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HOT ROLLED STEEL PLATES, SHEETS AND COILS

Selection of material
Welding consumables

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This brochure presents the welding consumable recommendations for MAG welding, flux-cored arc welding, metal arc welding with covered electrodes and submerged arc welding of hot rolled steels. The chemical composition of Ruukki's hot rolled steel grades as well as other technical data are shown on the web site www.ruukki.com.

Table 1.
MAG welding, recommended welding consumables

MAG WELDING (solid wire) Steel grade Standard		ESAB Wire + gas OK Autrod + gas	ELGA Wire + gas Elga-Matic + gas	RETCO OY Wire + gas ISAF + gas
EN 10025-2	S355J0, S355J2	12.51 + M21, CO_2	100 + M21, CO_2	IS-10 BRONZE + M21, CO_2
Multisteel	Multisteel	12.51 + M21, CO_2	100 + M21, CO_2	IS-10 BRONZE + M21, CO_2
EN 10025-3	S355N S355NL S420N S420NL	12.51 + M21, CO_2 13.28 + M21 12.51 + M21 13.28 + M21	100 + M21, CO_2 162 + M21, CO_2 100 + M21, CO_2 162 + M21, CO_2	IS-10 BRONZE + M21, CO_2 IS-10 BRONZE + M21, CO_2 IS-10 BRONZE + M21, CO_2 IS-10 BRONZE + M21, CO_2
Optim®; heavy plate	Optim 500 ML	13.28 + M21	103 + M21, CO_2	
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	12.51 + M21, CO_2 12.51 + M21, CO_2 12.51 + M21	100 + M21, CO_2 100 + M21, CO_2 100 + M21, CO_2	IS-10 BRONZE + M21, CO_2 IS-10 BRONZE + M21, CO_2 IS-10 BRONZE + M21, CO_2
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC	13.13 + M21 13.13 + M21 13.13 + M21 13.29 + M21 13.29 + M21 (13.31 + M21) [2)] (13.31 + M21) [2)] (13.31 + M21) [2)]	103 + M21, CO_2 135 + M21, CO_2 135 + M21, CO_2 135 + M21, CO_2 135 + M21, CO_2 135 + M21, CO_2 138 + M21, CO_2	
COR-TEN®	COR-TEN® A COR-TEN® B	13.26 + M21, CO_2 13.26 + M21, CO_2	140 + M21, CO_2 140 + M21, CO_2	
Raex® Boron steel	Undermatching consumable [1)] Raex 400/450/500 B24, B27	12.51 + M21, CO_2	100 + M21, CO_2	IS-10 BRONZE + M21, CO_2
Raex® Boron steel	High strength consumable Raex 400/450/500 B24, B27	AristoRod 69 + M21	135 + M21, CO_2	

[1)] The yield strength of the consumable is lower than that of the hardened base material.
[2)] Undermatching consumable (strength of the consumable lower than that of the base material).

