30° Seat - The angled seating surface of some types of rupture discs. The seat is angled at 30° in relation to the y-axis.

3-D Tag - Three-Dimensional Tag.- When attached to the rupture disc, it shows the proper orientation to the installation flow process and identifies all manufacturing data about the disc.

7I Holder - A 30° seat insert rupture disc holder designed to be installed between bolted pipe flanges.

Absolute Pressure - Is measured relative to a full vacuum (absolute zero pressure).

ACFM /Actual cubic feet per minute - A measure of volumetric flow rate (capacity).

Accumulation - Pressure increase over the maximum allowable working pressure (MAWP) or design pressure of the vessel allowed during discharge through the pressure-relief device. Accumulation is expressed in units of pressure or as percentage of MAWP or design pressure. Maximum allowable accumulations are established by pressure-design codes for emergency operating and fire contingencies.

Accuracy – Conformity of an actual value to an ideal value.

Actual Flow Capacity - is the flowing capacity determined by measurement.

Adapter Plate - A plate, used on a volume tank, which increases or decreases the size of a bolting pattern, or a plate used in conjunction with score blades.

Adjusted set pressure – vacuum or gauge pressure at which under test stand conditions (atmospheric back pressure) valves commence to lift.

Air Damage Test - A burst test performed on a rupture disc where the rupture disc dome is purposely dented and then burst. It is performed to determine the effect of damage on the burst pressure rating and the opening characteristics of the rupture disc.

Ambient Established room temperature- 72° F (22° C).

Anaerobic Digester- convert organic matter into biogas through a process called anaerobic digestion. In this process, bacteria decompose the organic matter in the absence of oxygen, producing a gas composed of 60 to 70 percent methane and 30 to 40 percent carbon dioxide—biogas.

Ambient temperature – temperature of the air or other medium where the equipment is to be used.[i]

Analog Gauge - A pressure gauge with a dial face, graduated scale and pointer.

Anneal - A heat treatment of metal to add softness and ductility. The metal is slowly heated in a furnace or oven to a specific temperature. The temperature is maintained long enough to refine the grain structure and is then cooled at a predetermined rate.

ANSI - American National Standards Institute. - A private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States.[ii]

Anvil - The flat component of a scoring die on which metal sheet material rests while the scoring process is performed.

API/ American Petroleum Institute - Is the main U.S. trade association for the oil and natural gas industry, representing

corporations involved in production, refinement, distribution, and many other aspects of the petroleum industry. [iii]

Arcuate - A cast, semicircular protrusion on an outlet holder. It assists in preventing fragmentation of the rupture disc by retaining the disc petal when burst occurs.

Arcuate Ring - An outlet ring with a protrusion similar to the cast protrusion on an ULTRX outlet holder. See arcuate and outlet ring.

ASME - American Society of Mechanical Engineers - ASME is a not-for-profit membership organization that enables collaboration; knowledge sharing, career enrichment, and skills development across all engineering disciplines, toward a goal of helping the global engineering community develop solutions to benefit lives and livelihoods.

ASME BPE – ASME BioProcessing Equipment standard provides designers and process engineers with a reliable and measurable way of specifying Hygienic Tubes, Valves and Fittings for use in High Purity applications such as Water-for-Injection (WFI), clean steam, ultra-filtration, etc. As a result, the process of design installation, validation and maintenance will be easier to manage and should assist in minimizing overall project and maintenance costs. A guideline that serves the needs of those involved in the BioProcessing, Pharmaceutical and Personal Care Products Industries. [iv]

Assembly Drawing - An Engineering drawing which shows all of the assembled components of a product, such as a rupture disc or a holder.

ASTM International, /American Society for Testing and Materials - is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services. ASTM has a dominant role among standards developers in the USA.

ATEX (***At****mosphères* ***Ex****plosibles)* - directive consists of two EU (European) directives describing what equipment and work environment is allowed in an environment with an explosive atmosphere.

Atmospheric Conditions - conditions with pressures ranging from 80 kPa to 110 kPa and temperatures ranging from −20 °C to 60 °C

Atmospheric Pressure - The pressure exerted by the atmosphere as a consequence of gravitational attraction on the vertical column of air lying directly above the surface of the earth. Normal atmospheric pressure is considered to be equal to 14.6959 psia (0 psig). Also called barometric pressure.

Auto-Ignition Temperature - Is the lowest temperature required to initiate or cause self-sustained combustion in the absence of an ignition source. This temperature varies considerably depending upon the nature, size and shape of the igniting surface.

Back Order - One or more items on an order that were not shipped as scheduled.

Back Pressure - Pressure acting on the outlet side of the rupture disc. Back pressure could simply be atmospheric pressure (zero gage pressure) or it could be higher. Pressure that exists on the outlet of a pressure-relief device as a result of the pressure in the discharge system is also known as back pressure.

Back Pressure Check Valve - Prevents damage to equipment and other gas control devices that may be otherwise damaged by an accidental reversal of the pressure in the system due to pressure waves from an explosion or such mishap.

Back Pressure Test - A test performed on a vacuum support or rupture disc to ensure that it will withstand a specified amount of vacuum or back pressure.

Flame Bank Assembly – Sub-Assembly consisting of a flame bank housing, flame arrester element and retainer pieces.

Bara or bar abs - A metric unit of absolute pressure.

Barg or bar gauge - A metric unit of atmospheric pressure. One barg equals 14.5038 psig, or 1 atmosphere.

B.D.I. Burst Disc Indicator - A thin, metallic (copper or tantalum) strip which is placed on the outlet side of a rupture disc. The strip acts as a closed electrical circuit until it is torn by the bursting rupture disc.

B.D.I. Alarm Monitor - The electrical circuitry to which a B.D.I. strip is connected. When the strip is torn, the B.D.I. strip creates an open circuit, causing an alarm in the monitor to sound.

BGR/Blanket Gas Regulator - Ensures that a constant gas pressure is maintained in the vapor space of a storage tank when liquid is removed from a tank or the temperature is reduced.

Bi-directional Flame Arrester - Flame arrester that prevents flame transmission from either side.

Bio-fuels - A wide range of fuels which are in some way derived from biomass.

Blanketing Gas, Tank Blanketing, or Tank Padding - Is the process of applying a gas to the empty space in a storage container. Blanketing involves using a buffer gas to protect products inside the storage container.

Blowdown –The difference between valve set pressure and the closing pressure expressed as a percentage of the set pressure or in pressure units. The less blowdown, the less stored media is lost during venting.

BPE – Bioprocessing Equipment – see ASME BPE.

British thermal unit (BTU) - Unit of heat that will increase the temperature of one pound of water by one degree Fahrenheit.

Bubble Tight - A measure of leak tightness demonstrated by immersing item in liquid with or without a soap solution to observe appearance of gas bubbles under test pressure.

Burst Certificate - A document supplied to the customer with each lot of rupture discs manufactured by CDC which states the rated burst pressure and the actual burst test results for the lot.

Burst Pressure - The amount of pressure differential necessary to cause the rupture disc to burst. See pressure differential.

Burst Tolerance - The allowable amount of deviation from the stamped rating of a rupture disc; the variation around the stamped burst pressure in which the individual rupture disc burst pressures in a lot are required to fall.

Button - A small, circular piece of sheet metal used as a component of a vacuum support. The buttons help hold the petals of the vacuum support together to provide strength only in the vacuum direction.

