Pressure Vessel Newsletter

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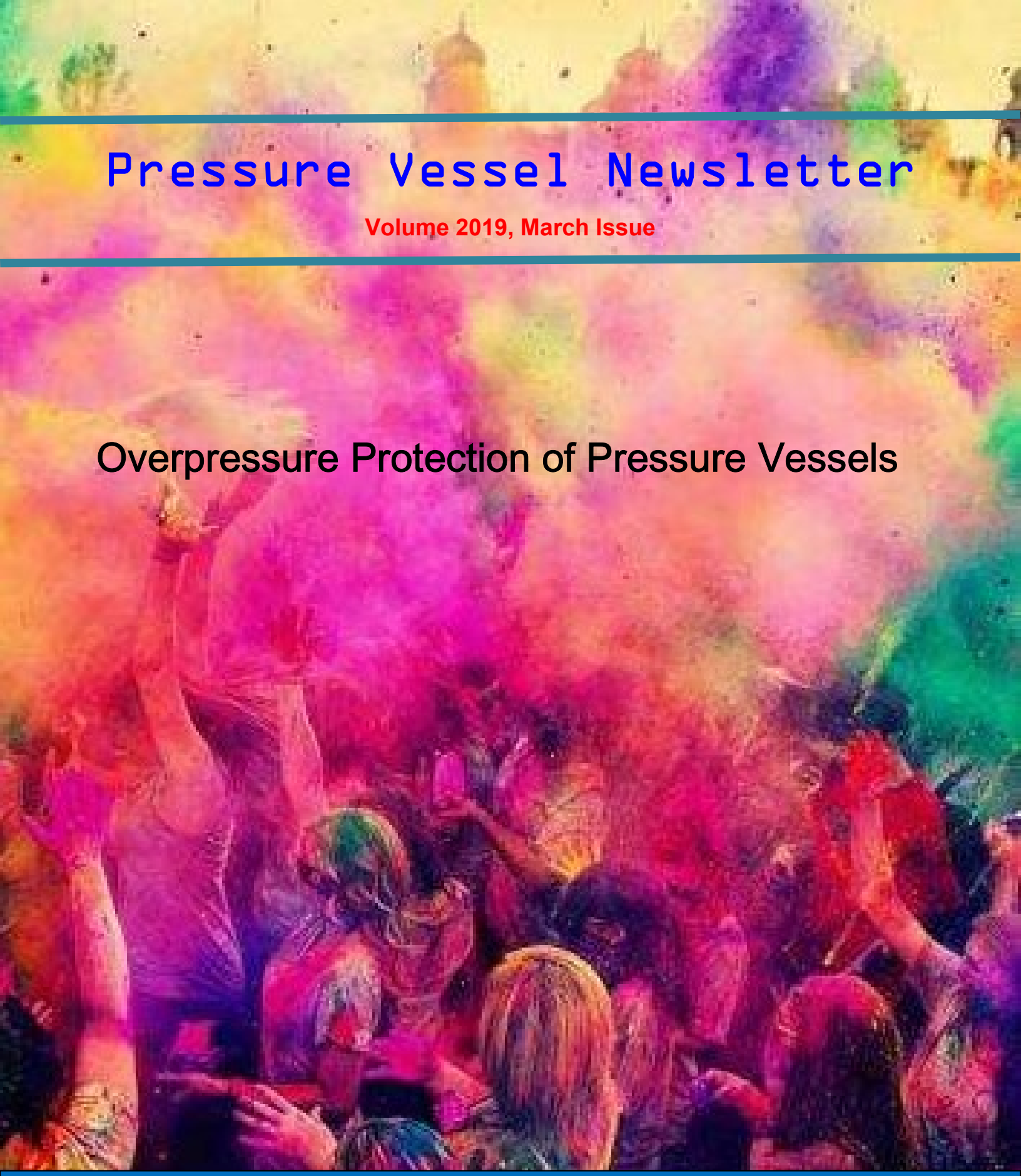
Overpressure Protection of Pressure Vessels



Serving the Pressure Vessel Community Since 2007

From The Editor's Desk:

"I smile and start to count on my fingers: One, people are good. Two, every conflict can be removed. Three, every situation, no matter how complex it initially looks, is exceedingly simple. Four, every situation can be substantially improved; even the sky is not the limit. Five, every person can reach a full life. Six, there is always a win-win solution. Shall I continue to count?"

Remembering Dr. Goldratt on his birth anniversary today (31st March).

Eliyahu Goldratt was an Israeli business management guru. He was the author of several business novels and non-fiction works, mainly on the application of the theory of constraints to various manufacturing, engineering, and other business processes.

