



voestalpine Böhler Welding

Filler Metals for Oil & Gas Downstream

voestalpine Böhler Welding
www.voestalpine.com/welding

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ONE STEP AHEAD.

Joining 1/4

	Alloy Group	Base Material Examples	Welding Process	Product Name	Classification AWS/EN
Unalloyed Steels	C-Mn	Plate: ASME SA516 GR. 55 Plate: ASME SA516 GR. 60 Plate: ASME SA516 GR. 65 Plate: ASME SA516 GR. 70 Forged: ASME SA181 Gr. F1 Pipe: ASME SA105 Gr. A, B, C Pipe: ASME SA106 Gr. A, B, C Tube: ASME SA210 Gr. A, B, C	SMAW	BÖHLER FOX EV 47	AWS A5.1: E7016-1H4R EN ISO 2560-A: E 38 4 B 42 H5
				BÖHLER FOX EV 50	EN ISO 2560-A: E 42 5 B 42 H5 AWS A5.1: E7018-1H4R
			SAW Wire	Union S 2 Si	AWS A5.17 EM12K EN ISO 14171 S2Si
			SAW Flux	UV 418 TT	EN ISO 14174 SA FB 1 55 AC H5
			SAW Wire+Flux	Union S 2 Si + UV 418 TT	AWS A5.17-SFA 5.17 F7A6-EM12K EN ISO 14171-S 42 5 FB S2Si
			SAW Wire	Union S 3 Si + UV 418 TT	AWS A5.17 EH12K EN ISO 14171 S3Si
			SAW Flux	UV 418 TT	- EN Iso 14174 SA FB 1 55 AC H5
			SAW Wire+Flux	Union S 3 Si + UV 418 TT	AWS A5.17-SFA 5.17 F7A8-EH12K EN ISO 14171-S 46 6 FB S3Si
			GTAW	BÖHLER EMK 6	AWS A5.18: ER70S-6 EN ISO 636-A: W 42 5 W3Si1
				BÖHLER EML 5	AWS A5.18 ER70S-3 EN ISO 636-A: W 46 5 W2Si
			GMAW	BÖHLER EMK 6	AWS A5.18: ER70S-6 EN ISO 14341-A: G3Si1 (wire)/ G 42 4 M21 3Si1
			FCAW	BÖHLER Ti 52-FD	AWS A5.36: E71T-1M21A4-CS1-H8 E71T-1-C1A2-CS1-H4 EN ISO 17632-A: T 46 4 P M 1 H10 EN ISO 17632-A T 42 2 P C 1 H5
			Low-alloyed Pressure Vessel Steels	C- ½ Mo	Plate: ASME SA571 Gr. J Fitting: ASME SA 234 WP1, WP1 Forging: ASME SA336 Gr. F1 Forged Fitting: ASME SA 182 Gr. F1 Pipe: ASME SA 335 Gr. P1 Tube: ASME SA 250 Gr. T1a, T1b Tube: ASME SA209 Gr. T1 Tube: EN10216-2: 16Mo3
SAW Wire	Union S 2 Mo	AWS A5.23 EA2 EN ISO 14171 S2Mo / EN ISO 24598-A S S Mo			
SAW Flux	UV 418 TT	- EN ISO 14174 SA FB 1 55 AC H5			
SAW Wire+Flux	Union S 2 Mo + UV 418 TT	AWS A5.23-SFA 5.23 F8A6-EA2-A2 EN ISO 14171 S46 4 FB S2Mo			
GTAW	BÖHLER DMO-IG	AWS A5.28: ER70S-A1 (ER80S-G) EN ISO 21952-A: W Mo Si			
GMAW	BÖHLER DMO-IG	AWS A5.28: ER70S-A1 (ER80S-G) EN ISO 21952-A: G Mo Si			
FCAW	BÖHLER DMO TI-FD	AWS A5.36: E81T1-M21PY-A1H8 EN ISO 17634-A: T MoL P M 1 H10			
1 ¼ Cr ½ Mo 1 Cr ½ Mo	Plate: ASME SA387 Gr. 11 Gr. 12 Fitting: ASME SA 234 WP11, WP12 Forging: ASME SA336 Gr. F11 Forged Fitting: ASME SA 182 Gr. F11, F12 Pipe: ASME SA 335, P11, P12 Tube: ASME SA 213 T11, T12	SMAW		Phoenix Chromo 1	AWS A5.5 E8018-B2 EN ISO 3580-A ECrMo1 B 4 2 H5
		SAW Wire		Union S 2 CrMo	AWS A5.23 EB2R EN ISO 24598-A S S CrMo1
		SAW Flux		UV 420 TTR	- EN ISO 14174 SA FB 1 65 DC
				UV 420 TTR-W	- EN ISO 14174 SA FB 1 65 AC
		SAW Wire+Flux		Union S 2 CrMo + UV 420 TTR(-W)	AWS A5.23-SFA 5.23 F8P2-EB2R-B2 EN ISO 24598-A S S CrMo1 FB
		GTAW		Union I CrMo	AWS A5.28 ER80S-G [ER80S-B2 (mod.)] EN ISO 21952-A W CrMo1Si EN ISO 21952-B W 55 1CM3
Union ER 80S-B2	AWS A5.28 ER80S-B2 EN ISO 21952-B W 1CM				

