



WW 316L is suitable for welding of austenitic stainless steels such as AISI 316L and for limited application in welding of AISI 318. The product is suitable for welding of steel used in chemical and nuclear reactors.

**Specification**

AWS A5.9 ER316L

**Limiting Chemical Composition (Wt. %)**

C	0.03	Si	0.30 – 0.65
Cr	18.0 – 20.0	P	0.03
Ni	11.0 – 14.0	S	0.03
Mo	2.0 – 3.0	Cu	0.75
Mn	1.0 – 2.5		

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	550
0.2% OS (MPa)	390
Elongation (%)	40
Impact (J)	49 at - 196° C



**FILLER WIRE WW 309L**

WW 309L is extensively used for welding of dissimilar steels such as ferritic to austenitic stainless steel. It is also used for under laying on ferritic steels for overlaying stainless steel weld metals.

**Specification**

AWS A5.9 ER309L

**Limiting Chemical Composition (Wt. %)**

C	0.03	Si	0.30 – 0.65
Cr	23.0 – 25.0	P	0.03
Ni	12.0 – 14.0	S	0.03
Mo	0.75	Cu	0.75
Mn	1.0 – 2.5		

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	570
0.2% OS (MPa)	410
Elongation (%)	35
Impact (J)	110 at - 0° C



**FILLER WIRE WW 309LMo**

WW 309LMo is used for welding of dissimilar steels containing Molybdenum such as carbon steel to AISI 316 / AISI316L. It is also used for under laying on ferritic steels for overlaying stainless steel containing Molybdenum.

**Specification**

AWS A5.9 ER309LMo

**Limiting Chemical Composition (Wt. %)**

C	0.03	Si	0.30 – 0.65
Cr	23.0 – 25.0	P	0.03
Ni	12.0 – 14.0	S	0.03
Mo	2.0 – 3.0	Cu	0.75
Mn	1.0 – 2.5		

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	590
0.2% OS (MPa)	440
Elongation (%)	35

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**FILLER WIRE WW 310**

WW 310 is used for welding of matching chemistry steel used for high temperature application.

**Specification**

AWS A5.9 ER310

**Limiting Chemical Composition (Wt. %)**

C	0.08 – 0.15	Si	0.30 – 0.65
Cr	25.0 – 28.0	P	0.03
Ni	20.0 – 22.5	S	0.03
Mo	0.75	Cu	0.75
Mn	1.0 – 2.5		

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	610
0.2% OS (MPa)	470
Elongation (%)	38

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**FILLER WIRE WW310 H**

WW 310H is used for welding of matching chemistry steel and HK 40 used extensively for high temperature application.

**Specification**

AWS A5.9 (ER 310 H)

**Limiting Chemical Composition (Wt. %)**

C	0.08 – 0.15	Si	0.30 – 0.65
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Cr	25.0 – 28.0	P	0.03
Ni	20.0 – 22.5	S	0.03
Mo	0.75	Cu	0.75
Mn	1.0 – 2.5		

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	590
0.2% OS (MPa)	440
Elongation (%)	35
Impact (J)	

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**FILLER WIRE WW 317L**

WW 317L is suitable for welding of matching chemistry steel used under severe corrosion conditions in petrochemical and paper industry. This grade has higher Molybdenum and Nickel content than ER 316L grade to improve crevice and pitting corrosion resistance. Low carbon content reduces the possibility of intergranular carbide precipitation. This increases the resistance to intergranular corrosion without the use of stabilizers such as Niobium and Titanium. This low carbon alloy, however, may not be as strong at elevated temperature as the niobium stabilized alloys or Type ER 317.

**Specification**

AWS A5.9 ER317L

**Limiting Chemical Composition (Wt. %)**

C	0.03	Si	0.30 – 0.65
Cr	18.5 – 20.5	P	0.03
Ni	13.0 – 15.0	S	0.03
Mo	3.0 – 4.0	Cu	0.75
Mn	1.0 – 2.5		

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	550
0.2% OS (MPa)	400
Elongation (%)	35

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**WW 318**

Welding of AISI 316, 316Ti and 318 steel which are subjected to high temperature and chloride containing environment applications. Addition of Niobium provides resistance to intergranular chromium carbide precipitation and thus increased resistance to intergranular corrosion.