CAF /Center after Forming - The cluster of holes punched in a radial pattern in the center of a top section or vacuum support. On CDC drawings, it is the measured distance from the center of the center hole to the center of the radial holes. The CAF is one of the factors that controls the burst pressure of a composite rupture disc.

CAL-VAC - A double-acting rupture disc designed to protect processing and storage tanks against implosions as well as damage from positive overpressure.

CD Number - An Engineering drawing number assigned to any holder or holder component that is not standard product.

Capacity - The measurement of flow by volume or weight bound by constraint of time.

CDC Type Rupture Disc - A composite rupture disc consisting of a slotted metal top section and a Teflon® or metal seal located on the process side of the top section.

CDCV Type Rupture Disc - A composite rupture disc which is the same as a CDC rupture disc, with a vacuum support installed on the process side of the seal.

Celsius (°C) - A metric scale of temperature measurement. To convert from °C to °F, multiply the number of degrees in Celsius by 1.8 then add 32.

CE Mark "Conformite Europenne" - The CE marking certifies that the products have met European Union health, safety and environmental requirements that ensure consumer and workplace safety. Indicates that a rupture disc device meets the essential safety requirements of the PED and TPED, and is manufactured, tested and marked per EN ISO 4126-2.

CFC - A formed composite circular vent panel consisting of a slotted metal top section and a Teflon® seal located on the process side of the top section.

CFR - A formed composite rectangular vent panel consisting of a slotted metal top section and a Teflon® seal located on the process side of the top section.

CFS - A formed composite square vent panel consisting of a slotted metal top section and a Teflon® seal located on the process side of the top section.

CGA /Compressed Gas Association - Develops and publishes the broadest distribution of technical information, standards, and recommendations for safe and environmentally responsible practices in the manufacture, storage, transportation, distribution, and use of industrial gases.

Check Valve – valve that prevents backflow against flow direction.

CIP/ Clean-in-Place - is a method of cleaning the interior surfaces of pipes, vessels, process equipment, filters and associated fittings, without disassembly. Industries that rely heavily on CIP are those requiring high levels of hygiene, and include: dairy, beverage, brewing, processed foods, pharmaceutical, and cosmetics.

Circular Vent Panel - A round vent panel. It can be formed or flat. SFC (Solid Metal) formed circular vent panel. CFC

(Composite) formed circular vent panel. CPC (Composite) flat circular vent panel.

Charpy impact test or Charpy v-notch test - a standardized test which determines the amount of energy absorbed by a material during fracture. This absorbed energy is a measure of a given material's toughness and acts as a tool to study temperature-dependent brittle-ductile transition. It is used in many industries for testing building and construction materials used in the construction of pressure vessels, bridges and to see how storms will affect materials used in building.

Clamp, Sanitary - A clamp used to hold together the inlet and outlet of a Sanitary Fitting holder or sanitary ferrules.

Clean Sweep - A rupture disc holder shaped to direct the process flow in a sweeping action across the rupture disc that contains a weir to modify or redirect the flow direction, causing a sweeping action across the rupture disc. Used in systems to prevent build up of viscous media and for easy cleaning.

Closing Pressure – The value of decreasing inlet static pressure at which the valve pallet re-establishes contact with the valve seat or at which lift becomes zero.

CMM/ Coordinate Measuring Machine. - An automated, programmable measuring device.

CMTR - Certified Material Test Report. (see MTR).

CNC/ Computer Numerical Control - A term used to describe programmable machine tools, such as a CNC lathe.

Coefficient of Discharge – The ratio of the mass flow rate in a valve to that of an ideal nozzle used to calculate the flow through a pressure relieving device as per industry standards.

Cold Box - A refrigerated box which is used for low-temperature testing to approximately -70 Deg F (minus 57 Deg C).

Coined - The rounded edge of a piece of sheet metal or other material that results from being punched in a die.

Composite Rupture disc - A rupture disc which consists of two or more components of metallic or non-metallic materials. Examples of are: CDC, CDCV, LD, LDV, PL, and PLV Rupture Discs.

Compressibility Factor or Compression Factor - Is a useful thermodynamic property for modifying the ideal gas law to account for the real gas behavior. The compressibility factor for specific gases can be read from generalized compressibility charts.

Compression Pressure - Applied to the convex side of the rupture disc. It is the opposite of tension.

Concave -The side opposite the dome side of the rupture disc; the side curved like the inner surface of a sphere.

Concentric - Two or more circles having a common center.

Condensate Accumulator – Device that collects condensate from saturated vapors typically from a bio-gas pipeline.

Control Valve – A valve with a power positioning actuator for moving closure member to any position relative to valve port or ports in response to and in proportion to an external signal. The energy for a

control valve actuator is derived from an independent source.

C_V – An experimentally determined valve sizing coefficient.

Convex - The domed side of a rupture disc; the surface that bulges outward.

CPC - A flat composite circular vent panel consisting of two slotted metal top sections and a Teflon® seal located between the top sections.

CPR - A flat composite rectangular vent panel consisting of two slotted metal top sections and a Teflon® seal located between the top sections.

CPS - A flat composite square vent panel consisting of two slotted metal top sections and a Teflon® seal located between the top sections.

Condensate Accumulator – Device that collects condensate from saturated vapors typically from a bio-gas pipeline.

Crown Height (CH) - The distance between the highest point on the dome and the top side of the seating area of a rupture disc component. Crown heights, A,B,C,&D.

CSA/ Canadian Standards Association - A not-for-profit membership-based association serving business, industry, government and consumers in Canada and the global marketplace. As a solutions-oriented organization, to develop standards that address real needs, such as enhancing public safety and health, advancing the quality of life and help to preserve the environment.

Customer Property - An item belonging to a customer and shipped to CDC or Groth, typically for re-work, repair, or replacement.

Cycle Test - A test where pressure and back pressure are alternately applied to a rupture disc a predetermined number of times.

Cycling - is when a system operates at its given pressure then relieved down to vacuum 1 Barg.

DAD Rupture Disc - Double-Acting Disc, a rupture disc that is rated to burst in either the positive or the back pressure direction.

Damage Ratio - See safety ratio.

Dead Band – The range through which the controlled variable can reverse direction without an observable regulator response.

Deflagration - Explosion propagating at subsonic (below the speed of sound) velocity.

Deflagration, Confined - A deflagration that is confined by physical means (piping).

Deflagration Flame Arrester (DEF) - Flame arrester designed to prevent the transmission of a deflagration. It can be an end-of-line flame arrester or an in-line flame arrester.

Deflagration, Unconfined - A deflagration that is not confined by any means (end of line, venting to atmosphere).

Deflagration Vent - Device per NFPA 68 designed to vent combustion gases and pressure resulting from a deflagration within an enclosure so that structural and mechanical damage is minimized. Does not apply to devices that are designed to protect storage vessels.

Dent Protector - A formed component of a rupture disc installed on the outlet side to protect the disc from objects falling on it.

Derate - A calculated percentage difference in burst pressure rating at another temperature. Used to establish the ambient manufacturing range for rupture disc to be rated at temperatures other than 72° F (22° C).

Design Pressure – pressure, together with design temperature, used to determine the minimum permissible thickness or other physical characteristics of a component, as determined by the design rules of the pressure design code. The design pressure is selected by the user to provide a suitable margin above the most severe pressure expected during normal operation. The design pressure is equal to or less than the MAWP.

