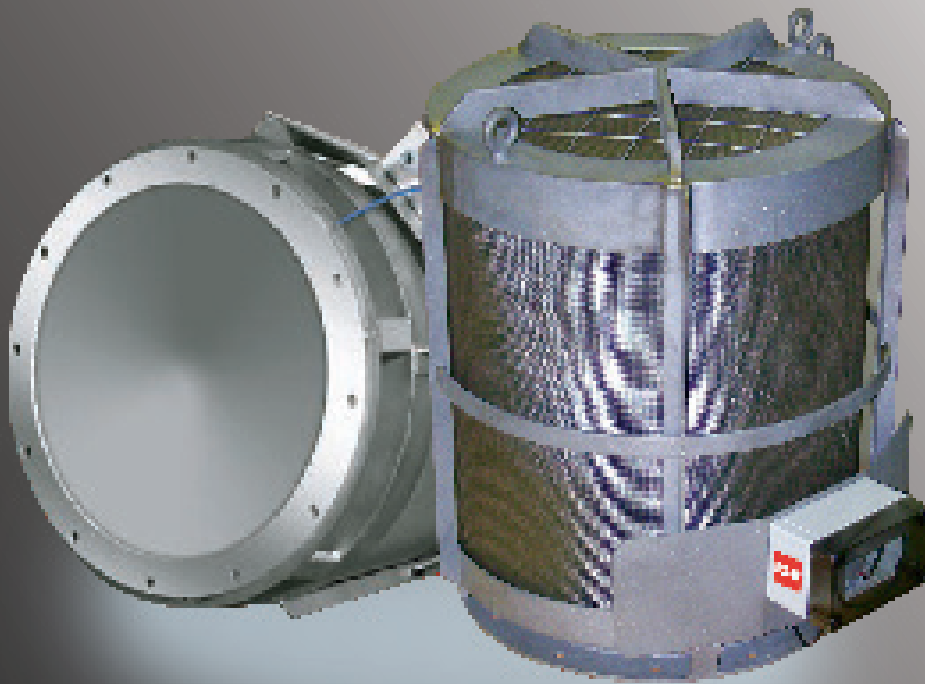


BS & B[®]

Explosion Venting IQR System™

Flame, Dust and Pressure Control



- Intercepts
- Quenches
- Retains

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BS&B Flameless Venting

IQR System™

Where the flameball ejected by a deflagration cannot be accepted and ducted relief is impractical, flameless venting technology provides an alternate passive protection system.

Flame, dust and pressure control:

Intercepts >>> Quenches >>> Retains



How the IQR System Works

The IQR system comprises of two parts, an explosion vent and a quenching module. The explosion vent responds to the rapidly building pressure of a deflagration and opens to relieve this pressure. As the developing fireball passes through the open explosion vent, it is intercepted by the quenching module. A stainless steel precision mesh, retained by a frame, performs as a 3-dimensional flame arrestor to quench the flame.

The quenching module retains the flame and hot gases of a deflagration as well as the burning and unburned dust passing through the open explosion vent. The 3-dimensional mesh arrangement acts as a heat sink that interrupts the explosion in mid-stream as well as an absorption of the pressure wave and dust that would normally be ejected by a vented explosion.

While the flameball temperature of a dust explosion can easily reach 932°F (500°C), the IQR quenching module typically remains below 212°F (100°C) followed by rapid cool down due to its large surface area. This results in a negligible change in temperature in the environment surrounding the IQR System.

With the quenching of flame, retention of dust, and control of pressure and temperature provided by the IQR system, this safety device may be applied indoors whenever the impact of a vented explosion must be avoided.

Safety Functions of the IQR System

- Flame arresting - no flame escapes providing a safe operating environment for personnel
- Eliminates the possibility of an external secondary ignition and subsequent explosion external to the protected equipment
- Dust retention - retains process product removing the possibility of potentially toxic product entering the environment
- Pressure retention - absorbs explosion pressure peak, protects personnel and surrounding environment, including buildings, from pressure blast
- Temperature control - absorbs fireball with negligible temperature rise in surrounding environment

