

PRESSURE / / SAFETY DEVICES

RUPTURE DISC / EXPLOSION PANEL

N2 BLANKETING SYSTEM / EMERGENCY RELIEF HATCH

The Leader of Safety Equipment



www.finedisc.co.kr



***FDC Small but strong
enterprise in the world!***



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CEO MESSAGE

FDC is a leading company that has succeeded in localization of Rupture Discs for the first time in Korea. We are competing against excellent companies of the world on the basis of the know-how accumulated from production of Rupture Discs over the past 25 years. We manufacture the complete Rupture Discs in accordance with KS B ISO 4126/6718, KOSHA, ASME Code Sec. VIII and ISO-9001:2008 quality system.

We constantly research and develop new products to improve the quality so to enable us to protect our customer's cherished properties and lives from hazards such as explosions.

Our business includes Rupture Discs, Explosion Panels, N2 Blanketing System and Emergency Relief Hatch. These products have been applied to pressure safety devices in various fields including Low Pressure Storage Tank, Pressure Tank, Oil&Gas Plant, Industrial Power Plant, Reactors, Semiconductor Industry, Shipbuilding, Environmental Control Facility, Fire Extinguishing System, Vehicle Industry, Aerospace, Defense Industry, Steel Mills and so on. We are, in addition, involved in the National Defense Industrial Products development project and recognized the performance and the quality.

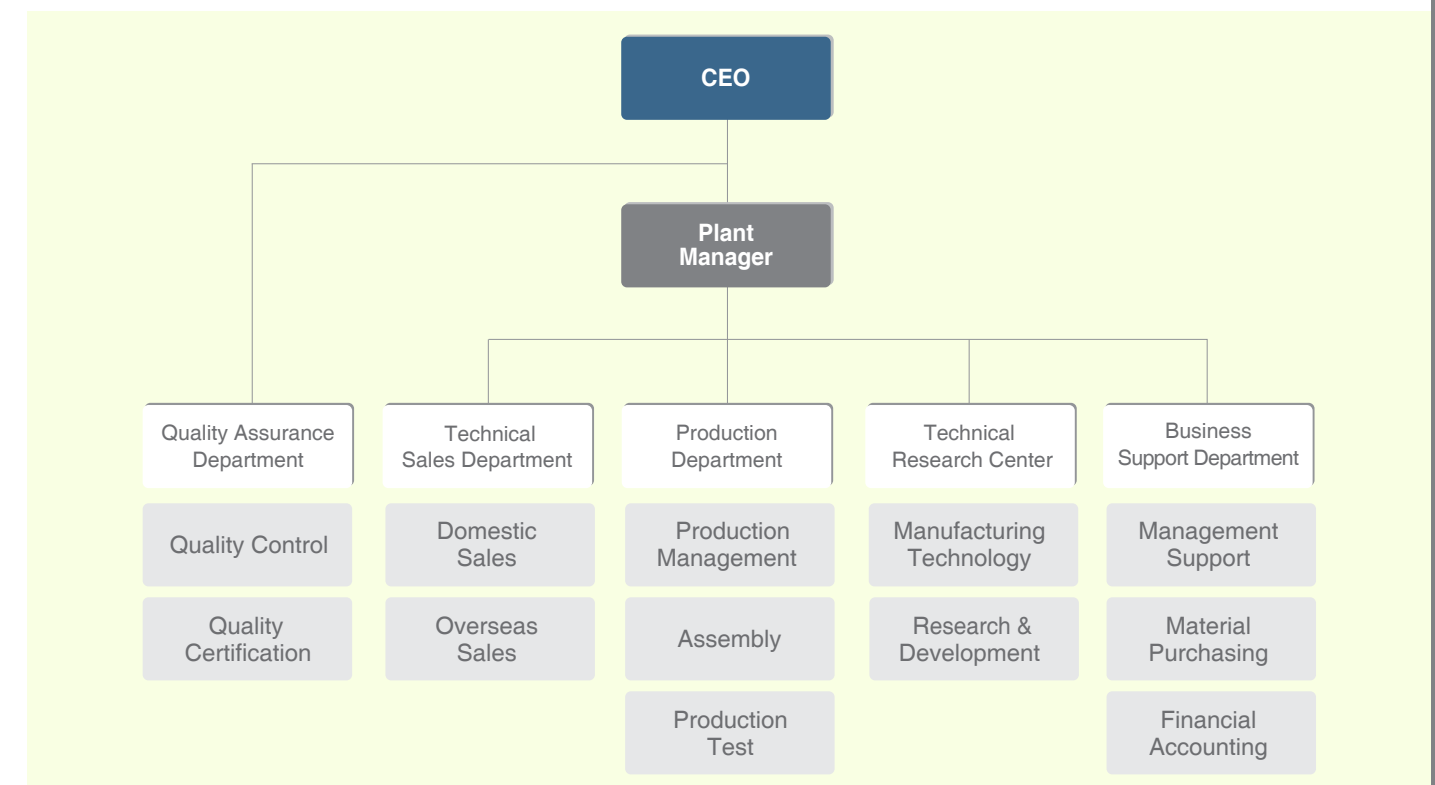
We will make it our highest priority that customer's safety and quality assurance, and do our best to be your good partner.

Chief Executive Officer
Yune Ha-won



99, Seobu-ro 1293beon-gil, Juchon-myeon, Gimhae-si, Gyeongsangnam-do, Korea

ORGANIZATION CHART



Building with proud HISTORY

2017	Registered as a class Q137 approved vendor of KHNP (Korea Hydro&Nuclear Power Co., Ltd) Approved vendor for NIGC, ICOFC, MAPNA
2016	Obtained ASME UD STAMP & NBBI Certificate, Approved vendor for NPCC
2015	Receives Total 90 KOSHA Certificates, Approved vendor for SABOC, Obtained TRCU Certificates
2014	Obtained CSEL (Special Equipment License) Certification in China Approved vendor for PETRONAS & Saipem Obtained CE ATEX & IEC EX certification(DUST) Registered Achilles FPAL Approved vendor for ADNOC GROUP (ADCO, ADMA-OPCO, ZADCO, ADGAS, FERTIL, BOROUGE), KNPC, KOC
2013	Registered a patent for KSRBK Model Approved vendor for TAKREER & FERTIL & Qatar Petroleum Obtained CE ATEX & IEC-Ex Certification(GAS) Obtained ISO 14001, OSHAS 18001 Certification Received 1 KOSHA Safety Type Certification Insured Products/Completed Operations Liability Coverage
2012	Obtained CE Mark(PED) Certification - EC Type - Examination(Module B) Received 69 KOSHA Safety Type Certification Registered as a spare part supplier to KHNP(Korea Hydro & Nuclear Power Co.,LTD.)
2011	Obtained CE Mark(PED) Certification - QA System(Module D) Obtained Russia 'GOST' Certification Received 6 KOSHA Safety Type Certification extra Selected as an INNO - BIZ
2010	Received 14 KOSHA Safety Type Certification extra Renamed to FDC Co.,LTD. Established R&D Center Won an excellence award from KOSHA Protection Device Quality Award Participated in Development Project of 20 Core Parts and Materials National Project of the Ministry of Knowledge Economy Selected as a Patent Star Company - Korean Intellectual Property Office/The Korea Chamber of Commerce & Industry Appointed as a promising small & medium enterprise for export - Small and Medium Business Administration Built up the room temperature test facility
2009	Received 45 KOSHA Safety Type Certification Developed Rupture Disc Size Calculation Program Participated in Development Project of Multi Pulse Rocket Propulsion System - Defense Acquisition Program Administration Registered as a protection device manufacturer(KOSHA) Product Liability Insurance - 300 million won
2008	Transferred to Fine Disc Co.,LTD.
2007	Proceeded Innovative Technology Development Project of small & medium business production environment
2006	Accomplished a Technical Development Project of building up the production system for Scored Type for industrial - academic cooperation with Inje University
2004	Succeeded in localization of Scored Type Rupture Disc
2003	Developed the ultra low pressure Rupture Disc Consulted on standardization of KS B ISO 6718/4162-2/4162-6
2002	Obtained ISO 9001 : 2000 Quality Assurance System Self - developed N2 Blanketing System
2000	Built up the production system of large size Rupture Disc
1999	Established Fine Disc as the Rupture Disk specialized company.

