

General Storage & Handling Instructions

Lincoln Electric Europe Welding Consumables

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Changes in respect to the previous revision:
-Added VacPac in paragraphs 1, 2 and 3-



Storage and handling instructions for covered electrodes

1. Scope

Covered arc welding electrodes, manufactured by Lincoln Electric Europe, delivered in their original packaging.

The packaging consists of either:

- A** cardboard boxes in outer carton;
- B** foil protected cardboard boxes in outer carton;
- C** plastic (PE) boxes with sealed cap, suitable for reclosing;
- D** hermetically sealed metal tin (LINC CAN™) in outer carton;
- E** hermetically vacuum sealed foil packs (MINI-PACK) in outer carton;
- F** hermetically vacuum sealed foil packs (VacPack, Sahara ReadyPack®) in outer carton.
- G** hermetically vacuum sealed foil packs (Protech®) in outer carton

Electrode Grade	Packaging type	A	B	C	D	E	F	G
Mild steel		X	X	X	X		X	X
Low alloyed high strength steel			X		X		X	
Low temperature fine grain steel			X		X	X	X	
Creep resistant steel			X				X	
Stainless steel			X	X	X	X	X	X
Duplex and Superduplex stainless steel			X				X	
Nickel base electrodes				X			X	
Hardfacing-; maintenance and repair electrodes				X				

2. Storage

2a. Storage of electrodes in cardboard boxes requires humidity and temperature controlled storage areas.

General recommended storage conditions include:

- temperature 17-27°C, relative humidity ≤60%
- temperature 27-37°C, relative humidity ≤50%.

2b. Plastic boxes require storage conditions similar to cardboard boxes

2c. No temperature and humidity requirements are applicable for electrodes in Linc-Can, Mini-Pack, Protech and Sahara ReadyPacks, providing that the hermetically sealed condition / vacuum condition is present in undamaged packs.

General recommended storage conditions include:

- Sahara ReadyPacks, Protech & Mini-Pack in outer cartons may be stored in layers to a maximum of 9;
- Linc Can in outerboxes may be stored in layers to a maximum of 5;
- Prevent damage and heating above 60°C for Linc-Can, VacPac, Protech and Sahara ReadyPacks;
- Prevent damage and heating above 40°C for Mini-Pack.

3. Handling

3a. Re-drying and subsequential holding, as recommended in table 1, is required for products in the following conditions

- rutile electrodes, being humidified for any reason;
- basic low hydrogen electrodes in cardboard boxes;
- basic low hydrogen electrodes, returned from shop floor or damaged Sahara ReadyPacks, Protech, Mini-Pack, VacPac or Linc Can;
- stainless steel and Ni-base electrodes after long and unknown storage conditions (deviating from recommendations);
- Wearshield electrodes in plastic (PE) boxes, stored for more than 1 year under conditions as described under section 2a. or earlier when the condition deviates from those recommended.

- 3b. Electrodes in Sahara ReadyPack, Protech, VacPac and Linc-Can can be used without re-drying, providing that vacuum or seal is present in the undamaged packaging. The electrodes can be consumed in the as received condition, direct from the packaging within a period of 8 hours after opening under the conditions of $\leq 35^{\circ}\text{C}$ and $\leq 90\%$ RH, with the electrodes remaining in the opened packaging and protected against excessive conditions as condensation, rain, etc. This time can be extended for Sahara ReadyPack and Vacpac to 12 hours under the conditions of $\leq 27^{\circ}\text{C}$ and $\leq 70\%$ RH. Once opened, Linc-Cans should be closed during welding operations using the plastic lid that is supplied with the tin. If vacuum or seal is not present, the electrodes shall follow the re-dry and holding procedure as recommended in table 1.
- Electrodes in Mini-Pack can be used without re-drying, provided that the vacuum is present in the undamaged packaging. The electrodes can be consumed in the as received condition, direct from the packaging within a period of 4 hours after opening under the conditions of $\leq 35^{\circ}\text{C}$ and $\leq 90\%$ RH, with the electrodes remaining in the opened packaging and protected against excessive conditions as condensation, rain, etc

The re-drying time / temperature listed in Table 1, is a general guideline. Specific individual re-drying instructions on the product label may differ.

