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OPERATION OF EASYBOND PIN BRAZING UNIT

1 PREPARATION OF THE SURFACE



It is crucial that to achieve a successful pin braze, the area of connection onto the pipeline (or other metal substrate) has a clean bright metal finish. In order to achieve this some degree of surface preparation will be required.



Pipeline and plant owners often have their own procedures for surface preparation and you should fully familiarise yourself with these procedures prior to any surface preparation works.

STEP ONE

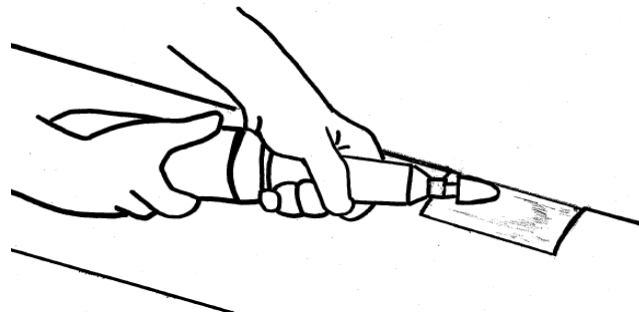


Figure 4

If necessary, the surface encompassing the pin braze area and adjacent earth connection shall be degreased before any grinding operation.

Scrape and clean the steel and clean an area for the earth device as near as possible to the braze area as illustrated in [STEP ONE - figure 4](#).

The metal surface must then be prepared to a bright clean finish to ensure a sound electrical connection between the earth device and the substrate. Never continuously work the metal such that any wall thickness is reduced.

An area sufficient to accommodate the brazing pin and cable lug must be correctly located and cleaned to a bright metal finish.

To prevent the cleaned metal surface re-oxidising, we recommend that pin brazing must take place as soon as possible after surface preparation, i.e. not more than 5 minutes delay.



Note that when using the optional 18V grinder (part #273 199 0685) you must carefully read the specific instruction manuals for this equipment. The manuals detail the safe operation of the equipment and the PPE required during their use.

2 LOADING THE PIN INTO THE BRAZING GUN

Load the gun with a brazing pin and ceramic ferrule individually by hand. Ensure that they are both back fully inserted and tight with the palm of your hand, as illustrated in [STEP TWO – figure 5](#).

STEP TWO



Figure 5

DO NOT STRAIGHTEN THE KINKED END OF THE PIN FUSE WIRE.

The legs of the pin holder must be adjusted as necessary to ensure a firm grip of the pin while maintaining concentricity with the ferrule holder.

Important:



Under no circumstances should a brazing pin which has been inserted and then removed from the gun be re-inserted and used for brazing without checking the kinked end profile and fuse wire connection to pin.

3 ADJUSTMENT OF BRAZING GUN



Before connecting the earth device to the steel, adjust the brazing pin "Lift Height" as follows:

Hold the cable lug or stinger flat on the steel surface (for direct pin connection). Insert a loaded brazing pin into the hole in the lug and press the gun/ferrule against the surface of the lug evenly overcoming the internal spring. Turn the ferrule holder until the white adjustment indicator tube is flush with the gun's rear face. The brazing gun should now be correctly set, as illustrated in [STEP THREE – figure 6](#).

When using threaded brazing pins, i.e. M8 brazing pin, the ceramic ferrule must be flat against the steel surface when checking the white adjustment indicator tube.

STEP THREE

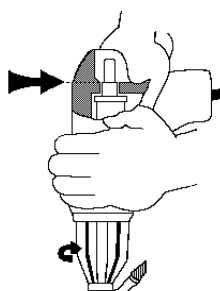


Figure 6

4 LOCATION OF CONNECTIONS

The desired position of the required pin braze area should be accurately marked on the steel. Do not use any oil based marker e.g. spray paint, as this will contaminate the grinding burr.

When pin brazing onto a coated pipeline then sufficient coating needs to be removed in order to accommodate both the earth device and area of the pin braze, this would be a minimum of 14 cm x 4 cm using the standard earth device. If the earth device is placed on a separate earth point on the pipe then the area required at the pin braze point will be a minimum of 4 cm x 4 cm.

5 PIN BRAZING

STEP FOUR

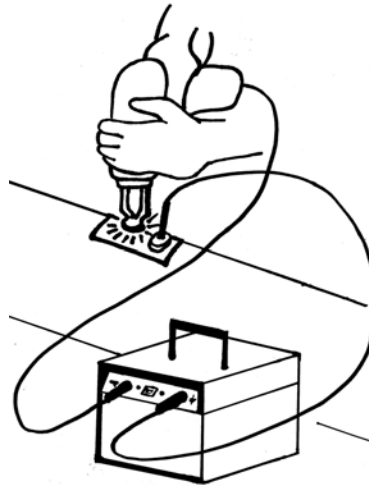


Figure 7

1. The magnetic earth device must be applied to the cleaned surface to ensure a sound electrical circuit.
2. The brazing gun must be correctly adjusted with the correct pin and ferrule fitted.
3. Locate the brazing pin so that the pin is in the centre of the hole in the cable lug. For vertical surfaces, the pin must be at the upper part of the hole in the cable lug.
4. Apply sustained pressure on the brazing gun so that full contact is made between the ferrule and the bond attachment (or the steel surface when using threaded pins).
5. When the operator is ready to braze, he should look well to one side to protect his eyes from glare. The operator's stance should be stable to enable this movement to be made without altering the critical positioning of the gun.
6. Hold the gun firmly and close the circuit by squeezing the trigger.