The processes are typically modeled as resource flows, the constraints typically represent limits on flows. In his book, *The Goal*, the protagonist is a manager in charge of a troubled manufacturing operation. At any point in time, one particular constraint (such as inadequate capacity at a machine tool) limits total system throughput, and when the constraint is resolved, another constraint becomes the critical one. The plot of Goldratt's stories revolve around identifying the current limiting constraint and raising it, which is followed by finding out which is the next limiting constraint. Another common theme is that the system being analyzed has excess capacity at a number of non-critical points, which, contrary to conventional wisdom, is absolutely essential to ensure constant operation of the constrained resource.

Goldratt's management concepts can be applied across all industries, manufacturing as well as engineering as his theory is based on identifying and fixing the constraints. The constraint can be a machine in a manufacturing environment or a process in a non-manufacturing environment. Successful application of his concepts rely heavily of continuous monitoring as constraints are always present and moving in any system. It is not possible to eliminate constraints – we can only manage them. He also goes on to prove in one of his books that to strive for 100% efficiency in an organization is a sure path to failure. We should instead strive for optimization.

For those interested in learning more about his theories, *The Goal* is a good place to start.

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OVERPRESSURE PROTECTION OF PRESSURE VESSELS

This article is a summary of the requirements from ASME Section VIII, Division 1, paragraphs UG-125 through UG-140. These requirements also apply to the pressure vessels that are constructed to the rules of ASME Section VIII, Division 2. All pressure vessels that are constructed to ASME Section VIII requirements are required to be provided with overpressure protection. This article will not discuss the overpressure protection requirements of unfired steam boilers.

Pressure relief valves or non-reclosing pressure relief devices may be used to protect against overpressure. A *pressure relief valve* is a pressure relief device which is designed to reclose and prevent the further flow of fluid after normal conditions have been restored. A *non-reclosing pressure relief device* is a pressure relief device designed to remain open after operation.

The overpressure protection system need not be, and is generally not, supplied by the vessel manufacturer. Further, the PRD need not be installed directly on the pressure vessel when there are no intervening stop valves between the vessel and the PRD or PRD's.

RESPONSIBILITY OF THE USER

The user or his/her designated agent's (User) plays a central role in providing overpressure protection for pressure vessels. User's responsibilities include:

1. Identifying all potential overpressure scenarios and the method of overpressure protection used to mitigate each scenario.
2. Ensuring that the required overpressure protection system is properly installed prior to initial installation.
3. If pressure relief device(s) (PRD) is to be installed, sizing and selecting the PRDs based on its intended service. Intended service considerations include normal operating and upset conditions, fluids and fluid phases.

CODE REQUIREMENTS FOR PRDs

When a PRD is provided, it shall prevent the pressure from rising more than 10% or 3 psi, whichever is greater, above the maximum allowable working pressure (MAWP). There are two exceptions:

1. When multiple PRDs are provided, they shall prevent the pressure from rising more than 16% or 4 psi, whichever is greater, above the MAWP.
2. When the pressure vessel can be exposed to fire or other unexpected sources of external heat, the PRDs shall be capable of preventing the pressure from rising more than 21% above the MAWP.

The requirements of 1) and 2) do not apply to vessels having no permanent supply connection and used for storage at ambient temperatures of non-refrigerated liquefied compressed gases, provided:

a. The PRD's are capable of preventing the pressure from rising more than 20% above the MAWP.
b. The set pressure marked on the PRD's shall not exceed the MAWP of the vessels.
c. The vessels have sufficient ullage (empty space) to avoid a liquid full condition.
d. The MAWP of the vessels on which these PRD's are installed is greater than the vapor pressure of the stored liquefied compressed gas at the maximum anticipated temperature that the gas will reach under atmospheric conditions.

The PRD's shall be readily accessible for testing, inspection, replacement and repair so that they cannot be readily rendered inoperative.

Vessels that are to operate completely filled with liquid shall be equipped with PRD designed for liquid service.

PRESSURE RELIEF VALVES

DEFINITIONS

Safety Valve: A *safety valve* is a pressure relief valve actuated by inlet static pressure and characterized by rapid opening or pop action. It is used to describe relief device on a compressible fluid or gas filled vessel. For such a valve, the opening is sudden. When the set pressure of the valve is reached, the valve opens almost fully.

Relief Valve: A *relief valve* is a pressure relief valve actuated by inlet static pressure which opens in proportion to the increase in pressure over the opening pressure. It is used to describe relief device on a liquid filled vessel. For such a valve, the opening is proportional to increase in the vessel pressure. Hence, the opening of valve is not sudden but gradual if the pressure is increased gradually.

