

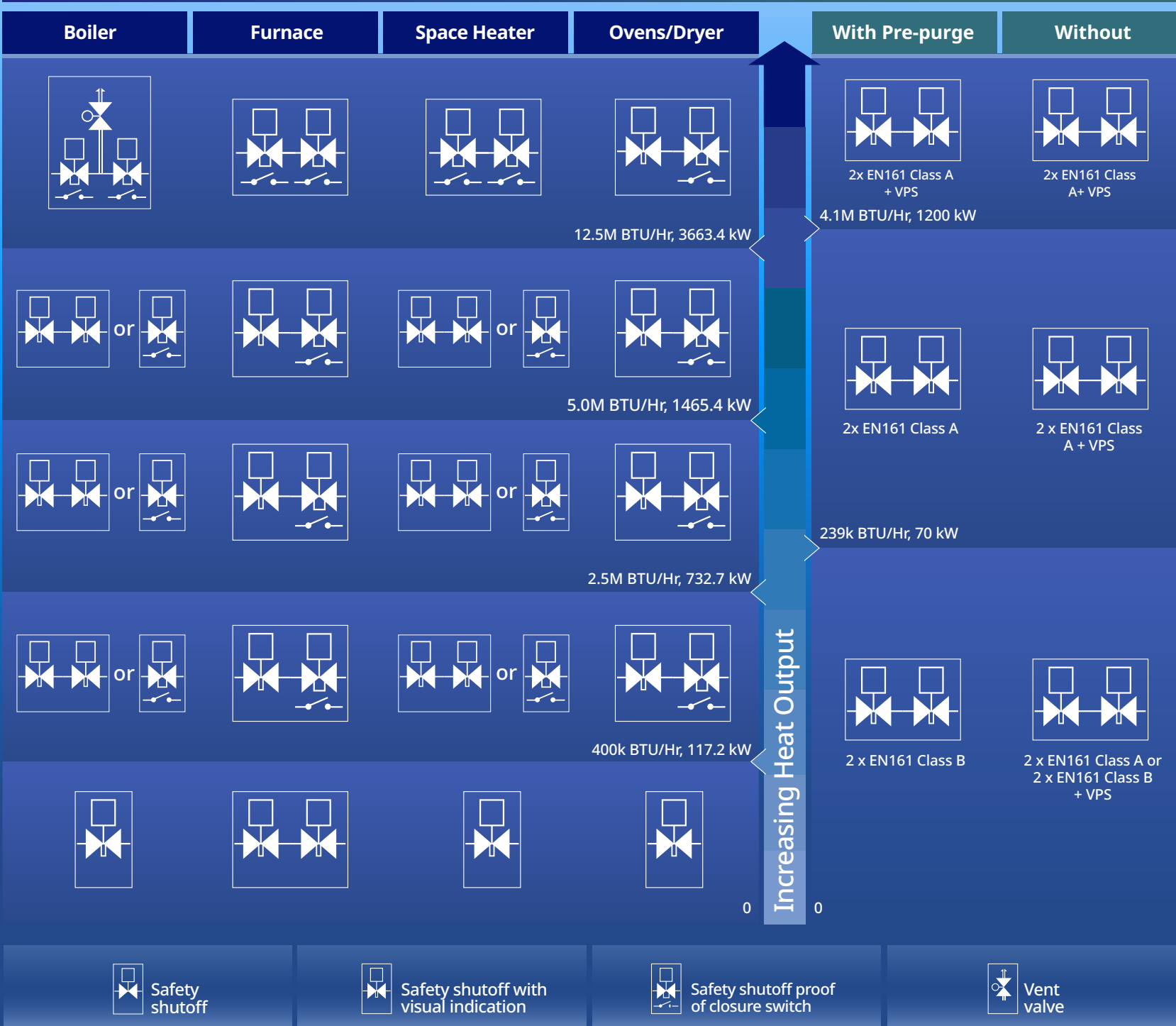
Industrial Burner Main Certifications by World region

Local regulations may vary at the Country, State, and/or City level



(UL,FM, CSA) North America (CE) Europe

Safety Shutoff Valve Configurations



Safety shut-off valves need to be 3rd party certified

North America

- FM** APPROVED: FM7400: Performance requirements for liquid and gas Safety Shutoff Valves
- UL**: UL429: Electrically Operated Valves, needs to be listed as Safety Shutoff Valve
- SP**: CSA/ANSI Z21.21 C/I • CSA 6.5 C/I: Automatic valves for gas appliances
- ANSI**: CGA 3.9-M94: Automatic Gas Safety Shutoff Valves

