
OERLIKON KAYNAK ELEKTRODLARI VE SANAYİ A.Ş.

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STORAGE AND REDRYING OF WELDING CONSUMABLES

COVERED ELECTRODES:

The covering of the electrodes, irrespective of its type, is more or less hygroscopic; i.e. it absorbs water from the air during storage and transport. The water content increases during storage as a function of the climatic conditions which, in the case of basic type electrodes can result in excessive amounts of hydrogen in the weld metal, despite packing in plastic films. Therefore storage and redrying shall be done according to below recommendations.

1. To prevent the covering and electrode from spalling and deformation, any impact load or high static load shall not be applied during transportation and storage. Maximum amount of packet that could be stored vertically on each other is limited by 20 packet.
2. To prevent the covering from becoming unacceptably moist, and to protect covered electrodes from other damage resulting from moisture (e.g. rusting of the core wire) the electrodes shall be stored in a dry room (Relative Humidity < 50%, >20°C) with their undamaged packing until their use. Because plastic packing covered on to the packets and cartons prevent electrodes from moisture. Electrodes shall be stored on the wooden pallets. This will prevent the moisture coming from the floor.
3. Depending on the covering type and base metal to be welded, the absorbed humidity is either not harmful or must be removed from the covering by redrying. In order to avoid damaging of the covering, the total redrying time shall not exceed 10 hours. Subsequently, the redried electrodes shall be stored in the drying cabinet or heated quiver at about 150°C. Redrying recommendations for OERLIKON electrodes are shown below Table 1. If the covering exhibits unacceptably high water content as a result of unsatisfactory storage or for other reasons, which may for example be recognisable in the welding performance or by increased spatter or formation of pores, redrying time can be increased.

Base Metal	Type of Covering	Example	Redrying Conditions
Unalloyed and low alloy steels	Cellulosic (C)	Cellocord P4L	These electrodes require a high water content in their covering, therefore, redrying shall not be carried out.
	Rutile (RR)	Overcord-S	Porosity in the weld metal, enhanced spattering and a more or less erratic weld behaviour point to an increased water content. Such electrodes can be redried for 1 hour at 100-110°C. If closed or opened packages are properly stored, redrying is not required.
	Rutile/cellulosic (RC)	Overcord-S	
	Rutile/basic (RB)	Spezial	The weld metal of basic electrodes must meet high metallurgical requirements. Since humidity of the covering will be the cause for porosity and cold cracking which is caused by high diffusible hydrogen (HD) content. These electrodes shall be redried for 2 hours at 300-350°C. In the case of steels having a yield limit higher than 355 N/mm ² , the upper temperature of 350°C shall be used. Redried electrodes shall be stored in the drying cabinet or heated quiver at about 150°C.
	Basic (B)	Supercito	
Fine Grained Structural Steels	Basic (B)	Tenacito-range	
Creep Resistant Steels	Rutile (R)	Molycord Ti	Porosity in the weld metal, enhanced spattering and a more or less erratic weld behaviour point to an increased water content. Such electrodes can be redried for 1 hour at 100-110°C. If closed or opened packages are properly stored, redrying is not required.
	Basic (B)	Molycord Kb	The weld metal of basic electrodes must meet high metallurgical requirements. Since humidity of the covering will be the cause for porosity and cold cracking which is caused by high diffusible hydrogen (HD) content. These electrodes shall be redried for 2 hours at 300-350°C. In the case of steels having a yield limit higher than 355 N/mm ² , the upper temperature of 350°C shall be used.
Austenitic Stainless and Heat Resisting Steels, Nickel Base Alloys, Dissimilar Joints	Rutile (R)	Inox AWL	High-alloy electrodes react sensitively to humid coverings. Since even with closed packages moisture absorption can not be entirely excluded, redrying for 2 hours at 300°C is recommended to avoid weld metal porosity.
	Basic (B)	Inox BWL+	
Ferritic, Martensitic and Duplex Stainless Steels	Basic (B)	Citochrom 13/1	In order to avoid cold cracking, redrying for 2 hours at 300-350°C is required.

SUBMERGED ARC WELDING FLUXES:

Submerged arc welding is normally a low hydrogen welding process when care is taken to maintain the flux in a dry condition. Owing to their mineralogical structure and manufacturing of welding fluxes, they are more or less susceptible to moisture. Agglomerated fluxes are bonded mixtures of finely ground raw materials tending to absorb moisture from the atmosphere more than fused fluxes. Thereby, their ability to be stored for a longer period of time can be affected. Fluxes those become damp must be redried, in order to avoid serious impairment of welded joints.

1. Usually, OERLIKON welding fluxes are supplied in PE- bags. PE-bags shall not be damaged during transportation and storage until their use, to prevent the welding flux to absorb moisture.
2. It is recommended to store the welding fluxes in a dry location at a possibly constant temperature (Relative Humidity < 50%, >20°C). Fluxes with undamaged bags shall be stored on the wooden pallets. This will prevent the moisture coming from the floor. Fluxes stored in such a way can be stored up to one year without deterioration.
3. Depending on the flux type, mineralogical structure and base metal to be welded, the absorbed humidity is either not harmful or must be removed from the flux by redrying. OERLIKON-fluxes shall be redried as follows :

Agglomerated fluxes: not less than 2 hours at 300-350°C.

Fused fluxes: not less than 2 hours at 250°C.

The minimum admissible redrying time is 10 hours, also in the case of repeated redrying.

4. Subsequently, the redried fluxes shall be stored in the drying cabinet or storage oven at about 150°C.

FLUX CORED WIRES, SOLID WIRES, FILLER RODS :

Tubular flux cored wires (Fluxofil XX, Fluxodur XXX) those are produced by FLOXOFIL technology, are insensitive to moisture pick-up from the air. Diffusible hydrogen content in the weld metal and cold cracking risk is low. Solid wires used in GMAW, SAW and filler metals used in GTAW are also insensitive moisture absorption. There is no need to redry these welding consumables. But, in order to not have problems during use and to get rid of weld defects, storage and handling shall be done accordingly;

1. Flux cored wires, GMAW wires and SAW wires are supplied in wire basket or plastic spools. Impact loads can damage the spools causing wire-feeding problems during use. So, during transportation and storage impact and static loading shall not be applied on spools. Maximum amount of spool that could be stored vertically on each other is limited by 8 spools.
2. These wires and rods are generally supplied as copper coated. Copper coating increases durability to rusting, provides better current flow and decreases wear in the contact tip. To prevent the wire and rod from rusting, they shall be stored in a dry room (Relative Humidity < 50%, >20°C) with their undamaged packing until their use. Because plastic packing and carton boxes prevent wires and rods from moisture. Wires and rods shall be stored on the wooden pallets. This will prevent the moisture coming from the floor.