1997 GUIDELINE for

45° REFRIGERATION FLARE FITTINGS AND COPPER TUBING

Guideline M

AIR-CONDITIONING & REFRIGERATION INSTITUTE

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IMPORTANT

SAFETY RECOMMENDATIONS

It is strongly recommended that the product be designed, constructed, assembled and installed in accordance with nationally recognized safety requirements appropriate for products covered by this guideline.

ARI, as a manufacturer's trade association, uses its best efforts to develop guidelines, employing state-of-the-art and accepted industry practices. However, ARI does not certify or guarantee safety of any products, components or systems designed, tested, rated, installed or operated in accordance with these guidelines or that any tests conducted under its standards will be non-hazardous or free from risk.

Note:

This is a new guideline.

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TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

45° REFRIGERATION FLARE FITTINGS & COPPER TUBING

Section 1. Purpose

1.1 *Purpose.* This guideline provides manufacturers, installers and servicing personnel with guidelines for acceptable practices for forming, installing, handling and servicing of fittings and copper tubing.

1.1.1 *Intent.* This guideline is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors and users.

1.1.2 *Review and Amendment.* This document is subject to review and amendment as technology advances.

Section 2. Scope

2.1 *Scope*. This guideline applies only to 45° flare fittings and copper refrigeration tubes; and only to refrigeration and air conditioning systems using halogenated hydrocarbon refrigerants. Topics addressed are:

Factory workmanship, handling and storage, forming tube flares, joint assembly, remake, repair, and leak testing of assemblies. Double and single flared tubes and metal seal caps with copper gaskets are included within the scope of this guideline.

Section 3. Definitions

3.1 *Definitions.* All terms in this document will follow the industry definitions in the current edition of *ASHRAE Terminology of Heating, Ventilation, Air-Conditioning and Refrigeration* unless otherwise defined in this section.

3.2 *"Shall," "Should," "Recommended" or "It Is Recommended."* "Shall," "should," "recommended" or "it is recommended" shall be interpreted as follows:

3.2.1 *Shall.* Where "shall" or "shall not" is used for a provision specified, that provision is mandatory if compliance with the standard is claimed.

3.2.2 *Should, Recommended, or It is Recommended.* "Should," "recommended," or "it is recommended" is used to indicate provisions which are not mandatory but which are desirable as good practice.

Section 4. Materials

4.1 *Fittings.* Materials used in the manufacture of refrigeration flare fittings should conform to the latest edition of SAE J513, unless otherwise specified by the purchaser.

4.2 *Tubing.* The preferred copper tube for mating flares is Unified Numbering System (UNS) No. C12200 soft annealed temper (phosphorized, high residual phosphorous), any other tube should be soft annealed and conform to ASTM Standard B280. Only tubing designated as "Refrigeration Service" should be used.

Section 5. Dimensions and Tolerances

5.1 *Dimensions.* Refrigeration fittings should dimensionally conform to SAE Standard J513, unless otherwise specified.

5.2 *Conformance.* The mating tubing flares should dimensionally conform to SAE Standard J533, unless otherwise specified. The wall thickness of the tubing should conform to ASTM Standard B280 as shown in Table 1.

Section 6. Fitting Quality

6.1 *Quality.* In addition to the materials dimensions tolerances and general specification of SAE Standard J513, tightened controls on concentricity and surface finish are recommended for refrigeration use.

6.1.1 *Tool Marks.* Only annular tool marks concentric with the center line of the sealing face should be permitted.

6.1.2 *Finish.* Surface of the flare face should not exceed a 63 microinch [1.6 µm] finish.

6.1.3 *Seating Surfaces.* Seating surfaces should be smooth and free from nicks, pit marks, and any other defects that prevent sealing.

6.1.4 *Sealing Face.* The sealing face of both male and female fittings should be concentric with the pitch diameter of the thread within 0.005 in. [0.127 mm] total indicator reading.