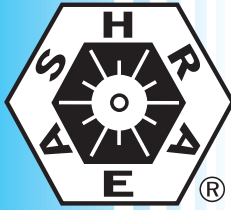


**BSR/ASHRAE Standard 41.4-1996 (RA 2006)  
Reaffirmation of ANSI/ASHRAE Standard 41.4-1996**



# **ASHRAE STANDARD**

## **Standard Method for Measurement of Proportion of Lubricant in Liquid Refrigerant**

Approved by the ASHRAE Standards Committee on October 29, 1995, and reaffirmed on January 21, 2006; by the ASHRAE Board of Directors on February 22, 1996, and reaffirmed on January 26, 2006; and by the American National Standards Institute on May 28, 1996, and reaffirmed on January 27, 2006.

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(This foreword is not a part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process.)

## FOREWORD

This is a reaffirmation of ASHRAE Standard 41.4-1996. This standard was prepared under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). It may be used, in whole or in part, by an association or government agency with due credit to ASHRAE. Adherence is strictly on a voluntary basis and merely in the interests of obtaining uniform standards throughout the industry.

The change made for the 2006 reaffirmation was that the name of the standard was added to the Contents page.

## 1. PURPOSE

This standard sets forth standard procedures for experimentally determining the weight concentration of miscible lubricant-and-liquid-refrigerant mixtures and, in limited cases, immiscible mixtures.

## 2. SCOPE

**2.1** This standard provides a method for measurement of proportion of lubricant in liquid refrigerant.

**2.2** This standard

- a. defines specialized terms,
- b. specifies the required data and minimum precision,
- c. specifies the methods of computation that should be used, and
- d. describes the equipment required.

**2.3** This standard is intended to apply only where it is known, or possible to determine, that the sample is of a miscible lubricant and liquid refrigerant mixture. This restriction is not intended to prevent the application of this standard to determine lubricant concentration in cases where lubricant immiscibility exists provided that the sample is confined entirely to either the lubricant-rich or refrigerant-rich layer.

**2.4** This standard does not apply to measurement of lubricant concentrations when the total amount of lubricant collected is less than .001 g.

**2.5** This standard provides for a primary (gravimetric) method but does not prohibit the use of other methods using new technologies, provided these methods are calibrated against the primary method.

## 3. DEFINITIONS

**resolution:** the minimum observable difference between two values of a measured characteristic.

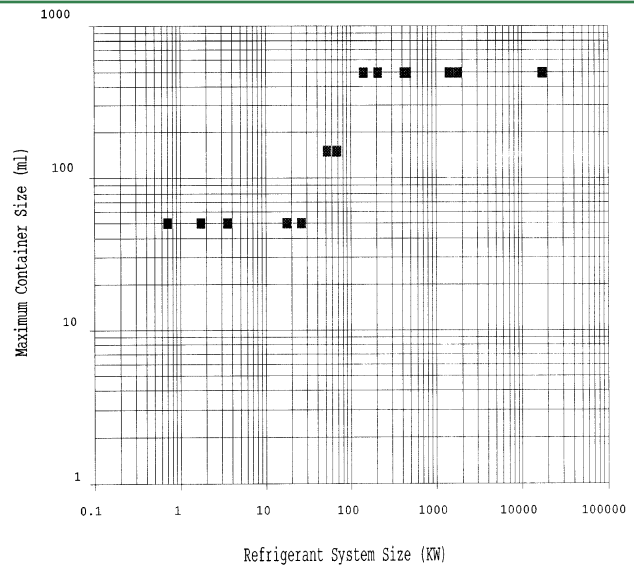


Figure 1 Maximum container size.

**lubricant concentration, sample basis:** the ratio of the weight of lubricant to the total weight of the refrigerant and lubricant in the sample.

**lubricant concentration, pure refrigerant basis:** the ratio of the weight of lubricant to the weight of the pure refrigerant in the sample.

## 4. LIST OF REQUIRED EQUIPMENT

1. A high-pressure type 304 stainless steel or aluminum alloy cylinder with needle valve. (Stainless steel provides better corrosion resistance but is heavier.) The cylinder shall have a bursting pressure not less than five times the saturation pressure exerted by the refrigerant under test at 60°C.<sup>1</sup> The cylinder shall have a rupture disc or a relief valve rated at not more than one-half of the cylinder burst pressure. (See Table 1 or Figure 1 for cylinder sizing.)
2. Analytical balance capable of weighing to 0.0001 g.
3. Top-loading balance capable of weighing to 0.01 g.
4. Pipe thread sealant compatible with the refrigerant/lubricant mixture.
5. Hot plate.
6. Forced-air oven capable of attaining 150°C.
7. Filter paper capable of retaining particles  $\geq 3 \mu\text{m}$ .
8. Beakers, 150 mL and 50 mL capacity.
9. Vacuum pump with gauge capable of measuring vacuum down to 100  $\mu\text{m Hg}$ .
10. Solvent (e.g., pentane and acetone), reagent grade or better.

## 5. METHOD OF TEST

**5.1** This section is a summary of the overall method of test. Details are provided in Section 6.

The cylinder assembly shall be evacuated and weighed ( $W_1$ ). A sample of liquid whose lubricant content is to be