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# ADMIRALTY FLEET ORDER

## CERROBEND—INSTRUCTIONS AS TO USE

ADMIRALTY, S.W.1,  
14th January, 1943.

The following Order having been approved by My Lords Commissioners of the Admiralty is hereby promulgated for information and guidance and necessary action.

By Command of their Lordships,

*H. V. Markham*

**Distribution Limited**

*To all Commanders-in-Chief, Flag Officers, Senior Naval Officers, Captains and Commanding Officers of H.M. Ships and Vessels carrying Aircraft and Shore Establishments concerned.*

NOTE :—The scale of distribution is shown in the Admiralty Fleet Order Volume, 1941, Instructions, paragraph 10.

Head of "P" Branch

**232.—Cerrobend—Instructions as to Use**

*To all Ships carrying Aircraft and Shore Establishments concerned*

(A.M.R. 25/43.—14.1.1943.)

Cerrobend is being introduced and supplied to naval air services to facilitate the bending of tubing required in the repair of aircraft.

2. Cerrobend is a fusible alloy containing bismuth, lead, tin and cadmium plating, and having a low melting point—160° F.—enables alloy tubing to be bent without damage being caused by the application of excessive heat. Owing to the bismuth content which causes the alloy to expand slightly on cooling, buckling, flattening and rupturing of the tubing is eliminated.

3. To ensure that the best results are obtained the following instructions must be followed :—

- (1) Fully anneal the tubing to be bent.
- (2) Clean the interior of the tubing with a pull-through.
- (3) *Tightly* seal one end of the tubing with a cork or rubber bung.
- (4) Fill the tube with a mixture of oil and paraffin (equal parts of Castrol XL and paraffin indicate the desired consistency of the mixture).
- (5) Pour out the oil mixture, leaving approximately one tablespoonful in the bottom.
- (6) Stand the tubing in boiling water up to 2 in. to 3 in. from the top of the tube.
- (7) Heat up sufficient Cerrobend in a ladle of water or in a water-jacketed tank, till water is boiling and alloy molten.
- (8) Pour the Cerrobend and water from the ladle (or the Cerrobend from the tank) into the tubing, allowing the alloy to run over to ensure that no airlocks occur.
- (9) Lower the loaded tubing immediately into cold water and leave for sufficient time for alloy and tubing to attain room temperature throughout (about 15 minutes for 1-in. diameter tubing). In tropical climates the cooling time will need to be extended.
- (10) Remove bung and pass tubing to bending machine (the bending operation should be carried out slowly).
- (11) Immerse bent tubing in boiling water and allow the Cerrobend to run out.
- (12) Plunge unloaded tubing into cold water and leave for two minutes to solidify any drops of Cerrobend retained in the oil film.
- (13) Clean thoroughly with tight fitting pull-through.

4. The alloy drained out of the tubing can be used again.

5. Cerrobend can also be used for bending rolled, extruded and other open sections. To do this, it is necessary to make a bar of Cerrobend with the section embedded in its centre. The bar can then be bent to the desired shape and the Cerrobend removed by immersion in boiling water.