"FDC would like to jump into a leading position among the world's companies through providing of high quality products, continuous R&D and management innovation"

Registration Certificates



Intellectual Properties



Type Certification of Rupture Disc



KOSHA CE-ATEX IEC-EX CSEL CE-PED GOST ASME UD CERTIFICATE NBBI CERTIFICATE TRCU-COC

Introduction

1. What is a Rupture Disc?

- A Rupture Disc is a non-mechanical safety device to relief when it is occurred that excessive pressure is over the critical pressure in a pressure system

2. When is it required a Rupture Disc?

- In case of a rapid rise in pressure as a result of runaway reaction and so on
- In case that there is any concern that fixtures cause other safety device malfunction
- In case that any leakage is not permitted
- In case that it contains strong corrosive fluid
- In case that it requires large relieving capacity in an instant by polymerization and so on
- Severe conditions such as high or low temperature

3. Features

- Special material and structure (It is easy to select material and is economical) And there is no size limit
- Constant rupture performance and release all of fluid
- Instantaneous release of maximum capacity
- Extensive service environment (strong corrosive fluid, temperature, liquid, gas, powder, etc.)
- Zero Leakage
- Extension of safety valve life
- Possible to check the Piping of outlet during operating
- Extension of overhaul period
- Easy to handle and cost reduction

4. Applicable Code

- ASME Sec. VIII Div.1
- ISO 4126-2~6
- API RP520
- KOSHA Safety Certification

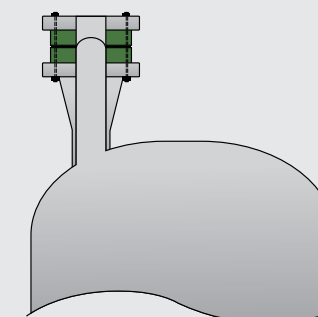
5. Materials of Rupture Disc - Holder / Disc / Accessory

- Stainless Steel (304SS, 316SS, 317SS, etc)
- Carbon Steel
- Duplex
- Aluminum
- Nickel, Inconel, Monel, Hastelloy, Titanium, Tantalum
- Graphite
- Teflon
- Maximum usable Temperature

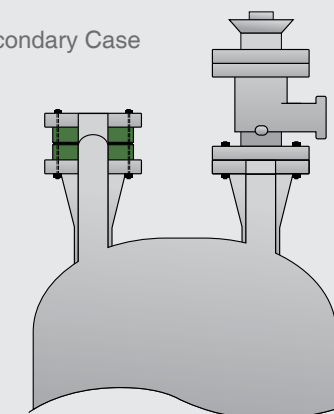
Teflon	200 °C	Monel	483 °C
Aluminum	120 °C	Inconel	592 °C
Stainless Steel	483 °C	Hastelloy	483 °C
Nickel	403 °C	Graphite	371 °C

6. Application of Rupture Disc

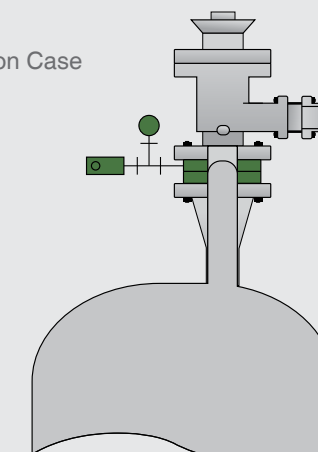
1) Primary Case



2) Secondary Case



3) Combination Case



4) External Fire Case



KOSHA Obligation Safety Certification

1. What is 'Obligation Safety Certification'?

Regarding of manufacture protection devices and protective equipments of hazardous machinery and instrument, it is the system that prevents from industrial accident to produce, distribute and use safe and reliable products by attaching the certification mark to products meet the requirements of safety certification criteria and selling



► Korea Obligation Safety Certification Mark

2. Scope of Obligation Safety Certification

Scope of Rupture Discs which are used to protect pressure vessels from overpressure or high vacuum by gas or steam
(However, it is excepted when used for release a pressure of liquid or the setting value of rupture pressure is below 0.1MPag)

3. Main contents and Requirements of Obligation Safety Certification

- It shall be conducted a burst test under the same temperature as service condition
- When you apply for certification, it is required a certification of the same type separately if it is different to specification submitted
- It shall be certified, even if it is imported products

4. Relevant regulations

- Occupation safety and health acts
- Regulations for Occupation safety and health acts
- Implementing Regulations in Occupation safety and health acts
- Notification of Protection Device Obligation Safety Certification Criteria
- Notification for declaration of Safety Certification and Autonomy Safety Confirmation

5. Performance Criteria of Products

Burst test	Set Pressure	below 0.3MPag	0.3MPag and over
	Allowable range of rupture Pressure	±0.015MPag	±5%
Leak test	Division		Soak time
	Nominal diameter of rupture disc(mm)	50 and below	1 min
		above 50&100 and below	2 min
		above 100	5 min
	* It shall be conducted a leak test under 90% of set pressure * It shall be conducted a leak test under 50% of set pressure in case of Flat/Slotted Type.		

6. Classification and Notation of the KOSHA Certification Type

Division in accordance with structure	Rupture disc of dome type (C)	Single plate type (O)
		Composite type (C)
		Carved type or cutout type (S)
	Rupture disc of inverted dome type(R)	Carved type or shearing type (S)
		Self-knife type (K)
	Rupture disc of flat type(F)	Exchanger type graphite rupture disc (R)
		Monoblock type graphite rupture disc (M)
		Cutout type rupture disc (S)
Other type (X)	Rupture discs produced depend on the manufacturers which are different than above.	

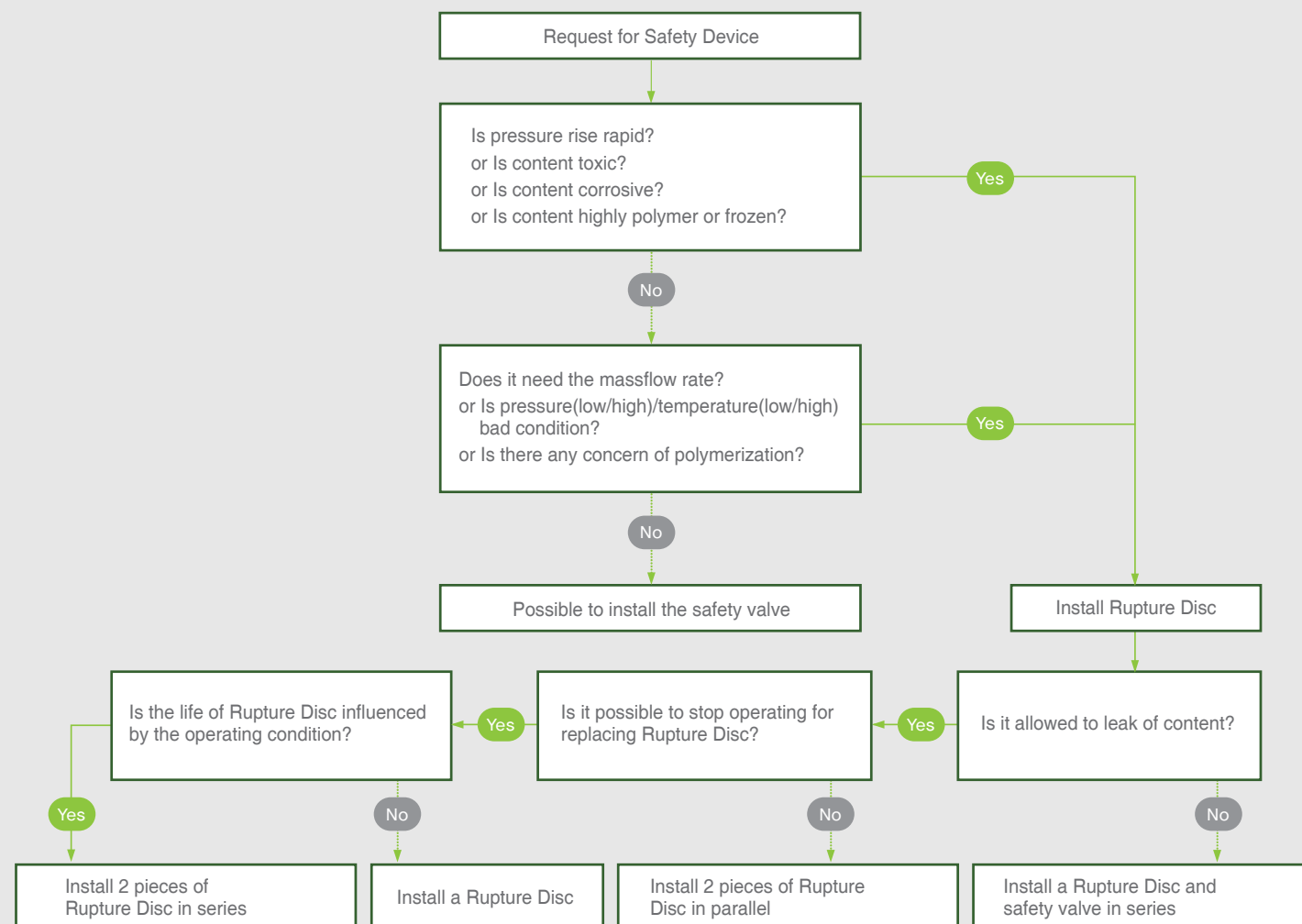
Division in accordance with nominal diameter	Division of nominal diameter	I	II	III	IV	V
	Range of nominal diameter(mm)	25 and below	above 25 & 50 and below	above 50 & 80 and below	above 80 & 100 and below	above 100