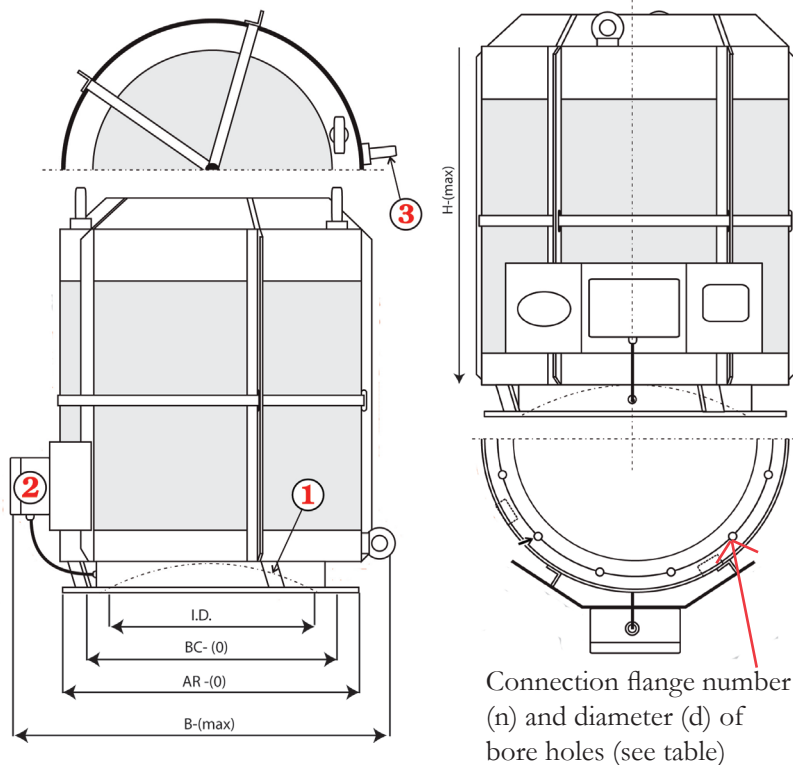
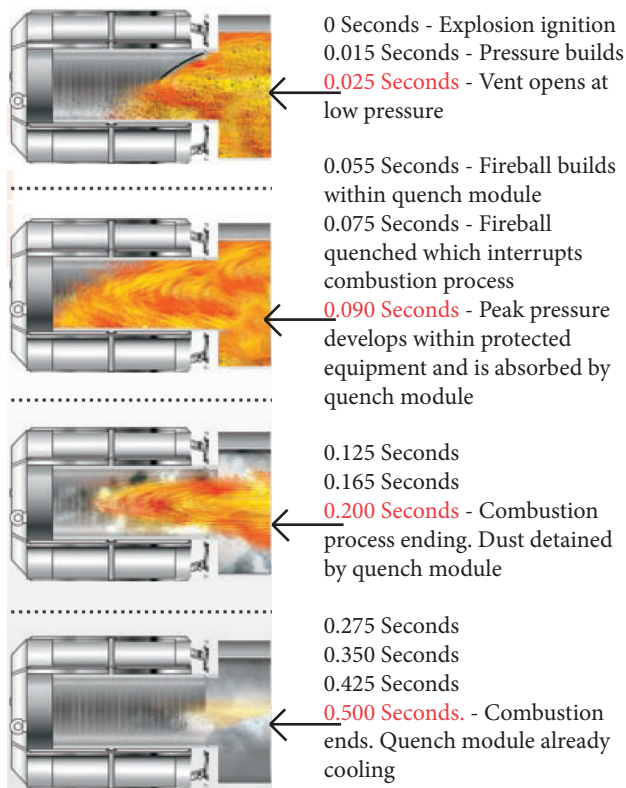
Application of the IQR System

The IQR System is recognized as an explosion venting device by Codes and Standards such as NFPA 68-2018, NFPA 654 and the European Atex Directive. The IQR System is a solution for the protection of process equipment installed indoors where one or more of the following conditions exist:

- Venting to outside requires ducting that is too long. Vent ducting that exceeds 20 feet (6m) in length is not recommended — ducts up to 10 feet (3m) in length have the least impact on the pressure developed within the protected process equipment.
- No space to install venting is available. This can arise where equipment is installed closely packed leaving no room for short and straight ducting.
- No access is available to outside for vent ducting. This can arise where equipment is installed in basement areas as where no outside wall is present.
- Release of fireball outside is unacceptable; a fireball might be ejected up to 100 feet (30m) and have 10 times the volume of the process equipment being protected.
- Release of dust (burned and unburned) outside is unacceptable.
- Release of explosion pressure pulse is unacceptable; adjacent building structures can be damaged by a pressure pulse that can exceed 2 or 3 psi over a large area for a short time.

Many of these application concerns apply to outdoor process equipment as well. The IQR System may be applied to outdoor process equipment where precautions are taken to avoid buildup of snow, ice and water in the quenching module.

IQR System Typical Fast Response Time



1. Explosion vent with integral Burst Alert[®] Sensor
2. IQR Monitor that provides signal upon activation for process shut down
3. Eyebolts for lifting and support after installation (if required)

Type	I.D.		H		A		B		AR		BC		d		n	wt	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm		lbs	Kg
IQR-8	8.2	208	22	560	14.2	360	17	430	10.6	269	9.6	243	0.33	8.5	8	64	29
IQR-12	12.2	310	22	560	18.1	460	20.9	530	15.4	391	14	355	0.43	11	12	75	34
IQR-16	15.5	393	37	940	22	560	24.8	630	19.7	500	17.4	443	0.51	13	16	121	55
IQR-20	19.4	494	37	940	26	660	29.1	740	23.6	599	21.4	544	0.51	13	20	152	69
IQR-24	23.5	596	55	1400	30.3	770	33.9	860	27.6	701	25.4	646	0.51	13	20	317	144
IQR-28	27.4	697	75.2	1910	34.6	880	38.2	970	31.5	800	29.6	752	0.51	13	28	494	224
IQR-32	31.5	799	87	2210	38.6	980	42.1	1070	35.4	899	33.7	854	0.51	13	28	606	275

Installation, Inspection and Maintenance

The IQR System is simply installed by a bolted flange connection at its inlet, just as an explosion vent would be applied. Installation may be in any convenient location.

In the case of larger size IQR devices or where installed to weak equipment, additional bracing may be required by connecting to the eyebolts supplied with each IQR unit. The IQR system is always supplied with an integral Burst Alert[®] sensor and monitor circuit that will generate an alarm signal when the device activates. Codes require that this alarm signal be used to shut down the process to stop the feed of dust and air which are the fuel for an explosion.

Annual inspection of the IQR system is recommended by factory trained personnel. While the IQR is a passive safety device, just like an explosion vent, periodic inspection ensures optimum safety.

Factory trained personnel are available for assistance with commissioning as well as annual inspection. Forthcoming changes to codes and standards require that both passive and active safety systems be subject to periodic inspection. The IQR system has no routine maintenance requirements. Commissioning and annual inspections will identify any planned maintenance requirements unique to each application.

After system activation there is minimal external cleanup compared to an open vented dust explosion. The IQR System can typically be refurbished after activation for quick and economic process restart.



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