Safety Relief Valve: A *safety relief valve* is a pressure relief valve characterized by rapid opening or pop action, or by opening in proportion to the increase in pressure over the opening pressure, depending on application.

Safety, safety relief, and relief valves shall be of the direct spring-loaded type.

Pilot-operated Pressure Relief Valve: A *pilot-operated pressure relief valve* is a pressure relief valve in which the major relieving device is combined with and is controlled by a self-actuated auxiliary pressure relief valve.

Pilot-operated pressure relief valves may be used provided that the pilot is self-actuated and the main valve will open automatically at not over the set pressure and will discharge its full rated capacity if some essential part of the pilot should fail.

The set pressure tolerances of pressure relief valves shall not exceed ± 2 psi for pressures up to and including 70 psi and ± 3% for pressures above 70 psi.

NONRECLOSING PRESSURE RELIEF DEVICES

ASME Section VIII, Division 1 permits four type of non-reclosing PRD's:

1. Rupture Disk Devices - A *rupture disk device* is a non-reclosing pressure relief device actuated by inlet static pressure and designed to function by the bursting of a pressure-containing disk. A *rupture disk* is the pressure-containing and pressure-sensitive activation component of a rupture disk device. Rupture disks may be designed in several configurations, such as plain flat, pre-bulged, or reverse buckling. A *rupture disk holder* is the structure that encloses and clamps the rupture disk in position.

   The burst pressure tolerance for rupture disk devices at the specified disk temperature shall not exceed ±2 psi of marked burst pressure up to and including 40 psi, and ±5% of marked burst pressure above 40 psi.

2. Pin Device - A *pin device* is a non-reclosing pressure relief device actuated by inlet static or differential pressure and designed to function by the activation of a load bearing section of a pin that supports a pressure-containing member. A *pin* is the load bearing activation component of a pin device its cross-sectional area is not limited to a circular shape. A *pin device body* is the structure that encloses the pressure-containing members.

   The set pressure tolerance for pin devices shall not exceed ±2 psi of marked set pressure up to and including 40 psi, and ±5% of marked set pressure above 40 psi.

3. Spring-loaded Nonreclosing Pressure Relief Devices – A spring-loaded non-reclosing pressure relief device is pressure actuated by means which permit the spring-loaded portion of the device to open at the specified set pressure and remain open until manually reset. The design of this PRD is such that if the actuating means fail, the device will achieve full opening at or below its set pressure. This PRD cannot be used in combination with any other PRD.
4. Open Flow Paths or Vents – These devices relieve pressure by opening directly or indirectly to the atmosphere.

PRESSURE SETTINGS

When a single pressure relief device is used, the set pressure marked on the device shall not exceed the MAWP of the vessel. When the required capacity is provided in more than one pressure relief device, only one pressure relief device need be set at or below the MAWP, and the additional pressure relief devices may be set to open at higher pressures but in no case at a pressure higher than 105% of the MAWP

When a pressure vessel can be exposed to fire or other unexpected sources of external heat, the device marked set pressure shall not exceed 110% of the MAWP of the vessel.

MARKING

Before the certification mark can be applied to any PRD, the device manufacturers shall have the capacity of their devices certified in accordance with the requirements of the Code.

SAFETY, SAFETY RELIEF, RELIEF, LIQUID PRESSURE RELIEF, AND PILOT-OPERATED PRESSURE RELIEF VALVES

Each safety, safety relief, relief, liquid pressure relief, and pilot-operated pressure relief valve NPS ½ and larger shall be plainly marked by the manufacturer or assembler with the required data in such a way that the marking will not be obliterated in service. The marking may be placed on the valve or on a metal plate or plates securely fastened to the valve.

1. The name, or an acceptable abbreviation, of the Manufacturer and the Assembler
2. Manufacturer's design or type number
3. NPS size _____ (the nominal pipe size of the valve inlet)
4. Set pressure _____ psi, and, if applicable, cold differential test pressure _____ psi
5. Certified capacity as applicable:
    a. lb/hr of saturated steam at an overpressure of 10% or 3 psi, whichever is greater, for valves certified on steam
    b. gal/min of water at 70°F at an overpressure of 10% or 3 psi, whichever is greater, for valves certified on water
    c. SCFM (standard ft^3/min at 60°F and 14.7 psia), or lb/min, of air at an overpressure of 10% or 3 psi, whichever is greater
    d. In addition to one of the fluids specified above, the Manufacturer may indicate the capacity in other fluids
6. Year built, or alternatively, a coding may be marked on the valve such that the valve manufacturer or assembler can identify the year the valve was assembled or tested
7. The certification mark with the UV designator placed under the Mark, as shown in Figure 1. The pilot of a pilot-operated pressure relief valve shall be plainly marked by the manufacturer or Assembler showing the

name of the manufacturer, the Manufacturer's design or type number, the set pressure in psi, and the year built (or a corresponding coding).