Division in accordance with nominal pressure	Division of nominal pressure	1	3	5	10	21	22
	Range of rupture pressure(MPag)	1 and below	above 1&3 and below	above 3&5 and below	above 5&10 and below	above 10&21 and below	above 21

Notation of type	RS II 3					
	Structure	Nominal Diameter		Nominal pressure		

RUPTURE DISC

SELECTION GUIDE



RUPTURE DISC

SELECTION MODEL

STEP 1. Check the pressure vessel and process operating specification (Process Data)

- Material properties of the fluids used
 - Gas or Vapor : Mol weight, Specific heat ratio, Compressibility coefficient
 - Liquid : Specific gravity, Viscosity
- State of the fluids used : Gas, Vapor, Steam, Liquid, etc.
- Operating condition : Static, Pulsation(Oscillation), Cycle, etc.
- MAWP(Maximum Allowable Working Pressure or Design Pressure) of pressure vessel
- Maximum operating pressure and temperature
- Required Capacity
- Set pressure and set temperature of Rupture Disc for rupture
- Back pressure and Vacuum pressure
- Material (Holder/Disc/Accessory)
- Connection(Flange/Fitting) specification
- Installation type of Rupture Disc : Primary, Secondary, Combination, External Fire
- Calculation of operating ratio :
 - Operating ratio = Maximum operating pressure/Minimum rupture pressure × 100
 - ※ Minimum rupture pressure = Set rupture pressure - Negative rupture tolerance

STEP 2. Model & Accessory (by FDC)

STEP 3. Calculation of size & rated flow capacity (by FDC)



RUPTURE DISC

SIZING

ASME SECTION VIII DIV 1	
Dry saturated steam	$A = \frac{W_T}{51.5KP}$ <p>note) For pressure up to 1500psig apply the above equation, and for dry saturated steam pressures over 1500psig and up to 3200psig, the value of W_T, calculated by the above equation, shall be corrected by being multiplied by the following factor.</p> $\left(\frac{0.1906P-1000}{0.2292P-1061} \right)$
Gas/Air	$A = \frac{W_T}{CKP\sqrt{\frac{M}{T}}}$
Liquid	$A = \frac{W_T}{2407 \cdot K \cdot \sqrt{(P-P_d) \cdot \omega}}$

W_T	Mass flow rate	(lb/hr)
A	Practical outlet area in opening ruptre disc	(in ²)
P	Whichever is greater in '(Set pressure × 1.10) + atmospheric pressure' or 'set pressure + 3psia + atmospheric pressure'	(psia)
P_d	Back pressure(pressure at outlet)	(psia)
M	Mol weight	
T	Absolute temperature at valve inlet, °F + 460°F	(R)
C	Constant for gas or steam based on specific heat ratio ($k=C_p / C_v$)	

k	C	k	C	k	C
1.00	315	1.26	343	1.52	366
1.02	318	1.28	345	1.54	368
1.04	320	1.30	347	1.56	369
1.06	322	1.32	349	1.58	371
1.08	324	1.34	351	1.60	372
1.10	327	1.36	352	1.62	374
1.12	329	1.38	354	1.64	376
1.14	331	1.40	356	1.66	377
1.16	333	1.42	358	1.68	379
1.18	335	1.44	359	1.70	380
1.20	337	1.46	361	2.00	400
1.22	339	1.48	363	2.20	412
1.24	341	1.50	364

K	Release coefficient (design coefficient, in general apply 0.62 for ruptre disc and practical measure × 0.9 in real measurement, but it shall be less than 0.875.)	
Z	Compressibility coefficient related to P and T (if there is no available data, Z=1.0)	
ω	Specific weight of liquid under the condition for valve inlet	(lb/ft³)

KS B ISO 4126	
Gas/steam at critical flow	$A_o = 3.469 \frac{Q_m}{C \cdot \alpha} \sqrt{\frac{Z_o}{P_o}}$ <p>or</p> $A_o = \frac{Q_m}{C \cdot \alpha \cdot P_o} \sqrt{\frac{T_o \cdot Z_o}{M}}$ <p>For the homogenized wet steam of 90% or more dryness</p> $A_o = 3.469 \frac{Q_m \cdot \sqrt{x}}{C \cdot \alpha} \sqrt{\frac{Z_o}{P_o}}$
Gas/steam at subcritical flow	$A_o = 3.469 \frac{Q_m}{C \cdot K_b \cdot \alpha} \sqrt{\frac{Z_o}{P_o}}$ <p>or</p> $A_o = \frac{Q_m}{C \cdot K_b \cdot \alpha \cdot P_o} \sqrt{\frac{T_o \cdot Z_o}{M}}$
Liquid	$A_o = 0.621 \frac{W_T}{K_v \cdot \alpha \cdot \sqrt{\Delta P \cdot \rho}}$

A_o	Minimum required flow cross sectional area	(mm ²)																																																																																																																					
Q_m	Mass Flow rate	(kg/h)																																																																																																																					
C	Function for isentropic exponent k (Refer to table 1. Physical properties of gas)																																																																																																																						
<table><tr><th>k</th><th>C</th><th>k</th><th>C</th><th>k</th><th>C</th><th>k</th><th>C</th></tr><tr><td>0.50</td><td>1.81</td><td>1.001</td><td>2.40</td><td>1.26</td><td>2.61</td><td>1.52</td><td>2.78</td></tr><tr><td>0.60</td><td>1.96</td><td>1.02</td><td>2.41</td><td>1.28</td><td>2.62</td><td>1.54</td><td>2.79</td></tr><tr><td>0.70</td><td>2.08</td><td>1.04</td><td>2.43</td><td>1.30</td><td>2.63</td><td>1.56</td><td>2.80</td></tr><tr><td>0.80</td><td>2.20</td><td>1.06</td><td>2.45</td><td>1.32</td><td>2.65</td><td>1.58</td><td>2.82</td></tr><tr><td>0.82</td><td>2.22</td><td>1.08</td><td>2.46</td><td>1.34</td><td>2.66</td><td>1.60</td><td>2.83</td></tr><tr><td>0.84</td><td>2.24</td><td>1.10</td><td>2.48</td><td>1.36</td><td>2.68</td><td>1.62</td><td>2.84</td></tr><tr><td>0.86</td><td>2.26</td><td>1.12</td><td>2.50</td><td>1.38</td><td>2.69</td><td>1.64</td><td>2.85</td></tr><tr><td>0.88</td><td>2.28</td><td>1.14</td><td>2.51</td><td>1.40</td><td>2.70</td><td>1.66</td><td>2.86</td></tr><tr><td>0.90</td><td>2.30</td><td>1.16</td><td>2.53</td><td>1.42</td><td>2.72</td><td>1.68</td><td>2.87</td></tr><tr><td>0.92</td><td>2.32</td><td>1.18</td><td>2.55</td><td>1.44</td><td>2.73</td><td>1.70</td><td>2.89</td></tr><tr><td>0.94</td><td>2.34</td><td>1.20</td><td>2.56</td><td>1.46</td><td>2.74</td><td>1.80</td><td>2.94</td></tr><tr><td>0.96</td><td>2.36</td><td>1.22</td><td>2.58</td><td>1.48</td><td>2.76</td><td>2.00</td><td>3.04</td></tr><tr><td>0.98</td><td>2.38</td><td>1.24</td><td>2.59</td><td>1.50</td><td>2.77</td><td>2.20</td><td>3.13</td></tr></table>								k	C	k	C	k	C	k	C	0.50	1.81	1.001	2.40	1.26	2.61	1.52	2.78	0.60	1.96	1.02	2.41	1.28	2.62	1.54	2.79	0.70	2.08	1.04	2.43	1.30	2.63	1.56	2.80	0.80	2.20	1.06	2.45	1.32	2.65	1.58	2.82	0.82	2.22	1.08	2.46	1.34	2.66	1.60	2.83	0.84	2.24	1.10	2.48	1.36	2.68	1.62	2.84	0.86	2.26	1.12	2.50	1.38	2.69	1.64	2.85	0.88	2.28	1.14	2.51	1.40	2.70	1.66	2.86	0.90	2.30	1.16	2.53	1.42	2.72	1.68	2.87	0.92	2.32	1.18	2.55	1.44	2.73	1.70	2.89	0.94	2.34	1.20	2.56	1.46	2.74	1.80	2.94	0.96	2.36	1.22	2.58	1.48	2.76	2.00	3.04	0.98	2.38	1.24	2.59	1.50	2.77	2.20	3.13
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V_o	Specific volume at practical release pressure and temperature	(m ³ /kg)																																																																																																																					
P_o	Release pressure	(bar)																																																																																																																					
α	Release coefficient (In general, apply 0.62)																																																																																																																						
T_o	Release temperature	(K)																																																																																																																					
Z_o	Compressibility coefficient at practical release pressure and temperature (If there is no available data, $Z_o=1.0$)																																																																																																																						
M	Mol weight																																																																																																																						
X	Dryness of wet steam																																																																																																																						
K_b	Viscosity correction factor related to Reynold's number(Re) If the liquid viscosity is less than that of water at 20°C, $k_v=1.0$ (Refer to Table 2. Capacity correction factor for viscosity)																																																																																																																						
K_v	Correction factor for reduction in the theoretical capacity as increase of the back pressure in subcritical flow (Refer to table 3. Capacity correction factor for back pressure)																																																																																																																						
Re	Reynold's number	$Re = \frac{0.3134 Q_m}{\mu \sqrt{A_o}}$																																																																																																																					
μ	Viscosity of the liquid																																																																																																																						
ΔP	differential pressure released through rupture disc ($\Delta P=P_o -P_b$)	(bar)																																																																																																																					
P_b	Back pressure (pressure at outlet)	(psia)																																																																																																																					