Continued

MAG WELDING (solid wire)				
Steel grade **Standard**		**LINCOLN ELECTRIC** **Wire + gas** **Lincoln + gas**	**OY UDDEHOLM AB** **Wire + gas** **Böhler Welding + gas**	**IMPOMET OY** **Wire + gas** **Oerlikon + gas**
EN 10025-2	S355J0, S355J2	LNM 26 + M21, CO_2	EMK 6 + M21	Carbofil 1 + M21, CO_2
Multisteel	Multisteel	LNM 26 + M21, CO_2	EMK 6 + M21	Carbofil 1 + M21, CO_2
EN 10025-3	S355N S355NL S420N S420NL	LNM 26 + M21, CO_2 LNM 26 + M21 LNM Ni 1 + M21 LNM Ni 1 + M21	EMK 6 + M21 EMK 6 + M21 EMK 6 + M21 Union Ni 2,5 + M21	Carbofil 1 + M21, CO_2 Carbofil NiMo1 + M21 Carbofil 1A + M21, CO_2 Carbofil NiMo1 + M21
Optim®; heavy plate	Optim 500 ML	LNM Ni 2,5 + M21	Union MoNi + M21	Carbofil NiMo1 + M21
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	LNM 26 + M21 LNM 26 + M21 LNM 26 + M21	EMK 6 + M21 EMK 6 + M21 EMK 6 + M21	Carbofil 1 + M21, CO_2 Carbofil 1 + M21, CO_2 Carbofil 1 + M21, CO_2
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC	LNM 26 + M21 LNM MONIVA + M21 LNM MONIVA + M21 LNM MONIVA + M21 LNM MONIVA + M21	DMO-IG + M21 Union NiMoCr + M21 Union NiMoCr + M21 Union NiMoCr + M21 Union NiMoCr + M21 Union X90 + M21 Union X96 + M21	Carbofil NiMo1 + M21 Carbofil NiMo1 + M21 Carbofil NiMo1 + M21 Carbofil NiMoCr + M21 Carbofil NiMoCr + M21
COR-TEN®	COR-TEN® A COR-TEN® B	LNM 28 + M21 LNM 28 + M21	Union Patinax + M21 Union Patinax + M21	
Raex® Boron steel	Undermatching consumable [1] Raex 400/450/500 B 24, B 27	LNM 26 + M21, CO_2	EMK 6 + M21	Carbofil 1 + M21, CO_2
Raex® Boron steel	High strength consumable Raex 400/450/500 B 24, B 27	LNM MONIVA	Union NiMoCr + M21	Carbofil CrMo 1 + M21

[1] The yield strength of the consumable is lower than that of the hardened base material.

[2] The yield strengths of the consumable and hardened base material are equal.

Table 2.
Flux-cored arc welding, recommended welding consumables

Flux-cored arc welding Steel grade Standard		ESAB Metal-cored wire OK Tubrod + gas	 Flux-cored wire OK Tubrod + gas	 Self-shielding wire
EN 10025-2	S355J0, S355J2	14.12 + M21	15.14 + M21, CO_2	Coreshield 8
Multisteel	Multisteel	14.12 + M21	15.14 + M21, CO_2	Coreshield 8
EN 10025-3	S355N S355NL S420N S420NL	14.12 + M21 14.04 + M21 14.12 + M21 14.04 + M21	15.14 + M21, CO_2 15.11 + M21 15.14 + M21, CO_2 15.11 + M21	Coreshield 8 Coreshield 8
Optim®; heavy plate	Optim 500 ML	14.06 + M21	15.11 + M21	
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	14.12 + M21 14.12 + M21 14.12 + M21	15.14 + M21, CO_2 15.14 + M21, CO_2 15.14 + M21, CO_2	Coreshield 8 Coreshield 8 Coreshield 8
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC	14.06 + M21 14.06 + M21 14.03 + M21 14.03 + M21 14.03 + M21 (14.03 + M21) [2] (14.03 + M21) [2] (14.03 + M21) [2]	15.07 + M21 15.07 + M21 15.07 + M21 15.09 + M21 15.09 + M21 15.09 + M21 [2] 15.09 + M21 [2] 15.09 + M21 [2]	
COR-TEN®	COR-TEN® A COR-TEN® B	14.04 + M21 14.04 + M21	15.17 + M21 15.17 + M21	
Raex® Boron steel	Undermatching consumable [1] Raex 400/450/500 B 24, B 27	14.12 + M21	15.14 + M21, CO_2	
Raex® Boron steel	High strength consumable Raex 400/450/500 B 24, B 27	14.03 + M21	15.09 + M21	

[1] The yield strength of the consumable is lower than that of the hardened base material.

[2] Undermatching consumable (strength of the consumable lower than that of the base material).