KEEP THE TRIGGER DEPRESSED UNTIL THE BRAZE IS COMPLETE

7. After about 2 seconds the fuse wire should rupture, disconnecting the circuit. The arc will extinguish and the pin or stud will be shot forward into the molten filler.

8. In the event of a fuse not rupturing after the normal time, the gun must be withdrawn completely from the work, keeping the trigger depressed.
9. After the fuse has ruptured, the gun must be held in place for a further 3 seconds to allow the braze to set
10. Remove the gun by pulling straight off the pipe or substrate in line with the brazed pin, then break out the ferrule if this is remaining in the ferrule holder. This can be achieved by levering against a suitable edge. Beware, it may be hot.
11. Hold the gun in a vertical position then depress the ejector button to expel the remaining fuse wire. Catch the wire in your hand to ensure it has been ejected, as illustrated below in [figure 7\(a\)](#).

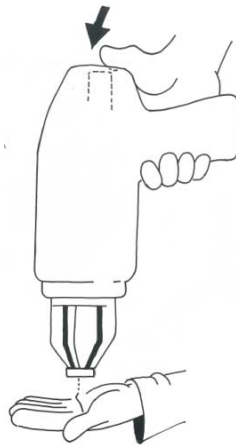


Figure 7(a)

6 TESTING A COMPLETED BOND

Threaded pin attachments should be tested by a torque device. For an M8 pin the torque device should be set to 10 Nm. The threads will fail at 25 Nm so do not use excessive force.

Direct braze pin attachments must be tested as per [STEP FIVE – figure 8](#) as follows:

The shank of the plain pin must be carefully broken off with a hammer taking care not to damage the lug. This must be done before another pin braze is made to the bond. After breaking off the shank the broken surface should be level or thereabouts with the outer surface of the lug ([figure 9 \[A\]](#)). The lug shall be complete in all aspects.

STEP FIVE



Figure 8

If the surface of the broken pin is proud of the surface of the lug this is an indication that the brazing time was too short * ([figure 9 \[B\]](#)). The reason for a short braze time is usually the result of excessive current being drawn due to the gun "lift height" being incorrect. This short time can also be caused by a poor earth connection.

If the surface of the broken pin is below the surface of the lug, this is an indication that the brazing time was too long ([figure 9 \[C\]](#)). The reason for a long braze time is the result of insufficient current being drawn. Insufficient current is usually the result of a poor battery condition.

If it is known that the battery is good then the cause may be incorrect setting of the gun "lift height".

If the ferrule is not held against the copper lug and is in partial contact then the arc can escape out of the gap and this will result in the side of the copper lug burning away.

Warning: Repeated bond attempts must not be made at the same position as this may cause structural/metallurgical damage to the base steel.

*** When using cable lugs part number #278 100 9000 /#278 100 7360 this result ([figure 9 \[B\]](#)) is acceptable due to thickness of copper material at braze area. Height of remaining brass shank should not exceed 2mm.**

FAULT DIAGNOSIS OF UNSATISFACTORY PIN BRAZE CONNECTION

Some common problems can be experienced by operators when first using the equipment. Listed below are a series of faults together with the most likely cause and remedy solutions. In the event of persistent problems or faults, contact the service engineer for advice or repair.

PROBLEM	POSSIBLE CAUSE	REMEDY
No arc or there is a short "pop" of the pin	Circuit not complete or highly resistive	<i>Check fuse wire on pin is engaged Check earth device is connected</i>
	Batteries flat	<i>Charge/replace batteries</i>
Arc time too short Figure 9 (B)	Excessive current drawn Poor earth connection	<i>Check gun adjustment Reset earth connection</i>
Arc time too long Figure 9 (C)	Insufficient current drawn	<i>Check gun adjustment Recharge batteries</i>
Bond falls off when tested	Too short brazing time Base metal not clean enough	<i>See above Thoroughly clean the area to be brazed</i>
Fuse wire stuck in contact nipple	Pin loose in holder Failure to eject previous fuse wire	<i>Tighten fit of pin holder jaws Replace contact nipple</i>
Brazing pin fails to push into molten braze material	Pin is out of line from the ferrule due to off centre ferrule holder jaws caused by heavy removal of spent ferrule	<i>Take care not to bend ferrule holder jaws when removing spent ferrule Replace ferrule holder</i>

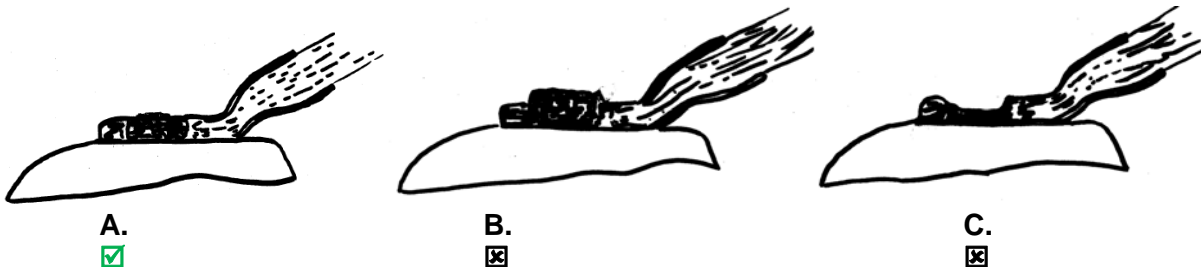


Figure 9