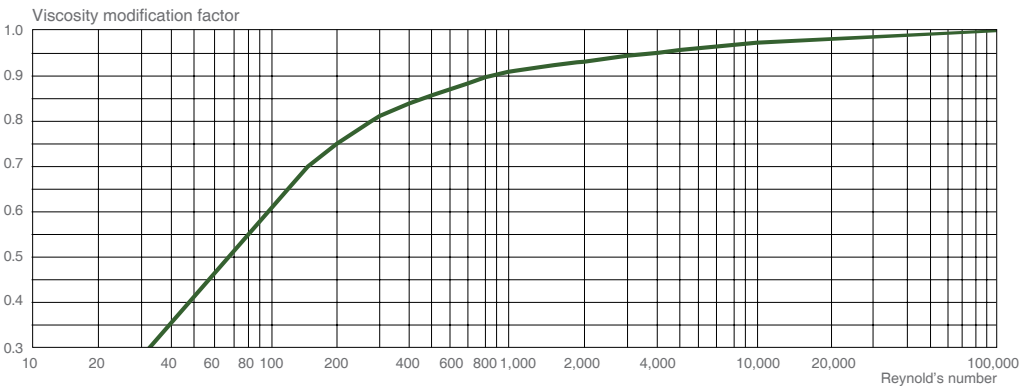
Table 1. Physical properties of gas

Name \ Physial property	Formula	Mol weight(M)	Adiabatic constant(K)	Name \ Physial property	Formula	Mol weight(M)	Adiabatic constant(k)
Acetylene	C ₂ H ₂	26.04	1.26	n-Hexane	n-C ₆ H ₁₄	86.18	1.06
Air	-	28.97	1.40	Hydrogen chloride	HCl	36.46	1.41
Ammonia	NH ₃	17.03	1.31	Hydrogen	H ₂	2.02	1.41
Argon	Ar	39.95	1.67	Hydrogen sulfide	H ₂ S	34.08	1.32
Butadiene	C ₄ H ₆	54.09	1.113	Dichloro difluoro methane	CCl ₂ F ₂	120.91	1.139
Benzene	C ₆ H ₆	78.12	1.12	Methane	CH ₄	16.04	1.31
iso-Butane	iso-C ₄ H ₁₀ or CH(CH ₃) ₃	58.12	1.10	Methyl alcohol	CH ₃ OH or CH ₄ O	32.04	1.20
n-Butane	n-C ₄ H ₁₀	58.12	1.09	Methyl chloride	CH ₃ Cl	50.49	1.20
Carbon disulfide	CS ₂	76.14	1.21	Nitrogen	N ₂	28.01	1.40
Carbon dioxide	CO ₂	44.01	1.29	Nitrogen dioxide	NO ₂	44.01	1.30
Carbon monoxide	CO	28.01	1.40	n-Nonane	n-CH ₃ (CH ₂) ₇ CH ₃ or C ₉ H ₂₀	128.26	1.04
Chlorine	Cl ₂	70.91	1.36	Oxygen	O ₂	32.00	1.40
Cyclohexane	C ₆ H ₁₂	84.16	1.09	n-Pentane	n-CH ₃ (CH ₂) ₃ CH ₃ or C ₅ H ₁₂	72.15	1.07
n-Decane	n-C ₁₀ H ₂₂	142.29	1.03	n-Propane	n-CH ₃ CH ₂ CH ₃ or C ₃ H ₈	44.10	1.13
Ethane	C ₂ H ₆	30.07	1.19	Water	H ₂ O	18.02	1.133
Ethyl alcohol	C ₂ H ₅ OH or C ₂ H ₆ O	46.07	-	Sulfur dioxide	SO ₂ or O ₂ S	64.06	1.29
Ethylene	C ₂ H ₄	28.05	1.24	Toluene	C ₆ H ₅ CH ₃ or C ₇ H ₈	92.15	1.09
Helium	He	4.00	1.66	Propylene	CH ₃ CHCH ₂ or C ₃ H ₆	42.08	1.15
n-Heptane	n-CH ₃ (CH ₂) ₅ CH ₃ or C ₇ H ₁₆	100.21	1.05	Octane	CH ₃ (CH ₂) ₆ CH ₃ or C ₈ H ₁₈	114.00	1.05


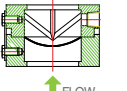

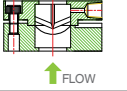

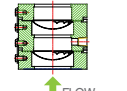

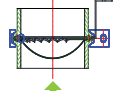
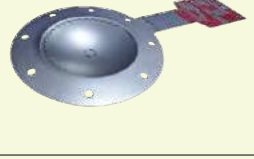
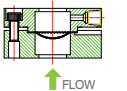

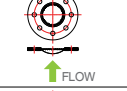

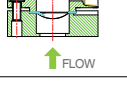

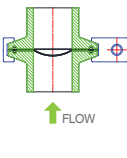
Table 2. Capacity correction factor for back pressure









$\frac{P_b}{P_o}$	Isentropic exponent(k)																			
	0.4	0.5	0.6	0.7	0.8	0.9	1.001	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	
	Volume modification factor for back pressure																			
0.45																	1.000	0.999	0.999	
0.50												1.000	0.999	0.999			0.994	0.992	0.989	
0.55												0.997	0.994	0.991	0.987		0.983	0.979	0.971	
0.60												0.989	0.983	0.978	0.972	0.967	0.961	0.955	0.945	
0.65							0.999	0.995	0.989	0.982	0.974	0.967	0.959	0.951	0.944	0.936	0.929	0.922	0.915	
0.70						0.985	0.975	0.965	0.953	0.943	0.932	0.922	0.913	0.903	0.895	0.886	0.879	0.871	0.858	
0.75		1.000	0.985	0.963	0.938	0.913	0.887	0.861	0.836	0.811	0.786	0.761	0.736	0.711	0.686	0.661	0.636	0.611	0.586	
0.80	0.999	0.985	0.965	0.942	0.921	0.900	0.881	0.864	0.847	0.833	0.819	0.806	0.794	0.783	0.773	0.764	0.755	0.747	0.739	
0.82	0.992	0.970	0.944	0.918	0.894	0.872	0.852	0.833	0.817	0.801	0.787	0.774	0.753	0.752	0.741	0.732	0.723	0.715	0.707	
0.84	0.979	0.948	0.917	0.888	0.862	0.839	0.818	0.799	0.782	0.766	0.752	0.739	0.727	0.716	0.706	0.697	0.688	0.680	0.672	
0.86	0.957	0.919	0.884	0.852	0.800	0.779	0.759	0.742	0.727	0.712	0.700	0.688	0.677	0.667	0.667	0.658	0.649	0.641	0.634	
0.88	0.924	0.881	0.842	0.809	0.780	0.755	0.733	0.714	0.697	0.682	0.688	0.655	0.644	0.633	0.624	0.615	0.606	0.599	0.592	
0.90	0.880	0.831	0.791	0.757	0.728	0.703	0.681	0.662	0.645	0.631	0.617	0.605	0.594	0.584	0.575	0.566	0.558	0.551	0.544	
0.92	0.820	0.769	0.727	0.693	0.664	0.640	0.619	0.601	0.585	0.571	0.559	0.547	0.537	0.527	0.519	0.511	0.504	0.497	0.490	
0.94	0.739	0.687	0.647	0.614	0.587	0.565	0.545	0.528	0.514	0.501	0.489	0.479	0.470	0.461	0.453	0.446	0.440	0.434	0.428	
0.96	0.628	0.579	0.542	0.513	0.489	0.469	0.452	0.438	0.425	0.414	0.404	0.395	0.387	0.380	0.373	0.367	0.362	0.357	0.352	
0.98	0.426	0.422	0.393	0.371	0.353	0.337	0.325	0.314	0.305	0.296	0.289	0.282	0.277	0.271	0.266	0.262	0.258	0.254	0.251	
1.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

