechanical Properties

$R_{p0.2}$ (MPa)	R_m (MPa)	A_5 (%)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG ~	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG ALG4Z2

Old reference: TIG AlMg4Z2

Classification

ISO 18273 : S Al Z (AlMg4Zn2)

Description & Applications

Solid rod for TIG welding of Aluminium alloy of AZ 5 G.

Normally used in nuclear industry, armament, etc.

Typical Chemical Composition (%)

Si	Fe	Cu	Cr	Mn	Ti	Mg	Zn	Al
0.05	0.1	0.003	0.09	0.4	0.1	4.0	2.0	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG ~	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG ALC6

Old reference: TIG AlCu6

Classification

AWS A5.10 : ER2319
ISO 18273 : S Al 2319 (AlCu6MnZrTi)

AMS : 4191

Description & Applications

Solid rod for TIG welding of Aluminium alloy AlCu6.

Main applications: Space industries.

Typical Chemical Composition (%)

Si	Fe	Cu	Mn	Zr	Ti	V	Al
0.2	0.1	6.5	0.3	0.12	0.16	0.08	Rem.

All Weld Metal Mechanical Properties

$R_{p0.2}$ (MPa)	R_m (MPa)	A_5 (%)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG ~	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG ALS5

Old reference: TIG AlSi5

Classification

AWS A5.10 : ER4043
ISO 18273 : S Al 4043 (AlSi5)

Material N° : 3.2245

Description & Applications

Solid rod for TIG welding of Aluminium alloys with a Si content up to 7%. Applicable for a wide variety of Aluminium alloys. Widely used in foundry reparations.

Base materials:

DIN	:	AlMgSi0,5; AlMgSi1; AlSi7Mg; ISi5Mg
Alloy	:	3004; 3005; 3303; 5005; 6060; 6061; 6070; 6063; 6071; 6351
Material N°	:	3.3206; 3.3210; 3.2371; 3.2341

Typical Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Zn	Ti	Al
5.0	<0.4	0.001	0.05	0.003	0.003	0.006	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
80	120	20

Welding Current & Instructions

Welding mode	Shielding Gas
TIG ~	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG ALS12

Old reference: TIG AlSi12

Classification

AWS A5.10 : ER4047
ISO 18273 : S Al 4047 (AlSi12)

Material N° : 3.2585

Description & Applications

Solid rod for TIG welding of Aluminium castings with more than 7% Si. Very similar to a eutectic brazing product (570-585°C), therefore very good flowing and wetting characteristics.

Main applications: For the reparation of foundry pieces or unidentified nuances of aluminium alloys, this is often the case in reparation of agricultural equipments / machinery.

Typical Chemical Composition (%)

Si	Fe	Cu	Mn	Mg	Zn	Al
12.0	<0.5	0.007	0.05	0.02	0.03	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
70	140	18

Welding Current & Instructions

Welding mode	Shielding Gas
TIG ~	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG AZ92A

Classification

AWS A5.19 : ERAZ92A
AMS : 4395

AFNOR : Mg Al 9

Description & Applications

Solid rod for TIG welding of most of the Magnesium-Aluminium-Zinc alloys.

Main applications: Welding of AM100A

Typical Chemical Composition (%)

Al	Mn	Si	Cu	Zn	Be	Fe	Mg
9.0	0.3	0.01	0.001	1.8	0.0005	0.002	Rem.

All Weld Metal Mechanical Properties

$R_{p0.2}$ (MPa)	R_m (MPa)	A_5 (%)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG EZ33A

Classification

AWS A5.19 : EREZ33A
AMS : 4396

AFNOR : Mg Zn 2

Description & Applications

Solid rod for TIG welding of wrought and cast base Magnesium alloys working at high temperature.

Typical Chemical Composition (%)

Zn	Mn	Si	Cu	Fe	Zr	Ce	Mg
2.5	<0.03	<0.01	<0.01	0.002	0.6	3.2	Rem.

