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May 24, 2012

SAFETY INFORMATION BULLETIN: SB12-01

**PRESSURE RELIEF DEVICE INLET AND DISCHARGE PIPING GUIDE FOR
 ONTARIO BOILERS AND PRESSURE VESSELS REGULATION O/REG.220/01 AND
 ONTARIO OPERATING ENGINEERS REGULATION O.REG. 219/01**

This is a general guide intended to assist Designers, Installers and Inspectors in determining when pressure relief device discharge piping must terminate inside or outside a building, or alternatively may require discharge to a suitable collection system. This document is not a substitute for, and should be used in conjunction with, the Regulations, Codes and Standards applicable to a particular installation.

FLUID TYPE	DISCHARGE TO
Water or liquids not more hazardous than water. Temperature from 0 to 65 degrees Celsius (32-150 degrees F)	A safe point inside or outside the building (for example a floor drain for water, or other liquids permitted in sewers).
Water or liquids not more hazardous than water. Temperature from 66 to 99 degrees Celsius (151-211 degrees F)	A safe point inside or outside the building. Terminate the discharge pipe not more than 6 inches from the floor in a manner to prevent splashing and scalding of personnel, or damage to sewers (e.g. cool to a max. of 65°C for sewer, see local Municipal By-Laws)
Steam	A safe point outside the building (see below)
High or Low Temperature Fluids that can cause burning, scalding, freezing, etc.	A safe point outside the building, or to a suitable closed collection system, when applicable
Fluids more hazardous than water (noxious, toxic, poisonous, etc)	A safe point outside the building, or to a suitable closed collection system, when applicable
Flammable fluids and gases	A safe point outside the building only (see below)
Gases (breathable)	A safe point inside or outside the building. Note that special precautions may be necessary for oxygen released inside a building.
Gases (non-breathable) e.g. inert gases, refrigerants, etc.	A safe point outside the building, or to a suitable closed collection system, when applicable



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Pressure Relief Device Inlet Connections

Pressure Relief Devices shall be installed in accordance with the manufacturer's instructions and,

- 1) Inlet connections of Pressure Relief Devices shall be:
 - a) directly connected to the pressure source with no intervening valves;
 - b) as short and straight as possible (e.g. avoid elbows, etc.);
 - c) configured so as to not restrict the pressure relief device inlet;
 - d) at least the full cross sectional area of the pressure relief device inlet;
 - e) installed so as to avoid undue stresses on the pressure relief device.

Pressure Relief Device Discharge (Outlet) Piping

- 2) Pressure Relief Device discharge piping shall be:
 - a) as short and straight as possible;
 - b) configured so as to not cause back pressure on the pressure relief device;
 - c) at least the full cross sectional area of the pressure relief device outlet, or larger (particularly for long pipe runs to avoid back pressure)
 - d) installed so as to avoid undue stresses on the pressure relief device.
- 3) No valves are permitted between the pressure relief device outlet and the point of discharge.
- 4) All Pressure Relief Device discharge piping shall be directed to a safe point of discharge, away from people, structures or items including running boards, platforms, ladders or other areas used by personnel and away from any windows, doors, air intakes for ventilation, air compression, etc. where the discharged fluid could re-enter the building or other equipment.
- 5) Ensure there is ample provision for gravity drain of the discharge line at all points, including the valve seat area on pressure relief valves, to prevent the accumulation of liquid, including condensation, and deposits.
- 6) Ensure that discharge lines vented outside a building are protected from freezing and ingress of water or foreign material.
- 7) The effects of a fire on the pressure relief discharge piping and discharged fluid should be considered.



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Note: Reference shall be made to construction codes for specific requirements and exemptions.

Some Reasons for Discharge Requirements to Specific Locations

There are a number of reasons why pressure relief devices must be discharged outside a building, or to suitable collection systems, including the following:

- Fluid discharge can be dangerous to people as a result of any number of fluid effects such as pressure, temperature, noise from discharged fluid, fluid type and toxicity, quantity of fluid released, etc.
- Steam and condensation can damage electrical controls as well as building internal construction materials.
- Steam can burn the skin, as well as the windpipe and lungs of people if inhaled, it also displaces the breathable air in a room. Exposure to steam can also cause death.
- Non-breathable gases can asphyxiate people in a building by displacing the breathable air.
- Some fluids are too hazardous to discharge into the atmosphere and must have suitable collection systems installed on the pressure relief device discharge line.

Other Regulations

Other Ontario Regulations may also apply to the discharge of fluids into the environment e.g. Ministry of the Environment, Ministry of Labour, etc. The Designer and/or Installer must also comply with all such Regulations.

References

ASME Section I - Power Boilers
ASME Section IV - Heating Boilers
ASME Section VIII, Div. 1, Appendix M - Pressure Vessels
ASME B31.1 - Power Piping
ASME B31.3 - Process Piping
ASME B31.5 - Refrigeration Piping and Heat Transfer Components
CSA-B51 Boiler, Pressure Vessel and Pressure Piping Code
CSA-B52 Mechanical Refrigeration Code
National Board Inspection Code NB-23