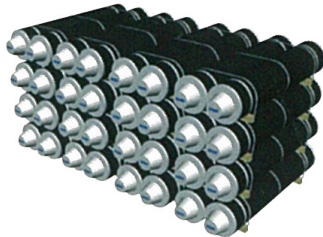


# UCAR<sup>®</sup> HANDLING & JOINTING



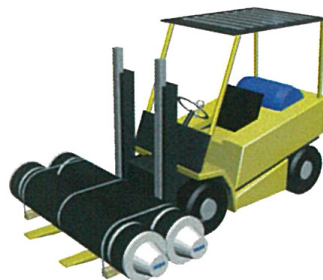
## 1 Storage & Handling

- Store in a clean, dry place where the electrodes will be protected from damage.
- Storage surfaces shall be flat and leveled.
- Concrete is the preferred surface for storage and stacking electrodes.
- Do not stack electrodes too high:
  - 250 to 450mm (10-18") electrodes: Max. 6 pallets high.
  - 500-700mm (20-28") electrodes: Max. 4 pallets high.
  - 750mm (30") electrodes: Max. 3 pallets high.



**Operators should always wear appropriate Personal Protective Equipment (PPE) to perform the activities described below.**

**Handle electrodes with care when using fork lifts or cranes for transport.**

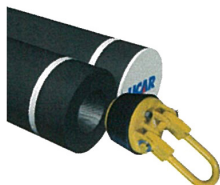


- Forks should be spread to fill the space between stringers to prevent tipping.
- Damage to end-faces and threads can lead to performance problems and difficulty in jointing: Retain protective end caps and sombreros.
- Always be careful when cutting steel banding.
- Use proper cutting tools and safety equipment.

## 2 Handling & Jointing

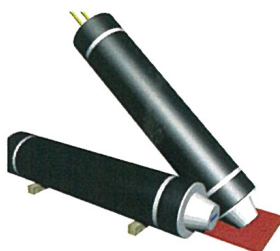
### Preparing New Electrode to be Added

- Maintain protective end cap until lift plug is to be inserted.
- Check that socket and end faces are clean and undamaged.
- Check that lift plug is clean and undamaged.
- Carefully insert lift plug into socket.
- Only use certified, load tested lifters.



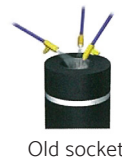
### Preparing to Add

When raising an electrode into the vertical position with a crane, the sombrero should be kept in place and some form of cushioning material should be used to prevent damage to the PreCet<sup>™</sup> pin.



Clean both the socket of the old column and the body, pin and end face of the new electrode with an airline.

If dirt in the threads remains it should be removed with a soft brush that will not damage the thread.



## 3 Handling & Jointing

### Adding the New Electrode

- Center the new electrode over the column and lower carefully.
- Use a spacer to prevent thread damage when lowering the new electrode.
- Ease the weight of the new electrode from the spacer and remove the spacer.
- The threads can then be engaged using the threaded stem attached, without further crane movement.
- The use of a torquing ring will aid the rotation during thread engagement.
- It is most important to tighten the joints correctly under controlled conditions.



The use of a lift plug and threaded stem attachment.

## 4 Handling & Jointing

### Applying the Torque

There are three basic methods:

1. Manual: Torque Wrench.
2. Mechanical: Hydraulic - Pneumatic.
3. Robot.

For electrodes over 500mm (20") in diameter, a mechanical or robotic method is preferred for consistent safe jointing.

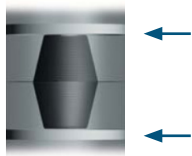
### Recommended Tightening Torques

Electrode mm	Diameter inches	Nm	Torque kg.m	lb.ft
250	10	390	40	300
300	12	590	60	450
350	14	830	85	600
400	16	1075	110	800
450	18	1375	140	1000
500	20	1770	180	1300
550	22	2460	250	1800
600	24	3440	350	2500
650	26	4520	460	3300
700	28	6000	610	4400
750	30	8000	815	5900

Note: Variations from these values may be applicable in certain cases. Please discuss with your Technical Service Engineer.

## 5 After the Add

The white bands indicate the position of the socket base.



