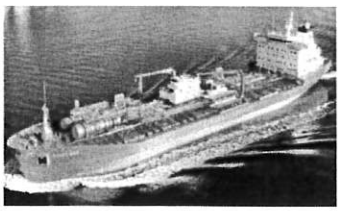
Photo courtesy of Hitachizosen Co., Ltd.

PREMIARC™ DW-309MoL & DW-309MoLP

The Indispensable FCWs for Dissimilar Metal Welding in Desalination Plants, Chemical Tankers and Paper Mills



Part of the DW stainless steel series, DW-309MoL and DW-309MoLP are special flux-cored wires. They are indispensable filler metals for welding dissimilar metal joints, such as in the buffer layer of clad steels, and the underlayer for overlaying. Mo-bearing austenitic stainless steel (316L and 317L), duplex stainless steel, carbon steel, and low-alloy steel usually constitute such dissimilar metal joints and clad steels. For the overlaying substrates, carbon steel and low-alloy steel are used. The demand for cost effective clad steels in particular, and thus for suitable filler metals, is expected to increase due to the brisk business in the relevant industries.

DW-309MoL and DW-309MoLP are classified as AWS A5.22 E309LMoT0-1/-4 and E309LMoT1-1/-4 respectively. As the AWS classifications indicate, the former is suitable for flat and horizontal fillet welding, whereas the latter is suitable for positional welding; both wires use either CO_2 gas or 75-80%Ar/20-25%CO_2 mixture shielding gas. The typical chemical and mechanical properties of these wires are shown in Table 1.

Table 1: Typical chemical and mechanical properties of DW-309MoL and DW-309MoLP deposited metals with CO_2 shielding gas

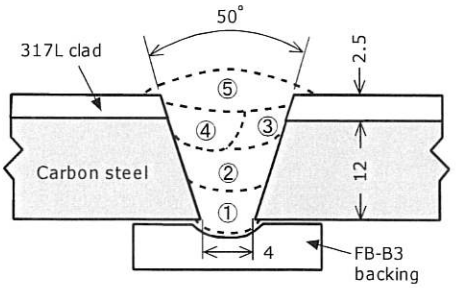
Trade designation	**DW-309MoL**	**DW-309MoLP**
C (%)	0.027	0.025
Si (%)	0.61	0.62
Mn (%)	1.18	0.81
P (%)	0.019	0.020
S (%)	0.009	0.010
Ni (%)	12.60	12.44
Cr (%)	23.20	22.60
Mo (%)	2.37	2.21
FNW(1)	28	25
0.2% PS (MPa)	540	540
TS (MPa)	720	699
El (%)	30	30

(1) Ferrite Number per WRC Diagram-1992.

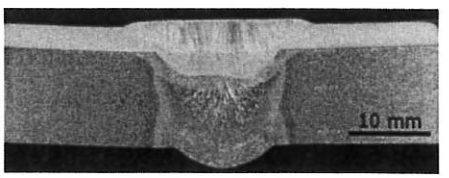
As DW-309MoL and DW-309MoLP weld metals contain sufficient amounts of ferrite, they can accommodate the detrimental effects caused by dilution by the carbon or low-alloy base metal. These effects may include the formation of martensite (brittle structure) and a fully austenitic structure (sensitive to hot cracking) in the weld metal. Similar to mild-steel titanium-type flux-cored wires, these wires offer excellent usability with a stable arc, low spatter, self-peeling slag removal, regular bead shape, and glossy bead appearance. Table 2 shows an example of a welding procedure for 317L stainless clad steel.

Table 2: One-side welding of 317L stainless clad steel plate with DW-309MoL and a FB-B3 backing

Pass No.	Trade designation	Size (mm)	Welding position	Amp. (A)	Volt. (V)	Speed (cm/min)
1	DW-100	1.2Ø	Flat	200	24	15
2	DW-100	1.2Ø	Flat	280	30	25
3	**DW-309MoL**	1.2Ø	Flat	180	26	43
4	**DW-309MoL**	1.2Ø	Flat	180	26	30
5	DW-317L	1.2Ø	Flat	190	28	14



(a) Weld pass sequence



(b) Cross section macrostructure