All Weld Metal Mechanical Properties

$R_{p0.2}$ (MPa)	R_m (MPa)	A_5 (%)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG CUS

Old reference: TIG Cu110

Classification

ISO 24373 : S Cu 1898 (CuSn1)
AWS A5.7 : ERCu

Material N° : 2.1006

Description & Applications

Solid rod for TIG welding of oxygen free Copper and Cooper alloys. Good flow and porosity free weld seams due to the alloying with Tin. The melting temperature is relatively low and projections are minor. If a high electrical conductivity is required use TIG CuAg.

Typical Chemical Composition (%)

Si	Mn	Sn	P	Cu
0.2	0.4	0.8	0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
50	190	35

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG CUS6

Old reference: TIG Cu114

Classification

ISO 24373 : S Cu 5180 (CuSn6P)
AWS A5.7 : ER CuSn-A

Material N° : 2.1022

Description & Applications

Solid rod for TIG welding and repairing of copper and similar copper tin alloys. Welding of zinc coated sheets. Surfacing of friction surfaces.

Base materials:

UNS	DIN	Material N°
C50700	CuSn2	2.1010
C51100	CuSn4	2.1016
C51900	CuSn6	2.1020
C52100	CuSn8	2.1030
	CuSn6Zn	2.1080
C52400	G-CuSn10	2.1050

Typical Chemical Composition (%)

Sn	P	Pb	Cu
6.0	0.2	<0.01	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
150	300	20

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG CUS8

Old reference: TIG CuSn8

Classification

ISO 24373 : S Cu 5210 (CuSn8P)

Material.N° : 2.1025

Description & Applications

Solid rod for TIG welding of Copper-Tin bronzes.

Main applications: For surfacing of friction surfaces and welding of galvanized sheets.

Typical Chemical Composition (%)

Sn	P	Cu
8.0	0.1	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
	260	20

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG CUS13

Old reference: TIG CuSn13

Classification

ISO 24373 : S Cu 5410 (CuSn12P)

Material.N° : 2.1056

Description & Applications

Solid rod for TIG welding of Copper-Tin bronzes as well as for Copper-Tin castings.

Main applications: Often applied to surface worn pieces as it has a good resistance to wear.

Typical Chemical Composition (%)

Sn	P	Cu
13.0	0.2	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
	320	5

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

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TIG CUSIL

Old reference: TIG CuSi3

Classification

ISO 24373 : S Cu 6560 (CuSi3Mn1) Material N° : 2.1461
 AWS A5.7 : ER CuSi-A

Description & Applications

Solid rod for TIG welding, especially recommended for hardfacings resistant to wear.

Main applications: Used in welding of galvanized sheets and also for welding of bronze.

Typical Chemical Composition (%)

Sn	Mn	Si	Zn	Al	Pb	Cu
0.8	1.0	3.0	<0.1	<0.01	<0.02	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
150	350	42

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG CUAG

Old reference: TIG CuAg

Classification

ISO 24373 : S Cu 1897 (CuAg1)

Material N° : 2.1211

Description & Applications

Solid rod for TIG welding of oxygen free Copper and copper alloys where a high electrical conductivity is required. For equipments and pipes made of copper and especially for conductor rails. Good flow, porosity free welds seams and high electrical conductivity due to the alloying with Silver. The melting temperature is relatively low and projections are minor.

Typical Chemical Composition (%)

Ag	Mn	Mn	P	Cu
1.0	0.6	0.06	0.01	Rem.

All Weld Metal Mechanical Properties

$R_{p0.2}$ (MPa)	R_m (MPa)	A_5 (%)	Electrical conductivity (Sxm/mm ²)
60	190	35	40-46

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG CUA8

Old reference: TIG CuAl8

Classification

ISO 24373 : S Cu 6100 (CuAl7)
AWS A5.7 : ERCuAl-A1

Material N° : 2.0921

Description & Applications

Solid rod recommended for assemblies made of copper-aluminium like pipelines and heat exchangers. Frequently used for hardfacing pumps.

In general, the product has an excellent resistance to friction and to marine corrosion. Also used in assemblies of galvanised sheets, special brass (CuZn20Al).