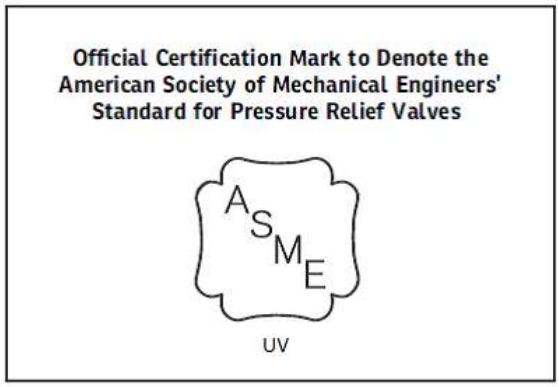

Figure 1: Certification Mark with UV Designator

8. Restricted lift _____ in. (for restricted lift valves only)

Safety and safety relief valves certified for a steam discharging capacity under the provisions of ASME Section I and bearing the certification mark with the V designator for safety valves may be used on pressure vessels.

PRESSURE RELIEF VALVES IN COMBINATION WITH RUPTURE DISK DEVICES

Pressure relief valves in combination with rupture disk devices shall be marked with the capacity in addition to the markings listed above, and the marking for rupture disk device described later in this article. The marking may be placed on the pressure relief valve or rupture disk device or on a plate or plates. The marking shall include the following:

1. Name of manufacturer of the valve
2. Design or type number of the valve
3. Name of manufacturer of the rupture disk device
4. Design or type number of the rupture disk device
5. Capacity or combination capacity factor
6. Name of the organization responsible for this marking. This shall be either the vessel user, vessel manufacturer, rupture disk manufacturer, or pressure relief valve manufacturer.

PRESSURE RELIEF VALVES IN COMBINATION WITH PIN DEVICES

Pressure relief valves in combination with pin devices shall be marked with the capacity in addition to the markings listed above, and the marking for pin device described later in this article. The marking may be placed on the pressure relief valve or pin device or on a plate or plates. The marking shall include the following:

1. Name of manufacturer of the valve
2. Design or type number of the valve
3. Name of manufacturer of the pin device
4. Design or type number of the pin device
5. Capacity or combination capacity factor
6. Name of the organization responsible for this marking. This shall be either the vessel user, vessel manufacturer, pin manufacturer, or pressure relief valve manufacturer.

RUPTURE DISK DEVICES

Every rupture disk and holder shall be plainly marked by the Manufacturer in such a way that the marking will not be obliterated in service. The markings may be placed on the flange of the disk or a metal tag. The metal tag either shall be securely fastened to the disk or, when attaching the tag is impracticable, shall accompany the disk, provided the lot number is also marked on the disk. Each rupture disk shall be marked with the following information:

1. The name, or an acceptable abbreviation, of the Manufacturer
2. Manufacturer's design or type number
3. Lot number
4. Disk material
5. Size _____ (NPS of rupture disk holder)
6. Marked burst pressure _____ psi
7. Specified disk temperature _____ ^{o}F
8. For capacity certified devices:
    a. lb/hr of saturated steam at an overpressure of 10% or 3 psi, whichever is greater, for devices certified on steam
    b. gal/min of water at 70^{o}F at an overpressure of 10% or 3 psi, whichever is greater, for devices certified on water
    c. SCFM (standard ft^3/min at 60^{o}F and 14.7 psia), or lb/min, of air at an overpressure of 10% or 3 psi, whichever is greater
    d. In addition to one of the fluids specified above, the Manufacturer may indicate the capacity in other fluids
9. For flow resistance certified devices:
    a. Minimum net flow area _____ in^2
    b. Certified flow resistance (one or more as applicable)
10. Year built, or alternatively, a coding may be marked on the rupture disk such that the rupture disk device manufacturer can identify the year the valve was assembled and tested

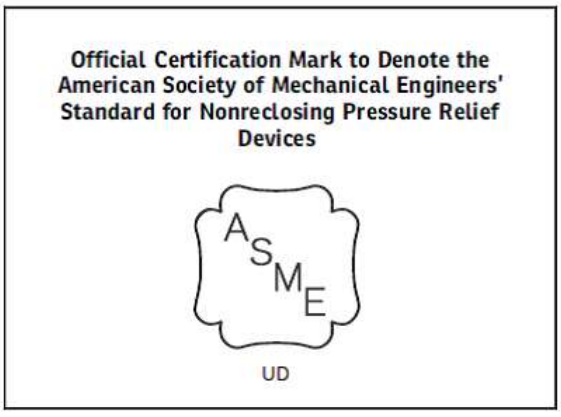

Figure 2: Certification Mark with UD Designator

11. The certification mark with the UD designator placed under the Mark, as shown in Figure 2.

PIN DEVICES AND PIN ACTUATED PILOT-OPERATED PRESSURE RELIEF DEVICES

Pin devices shall be plainly marked by the Manufacturer with the required data in such a way that the marking will not be obliterated in service. The marking may be placed on the device housing or on a metal plate or plates securely fastened to the device. The marking shall include the following:

1. The name, or an acceptable abbreviation, of the Manufacturer
2. Manufacturer's design or type number
3. NPS size _____ (the nominal pipe size of the device inlet)
4. Set pressure _____ psi
5. Flow direction
6. Pin to pin device identifier
7. For capacity certified devices:
    a. lb/hr of saturated steam at an overpressure of 10% or 3 psi, whichever is greater, for devices certified on steam
    b. gal/min of water at 70°F at an overpressure of 10% or 3 psi, whichever is greater, for devices certified on water
    c. SCFM (standard ft^3/min at 60°F and 14.7 psia), or lb/min, of air at an overpressure of 10% or 3 psi, whichever is greater
    d. In addition to one of the fluids specified above, the Manufacturer may indicate the capacity in other fluids
8. For flow resistance certified devices:
    a. Minimum net flow area _____ in^2
    b. Certified flow resistance (one or more as applicable)
9. Year built, or alternatively, a coding may be marked on the device such that the device manufacturer can identify the year the device was tested
10. The certification mark with the UD designator placed under the Mark, as shown in Figure 2.
11. The pin shall be marked according to one of the following methods:
    a. For pin devices using a replaceable pin to control set pressure, the pin shall be marked with its lot number, pin temperature °F and the information required by 1), 4), 6) and 9)
    b. For pin devices that are single use and permanently assembled, the marking requirements in a) above and 8a) and 8b) shall be applied to the device
    c. For pin devices that have a replaceable pin within a sealed body, the pin shall be marked with its lot number

INSTALLATION

- Pressure relief devices intended for relief of compressible fluids shall be connected to the vessel in the vapor space above any contained liquid or to piping connected to the vapor space in the vessel which is to be protected.
- Pressure relief devices intended for relief of liquids shall be connected below the liquid level.

- The opening through all pipe, fittings, and non-reclosing pressure relief devices (if installed) between a pressure vessel and its pressure relief valve shall have at least the area of the pressure relief valve inlet. The characteristics of this upstream system shall be such that the pressure drop will not reduce the relieving capacity below that required or adversely affect the proper operation of the pressure relief valve.
- The opening in the vessel wall shall be designed to provide unobstructed flow between the vessel and its pressure relief device.
- When two or more required pressure relief devices are placed on one connection, the inlet internal cross-sectional area of this connection shall be either sized to avoid restricting flow to the pressure relief devices or made at least equal to the combined inlet areas of the safety devices connected to it.
- There shall be no intervening stop valves between the vessel and its pressure relief device or devices, or between the pressure relief device or devices and the point of discharge, except:
    - When these stop valves are so constructed or positively controlled that the closing of the maximum number of block valves possible at one time will not reduce the pressure-relieving capacity provided by the unaffected pressure relief devices below the required relieving capacity; or
    - Under certain conditions set forth in Nonmandatory Appendix M (the reader is advised to consult the code for these exceptions).
- The pressure relief devices on all vessels shall be so installed that their proper functioning will not be hindered by the nature of the vessel's contents.
- Discharge lines from pressure relief devices shall be designed to facilitate drainage or shall be fitted with drains to prevent liquid from lodging in the discharge side of the pressure relief device, and such lines shall lead to a safe place of discharge. The size of the discharge lines shall be such that any pressure that may exist or develop will not reduce the relieving capacity of the pressure relief devices below that required to properly protect the vessel, or adversely affect the proper operation of the pressure relief devices.
- For rupture disks that are marked with only a lot number, following the installation of the disk, the metal tag shall be sealed to the installation in a manner that will prevent removal of the disk without breaking the seal. The seal shall identify the organization responsible for performing the installation.

