NIBCO INC.
WORLD HEADQUARTERS
1516 MIDDLEBURY ST.
ELKHART, IN 46516-4740
USA
PHONE: 574.295.3000
FAX: 574.295.3307
WEB: www.nibco.com

AHEAD OF THE FLOW®

TECHNICAL BULLETIN

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NIBCO® Bronze Ball Valves for Flammable Fluid and Fuel Gas Applications

Flammable fluids and fuel gas standards are different from those governing plumbing and mechanical piping systems. The following will attempt to explain these various standards and codes.

This paper is strictly concerned with fuel gases and flammable liquids used in retail, commercial, and residential construction. Valves for these markets are governed by requirements established by the American Gas Association (AGA), American Society of Mechanical Engineers (ASME), American National Standards Institute (ANSI), Canadian Gas Association (CGA), and Underwriters Laboratories (UL). UL or CSA International performs third party testing and listing. Valves for the production of petroleum products at the well head, refinery and in transportation are governed by standards developed by the American Petroleum Institute (API) and are not addressed in this paper.

The four valves offered by NIBCO for these applications and the standards that govern their design are:

- **T-585-70-UL/T580-70-UL**
  - UL 842
  - ASME B16.33 (The catalog refers to AGA B16.33 which is incorrect)
  - CGA 3.16
- **T-595-YUL/T-590-YUL**
  - UL 842
- **T-FP-600**
  - AGA 3-88
  - CR 91-002
- **GB-1/GB-2**
  - AGA 3-88
  - CR 91-002
  - Can 1-9.1 (now covered as CFA 9.1)
  - ANSI Z21.15
  - Can/CGA 9.2 (now simply CGA 9.2)

STANDARDS

UNDERWRITERS LABORATORIES (UL)

1. **UL842 Valves for Flammable Fluids**
   (T-585 / 580-70-UL and T-595 / 590-Y-UL)
   This standard establishes requirements for valves "that are intended to be used for the control of flammable fluids. They are of the type used commonly in piping systems and in the assembly of motor fuel dispensing and fuel burning equipment." Flammable fluids are defined as fuel oils, gasoline, kerosene, and similar petroleum products, liquefied petroleum gas (LP-Gas) in the gaseous phase not in excess of 1 psi, and manufactured and natural fuel gases. These valves are listed by UL for the following applications (letters within the parenthesis are UL classifications):

   a) **LP Gas Shut-Off (YSDT)** – Valves including DOT shipping container (cylinder) valves, gas line service valves and emergency shutoff valves. These valves are to be installed and used per NFPA 58 for the Storage and Handling of Liquefied Petroleum Gases. They are suitable for use with LP-Gas in either the liquid or gaseous phase at working pressures of at least 250 psi.
   b) **Compressed Gas Shut-Off (YQNZ)** – Valves including DOT shipping container (cylinder) valves and gas line service valves for use in systems storing and handling various compressed gases other than those for LP-Gas and anhydrous-ammonia.
   c) **Gas Shut-Off (YRPV)** – Valves intended for use in lines conveying fuel gases.
   d) **Flammable Liquid Shut-Off (YRBX)** – Valves designed for use in pipe lines or equipment assemblies for gasoline, kerosene, fuel oil, etc.
   e) **Manual Shut-Off (MHKZ)** – Valves used to shut off the flow to gas or oil burning equipment.

AMERICAN SOCIETY OF MECHANICAL ENGINEERING (ASME)

1. **ASME B16.33 Manually Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 psig (Sizes 1/2" through 2")**
   (T-585 / 580-70-UL)
   This standard applies to valves intended for outdoor installation as LP and natural gas shut-off valves at the end of the gas service line and before the gas regulator and meter where the designated pressure of the gas piping system does not exceed 125 psig.

2. **ASME B16.44 Manually Operated Metallic Gas Valves for Use in House Piping Systems**
   (Not referenced by NIBCO yet)
   This Standard covers quarter turn manually operated metallic valves intended for indoor installation as gas shutoff valves when installed in indoor gas piping between a gas meter outlet and the inlet connection to a gas appliance. The standard limits applications to temperatures between 32°F and 125°F at pressures not to exceed 2 psig. This is a Standard still in evolution. The new revision that is expected to be adopted in early 2001 will increase the pressure limits to 5 psig and establishes requirements for outdoor service below 32°F. This revised Standard is intended to replace AGA 3-88.

CSA INTERNATIONAL
(The recently established testing and approval agency for the Canadian Gas Association (CGA) and American Gas Association (AGA))

1. **CGA 3.16 Lever Operated Non-Lubricated Gas Shut-Off Valves**
   (T-585 / 580-70-UL)
   This Canadian standard establishes requirements for valves in gas service (natural, manufactured and liquefied petroleum gases) used for appliances, equipment and piping systems up to 125 psig.

2. **AGA 3-88 Manually Operated Gas Valves for Use in House Piping Systems**
   (T-FP-600 and GB-1 / GB-2)
   This standard establishes requirements for gas shut-off valves for indoor use with ratings of 2 psig or 5 psig. These valves are for use between the outlet of the gas meter and the inlet of appliances, inside the house.

3. **CGA CR91-002 Manually Operated Gas Valves for Use on Piping**
   (T-FP-600, GB-1 / GB-2)
   This Canadian standard establishes requirements for valves for indoor use between the gas meter and appliance at pressure ratings of 2 psig and 5 psig.

4. **CGA 9.2 Manually Operated Shut-Off Valves for Gas Piping Systems**
   (GB-1 / GB-2)
   This Canadian standard establishes requirements for valves downstream from the meter operating at a maximum of 1/2 psig.

5. **CGA 9.1 Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves**
   (GB-1 / GB-2)
   This is the same standard as ANSI Z21.15, below. The standard carries both numbers.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

1. **ANSI Z21.15 Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves**
   (GB-1 / GB-2)
   This standard establishes requirements for valves that are intended for direct hook up or are a part of an appliance and have pressure ratings not higher than 1/2 psig.

CODES

Codes cover specific installation practices. There are two primary model code bodies, one governed by the International Association of Plumbing and Mechanical Officials (IAPMO) and the other by the International Code Council (ICC).

IAPMO

The Uniform Plumbing Code published by IAPMO, says “all valves and appurtenances used in connection with the above piping shall be of a type designed and approved for use with fuel gas.” The phrase “designed and approved” means that the valve is designed to the appropriate ASME or ANSI standard. Chapter 14, Mandatory Referenced Standards, lists ASME 16.33 and ANSI Z21.15 but not AGA 3-88.

ICC

The International Fuel Gas Code requires that shut off valves operating above 0.5 psig comply with ASME B16.33. Valves operating below 0.5 psig are required to comply with ANSI Z21.15 or ASME B16.33. ICC does not list AGA 3-88 as a referenced standard.

NOTE: AGA 3-88 was not written as an ANSI Standard. Therefore, it has not become a nationally recognized standard. ASME 16.44 was written and is being revised to fulfill the requirements of 3-88 as an ANSI standard. ASME 16.44 is expected to be approved early 2001. The model codes should reference this Standard once it is adopted.

CERTIFICATION

Valves must be tested and approved before a manufacturer can put either the CSA (formerly AGA and CGA) or UL Mark on the valve. Representative valves are tested for failure under various stress and heat conditions by CSA International and Underwriters Laboratories. Each agency makes periodic inspections of the manufacturer’s production facilities. Both agencies will investigate field complaints of failures or design violations.