Design Temperature – pressure, together with the design temperature, used to determine the minimum permissible thickness or physical characteristic of each component, as determined by design rules of the pressure-design code.

Destruction Efficiency – Mass fraction of the fluid vapor that can be oxidized or partially oxidized. For a hydrocarbon, this is the mass fraction of carbon in the fluid vapor that oxidizes to carbon monoxide or carbon dioxide.

Detail Drawing - An Engineering drawing showing the dimensional details of one specific component.

Detonation - Explosion propagating at (super) sonic velocity and characterized by a high pressure shock wave.[v]

Detonation, Stable - Detonation progressing through a confined system without significant variation of velocity and pressure characteristics at sonic velocity and generate high pressure waves.

Detonation Flame Arrester (DET) - Flame arrester designed to prevent the transmission of a detonation. It can be an end-of-line flame arrester or an in-line flame arrester, and can be used for both stable detonations and unstable detonations.

Detonation Unstable (Overdriven) - Detonation during the transition of a combustion process from a deflagration into a stable detonation generating extremely high pressure waves.

Die - A tool held in a press and used to form, cut, score, or burst a rupture disc or a component part.

DIN Deutsches Institut fur Normung (Translation: German Standards Institute) - The German national organization for standardization and is that country's ISO member body. DIN is a Registered German Association headquartered in Berlin. There are currently around thirty thousand DIN Standards, covering nearly every field of technology. It is the official national-standards body, representing German interests at the international and European levels.

Downstream - Identifies the vent ("non-process"), or outlet, side of the rupture disc or valve. See outlet.

Draw -The clamping force exerted on the flange area of a 30° seat type rupture disc during the seating operation.

Drill Press - A machine used for drilling holes.

Drip Trap - Provides automatic, manual or electrically actuated safe removal of condensate from the low point of a pipeline.

Dye Penetrant - A liquid of very low viscosity which is visible under black light.

When applied to the scored area of a rupture disc, it will leak through any areas that are cut completely through the metal. The disc can be viewed under ultraviolet light and the cut areas will be apparent.

EAR/Export Administration Regulations- Regulations set forth in parts 730-744, of Title 15 of the Code of Federal Regulations, which govern the export of commercial and dual-use items under the U.S. Department of Commerce.

EBW /Electron Beam Welding - A welding process that penetrates deeply, making it possible to weld much thicker work pieces than is possible with most other welding processes.. Almost all metals can be welded by the process, but the most commonly welded are stainless steels, superalloys, and reactive and refractory metals. The process is also widely used to perform welds of a variety of dissimilar metals combinations.

ECN /Engineering Change Notice - A process used to document a change to a controlled engineering document such as a drawing or procedure.

ECR/ Engineering Change Request – A process used to request a change to a design.

Electrode - The tip on a welder.

Electropolish - Electro chemical treatments of metal that removes material from surface and used to polish, passivate, and deburr.

Emergency Venting - Venting required when an abnormal condition, such as ruptured internal heating coils or an external fire, exists either inside or outside of a tank.

End-of-Line Flame Arrester - Flame arrester that is fitted with one pipe connection only.

ENVIRO GUARD - Pipe end cover to protect vent free rupture disc piping and safety valve outlets from unwanted foreign material, rain, insects, or birds.

Endurance Burning - Stabilized burning for an unlimited time.

Endurance Burning Flame Arrester - Flame arrester that prevents flame transmission during and after endurance burning.

ENVIROSEAL - A flat, composite rupture disc that is installed directly between standard bore ASME, DIN or JIS bolted pipe flanges.

ERP/ Enterprise Resource Planning - An information system that integrates all manufacturing and related applications for an entire enterprise.

Excess Flow Valve - A valve used on the outlet side of a rupture disc holder to allow pressure to bleed off in the event that the rupture disc should leak.

Explosion - An **explosion** is a rapid increase in volume and release of energy in an extreme manner, usually with the generation of high temperatures and the release of gases. An explosion creates a shock wave. If the shock wave is a supersonic detonation, then the source of the blast is called a "high explosive". Subsonic shock waves are created by low explosives through the slower burning process known as deflagration.[vi]

Explosion Group (Ex.G) - Ranking of flammable gas-air mixtures with respect to the maximum experimental safe gap (MESG).

EL/Explosive Limits - Lower Explosive Limit (LEL) - is the minimum concentration

of gas vapor in air below which flame propagation will not occur. Upper Explosive Limit (UEL) - is the maximum concentration of gas vapor in air above which flame propagation will not occur.

Emergency Relief Valve (ERV) – A pressure (vacuum) relief device intended to provide emergency venting.

Fahrenheit (°F) - A scale of temperature measurement.

FDA/ Food and Drug Administration - A U.S. agency that oversees medications, food safety, cosmetics, medical and veterinary products and much more. They are "responsible for ensuring that foods are safe, wholesome and sanitary; human and veterinary drugs, biological products and medical devices are safe and effective; cosmetics are safe; and electronic products that emit radiation are safe".

Fixed-roof storage - Is an atmospheric tank that requires vents to prevent pressure changes, which would otherwise result from temperature changes and withdrawal or addition of liquid. These are designed as atmospheric, low, or high-pressure tanks, fixed roof tanks may be of cone roof or dome roof type construction.

Flame Bank Assembly – Sub-Assembly consisting of a flame bank housing, flame arrester element and retainer pieces.

Flame Front Waste Gas Burner – Burner that utilizes a pilot flame ignited by a flame front generated at ground level. A.K.A. Flame Front Generator (FFG).

Flame Arrester – a device fitted to the opening of an enclosure or to the connecting pipework of a system of enclosures and whose intended function is to allow flow but prevent the transmission of flame.

Flame Arrester Element - Portion of a flame arrester whose principal function is to prevent flame transmission.

Flame Arrester Housing - Portion of a flame arrester whose principal function is to provide a suitable enclosure for the flame arrester element and allow mechanical connections to other systems.

Flame Trap Assembly and Pressure Relief - Unit composed of a flame arrester and a back pressure regulator with a thermal switch valve that stops flow when a flame has stabilized on the flame arrester element.

Flange - A piping component used to terminate the end of a pipe section, connect pipe sections together, or clamp a rupture disc between a protruding rim on a pipe shaft used to hold it in place or attach it to another object.

Flare – A device or system used to safely dispose of relief gases in an environmentally compliant manner through the use of combustion.

Floating Roof - Storage tank equipped with a roof that floats on the surface of the stored liquid. The roof rises and falls with the liquid level in the tank. No vapor space exists in this type of tank eliminating the need for venting. A rim seal system is used between the tank shell and roof to reduce rim evaporation.

Flow Capacity – The rate of flow through a device under stated opening and conditions of inlet and outlet pressures.

Flow Rate – The number of units of fluid passing through a channel in a unit of time.

FOD - Foreign Object Debris or Foreign Object Damage – Any material or substance used during the manufacturing or assembly of a part that poses a potential risk to the

parts functionality or may come in direct contact with a customer's process media.

FPSO - Floating Production, Storage and Off-loading Vessel.

FS / Flat Seat - A rupture disc which seals on a flat seating surface.

FPT/ Female Pipe - Taper - A.K.A FPT, FNPT and NPT (F). The taper rate for all NPT threads is $\frac{1}{16}$ measured by the change of diameter (of the pipe thread) over distance. The angle between the taper and the center axis of the pipe is 1° 47′ 24″ (1.7899°). Commonly-used sizes are $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1.[vii]

Flash point - Of a volatile liquid is the lowest temperature at which it can vaporize to form an ignitable mixture in air. Measuring a liquid's flash point requires an ignition source. At the flash point, the vapor may cease to burn when the source of ignition is removed. The flash point is not to be confused with the auto ignition temperature, which does not require an ignition source.