OVERPRESSURE PROTECTION BY SYSTEM DESIGN

PRESSURE IS SELF-LIMITING

- A pressure vessel does not require a pressure relief device if the pressure is self-limiting (e.g., the maximum discharge pressure of a pump or compressor), and this pressure is less than or equal to the MAWP of the vessel at the coincident temperature and the following conditions are met:
- The decision to limit the pressure by system design is the responsibility of the user. The user shall request that the Manufacturer's data report state that overpressure protection is provided by system design.
- The user shall conduct a detailed analysis to identify and examine all potential overpressure scenarios. The "Causes of Overpressure" described in ANSI/API Standard 521, Pressure-Relieving and Depressuring Systems, shall be considered. Other standards or recommended practices that are more appropriate to the specific application may also be considered. A multidisciplinary team experienced in methods such as hazards and operability analysis (HazOp); failure modes, effects, and criticality analysis (FMECA); "what-if" analysis; or other equivalent methodology shall establish that there are no sources of pressure that can exceed the MAWP at the coincident temperature.
- The results of the analysis shall be documented and signed by the individual in responsible charge of the management of the operation of the vessel.

PRESSURE IS NOT SELF-LIMITING

If the pressure is not self-limiting, a pressure vessel may be protected from overpressure by system design or by a combination of overpressure by system design and pressure relief devices, if the following conditions are met. The rules below are not intended to allow for normal operation above the MAWP at the coincident temperature.

- The vessel is not exclusively in air, water, or steam service except where any of the following apply:
- These services are critical to preventing the release of fluids that may result in safety or environmental concerns.
- Failure or premature opening of the pressure relief device would result in an unacceptably high probability of failure or damage to the vessel or other equipment in the system.
- Failure or premature opening of the pressure relief device would result in significant operational upset(s).
- The decision to limit the overpressure by system design is the responsibility of the user. The user shall request that the Manufacturer's data report state that overpressure protection is provided by system design if no pressure relief device is to be installed. If no pressure relief device is to be installed, acceptance of the jurisdiction may be required.
- The user shall conduct a detailed analysis to identify and examine all scenarios that could result in an overpressure condition and magnitude of the overpressure. The "Causes of Overpressure" as described in ANSI/API Standard 521, Pressure-Relieving and Depressuring Systems, shall be considered. Other standards or recommended practices that are more appropriate to the specific application may also be considered. A multidisciplinary team experienced in methods such as hazards and operability analysis (HazOp); failure modes, effects, and criticality analysis (FMECA); "what-if" analysis; or other equivalent methodology shall conduct the analysis.
- The overpressure scenario shall be readily apparent so that operators or protective instrumentation will take corrective action to prevent operation above the MAWP at the coincident temperature.
- There shall be no credible overpressure scenario in which the pressure exceeds 116% of the MAWP times the ratio of the allowable stress value at the temperature of the overpressure scenario to the allowable stress value at the design temperature. The overpressure limit shall not exceed the test pressure. Credible events or scenario analysis as described in WRC Bulletin 498 "Guidance on the Application of Code Case 2211 — Overpressure Protection by Systems Design" shall be considered.
- The results of the analysis shall be documented and signed by the individual in responsible charge of the management of the operation of the vessel.

References:

ASME Boiler and Pressure Vessel Code, Section VIII, Division 1: 2017 Edition

PERMISIBLE OUT-OF-ROUNDNESS IN SHELLS

The following article provides requirements for permissible out-of-roundness of cylindrical, conical and spherical shells. The requirements are from ASME Section VIII, Division 1 code (2017 Edition) – paragraph UG-80. The code provides permissible out-of-roundness requirements for both internal pressure and external pressure. Both these conditions will be discussed in this article. However, full requirements of UG-80 are not reproduced here; only those requirements consistent with the following two assumptions will be discussed:

1. The longitudinal joints are butt-welded; i.e., lap welded joints are excluded from discussion, and
2. At any cross section, the thickness of the shell, conical section, or the spherical shell is uniform.

INERNAL PRESSURE

The difference between the maximum and minimum inside diameters at any cross section (D_{max} - D_{min}) shall not exceed 1% of the nominal diameter at the cross section under consideration.

When the cross section passes through an opening or within 1.1D of the opening measured from the center of the opening, D_{max} - D_{min} may be increased by 2% of the inside diameter of the opening.

EXAMPLE ONE:

Inside diameter of the vessel:	72”
D_{max} - D_{min} at any cross section:	≤ (0.01 x 72)
	≤ 0.72”
Inside diameter of the opening:	24”
D_{max} - D_{min} at a cross section through an opening:	≤ (0.72” + 0.02 x 24)
	≤ 1.2”

EXTERNAL PRESSURE

The shell of a completed vessel to operate under external pressure shall meet the following requirements at any cross section:

1. All limitations imposed for internal pressure.
2. The maximum deviation from the true circular form, measured radially on the outside or inside of the vessel, shall not exceed the maximum permissible deviation ”e” obtained from Figure 1 (Figure UG-80.1).