Some products are applied for welding overlay in addition to joining.

Joining 2/4

	Alloy Group	Base Material Examples	Welding Process	Product Name	Classification AWS/EN
Low-alloyed Pressure Vessel Steels	2 ¼ Cr 1 Mo	Plate: ASME SA387 Gr. 22 Fitting: ASME SA 234 WP22 Forging: ASME SA336 Gr. F22 Forged Fitting: ASME SA 182 Gr. F22 Pipe: ASME SA 335, P22 Tube: ASME SA213 Gr. T22	SMAW	Phoenix SH Chromo 2 KS	AWS A5.5 E9015-B3 EN ISO 3580-A ECrMo2 B 4 2 H5 EN ISO 3580-B E 6215-2C1M
			SAW Wire	Union S 1 CrMo 2	AWS A5.23 EB3R EN ISO 24598-A S S CrMo2
			SAW Flux	UV 420 TTR	- EN ISO 14174 SA FB 1 65 DC
				UV 420 TTR-W	- EN ISO 14174 SA FB 1 65 AC
			SAW Wire+Flux	Union S1 CrMo 2 + UV 420 TTR(-W)	AWS A5.23-SFA 5.23 F9P2-EB3R-B3R
			GTAW	Union I CrMo 910 Spezial	AWS A5.28 ER90S-G
	Union ER 90S-B3	AWS A5.28 ER90S-B3 EN ISO 21952-B W 2C1M			
	2 ¼ Cr 1 Mo ¼ V	Plate: ASME SA542 Type D, CL 4a Plate: ASME SA832 Gr. 22V Forging: ASME SA336 Gr. F22V, SA541 Gr. 22V Forged Fitting: ASME SA 182 Gr. F22V	SMAW	Phoenix Chromo 2V	AWS A5.5 E9015-G EN ISO 3580-A E ZCrMoV2 B 4 2 H5
			SAW Wire	Union S 1 CrMo 2V	AWS A5.23 EG EN ISO 24598-A S S Z CrMoV2
			SAW Flux	UV 430 TTR-W	- EN ISO 14174 SA FB 1 57 AC
SAW Wire+Flux			Union S1 CrMo 2V + UV 430 TTR-W	AWS A5.23 F9PZ-EG-G EN ISO 24598-A S S Z CrMo 2V FB	
GTAW			Union I CrMo 2V	AWS A5.28 ER90S-G	
Medium-alloyed High Temperature Steels	5 Cr ½ Mo	Plate: ASME SA387 Gr. 5 CL. Fitting: ASME SA 234 WP5 Forging: ASME SA336 Gr. F5 Forged Fitting: ASME SA 182 Gr. F5 Pipe: ASME SA335 Gr. P5 Tube: ASME SA213 Gr. T5	SMAW	BÖHLER FOX CM 5 Kb	AWS A5.5: E8018-B6H4R EN ISO 3580-A: ECrMo5 B 4 2 H5
			SAW Wire	Union S1 CrMo 5	AWS A5.23 EB6 EN ISO 24598-A S S CrMo5
			SAW Flux	UV 420 TT	- EN ISO 14174 SA FB 1 65 AC
			GTAW	BÖHLER CM 5-IG	AWS A5.28: ER80S-B6 EN ISO 21952-A: W CrMo5Si
	GMAW	BÖHLER CM 5-IG	AWS A5.28: ER80S-B6 EN ISO 21952-A: G CrMo5Si		
	9 Cr 1 Mo	Plate: ASME SA387 Gr. 9 Fitting: ASME SA234 WP9 Forging: ASME SA336 Gr. F9 Forged Fitting: ASME SA 182 Gr. F9 Pipe: ASME SA335 Gr. P9 Tube: ASME SA213 Gr. T9	SMAW	BÖHLER FOX CM 9 Kb	AWS A5.5: E8018-B8 EN ISO 3580-A: ECrMo9 B 4 2 H5
			GTAW	BÖHLER CM 9-IG	AWS A5.28 ER80S-B8 EN ISO 21952-A G CrMo9Si
Heat Resistant Stainless Steels	S.S 304H	UNS30409	SMAW	Thermanit ATS 4	AWS A5.4 E308H-15 EN ISO 3581-A E 19 9 H B 2 2
			SAW Wire	Thermanit ATS 4	AWS A5.9 ER19-10H EN ISO 14343 S 19 9 H
			SAW Flux	Marathon 104	EN ISO 14174 SA FB 2 55 AC H5
			SAW Wire+Flux	Thermanit ATS 4 + Marathon 104	AWS A5.9 ER19-10H EN ISO 14343 S 19 9 H
			GTAW	Thermanit ATS 4	AWS A5.9 ER19-10H EN ISO 14343-A W 19 9 H / EN ISO 14343-B SS19-10H
			GMAW	Thermanit ATS 4	AWS A5.9 ER19-10 H EN ISO 14343-A G 19 9 H / EN ISO 14343-B SS19-10H

