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ANSI/ASHRAE Standard 218-2026
Method of Test for Lubricant and Refrigerant Miscibility Determination

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NOTE

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FOREWORD

Lubricant and refrigerant miscibility is a liquid/liquid property under a prescribed temperature and composition. It is relevant to an HVAC system when the refrigerant is in the liquid phase. When a liquid refrigerant and lubricant are mixed together and remain a single-phase solution, they are then referred to as "miscible." Adequate miscibility between the lubricant and refrigerant is desired in most HVAC system designs to maintain performance. With lubricant being miscible within the refrigerant, viscosity is greatly reduced. This promotes circulation of the lubricant throughout the system and its return to the compressor. It also minimizes the lubricant film thickness coating the heat exchanger coils, which helps promote maximum heat transfer.

1. PURPOSE

The purpose of this standard is to establish a test procedure to determine the critical solution locus of miscible properties of a lubricant and refrigerant mixture.

2. SCOPE

This standard applies to the following:

a. Single-component refrigerant and lubricant mixtures
b. Multicomponent refrigerant and lubricant mixtures

3. DEFINITIONS

charging apparatus: a device that allows the accurate vacuum transfer of small volumes of gaseous refrigerants to the sealed tube (or metal test cell) containing precharged lubricant. This apparatus consists of a manifold (metal or glass), vacuum pump, pressure gage, high vacuum gage, refrigerant cylinder, valves, and filling ports. The function of this apparatus is to evacuate the tube, degas the lubricant, add refrigerant, and seal the tube. It is calibrated so that the required mass of refrigerant is added very accurately by following the change in pressure on the pressure gage as refrigerant is added to the tube.

lubricant: a stable fluid that is compatible with system components, will form a friction reducing film between rubbing surfaces and seal critical clearances, and has low-temperature transport properties suitable for the application in which it is used.[1]

personal protective equipment (PPE): equipment worn to minimize exposure to a variety of hazards.[2] Examples of PPE include items such as gloves, foot and eye protection, protective hearing devices (earplugs, muffs), hard hats, respirators, face shields, safety shields, and full-body suits.

refrigerant: the working fluid used for heat transfer in a refrigerating system; the refrigerant absorbs heat and transfers it at a higher temperature and a higher pressure, usually with a phase change. Substances added to provide other functions, such as lubrication, leak detection, absorption, or drying, are not refrigerants.[3]

refrigeration equipment: systems containing refrigerant and lubricant for use in HVAC&R applications.

sealed glass tube: a borosilicate glass tube with one end formed into a round bottom. The tube is charged with the refrigerant and lubricant to be tested and then sealed in a rounded tip at the other end.[4] The glass tube must be rated for the maximum pressure anticipated for the test conditions for the refrigerant.

test apparatus: a system of equipment with a specific purpose. Such items include the charging manifold and controlled temperature bath.

test cell: a steel cell containing a charge valve and windows that allow the operator to clearly observe the refrigerant/lubricant mixture for any visual changes. The cell must be rated for the maximum pressure anticipated for the test conditions for the particular refrigerant and possess a pressure relief device.

4. SAFETY

There are inherent hazards when handling pressurized glass tubes or metal vessels. Therefore, the operator shall follow the safety procedures herein and be aware of the possible hazards at every step of the procedure.

Informative Note: See Informative Appendix A for special areas of concern.