   For points falling above the curves, e = 1.0 t

   For points falling below the curves, e = 0.2 t.

   - t is the nominal plate thickness less corrosion allowance for cylinders and spheres
   - t = effective thickness of conical section, t cos α (α is one-half the apex angle in conical heads and sections. see Figure 3 for α)

   Measurements shall be made on the surface of the base metal, and not on welds or any other raised parts of the material. Measurements shall be made using a segmental circular template with:

   - Design inside radius OR design outside radius

- Chord length equal to twice the arc length obtained from Figure 2 (Figure UG-29.2).

The values of L and D_o in Figures 1 and 2 shall be as follows:

For Cylinder

L = design length of vessel section between lines of support

D_o = outside diameter of cylindrical shell

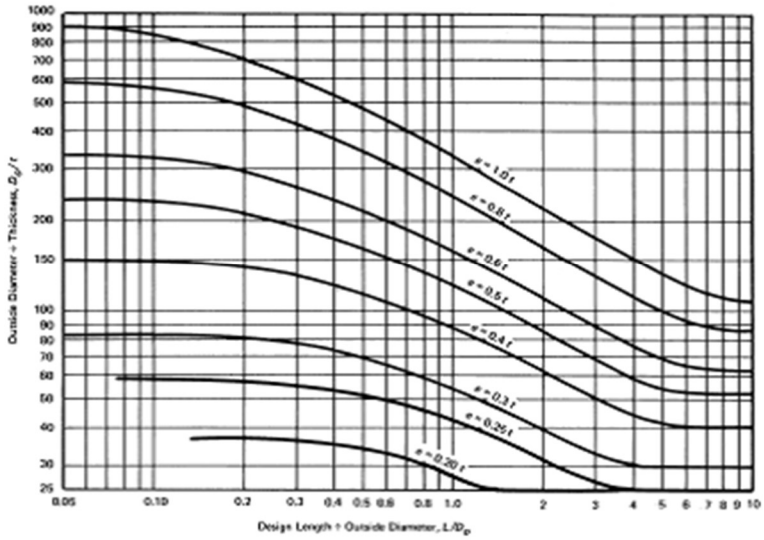

Figure 1: Maximum Permissible Deviation from a Circular Form "e" for Vessels under External Pressure

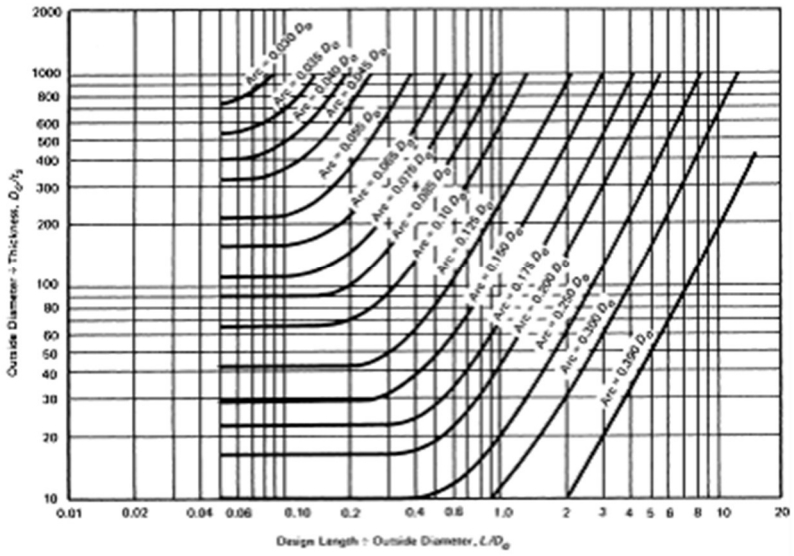

Figure 2: Maximum Arc of Shell Left Unsupported because of Gap in Stiffening Ring of a Cylinder under External Pressure

For cones and conical sections

L = 0.5 D_o

D_S = Outside diameter at the small end of conical section

D_L = Outside diameter at the large end of conical section

L_C = Axial length of conical section (See Figure 3)

At the large end, $L = L_e$

$D_o = D_L$

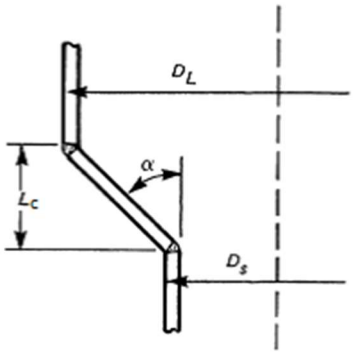

Figure 3: Axial Length of Conical Section

At the small diameter end, $L = L_e (D_L/D_S)$

$D_o = D_S$

At the mid-length diameter, $L = L_e [2 D_L/(D_L + D_S)]$

$D_o = 0.5 (D_L + D_S)$

At any cross section, having an outside diameter of D_x,

$L = L_e (D_L/D_x)$

$D_o = D_x$

Spheres

$L_e = 0.5 L_C (1 + D_S/D_L)$

EXAMPLE TWO:

Continuing with the previous example, $D_O = 72$”

Assume $L = 60$” and $t = 0.375$”

$L/D_O = 0.83$ and $D_O/t = 192$

From Figure 1,

$e = 0.65\ t = 0.24$”

References:

ASME Boiler and Pressure Vessel Code, Section VIII, Division 1: 2017 Edition

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EVERYTHING YOU NEED TO ELIMINATE PROCASTINATION AND BECOME EXTREMELY PRODUCTIVE

Stop for a moment and picture the most successful person you can think of.

Got it? Perfect.

What makes that person incredibly successful is that they have learned how to use their time efficiently and created a habit out of it.

And one thing they have in common with you is that they have the same 24 hours within a day.

Someone has given this definition of Hell: *The last day you have on earth, the person you became will meet the person you could have become*.

HERE COMES THE GOOD NEWS.

The moment you wake up tomorrow, you have a new slate and a completely new beginning. Full control and power to direct your life the way you want it.

If this is what you want, read on. However, be warned... this is not a to-do list. This article will help you to:

1. Assess how you are currently spending time.
2. Find ways to get more time.
3. Use your time more efficiently.

ASSESS HOW YOU ARE CURRENTLY SPENDING TIME

We are in the age of distraction. Because of that, we need to pay special attention to what we spend our time on.

First make a good faith effort to make a list of daily activities you typically spend time on. For each activity, assess how many hours you spend on this activity on different days of the week.

Do this for every activity and then add all the hours for the grand total. Then subtract the grand total from 168 (total hours in one week) … this will show you a gap you were not aware of.

Below is a sample of daily activities:

1. Internet & TV:
2. Work of University:
3. Socializing with friends:
4. Spending time with partner/family:
5. Working out:
6. Reading for pleasure:
7. Sleeping:
8. Preparing food/eating:
9. Commute:
10. Other:

Next thing is to define biggest time wasters (activities that you spend time on, which are not contributing to your goals). Go back to that list and be honest with yourself. Which one of these activities is a time waster, and which actually serve you well?

You will find that you are spending a big chunk of your day on such activities before learning to use your time more effectively. It doesn't mean that you get rid of these activities altogether… only that you limit time spent on such activities.

Evaluation of the current daily activities can give you a lot of insight and can help you prioritize what is truly important to you.

Now that we have assessed where you currently are at, we will now move on to the second important piece…

FIND WAYS TO GET MORE TIME

There are a couple of tricks to really get more time out of your day.

Optimize sleep and get up early

"Optimizing sleep" means finding the perfect time you should go to bed each night and discover the ideal time you should get up in order to maximize energy and health.

When it comes to getting up early, follow these suggestions:

- Go to bed at the same time
- Get up earlier gradually (If you are currently getting up at 8 am, and your goal is 6 am, start with 7:50 am, then 7:40 am, and so on, until you reach your goal, and then work on maintaining it)

You might experience energy drops in the first couple of weeks. But that is normal until your body adjusts to the new schedule. During the day, if you experience a sudden drop of energy, take 20-30 minute nap.

Reclaim dead time

Dead time = time spent on activities that you cannot eliminate at this moment but can be used more productively. Example: commuting/ working out/ buying groceries.

In order to be productive, find something you can do while being engaged in these activities. Possible options include: listening to audiobooks/ podcasts/ reading books etc.

The main idea here is to do something that will give you value while performing items that you already are committed to spending time on.

Now that you have found some ways to shave hours off your current time expenditure, let's go onto…

USE YOUR TIME MORE EFFICIENTLY

These are some of the proven ways:

Set goals

Goals work like a lens of a camera. If you set the lens and focus properly, you will be able to take a clear picture. If it is out of focus, your picture will be blurry.

When it comes to setting goals, there are few simple guidelines:

- Focus on one year ahead, and set from 3-5 main goals, for the most important areas of your life (health, work, social relationships, personal growth, travel etc.)
- Make your goals specific, and phrase them in a way as if you've already achieved them.

Example:

Complete writing book on XXXX by end of December 2019.

All you need to do is write down yours and start.

Define high leverage activities to achieve your goals

References:

Mind Over Medicine: How to Help Your Body Heal Itself *by* Lissa Rankin, M.D.

BUILDING A BETTER TOMMORROW

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