Electrode product groups	Re-drying time (h) *	Temp. ($^{\circ}\text{C}$)	Holding
Mild steel: - rutile E 6013 - rutile E 6012, E7024	0,5-1 1-2	70-80 100-120	Cabinet 10-20 $^{\circ}\text{C}$ above ambient temperature
- basic low hydrogen ($\text{H}_{\text{DM}} < 8\text{ml}/100\text{g}$) - basic very low hydrogen **	2-6 2-6	250-375 325-375	a. Holding oven max. one year at 120-180 $^{\circ}\text{C}$ b. Quiver max. 10h at RT-125 $^{\circ}\text{C}$ (see illustration fig. 1) c. Plastic (PE) box max. 2 weeks workshop conditions
Low alloyed: - basic very low hydrogen **	2-6	325-375	
Hardfacing-; maintenance & repair electrodes			
Stainless steel: - non EMR-Sahara electrodes - EMR-Sahara range	1-6 1-6	200-300 125-300	Holding oven unlimited time at 75-125 $^{\circ}\text{C}$ Quiver max. 10h at RT-125 $^{\circ}\text{C}$
Ni-base	1-6	200-300	Holding oven unlimited time at 75-125 $^{\circ}\text{C}$ Quiver max. 10h at RT-125 $^{\circ}\text{C}$

Table 1 Covered electrode re-dry times and temperatures

- * Re-drying can be repeated twice within the indicated max. time of 6h. Re-drying of electrodes should be carried out by taking them out of the packaging and place the electrodes in approx. 3 cm thick layers in a temperature controlled air-circulation oven.
- ** If these EMR-SAHARA electrodes are redried a maximum content HDM of $\leq 5\text{ml}/100\text{g}$ is valid.

4. Deteriorated product

Covered electrodes that have suffered from serious water and moisture contamination, or have been exposed to the atmosphere over long periods of time cannot be restored in their original condition and should be discarded.

