This document for storage and handling instructions is applicable to the following Lincoln Electric Europe welding consumable brands: Lincoln Electric, Special Alloys, Oerlikon and SAF-FRO.
All the following information are guidelines and recommendations to support the end user in his own assessment regarding the suitability of the product for his application.

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 aluminium foil packs Sahara ReadyPack® (SRP) in outer carton.;
- **F** hermetically vacuum sealed foil packs (VPMD- Vacuum Pack Medium, VPMC- Vacuum pack Micro) in outer carton.

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

Table 1. Packaging types for electrode grades

2. Storage

2a. Stick electrodes packed in the original foil and cardboard box require controlled warehouse conditions to ensure that condensation does not form on the product. The storage temperature should always be above dew point for a given humidity, and protection from moisture and adverse atmospheric conditions should be ensured.

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

2c. No temperature and humidity requirements are applicable for electrodes in vacuum packing, providing that the hermetically sealed condition / vacuum condition is present in undamaged packs.
General recommended storage conditions include:

- Sahara ReadyPack® (SRP), VPMD, and VPMC in outer cartons may be stored in layers to a maximum of 9;
- Linc Can in outer boxes may be stored in layers to a maximum of 5;
- Prevent damage and heating above 60°C for Linc-Can, VPMD- Vacuum Pack Medium, VPMC-Vacuum pack Micro, Sahara ReadyPack® (SRP).

3. Handling

3a. Re-drying and subsequent holding, as recommended in table 2, 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 ReadyPack® (SRP), VPMD, VPMC and 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® (SRP), VPMD, VPMC and Linc-Can and vacuum packing 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 ≤35°C and ≤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 to 12 hours under the conditions of ≤27°C and ≤70% RH, 8 hours for VPMD and VPMC. 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 2.

REDRYING AND HOLDING RECOMMENDATIONS

The re-drying time / temperature listed in Table 2, is a general guideline. Specific individual re-drying instructions on the product label may differ.

Electrode product groups	Re-drying time (h)*	Temp. (°C)	Holding
Mild steel: - rutile E6013 - rutile E6012, E7024	0.5-1h 1-2h	70-80 100-120	Cabinet 10-20°C above ambient temperature
- basic, low hydrogen (HDM <8 ml/100g) - basic, very low hydrogen*	2-6h 2-6h	250-375 325-375	a. Holding oven max. one year at 120-180°C b. Quiver max. 10h at RT-125°C (see illustration fig. 1) c. Plastic (PE) box max. 2 weeks workshop conditions
Low alloy: - basic, very low hydrogen**	2-6h	325-375	
Hardfacing-; maintenance & repair electrodes			
Stainless steel: - non EMR-SAHARA electrodes - EMR-SAHARA range	1-6h 1-6h	200-300 125-300	Holding oven unlimited time at 75-125°C quiver max. 10h at RT-125°C
Ni-base	1-6h	200-300	

Table 2. 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.

