

ALPHA[®] EYRE NO. 7

Flux for Aluminum Cable Jointing

DESCRIPTION

Aluminum cannot be soldered using conventional solders and fluxes in view of the extremely tough oxide film present on the surface of the aluminum. Alpha has developed **ALPHA EYRE No. 7** Flux and ALPHA Alca P Solder, a suitable flux and solder alloy for the jointing of aluminum. This flux and solder combination have been tested and approved by cable manufacturers in both the U.K. and India.

READ ENTIRE TECHNICAL DATA SHEET BEFORE USING THIS PRODUCT

PRODUCT INFORMATION

ALPHA EYRE No. 7 Flux is an organic flux which on decomposition at a temperature a little below the jointing temperature of approximately 316 °C (600 °F) removes the refractory oxide from the strand of the core and makes the surface receptive to solder. Because of the low specific gravity of the flux residues, they are replaced by the solder forming a sound metal to metal contact. It possesses an added advantage over the inorganic type of fluxes and welding techniques inasmuch as the soldering temperature can be maintained as low as 316 °C (600 °F) thus avoiding damage to the paper impregnation and the insulation.

Recommended to be used along with ALPHA EYRE No. 7 Flux, ALPHA Alca P Solder is prepared under a special process from exceptionally high purity raw material. It has excellent capillary flow and its short plastic range reduces the tendency towards cold shuts inside the ferrule joint and lessens the risk of cavitation.

APPLICATION GUIDELINES

In order to achieve sound joints on aluminum conductors, a definite technique has been established and must be followed carefully. Below are some aspects of the jointing technique which require careful attention.

Jointing Technique

1. The wires of the standard conductor must be loosened in such a manner that the flux will penetrate through the outer wires to the center of the core and also to ensure that the bottom portions of the strands are properly fluxed.
2. The conductors must be adequately pre-heated.

3. The conductors must be well pre-tinned to a shiny mirror-like finish. The ferrule should always pre-tinned with ALPHA AYRE NO. 7 Flux and ALPHA Alca P Solder.
4. The temperature of the solder during the basting operation should be maintained between 300 to 325 °C (572 to 618 °F). If the higher limit is exceeded, there is a possibility of partial annealing of the conductor strands resulting in lower tensile values and a distinct risk of charring the flux. However, it is practical to keep the solder in the pot nearer the upper limit to allow for heat loss in transportation of the metal from the pot to the joint location. Dross formation in the pot is kept to a minimum when ALPHA Alca P is employed but any skin forming on the surface should be removed before basting is commenced.
5. When tinning of the conductor is commenced, it is recommended to ensure as much as possible that flux residues and other foreign matter which are collected in the lower ladle are not transferred back to the solder pot.
6. On no account should flux be brushed on the inside of the tinned ferrule before applying the ferrule over the conductor.

Jointing Instructions for H.T. Cables

Straight Through Joints

1. Cut the ends of the conductors to allow a gap of 3mm (approximately 1/8") between the ends. The reason for the gap is to assist flux and solder penetration along the interstices of the strands.
2. Remove the paper insulation from the ends of the core for a distance equal to half the length of the ferrule plus 13mm (approximately 1/2") at the end.
3. Protect the paper insulation in the way by taping with dry cotton tape.
4. For conductors up to 300mm², round the core with pliers against the twist of the strands. This operation effects a general loosening of the core.
5. For conductors 300mm² and above, the strands are to be processed per the table shown on the next page:

Conductor Size (mm)	Stranding (mm)	Approx. Overall Length of Ferrule (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
300	61 / 2.50	84	29	19	9	-	-
400	61 / 3.00	92	29	19	9	-	-
500	91 / 2.65	102	39	29	19	9	-
625	91 / 3.00	113	39	29	19	9	-

6. Insert a metal probe into the center of the core as to affect a general loosening and slight displacement of the wires. After this operation, the strands should present a slightly belled out appearance, but it is important that the wires should not be unduly displaced, otherwise some difficulty will subsequently be experienced when applying the weak-back ferrule. It is

sufficient merely to ensure that the wires are loosened so as just to allow the flux and solder to penetrate fully into the strand and effect bright “tinning” of the central wires.