Continued

Flux-cored arc welding			
Steel grade **Standard**		**ESAB**	
		Metal-cored wire **Filarc + gas**	**Flux-cored wire** **Filarc + gas**
EN 10025-2	S355J0, S355J2	PZ 6102 + M21	PZ 6113 + M21, CO_2
Multisteel	Multisteel	PZ 6102 + M21	PZ 6113 + M21, CO_2
EN 10025-3	S355N S355NL S420N S420NL	PZ 6102 + M21 PZ 6104 + M21 PZ 6102 + M21 PZ 6104 + M21	PZ 6113 + M21, CO_2 PZ 6138 + M21 PZ 6113 + M21, CO_2 PZ 6138 + M21
Optim®; heavy plate	Optim 500 ML		PZ 6138 + M21
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	PZ 6102 + M21 PZ 6102 + M21 PZ 6102 + M21	PZ 6113 + M21, CO_2 PZ 6113 + M21, CO_2 PZ 6113 + M21, CO_2
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC		PZ 6138 + M21 PZ 6146 + M21 PZ 6146 + M21 PZ 6147 + M21 PZ 6148 + M21 PZ 6149 + M21 (PZ 6149 + M21) [2] (PZ 6149 + M21) [2]
COR-TEN®	COR-TEN® A COR-TEN® B	PZ 6104 + M21 PZ 6104 + M21	PZ 6112 + M21, CO_2 PZ 6112 + M21, CO_2
Raex® Boron steel	Undermatching consumable [1] Raex 400/450/500 B 24, B 27	PZ 6102 + M21	PZ 6113 + M21, CO_2
Raex® Boron steel	High strength consumable Raex 400/450/500 B 24, B 27	PZ 6102 + M21	PZ 6148 + M21

Flux-cored arc welding			
Steel grade **Standard**		**ELGA**	
		Metal-cored wire **Elga + gas**	**Flux-cored wire** **Elga + gas**
EN 10025-2	S355J0, S355J2	MXA 100 + M21	DWA 50 + M21
Multisteel	Multisteel	MXA 100 + M21	DWA 50 + M21
EN 10025-3	S355N S355NL S420N S420NL	MXA 100 + M21 MXA 55T + M21 MXA 100 + M21 MXA 55T + M21	DWA 50 + M21 DWA 55L + M21 DWA 50 + M21 DWA 55L + M21
Optim®; heavy plate	Optim 500 ML	MXA 55T + M21	DWA 55L + M21
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	MXA 100 + M21 MXA 100 + M21 MXA 100 + M21	DWA 50 + M21 DWA 50 + M21 DWA 50 + M21
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC		DWA 65L + M21 DWA 65L + M21 110B + M21, CO_2 110B + M21, CO_2 110B + M21, CO_2
COR-TEN®	COR-TEN® A COR-TEN® B		DW588 + CO_2 DW588 + CO_2
Raex® Boron steel	Undermatching consumable [1] Raex 400/450/500 B 24, B 27		DWA 50 + M21
Raex® Boron steel	High strength consumable Raex 400/450/500 B 24, B 27		110B + M21, CO_2

[1] The yield strength of the consumable is lower than that of the hardened base material.

[2] Undermatching consumable (strength of the consumable lower than that of the base material).

Continued

Flux-cored arc welding				
Steel grade **Standard**		**LINCOLN ELECTRIC**		
		Metal-cored wire **Lincoln + gas**	**Flux-cored wire** **Lincoln + gas**	**Self-shielding wire** **Lincoln**
EN 10025-2	S355J0, S355J2	OS MC 710-H + M21	OS 71 E-H + M21, CO_2	IS NR 203 Ni 1
Raex®	Multisteel	OS MC 710-H + M21	OS 71 E-H + M21, CO_2	IS NR 203 Ni 1
EN 10025-3	S355N S355NL S420N S420NL	OS MC 710-H + M21 OS MC 715-H + M21 OS MC 715-H + M21 OS MC 715-H + M21	OS 71 E-H + M21, CO_2 OS 81 Ni 1-H + M21 OS 81 Ni 1-H + M21 OS 81 Ni 1-H + M21	IS NR 203 Ni 1 IS NR 400 IS NR 400 IS NR 400
Optim®; heavy plate	Optim 500 ML	OS MC 1100 + M21	OS 81 K 2-H + M21	IS NR 400
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	OS MC 710-H + M21 OS MC 710-H + M21 OS MC 710-H + M21	OS 71 E-H + M21, CO_2 OS 71 E-H + M21, CO_2 OS 71 E-H + M21, CO_2	IS NR 203 Ni 1 IS NR 203 Ni 1 IS NR 203 Ni 1
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC		OS 71 E-H + M21, CO_2 OS 71 E-H + M21, CO_2 OS 71 E-H + M21, CO_2 OS 550-H + M21 OS 690-H + M21	
COR-TEN®	COR-TEN® A COR-TEN® B		OS 81 Ni 1-H + M21 OS 81 Ni 1-H + M21	IS NR 203 Ni 1 IS NR 203 Ni 1
Raex® Boron steel	Undermatching consumable [1] Raex 400/450/500 B 24, B 27	OS MC 710-H + M21	OS 71 E-H + M21, CO_2	
Raex® Boron steel	High strength consumable Raex 400/450/500 B 24, B 27	OS MC 1100 + M21		

