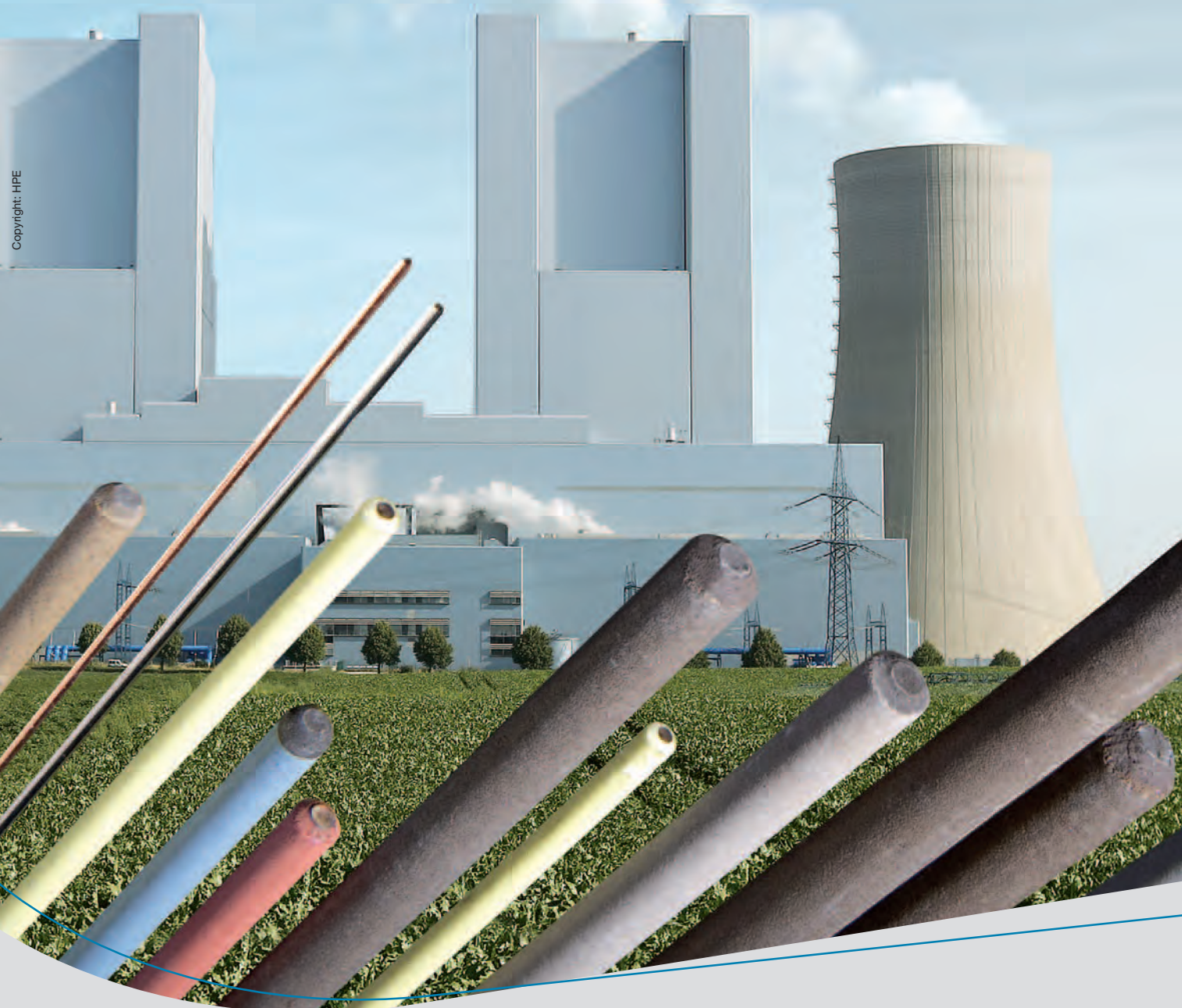


Filler Metals for Thermal Power Generation

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Joining 1/4

	Alloy Group	Base Material Examples ASTM / EN	Welding Process	Product Name	Classification AWS	Classification EN ISO		
Bainitic Steels	0,5 Mo	T/P1 / 16Mo3	SMAW	Phoenix SH Schwarz 3 K	A5.5: E7015-G	3580-A: E Mo B 4 2 H5		
				BÖHLER FOX DMO Ti	A5.5: E7015-G	3580-A: E Mo R 1 2		
				BÖHLER FOX DMO Kb	A5.5: E7018-A1H4R	3580-A: E Mo B 4 2 H5		
			GTAW	Union I Mo	A5.28: ER70S-A1	21952-A: W MoSi		
				BÖHLER DMO-IG	A5.28: ER70S-A1 (ER80S-G (A1))	21952-A: W MoSi		
			GMAW	Union I Mo	A5.28: ER70S-A1	21952-A: G MoSi		
				BÖHLER DMO-IG	A5.28: ER70S-A1 (ER80S-G (A1))	21952-A: G MoSi		
			FCAW	Union MV Mo	A5.28: E 80 C-G H4	17632-A: T Mo M M 2 H5		
				BÖHLER DMO Ti-FD	A5.29: E 81 T1-A1M	17634-A: T Mo L P M 1		
			SAW wire	Union S 2 Mo	A5.23: EA2	14171: S2Mo		
				BÖHLER EMS 2 Mo	A5.23: EA2	14171: S2Mo		
			SAW flux	UV 420 TT		14174: SA FB 1 65 DC		
	UV 305			14174: SA AR 1 76 AC H5				
	BÖHLER BB 24			14174: SA FB 1 65 DC H5				
	1 1/4 Cr; 0,5 Mo	T/P12 / 13CrMo4-5	SMAW	Phoenix Chromo 1	A5.5: E8018-B2	3580-A: E CrMo 1 B 4 2 H5		
				BÖHLER FOX DCMS Ti	A5.5: E8013-B2 (mod.)	3580-A: E CrMo 1 R 1 2		