Flow - The normal or specified direction of the process through the valve or rupture disc.

Flow Coefficient (C_V) – The regulator capacity in GPM of water at 20 degrees Celsius with one PSI pressure drop at full rated travel.

Foam Separator - Initial gas cleaner at exit of a digester that includes a water spray assembly which removes foam and particles from the gas line to prevent clogging of downstream equipment.

Form Cap - A solid, concave-shaped piece of steel used when prebulging a rupture disc, top section, or vacuum support to ensure that the component reaches a specified cap height.

Form Pressure - Same as pre-bulge.

Fragmentation - Pieces of the rupture disc that may tear off when the rupture disc bursts that may cause damage to components downstream.

Fragmentation Test - A burst test performed on a volume tank to ensure that pieces of the rupture disc will not tear off when the rupture disc bursts.

Free Vents – open vents

Fugitive Emissions - Fugitive emissions are emissions of gases or vapors from pressurized equipment due to leaks and various other unintended or irregular releases of gases. As well as the economic cost of lost commodities, fugitive emissions contribute to air pollution.

Full Lift - The open position of the valve pallet at which the valve reaches the full rated flow capacity.

Full Vacuum - –14.7 psig, or 0 psia.

Fully Enclosed Waste Gas Burner – Burner that utilizes an enclosed combustion chamber to regulate the gas mixture and temperature during the combustion process. Resulting in a destruction efficiency of at least 99.8%. A.K.A. Fully Enclosed Flare (FEF).

Fusible Element – The component in a flame trap assembly which fails when a flame stabilizes on the flame arrester element, causing the flame trap assembly to close.

G Number - An Engineering number assigned to any Groth component or assembly that is not standard product.

Gauge Pressure - Is measured relative to the local atmospheric pressure.

Gasket - A seal used between parts, such as a rupture disc holder and a pipe flange, or between a rupture disc and a holder, to prevent leakage.

Gauge - An instrument used for measuring pressure, length, diameter, etc.

GEP / General Engineering Procedure - A document created and controlled by the CDC Engineering department.

GGEP – Groth General Engineering Procedure – A document created and controlled by the Groth Engineering department.

Girdle - A component of a CAL-VAC or a POS-A-SET rupture disc which controls the vacuum burst pressure in a CAL-VAC and the positive burst pressure in a POS-A-SET rupture disc.

GRAFSERT - A solid machined rupture disc made of phenolic impregnated graphite.

Graphite - The soft, steel-gray to black, hexagonally crystallized allotrope of carbon. Used in making the GRAFSERT rupture disc by molding it with a binder.

GTAW /Gas Tungsten Arc Welding – Also referred to as TIG (Tungsten Inert Gas) welding.

Guide rod – component for guidance of valve pallet.

Handling Support - A flat or pre-bulged component of a rupture disc which aids in holding the rupture disc together during installation but does not affect the rupture disc's burst pressure.

Hartford Testing Burst tests - Witnessed by an inspector employed by Hartford Steam Boiler Inspection and Insurance Company.

Header - A pipe that serves as a central connection for two or more smaller pipes.

Heating Jacket – closed room for heating of a device, which encloses the device fully or partly.

Heat Shield - A flat metal component used to reduce the process temperature to which a rupture disc is exposed. It is installed between bolted pipe flanges upstream of the rupture disc.

HL / Heavy Lip - A 30° Seat holder designed for higher pressure rupture discs and ASME bolting classes.

Height Gauge - A dial indicator gauge mounted on a stand, used for measuring crown heights of rupture disc components.

Helium Leak Test - See Mass Spectrometer.

Holder - Two components, called the inlet and outlet, designed to hold a rupture disc in tension.

Hook Ring - A ring welded to the rupture disc. The I.D. of the hook ring is slightly larger than the O.D. of the step on the flat seat holder, and is used to prevent the rupture disc from slipping.

HPX – Scored reverse acting disc.

Hydraulic Flame Arrester - Flame arrester designed to break the flow of an explosive mixture into discrete bubbles in a water column, thus preventing flame transmission

Hydraulic Diameter - Is the measurement of the cross sectional area of a flow channel, exposed to a flame, relative to the total surrounding surface area within an arrestor

Hydraulic Press - A piece of equipment consisting of two platens and a hydraulic cylinder, designed to apply a compressive force to a piece of tooling.

ID/Inside diameter - Nominal pipe inside dimension.

Implosion - A collapse inward of a processing tank or a storage tank.

Inches of Mercury - A unit of pressure measured by the displacement of a column of mercury in a glass tube. The column of mercury rises or falls as the pressure of the air on the mercury changes. (Also see manometer.) 2.036 inches of mercury equal one psig.

Inspirating Venturi – Point where air and pilot gas are mixed for the burner.

INWC / Inches of water column - A unit of pressure measured by the displacement of a column of water in a glass tube. The column of water rises or falls as the pressure of the air on the water changes. (Also see manometer.) 27.70851 inches of water equal one psig.

Indent - A planned, controlled indentation located on the dome of the scored reverse acting rupture disc. See also *precision indent.*

Inert Gas – Non-flammable gas which will not support combustion and does not react to produce a flammable gas.

Inlet - An opening providing a means of entrance; the side of a rupture disc or rupture disc holder which is installed next to the process. See upstream and process.
Inlet Ring - A ring placed on the inlet side of a rupture disc. See ring.

In-line Flame Arrester - Flame arrester that is fitted with two pipe connections, one on each side of the flame arrester that prevents the transmission of a flame in a confined space (typically a pipeline).

Installation - The process of bolting up or connecting the valve or rupture disc and holder assembly to the customer's process system.

IOM/Installation, Operation and Maintenance Manual – Document that ships with each product from Groth Corporation that provides guidance on proper installation, operation and maintenance including safety precautions and troubleshooting guides.

Integrated Temperature Sensor - Temperature sensor integrated into the flame arrester, as specified by the manufacturer of the flame arrester, in order to provide a signal suitable to activate counter measures.

Inversion - Installation of a rupture disc or holder assembly upside down from how it is designed to be installed.

Inversion Ratio - On some types of rupture discs, a measurement of how far above or below its rated burst pressure the rupture disc will burst if it is installed upside down.

ISO-International Organization for Standardization - An international-standard-setting body composed of representatives from various national standards organizations. The organization promulgates worldwide proprietary industrial and commercial standards. It has its headquarters in Geneva, Switzerland. While ISO defines itself as a non-governmental organization, its ability to set standards that often become law, either through treaties or national standards, makes it more powerful than most non-governmental organizations.

ISO 9001 - A quality standard published by the ISO. CDC and Groth's Quality Assurance programs have been certified by TUEV-Cert, a German organization, as meeting the requirements of this standard.

ISOBARIC - Process is a Constant Pressure.

ISOCHORIC - Process is a Constant Volume.

ISPESL - The Italian organization responsible for certifying the burst pressure of rupture discs used in certain installations in that country.

ISOTHERMAL - Process is a Constant Temperature.

ITAR/International Traffic in Arms Regulations - Regulations set forth in parts 120-1130 of title 22 of the code of Federal Regulations which govern the export of defense Articles and Defense services under the US Department of State. The ITAR implements the provisions of the Arms Export Control Act (AECA) of 1976.

