ATIS-0600031.2019

(Pumped) Distributed Refrigerant Cooling – Standardized Infrastructure

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(Pumped) Distributed Refrigerant Cooling – Standardized Infrastructure

Alliance for Telecommunications Industry Solutions

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American National Standards Institute, Inc.

Abstract

Equipment cooling infrastructure solutions have expanded and adapted to meet increasing equipment heat loads and improved energy efficiencies. Infrastructure solutions now include energy efficient Close-coupled cooling (C^3) alternatives that bring the cooling (heat transfer) closer to the heat source. One C^3 solution utilizes distributed refrigerant as a thermal transfer medium. As the industry adopts and integrates Distributed Refrigerant Cooling (DRC) systems, common infrastructure standards are needed to ensure interoperability and connectivity between manufacturers. This standard outlines design requirements for a standard refrigerant distribution infrastructure.

Foreword

The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Standard.

As a leading technology and solutions development organization, the Alliance for Telecommunications Industry Solutions (ATIS) brings together the top global information and communications technology (ICT) companies to advance the industry's most-pressing business priorities. ATIS serves the public through improved understanding between carriers, customers, and manufacturers. The Sustainability in Telecom: Energy and Protection (STEP) Committee – formerly the Network Interface, Power, and Protection Committee (NIPP) – engages industry expertise to develop standards and technical reports for telecommunications equipment and environments in the areas of energy efficiency, environmental impacts, power and protection. The work products of STEP enable vendors, operators and their customers to deploy and operate reliable, environmentally sustainable, energy efficient communications technologies. STEP is committed to proactive engagement with national, regional and international standards development organizations and forums that share its scope of work.

ANSI guidelines specify two categories of requirements: mandatory and recommendation. The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages.

Suggestions for improvement of this standard are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, STEP, 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this standard, STEP, which was responsible for its development, had the following roster:

E. Gallo, STEP Chair (Ericsson)
J. Fuller, STEP Vice Chair (AT&T)
C. Forbes, STEP-NPP Chair (NTS)
C. Von Hagel, STEP-NPP Vice Chair (Intertek)

The Network Physical Protection (NPP) Subcommittee was responsible for the development of this standard.

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American National Standard on –

(Pumped) Distributed Refrigerant Cooling – Standardized Infrastructure

1 Scope, Purpose, & Application

1.1 Scope

This standard is part of a suite of standards supporting the installation design and material selection of distributed cooling systems for electronic equipment. More specifically, this standard addresses material and connectivity specifications for the deployment of a universal distributed refrigerant infrastructure. DRC systems are typically comprised of three (3) primary common elements: 1) Thermal transfer system – Refrigerant pumping unit; 2) refrigerant distribution infrastructure; and 3) close-coupled cooling units.

Unless otherwise specifically identified, this standard supports refrigerant systems incorporating R134aR134a, HFE, and HFO, as the refrigerants utilized in the distribution infrastructures between the pumping unit and close-coupled cooling units.

1.2 Purpose

The purpose of this standard is to provide support for the deployment of a universal application infrastructure for Distributed Refrigerant Cooling (DRC) systems. The universal application allows for the installation of a single, common infrastructure that is adaptable to support multiple vendors of DRC. This infrastructure may be designed and installed within an equipment area prior to the placement of equipment and racking, without specificity of the DRC vendor. This early placement may reduce overall installation costs and provides for more rapid deployment equipment build-outs in the supported space. The standard also provides for a designation of standard-refrigerant infrastructure interface(s) or port(s). This commonality provides manufacturers of equipment-specific standards and specifications for connectivity to the core refrigerant infrastructure. For the purposes of this standard, the primary cooling loop (e.g., chilled water, DX, etc.) is not included.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

[Ref 1] ANSI/ASHRAE Standard 15-2010, *Safety Standard for Refrigeration Systems.*[1]

[Ref 2] ANSI/ASHRAE Standard H23.5, *Streamline Copper Refrigeration Service Tube.*[1]

[Ref 3] ANSI/ASHRAE Standard 34-2010, *Designation and Safety Classification of Refrigerants.*[1]

[Ref 4] ASME B 31, *Power Piping.*[2]

[Ref 5] ASTM B 88-09, *Standard Specification for Seamless Copper Water Tube.*[3]

[Ref 6] ASTM B 280-08, *Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.*[3]

[1] This document is available from ASHRAE <https://www.ashrae.org/ >.

[2] This document is available from ASME < https://www.asme.org/>.

[3] This document is available from the American Society for Testing and Materials (ASTM) < http://www.astm.org