Some products are applied for welding overlay in addition to joining.

Joining 3/4

	Alloy Group	Base Material Examples	Welding Process	Product Name	Classification AWS/EN
Heat Resistant Stainless Steels	S.S 304H	UNS30409	FCAW	BÖHLER E 308 H PW-FD Bi-Free	AWS A5.22: E308HT1-1/4 EN 17633-A: T Z 19 9 H P C1/M21 1
	S.S 310	UNS31000	SMAW	Thermanit C	AWS A5.4 E310-15 (mod.) EN ISO 3581-A E25 20 B 2 2
			GTAW	Thermanit C Si	AWS A5.9 ER310 (mod.) EN ISO 14343-A W 25 20 Mn / EN ISO 14343-B SSZ31
			GMAW	Thermanit C Si	AWS A5.9 ER310 (mod.) EN ISO 14343-A G 25 20 Mn
High Temperature High-alloyed	Wrought: Alloy 800 Alloy 800H Alloy 800HT	UNS8800 UNS8810 UNS8811	SMAW	UTP 2133 Mn	- EN ISO 3581-A: EZ 21 33 B 4 2
			GTAW	UTP A 2133 Mn	- EN ISO 14343: WZ 21 33 Mn Nb
			GMAW	UTP A 2133 Mn	- EN ISO 14343: GZ 21 33 Mn Nb
	Cast Tubes: Alloy HK Alloy HP Alloy HP Nb Alloy HP M.A		SMAW	UTP 2535 Nb	- EN 1600: EZ 25 35 Nb B 6 2
			GTAW	UTP A 2535 Nb	- EN ISO 14343-A: WZ 25 35 Zr
			GMAW	UTP A 2535 Nb	- EN ISO 14343-A: GZ 25 35 Zr
	Cast Tubes Alloy 35/45 Alloy 35/45 M.A	GX45NiCrNbSiTi 45-35	SMAW	UTP 3545 Nb	- EN 1600: EZ 35 45 Nb B 6 2
			GTAW	UTP A 3545 Nb	- EN ISO 14343-A: WZ 35 45 Nb
			GMAW	UTP A 3545 Nb	- EN ISO 14343-A: GZ 35 45 Nb
	Stainless Steel	Austenitic	S.S 309L Only Weld-Overlay Buffer	SMAW	BÖHLER FOX CN 23/12
SAW Wire				Thermanit 25/14 E309L	AWS A5.9 ER309L EN ISO 14343 S 23 12 L
SAW Flux				Marathon 431	EN ISO 14174 SA FB 2 64 DC
GTAW				BÖHLER CN 23/12-IG	AWS A5.9: ER309L EN ISO 13343-A: G 23 12 L
GMAW				Thermanit 25/14 E309L Si	AWS A5.9 ER 309 L Si EN ISO 14343-A G 23 12 L Si
FCAW				BÖHLER CN 23/12-FD	AWS A5.22: E309LT0-4/1 EN 17633-A: T 23 12 L R M21 (C1) 3
Austenitic Nb Stabilized		S.S 321/347	SMAW	BÖHLER FOX SAS 2	AWS A5.4: E347-15 EN ISO 3581-A: E 19 9 Nb B 2 2
			SAW Wire	Thermanit H-347	AWS A5.9 ER347 EN ISO 14343 S 19 9 Nb
			SAW Flux	Marathon 431	EN ISO 14174 SA FB 2 64 DC
			GTAW	BÖHLER SAS 2-IG	AWS A5.9: ER347 EN ISO 13343-A: W 19 9 Nb
			GMAW	Thermanit H-347	AWS A5.9 ER 347 EN ISO 14343-A G 19 9 Nb / EN ISO 14343-B SS347
				Thermanit H Si	AWS A5.9 ER 347Si EN ISO 14343-A G 19 9 Nb Si / EN ISO 14343-B SS347Si
			FCAW	BÖHLER SAS 2-FD	EN ISO 17633-A: T 19 9 Nb R M21/C1 3 AWS A5.22: E347T0-4/1