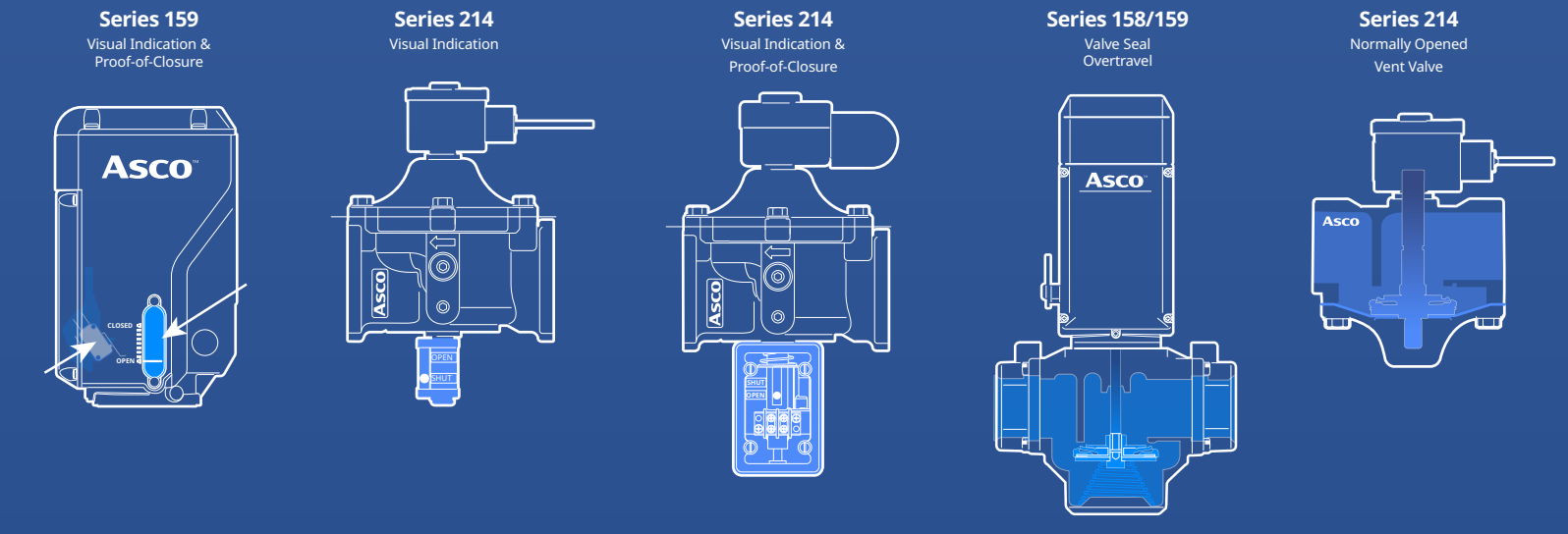
Europe

- CE**: EN13611: Safety and control devices for burners and appliances burning gaseous and/or liquid fuels - General requirements
- EN 161**: Automatic shut-off valves for gas burners and gas appliances for operating pressure up to 500 kPa
- EN 16678**: Automatic shut-off valves for gas burners and gas appliances for operating pressure of above 500 kPa up to and including 6 300 kPa

Valves Technical Specifications

North America

- Visual Indication (VI):**
 - Must be able to visually see at a distance, what state the valve is in if light used, absence of light can't show position
- Proof Of Closure Switch (POC):**
 - An electronic switch that closes when the valve is closed, sending a signal to your controller that the valve is closed. This switch is factory set and can not be adjusted in the field
 - POC needs to be triggered by a valve overtravel
 - Overtravel occurs when the valve closes and travel beyond closure
- Vent Valve:**
 - Normally Open Valve is used to allow venting of air or gas from the combustion system to the atmosphere
 - Releases the gases trapped between the two Safety Shutoff Valve (SSOV) when SSOV's are closed
 - Vented to a safe area

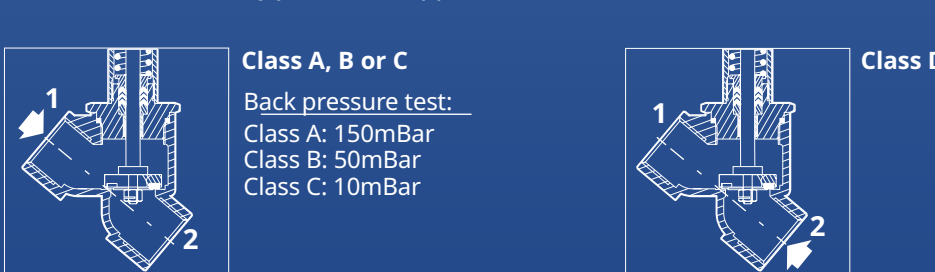


Europe

- EN 13611:** Safety and control devices for burners and appliances burning gaseous and/or liquid fuels - General requirements
- + additional requirements for Automatic shutoff valves**
- EN 161:** Automatic shut-off valves for gas burners and gas appliances