				BÖHLER FOX DCMS Kb	A5.5: E8018-B2 H4R	3580-A: E CrMo 1 B 4 2 H5		
			GTAW	Union I CrMo	A5.28: ER80S-G	21952-A: W CrMo 1 Si		
				Union ER 80S-B2	A5.28: ER80S-B2			
				BÖHLER DCMS-IG B2	A5.28: ER80S-B2			
				BÖHLER DCMS-IG	A5.28: ER80S-G	21952-A: W CrMo 1 Si		
			GMAW	Union I CrMo	A5.28: ER80S-G	21952-A: G CrMo 1 Si		
				BÖHLER DCMS-IG	A5.28: ER80S-G	21952-A: G CrMo 1 Si		
			FCAW	Union MV CrMo	A5.28: E 80 C-B2 H4	17634-A: T CrMo 1 M M 2 H5		
				BÖHLER DCMS Ti-FD	A5.29: E 81 T1-B2M	17634-A: (T CrMo 1 P M 1)		
			SAW wire	Union S 2 CrMo	A5.23 EB2R	24598-A: S CrMo1		
				BÖHLER EMS 2 CrMo	A5.23: EB2	24598-A: S CrMo1		
			SAW flux	UV 420 TT		14174: SA FB 1 65 H5		
				UV 305		14174: SA AR 1 76 AC H5		
				BÖHLER BB 24		14174: SA FB 1 65 DC H5		
			1 Cr; 1 Mo; V	-- / 15CrMoV5-10	SMAW	Phoenix SH Kupfer 3 K	A5.5: E9018-G	3580-A: E Z CrMoV1 B 4 2 H5
						BÖHLER FOX DCMV	A5.5: E9018-G	3580-A: E Z CrMoV1 B 4 2 H5
	0,5 Cr; 1 Mo; V	-- / 14MoV6-3	SMAW	BÖHLER FOX DMV 83 Kb	A5.5: E9018-G	3580-A: E Mo V B 4 2 H5		
			GTAW	BÖHLER DMV 83-IG	A5.28: ER80S-G	21952-A: W MoVSi		
			GMAW	BÖHLER DMV 83-IG	A5.28: ER80S-G	21952-A: G MoVSi		
	1 Ni; 0,5 Cu; 0,5 Mo; Nb	-- / 15NiCuMoNb5 (WB36)	SMAW	Phoenix SH Schwarz 3 K Ni	A5.5: E9018-G	2560-A: E 50 4 1 NiMo B 4 2 H5		