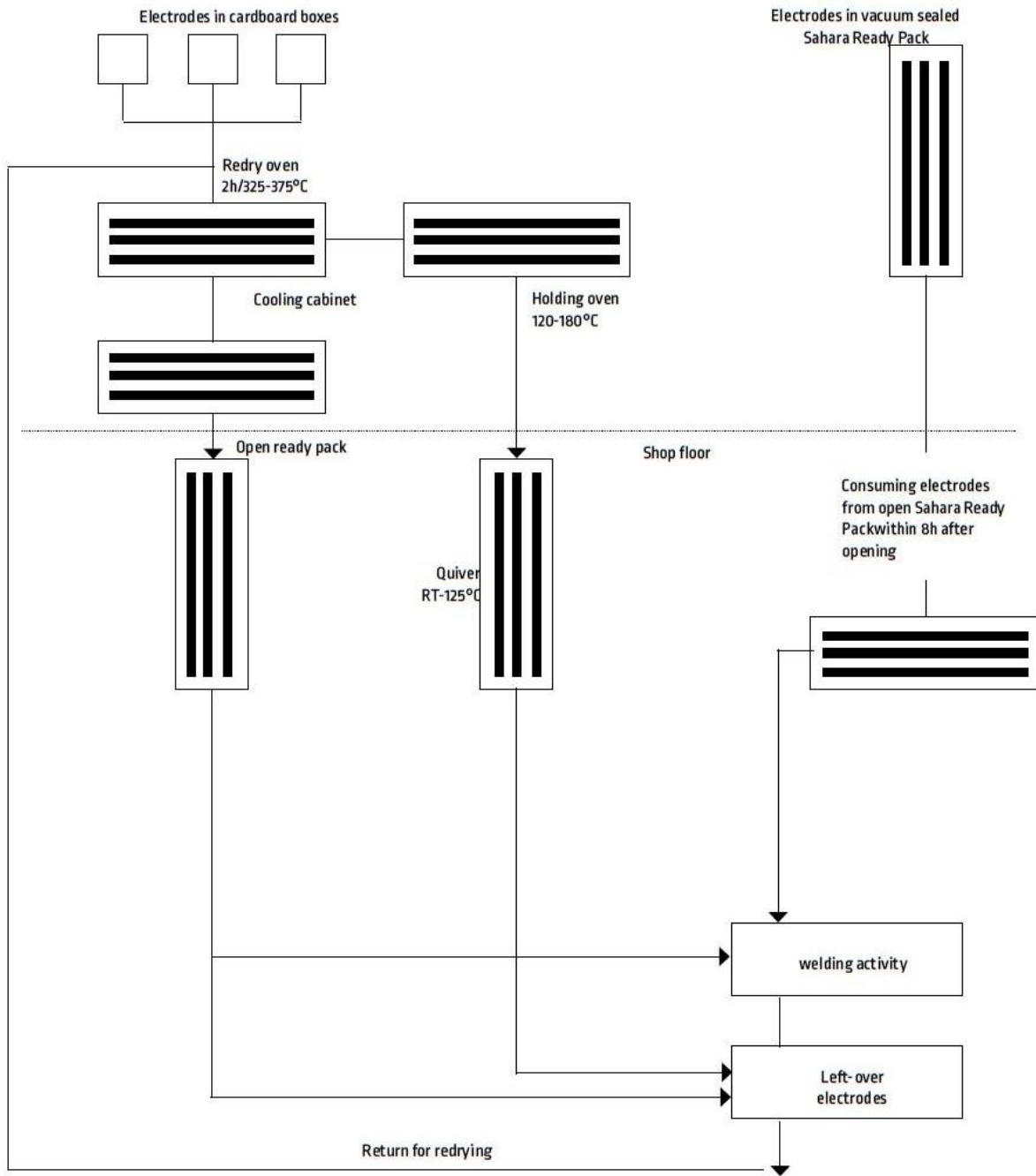


Figure 1 Recommended handling procedure of stick electrodes

Storage and handling instructions for cored wires

1. Scope

Tubular cored wires with the following trade names are supplied in various spooling and packaging:

Product family	Packaging
OUTERSHIELD®	- spool in plastic bag in cardboard box - spool in Al/PE vacuum packaging in cardboard outerbox or - spool in plastic protection on pallet - Accutrack® drums
INNERSHIELD® /LINCORE®	- spool in cardboard box or plastic bucket or hermetically sealed cans
COR-A-ROSTA®	- spool in Al/PE vacuum bag in cardboard box

Table 2 Cored wire packaging forms

2. Storage

Exposure to a humid environment with only a relative thin plastic foil shall be prevented.

Tubular wire, packed in the original foil and cardboard box or drum require controlled warehouse conditions such as:

- temperature 17-27°C, relative humidity: ≤60%;
- temperature 27-37°C, relative humidity: ≤50%.

INNERSHIELD wires in plastic buckets or in hermetically sealed cans and OUTERSHIELD as well as COR-A-ROSTA in Al/PE bags under vacuum, if applicable, do not require measures against moisture pick-up. Damage of the packaging shall be prevented.

3. Handling

3a. OUTERSHIELD, INNERSHIELD xxx-H types and COR-A-ROSTA

Spools outside the protective packaging allow exposure to normal workshop conditions during ≤72 hours.

Drums fitted with the original lid or recommended drum hood allow exposure to normal workshop conditions during 2 weeks

3b. INNERSHIELD, non xxx-H types:

Spools outside the protective packaging allow 2 weeks exposure to normal workshop conditions.

In all cases the products require protection against contamination with moisture, dirt and oil products. During interruption of the production process for more than 8 hours, wire spools shall be stored in their plastic bag in the above-mentioned storage conditions.