EN161 Classes:

Class	Description	Test Pressure Opposing Flow Direction
Class A	Valves where sealing force is not decreased by the gas inlet pressure	15 kPa (150 mbar, 2.2 psi)
Class B		5 kPa (50 mbar, 0.7 psi)
Class C		1 kPa (10 mbar, 0.14 psi)
Class D	Valves which are not subject for sealing force or fixed closing time requirements. <i>Note: only for control application</i>	N/A



Valve Proving System (VPS)

Is a certified system used on gas burners which can prove that the double Safety Shutoff Valve (SSOV) arrangement is closed and tight by detecting leakages through a specific test. Two kinds of VPS are used in the industry: Active/pressure VPS or passive/static VPS.

Mandatory in Europe

- European Standard EN 746-2 for industrial thermoprocessing equipment makes VPS mandatory for system with heat output >1,200kW.
- European Standard EN 676 for automatic forced draft burners for gaseous fuels makes VPS mandatory for system with heat output >1,200kW.
- The VPS system needs to be certified by EN 1643.

Can be accepted in North America as an alternate to Vent Valves

- NFPA 85 (when venting of gas is prohibited).
- NFPA 160, Standard for Flame Effects Before an Audience.
- Fuel-fired equipment insured by Factory Mutual (FM).

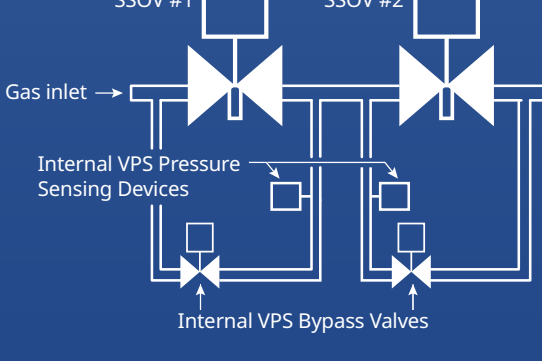
Can be accepted in North America as an alternate to POC

- NFPA 86.
- Fuel-fired equipment insured by FM.
- Fuel-fired equipment insured by GE GAP Services.

Passive/Static Valve-Proving System

Separately tests valves by running a specific sequence. This burner management system is handled directly by the Burner Management System or by a dedicated device. It will open and close individually the safety shut off valves and monitor pressure rise or pressure decay. To avoid opening and closing the SSOVs, and keep a similar sequence, some discrete VPS have internal bypass valves.

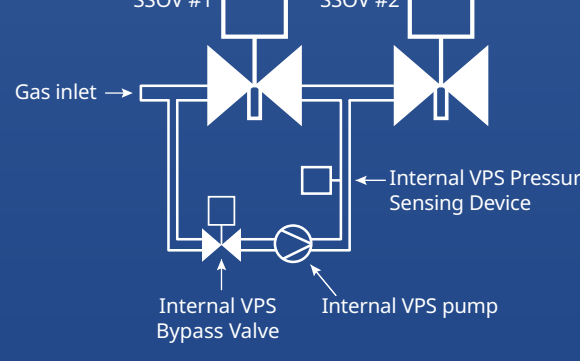
Stand alone VPS with internal pressure sensing and bypass valves



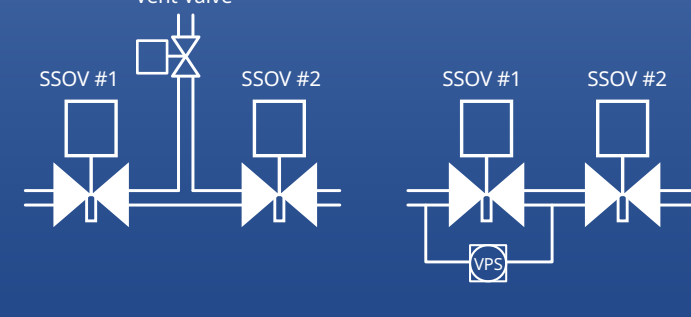
Active/Pressure Valve-Proving System

Tests both valves at the same time. It uses a pump and an internal valve to pressurize the volume between the 2 safety shutoff valves of the burner. The pressure trapped here, ends-up being higher than the fuel train pressure. The VPS then monitors this overpressure. If any change is noticed during the specified time, the test has failed. If the overpressure is maintained, the valves passed the test and are proven to be closed.

Stand alone active VPS with internal pump and sensing pressure



An Alternative to Vent Valves



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