				BÖHLER FOX DMO Kb	A5.5: E7018-A1H4R	3580-A: E Mo B 4 2 H5		
			GTAW	Union I Mo	A5.28: ER70S-A1	21952-A: W MoSi		
				BÖHLER DMO-IG	A5.28: ER70S-A1 (ER80S-G (A1))	21952-A: W MoSi		
			GMAW	Union MoNi	A5.28: ER90S-G	16834-A: G 62 5 M Mn3Ni1Mo		
				BÖHLER DMO-IG	A5.28: ER70S-A1 (ER80S-G (A1))	21952-A: G MoSi		
			SAW wire	Union S 3 NiMo 1	A5.23: EF3	14171-A: S3Ni1Mo / 26304-A: S3Ni1Mo		
BÖHLER 3 NiMo 1-UP				A5.23: EF3	26304: S 3Ni1Mo			
SAW flux			UV 420 TT(R)		14174: SA FB 1 65 DC			
			BÖHLER BB 24		14174: SA FB 1 65 DC H5			
2 1/4 Cr; 1 Mo	T/P22 / 10CrMo9-10	SMAW	Phoenix SH Chromo 2 KS	A5.5: E9015-B3	3580-A: E CrMo 2 B 4 2 H5			
			BÖHLER FOX CM 2 Kb	A5.5: E9018-B3 H4R	3580-A: E CrMo 2 B 4 2 H5			
		GTAW	Union I CrMo 910	A5.28: ER90S-G	21952-A: W CrMo 2 Si			
			Union ER 90S-B3	A5.28: ER90S-B3				
			BÖHLER CM2-IG B3	A5.28: ER90S-B3				
			BÖHLER CM 2-IG	A5.28: ER90S-G	21952-A: W CrMo 2 Si			
		GMAW	Union I CrMo 910	A5.28: ER90S-G	21952-A: G CrMo 2 Si			
			BÖHLER CM 2-IG	A5.28: ER90S-G	21952-A: G CrMo 2 Si			
		FCAW	Union MV CrMo 910	A5.28: E91 T1-B3M	17634-A: T CrMo 2 M M 2 H5			
			BÖHLER CM 2 Ti-FD	A5.29: E91T1-B3M	17634-A: T ZCrMo2 P M 1			