Table 3. Capacity correction factor for viscosity


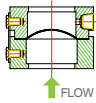

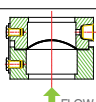

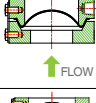

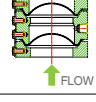
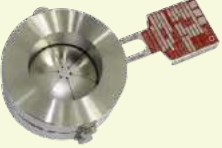
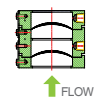
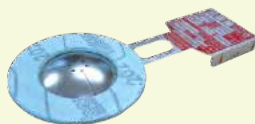
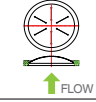

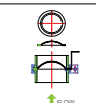










PRODUCTS LIST

RUPTURE DISC				
REVERSE TYPE	Model (Image)	Description	Holder or Connection Type	Drawing
		Reverse Dome Knife Type	KS	
			Insert Flat Seat Knife Blades Single Type	
			KD	
			Insert Flat Seat Knife Blades Double Type	
		Reverse Dome Shear Type	BK	
			Bolted Flat Seat Knife Blades Single Type	
			FS	
			Insert Flat Seat Single Type	
		Reverse Dome Shear Type for Ferrule	FD	
			Insert Flat Seat Double Type	
			BF	
			Bolted Flat Seat Single Type	
		Reverse Dome Buckling Knife Type	FERRULE	
			Ferrule Connection Type	
			BFS	
			Insert Flat Seat Single Type for RBK	
		Reverse Dome Buckling Knife Type for Flange	BBF	
			Bolted Flat Seat Single Type for RBK	
			RF	
			Raised Face Flange Type	
		Reverse Dome Buckling Knife Type for Flange	FF	
			Flat Face Flange Type	
			FS	
			Insert Flat Seat Single Type	
		Reverse Dome Scored Type	BF	
			Bolted Flat Seat Single Type	
			INSERT FLAT SINGLE TYPE	
	Reverse Dome Scored Type for Ferrule			

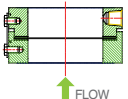
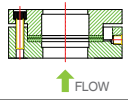
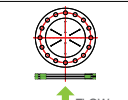
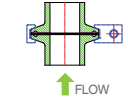
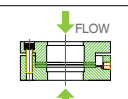
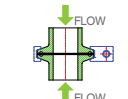
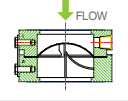
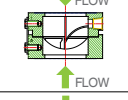
Size	Set. Pressure	Vacuum Support Required	Available Service Phase		Spark	Fragment	Max Operating Ratio
			Gas or Vapor	Liquid			
							
1/2" ~ 48" (15A ~ 1200A)	0.3 ~ 150 kg/cm ²	No	Yes	No	Yes	No	90%
1/4" ~ 4" (8A ~ 100A)							
1/2" ~ 24" (15A ~ 600A)	0.35 ~ 30 kg/cm ²	No	Yes	Yes	No	No	90%
1/4" ~ 4" (8A ~ 100A)							
1S~4S FERRULE	0.35 ~ 30 kg/cm ²	No	Yes	Yes	No	No	90%
1/2" ~ 36" (15A ~ 900A)	0.1 ~ 100 kg/cm ²	No	Yes	Yes	No	No	90%
1/4" ~ 4" (8A ~ 100A)							
1/2" ~ 36" (15A ~ 900A)	0.1 ~ 100 kg/cm ²	No	Yes	Yes	No	No	90%
1/2" ~ 24" (15A ~ 600A)	1.5 ~ 150 kg/cm ²	No	Yes	Yes	No	No	90%
1/4" ~ 4" (8A ~ 100A)							
1" ~ 4" (25A ~ 100A)	6 ~ 10 (kg ~ cm ²)	No	Yes	Yes	Yes	No	90%









PRODUCTS LIST

RUPTURE DISC					
		Model (Image)	Description	Holder or Connection Type	Drawing
FORWARD TYPE	KRSRF		Forward Dome Scored Type	FS	
				Insert Flat Seat Single Type	
				BF	
	KRSRT		Forward Dome Tension Flat Seat Type	FS	
				Insert Flat Seat Single Type	
				SS	
COMPOSITE DOME TYPE	KSRCT		Forward Dome Tension Sloped Seat Type	SS	
				Insert Sloped Seat Single Type	
				SD	
	KSRCH		Composite Dome Flat Seat Type	SD	
				Insert Sloped Seat Double Type	
				FS	
	KSRCHD		Composite Dome Flat Seat Double Acting Type	FD	
				Insert Flat Seat Double Type	
				BF	
	KSRRC		Composite Dome Flat Seat Type for Flange	RF	
				Raised Face Flange Type	
				FF	
	KSRRCF		Composite Dome Flat Seat Type for Ferrule	FERRULE	
				Ferrule Connection Type	
				FERRULE	

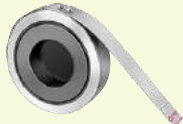
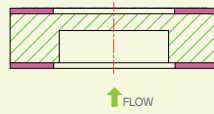

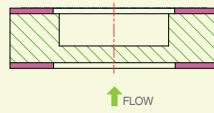

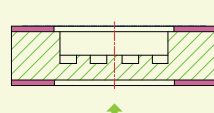

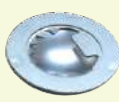
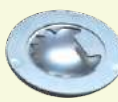
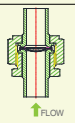
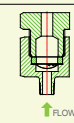
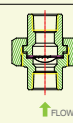



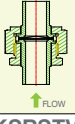
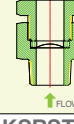
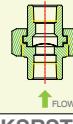



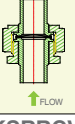
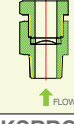




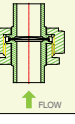
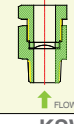
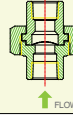

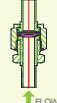
Size	Set. Pressure	Vacuum Support Required	Available Service Phase		Spark	Fragment	Max Operating Ratio
			Gas or Vapor	Liquid			
							
1/2" ~ 12" (15A ~ 300A)	5 ~ 700 kg/cm ²	No	Yes	Yes	No	No	80%
1/4" ~ 4" (8A ~ 100A)							
1/2" ~ 48" (15A ~ 1200A)	15 ~ 1,500 kg/cm ²	No	Yes	Yes	No	Yes	70%
1/2" ~ 40" (15A ~ 1000A)	15 ~ 1,500 kg/cm ²	Yes or No	Yes	Yes	No	Yes	70%
1/2" ~ 40" (15A ~ 1000A)	Teflon Seal	Yes	Yes	Yes	No	No	80%
	0.1 ~ 30 kg/cm ²						
1/2" ~ 48" (15A ~ 1200A)	0.05 ~ 50 kg/cm ²	Yes	Yes	Yes	No	No	80%
1/4" ~ 4" (8A ~ 100A)							
1/2" ~ 48" (15A ~ 1200A)	0.05 ~ 50 kg/cm ²	Yes	Yes	Yes	No	No	80%
1/2" ~ 52" (15A ~ 1300A)	0.05 ~ 50 kg/cm ²	Yes	Yes	Yes	No	No	80%
1S~4S FERRULE	0.3 ~ 15 kg/cm ²	Yes	Yes	Yes	No	No	80%
1S~4S FERRULE	0.3 ~ 15 kg/cm ²	Yes	Yes	Yes	No	No	80%