4. Deteriorated product

Cored electrode products that are rusty, have suffered from serious water and moisture contamination, or have been exposed to the atmosphere over long periods of time cannot be restored in their original condition and should be discarded.

Storage and handling instructions for welding fluxes

1. Scope

Welding fluxes are supplied in plastic bags, bulk bags, Sahara ReadyBags and metal drums

2. Storage

The following storage conditions are recommended:

Welding fluxes, packed in plastic bags, require controlled warehouse conditions such as:

- temperature 17-27°C, relative humidity: ≤60%
- temperature 27-37°C, relative humidity: ≤50%

Product in metal drums and Sahara ReadyBags does not require special storage conditions but rust and damage of the packaging shall be prevented.

3. Handling

Product characteristics as specified for the original condition, are retained if the product is treated in accordance with the following recommendations:

Storage conditions	0-6 months, temperature ≤37°C or rel. humidity <50%	>6 months or temperature >37°C or relative humidity 50-90%*
Packing		
Plastic bags / Bulk bag	use as is**	redry 1-2h / 300-375°C
Sahara ReadyBag	use as is	use as is
Metal drums	use as is	use as is

Table 3 Welding flux re-dry times and temperatures

* if storage conditions include a relative humidity over 90% the flux may have been deteriorated so that re-drying becomes ineffective.

** if a severe application is considered (HAZ or weld metal hardness HV10 >350, heavy restraint, etc.) re-drying 1-2h / 300-375°C is recommended.

For MIL800-H, MIL800-HPNi and 842-H fluxes Follow all previous procedures, with the following changes:

- Set temperature between 120°-205°C
- For ovens in which heating rods are inserted into the flux, do not let the temperature of flux adjacent to the rods exceed 205°C

Re-drying is carried out with the product removed from the original packaging and treated in an oven with an even temperature. It is recommended to have either an oven atmosphere circulation over a maximum flux height of 3 cm or to have the flux moving. The re-drying operation can be repeated to a maximum of 4 times. Re-dried flux and flux handled in the welding operation, shall be kept dry, preferably at a temperature of 50-120°C above ambient temperature, time unlimited.

4. Deteriorated product

Welding fluxes that have suffered from serious water and moisture contamination, or have been exposed to the atmosphere over long periods of time cannot be restored in their original condition and should be discarded.

5. Recycling

Non consumed flux collected from the weld shall be cleaned from slag, metal and/or other contamination. Damage of the flux by heavy impingement in the transport system shall be prevented. Prevent separation of the different grain fraction in cyclones or in "dead" corners. Add new flux in the hopper in a circulation system before a level of 25% of the full hopper is reached.

Storage and handling instructions for solid wires & rods

1. Scope

Solid wires and rods can be supplied in various packaging units in tubes, spools and drums.

2. Storage

Exposure to a humid environment shall be prevented.

The following storage conditions are recommended.

Solid wire in the original packaging require controlled warehouse conditions such as:

- temperature 17-27°C, relative humidity ≤60%
- temperature 27-37°C, relative humidity ≤50%

3. Handling

Rods and spools outside the protective packaging allow 2 weeks of exposure to normal workshop conditions.

In all cases, the products require protection against contamination with moisture, dirt and oil products.

During interruption of the production process for more than 8 hours, wire spools shall be stored in their plastic bag in the above mentioned storage conditions.

Damage of packaging should be avoided

4. Deteriorated product

Products that are oxidized, have suffered from serious water and moisture contamination, or have been exposed to the atmosphere over long periods, cannot be restored in their original condition and should be discarded.

Shelf Life for all consumables

Shelf life indicates how long our goods can be stocked at customer's premises and is not an integration to warranty.

Shelf life for all consumables is **3 years**, with two exceptions described below, provided storage and handling conditions are met,

- for consumables in Sahara Ready Pack (SRP) with vacuum, shelf life can be extended to **5 years**
- for Al (alloy) consumables, the shelf life is limited to **1 year**.

Individual products might have a longer shelf life, but as standards or formulas might change, we do not extend shelf life.