Flux-cored arc welding			
Steel grade **Standard**		**OY UDDEHOLM AB**	
		Metal-cored wire **Böhler Welding + gas**	**Flux-cored wire** **Böhler Welding + gas**
EN 10025-2	S355J0, S355J2	MV 70 + M21, C1	RV 71 + M21, C1
Multisteel	Multisteel	MV 70 + M21, C1	RV 71 + M21, C1
EN 10025-3	S355N S355NL S420N S420NL	MV 70 + M21, C1 MV 70 + M21, C1 MV 70 + M21, C1 HL 53.FD + M21	RV 71 + M21, C1 RV 71 + M21, C1 RV 71 + M21, C1 TG 50 Ni + M21
Optim®; heavy plate	Optim 500 ML		
Ruukki Laser®	Ruukki Laser 250C Ruukki Laser 355 MC Ruukki Laser 420 MC	MV 70 + M21 MV 70 + M21 MV 70 + M21	RV 71 + M21 RV 71 + M21 RV 71 + M21
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC		
COR-TEN®	COR-TEN® A COR-TEN® B		
Raex® Boron steel	Undermatching consumable [1] Raex 400/450/500 B 24, B 27	MV 70 + M21	RV 71 + M21
Raex® Boron steel	High strength consumable Raex 400/450/500 B 24, B 27		

[1] The yield strength of the consumable is lower than that of the hardened base material.

Continued

Flux-cored arc welding			
Steel grade **Standard**		**RETCO OY**	
		Metal-cored wire **Trimark + gas**	**Flux-cored wire** **Trimark + gas**
EN 10025-2	S355J0, S355J2	METALLOY-76 + M21	TM-770 + M21
Multisteel	Multisteel	METALLOY-76 + M21	TM-770 + M21
EN 10025-3	S355N S355NL S420N S420NL	METALLOY-76 + M21	TM-770 + M21 TM-881 K2 + M21 TM-881 K2 + M21 TM-881 K2 + M21
Optim®; heavy plate	Optim 500 ML		TM-811 N2 + M21
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	METALLOY-76 + M21 METALLOY-76 + M21 METALLOY-76 + M21	TM-770 + M21 TM-770 + M21 TM-770 + M21
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC		TM-811 N2 + M21 TM-881 K2 + M21
COR-TEN®	COR-TEN® A COR-TEN® B		TM-81 W + M21 TM-81 W + M21
Raex® Boron steel	Undermatching consumable [1] Raex 400/450/500 B24, B27	METALLOY-76 + M21	TM-770 + M21
Raex® Boron steel	High strength consumable Raex 400/450/500 B24, B27		

Flux-cored arc welding			
Steel grade **Standard**		**IMPOMET OY**	
		Metal-cored wire **Oerlikon + gas**	**Flux-cored wire** **Oerlikon + gas**
EN 10025-2	S355J0, S355J2	Fluxofil M8 + M21	Fluxofil 14HD + M21
Multisteel	Multisteel	Fluxofil M8 + M21	Fluxofil 14HD + M21
EN 10025-3	S355N S355NL S420N S420NL	Fluxofil M8 + M21 Fluxofil M8 + M21 Fluxofil M8 + M21 Fluxofil M10 + M21	Fluxofil 14HD + M21 Fluxofil 20HD + M21 Fluxofil 14HD + M21 Fluxofil 20HD + M21
Optim®; heavy plate	Optim 500 ML	Fluxofil M42 + M21	Fluxofil 42 + M21
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	Fluxofil M8 + M21 Fluxofil M8 + M21 Fluxofil M8 + M21	Fluxofil 14HD + M21 Fluxofil 14HD + M21 Fluxofil 14HD + M21
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC	Fluxofil M42 + M21 Fluxofil M42 + M21 Fluxofil M42 + M21 Fluxofil M42 + M21 Fluxofil M42 + M21 Fluxofil M45 + M21	Fluxofil 42 + M21 Fluxofil 42 + M21 Fluxofil 42 + M21 Fluxofil 42 + M21 Fluxofil 42 + M21
COR-TEN®	COR-TEN® A COR-TEN® B		Fluxofil 18 + M21 Fluxofil 18 + M21
Raex® Boron steel	Undermatching consumable [1] Raex 400/450/500 B24, B27	Fluxofil M8 + M21	Fluxofil 14HD + M21
Raex® Boron steel	High strength consumable Raex 400/450/500 B24, B27	Fluxofil 36 + M21	Fluxofil 14HD + M21