Base materials:

UNS	Alloy	DIN	Material N°
C60600		CuAl5	2.0916
C61000		CuAl8	2.0920
C68700	Yorcalbro	CuZn20Al2	2.0460

Typical Chemical Composition (%)

Si	Fe	Mn	Ni	Pb	Al	Zn	Cu
0.03	0.05	0.1	0.2	<0.02	8.1	<0.1	Base

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
180	400	40

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

Pre-heating at 200 to 300°C is advised for massive parts.

ind.10



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TIG CUA8NI

Old reference: TIG CuAl9Mn

Classification

ISO 24373 : S Cu 6327 (CuAl8Ni2Fe2Mn2) Material N° : 2.0922

Description & Applications

Solid rod for TIG welding recommended for assembly of Copper-Aluminium of similar composition. Frequently used for welding and reparation of pumps and piping systems for sea water. Often used in anti-wear surfacing. Also used for assembly of galvanized sheets. The product corresponds to Indret N°108 specifications.

Typical Chemical Composition (%)

Mn	Fe	Al	Ni	Zn	Cu
1.8	1.4	8.5	2.3	0.017	Base

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
330	650	27

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG CUA9

Old reference: TIG CuAl9

Classification

ISO 24373 : S Cu 6180 (CuAl10Fe)

AWS A5.7 : ERCuAl-A2

Description & Applications

Solid rod for TIG welding of cupro-aluminium alloys of similar composition. Deposits are harder than those of TIG CuAl8, and are often used for hardfacing of ferritic/perlitic steels. High resistance to wear and abrasion. Assemblies for welding and hardfacing of aluminium-bronze, of aluminium covered steels, of cast iron in machining tools industry and in naval construction. Welding of aluminium-bronze piping resistant to seawater corrosion, erosion and cavitation.

Typical Chemical Composition (%)

Fe	Zn	Al	Ni	Pb	Si	Cu
1.2	<0.02	9.8	0.007	<0.02	<0.1	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
	500	35

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG CUA9NI

Old reference: TIG CuAl9Ni

Classification

ISO 24373 : S Cu 6328 (CuAl9Ni5Fe3Mn2) AWS A5.7 : ERCuNiAl

Description & Applications

Solid rod for TIG welding, to assembly of cupro-aluminium of similar composition. It has better resistance to wear and corrosion than TIG CuAl9Mn.

Typical Chemical Composition (%)

Mn	Fe	Al	Ni	Cu
1.3	3.2	9.0	4.5	Rem.

All Weld Metal Mechanical Properties

$R_{p0.2}$ (MPa)	R_m (MPa)	A_5 (%)
400	700	15

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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Classification

ISO 24373 : S Cu 6338 (CuMn13Al8Fe3Ni2) Material N° : 2.1368
AWS A5.7 : ERCuMnNiAl

Description & Applications

Solid rod for TIG welding of Copper-Aluminium, for surfacing on steels and cast iron as well as for cavitation resistant overlayers. It has high resistance to wear and marine / sea water corrosion.

Base materials:

UNS	DIN	Material N°
C62300	CuAl10Fe3Mn2	2.0936
C63000	CuAl10Ni5Fe4	2.0966
	G-CuAl10Fe	2.0940
	CuAl9Mn2	2.0960
	G-CuAl8Mn	2.0962

Typical Chemical Composition (%)

Fe	Mn	Al	Ni	Zn	Si	Cu
2.5	12.0	7.5	2.0	<0.15	0.03	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
400	650	20

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

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TIG CUNI10

Old reference: TIG CuNi90.10

Classification

ISO 24373 : S Cu 7061 (CuNi10)

Material.N° : 2.0873

Description & Applications

Solid rod for TIG welding of Copper-Nickel types Cu90-Ni10 and lower Ni-alloyed Cu-Ni alloys.