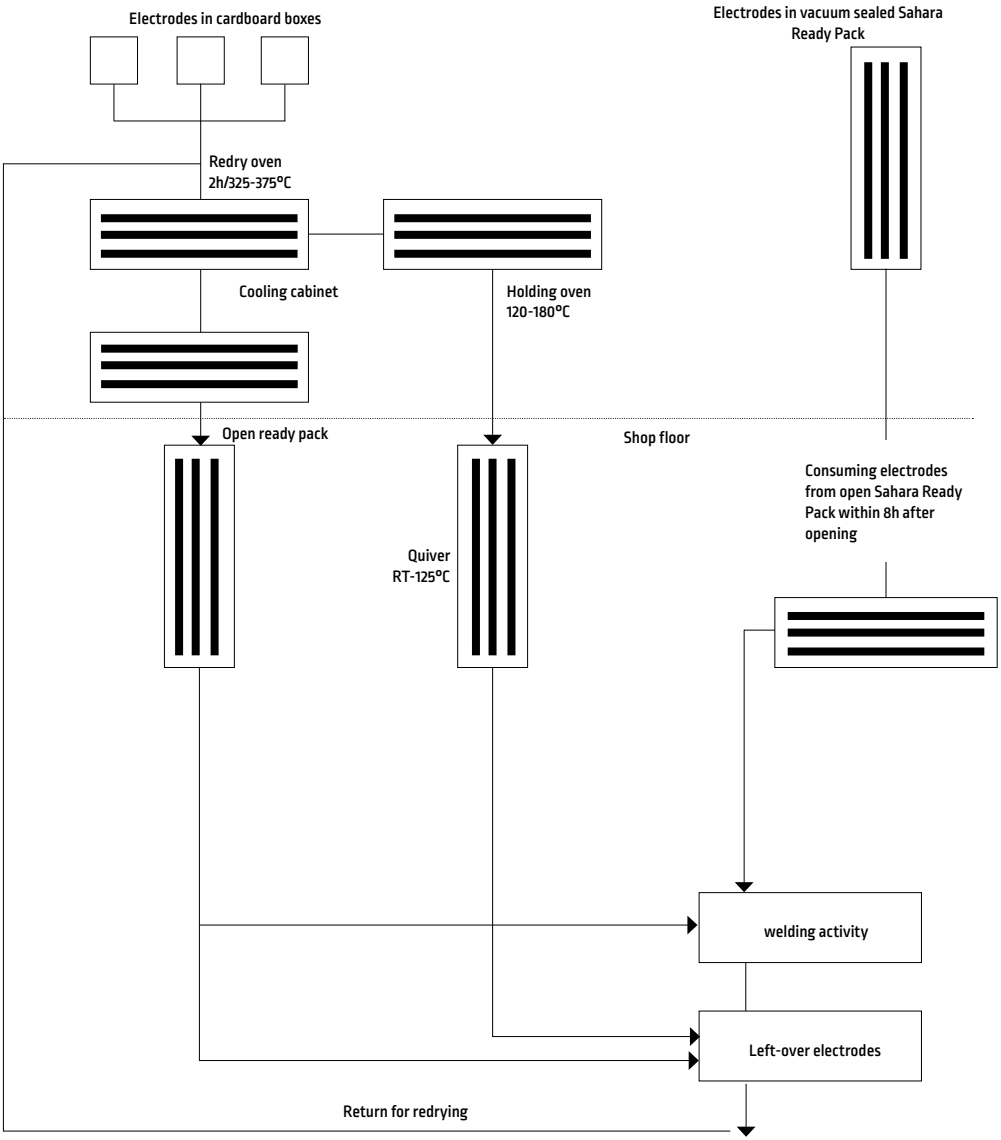
** If these EMR-SAHARA, vacuum packing electrodes are re-dried a maximum content HDM of ≤5ml/100g is valid.

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 EMR-SAHARA® electrodes after removal either from a regular cardboard box or vacuum sealed Sahara ReadyPack®



FLUX-CORED WIRES

1. Scope

Tubular cored wires with the following trade names are supplied in various formats:

Tradename	Brand	Technology	Spool in plastic bag & cardboard box	Spool in Al/PE vacuum packaging & cardboard box	Accutrak® drums
OUTERSHIELD	Lincoln	Folded	X	X	X
INNERSHIELD	Lincoln	Folded	X	X	
COR-A-ROSTA	Lincoln	Folded		X	
SUPERCORE	Lincoln	Folded		X	
FLUXINOX	Oerlikon	Folded	X		
INOXCORED	SAF-FRO	Folded	X		
FLUXOFIL	Oerlikon	Seamless	X	X	X
FLUXOCORD	Oerlikon	Seamless	X	X	
CITOFLUX	Oerlikon	Folded	X	X	X
SAFDUAL	SAF-FRO	Folded	X	X	X
STEELCORED	SAF-FRO	Seamless	X	X	X
LNS-T	Lincoln	Folded	X		

Table 3. Tubular cored wire formats

2. Storage

Tubular cored wire packed in the original foil and cardboard box or drum require controlled warehouse conditions to ensure that condensation does not form on the product. The storage temperature should always be above dew point for a given humidity, and protection from moisture and adverse atmospheric conditions should be ensured.
Flux Cored Wires in Al bags under vacuum do not require measures against moisture pick-up, as long as the packaging remains undamaged.

