

THE ENGINEERING EQUIPMENT AND MATERIALS USERS ASSOCIATION

**90/10 COPPER NICKEL ALLOY PIPING
FOR OFFSHORE APPLICATIONS**

**SPECIFICATION: TUBES
Seamless and Welded**

PUBLICATION No. 144 : 1987 .

EEMUA

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45 Beech Street
London
EC2Y 8AD

Tel 0171 628 7878
Fax 0171 628 7862
e-mail sales@eemua.co.uk
website www.eemua.co.uk



THE ENGINEERING EQUIPMENT AND MATERIALS USERS ASSOCIATION

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FOREWORD

The Publications in this series of specifications for 90/10 copper nickel tubes, flanges and fittings are as follows:

Publication No. 144	Tubes: seamless and welded
Publication No. 145	Flanges: composite and solid
Publication No. 146	Fittings

The specified outside diameters of tubes, in sizes up to and including 20 in/508 mm, covered by this specification have been selected from BS 2871 : Part 2: 1972 "Copper and copper alloys — tubes (seamless) for general purposes: table 3, Preferred sizes of tubes for pipelines for shipbuilding and other engineering purposes". The specified outside diameters of the remaining sizes covered by this specification have been selected from BS MA 60 "Summary and application of copper and copper alloy tubes for ships' pipework systems." The wall thicknesses have been selected to cover the specific requirements of the oil and oil related industries.

This specification specifies the requirements for seamless and seam-welded tubes for offshore and associated piping installations based on BS MA 60, DIN 86007 and ANSI/ASME B31.3.

The table of tube outside diameters is also based on ISO 274 up to and including 16 in/419 mm.

The titles of other publications referred to in this publication are listed in Appendix A.

NOTE: The reference to "tube" rather than "pipe" in this specification is based on the usage of this word in existing copper and copper alloy standards.

SECTION ONE: SEAMLESS TUBES

1.1 Scope and design basis

Section one of this specification specifies the requirements for seamless 90/10 Cu/Ni Alloy — UNS 7060X* tubes for offshore and related industries. This section specifies the requirements for seamless tubes in diameters from ½ in/16 mm to 16 in/419 mm† for maximum design pressures of:

- (a) 16 bar at a temperature range of minus 29°C and a maximum of +75°C.
- (b) 20 bar at a temperature range of minus 29°C and a maximum of +38°C.

The two corresponding ranges of wall thicknesses comply with the pressure containment requirements of ANSI B.31.3 and DIN 86007 as well as the requirements of IACS (International Association of Classification Societies) with additional allowances for robustness to withstand mechanical damage, especially in the smaller sizes.

The ranges of diameters and related wall thicknesses of seamless tubes are given in tables 1.2.1 (16 bar) and 1.2.2 (20 bar), "Dimensions of seamless 90/10 Cu/Ni tubes for offshore and associated installations".

Note: Users of this specification should note that while observing the requirements of this specification they should at the same time ensure compliance with such statutory requirements, rules and regulations that may be applicable to an individual offshore or associated installation. It should also be noted that the wall thicknesses stated in tables 1.2.1 and 1.2.2 were calculated using an allowable design stress of 68.6N/mm², together with a corrosion allowance of 0.5 mm. However, to cater for the additional requirements for the use of saddle pieces, an overriding design stress of one fifth of the minimum tensile value of 270N/mm² has been used for final calculation purposes.

1.2 Information to be supplied by the purchaser

The purchaser shall state in his enquiry and order the following information:

- (a) The title and number of this section (EEMUA Publication No. 144: 1987 section 1) and material designation (see table 1.3).
- (b) Seamless or seam-welded as appropriate.
- (c) Pressure rating 16 or 20 bar.
- (d) Tube size and specified thickness in inches and millimetres†.
- (e) Whether supplementary mechanical tests are required (see clause 1.7.).
- (f) Since a hydraulic or eddy current test for each tube is mandatory, the purchaser shall state whether hydraulic testing is required in addition to, or in preference to, eddy-current testing (see clause 1.9.).
- (g) Whether manufacturer's certificates are required (see clause 1.11).
- (h) Whether it is his intention to inspect the material at the supplier's works (see Addendum).
- (j) Whether individual cast analyses are required to be supplied (see Addendum).
- (k) Whether any additional identification marking other than that specified herein is required.

* Alloy UNS 7060X is a modified form of the following national designated alloys — UNS 70600, BS CN102 and DIN 2.0872 — see table 1.3 of this specification for chemical composition and mechanical properties.

† For purposes of this specification inch dimensions are nominal and the metric dimensions refer to specified outside diameters.

Seamless tubes**1.3 Freedom from defects**

The tubes shall be visibly clean, smooth and free from harmful defects and from deleterious films in the bore. No defect shall penetrate the wall of the tube that will give a resulting thickness of less than the minimum stated in tables 1.2.1 and 1.2.2.

1.4 Materials and manufacture

The casts and the tubes shall comply with the properties of table 1.3.

The tubes shall be seamless and in no case shall they be redrawn from used tubes.

The tubes shall be supplied in straight lengths in the annealed condition.

1.5 Dimensions and tolerances**1.5.1 Outside diameter**

The mean outside diameter of finished tubes in sizes up to and including 4 in/108 mm shall be within the outside diameter tolerances specified in tables 1.2.1 and 1.2.2. The mean outside diameter is half the sum of any two diameters measured at right angles on the same cross section of the tube.

Tube sizes 6 in/159 mm up to and including 16 in/419 mm are also based on BS 2871 : Part 2 : table 3 for specified diameters, but in this section the tolerances have been applied to the inside diameters to facilitate alignment of matching weld preparations.

1.5.2 Inside diameter

The mean inside diameter of finished tubes in sizes 6 in/159 mm and larger shall be within the inside diameter tolerances specified in tables 1.2.1 and 1.2.2 for a distance of 100 mm from each end. The mean inside diameter is half the sum of any two inside diameters measured at right angles on the same cross section of the tube.

1.5.3 Ovality

The ovality of finished tubes shall be such that the difference between the maximum and minimum diameters measured on the same cross section shall not exceed 2% of the size specified in column 2 in tables 1.2.1 and 1.2.2.

1.5.4 Thickness

The thickness of tubes at any point shall not vary from that specified by more than 10% for diameters up to and including 4 in/108 mm. For diameters 6 in/159 mm and larger the wall thickness at any point shall not be less than the minimum values which equate to minus 12½% as quoted in tables 1.2.1 and 1.2.2.

1.5.5 Length

(a) When tubes are required in randoms, the minimum random lengths shall not be less than those specified below. Shorter random lengths may be supplied upon agreement between purchaser and manufacturer.

Table 1.1.1
Minimum random lengths for seamless tubes

DIAMETER		MINIMUM RANDOM LENGTHS	
Over	Up to and Including	16 bar	20 bar
mm	mm	m	m
—	57	6	6
57	159	5	5
159	323.9	5	4
323.9	368	4	3
368	419	3	—