

ESAB welding consumables for lean duplex stainless steel

The combination of high strength and comparable corrosion resistance has made lean duplex stainless steels a cost competitive option in numerous applications where traditionally AISI 304 and AISI 316L materials are used. Typical applications are desalination plants, pipes, storage tanks, floodgates and footbridges. In certain applications such as black liquor where Mo has been found to have a negative effect on the corrosion resistance, lean duplex grades have replaced duplex grades.

Although most lean duplex stainless steel grades can be welded successfully with standard duplex 2209 type consumables, lean duplex consumables offer a more cost efficient solution while matching mechanical properties and corrosion resistance are guaranteed. To avoid excessive amounts of ferrite in the weld metal, they are higher alloyed with austenite promoting elements than the corresponding steel grades. The ESAB range of lean duplex consumables consists of:

- MMA/SMAW: OK 67.56
- MIG/GMAW: OK Autrod 2307
- FCAW: Shield-Bright 2307
- TIG/ GTAW: OK Tigrod 2307
- SAW: OK Autrod 2307/OK Flux 10.93

The table reviews lean duplex stainless steel grades that can be successfully welded, including some important footnotes on exceptions.

Lean duplex stainless steel grades

ESAB lean duplex consumables

AISI/ UNS No.	EN No.	Grade	OK 67.56	OK Autrod 2307	Shield-Bright 2307	OK Tigrod 2307	OK Autrod 2307/ OK Flux 10.93
S32001	1.4482	19D	x*	x	x	x	x
S82011		2102	x*	x	x	x	x
S32101	1.4162	LDX 2101®	x*	x	x	x	x
S32202	1.4062	2202	x*	x	x	x	x
S32304	1.4362	2304	x*	x	x	x	x
S32003		2003	1	1	1	1	1
	1.4655		2	2	2	2	2

* Apply stringer beads or moderate weaving. Excess weaving causes poor slag detachability. AC/DC+ polarity.

X: Well suited for the job.

1: Lean grade can be used if slightly undermatching corrosion resistance is acceptable.

2: Suitable except when Cu-alloying is required.



OK 67.56

Classification, all weld metal	Approvals
EN 1600: E Z 23 7 N L R 3 2	CE

Typical chemical composition, all weld metal (wt%)

C	Si	Mn	Cr	Ni	N	FN*
0.03	0.9	0.7	23.7	6.9	0.15	35 - 65

*According to WRC 92

Typical mechanical properties, all weld metal

Rp0.2 (MPa)	Rm (MPa)	A5 (%)	CVN (J)
609	754	26	47 (+20°C) 38 (-30°C)

Welding positions



Welding current and economy data

Ø x length	Current (A)	W	η(%)	H	U (V)	Welding positions
2.5x300	50 - 80	2.0	117	0.8	25	1 2 3 4 6
3.2x350	60 - 120	3.7	113	1.3	27	1 2 3 6
4.0x350	100 - 170	5.6	115	2.0	27	1 2 3

W: Weight (kg/100 electrodes)

η: Efficiency (g weld metal/g core wire)

H: Deposition rate at 90% of max. current (kg weld metal/hour arc time)

U: Arc voltage (V)

OK Autrod 2307/ OK Tigrod 2307

Classification wire	Approvals
EN ISO 14343: G Z 23 7 N L EN ISO 14343: W Z 23 7 N L	

Typical chemical composition, all weld metal (wt%)

C	Si	Mn	Cr	Ni	N	FN*
0.02	0.5	1.3	23.0	7.0	0.15	35 - 65

*According to WRC 92

Typical mechanical properties, all weld metal

Rp0.2 (MPa)	Rm (MPa)	A5 (%)	CVN (J)
560	730	32	160 (+20°C) 60 (-60°C)

Welding current and economy data

Ø (mm)	Current (A)	W	H	U (V)	WFS (m/min)
1.0	80 - 190	15	2.8	16 - 24	2.9 - 8.4
1.2	180 - 280	18	4.0	20 - 28	4.9 - 8.5

W: Gas consumption (l/min). Recommended gas: Ar+30%He+2.5%CO₂ (Ar+2%CO₂)

H: Deposition rate at 90% of max. current (kg weld metal/hour arc time)

U: Arc voltage (V)

WFS: Wire feed speed (m/min)

Item numbers and packaging details

Description	Item number	Diameter (mm)	Length (mm)	Weight/package (kg)
OK 67.56	67562520L0	2.5	300	4.2
OK 67.56	67563230T0	3.2	350	5.4

Shield-Bright 2307

Classification wire	Approvals
EN ISO 17633-A T 23 7 N L P M21 2	

Typical chemical composition, all weld metal (wt%)

C	Si	Mn	Cr	Ni	N	FN*
0.028	0.72	0.78	23.7	8.4	0.12	35 - 65

*According to WRC 92

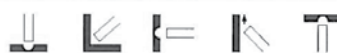
Typical mechanical properties, all weld metal

Rp0.2 (MPa)	Rm (MPa)	A5 (%)	CVN (J)
626	774	33	62 (-20°C) 63 (-30°C)

Welding current and economy data

Ø (mm)	Current (A)	U (V)	WFS (m/min)
1.2	130 - 220	25 - 30	6.0 - 14.0

Welding positions



OK Autrod 2307/OK Flux 10.93

Classification flux/wire	Approvals
EN 760: SA AF 2 DC EN ISO 14343: S Z 23 7 N L	CE

Typical chemical composition, all weld metal (wt%)

C	Si	Mn	Cr	Ni	N	FN*
0.02	0.7	1.1	22.5	7.5	0.12	35 - 65

*According to WRC 92

Typical mechanical properties, all weld metal

Rp0.2 (MPa)	Rm (MPa)	A5 (%)	CVN (J)
560	725	35	145 (+20°C) 95 (-40°C)

Welding current and economy data

Ø (mm)	Current (A)	H	U (V)
2.0	250 - 400	4.5	26 - 32
2.4	300 - 500	5.5	28 - 33
3.2	400 - 600	7.0	29 - 34

Item numbers and packaging details

Description	Item number	Diameter (mm)	Length (mm)	Weight/package (kg)
OK 67.56	67564030G0	4.0	350	10.8
OK Autrod 2307	1685109820	1.0		15
OK Autrod 2307	1685129820	1.2		15
Shield-Bright 2307	35LD12753V	1.2		16
OK Tigrod 2307	168516R150	1.6		5
OK Tigrod 2307	168520R150	2.0		5
OK Tigrod 2307	168524R150	2.4		5
OK Autrod 2307	1685200300	2.0		25
OK Autrod 2307	1685240300	2.4		25
OK Autrod 2307	1685320300	3.2		25
OK Autrod 2307	1685400300	4.0		25
OK Flux 10.93	1093100000			20

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