Some products are applied for welding overlay in addition to joining.

Joining 4/4

	Alloy Group	Base Material Examples	Welding Process	Product Name	Classification AWS/EN
Nickel-base	Alloy 600	UNSN06600	SMAW	UTP 068 HH	AWS A5.11 : E NiCrFe-3 (mod.) EN ISO 14172 : E Ni 6082 (NiCr20Mn3Nb)
			GTAW	UTP A 068 HH	AWS A5.14 : ER NiCr-3 EN ISO 18274 : S Ni 6082 (NiCr20Mn3Nb)
			GMAW	UTP A 068 HH	AWS A5.14 : ER NiCr-4 EN ISO 18274 : S Ni 6082 (NiCr20Mn3Nb)
	Alloy 625 Alloy 825	UNS06625 UNS08825	SMAW	UTP 6222 Mo	AWS A5.11 : E NiCrMo-3 EN ISO 14172 : E Ni 6625 (NiCr22Mo9Nb)
			GTAW	UTP A 6222 Mo	AWS A5.14 : ER NiCrMo-3 EN ISO 18274 : S Ni 6625 (NiCr22Mo9Nb)
			GMAW	UTP A 6222 Mo	AWS A5.14 : ER NiCrMo-4 EN ISO 18274 : S Ni 6625 (NiCr22Mo9Nb)
	Alloy 617	UNS06617	SMAW	UTP 6170 Co	AWS A5.11 : ~ ENiCrCoMo-1 (mod.) EN ISO 14172 : ~ E Ni 6117~ (NiCr22Co12Mo)
			GTAW	UTP A 6170 Co	AWS A5.14 : ER NiCrCoMo-1 EN ISO 18274 : S Ni 6617 (NiCr22Co12Mo9)
			GMAW	UTP A 6170 Co	AWS A5.14 : ER NiCrCoMo-2 EN ISO 18274 : S Ni 6617 (NiCr22Co12Mo9)
Low-temperature Steels	1% Ni	ASME SA572 Gr. 65 ASME SA573	SMAW	BÖHLER FOX EV 60	AWS A5.5 E8018-C3H4R EN ISO 2560-A E 46 6 1Ni B 42 H5
			SAW Wire	Union S 3 NiMo 1	AWS A5.23 EF3 EN ISO 14171 S3NiMo1
			SAW Flux	UV 420 TT(R)	- EN ISO 14174 SA FB 1 65 DC
			GTAW	BÖHLER Ni1-IG	AWS A5.28 ER80S-Ni1 (mod.) EN ISO 636-A W3Ni
			GMAW	BÖHLER NiMo1-IG	AWS A5.28 ER90S-G EN ISO 16834-A G Mn3Ni1Mo (wire) / G 55 6 M21 Mn3Ni1Mo
	2-2.5% Ni	ASME SA203 Gr. A & B ASME SA572 Gr. 65	SMAW	BÖHLER FOX 2,5 Ni	AWS A5.5 E8018-C1H4R EN ISO 2560-A E 46 8 2Ni B 42 H5
			SAW Wire	Union S 2 Ni 2,5	AWS A5.23 ENi2 EN ISO 14171 S2Ni2
			SAW Flux	UV 418 TT, UV 421 TT	- EN ISO 14174 SA FB 1 55 AC H5
			SAW Wire+Flux	Union S 2 Ni 2,5 + UV 418 TT	AWS A5.23-SFA 5.23 F8A10-ENi2-Ni2 EN ISO 14171 S 46 8 FB S2Ni2
			GTAW	BÖHLER 2,5 Ni-IG	AWS A5.28 ER80S-Ni2 EN ISO 636-A W2Ni2 / W 46 8 W2Ni2
			GMAW	BÖHLER 2,5 Ni-IG	AWS A5.28 ER80S-Ni2 (wire) / G 46 8 M/C G2Ni2 EN ISO 14341-A G2Ni2
	3.5% Ni	ASME SA203 Gr. D, E, F	SMAW	Phoenix SH Ni 2 K 80	AWS A5.5 E7018-C2L EN ISO 2560-A E 42 6 3Ni B 3 2 H5
			SAW Wire	Union S 2 Ni 3,5	AWS A5.23 ENi3 EN 756 S2Ni3
			SAW Flux	UV 418 TT	- EN ISO 14174 SA FB 1 55 AC H5
			SAW Wire+Flux	Union S 2 Ni 3,5 + UV 418 TT	AWS A5.23-SFA 5.23 F8A15-ENi3-Ni3 EN ISO 14171 S 46 8 FB S2Ni3
GTAW			Union I 3,5 Ni	AWS A 5.23 ER80S-Ni3 (mod.) EN 1668 W Z42 10 W2Ni3	