PRODUCTS LIST

RUPTURE DISC				
Model (Image)		Description	Holder or Connection Type	Drawing
COMPOSITE FLAT TYPE	KSROH	Composite Flat Type	H	
			Insert Flat Seat Single Type for RO	
			B	
	KSRO	Composite Flat Type for Flange	Bolted Flat Seat Single Type for RO	
			RF	
			Raised Face Flange Type	
	KSROF	Composite Flat Type for Ferrule	FF	
			Flat Face Flange Type	
			FERRULE	
	KSROHD	Composite Flat Double Acting Type	Ferrule Connection Type	
			H	
			Insert Flat Seat Single Type for RO	
ULTRA LOW PRESSURE TYPE	KSRRLL	Reverse Dome Knife Type - LP	B	
			Insert Flat Seat Single Type for RO	
			FERRULE	
	KSRRLD	Reverse Dome Knife Double Acting Type - LP	Ferrule Connection Type	
			LS	
			Insert Flat Seat Single Type for RRL & RRLD	
	KSROL	Composite Flat Type for Flange - LP	LVS	
			Insert Flat Seat Single Type for RRL & RRLD(Vacuum)	
			RF	
	KSRRLL	Reverse Dome Knife Type - LP	Raised Face Flange Type	
			FF	
			Flat Face Flange Type	

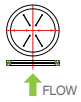
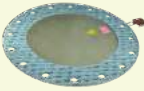

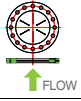


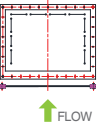
Size	Set. Pressure	Vacuum Support Required	Available Service Phase		Spark	Fragment	Max Operating Ratio
			Gas or Vapor	Liquid			
							
1/2" ~ 48" (15A ~ 1200A)	0.05 ~ 35 kg/cm ²	Yes	Yes	Yes	No	No	50%
1/4" ~ 4" (8A ~ 100A)							
1/2" ~ 72" (15A ~ 1800A)	0.05 ~ 35 kg/cm ²	Yes	Yes	Yes	No	No	50%
1S~4S FREEULE	0.05 ~ 15 kg/cm ²	Yes	Yes	Yes	No	No	50%
1/2" ~ 48" (15A ~ 1200A)	0.05 ~ 15 kg/cm ²	Yes	Yes	Yes	No	No	50%
1/4" ~ 4" (8A ~ 100A)							
1S~4S FREEULE	0.05 ~ 15 kg/cm ²	Yes	Yes	Yes	No	No	50%
1/2" ~ 10" (15A ~ 250A)	0.01 ~ 1.0 kg/cm ² (100 ~ 10,000 mmAq)	Yes	Yes	No	No	No	50%
1/2" ~ 10" (15A ~ 250A)	0.01 ~ 1.0 kg/cm ² (100 ~ 10,000 mmAq)	Yes	Yes	No	No	No	50%
4" ~ 32" (100A ~ 800A)	0.01 ~ 0.15 kg/cm ² (100 ~ 1,500 mmAq)	Yes	Yes	No	No	No	50%

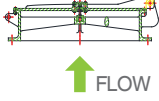
PRODUCTS LIST

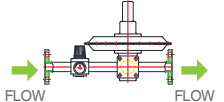

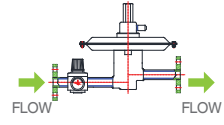

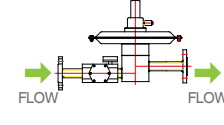

RUPTURE DISC										
Model				Description	Connection Type					
GRAPHITE DISC	KSRGM		Drawing		Mono Type	Inserted between Flange				
										
	KSRGI		Drawing		Inverted Type	Inserted between Flange				
										
KSRGD		Drawing		Double Acting Type	Inserted between Flange					
										
FITTING CONNECTION TYPE		KSRRKV	KSRRKP	KSRRKU	Reverse Dome Shear Type	VCR	PLUG	UNION		
	Image									
	Drawing									
		KSRSFV	KSRSFP	KSRSFU	Forward Dome Scored Type					
	Image									
	Drawing									
		KSRSFV	KSRSFP	KSRSFU	Forward Dome Tension Type					
	Image									
	Drawing									
		KSRRCV	KSRRCP	KSRRCU	Composite Dome Flat Seat Type					
	Image									
	Drawing									
		KSWSRV			Reverse Dome Scored Type					
	Image		Drawing							








Model	Size	Set. Pressure	Vacuum Support Required	Available Service Phase		Spark	Fragment	Max Operating Ratio
				Gas or Vapor	Liquid			
								
KSRGM	1/2" ~ 24"	0.017 ~ 10 kg/cm ²	Yes	Yes	Yes	No	Yes	90%
KSRGI	1/2" ~ 24"	0.017 ~ above 70 kg/cm ²	Yes	Yes	Yes	No	Yes	90%
KSRGD	1-1/2" ~ 24"	0.017 ~ 0.49 kg/cm ²	Yes	Yes	Yes	No	Yes	90%
KSRRKV	1/4" ~ 1" (8A ~ 25A)	4 ~ 50 kg/cm ²	No	Yes	Yes	No	No	90%
KSRRKP KSRRKU	1/4" ~ 2" (8A ~ 50A)		No	Yes	Yes	No	No	90%
KSRSFV	1/4" ~ 1" (8A ~ 25A)	15 ~ 3,500 kg/cm ²	No	Yes	Yes	No	No	90%
KSRSFP KSRSFU	1/4" ~ 2" (8A ~ 50A)		No	Yes	Yes	No	No	90%
KSRSTV	1/4" ~ 1" (8A ~ 25A)	15 ~ 3,500 kg/cm ²	No	Yes	Yes	No	Yes	70%
KSRSTP KSRSTU	1/4" ~ 2" (8A ~ 50A)		No	Yes	Yes	No	Yes	70%
KSRRCV	1/4" ~ 1" (8A ~ 25A)	1.5 ~ 50 kg/cm ²	Yes	Yes	Yes	No	No	80%
KSRRCP KSRRCU	1/4" ~ 2" (8A ~ 50A)		Yes	Yes	Yes	No	No	80%
KSWSRV	1/4" ~ 1" (8A ~ 25A)	10.5 ~ 355 kg/cm ²	No	Yes	Yes	No	No	90%








PRODUCTS LIST








EXPLOSION PANEL	Model (Image)	Description	Connection Type	Drawing
	KSRPR	Round Flat Type Round Dome Type	RF	
	 		FF	
	KSRPS		FF	
	 	Rectangular Flat Type Rectangular Dome Type	Flat Face Flange Type	

EMERGENCY RELIEF HATCH	Model (Image)	Description	Connection Type	Drawing
	KSRH	Rupture Rod & Seal Type	Standard Flange	

N ₂ BLANKETING SYSTEM	Model (Image)	Description	Connection Type	Drawing
	KSBKL	Single Operating Type	Standard Flange or Screwed Piping	
				
	KSBKT	Pilot Operating Type	Standard Flange or Screwed Piping	
		Pilot Operating Type	Standard Flange or Screwed Piping	
	KSBKS			
				

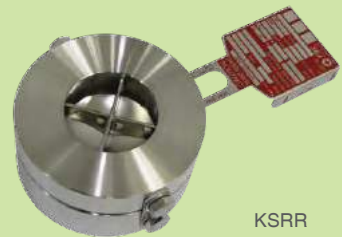
Size	Set. Pressure	Vacuum Support Required	Available Service Phase		Spark	Fragment	Max Operating Ratio
			Gas or Vapor	Liquid			
							%
Max. Ø3600	0.01 ~ 0.5 kg/cm ² (100 ~ 5000 mmAq)	Yes	Yes	No	No	No	50%
1500 X 2000 mm	0.01 ~ 0.5 kg/cm ² (100 ~ 5000 mmAq)	Yes	Yes	No	No	No	50%

Size	Set. Pressure	Vacuum Support Required	Available Service Phase		Spark	Fragment	Max Operating Ratio
			Gas or Vapor	Liquid			
							%
18" ~ 36" (450A ~ 900A)	150 ~ 5000 mmAq	N/A	Yes	N/A	N/A	N/A	N/A