3. Handling of wire outside of packages

The following minimum precautions should be taken to safeguard the wire after opening the original package:

- Wires removed from original packaging should not be exposed to damp moisture conditions or extremes in temperature and/or humidity where surface condensation can occur.
- When not in use, wires should be placed in original packaging and sealed as best as possible.
- After exposure, hydrogen levels can be reduced by conditioning the wire*. Wires on metal spools may be conditioned at a temperature of 100°C ± 4°C for a period of 6 to 12 hours, cooled and then stored in a sealed poly bags (0.03mm minimum thickness) or equivalent.

* Oerlikon Fluxofil and Fluxocord, SAF-FRO Steelcored cored wires do not require conditioning after exposure to moisture due to the seamless nature of the wire which guarantees the diffusible hydrogen levels stated for these wires. Products shall be protected from condensation and other sources of contamination and stored in suitable conditions to avoid damage to packaging and exposure to moisture.

4. Deteriorated product

Cored wire 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.

SOLID WIRES & TIG RODS

1. Scope

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

2. Storage

Products shall be protected from condensation and other sources of contamination and stored in suitable conditions to avoid damage to packaging and exposure to moisture.

3. Handling

Rods and spools outside the protective packaging should be handled and monitored to ensure that they remain in a suitable condition for use.
In all cases, the products require protection against contamination with moisture, dirt and oil products.
If interruption of the production process occurs for more than 8 hours, wires / rods shall be stored in their original resealed packaging.
Damage of packaging should be avoided.

4. Deteriorated product

Products should be checked before use if they have been exposed to adverse handling or storage conditions to ensure that they are in a suitable condition prior to welding.

FLUX

1. Scope

Welding fluxes supplied in paper bags with PE inlay, plastic bags, Sahara ReadyBags, Drybags, PE and aluminum foil liner bigbags, plastic pails and metal drums.

2. Storage

The following storage conditions are recommended:
- Avoid direct exposure to sunlight, rain or snow

Welding fluxes, packed in paper bags, plastic bags and PE big-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, Sahara ReadyBags, Drybags and Aluminium foil liner big-bag does not require special storage conditions but rust and damage of the packaging shall be prevented.

3. Handling

Flux packaging should be acclimatized to the welding environment before opening to avoid any risk of condensation. Product characteristics as specified for the original condition, are retained if the product is treated in accordance with the following recommendations:

	Storage conditions	
Packaging	**0-6 months, temperature ≤37°C or rel. humidity <50%**	**>6 months or temperature >37°C or relative humidity 50-90%* [1]**
Paper bag, Plastic bag /PE bigbag	use as is [2,3]	Redry 300-350°C for 2h minimum
Plastic pail, Sahara ReadyBag / Drybag / Al foil liner, Metal drum	use as is [3]	use as is [3]

Table 4. Welding flux re-dry times and temperatures

[1] if storage conditions include a relative humidity over 90% the flux may have been deteriorated so that re-drying becomes ineffective.
[2] if a severe application is considered (HAZ or weld metal hardness HV10 >350, heavy restraint, etc.) re-drying 300-350°C for 2h minimum.
[3] As long as the packaging is in its original condition (Unopened/Undamaged).

For MIL800-H, MIL800-HPNi and 842-H fluxes Follow all previous procedures, with the following changes:
· Set temperature between 120ºC-205ºC
· For ovens in which heating rods are inserted into the flux, do not let the temperature of flux adjacent to the rods exceed 205ºC.

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 80-120ºC above ambient temperature, time unlimited.
Dry flux (virgin flux from unopened bag or redried flux) not maintained without the above recommended temperature range will have to be redried after some time. 8 hours is typically considered as the maximum duration before redrying but can be less depending on the environment condition and level of exposure of the flux to it.

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. The recycling equipment should prevent the fines build up and keep the flux grain size distribution consistent before fresh flux addition

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 with vacuum packing, 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.