Joining 2/4

	Alloy Group	Base Material Examples ASTM / EN	Welding Process	Product Name	Classification AWS	Classification EN ISO
Bainitic Steels	2 1/4 Cr; 1 Mo	T/P22 / 10CrMo9-10	SAW wire	Union S 1 CrMo 2	A5.23: EB3R	24598: S CrMo2
				BÖHLER CM 2-UP	A5.23: EB3	24598: S CrMo2
			SAW flux	UV 420 TTR		14174: SA FB 1 65 DC
				UV 305		14174: SA AR 1 76 AC H5
	2 1/4 Cr; 0,5 Mo; 1,5 W; V; Nb; B	T/P23 / 7CrWVMoNb9-6	SMAW	Thermanit P 23	A5.5: E9015-G	3580-A: E ZCrWV 2 1,5 B 4 2 H5
				BÖHLER FOX P 23	A5.5: E9015-G	3580-A: E ZCrWV 2 1,5 B 4 2 H5
			GTAW	Union I P23	A5.28: ER90S-G	21952-A: W ZCrWV 2 1,5
				BÖHLER P 23-IG	A5.28: ER90S-G	21952-A: W ZCrWV 2 1,5
			SAW wire	Union S P23	A5.23: EG	24598-A: S Z CrWV 2 1,5
				BÖHLER P 23-UP	A5.23: EG	24598-A: S Z CrWV 2 1,5
			SAW flux	UV P23		14174: SA FB 1 55 AC
				UV 305 (only single layer)		14174: SA AR 1 76 AC H5
	BÖHLER BB 430			14174: SA FB 1 55 AC		
	BÖHLER BB 305 (only single layer)			14174: SA AR 1 76 AC H5		
	2 1/4 Cr; 1 Mo; V; Ti; B	T/P24 / 7CrMoVTiB10-10	SMAW	Thermanit P 24	A5.5: E9015-G	3580-A: E ZCrMo2WVNb B 4 2 H5
				BÖHLER FOX P 24	A5.5: E9015-G	3580-A: E ZCrMo2VNb B 4 2 H5
GTAW			Union I P24	A5.28: ER90S-G	21952-A: W ZCrMo2VTi/Nb	
			BÖHLER P 24-IG	A5.28: ER90S-G	21952-A: W ZCrMo2VTi/Nb	
SAW wire			Union S P24	A5.23: EG	24598-A: S ZCrMo2VNb	
			BÖHLER P 24-UP	A5.23: EG	24598-A: S ZCrMo2VNb	
SAW flux			UV P 24		14174: SA FB 1 55 AC	
			UV 305		14174: SA AR 1 76 AC H5	
	BÖHLER BB 430		14174: SA FB 1 55 AC			
	BÖHLER BB 305 (only single layer)		14174: SA AR 1 76 AC H5			
Martensitic Steels	9 Cr; 1 Mo; V; Nb	SMAW	Thermanit Chromo 9 V	A5.5: E9015-B9	3580-A: E CrMo9 1 B 4 2 H5	
			Thermanit Chromo T 91 (root)	A5.5: E9018-B9	3580-A: E CrMo9 1 B 4 2 H5	
			BÖHLER FOX C 9 MV	A5.5: E9015-B9	3580-A: E CrMo9 1 B 4 2 H5	
		GTAW	Thermanit MTS 3	A5.28: ER90S-B9	21952-A: W CrMo 9 1	
			BÖHLER C 9 MV-IG	A5.28: ER90S-B9	21952-A: W CrMo 9 1	
		GMAW	Thermanit MTS 3	A5.28: ER90S-B9	21952-A: G CrMo 9 1	
			BÖHLER C 9 MV-IG	A5.28: ER90S-B9	21952-A: G CrMo 9 1	
		FCAW	Thermanit MTS 3-PW	A5.29: E91T1-B9M	17634-B: T 69 T1-1M-9C1MV	
	BÖHLER C 9 MV Ti-FD		A5.28: E91T1-B9M	17634-B: T 69 T1-1M-9C1MV		
	SAW wire	Thermanit MTS 3	A5.23: EB9	24598-A: S CrMo9 1		
		BÖHLER C 9 MV-UP	A5.23: EB9	24598-A: S CrMo9 1		
	SAW flux	Marathon 543		14174: SA FB 2 55 DC H5		
		BÖHLER BB 910		14174: SA FB 2 55 DC H5		
	9 Cr; 0,5 Mo; 1,5 W; V, Nb	T/P92 / X10CrW-MoVNb9-2	SMAW	Thermanit MTS 616	A5.5: (E9015-B9 mod.)	3580-A: E ZCrMoWVNb 9 0,5 2 B 4 2 H5
				BÖHLER FOX P 92	A5.5: (E9015-B9 mod.)	3580-A: E ZCrMoWVNb 9 0,5 2 B 4 2 H5
			GTAW	Thermanit MTS 616	A5.28: (ER90S-B9 mod.)	21952-A: W ZCrMoWVNb 9 0,5 1,5
BÖHLER P 92-IG				A5.28: (ER90S-B9 mod.)	21952-A: W ZCrMoWVNb 9 0,5 1,5	
GMAW			Thermanit MTS 616	A5.28: (ER90S-B9 mod.)	21952-A: G ZCrMoWVNb 9 0,5 1,5	
			BÖHLER P 92-IG	A5.28: (ER90S-B9 mod.)	21952-A: G ZCrMoWVNb 9 0,5 1,5	
FCAW			Thermanit MTS 616-PW	A5.29: E91T1-GM	17634-A: T ZCrWMo9VNb P M 1	
			BÖHLER P 92 Ti-FD	A5.29: E91T1-GM	17634-A: T ZCrWMo9VNb P M 1	
SAW wire			Thermanit MTS 616	A5.23: EB9 (mod.)	24598-A: S ZCrMoWVNb 9 0,5 1,5	
			BÖHLER P 92-UP	A5.23: EB9 (mod.)	24598-A: S ZCrMoWVNb 9 0,5 1,5	
SAW flux			Marathon 543		14174: SA FB 2 55 DC H5	
			BÖHLER BB 910		14174: SA FB 2 55 DC H5	

