

N-P-MC 110



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Relief and Flashback Protection Device Inspection

This Technical Rule can be used at all BASF sites in North America, which are bound by BC032.020 Pressure Relieving and Venting Devices.

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1 Purpose and Benefits

To provide a guideline to help the user achieve compliance with the requirements of *BC032.020 Pressure Relieving and Venting Devices*, *BC032.025 Flashback Protection Devices/Systems*, and other Regulatory Requirements.

This guideline will provide consistent methodology across North America to achieve compliance with corporate requirements.

2 Procedure

2.1 General Requirements

All relief and flashback devices (including throw-away units) should have an as-found visual inspection to document the condition and highlight any problems or concerns.

Each site will develop a Written Preventative Maintenance Program, per section 4.2 of *BC032.020 Pressure Relieving and Venting Devices*, and section 4.2 of *BC032.025 flashback Protection Devices/Systems*, including responsibilities for the following:

- Relief Valves
- Rupture Discs
- Conservation Vents
- Weighted Manways
- Flashback Protection Devices

The Program should meet the requirements of *BC032.020 Pressure Relieving and Venting Devices* and *BC032.025 Flashback Protection Devices/Systems*.

Field EVT testing of pressure safety valves application and restrictions are defined in Annex 1. NGMC110D.

2.2 Inspection Frequency

For newly installed devices, the Responsible Technical Representative and Owner will establish relief device inspection frequencies. This determination must consider the severity of service, process corrosion or fouling conditions, whether the relief device is protected by a rupture disc, and the potential risk to plant safety associated with device failure. The recommended frequency can also be based on devices in the same or similar service.

The Responsible Technical Representative will assign subsequent inspection frequencies for relief devices, pressure safety elements, and flashback devices based upon this guideline. These **typical** inspection frequencies are for devices which have successfully passed initial inspections, and have not failed subsequent inspections:

- 3 years recommended for devices in heavy fouling or corrosive process services that may have an adverse effect on the mechanical performance of the valve, or in new process services that have no operating history. Frequencies may be set to accommodate unit turnaround cycles.
- 5 years recommended for devices in light fouling services.

- 5 years for devices in other process or utility services. This can be increased to a maximum of 10 years (consistent with API 510) for clean [non-fouling] and noncorrosive services if inspection history indicates no performance problems and a formal Risk Analysis/Assessment is performed and documented.
- Domestic hot water heater relief valves do not require testing and need to be replaced every 10 years.
- Flashback protective devices, such as flame arrestors, depend upon the fouling characteristics of the process. The frequency must be considered on a case-by-case basis. Any monitoring instruments associated with the flashback protection device must also be inspected and tested at an established frequency.
- When rupture discs are equipped with Burst Disc Indicators (BDI's), consideration should be given to periodic testing of the BDI's.

The Responsible Technical Representative is responsible for identifying and implementing changes to inspection intervals based upon the service history. The Responsible Technical Representative will review the device service and inspection history before adjustments are made to the current inspection frequency.

Relief devices that fail to pass the shop pretest, or show heavy fouling, or have experienced material failure, will be reviewed for corrective action by the Responsible Technical Representative. The inspection cycle will typically be reduced until the failure mechanism has been improved. If the relief device passes the inspection during the next cycle, the Responsible Technical Representative will review the device service and safety risk, and then reset the inspection frequency to the appropriate term.

2.3 Inspections for New, Refurbished, or Stored Devices

New devices purchased for routine replacements or capital projects should be verified to be in proper working condition prior to installation, are distinctively marked (such as color coded), and have all the required documentation.

Devices that have been held in storage may be placed into service without additional inspections or tests by a certified repair facility providing:

- Storage is adequate to ensure device integrity and cleanliness
- Device is protected against foreign material and debris from entering the internals
- Device is inspected by a knowledgeable individual and is verified to be without rust, corrosion, debris or other visible damage.

The inspection frequency start date will be the date actually placed in service. The date placed in service must be documented

Devices, which do not meet the storage and inspection criteria should be shop tested or inspected by a qualified individual as appropriate prior to installation.

2.4 Extension of Scheduled Inspections

Temporary extensions may be needed from time to time because devices are unavailable for inspection due to production requirements, marketing requirements etc. Proper planning and cooperation between Production and Maintenance will make these requests an exception. Inspection intervals are predetermined on a technical basis, and upcoming inspections must be reviewed in advance.

If the equipment will not be available for inspection the following must be done:

- The owner fills out a temporary extension request and forwards it to the Responsible Technical Representative. Included must be the reason for the request, a firm date that the equipment will be available for inspection and the consequences of equipment failure with regard to safety, ecology, and production.
- The Responsible Technical Representative completes and documents a technical risk assessment, including a review of the inspection history of the relief device, service, physical arrangement (rupture disc below the device, relieves into containment, etc.), etc. The Responsible Technical Representative then provides comments on any concerns with the extension request and forwards it to the area TES Manager (or equivalent).
- The TES Manager (or equivalent) reviews the data and approves/rejects the extension request and forwards to Operations Manager (or equivalent).
- The Operations Manager reviews the data and approves/rejects the extension request and returns to the Responsible Technical Representative.
- Upon approval the Responsible Technical Representative or designee changes the inspection due date.
- The circuit breakers for this guideline are the TES Manager and the Operations Manager (or equivalent, in both cases). Both must approve for extension to be granted.
- It is not allowable for any inspection to become overdue unless an extension request is properly submitted and approved.