[1] The yield strength of the consumable is lower than that of the hardened base material.

Continued

Table 3.
Metal arc welding with covered electrodes, recommended welding consumables

Metal arc welding with covered electrodes					
Steel grade Standard		**ESAB**			
		General-purpose electrode OK	**High-efficiency electrode OK**	**General-purpose electrode Filarc**	**High-efficiency electrode Filarc**
EN 10025-2	S355J0, S355J2	48.00	38.65	35	C6HH
Multisteel	Multisteel	48.00	38.65	35	C6HH
EN 10025-3	S355N S355NL S420N S420NL	48.00 48.08 48.00 48.08	38.65 38.65 	35 75 35 75	C6HH C75 C6HH C75
Optim®; heavy plate	Optim 500 ML	48.08		75	
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	48.00 48.00 48.00	38.65 38.65 38.65	35 35 35	C6HH C6HH C6HH
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC	74.78 74.78 74.78 75.75 75.75 75.78 (75.78)[2)] (75.78)[2)]		98 118 118 118 118	
COR-TEN®	COR-TEN® A COR-TEN® B	73.08 73.08		35Z 35Z	C75 C75
Raex® Boron steel	Undermatching consumable [1)] Raex 400/450/500 B24, B27	48.00	38.65	35	
Raex® Boron steel	High strength consumable Raex 400/450/500 B24, B27	75.75		118	

[1)] The yield strength of the consumable is lower than that of the hardened base material.

[2)] Undermatching consumable (strength of the consumable lower than that of the base material).

Continued

Metal arc welding with covered electrodes

Steel grade Standard		ELGA		LINCOLN ELECTRIC	
		General-purpose electrode Elga	High-efficiency electrode Elga	General-purpose electrode Lincoln	High-efficiency electrode Lincoln
EN 10025-2	S355J0, S355J2	P48 S / 48 M	MAXETA 20	CONARC 48	CONARC V 180
Multisteel	Multisteel	P48 S / 48 M	MAXETA 20	CONARC 48	CONARC V 180
EN 10025-3	S355N S355NL S420N S420NL	P48 S / 48 M P62 MR / 48 M P48 S / 48 M P62 MR / 48 M	MAXETA 11 MAXETA 24 MAXETA 20 MAXETA 24	CONARC 48 KRYO 1 CONARC 48 KRYO 1	CONARC V 180 KRYO 1-180 CONARC V 180 KRYO 1-180
Optim®; heavy plate	Optim 500 ML	P51	MAXETA 24	KRYO 2	KRYO 1-180
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	P48 S / 48 M P48 S / 48 M P48 S / 48 M	MAXETA 11 MAXETA 11 MAXETA 11	CONARC 48 CONARC 48 CONARC 48	CONARC V 180 CONARC V 180 CONARC V 180
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC	P51 P51 P51 P110 MR P110 MR	MAXETA 24 MAXETA 24 MAXETA 24 MAXETA 110 MAXETA 110	CONARC 60 G CONARC 60 G CONARC 60 G CONARC 80 CONARC 80	
COR-TEN®	COR-TEN® A COR-TEN® B	P62 MR / P48 K P62 MR / P48 K		KRYO 1 KRYO 1	KRYO 1-180 KRYO 1-180
Raex® Boron steel	Undermatching consumable [1] Raex 400/450/500 B24, B27	P48 S / 48 M	MAXETA 11	CONARC 48	CONARC V 180
Raex® Boron steel	High strength consumable Raex 400/450/500 B24, B27	P110	MAXETA 110	CONARC 85	