Item Number - The numerical designator assigned to each product the customer has ordered.

J-Hook - A curved metal rod welded to the outside diameter of a rupture disc holder. It is used as a locating device to ensure proper orientation with respect to flow during installation.

Jig - A device for guiding a tool or for holding machine work in place.

JIS - Japanese Industrial Standard - Specifies the standards used for industrial activities in Japan. The standardization process is coordinated by Japanese Industrial Standards Committee and published through Japanese Standards Association.

KBA - A reverse-acting rupture disc used in a holder which contains welded-in knife blades.

kgf - Kilograms Force - A metric unit of force. One kilogram equals 2.20462 pounds force.

kgf/cm2 - Kilograms Force Per Square Centimeter - A metric unit of pressure. One kgf/cm2 equals 14.2233 psig.

Kick Punch - A piece of equipment, operated by a foot pedal, used to punch a hole through a piece of sheet metal.

Knife Blades - An integral part of a rupture disc holder used with KBA, ZAP, RSD, RSDW, CALVAC, POS-A-SET and VIP rupture discs. The knife-blades are sharp-edged pieces of steel, which function to cut the rupture disc into sections when it ruptures.

KPa/ Kilopascals - A metric unit of pressure. One kilopascal equals one thousand pascals. See Pascal.

K_R Factor - A measure of flow resistance used by piping engineers to design a relief

system and to determine its flow capacity. Certified K_R Factors represent tested flow resistance values certified by the ASME.

Lathe - A machine on which a piece of metal is spun and shaped by a fixed cutting tool.

Lead Wire - An insulated electrical wire with a connector on one end designed to plug into the connector on a B.D.I.

Leak Test - A test performed on a rupture disc assembly by submerging the assembly in water and pressurizing the inlet side of the rupture disc. Bubbles in the water indicate a leak either through the rupture disc or in the seating area of the assembly.

Leakage – Flow of a fluid past a seat or seal, in the closed position.

Lennox - Also called a nibbler. A device used to cut metal which consists of moving, opposed blades.

LL/Light Lip - A 30° Seat holder used for normal operating pressures.

Lift – The actual travel of the valve pallet from the closed position on the valve seat when a valve is relieving.

Linear Interpolation - The process of determining an unknown point that lies between two known points by presuming a linear relationship between the three points.

Liquid Nitrogen - Nitrogen in its liquid state. It is liquid below its boiling point of -320°F.

Liner - A solid component of a rupture disc which isolates other rupture disc components from the process media or the environment.

Lockup – Deviation from the set point when the blanket gas regulator is at a no flow condition.

Lot - A lot of rupture discs are those rupture discs manufactured of a given heat number and thickness of material, at one time, of the same size, type and manufacturing process, including heat treatment.

LOTRX - A reverse acting, scored rupture disc which is similar to the STAR X rupture disc, but can be used for lower rated burst pressures and uses an inlet and outlet ring.

LOX - Oxygen in a liquid state.

Lug - A small, square or rectangular piece of sheet metal used as a component of a vacuum support. The lugs help align and hold the petals of the vacuum support together.

Man-way - A small passageway that a person may pass through.

Manometer - An instrument used for measuring pressure. It operates on the fundamental principle of displacing a liquid column by the unknown pressure force to be measured.

Manufacturing Range - The pressure range (agreed upon by the customer and the rupture disc manufacturer) in which the specified burst pressure must fall. Manufacturing ranges are expressed as (a) plus or minus a percentage of the specified pressure, (b) plus or minus pressure units, or (c) 0 percent or zero pressure units.
See zero manufacturing range.

Mass Spectrometer - A machine that operates in a vacuum atmosphere to detect leakage through a test sample, such as a

rupture disc, holder, or welded joint. Also called helium leak test machine.

MAWP/ Maximum Allowable Working Pressure – Maximum gauge pressure permissible at the top of completed vessel in its normal operating position at the designated coincident temperature for that specified pressure. The MAWP is the basis for the pressure setting of the pressure-relief devices that protect the vessel.

MAWV (Design Vacuum) – same as MAWP, only for negative pressure (vacuum).

mbarg /millibar gage - A metric unit of pressure. One mbarg equals .0145 psig.

Media – Liquid or vapor in a process or storage tank.

MICRO X - A cross-scored, tension-type rupture disc, designed for non-fragmentation with a four-petal opening.

Mid-flange - The middle component of a double disc assembly. It comprises the outlet of the bottom rupture disc, and the inlet of the top rupture disc.

Milling machine - A machine used for shaping, cutting, or polishing metal surfaces.

MINTRX - A reverse-acting, scored rupture disc which is similar to the ULTRX rupture disc but can be used for lower rated burst pressures.

MNFA /Minimum Net Flow Area. - The minimum relief area of a rupture disc device after burst. It is used as an alternate method of calculating a relief system's capacity.

MPT /Male Pipe Taper - A.K.A. – NPT. See FPT or NPT.

MRB/ Material Review Board - A cross functional team assembled for the purpose of evaluating a product that has been rejected by inspection. Agreed disposition of the rejected item(s) is the main function of the team.

Maximum Experimental Safe Gap (MESG) Safe gap measured in accordance with IEC 60079-1-1:2002 between parallel surfaces that will prevent the explosion of any gas-air mixture on one side of the gap from igniting the mixture of the same gases on the other side.

Molecular Weight – the Mol weight of a media. A.K.A. Molecular Mass.

Modulating Action - Proportional opening of a device in relation to tank pressure.

MTR – A report documenting the result of tests performed by the material manufacturer to fulfill the requirements of the material specification.

Muffled Outlet - An outlet on a Screw-Type or Tite-Seal holder designed to disperse the expelled media.

NCMH (Nm^3/h) - Normal cubic metres of air or gas per hour at a temperature of 0 °C and pressure of 101,3 kPa.

NDE – Non-destructive Examination- Method to examine materials without affecting the usability of the piece.

NFPA/ National Fire Protection Association The mission of the international nonprofit NFPA, established in 1896, is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating consensus codes and standards, research, training, and education. NFPA

develops, publishes, and disseminates more than 300 consensus codes and standards intended to minimize the possibility and effects of fire and other risks.

Nibbler - See Lennox.

Non-refrigerated Tank - Container that stores material in a liquid state without the aid of refrigeration either by evaporation of the tank contents or by a circulating refrigeration system. Generally, the storage temperature will be close to or higher than ambient temperature.

Non-Fragmenting design– (Non-Fragmentation, Non-Fragmenting) – no fragments are released into the downstream piping and/or equipment during an overpressure condition (after burst).

Normal Venting - Venting required due to operational requirements or atmospheric changes.

NIOSHA - The OSH Act, which created OSHA also created the National Institute for Occupational Safety and Health (NIOSH) as a research agency focusing on occupational health and safety. NIOSH, however, is not a part of the U.S. Department of Labor.

NPT/ National Pipe Taper – see also FPT or MPT. The taper rate for all NPT threads is $\frac{1}{16}$ measured by the change of diameter (of the pipe thread) over distance. The angle between the taper and the center axis of the pipe is 1° 47′ 24″ (1.7899°). Commonly-used sizes are $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1. [viii]

O.D./ Outside Diameter - A recognized feature of the rupture disc describing the outer diameter of the device.