Base materials:

UNS	Alloy	DIN	Material N°
C70600	CuNi90/10	CuNi10Fe1Mn	2.0872

Typical Chemical Composition (%)

Mn	Fe	Si	Ni	P	Pb	Ti	Cu
0.8	1.0	<0.2	10.5	<0.02	<0.02	0.4	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
200	320	15

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG CUNI30

Old reference: TIG CuNi30

Classification

ISO 24373 : S Cu 7158 (CuNi30Mn1FeTi) Material.N°: 2.0837
AWS A5.7 : ERCuNi

Description & Applications

Solid rod for TIG welding of different Copper-Nickel types as Cu/Ni70.30, 80.20 and 90.10.

Main applications: For offshore applications, seawater desalination plants, for ship building, in the chemical industry.

Base materials:

UNS	Alloy	DIN	Material N°
C70600	CuNi90/10	CuNi10Fe1Mn	2.0872
	CuNi80/20	CuNi20Fe	2.0878
C71500	CuNi70/30	CuNi30Mn1Fe	2.0882

Typical Chemical Composition (%)

Mn	Fe	Si	Ni	P	Pb	Ti	Cu
0.7	0.6	<0.2	30.0	<0.02	<0.02	0.4	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
240	400	32

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 5-10 l/min Argon / He : 5-10 l/min

ind.10



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TIG T40

Classification

ISO 24304 Ti 0120 (Ti99.6)
AWS A5.16 : ERTi-2

N° de Mat. : 3.7035
AMS : 4951

Description & Applications

Solid rod for TIG welding of pure titanium.

Main applications: Heat exchangers, condensers, evaporators for nuclear plants, oil refinery, aeronautical and chemical industries.

Typical Chemical Composition (%)

C	N ₂	H ₂	O ₂	Fe	Ti
<0.03	<0.015	<0.008	0.08-0.16	<0.12	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
290	390-540	20

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.10



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TIG TPD0.2

Classification

ISO 24304
AWS A5.16:

Ti 2401 (TiPd0.2A)
ERTi -7

Description & Applications

Solid rod for TIG welding of similar titanium alloy. The addition of Palladium increases the resistance to reduction background.

Main applications: Heat exchangers.

Typical Chemical Composition (%)

C	N ₂	H ₂	O ₂	Fe	Pd	Ti
<0.03	<0.015	<0.008	0.08-0.16	<0.12	0.12-0.25	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)	KV (J)
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Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.10



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TIG TA6V4

Classification

ISO 24304 Ti 6402 (TiAl6V4B) N° de Mat. : 3.7165
AWS A5.16 : ERTi-5 AMS : 4954

Description & Applications

Solid rod for TIG welding of similar titanium alloy.

Main applications: Aeronautical industry.

Typical Chemical Composition (%)

C	N ₂	H ₂	O ₂	Fe	Al	V	Y	Ti
<0.05	<0.03	<0.005	0.12-0.20	<0.22	6.0	4.0	<0.005	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
900	960-1270	8

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.10



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TIG TA6V4 ELI

Classification

ISO 24304 Ti 6408 (TiAl6V4A) AMS : 4956
AWS A5.16 : ERTi-23

Description & Applications

Solid rod for TIG welding of similar titanium alloy. The decrease of interstitial elements increase the weldability and the hardness.

Main applications: Aeronautical industry.

Typical Chemical Composition (%)

C	N ₂	H ₂	O ₂	Fe	Al	V	Y	Ti
<0.05	<0.03	<0.005	0.12-0.20	<0.22	6.0	4.0	<0.005	Rem.

All Weld Metal Mechanical Properties

R _{p0.2} (MPa)	R _m (MPa)	A ₅ (%)
900	960-1270	8

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding : Argon : 3-6 l/min

ind.10



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TIG CO1

Classification

AWS A5.21 : ERCoCr-C
DIN 8555 : WSG-20-GO-55-CSTZ

EN 14700 : S Co3

Description & Applications

Cobalt Base continues cast hardfacing rod for TIG and oxy-acetylene welding. Very good resistance to metal-metal wear, abrasion and corrosion and heat up to 900°C. Excellent gliding characteristics, good to polish. Only machinable with tungsten carbide tools or by grinding.