Joining 3/4

	Alloy Group	Base Material Examples ASTM / EN	Welding Process	Product Name	Classification AWS	Classification EN ISO		
Martensitic Steels	9 Cr; 1 Mo; 1 W; V; Nb	T/P911 / X11CrMoW-VNb9-1-1	SMAW	Thermanit MTS 911	A5.5: E9015-B9 (mod.)	3580-A: E ZCrMoWVNb 9 1 1 B 4 2 H5		
				BÖHLER FOX C 9 MVW	A5.5: E9015-B9 (mod.)	3580-A: E ZCrMoWVNb 9 1 1 B 4 2 H5		
			GTAW	Thermanit MTS 911	A5.28: ER90S-B9 (mod.)	21952-A: W ZCrMoWVNb 9 1 1		
				BÖHLER C 9 MVW-IG	A5.28: ER90S-B9 (mod.)	21952-A: W ZCrMoWVNb 9 1 1		
			GMAW	Thermanit MTS 911	A5.28: ER90S-B9 (mod.)	21952-A: G ZCrMoWVNb 9 1 1		
				BÖHLER C 9 MVW-IG	A5.28: ER90S-B9 (mod.)	21952-A: G ZCrMoWVNb 9 1 1		
	SAW wire	Thermanit MTS 911	A5.23: EB9 (mod.)	24598-A: S ZCrMoWVNb 9 1 1				
		BÖHLER C 9 MVW-UP	A5.23: EB9 (mod.)	24598-A: S ZCrMoWVNb 9 1 1				
	SAW flux	Marathon 543		14174: SA FB 2 55 DC H5				
		BÖHLER BB 910		14174: SA FB 2 55 DC H5				
	11 Cr; 0,5 Mo; 1,5 W; 1 Co; V; Nb	VM12-SHC / X12CrCoW-VNb11-2-2	SMAW	Thermanit MTS 5 CoT	A5.5: E9015-B9 (mod.)	3580-A: E ZCrCoW11 2		
				BÖHLER FOX C12 CoW	A5.5: E9015-B9 (mod.)	3580-A: E ZCrCoW11 2		
			GTAW	Thermanit MTS 5 CoT	A5.28: ER110S-G	21952-A: W ZCrCoW 11 2 2		
				BÖHLER C12 CoW-IG	A5.28: ER110S-G	21952-A: W ZCrCoW 11 2 2		
	10 Cr; 1 Mo; V	-- / X20CrMoV11-1	SMAW	Thermanit MTS 4		3580-A: E CrMoWV 12 B 4 2 H5		
				BÖHLER FOX 20 MVW		3580-A: E CrMoWV 12 B 4 2 H5		
			GTAW	Thermanit MTS 4 Si		21952-A: W CrMoWV 12 Si		
				BÖHLER 20 MVW-IG		21952-A: W CrMoWV 12 Si		
GMAW			Thermanit MTS 4 Si		21952-A: G CrMoWV 12 Si			
			BÖHLER 20 MVW-IG		21952-A: G CrMoWV 12 Si			
SAW wire			Thermanit MTS 4		24598-A: S CrMoWV 12			
			BÖHLER 20 MVW-UP		24598-A: S CrMoWV 12			
SAW flux	Marathon 543		14174: SA FB 2 55 DC H5					
	UV 420 TT		14174: SA FB 1 65 DC H5					
BÖHLER BB 24			14174: SA FB 1 65 DC H5					
			14174: SA FB 1 65 DC H5					
9 Cr; 1,5 Mo; 1 Co; V; Nb	CB2 (GX13CrMo-CoVNb9-2-1)	SMAW	Thermanit MTS 5 Co 1	A5.5: E9015-G	3580-A: E Z CrCoMoV 10 1 1 B 42 H5			
		FCAW	BÖHLER CB 2 Ti-FD	A5.29: E91T1-GM	17634-A: T ZCrMoCo9VNbNB P M 1			
Austenitic Steels	18 Cr; 9 Ni; 3 Cu; Nb	304HCu	SMAW	Thermanit 304 H Cu	A5.4: E308H-15 (mod.)	3581-A: EZ1816 Cu H B22		
				BÖHLER FOX E 304 H Cu	A5.4: E308H-15 (mod.)	3581-A: E Z 18 16 1 Cu H B 2 2		
			GTAW	Thermanit 304 H Cu		14343-A: W Z 18 16 1 Cu H		
				BÖHLER ER 304 H Cu-IG	A5.9: ER308H (mod.)	14343-A: W Z 18 16 1 Cu H		
	25 Cr; 21 Ni; Nb	310N (HR3C)	SMAW	(Thermanit 310N)* or Thermanit 617		14172: E Ni 6117		
				BÖHLER FOX NIBAS 617	A5.11: E NiCrCoMo-1 (mod.)	14172: E Ni 6117		
			GTAW	(Thermanit 310N)* or Thermanit 617		18274: S Ni 6617		
				BÖHLER NIBAS 617-IG	A5.14: ER NiCrCoMo-1	18274: S Ni 6117		
			18 Cr; 10 Ni; Nb	347H FG	SMAW	(Thermanit 310N)* or Thermanit 617		18274: S Ni 6617
						BÖHLER FOX NIBAS 617	A5.11: E NiCrCoMo-1 (mod.)	14172: E Ni 6117
GTAW	(Thermanit 310N)* or Thermanit 617		18274: S Ni 6617					
	BÖHLER NIBAS 617-IG	A5.14: ER NiCrCoMo-1	18274: S Ni 6617					

