

For welding steel such as:

Outokumpu	EN	ASTM	SS*	BS*	NF*
4541	1.4541	321	2337	321S31	Z6 CNT 18-10
-	1.4550	347	2338	347S31	Z6 CNNb 18-10

\* Obsolete national standards, replaced by EN 10088.

#### Characteristics

AVESTA 347/MVNB basic has a basic type coating and produces a weld metal that ensures safety against the formation of pores and cracks and possesses very good mechanical properties, even at elevated temperatures. The composition of the coating, characteristic of basic electrodes, gives very good penetration and position welding properties.

AVESTA 347/MVNB is used for welding titanium and niobium-stabilised steels of the ASTM 321 and ASTM 347 types.

A stabilised weldment possesses improved high temperature properties, e.g. creep resistance, compared to low-carbon non-stabilised materials. 347/MVNB is therefore primarily used for applications where service temperatures exceed 400°C. Constructions with lower service temperatures can be welded with AVESTA 308L/MVR, which offers better resistance to hot cracking.

#### Welding directions

AVESTA 347/MVNB basic should be welded with a short arc using DC (+pole). High amperages causing overheating of the electrode should be avoided. Large weld pools at high temperatures increase the risk of hot cracking. Stabilised welding consumables are somewhat more susceptible to hot cracking than the corresponding unstabilised consumables.

#### Weld deposit data

Metal recovery approx. 100%.

#### Packaging data

Diam. mm	Length mm	Weight/capsule, kg	Approx. No. of electrodes/capsule	Weight/carton, kg
2.5	300	1.70	102	10.20
3.25	350	4.80	150	14.40
4.0	350	4.80	100	14.40

**Approvals:** CWB, DB, DNV, TÜV.

#### Standard designations

EN 1600            E 19 9 Nb B  
AWS A5.4        E 347-15

#### Typical analysis % (All weld metal)

C	Si	Mn	Cr	Ni	Nb
0.06	0.2	1.7	19.5	10.0	≥10xC
Ferrite		5 FN DeLong			

#### Mechanical properties

	Typical values (IIW)	Min. values EN 1600
Yield strength, R <sub>p0.2</sub>	520 N/mm <sup>2</sup>	350 N/mm <sup>2</sup>
Tensile strength, R <sub>m</sub>	680 N/mm <sup>2</sup>	550 N/mm <sup>2</sup>
Elongation, A <sub>5</sub>	30 %	25 %
Impact strength, KV		
+20°C	80 J	-
-40°C	60 J	-
Hardness approx.	255 Brinell	

#### Welding data

DC+ or AC	Diam. mm	Current, A
	2.5	50– 70
	3.25	70–100
	4.0	100–140

**Interpass temperature:** Max. 100°C.

**Heat input:** Max. 1.5 kJ/mm.

**Heat treatment:** Generally none. 347 types can be used for cladding, which normally requires stress relieving at around 590°C. Such a heat treatment will lower the ductility at room temperature. Always consult the supplier of the parent metal or seek other expert advice to ensure that the correct heat treatment is carried out.

**Structure:** Nb-stabilised austenite with 5-10 % ferrite.

**Scaling temperature:** Approx. 850°C (air)

**Corrosion resistance:** 347/MVNB is primarily intended for high temperature service or applications that should be heat treated. However, the corrosion resistance corresponds to that of 308H, i.e. good resistance to general corrosion.

#### Welding positions