Main applications: Cutting tools, shredding tools, mixing and drilling tools, hot working tools without thermal shock, extrusion screws.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	W	Mo	Fe	P	S	Co
2.4	1.2	0.2	31.0	2.2	12.5	0.3	2.5	<0.02	<0.03	Rem.

All Weld Metal Mechanical Properties

Hardness
53-57 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

Preheat large components or special steels to 500-600°C. Keep this temperature during welding and cool down slowly, preferable in an oven, to reduce the risk of cracking while cooling.

For oxy-acetylene welding use a reducing flame (slight excess of acetylene).

ind.10



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TIG CO6

Classification

AWS A5.21 : ERCoCr-A
DIN 8555 : WSG-20-GO-40-CTZ

EN 14700 : S Co6

Description & Applications

Cobalt Base continues cast hardfacing rod for TIG and oxy-acetylene welding. Very good resistance to metal-metal wear, cavitation and corrosion as well as heat up to 900°C. Excellent gliding characteristics, good to polish, non-magnetic. Machinable with tungsten carbide tools or by grinding.

Main applications: Valves, valve seats and other sealing faces, hot press tools, pump parts, extrusion screws.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	W	Mo	Fe	P	S	Co
1.2	1.3	0.1	29.5	2.5	4.6	0.3	2.4	<0.02	<0.03	Rem.

All Weld Metal Mechanical Properties

Hardness
39-43 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

Preheat large components or special steels to 300-600°C. Keep this temperature during welding and cool down slowly, preferable in an oven, to reduce the risk of cracking while cooling.
For oxy-acetylene welding use a reducing flame (slight excess of acetylene).

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TIG CO12

Classification

AWS A5.21 : ERCoCr-B
DIN 8555 : WSG-20-GO-50-CSTZ

EN 14700 : S Co2

Description & Applications

Cobalt Base continues cast hardfacing rod for TIG and oxy-acetylene welding. Very good resistance to metal-metal wear, abrasion, cavitation, corrosion and heat up to 900°C. Excellent gliding characteristics, good to polish. Only machinable with tungsten carbide tools or by grinding.

Main applications: Cutting tools, shredding tools, saw blades, extrusion dies, mixing tools, hot working tools without thermal shock, extrusion screws in the wood, paper and plastic industry.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	W	Fe	P	S	Co
1.4	1.4	0.1	30.5	2.4	0.2	8.4	2.0	<0.02	<0.03	Rem.

All Weld Metal Mechanical Properties

Hardness
47-50 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

Preheat large components or special steels to 400-600°C. Keep this temperature during welding and cool down slowly, preferable in an oven, to reduce the risk of cracking while cooling.
For oxy-acetylene welding use a reducing flame (slight excess of acetylene).

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TIG CO21

Classification

AWS A5.21 : ERCoCr-E
DIN 8555 : WSG-20-GO-300-CKTZ

EN 14700 : S Co1

Description & Applications

Cobalt Base continues cast hardfacing rod for TIG welding. Very good resistance to metal-metal wear, thermal shock, corrosion and heat up to 1000°C. Excellent gliding characteristics, high toughness, good to polish, non-magnetic.

Main applications: Engine valves, hot forging dies, gas turbines.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	W	Fe	P	S	Co
0.25	0.6	0.3	27.8	2.4	5.4	0.01	1.4	<0.02	<0.03	Rem.

All Weld Metal Mechanical Properties

Hardness
29-33 HRC

Hardness at 600°C
~240 HB

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

Preheat large components or special steels to 200-400°C. Keep this temperature during welding and cool down slowly, preferable in an oven, to reduce the risk of cracking while cooling.

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TIG CO25

Classification

DIN 8555 : WSG 20-GZ-250-CKTZ

EN 14700 : S Co1

Description & Applications

Cobalt Base continues cast hardfacing rod for TIG welding. Very good resistance to metal-metal wear, thermal shock and corrosion up to 1000°C even in sulphuric gases. Non magnetic deposit.