Metal arc welding with covered electrodes

Steel grade Standard		OY UDDEHOLM AB		IMPOMET OY	
		General-purpose electrode Böhler Welding	High-efficiency electrode Böhler Welding	General-purpose electrode Oerlikon	High-efficiency electrode Oerlikon
EN 10025-2	S355J0, S355J2	FOX EV 50	FOX HL 180 Ti	Supercito, Spezial	OH blau 180
Multisteel	Multisteel	FOX EV 50	FOX HL 180 Ti	Supercito, Spezial	OH blau 180
EN 10025-3	S355N S355NL S420N S420NL	FOX EV 50 FOX EV 60 FOX EV 50 FOX EV 60	FOX HL 180 Ti	Tenacito Tenacito Tenacito Tenacito	OH blau 180 OH blau 180 OH blau 180 OH blau 180
Optim®; heavy plate	Optim 500 ML	FOX EV 70 Mo		Tenacito 65	
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	FOX EV 50 FOX EV 50 FOX EV 50		Tenacito Tenacito Tenacito	Febacito 160S Febacito 160S
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC	FOX EV 70 Mo SH Ni 2 K 90 SH Ni 2 K 90 SH Ni 2 K 90 SH Ni 2 K 90 SH Ni 2 K 130 SH Ni 2 K 130		Tenacito 65 Tenacito 65 Tenacito 65 Tenacito 75 Tenacito 75 Tenacito 100	
COR-TEN®	COR-TEN® A COR-TEN® B	FOX NiCuCr FOX NiCuCr		Tencord KB Tencord KB	
Raex® Boron steel	Undermatching consumable [1] Raex 400/450/500 B24, B27	FOX EV 50		Supercito	Febacito 160S
Raex® Boron steel	High strength consumable Raex 400/450/50 B24, B27	SH Schwartz 3 K Ni		Cromocord Kb	

[1] The yield strength of the consumable is lower than that of the hardened base material.

Continued

Metal arc welding with covered electrodes			
Steel grade **Standard**		**RETCO OY**	
		General-purpose electrode **SOUDOMETAL**	**High-efficiency electrode** **SOUDOMETAL**
EN 10025-2	S355J0, S355J2	COMET J 50 +	COMET J 160
Multisteel	Multisteel	COMET J 50 +	COMET J 160
EN 10025-3	S355N S355NL S420N S420NL	COMET J 50 + COMET J 50 + COMET J 50 + COMET J 50 +	COMET J 160 COMET J 160 COMET J 160 COMET J 160
Optim; heavy plate	Optim 500 ML	COMET J 50 +	COMET J 160
Ruukki Laser	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	COMET J 50 + COMET J 50 + COMET J 50 +	
Optim; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC	COMET J 50 + COMET J 62 COMET J 62 COMET J 76M-ELH COMET J 76M-ELH	
COR-TEN®	COR-TEN® A COR-TEN® B	COMET J 50 C COMET J 50 C	
Raex® Boron steel	Undermatching consumable [1)] Raex 400/450/500 B24, B27	COMET J 50+	COMET J 160
Raex® Boron steel	High strength consumable Raex 400/450/500 B24, B27	MOLYCROM 15	

[1)] The yield strength of the consumable is lower than that of the hardened base material.