OEM/ Original Equipment Manufacturer - Products that are purchased to install onto a piece of equipment sold under the purchasing brand name.

OSHA / United States Occupational Safety and Health Administration - An agency of the United States Department of Labor. Its mission is to prevent work-related injuries, illnesses, and occupational fatality by issuing and enforcing standards for workplace safety and health.

One-Hole Tag - A flat tag that can be attached by a wire to an assembly.

Opening Pressure – The value of increasing inlet static pressure at which there is measurable lift of the pallet or at which discharge of the fluid becomes continuous.

Opening Test - A burst test performed on a volume tank to ensure that the rupture disc will open sufficiently to provide adequate pressure relief.

Operating Pressure – Pressure the process system experiences during normal operation, including normal variation. Also know as Maximum Operating Pressure - the maximum pressure expected during normal operation.

Operating Ratio - The relationship between the pressure at which the customer's system operates and the rated burst pressure of the rupture disc installed in that system.

O-Ring - A molded piece of material, usually doughnut-shaped, used to seal two components.

Outlet - The side of a valve, rupture disc, or rupture disc holder which is installed away, or downstream, from the process.

Outlet Ring - A ring placed on the outlet side of a rupture disc. See ring.

Overpressure - Pressure increase at the valve inlet above the set pressure, when the valve is relieving. Overpressure is expressed in pressure units or as a percentage of the set pressure. The value or magnitude of the overpressure is equal to the value or magnitude of the accumulation when the valve is set at the maximum allowable working pressure or design pressure and the inlet piping losses are zero. If the relieving device is set to open at the MAWP of the vessel, then overpressure is equivalent to accumulation.

Pallet – See valve pallet.

Pa/Pascal - A metric unit of pressure. One psig is equal to 6895 Pascal.

PED/ European "Pressure Equipment Directive" - Sets out the standards for the design and fabrication of pressure vessels, piping, safety valves and other components and assemblies subject to pressure loading and having a maximum pressure more than 0.5 bar gauge. It also sets the administrative procedures requirements for the "conformity assessment" of pressure equipment, for the free placing on the European market without local legislative barriers.

Performance Tolerance – the difference between the minimum and maximum specified bursting pressures at a coincident temperature. A pressure range that includes both manufacturing range and burst tolerance at a coincident temperature.[ix]

Petal - One section of a rupture disc or a vacuum support in the burst condition.

Petroleum Products - Hydrocarbon materials or other products derived from crude oil.

PV valve - Weight-loaded, pilot-operated, or spring-loaded valve, used to relieve excess pressure and/or vacuum that has developed in a tank.

PIE /Price in Effect at the time of shipment.

PL Rupture Disc - A rupture disc which is the same as a CDC rupture disc, with the addition of a Teflon® liner on the outlet side of the top section.

PLV Rupture Disc - A rupture disc which is the same as a PL rupture disc, but with a vacuum support on the outlet side of the top section and a Teflon® liner on the outlet side of the vacuum support.

PMI /Positive Material Identification – is the analysis of a metallic alloy to establish composition by reading the quantities by percentage of its constituent elements.

Profilometer - An electronic instrument used to measure a surface's profile, in order to quantify its roughness.

Polymerization- A process of reacting monomer molecules together in a chemical reaction to form three-dimensional networks or polymer chains.

POS-A-SET - A double-acting rupture disc that is designed to provide positive relief at extremely low positive pressures (i.e., in the range of 1" water column to 30" water column).

Positive Break - A burst test made by applying pressure from the process side toward the non process side.

Positive Pressure - Pressure being applied on the process side of rupture disc material in the direction of flow.

POV /Pilot Operated Valve – Pressure relief valve in which the primary relieving device (main valve) is combined with and

controlled by a self-actuated auxiliary pressure-relief valve (pilot valve). Pilot valves have better seat leakage and opening characteristics than normal PVRV.

Pre-bulge Pressure - Pressure applied to form rupture disc within a die.

Pre-Volume Flame Arrester - Flame arrester that, after ignition by an internal ignition source, prevents flame transmission from inside an explosion-pressure-resistant containment (e.g. a vessel or closed pipe work) to the outside, or into the connecting pipe work.

Precision Indent - A planned, controlled indentation located on the dome of the scored reverse acting rupture disc. See also *indent.*

Press - A piece of machinery designed to hold something together by means of a clamping force. Also called hydraulic press.

Pressure Differential - The difference in the pressures on the inlet and outlet sides of a rupture disc, valve, or flame arrester.

Pressure gauge - An instrument used for measuring pressure.

Pressure Snubber - A fitting with a small orifice which is installed in a pressure gauge or other sensitive instrument to dampen pressure pulsations which could damage the instrument.

Pressure Relief Valve – A valve designed to open and relieve excess pressure and to reclose and prevent further flow of fluid after normal conditions have been restored.

Process - The customer's product or media, which is being produced under set temperature and pressure.

Process Vessel (Tank) – A tank or vessel used for an integrated operation in petrochemical facilities, refineries, gas plants, oil and gas production facilities and other facilities. A process tank can involve (not limited to) preparation, separation, reaction, surge control, blending, purification, change in state, energy content, or composition of a material.

Proof Pressure Test - A test where the completed rupture disc is pressurized to some percentage of the rupture disc rating.

Protective Cover - A thin, circular piece of Teflon® that is located between the holder outlet and the gasket to protect the rupture disc or knife-blades from the outside environment.

Prototype - Is the fabrication of an original type, form, or instance of something serving as a typical example, to demonstrate operation and or theory.

Protrusion - The portion of the outlet ring that begins the tearing through the score line on a rupture disc.

PRV/ Pressure Relief Valve - Prevents tank pressure from exceeding pressure and/or vacuum design limits. Available in vent to atmosphere configuration or vent to downstream pipeline (outlet flange) with three operational versions: Weight Loaded, Spring Loaded, Pilot Operated. Also known as PVRV, conservation vent, vent valve, or vent.

psia/ Pounds per Square Inch Absolute. - A unit of pressure measurement where 0 psia is equal to a full vacuum, and atmospheric pressure is equal to 14.7 psia.

psig /Pounds per Square Inch Gauge - A unit of pressure measurement where

atmospheric pressure is equal to 0 psig, and a full vacuum is equal to -14.7 psig.

Punch Press - A machine consisting of two platens, a flywheel, and a motor, designed to apply a sudden compressive force. Generally used for punching or stamping metal parts.

Pulsing - Is operating surges caused by temporary fluctuations of system pressure.

RAF/ Radius After Forming - The radial distance from the center hole of a formed component to another feature, such as a hole or slit, of that component.

RAS/ Rupture Disc - A reverse acting cross-scored rupture disc that is designed not to fragment when it bursts.

Rated Burst Pressure - The value of the pressure, at the customer's requested temperature, at which a rupture disc is manufactured to burst. Also called stamped burst pressure.

Rated Valve Capacity – The quantity of test fluid (air or water) that would pass through the valve at rated travel under the stated pressure conditions as determined by the appropriate equations and manufacturer's ratings.

Rated Relieving Capacity – Relieving capacity used as the basis for the application of a pressure-relief device, determined in accordance with the pressure-design code or regulation and supplied by the manufacturer. A.K.A. Rated Flow Capacity.

RBF/ Radius Before Forming - The radial distance from the center hole of a flat component to another feature, such as a hole or slit, of that component.

