

Does Your CO₂ Meet Requirements?

By J. R. Nerat

When fire suppression products don't function as designed, experts are often called in to help identify the reason. Once a detrimental extinguishing agent or hardware problem is identified, the next step is figuring out who or what was responsible and if the situation could have been prevented.

Most fire equipment performance problems that occur in the field can, unfortunately, often be tracked back to a particular service procedure or company. While most service companies try to ensure all the services they provide are performed correctly, sometimes they simply are unaware of how they may be contributing to various performance related problems.

The pressure mediums used to charge and expel various forms of extinguishing agents must meet certain minimum specifications to ensure they do not create any potential problems. Hardware product listings, as well as various code compliance requirements,

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dictate recharge and service procedures utilize the proper expellant mediums.

The use of improper extinguishing or expelling mediums can affect extinguishing performance, as well as contribute to potential long-term hardware component problems within fire protection equipment. Problems associated with internal hardware components like safety reliefs and cartridge seal bushing assemblies can many times be directly linked with improper or contaminated carbon dioxide supplies. Of the many grades of carbon dioxide commercially available, it is important to point out that the med-

ical grade commonly referenced does not meet minimum fire equipment requirements. In reality, medical grade carbon dioxide is below the grade specifically identified and required for use within fire extinguishers.

Whether used as an expellant or extinguishing agent, the carbon dioxide utilized for fire protection purposes must meet certain minimum specifications. For portable CO₂ fire extinguishers, the *ANSI/UL 154* equipment hardware design and performance standard identifies the specific minimum grade of carbon dioxide manufacturers must use. It is specified that the vapor phase of carbon dioxide shall have a maximum water content of 60 parts per million (PPM) by weight at a dew point of -52°F, a minimum acceptable purity level of 99.5 percent, and maximum oil content of 10 PPM by weight. For many years, the grade of CO₂ identified in *NFPA 10* was wrong and should be corrected in the pending 2006 edition.

Carbon Dioxide Specifications:

CGA G-6.2-2000 (General/Basic Summary of Specifications)

<u>QVL</u>	<u>Applications</u>	<u>% CO₂</u>	<u>% Water</u>	<u>Dew Point</u>	<u>Oil Content</u>
E	Medical	99.0	200 ppm	-32°F	
G	Commercial	99.0	32 ppm	-60°F	
H	Food Processing	99.5	20 ppm	-67°F	
I	Beverages	99.9	20 ppm	-67°F	5 ppm

ANSI/UL 154 Standard

- Vapor phase not less than 99.5 percent carbon dioxide with no taste or odor
- Water content shall not be more than 60 ppm by weight at -52°F dew point
- Oil content shall not be more than 10 ppm by weight

2006 edition of NFPA 10 (Pending)

- Vapor phase of carbon dioxide shall not be less than 99.5 percent carbon dioxide
- Water content shall not be more than 60 ppm by weight at -52°F dew point
- Oil content shall not exceed 10 ppm by weight

**Readers should consult with their specific suppliers to determine the actual properties and various specifications of carbon dioxide available to them.*

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The specific characteristics and properties of carbon dioxide can be determined by using mass spectrometry analysis. Suppliers need to perform this test periodically to determine purity levels and ensure no detrimental impurities or contaminants exist.

While it is difficult for most fire equipment service companies to identify or determine if supplied carbon dioxide meets specifications, companies should be able to produce proper documenta-

tion that the materials they purchase for recharge meet requirements. Because suppliers will typically offer multiple grades of carbon dioxide, each purchase order should specifically identify and document the proper grade and properties of carbon dioxide desired.

Some fire equipment manufacturers provide the proper specification of carbon dioxide required within service manuals, while others reference the applicable NFPA or CGA standards for guidance.

To help service companies understand some of the variables associated with CO₂ specifications, this list provides some of the grades of carbon dioxide available, as well as the *ANSI/UL 154* specifications and new references in *NFPA 10*, pending the 2006 edition.

Remember the *ANSI/UL 154* and new *NFPA 10* specification recommendations are minimums, and that fire equipment manufacturers may specify or require a higher grade and purity to maintain product listings in the field. ♦

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