



Replace Burst Plates with Secondary Relief Valves



Technology/Practice Overview

Description

Rupture Discs, or “Burst Plates,” are a low capital cost alternative to pressure relief valves, for the protection of process equipment when gas pressures rise to levels exceeding the maximum allowable operating pressure. These burst plates are for one-time use only. If the calibrated metal membrane (burst plate) is broken by excessive gas pressure, significant amounts of methane, along with volatile organic compounds (VOCs), and hazardous air pollutants (HAPs), vent to the atmosphere until the device is manually blocked-in and the broken plate replaced with a new plate.

One Partner has reported installing secondary pressure relief valves (PRVs) on burst plates to reduced methane emissions. The pressure relief valve will open when the burst plate breaks, and

then automatically close when the gas pressure returns to safe levels. Installing PRVs on top of burst plates has the dual benefits of reducing fugitive leaks while the burst plate is intact, and minimizing gas release during pressure surges.

Operating Requirements

The PRVs have to pass the ASME Code 26 and Department of Transportation’s pressure relief valve requirements.

Applicability

PRVs added in conjunction with burst plates are most advantageous at unmanned sites that may be prone to pressure surges.

Methane Emissions

The methane emissions reductions can be estimated using vendor’s data, which is readily available for any size burst

- Compressors/Engines
- Dehydrators
- Directed Inspection & Maintenance
- Pipelines
- Pneumatics/Controls
- Tanks
- Valves
- Wells
- Other

Applicable Sector(s)

- Production
- Processing
- Transmission
- Distribution

Other Related PROs:

Test and Repair Pressure Safety Valves, PRO No. 602

Install Flares, PRO No. 904

Economic and Environmental Benefits

Methane Savings

Estimated annual methane emission reductions 500 Mcf per rupture

Economic Evaluation

Estimated Gas Price	Annual Methane Savings	Value of Annual Gas Savings*	Estimated Implementation Cost	Incremental Operating Cost	Payback (months)
\$7.00/Mcf	500 Mcf	\$3,700	\$2,000	\$100	7 Months
\$5.00/Mcf	500 Mcf	\$2,700	\$2,000	\$100	10 Months
\$3.00/Mcf	500 Mcf	\$1,600	\$2,000	\$100	16 Months

* Whole gas savings are calculated using a conversion factor of 94% methane in pipeline quality natural gas.

Additional Benefits

- Avoidance of catastrophic events in gas service lines

Replace Burst Plates with Secondary Relief Valves (Cont'd)

plate and pressure rating (e.g., 8,000 scf per minute for a 2-inch burst plate operating at 150 psig).

Economic Analysis

Basis for Costs and Emissions Savings

Methane emissions reductions of 500 Mcf per year apply to a single incident of rupturing a 2-inch burst plate on a 150 psig system and venting gas continuously for 1 hour until manually blocked in and replaced.

The implementation costs are assumed to be \$2,000 for purchasing and installing a pressure relief valve.

Discussion

The primary benefit of this PRO is to save natural gas. An additional benefit is the avoidance of catastrophic events in gas service lines. The capital costs are based on installing a pressure relief valve on top of a rupture disk. The maintenance costs are for inspecting the valve once a year for leakage. The payback is based on the vented gas savings.

Methane Content of Natural Gas

The average methane content of natural gas varies by natural gas industry sector. The Natural Gas STAR Program assumes the following methane content of natural gas when estimating methane savings for Partner Reported Opportunities.

Production	79 %
Processing	87 %
Transmission and Distribution	94 %