WW 318L – a low carbon containing product is also available on request.

**Specification**

AWS A5.9 ER318

**Limiting Chemical Composition (Wt. %)**

C	0.08	Si	0.30 – 0.65
Cr	18.0 – 20.0	P	0.03

Ni	11.0 – 14.0	S	0.03
Mo	2.0 – 3.0	Cu	0.75
Mn	1.0 – 2.5	Nb	8 X C – 1.0

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	550
0.2% OS (MPa)	400
Elongation (%)	25



**WW 321**

**Specification**

AWS A5.9 ER321

**Limiting Chemical Composition (Wt. %)**

C	0.08	Si	0.30 – 0.65
Cr	18.5 – 20.0	P	0.03
Ni	9.0-10.5	S	0.03
Mo	0.75	Cu	0.75
Mn	1.0 – 2.5	Ti	9xCmin./1.0max

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	550
0.2% OS (MPa)	400
Elongation (%)	25



**WW 347**

Suitable for 18%Cr-8%Ni-Nb and 18%Cr-8%Ni-Ti Stainless Steel. Addition of Niobium provides resistance to intergranular chromium carbide precipitation and thus increased resistance to intergranular corrosion.

**Specification**

AWS A5.9 ER347

**Limiting Chemical Composition (Wt. %)**

C	0.08	Si	0.30 – 0.65
Cr	18.0 – 21.0	P	0.03
Ni	9.0-11.0	S	0.03
Mo	0.75	Cu	0.75
Mn	1.0 – 2.5	Nb	10 X C – 1.0

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	630
0.2% OS (MPa)	460
Elongation (%)	40
Impact (J)	0*80

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**WW 430**

Welding of AISI 403 stainless steel where maximum corrosion resistance at temperatures up to 1600 deg.F is required. Pre-heating and post-heat treatment is recommended.

**Specification**

AWS A5.9 ER430

**Limiting Chemical Composition (Wt. %)**

C	0.10	Si	0.5
Cr	15.5 – 17.0	P	0.03
Ni	0.6	S	0.03
Mo	0.75	Cu	0.75
Mn	0.6		

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	550
0.2% OS (MPa)	400
Elongation (%)	25

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**WW 385**

Joining of Stainless Cr-Ni-Mo-Cu 904L or similar materials. Good resistance to stress Corrosion cracking and intergranular corrosion, as well as, in non-oxidising acids e.g. sulfuric, phosphoric and acetic. Good resistance to pitting.

**Specification**

AWS A5.9 ER385

**Limiting Chemical Composition (Wt. %)**

C	0.025	Si	0.5
Cr	19.5 – 21.0	P	0.02
Ni	24.0 – 26.0	S	0.03
Mo	4.2 – 5.2	Cu	1.2 – 2.0
Mn	1.0 – 2.5		

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	540
0.2% OS (MPa)	400
Elongation (%)	35
Impact (J)	120

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**WW 383**

**Specification**

AWS A5.9 ER383

**Limiting Chemical Composition (Wt. %)**

C	0.025	Si	0.5
Cr	26.5 – 28.5	P	0.02
Ni	30.0 – 33.0	S	0.03
Mo	3.2 – 4.2	Cu	0.75 – 1.0
Mn	1.0 – 2.5		

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	550
0.2% OS (MPa)	400
Elongation (%)	25



**WW 318 L**

Welding of AISI 316, 316Ti and 318 steel which are subjected to high temperature and chloride containing environment applications. Addition of Niobium provides resistance to intergranular chromium carbide precipitation and thus increased resistance to intergranular corrosion.

**Specification**

AWS A5.9 ER318

**Limiting Chemical Composition (Wt. %)**

C	0.08	Si	0.30 – 0.65
Cr	18.0 – 20.0	P	0.03
Ni	11.0 – 14.0	S	0.03
Mo	2.0 – 3.0	Cu	0.75
Mn	1.0 – 2.5	Nb	8 X C – 1.0

**Typical Mechanical Properties of All-weld Metal**

Tensile Strength (MPa)	550
0.2% OS (MPa)	400
Elongation (%)	25