Red Ball Order - An emergency service order, with a reduced lead time and premium price. Usually manufactured for a customer whose process is in danger of being shut down until a new rupture disc or valve is received.

Refrigerated Tank - Container that stores liquid at a temperature below atmospheric temperature with or without the aid of refrigeration either by evaporation of the tank contents or by a circulating refrigeration system.

Relief Device - Device used to relieve excess pressure and/or vacuum that has developed in a tank.

Relieving Pressure - Pressure at the inlet of a relief device when it is flowing at the required relieving capacity.

Required Relieving Capacity - Flow capacity of a relief device required to prevent excessive pressure or vacuum in a tank under the most severe operating or emergency conditions. A.K.A. Required Flow Capacity.

Reverse-Acting - A type of rupture disc which bursts when the dome of the rupture disc completely collapses in the flow direction. The dome of the rupture disc is oriented toward the process. The rupture disc works in compression rather than tension.

Reverse Buckling - See reverse-acting.

Repeatability – The closeness of agreement of a regulated valve when returned to the same steady-state conditions after upset(s).

RCS type Rupture Disc - A reverse-acting, cross-scored rupture disc which is designed not to fragment when it bursts.

RHI /Reduced Height Insert - A flat seat insert holder similar to the Unisert, but with a reduced overall height. Used with flat seat composite type and MICRO X rupture discs.

RIF /Radius In Flat - A dimension on a rupture disc component measured before it is Pre-bulged. Also called RBF.

Ring - A punched or formed piece of sheet metal placed in the seating area of a rupture disc or vacuum support, usually to improve seating characteristics and reduce the potential for damage to the seating area of the rupture disc.

RMR/ Returned Material Report - A report packet which contains all information in regard to a customer's order which has been returned for evaluation.

RMA/Returned Material Authorization - Authorization provided to customer from the Sales representative for return of product for testing and / or evaluation.

RSD Rupture Disc - A reverse-acting rupture disc used in a holder which contains replaceable knife blades.

RSDW Rupture Disc - A reverse-acting rupture disc used in a holder which contains welded-in knife blades.

Rupture Disc - A non-reclosing pressure relief device.

Run-Up Length (L) – Pipe length on the unprotected side of the flame arrester.

Run-Up Length Ratio (L/D) - Run up length divided by pipe diameter.

Safety Ratio - On some types of rupture discs, an inherent design that if the rupture disc should be damaged, it will burst within a certain limit (such as 1.5 times its rated burst pressure). Also called damage ratio.

Sanitary Fitting - A product built to fit the dimensions of tubing and thin-walled piping used in the pharmaceutical, dairy, and food processing industries.

SANITRX - A reverse-acting, solid metal rupture disc designed for use in sanitary applications, such as in the pharmaceutical, dairy, and food processing industries.

SANITRX NA - A sanitary type rupture disc for use with Nova septic NA-connect holder.

SC Number - An Engineering drawing number assigned to any rupture disc or rupture disc component that is not standard product.

SCFM /Standard cubic feet per minute - A measure of volumetric flow rate (capacity).

SCFH - Standard cubic feet of air or gas per hour (same as free air or free gas) at a temperature of 15.6 °C (60 °F) and an absolute pressure of 101.3 kPa (14.7 psi).

Set Pressure – Inlet gauge pressure at the device inlet at which the relief device is set to start opening under service conditions.

Set Point – The set value of a regulated variable at the minimum controllable flow.

Set Vacuum – internal negative pressure at which a vacuum valve first opens stabilized burning for a specified time.

Score - A mechanical process used to partially cut or thin an area of the rupture disc material.

Score Blade - The component of a score die which is designed to partially deform, displace, or score metal sheet material resting on an anvil.

Screw Type Assembly - An assembly consisting of a standard or composite rupture disc and a reusable Screw Type holder.

SDV /Safety Diverter Valve – A three-way valve that provides a quick and easy method for valve changeover and maintenance without interrupting the process.

Seal - The solid, pressure-retaining component of a rupture disc. It can be flat or pre-bulged, metal, or Teflon®.

SEALSERT - A GRAFSERT rupture disc with an integrated fluorocarbon lining.

Seat - the sealing portion of the rupture disc holder. Also, the portion of the rupture disc that comes in contact with the rupture disc holder.

Seat Leakage – The quantity of test fluid (air or water) passing through an assembled valve in the closed position under the test conditions defined.

Sediment Trap - Removes solids and liquids protecting downstream equipment from clogging or corrosion by utilizing a centrifugal force developed by a circular motion. This force and the sudden drop of gas velocity assists in the removal of solids and liquids in the gas.

SFC - A formed circular vent panel consisting of a solid metal seal.

Shipping Protector - A formed piece of material, either plastic or metal, designed to protect finished product during shipping.

Shop Range - A pressure range indicated on the work order. The shop range will be equal to or smaller than the manufacturing range or the min. / max. range. All lot qualification burst tests must fall within the shop range.

Short time burning – Stabilized burning for a specified time.

SIP /Sterilizing in place - A saturated steam at a pressure of 1 bar. After sterilization, a system has to be cooled down by means of blowing out the system with sterile air.

Slip Ring - A ring welded to a rupture disc in the seating area. It adds rigidity to the rupture disc to prevent the rupture disc from slipping in the holder.

Slit - A cut through a rupture disc component, such as a top section or vacuum support.

Slot Cover - A component of a Composite rupture disc made of metal or Teflon®, with slots cut into it to prevent it from retaining pressure. It is used to protect the seal from being cut by the slots or holes in either the top section or the vacuum support.

Sonic Flow - The condition where the velocity of a flowing gas is greater than or equal to the local speed of sound.

Sour Gas - Natural gas or substance containing significant amounts of Hydrogen Sulfide.

SPC /Statistical Process Control - A method of monitoring the performance of a machine or system by collecting sample data, plotting it in graphs, and analyzing

results by recognized statistical formula's.

Special - Any nonstandard product.

Specific Gravity – The comparison of a liquid substance to water.

Specified Burst Pressure - The rupture disc burst pressure at a given temperature specified by the customer. This value is used on the work order to indicate a customer's requirement of marking the rupture disc tags with the specified burst pressure rather than the rated burst pressure.

Spot weld - To join metals by applying heat and pressure from an electrode.

SRA – Scored Reverse Acting. A bursting disc that is scored on the outlet side.

Stabilized burning – steady burning of flame, stabilized at, or close to the flame arrester element.

Stoichiometric Mixture - Is a flammable fuel/air mixture which becomes totally consumed when ignited (complete combustion).

Stability – Ability to hold a steady controlled variable within the limits of stated accuracy of regulation.

Stamped Burst - An ASME Code term. See Rated Burst Pressure.

Static Flame Arrester - Flame arrester designed to prevent flame transmission by quenching gaps.

STD /Standard - A forward acting solid metal rupture disc.

Star Date - A date before which the customer requests that an order should not be shipped.

STAR X - A reverse acting, scored rupture disc which is similar to the MINTRX rupture disc, but can be used for lower rated burst pressures and uses an outlet ring.

Stoomwezen - The Netherlands organization responsible for certifying the burst pressure of rupture discs used in certain installations in that country.

Storage Tank – A fixed tank or vessel that is not part of the processing unit in petrochemical facilities, refineries, gas plants, oil and gas production facilities and other facilities. These tanks or vessels are often located in tank farms.