2.5 Exemptions to this Rule

2.5.1 Integral Relief Valves on Positive Displacement Pumps

Most positive displacement pumps come with relief valves as a standard feature or as an option. These relief valves are intended to protect only the pump by recirculating the pumped fluid from the pump discharge to the pump suction when their set pressure is exceeded. They cannot be used as a PSV to protect the piping system, are not defined as a "PSV", and are not included in this Guideline. A PSV is installed to protect the system piping and vessels. Many of these relief valves can only be set or checked for the proper relief pressure while installed on the pump. Others can be removed and the pressure set or checked on a test stand. In either case this is part of the pump PM and not a part of the PSV program.

2.5.2 Pressure control valves

A device that controls the pressure of a system within specified operating limits. For example, Fulflo valves on lube oil systems.

2.5.3 Pre-test Failure

For the purpose of this Guideline, a failed pretest is one in which the relief device would not protect a vessel or system from overpressure or vacuum within the tolerances listed below:

For relief devices in liquid, vapor, or unfired vessel steam service (Section VIII):

- +/- 2 psig (15 kPa) of set pressure for pressures up to and including 70 psig
- +/- 3% of set pressure for pressures above 70 psig

For boiler (Section I) relief devices:

Set Pressure, psi	Tolerance, +/- from Set Pressure
▪ < 70	2 psi
▪ > 70 and < 300	3% of Set Pressure
▪ > 300 and < 1,000	10 psi
▪ > 1,000	1% of Set Pressure

Fouling within a device is subjective and difficult to quantify. Fouling can occur when the product fluid plates out on internal components. This is considered 'Light Fouling'. Fouling becomes an issue if it is severe enough to affect performance (either set pressure or restricted flow). This is considered 'Heavy Fouling'. The inspection and repair report should note if this occurs and will be considered a "failed" pretest.

Leakage on the pretest is not considered "failed", unless the leak causes an unsafe condition in service.

An early lift on the pretest is not considered "failed", unless the leakage causes an unsafe condition in service.

2.5.4 Electronic Valve Tester (EVT)

Device used to field test and confirm the set-pressure of a Pressure Safety Valve. The Device does not confirm any other mechanical integrity issues with the valve (e.g. full relief capability of valve, internal condition of valve, etc).

3 Responsibilities

The responsibilities are to be defined at each site and included in the Written Preventative Maintenance Program.

4 Glossary

Pressure Relief Device	A device used to protect a piece of equipment or a piping system from an overpressure or under pressure (vacuum) condition, including rupture discs, Pressure Safety Valves (PSV), conservation vents, tank emergency vents, rupture pin devices, etc.
Pressure Safety Element (PSE)	A device used to protect a piece of equipment or a piping system from an overpressure characterized by non-reclosing action. Typically, a PSE refers to a rupture disc or rupture pin device.
Owner	The Operations Manager (or equivalent) or their designee responsible for the operation of relief and flashback protective devices.
Responsible Technical Representative	Member of the Technical Engineering Services (TES), Maintenance, or other department with responsibility for: <ul style="list-style-type: none"> ▪ Defining relief device inspection frequencies, including changes to intervals ▪ Reviewing inspection history of the relief device and making recommendations to inspection interval extension requests ▪ Defining and implementing corrective actions to resolve deficiencies based upon inspection and test results
Flashback Protection Devices (Flame Arrestor)	Flashback Protection Devices (Flame Arrestor) are devices installed in the normal vent line of a tank, vessel, or piping system, designed to stop the propagation of a flame front. Devices falling into this category include flame arrestors and detonation arrestors.

5 References

BC032.020	Pressure Relieving and Venting Devices
BC032.025	Flashback Protection Devices/Systems
API 510	Pressure Vessel Inspection Code: In-Service Inspection, Rating, Repair, and Alteration
API 576	Inspection of Pressure Relieving Devices

6 Attachments

N-P-MC 110 Annex 1	Application and Restrictions for Field EVT Testing of Pressure Safety Valve
N-P-MC 110 Form 01	Typical Relief Device Extension Request
N-P-MC 110 Form 02	Typical Rupture Disc Preventative Maintenance
N-P-MC 110 Form 03	Typical Flashback Device Preventative Maintenance

7 Overview of Changes

Compared to **N-G-MC 110:May-2009** following changes have been made:

Table 2-1: Overview of the Most Important Changes

Section	Short Description of Changes
Section 2	Moved Definitions to the Glossary; "Exceptions" became Section 2.5
Section 3	Removed Scope; its stated on Cover page
Section 3	Changed from Guideline to Recommended Procedure
Section 3	Added flexibility where the "TES Manager" title that is used; Now included "or equivalent" Added language to the requirements for "Responsible Technical Representative" review on extension requests Changed the pretest tolerances to align with ASME Sec VIII and Sec I

Approval

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