* under development

Joining 4/4

	Alloy Group	Base Material Examples ASTM / EN	Welding Process	Product Name	Classification AWS	Classification EN ISO
Ni-Base Alloys	22 Cr; 9 Mo; 12 Co; 0,3 Ti; 1 Al; Ni balance	Alloy 617	SMAW	Thermanit 617	A5.11: E NiCrCoMo-1 (mod.)	14172: E Ni 6117
				BÖHLER FOX NIBAS 617	A5.11: E NiCrCoMo-1 (mod.)	14172: E Ni 6117
			GTAW	Thermanit 617	A5.14: ER NiCrCoMo-1	18274: S Ni 6617
				BÖHLER NIBAS 617-IG	A5.14: ER NiCrCoMo-1	18274: S Ni 6617
			GMAW	Thermanit 617	A5.14: ER NiCrCoMo-1	18274: S Ni 6617
				BÖHLER NIBAS 617-IG	A5.14: ER NiCrCoMo-1	18274: S Ni 6617
			SAW wire	Thermanit 617	A5.14: ER NiCrCoMo-1	18274: S Ni 6617
				BÖHLER NIBAS 617-UP	A5.14: ER NiCrCoMo-1	18274: S Ni 6617
			SAW flux	Marathon 444		14174: SA FB 2 AC
				BÖHLER BB 444		14174: SA FB 2 AC
	20 Cr; 6 Mo; 20 Co; 2 Ti; 0,5 Al; Ni-base	Alloy 263	SMAW	Thermanit 263*		
			GTAW	Thermanit 263		
	Dissimilar welds		SMAW	Thermanit Nicro 82	A5.11: E NiCrFe-3 (mod.)	14172: E Ni 6082
				BÖHLER FOX NiCr 70 Nb	A5.11: E NiCrFe-3 (mod.)	14172: E Ni 6082
				Thermanit Nicro 182	A5.11: E NiCrFe-3	14172: E Ni 6182
				BÖHLER FOX NiCr 70/15	A5.11: E NiCrFe-3	14172: E Ni 6182
				Thermanit 617	A5.11: E NiCrCoMo-1 (mod.)	14172: E Ni 6117
				BÖHLER FOX NIBAS 617	A5.11: E NiCrCoMo-1 (mod.)	14172: E Ni 6117
			GTAW	Thermanit Nicro 82	A5.14: ER NiCr-3	18274: S Ni 6082
				BÖHLER NiCr 70 Nb-IG	A5.14: ER NiCr-3	18274: S Ni 6082
Thermanit 617				A5.14: ER NiCrCoMo-1	18274: S Ni 6617	
BÖHLER NIBAS 617-IG				A5.14: ER NiCrCoMo-1	18274: S Ni 6617	
GMAW			Thermanit Nicro 82	A5.14: ER NiCr-3	18274: S Ni 6082	
			BÖHLER NiCr 70 Nb-IG	A5.14: ER NiCr-3	18274: S Ni 6082	
	Thermanit 617	A5.14: ER NiCrCoMo-1	18274: S Ni 6617			
	BÖHLER NIBAS 617-IG	A5.14: ER NiCrCoMo-1	18274: S Ni 6617			

* under development

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