Main applications: Surfacing of engine valves, forging dies, gas turbines, mixers.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	W	Fe	Co
0.15	0.9	0.7	21.0	9.8	0.03	15.0	3.0	Rem.

All Weld Metal Mechanical Properties

Hardness
~230 HB

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG FICO25

Classification

DIN 8555 : WSG 20-GZ-250-CKTZ
EN 14700 : S Z Co1

Material N° : 2.4964
AMS : 5796

Description & Applications

Cobalt Base continues cast hardfacing rod for TIG welding. Very good resistance to metal-metal wear, thermal shock and corrosion up to 1000°C even in sulphuric gases. Non magnetic deposit.

Main applications: Engine valves, forging dies, gas turbines, mixers.

Base materials: Alloy 25, UNS R30605, AMS 5537, Material N° 2.4964, CoCr20W15Ni and similar.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	W	Fe	P	S	Co
0.1	0.1	1.5	20.0	10.0	15.0	<1.0	<0.01	<0.01	Rem.

All Weld Metal Mechanical Properties

Hardness
~230 HB

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG FICO31

Classification

AFNOR : KC 26 NW
AMS : 5789

ISO 14700 : S Co1

Description & Applications

Solid rod for GTAW / TIG welding used for aeronautical applications. The deposit is Corrosion and heat resistant.

Main applications: Aeronautical industry.

Typical Chemical Composition (%)

C	Si	Mn	Fe	Cr	Ni	W	P	S	Co
0.5	0.8	0.8	1.0	25.0	10.5	7.5	0.01	0.006	Rem.

All Weld Metal Mechanical Properties

Hardness
~ 30 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG FICO188

Classification

AMS : 5801
EN 3888 : CoCr22Ni22W15

Material N° : 2.4683

Description & Applications

Cobalt Base continues cast hardfacing rod for TIG welding. Very good resistance against oxidation up to 1150°C. Welding of oxidation and creep resisting alloy like alloy 188 , UNS R30188, AMS 5608 , Material N° 2.4683 , CoCr22NiW and similar.

Main applications: Gas turbine engine combustor cans, spray bars, flame-holders, after-burner liners...

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	W	Fe	La	Co
0.1	0.3	0.8	22.0	23.0	14.0	<3.0	0.06	Rem.

All Weld Metal Mechanical Properties

Hardness

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG FICO414

Classification

AFNOR : KC 29 NW

Description & Applications

Solid rod for TIG welding for repairing and hardfacing of jet engine or turbine parts.

Main applications: Aeronautical industry.

Typical Chemical Composition (%)

C	Si	Mn	Fe	Cr	Ni	W	B	Co
0.12	0.8	0.9	0.1	29.0	10.2	7.0	0.002	Rem.

All Weld Metal Mechanical Properties

Hardness

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG FICO694

Classification

AFNOR : KC 28 W

EN 4326 : CoCr28W20Ni5V1

Description & Applications

Solid rod for TIG Welding. Corrosion and heat resistant for aeronautical applications.

Main applications: Hardfacing of gas turbine blade shroud interlock surfaces and other wear attacked areas.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Fe	W	B	V	Co
0.85	0.6	0.3	28.0	5.8	<3.0	20.0	<0.05	1.0	Rem.

All Weld Metal Mechanical Properties

Hardness

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG FICO918

Classification

AFNOR : KC 20 NTa

Description & Applications

Solid rod for TIG welding and repairing and hardfacing of jet engine or turbine parts.

Main applications: Aeronautical industry.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Ta	Fe	Al	Cu	Co
0.07	0.1	0.1	20.0	20.0	7.5	0.05	0.07	0.06	Rem.

All Weld Metal Mechanical Properties

Hardness

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG FICOT800

Classification

AFNOR : KD 28 C

Description & Applications

Solid rod for TIG welding and hardfacing. Low coefficient of friction for aeronautical applications.

Main applications: Hardfacing of notches in jet engine turbine blade.

Typical Chemical Composition (%)

C	Si	Cr	Mo	Ni	Fe	N	P	S	Co
0.01	3.5	18.0	29.0	1.0	1.0	0.01	<0.01	<0.01	Rem.