Table 4
Submerged arc welding, recommended welding consumabless

Submerged arc welding Steel grade Standard		ESAB Wire + flux OK Autrod + OK Flux	LINCOLN ELECTRIC Wire + flux Lincoln + Lincoln	ELGA Wire + flux Elgasaw + Elgaflux
EN 10025-2	S355J0, S355J2	12.22 + 10.71	L-61 + FX 860	102 + 251 B
Multisteel	Multisteel	12.22 + 10.71	L-61 + FX 860	102 + 251 B
EN 10025-3	S355N S355NL S420N S420NL	12.22 + 10.71 13.27 + 10.62 12.22 + 10.71 13.27 + 10.62	L-61 + FX 860 L-50 M + FX P 230 L-61 + FX 860 L-50 M + FX P 230	102 + 251 B 103Si + 285 B 102 + 251 B 103Si + 285 B
Optim®; heavy plate	Optim 500 ML	13.27 + 10.62	LNS 162 + FX P 230	103Si + 285 B
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	12.22 + 10.71 12.22 + 10.71 12.22 + 10.71	L-61 + FX 860 L-61 + FX 860 L-61 + FX 860	102 + 251 B 102 + 251 B 102 + 251 B
Optim; strip®	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC	12.34 + 10.71 12.34 + 10.71 12.34 + 10.71 13.43 + 10.62 13.43 + 10.62 (13.43 + 10.62) [2)] (13.43 + 10.62) [2)] (13.43 + 10.62) [2)]	LNS 140 A + FX 860 LNS 164 + FX P 230 LNS 164 + FX P 230 LNS 168 + FX P 230 LNS 168 + FX P 230	
COR-TEN®	COR-TEN® A COR-TEN® B	13.36 + 10.71 13.36 + 10.71	LNS 163 + FX P 230 LNS 163 + FX P 230	
Raex® Boron steel	Undermatching consumable [1)] Raex 400/450/500 B24, B27	12.22 + 10.71	L-61 + FX P 230	103Si + 285 B
Raex® Boron steel	High strength consumable Raex 400/450/500 B24, B27	13.43 + 10.62	LNS 168 + FX P 230	

[1)] The yield strength of the consumable is lower than that of the hardened base material.

[2)] Undermatching consumable (strength of the consumable lower than that of the base material).

Continued

Submerged arc welding Steel grade Standard		OY UDDEHOLM AB Wire + flux Böhler Welding + Böhler Welding	IMPOMET OY Wire + flux Oerlikon + Oerlikon
EN 10025-2	S355J0, S355J2	Union S 2 + UV 400	OE-S2 + OP 122
Multisteel	Multisteel	Union S 2 + UV 400	OE-S2 + OP 122
EN 10025-3	S355N S355NL S420N S420NL	Union S 2 + UV 400 Union S 2 Ni 2,5+UV 420 TT Union S 2 Ni 2,5+UV 420 TT Union S 2 Ni 2,5+UV 420 TT	OE-S2 + OP 122 OE-SD3 + OP 121TT OE-SD3 + OP 121TT OE-SD3 + OP 121TT
Optim®; heavy plate	Optim 500 ML	Union S 3 Mo + UV 420 TT	OE-S3NiMo1 + OP 121TT
Ruukki Laser®	Ruukki Laser 250 C Ruukki Laser 355 MC Ruukki Laser 420 MC	Union S 2 + UV 400 Union S 2 + UV 400 Union S 2 + UV 400	OE-S2 + OP 122 OE-S2 + OP 122 OE-SD3 + OP 121TT
Optim®; strip	Optim 500 MC Optim 550 MC Optim 600 MC Optim 650 MC Optim 700 MC Optim 900 QC Optim 960 QC Optim 1100 QC	Union S 3 Mo + UV 421 TT Union S 3 NiMoCr + UV 421 TT Union S 3 NiMoCr + UV 421 TT Union S 3 NiMoCr + UV 421 TT Union S 3 NiMoCr + UV 421 TT	OE-S3NiMo1 + OP 121TT OE-S3NiMo1 + OP 121TT OE-S3NiMo1 + OP 121TT FC 42 + OP 121TT/W FC 42 + OP 121TT/W FC 45 + OP 121TT/W FC 45 + OP 121TT/W
COR-TEN®	COR-TEN® A COR-TEN® B	Union Patinax + UV 420 TT Union Patinax + UV 420 TT	FC 48 + OP 121TT FC 48 + OP 121TT
Raex® Boron steel	Undermatching consumable [1] Raex 400/450/500 B24, B27		OE-S2 + OP 122
Raex® Boron steel	High strength consumable Raex 400/450/500 B24, B27		OE-S3NiMo1 + OP 121TT

[1] The yield strength of the consumable is lower than that of the hardened base material.

Ruukki is a metal expert you can rely on all the way, whenever you need metal based materials, components, systems or total solutions. We constantly develop our product range and operating models to match your needs.

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