Some products are applied for welding overlay in addition to joining.

Strip Cladding

	Deposited Alloy	Welding Process	Layer	Strip	Flux
Stainless Steel	S.S 410S	SAW	1st Layer	SOUDOTAPE 430	RECORD INT 101
		ESW	1st Layer	SOUDOTAPE 430	RECORD EST 122
	S.S 308L	SAW	1st Layer	SOUDOTAPE 309 L	RECORD INT 109
			2nd Layer	SOUDOTAPE 308 L	RECORD INT 109
		ESW	1st Layer	SOUDOTAPE 309 L	RECORD EST 122
			2nd Layer	SOUDOTAPE 308 L	RECORD EST 122
			ESW Single layer	Single Layer	SOUDOTAPE 308 L
	ESW High Speed	1st Layer	SOUDOTAPE 309 L	RECORD EST 136	
	S.S 308H	SAW	1st Layer	SOUDOTAPE 309 L	RECORD INT 101
			2nd Layer	SOUDOTAPE 308 L	RECORD EST 136
	S.S 316L	SAW	1st Layer	SOUDOTAPE 309 L	RECORD INT 109
			2nd Layer	SOUDOTAPE 316 L	RECORD INT 109
		ESW	1st Layer	SOUDOTAPE 309 L	RECORD EST 122
			2nd Layer	SOUDOTAPE 316 L	RECORD EST 122
			ESW Single layer	Single Layer	SOUDOTAPE 21.13.3 L
	ESW High Speed	1st Layer	SOUDOTAPE 309 L	RECORD EST 136	
	2nd Layer	SOUDOTAPE 316 L	RECORD EST 136		
	S.S 317L	SAW	1st Layer	SOUDOTAPE 21.13.3 L	RECORD INT 101 Mo
			2nd Layer	SOUDOTAPE 316 L	RECORD INT 101 Mo
		ESW	1st Layer	SOUDOTAPE 316 L	RECORD EST 317-2
2nd Layer	SOUDOTAPE 316 L		RECORD EST 317-2		
ESW Single layer	Single Layer	SOUDOTAPE 21.13.3 L	RECORD EST 317-1		
S.S 347	SAW	1st Layer	SOUDOTAPE 309 L	RECORD INT 109	
		2nd Layer	SOUDOTAPE 347	RECORD INT 109	
	ESW	1st Layer	SOUDOTAPE 309 L	RECORD EST 122	
		2nd Layer	SOUDOTAPE 347	RECORD EST 122	
		ESW Single layer	Single Layer	SOUDOTAPE 21.11 LNb	RECORD EST 122
	ESW High Speed	Single Layer	SOUDOTAPE 24.12 LNb	RECORD EST 136	
ESW High Speed	1st Layer	SOUDOTAPE 309 L	RECORD EST 136		
2nd Layer	SOUDOTAPE 347	RECORD EST 136			
Alloy 254 SMO	ESW	1st Layer	SOUDOTAPE 254SMo	RECORD EST 122	
		2nd Layer	SOUDOTAPE 254SMo	RECORD EST 122	
ESW	1st Layer	SOUDOTAPE 309L	RECORD EST 122		
Nickel-Base	Alloy 276	ESW	1st Layer	SOUDOTAPE NiCrMo59	RECORD EST 259
			2nd Layer	SOUDOTAPE NiCrMo4	RECORD EST 259
	Alloy 59	ESW	1st Layer	SOUDOTAPE NiCrMo59	RECORD EST 259
			2nd Layer	SOUDOTAPE NiCrMo59	RECORD EST 259
	Alloy 825	ESW	1st Layer	SOUDOTAPE 825	RECORD EST 201
			2nd Layer	SOUDOTAPE 825	RECORD EST 201
	ESW Single layer	Single Layer	SOUDOTAPE 825	RECORD EST 138	
	Alloy 625	SAW	1st Layer	SOUDOTAPE 625	RECORD NFT 201
			2nd Layer	SOUDOTAPE 625	RECORD NFT 201
		ESW	1st Layer	SOUDOTAPE 625	RECORD EST 201