All Weld Metal Mechanical Properties

Hardness

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG 819 BS

Classification

EN 14700 : S Fe3

Material N° : 1.6773

Description & Applications

Solid rod for TIG welding and hardfacing. Product of high purity for welding without micro porosity.

Main applications: To repair and to surface the parent material 36NiCrMo16, 1.6773. Used for cold working tools, swages for forging and punching tools as well as for moulds for plastics.

Available copper coated or bare.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	P	S	Fe
0.35	0.3	0.4	1.7	3.8	0.3	<0.015	<0.010	Rem.

All Weld Metal Mechanical Properties

Hardness
~48 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG BMS

Classification

AIR 9117 : 8 CD 12

Description & Applications

Solid rod for TIG welding of steels such as 15CrMoV6, 25CrMo4, 35CrMo4, 20CrMo12... Product of high purity for welding without microporosity.

It is also used for hardfacing of tool steels.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	P	S	Fe
0.06	0.7	1.1	2.7	1.0	<0.015	<0.015	Rem.

All Weld Metal Mechanical Properties

R _e (MPa)	R _m (MPa)	A ₅ (%)	Hardness
440	570	24	~36 HRC
After PWHT 730°C/2h			

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min Back shielding: Nitrogen / H ₂ : 3-6 l/min

Preheating of work-pieces at ~250°C. Post weld heat treatment: 730°C/2h

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TIG MARVAL 18S

Classification

EN 14700 : S Fe5

Material N° : 1.6359

Description & Applications

Solid rod for TIG welding of similar chemical composition steels. Product of high purity for welding without microporosity. The deposit can be machined with standard tools after welding and then age hardened by a subsequent heat treatment. Also used to weld Maraging steels like X2NiCoMo18-9-5; 1.6356 and others (Maraging 200-250).

Main applications: For building up dies for extrusion of Al-castings and plastics, for hot working tools, for moulds, etc...

Typical Chemical Composition (%)

C	Si	Mn	Ni	Co	Mo	Ti	Al	Fe
<0.01	<0.1	<0.1	18.0	8.5	5.0	0.5	0.1	Rem.

All Weld Metal Mechanical Properties

Hardness (As welded)	Hardness after age hardening
~36 HRC	4h at 480°C: ~50 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG MARVAL X12S

Classification

DIN 8555 : MSG 5-GZ-400-R
EN 14700 : S Z Fe7

Material N° : 1.4530

Description & Applications

Solid rod for TIG welding and for hardfacing. Product of high purity for welding without microporosity.

Main applications: Used to weld and to repair parent metals like X1CrNiMoAlTi12-9-2 and others.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	Mo	Ti	Al	Fe
<0.01	0.05	0.02	12.0	9.4	2.0	0.3	0.7	Rem.

All Weld Metal Mechanical Properties

Hardness
~32 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG SMV3S

Classification

EN 14700 : S Fe3

Material N° : 1.2343

Description & Applications

Solid rod for TIG welding and hardfacing steels of similar chemical composition. Product of high purity for welding without microporosity.

Main applications: For hardfacing forging tools, moulds...

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	V	Fe
0.38	0.9	0.3	5.0	1.3	0.5	Rem.

All Weld Metal Mechanical Properties

Hardness
~58 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

Preheating at 300-400°C massive parts. Maintain temperature during welding and cold slowly.

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TIG HB25

Old reference: TIG R250B

Classification

DIN 8555 : WSG 1-GZ-250-P
EN 14700 : S Fe1

Material N° : 1.8401

Description & Applications

Copper coated solid rod for TIG welding to surfacing. Tough deposit, easy to machine.

Main applications: Used for surfacing of rails, shafts, rollers, crane wheels as well as for semi-hard build up and intermediate layers.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Al	Ti	P	S	Fe
0.3	0.5	1.1	1.0	0.1	0.2	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

Hardness
225-275 HB

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG HB35

Old reference: TIG R350B

Classification

DIN 8555 : WSG 2-GZ-350-P
EN 14700 : S Fe2

Material N° : 1.8405

Description & Applications

Copper coated solid rod for TIG welding to surfacing.