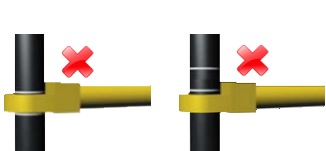
Slip electrode to correct operating position and avoid clamping inside the white bands.



Do not clamp on open sockets or those with lift plugs left in.

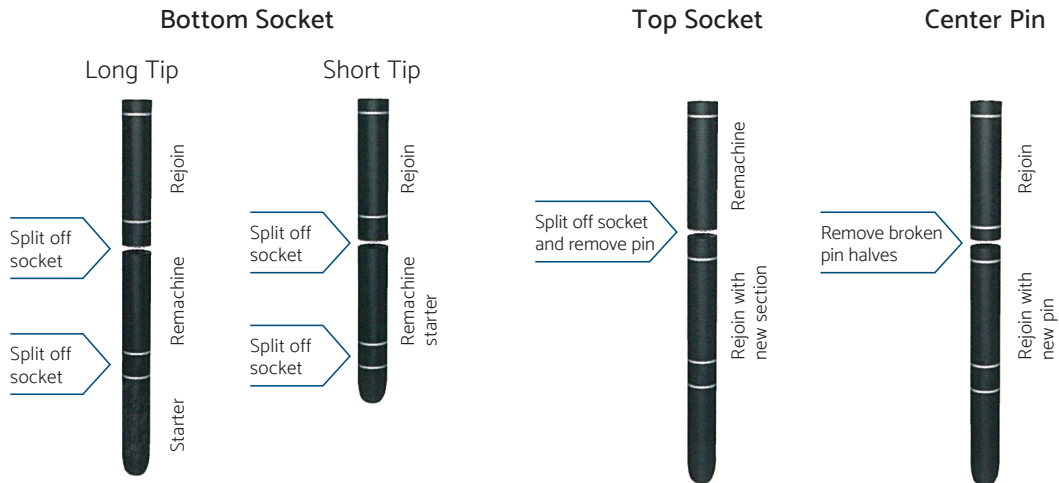


No joints should be left above the clamp.



## 6 Electrode Recovery

Depending on type of breakage, some suggested best possible recoveries are shown below. Sockets to be removed are easily split off with a hammer and chisel.



## 7 Electrode Handling Tools

Always remember that safety is totally dependent on maintaining lifting equipment in good condition and on using it correctly.



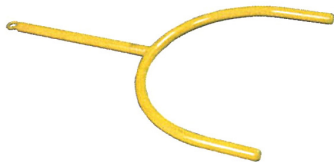
### Graphite Lift Plug

Graphite Lift Plugs are compatible with the electrodes, having similar hardness and thermal expansion properties. Thus they cause less socket damage than metal plugs which may be burred. They can be left as top socket protection without risk of socket wall splitting due to unequal thermal expansion.



### Torquing Ring

This device can be used to aid rotation of the electrode during manual jointing or can be attached by cable to either a pneumatic/hydraulic piston or mechanical torquing device. A mechanical method for applying the torque is preferred for electrodes over 500mm (20") diameter.



### Spacer

Effective in preventing socket to nipple thread contact while lowering the new electrode. The spacer can be made of metal or wood.



### Threaded Stem Hook

Used to allow final lowering of new electrode without further crane movement.



### Torque Wrench

Used for manual application of torque either off or on furnace depending on practice.



## 8 Safety Considerations

- It is recommended that you follow safety instructions, use appropriate tools and follow the handling instructions.
- A lack of careful handling during the movements on and off furnace and during jointing of an electrode column can lead to safety hazards.
- The low friction property of graphite leads to difficulties in handling that require the correct tools for safety.
- Due to the shape and weight of connecting pins, improper handling can result in dangerous conditions.
- Graphite is a dense material. Consider the weight of graphite products when handling or transporting.
- Electrodes are often transported with cranes. You should stay away from suspended loads.
- Adding graphite into a molten bath may cause unexpected foaming of the bath to the point that the vessel may not contain the molten substance (carbon boil).
- Be careful when handling used or broken electrodes. Even "Black" electrodes can still be in excess of 300 °C.
- For additional information regarding our electrodes and pins, please refer to our Safety Data Sheets (SDS #4155 and 4156).

For more information, please visit [www.graftech.com](http://www.graftech.com) or contact one of our sites directly:

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