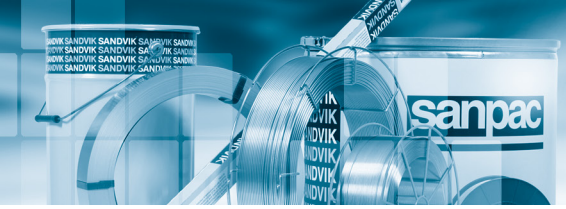

SANDVIK

Datasheet updated 2012-08-17 14:49:50 (supersedes all previous editions)

Sandvik 19.12.3.L

(Welding wire)

Sandvik 19.12.3.L is a filler material for joining stainless CrNiMo and CrNi steels, stabilized or non-stabilized, e.g. ASTM 316, 316L and 316Ti as well as 304, 304L, 321 and 347, used for service temperatures up to 400°C (750°F), stainless Cr steels with max 19% Cr. Sandvik 19.12.3.L is available as wire and rods for MIG/MAG, TIG, plasma-arc and submerged-arc welding.

STANDARDS

- AWS ER316L
- EN number 19 12 3 L

Product standards

- EN ISO 14343
- ASME/AWS SFA5.9

FILLER METAL

CHEMICAL COMPOSITION (AIM), WT%

C	Si	Mn	P	S	Cr	Ni	Mo	N
<0.020	0.4	1.8	<0.025	<0.015	18.5	12.5	2.6	<0.060

CHEMICAL COMPOSITION - ALL-WELD METAL

The following data are typical for non heat treated weld metal made by MIG welding with a shielding gas of Ar + 2%O2.

CHEMICAL COMPOSITION, WT%

C	Si	Mn	P	S	Cr	Ni	Mo	N
0.015	0.3	1.8	0.012	0.010	18.5	12	2.6	0.05

The data below is typical for non heat treated all-weld metal made by SAW, Flux 15W.

CHEMICAL COMPOSITION, WT%

C	Si	Mn	P	S	Cr	Ni	Mo	N
0.018	0.5	1.5	0.023	0.011	18	12	2,6	0.06

MICROSTRUCTURE - ALL-WELD METAL

Austenitic matrix with a ferrite content of about 10 FN according to DeLong.

MECHANICAL PROPERTIES - ALL-WELD METAL

Temperature	°C	20	400	-196
Yield strength, $R_{P0.2}$	MPa	410	290	-
Tensile strength, R_M	MPa	610	470	-
Elongation, A_5	%	35	26	-
Reduction in area, Z	%	40	-	-
Impact strength, Charpy V	J	110	-	50
Hardness, Vickers	HV	160	-	-

SAW - typical for non heat treated weld metal using flux 15W

Temperature	° C	20
Yield strength, $R_{P0.2}$	MPa	390
Tensile strength, R_m	MPa	580
Elongation, A	%	35
Impact strength, Charpy V	J	60

PHYSICAL PROPERTIES - ALL-WELD METAL

Temperature °C	20	100	300	500
Thermal conductivity, W/m	15	16	19	20

CORROSION PROPERTIES - ALL-WELD METAL

Sandvik 19.12.3L has good resistance to general corrosion and due to its low carbon content, good resistance to intercrystalline corrosion. It also has good resistance to pitting corrosion due to the balanced molybdenum content. Example: Pitting corrosion test. Three days in 1% $FeCl_3$ at 20 °C (68 °F), no corrosion observed.

RECOMMENDED WELDING DATA

MIG welding
Electrode positive is used to give good penetration in all types of welded joint. The following table shows common conditions for MIG welding.

Wire diameter, mm	Wire feed, m/min	Current, A	Voltage, V	Gas, l/min
Short-arc welding				
0.8	4-8	40-120	15-19	12
1.0	4-8	60-140	15-21	12
Spray-arc welding				
1.0	6-12	140-220	23-28	18
1.2	5-9	180-260	24-29	18
1.6	3-5	230-350	25-30	18
Pulsed-arc welding[1)]				
1.2	3-10	150-250	23-31	18

[1)]Pulse parameters: Peak current 300 - 400 A
Background current 50 - 150 A
Frequency 80 - 120 Hz

Sandvik can provide recommendations for shielding gases.

Short-arc welding is used with light gauge material of less than about 3 mm, in depositing root runs, and in welding out-of-flat positions.

The higher the inductance in short-arc welding, the higher the fluidity of the molten pool.

Spray-arc welding is normally used for heavier gauge material.

TIG welding
The parameters for TIG welding depend largely upon the base metal thickness and the welding application.

Electrode negative and a shielding gas of argon or helium should be used to prevent oxidation of the weld metal.

Submerged-arc welding
Electrode positive is suggested for joint welding to give good penetration.

Wire diameter, mm	Current, A	Voltage, V
2.0	200-300	28-32
2.4	250-400	28-32
3.2	300-450	29-34
4.0	350-500	30-35

Recommended flux is Sandvik 15W.

APPROVALS

CE, DNV, TÜV

DISCLAIMER:
Recommendations are for guidance only, and the suitability of a material for a specific application can be confirmed only when we know the actual service conditions. Continuous development may necessitate changes in technical data without notice. This datasheet is only valid for Sandvik materials.