Main applications: Hardfacing of pressing and stamping tools.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Al	Ti	P	S	Fe
0.7	0.5	1.9	1.0	0.1	0.2	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

Hardness
330-370 HB

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

Preheat the parent metal, depending on the carbon-equivalent and thickness, up to about 350°C.

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TIG HB50

Old reference: TIG R500B

Classification

DIN 8555 : WSG 2-GZ-50
EN 14700 : S Fe2

Material N° : 1.8425

Description & Applications

Copper coated solid rod for TIG welding to surfacing.

Main applications: Hardfacing of civil engineering equipments such as shovel and bucket teeth, bucket edges, excavators as well as cutting edges.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Al	Ti	P	S	Fe
1.1	0.5	1.9	1.8	0.1	0.2	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

Hardness
~50 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

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TIG HB60

Old reference: TIG R600B

Classification

DIN 8555 : WSG 6 GZ-60-S
EN 14700 : S Fe6

Material N° : 1.4718

Description & Applications

Copper coated solid rod for TIG welding to surfacing. Used for hardfacing parts subject to high impact and medium abrasion. A kind of a universal hardfacing wire used in quarries, mines, steel works, cement works, crushing plants, the wood industry, in the car industry and others.

Main applications: Hardfacing of block presses, crusher jaws, wheel rims, rollers, caterpillar tracks, ploughshares, running surfaces, cutting edges etc

Typical Chemical Composition (%)

C	Si	Mn	Cr	Ni	P	S	Fe
0.45	3.0	0.4	9.2	0.17	<0.02	<0.01	Rem.

All Weld Metal Mechanical Properties

Hardness
~60 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

Tool steels have to be preheated to 300-400°C, depending on the thickness and composition.

ind.10



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TIG HBF17

Old reference: TIG HBCrMo17-1

Classification

DIN 8555 : WSG 6-GZ-50-RZ
EN 14700 : S Fe8

Material N° : 1.4122

Description & Applications

Solid rod for TIG welding to surfacing. Used for hardsurfacing parts subject to corrosion and heat as well as cold working tools. For gas, water and steam valves with service temperatures up to 500°C.

Main applications: Hardfacing and welding of Base metals X55CrNiMoV12, X55Cr14, X160CrMoV12.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	Fe
0.4	0.5	0.5	16.5	1.1	Rem.

All Weld Metal Mechanical Properties

Hardness
~53 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

Tool steels have to be preheated to 350-450°C, depending on the thickness and composition.

ind.10



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TIG HBC62

Classification

DIN 8555 : WSG 4-GZ-60-S
EN 14700 : S Fe4

Material N° : 1.3348

Description & Applications

Solid rod for TIG welding to surfacing. Composition of high speed steel, used for hardsurfacing cold working tools as lathe tools, drilling tools, cutting tools.

Main applications: Hardfacing and repairing of high speed steels like 85WMoCrV6.5.4.2, 1.3339, 1.3333 and others.

Typical Chemical Composition (%)

C	Si	Mn	Cr	Mo	V	W	Fe
1.0	0.4	0.2	3.6	8.5	1.8	1.6	Rem.

All Weld Metal Mechanical Properties

Hardness
~62 HRC

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

Tool steels have to be preheated to 350-450°C, depending on the thickness and composition.

ind.10



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TIG HCUBE

Old reference: TIG CuBe2

Classification

EN 14700 : S Z Cu1

AFNOR : CuBe2

Description & Applications

Solid rod for TIG welding to surfacing. Used for welding and surfacing of copper and copper beryllium.

Typical Chemical Composition (%)

Be	Co	Ni	Fe	Cu
2.0	0.25	0.02	0.01	Rem.

All Weld Metal Mechanical Properties

Hardness

Welding Current & Instructions

Welding mode	Shielding Gas
TIG = -	Ar : 6-12 l/min

ind.10



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