			2nd Layer	SOUDOTAPE 625	RECORD EST 201
			ESW Single layer	Single Layer	SOUDOTAPE 625
ESW High Speed	1st Layer	SOUDOTAPE 625	RECORD EST 236		
2nd Layer	SOUDOTAPE 625	RECORD EST 236			
Alloy 400	SAW	1st Layer	SOUDOTAPE NiCu7	RECORD NiCuT	
		2nd Layer	SOUDOTAPE NiCu7	RECORD NiCuT	
		3rd Layer	SOUDOTAPE NiCu7	RECORD NiCuT	
	ESW	1st Layer	SOUDOTAPE NiCu7	RECORD EST 400	
2nd Layer		SOUDOTAPE NiCu7	RECORD EST 400		
Alloy 200	SAW	1st Layer	SOUDOTAPE NiTi	RECORD NiT	
		2nd Layer	SOUDOTAPE NiTi	RECORD NiT	
		3rd Layer	SOUDOTAPE NiTi	RECORD NiT	
	ESW	1st Layer	SOUDOTAPE NiTi	RECORD EST 200	
		2nd Layer	SOUDOTAPE NiTi	RECORD EST 200	
3rd Layer	SOUDOTAPE NiTi	RECORD EST 200			
Alloy 22	ESW	1st Layer	SOUDOTAPE NiCrMo22	RECORD EST 259	
		2nd Layer	SOUDOTAPE NiCrMo22	RECORD EST 259	



voestalpine Böhler Welding

Böhler Welding know-how joins steel

Customers in over 120 countries join the expertise of voestalpine Böhler Welding (formerly the Böhler Welding Group). Focused on filler metals, voestalpine Böhler Welding offers extensive technical consultation and individual solutions for industrial welding and soldering applications. Customer proximity is guaranteed by 40 subsidiaries in 28 countries, with the support of 2,200 employees, and through more than 1,000 distribution partners worldwide.



Böhler Welding – More than 2,000 products for joint welding in all conventional arc welding processes are united in a product portfolio that is unique throughout the world. Creating lasting connections is the brand's philosophy in welding and between people.



UTP Maintenance – Decades of industry experience and application know-how in the areas of repair as well as wear and surface protection, combined with innovative and custom-tailored products, guarantee customers an increase in the productivity and protection of their components.



Fontargen Brazing – Through deep insight into processing methods and ways of application, Fontargen Brazing provides the best brazing and soldering solutions based on proven products with German technology. The expertise of this brand's application engineers has been formulated over many years of experience from countless application cases.

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Oil & Gas Downstream

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