Compressed Gas Association
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CGA G-2.2—2021

GUIDELINE METHOD FOR DETERMINING MINIMUM OF 0.2% WATER IN ANHYDROUS AMMONIA

FOURTH EDITION

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Work Item 20-035
Specialty Gases Committee

NOTE—Technical changes from the previous edition are underlined.

FOURTH EDITION: 2021
THIRD EDITION: 2016
REAFFIRMED: 1997
SECOND EDITION: 1985

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1 Introduction

Anhydrous ammonia shipped in U.S. Department of Transportation (DOT) Specification MC-330 or MC-331 cargo tanks constructed of quenched and tempered steel (QT) shall have a minimum water content of 0.2% by weight. Except as provided for in regulations, shippers or carriers are required to perform periodic analyses for the prescribed water content in the ammonia. See Title 49 of the U.S. *Code of Federal Regulations* (49 CFR) 173.315(a) Note 14 and 173.315(1) [1].[1]

2 Scope

This publication is intended to provide shippers and carriers with a guideline method of analysis to determine the presence in anhydrous ammonia of the prescribed minimum water content of 0.2% by weight as required by DOT regulations. Lack of the appropriate percentage of water in single loads of ammonia has been found by experience to result in extensive stress corrosion damage to the QT cargo tanks. This method is intended for field use and thus the equipment and procedure selected may vary slightly from that used under laboratory conditions. Other proven methods of determining water content such as Orono Spectral Solution's "Standard Test Method for Water in Anhydrous Ammonia (0.2 to 0.5%) by Infrared Determination (Version 2017 - 03.2), authorized by DOT Special Permit SP 20402, are acceptable.

3 Definitions

For the purpose of this publication, the following definitions apply.

3.1 Publication terminology

3.1.1 Shall
Indicates that the procedure is mandatory. It is used wherever the criterion for conformance to specific recommendations allows no deviation.

3.1.2 Should
Indicates that a procedure is recommended.

3.1.3 May
Indicates that the procedure is optional.

3.1.4 Will
Is used only to indicate the future, not a degree of requirement.

3.1.5 Can
Indicates a possibility or ability.

4 Properties of ammonia

At room temperatures and atmospheric pressure, anhydrous ammonia is a pungent, colorless gas. Ammonia vapor at a pressure of 1 atmosphere (101.325 kPa) and a temperature of 32 °F (0 °C) is lighter than air, having a relative density of 0.5970.[2] The sharp, pungent odor of ammonia serves as a warning signal that very small concentrations of ammonia vapor in air are readily detectable.

[1] References are shown by bracketed numbers and are listed in order of appearance in the reference section.

[2] kPa shall indicate gauge pressure unless otherwise noted as (kPa, abs) for absolute pressure or (kPa, differential) for differential pressure. All kPa values are rounded off per CGA P-11, *Guideline for Metric Practice in the Compressed Gas Industry* [2].