Stress Relieve - A process used to reduce the internal ("residual") stress in a piece of metal that has been cold formed. It consists of heating the metal to a suitable temperature, holding it long enough to reduce the stress, and then cooling it slowly enough to minimize the development of new stresses.

Strip - A component of a top section, used to cover the slots in place of a slot cover. Also, a long, single piece of metal used on a vacuum support on the slits cut from the center hole to the radial hole.

Subsonic Flow - The condition where the velocity of a flowing gas is less than the local speed of sound. Also known as subcritical flow.

Tab - (1) On a top section or vacuum support, a solid section of metal in the middle of a slit. (2) A rectangular protrusion left on the outside diameter of a rupture disc

or rupture disc component for the purpose of attaching a rupture disc tag.

Tanksert - A composite rupture disc which is designed to be mounted to railroad tankcars for overpressure protection.

Teflon® - The registered trademark of the DuPont Corporation for its fluorocarbon resins. The three types used at CDC are TFE, FEP, and PFA.

Tension Pressure - applied to the concave side of the rupture disc, the opposite of compression.

Tension Burst - The burst pressure of a solid piece of sheet metal that has been burst in a die, starting from the flat state.

Thermal Inbreathing - Movement of air or blanketing gas into a tank when vapors in the tank contract or condense as a result of weather changes (e.g. a decrease in atmospheric temperature).

Thermal Outbreathing - Movement of vapors out of a tank when vapors in the tank expand and liquid in the tank vaporizes as a result of weather changes (e.g. an increase in atmospheric temperature).

Thermocouple – a device consisting of two different conductors (usually metal alloys) that produce a voltage proportional to a temperature difference between either end of the pair of conductors.

Thermowell – Thermocouple shielding.

TIG Welding - See GTAW.

Tite-Seal Assembly - A sealed assembly consisting of a standard or composite rupture disc and a brass Tite-Seal holder. Typically considered a throw away unit because rupture disc cannot be replaced.

Top Section - The component of a composite rupture disc which determines the burst pressure.

Torque - Applied force or loading that tends to create a rotation.

Touch Point - On a solid metal rupture disc, the vertical location at which the score blade barely touches the rupture disc material without actually cutting into the material.

TPI /Threads Per Inch - used to determine number of threads used to secure a device or on a bolt.

TUEV Technische Uberwachungs-Vereine Technical Inspection Agency - German and Austrian organizations responsible for certifying the burst pressure of rupture discs used in certain installations in those countries.

TUEV Testing Burst - Testing witnessed by a representative certified by TUEV.

Turtle backing - the appearance of a rupture disc which has partially collapsed in the backpressure direction onto a component with a lower crown height. The pattern that is created on the disc looks similar to the design on a turtle's shell.

UD Code Symbol - UD stands for unfired disc. Per ASME Code, Section VIII, 1997 Addenda, all rupture discs manufactured to comply with ASME Section VIII, must have the UD code symbol stamp, the certified flow resistance factor K_R and the minimum net flow area stamped on the tag.

ULTRX - A reverse-acting, scored rupture disc which is designed not to fragment when it bursts.

Union - A coupling device for connecting pipes which can be adapted to be used as a rupture disc holder.

UNISERT - A flat seat rupture disc holder having special alignment pins. Used with flat seat composite and Micro-X type rupture discs.

Upstream -The process, or inlet, side of the rupture disc or valve.

USP /United States Pharmacopeia - A non–governmental, official public standards–setting authority for prescription and over–the–counter medicines and other healthcare products manufactured or sold in the United States. USP also sets widely recognized standards for food ingredients and dietary supplements. USP sets standards for the quality, purity, strength, and consistency of these products–critical to the public health.

Valve Pallet – The component of a valve that sits on the seat when closed and moves away from the seat when the valve opens.

Valve Seat - The sealing area of the valve.

Valve Stem - A rod attached to the valve pallet, for guidance or actuation.

Vacuum - A gas pressure below normal atmospheric pressure. Normal atmospheric pressure is equal to 0 psig; a "full vacuum" is equal to -14.6959 psig (often rounded to minus 14.7).

Vacuum Pressure - A pressure that is lower than atmospheric pressure. A vacuum pressure can be created when a tank is emptied of its fluid faster than another fluid can rush in. This “lower than atmospheric pressure” inside the tank causes it and the rupture disc mounted on it to want to pull inwards.

Vacuum Support - A component of a rupture disc that is designed to counteract the reversal effect of backpressure upon the rupture disc. Valve pallets may also have a vacuum support that performs the same function.

Vent Panel - A round or rectangular rupture disc used for low-pressure relief of gas or dust. It can be formed or flat.

Vessel – Container or structural envelope in which materials are processed, treated, or stored.

VIP Rupture Disc - A reverse-acting disc with an integral knifeblade assembly.

Volume Tank - A pressure vessel used to store compressed air for rupture discs or valves.

Volume Test - A burst test of a rupture disc where the rupture disc is mounted on a volume tank.

VPC - A flat scored aluminum circular vent panel with Teflon® coating applied to both the process and vent sides.

VPR - A flat scored aluminum rectangular vent panel with Teflon® coating applied to both the process and vent sides.

VPS - A flat scored aluminum square vent panel with Teflon® coating applied to both the process and vent sides.

VRD - A reverse acting, scored rupture disc similar to an ULTRX or STAR X rupture disc. It incorporates a mating holder with a reduced assembly height.

VRV/Vacuum Relief Valve - Prevents tank pressure from exceeding vacuum design limits. Available in vent from atmosphere configuration or vent from upstream pipeline (inlet flange) with three operational versions: Weight Loaded, Spring Loaded, Pilot Operated. Also known as PVRV, conservation vent, vent valve, or vent.

Waste Gas Burner - Device used to combust bio-gas generated by digesters.

Wetted Area - Surface area of a tank exposed to liquid on the interior and heat from a fire on the exterior.

Weir - An obstruction in an open channel over which liquid flows.

Working Band – The pressure range in a process or storage vessel in which none of the installed relief devices are active.

Work Order - 1) The document that gives the customer's name and describes what products they have ordered, and the date the products are scheduled to ship. 2) The document for production departments, similar to a work order that is used to build components of either rupture discs or holders, usually for inventory. 3) The document for the maintenance, and the tool and die departments, requesting that a job be performed.

Work Order Number - A unique number assigned to each customer order for tracking purposes.

ZAP Rupture Disc - A reverse-acting rupture disc with encapsulating rings. Used in a holder which contains knife blades.

Zero Manufacturing Range - A manufacturing range in which the rupture disc is stamped with the customer's requested pressure rating. The burst tolerance then applies to this rating. See manufacturing range and burst tolerance.

APPROVALS:

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Engineering: *E. Frank Kurtz*

Date: 9/1/2012

Quality Assurance: Todd Hawkins

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[i] EN 13237-3.2
[ii] ANSI website http://www.ansi.org/membership/overview/overview.aspx?menuid=2http://www.ansi.org/membership/overview/overview.aspx?menuid=2
[iii] API website http://www.api.org/
[iv] http://www.asme.org/groups/technical-institutes-and-divisions/bioprocessing-equipment
[v] EN 13237-3.18
[vi] Wikipedia - http://en.wikipedia.org/wiki/Explosions
[vii] http://en.wikipedia.org/wiki/National_pipe_thread
[viii] http://en.wikipedia.org/wiki/National_pipe_thread
[ix] Zappe R.W. Valve Selection Handbook, 3rd Ed. Gulf Publishing Co. 1991 251 p.