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ANSI/ASHRAE Standard 219-2021 (RA2026)
Method of Testing the Ability of Liquid Line Filter Driers or Adsorbents to Remove Organic Acid

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Preview

NOTE

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FOREWORD

Standard 219 presents a method of test to calculate the amount of organic acid adsorbed onto an adsorbent material. For the purposes of this standard, the terms "adsorbent desiccant material," "adsorbent material," and "adsorbent" are used interchangeably to refer to the adsorbent material. This information is useful to HVAC&R system designers to properly size filter driers used in their systems.

Though this standard contains cautionary notations, it does not address all safety concerns. Evaluating materials using this test method can expose the operator to hazards such as both high and low pressures, high and low temperatures, toxic fumes, electric currents, mechanical energy, and other physical hazards. This test method should only be performed by individuals with experience in mitigating these dangers as well as handling refrigerants and general chemical knowledge.

This is a reaffirmation of Standard 219-2021. This standard was prepared under the auspices of 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 guidelines throughout the industry. This version of the reaffirmation has no changes.

1. PURPOSE

This standard establishes a suitable laboratory apparatus and test method for determining the ability of various adsorbents and refrigerant liquid line filter driers to remove specific organic acids from refrigerant-lubricant mixtures.

2. SCOPE

This standard applies to the measurement of the mass of a specific organic acid removed from a refrigerant-lubricant mixture by a liquid line filter drier containing an adsorbent desiccant material or through a specific adsorbent material that can remove acid by adsorption and/or chemical reaction. The standard applies to methods associated with the extraction of both short- and long-chain carboxylic acids.

3. DEFINITIONS AND SYMBOLS

3.1 Definitions

acid capacity: amount of organic acid removed by an adsorbent material when in equilibrium with a refrigerant containing 3% lubricant and a specified concentration of acid, as measured in grams of organic acid removed per 100 g of adsorbent or, if a commercial filter-drier is used in the test, as grams of organic acid removed by the specific filter drier type.

If a commercial filter-drier is used in the test, then the acid capacity is the grams of acid removed by the specified drier type under the above conditions.

adsorbent material: materials capable of removing contaminants including water, acids, and other compounds formed from the breakdown of refrigerant and lubricant.

contaminant loading: mass of test contaminant in grams that is added to the test apparatus.

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].

mixed acid POE lubricant: a polyolester lubricant composed of linear and branched carboxylic acids.

organic acid: organic compound with acidic properties. Common organic acids are the carboxylic acids, whose acidity is associated with the carboxyl group –COOH. (***Informative Note:*** Hexanoic acid is an example of a carboxylic acid.)

personal protective equipment (PPE): equipment worn to minimize exposure to a variety of hazards [2]. Examples of PPE include such items 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].

Preview