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## SELECTING AND INSTALLING PRESSURE REGULATORS

# 6 Gas-Pressure Regulator Questions, Part 2

**G**as pressure regulation is an important part of the overall safety for gas-fired equipment. Too much or too little gas pressure to the burner can result in an unstable burner or even an oven explosion. To help avoid this potential hazard, the National Fire Protection Association developed NFPA Standard 86 to address specific control requirements that all gas trains must have.

In order to control gas pressure within operating parameters, regulators must be properly selected, installed and set to meet NFPA 86. Last month, I outlined four of six questions to ask:

- When is a regulator required?
- Is a lockup-type regulator required?
- What are the venting requirements for regulators?
- Is a listed regulator required?

In this issue, I'll complete the list of questions to ask as well as look at upstream vs. downstream and authorities having jurisdiction.

### 5. Can the Regulator Be Mounted Downstream of the Safety-Shutoff Valves?

With the advent of new types of controls, there are advantages to mounting the pressure regulator downstream or upstream of the safety-shutoff valves, depending on the type of pressure regulator used. Currently, NFPA 86 does not have specific requirements for the relative position of the equipment pressure regulator in relation to the safety-shutoff valves. NFPA 86 simply requires that the pressure regulator be mounted downstream of the strainer/filter (see 6.2.5.3.3). Because the mandatory requirements of NFPA 86 do not prohibit mounting the gas-pressure regula-

### MOUNTING UPSTREAM OR DOWNSTREAM

**A** safety advantage to mounting the gas-pressure regulator upstream of the safety valves is that the low-gas pressure switch is able to monitor the outlet pressure of the regulator for a low-gas condition that produces an unstable burner. In the case when the low-gas switch is mounted upstream of the pressure regulator and the pressure regulator is the cause of the low-gas condition to the burner, only the flame detection system will shut down the system if and when the flame goes out.

An advantage to mounting the regulator downstream of the safety valve is that the regulator will function better by responding faster and more accurately to back pressure coming from the burner and to changes to the inlet pressure to the regulator. Having better gas-pressure control to the burner reduces the chance of having an unstable burner.

tor downstream of the safety-shutoff valves, the regulator may be installed downstream of both safety-shutoff valves. This statement may seem contrary to the requirements in NFPA 86 because its appendix illustrates the position of the equipment regulator to be upstream of the safety-shutoff valves. However, the appendix is intended to be explanatory information for guidance; it is not

mandatory language (see the beginning of Annex A on page 65 of NFPA 86-2003). There are safety advantages to either arrangement (see sidebar "Mounting Upstream or Downstream").

### 6. Are Multifunctional Controls Allowed?

A multifunctional control is a device that integrates a safety-shutoff valve

### AUTHORITY TRUMPS NFPA

**W**hen meeting NFPA 86 pressure regulator requirements, don't forget that the standard does not supersede the requirements of the authority having jurisdiction, which trumps NFPA mandates and its exceptions. For example, the AHJ may require all pressure regulators to be vented, no exceptions. The AHJ may demand that the pressure regulator be mounted upstream of the safety-shutoff valves, that the pressure regulator be listed by a nationally recognized testing laboratory, or that the pressure regulator be a lockup type.

In cases where an oven built to NFPA 86 does not satisfy the AHJ, there are, essentially, two options. One is to make changes that satisfy the authority, and the other is simply to work with the authority to get a variance, which also may need to be authorized by a professional engineer having a license that is accepted by the AHJ.

Both options can be costly, and that's why knowing the applicable codes and standards is of great value when selecting and installing a gas pressure regulator on an oven.

and a gas-pressure regulator or a flow-control device that can vary gas flow to the burner. Typically, the shutoff-valve seat in a multifunctional control is also the regulating disk of the regulator, which regulates or modulates the gas flow to the burner. NPFA 86 does not prohibit the use of such devices to meet 6.2.5.4.1, which requires a gas-pressure regulator but also allows a flow-control device as an alternative. However, when using a multifunctional control for flow control, NPFA 86 does require that the safety-shutoff valve within the multifunctional control be listed as a safety-shutoff valve by a nationally recognized testing laboratory, and that the multifunctional control be designed and tested by the control manufacturer for its intended purpose (see 7.7.1.3). The flow control part of the multifunctional control does not have to be listed.

With regard to safety, there are advantages to using multifunctional controls, depending on the application. For one, multifunctional controls regulate gas pressure more precisely; the hysteresis can be less than 1 percent rather than 10 percent to 15 percent or more on some standard gas-pressure regulators. Generally speaking, this advantage is more significant for modulating burner applications. In addition, having the regulator internal to the control reduces the number of pipe joints, which reduces potential sources for external gas leakage. **PH**

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Given the complexity and diversity of combustion applications, this article is not intended to relieve any user and/or company from taking it upon themselves to gain a thorough understanding of NFPA codes and standards, and the requirements for compliance of the user and/or company's own operation. As such, the author and Karl Dungs USA disclaim liability for any personal injury or property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of or reliance on this article.