Size	Set. Pressure	Vacuum Support Required	Available Service Phase		Spark	Fragment	Max Operating Ratio
			Gas or Vapor	Liquid			
							%
1/2" ~ 2"	12.5 ~ 8000 mmAq	N/A	Yes	No	N/A	N/A	N/A
1/2" ~ 2"	20 ~ 8000 mmAq	N/A	Yes	No	N/A	N/A	N/A
1" ~ 2"	20 ~ 8000 mmAq	N/A	Yes	No	N/A	N/A	N/A



REVERSE TYPE



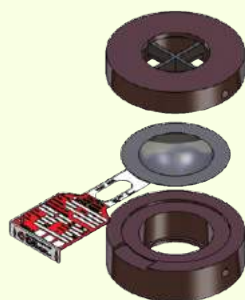
KSRR



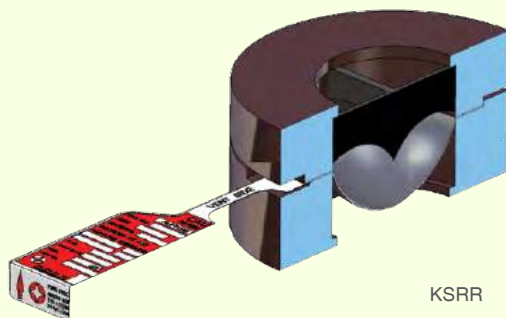
KSRR

KSRR (Reverse Dome Knife Type)

- Reversal structure ruptured by knife blade attached to upper holder while dome is inverted
- Mounted into FDC standard holder
- Ideal for counterpressure, vacuum and pulsation conditions
- Withstands full vacuum without vacuum support



KSRR



KSRR



KSRBKH



KSRBKH

KSRBKH (Reverse Dome Buckling Knife Type)

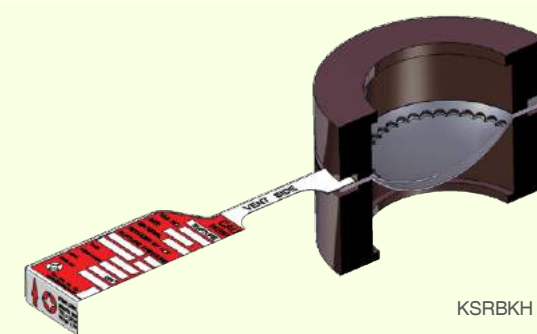
- Ruptured while dome is sheared by Knife of Control Disc
- Mounted into FDC standard holder
- It consists of Control Disc and Seal Disc
- Easy to handle with strong impact resistance
- Precise rupture performance and excellent reliability
- Ideal for counterpressure, vacuum and pulsation conditions
- Withstands full vacuum without vacuum support

KSRBK (Reverse Dome Buckling Knife Type for Flange)

- Identical disc type with KSRBKH, but mounted directly between flanges without holder



KSRBKH



KSRBKH



KSRRK



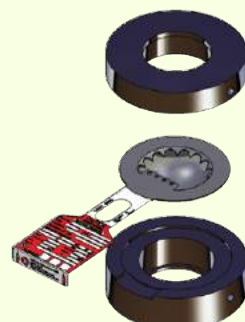
KSRRK

KSRRK (Reverse Dome Shear Type)

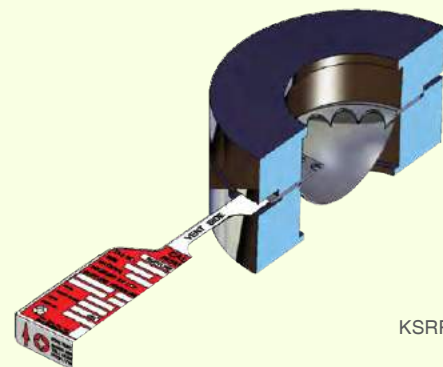
- Shearing structure ruptured by knife ring attached to disc while dome is inverted
- Mounted into FDC standard holder
- It is integrated with Disc and Knife
- Easier to handle than KSRR
- Ideal for counterpressure, vacuum and pulsation conditions
- Withstands full vacuum without vacuum support

KSRRKF (Reverse Dome Shear Type for Ferrule)

- KSRRK type disc designed for installation between ferrules



KSRRK



KSRRK



KSRSR



KSRSR



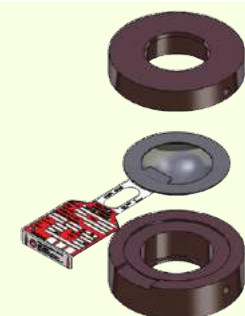
KSRSR

KSRSR (Reverse Dome Scored Type)

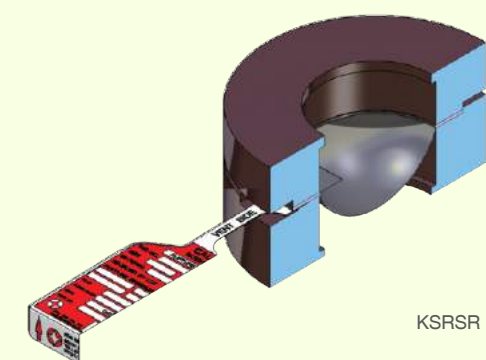
- Carved structure ruptured while inverted along with Scored Line processed precisely
- Mounted into FDC standard holder
- Designed for high pressure application
- Ideal for counterpressure, vacuum and pulsation conditions
- Withstands full vacuum without vacuum support

KSRSRF (Reverse Dome Scored Type for Ferrule)

- Identical disc type with KSRSR but mounted directly on the Ferrule Connection without holder



KSRSR



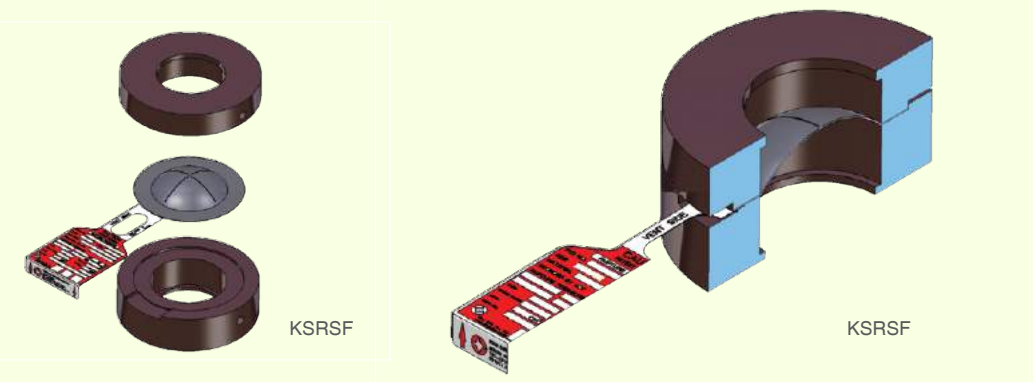
KSRSR



FORWARD TYPE



- KRSF (Forward Dome Scored Type)**
- Carved structure with Scored Damage processed precisely ruptured by tension
 - Mounted into FDC standard holder
 - Designed for high pressure application
 - Ideal for counterpressure, vacuum and pulsation conditions
 - Withstands full vacuum without vacuum support



- KRSST (Forward Dome Tension Flat Seat Type)**
- Structure with disc ruptured by tensile strength
 - Mounted into FDC standard holder
 - Precise rupture performance and excellent reliability
 - Designed for high/ultra high pressure application

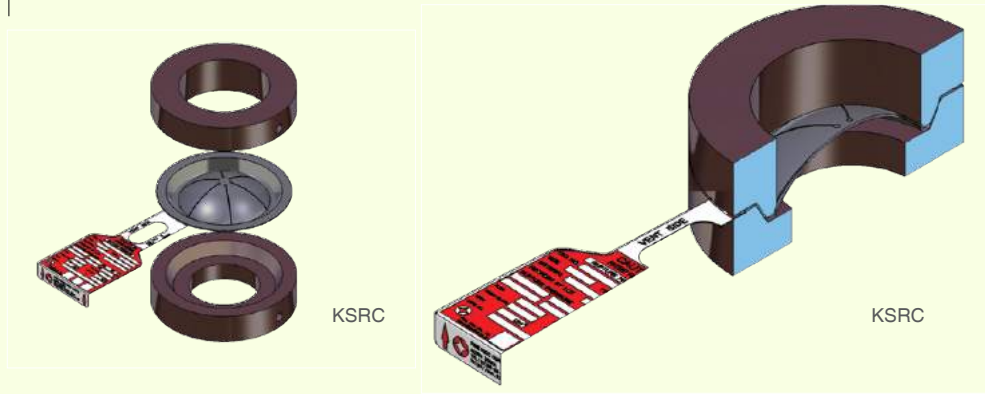
- KSRCT (Forward Dome Tension Sloped Seat Type)**
- Consists of top disc, support disc and guide ring
 - Identical feature with KRSST, but seat type is different
 - mounted into FDC standard holder
 - Ideal for counterpressure and pulsation conditions