7. Pre-heat the conductors by liberally basting with ALPHA Alca P Solder which should be brought up and maintained at a temperature of 316 °C (600 °F). The number of ladles of solder required for this operation depends on the size of the conductor. Assuming a conductor 300 mm² and a 4” ladle, it has been found in practice that three to four full ladles are required.
8. Wipe off the excess solder quickly. Immediately brush ALPHA EYRE No. 7 Flux ensuring that the flux flows freely through the central wires of the core. Attention should be given to brushing the underside of the strands with flux. At this stage, the flux will start to react on the aluminum rendering the conductor dull gray in appearance.
9. Baste the conductor again with ALPHA Alca P Solder when it will be noticed that “tinning” will commence immediately. If necessary, apply more flux and re-baste with solder till the conductor is well “tinned”. Examine the underside of the conductor with the aid of a mirror to ensure that overall “tinning” has been achieved.
10. After the pre-tinning operation, apply ALPHA EYRE No. 7 Flux to an appropriate size of weak-back ferrule, and immerse the ferrule in the solder pot to “tin” the surface. Apply the ferrule centrally over the conductors and close firmly but not completely with pliers so as to leave a slot of approximately 4mm to 6mm (3/16” to 1/4”).
11. Re-baste the ferrule assembly with a few ladles of solder keeping the temperature of the solder at 316 °C (600 °F) and immediately apply a little more flux into the opening of the ferrule and at the ends. Now close the ferrule tightly around the conductor and baste with solder from ladle to ladle till the solder begins to solidify.
12. Wipe off excess solder with a clean wiping cloth (impregnated insulation paper may be used). Allow the ferrule assembly to set without disturbance.

Terminations

1. Tin the conductor in the manner described above.
2. When soldering in the vertical or inverted position, drill a hole with a diameter approximately half that of the conductor in the closed end of the socket and when soldering in the horizontal position make a longitudinal cut approximately 3mm wide (1/8”) in the socket.
3. Tin the socket by applying ALPHA AYRE No. 7 Flux and immersing in ALPHA Alca P Solder maintained at 316 °C (600 °F).
4. Fit the socket on to the conductor and pour molten ALPHA Alca P Solder into the drilled hole or the longitudinal cut till the solder flows freely.
5. Bind the conductor and the socket end with dry cotton tape to retain the solder in the socket. Pour more solder and wipe off the excess while allowing the assembly to cool. Allow to set without disturbance.
6. For soldering in the horizontal position, apply the same technique as for ferrules.

Tee Joints

A. Married Joints:

1. Prepare the conductor of the main cable and tin with ALPHA EYRE No. 7 Flux and ALPHA Alca P Solder in the manner described above paying particular attention to the underside of the conductor.
2. Prepare the end of the branch cable and clean the individual wires. Divide the wires into two groups and wind on to the main cable in the opposite direction in a normal manner.
3. Pre-heat the assembly by basting with ALPHA Alca P Solder at 316 °C (600 °F). Quickly wipe off excess solder and immediately apply a liberal quantity of ALPHA EYRE No.7 Flux and re-baste with solder paying particular attention to the underside of the conductor.
4. Continue basting from ladle to ladle till the solder begins to solidify.
5. Wipe off excess solder and allow the joint to set without disturbance.

When the branch cable is relatively large, say 70mm or above, married joints may not be satisfactory and Tee Joints using weak-back or claw-type connectors are recommended.

B. Claw Connector Joints:

1. Prepare and tin the main cable using ALPHA EYRE No. 7 Flux and ALPHA Alca P Solder in the manner described above and the branch cable as for the terminations.
2. Tin the connector by applying ALPHA EYRE No. 7 Flux and dipping into molten ALPHA Alca P Solder at 316 °C (600 °F). Fit the socket end to the branch cable and complete in the same manner as described for terminations.
3. Fit the ferrule portion into the main conductor and complete in the manner described for straight through joints.

TECHNICAL DATA

Item	Typical Values	Item	Typical Values
Appearance	Yellow to greenish yellow viscous liquid	Shelf Life (from Date of Mfg.)	6 Months
Flash Point (T.C.C.)	>93 °C (>200 °F)	Packaging Size	100g Jar

SAFETY & WARNING

It is recommended that the company/operator read and review the Safety Data Sheets for the appropriate health and safety warnings before use. **Safety Data Sheets are available at MacDermidAlpha.com/assembly-solutions/knowledge-base**

CONTACT INFORMATION

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Also read carefully warning and safety information on the Safety Data Sheet. This data sheet contains technical information required for safe and economical operation of this product. READ IT THOROUGHLY PRIOR TO PRODUCT USE . Emergency safety directory assistance: US 1 202 464 2554, Europe + 44 1235 239 670, Asia + 65 3158 1074, Brazil 0800 707 7022 and 0800 172 020, Mexico 01800 002 1400 and (55) 5559 1588

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