COMPOSITE DOME TYPE



- KSRC (Composite Dome Sloped Seat Type)**
- Composite/Dome structure ruptured by slit processed on Top disc
 - Mounted into FDC standard holder
 - It consists of Top disc, Seal disc and Vacuum disc
 - Suitable for liquid or steam media environments
 - Teflon or Metal seal is available
 - Ideal for counterpressure, vacuum and pulsation conditions
 - If required, vacuum support is available



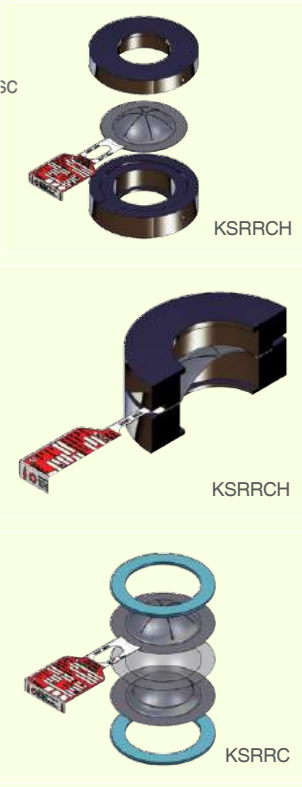
- KSRRCH (Composite Dome Flat Seat Type)**
- Composite / Dome structure ruptured by slit processed on Top disc
 - Mounted into FDC standard holder
 - It consists of Top disc, Seal disc and Vacuum disc
 - Suitable for liquid or steam media environments
 - Teflon or Metal seal is available
 - Ideal for counterpressure, vacuum and pulsation conditions
 - If required, vacuum support is available

- KSRRCHD (Composite Dome Flat Seat Double Acting Type)**
- KSRRCH type disk burst in one direction for overpressure and in the opposite direction for vacuum

- KSRRC (Composite Dome Flat Seat Type for Flange)**
- Identical disc type with KSRRCH, but mounted directly between flanges without holder

- KSRRCF (Composite Dome Flat Seat Type for Ferrule)**
- KSRRC type disc designed for installation between ferrules

- KSRRCFD (Composite Dome Flat Seat Double Acting Type for Ferrule)**
- KSRRC type disc burst in one direction for overpressure and in the opposite direction for vacuum



COMPOSITE FLAT TYPE



KSROH

KSROH (Composite Flat Type)

- Composite/Flat structure ruptured by slit processed on Top disc
- Mounted into FDC standard holder
- It consists of Top disc, Seal disc and Vacuum disc
- Teflon or Metal seal is available
- Vulnerability to pulsation conditions
- If required, vacuum support is available

KSRO (Composite Flat Type for Flange)

- Identical disc type with KSROH, but mounted directly between flanges without holder

KSROF (Composite Flat Type for Ferrule)

- KSRO type disc designed for installation between ferrules

KSROHD (Composite Flat Double Acting Type)

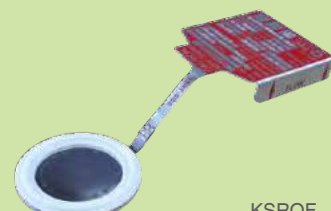
- KSROH type disc burst in one direction for overpressure and in the opposite direction for vacuum

KSROFD (Composite Flat Double Acting Type for Ferrule)

- KSROF type disc burst in one direction for overpressure and in the opposite direction for vacuum



KSRO



KSROF



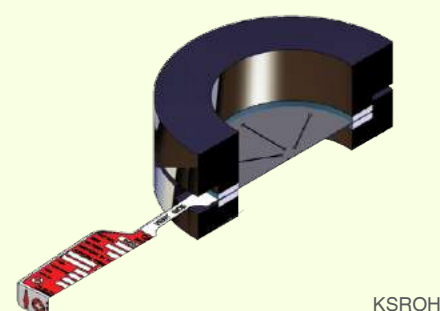
KSROHD



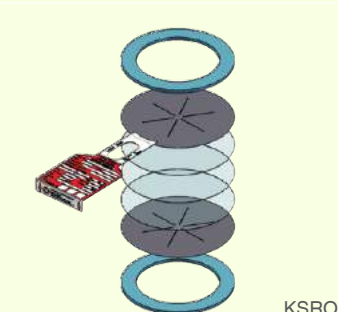
KSROFD



KSROH



KSROH

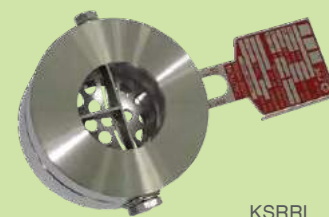


KSRO

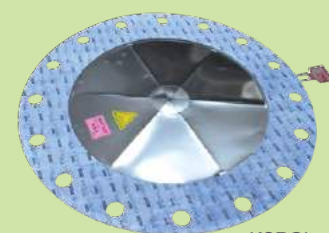


KSROF

ULTRA LOW PRESSURE TYPE



KSRRRL



KSROL

KSRRRL (Reverse Dome Knife Type - LP)

- Designed for ultra low pressure with minimum 100mmAq of set pressure
- Reversal structure ruptured by knife blade attached upper holder while dome is inverted
- Mounted into FDC standard holder
- It consists of Support disc, Disc seal and Vacuum support

KSRRLD (Reverse Dome Knife Double Acting Type - LP)

- KSRRRL type disc burst in one direction for overpressure and in the other direction for vacuum

KSROL (Composite Flat Type for Flange - LP)

- It is used for ultra low pressure with minimum 100mmAq of set pressure
- Composite/Flat structure ruptured by slit processed on Setting disc
- It consists of Top disc, Setting disc, Seal disc and Vacuum disc
- Teflon or Metal seal is available

FITTING CONNECTION TYPE



VCR



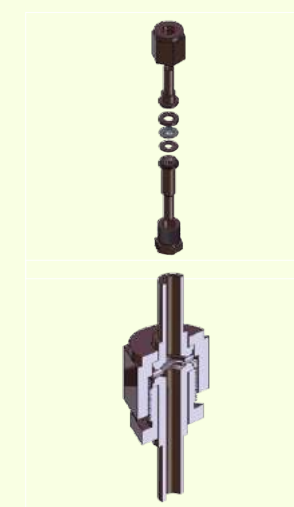
PLUG



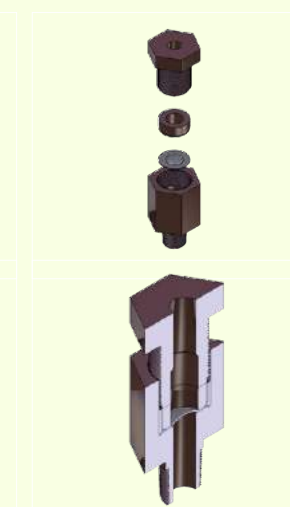
UNION



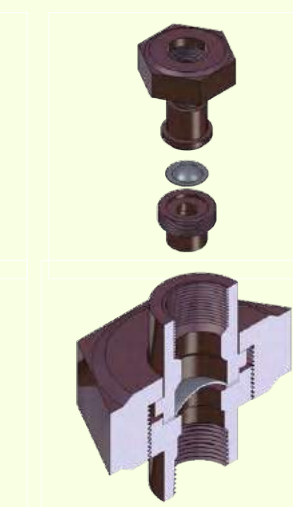
- **KSRRKV / KSRRKP / KSRRKU** (Reverse Dome Shear Type for VCR/PLUG/UNION)
 - KSRRK disc for fitting connection
- **KSRSFV / KSRSFP / KSRSFU** (Forward Dome Scored Type for VCR/PLUG/UNION)
 - KSRSF disc for fitting connection
- **KSRSTV / KSRSTP / KSRSTU** (Forward Dome Tension Type for VCR/PLUG/UNION)
 - KSRST disc for fitting connection
- **KSRRCV / KSRRCP / KSRRCU** (Composite Dome Shear Type for VCR/PLUG/UNION)
 - KSRRC disc for fitting connection
- **KSWSRV** (Reverse Dome Scored Welding Type for VCR)
 - KSRSR disc for fitting connection



VCR



PLUG



UNION



FDC'S RUPTURE DISC ASSEMBLY FOR FLANGE

HOLDER DESCRIPTION

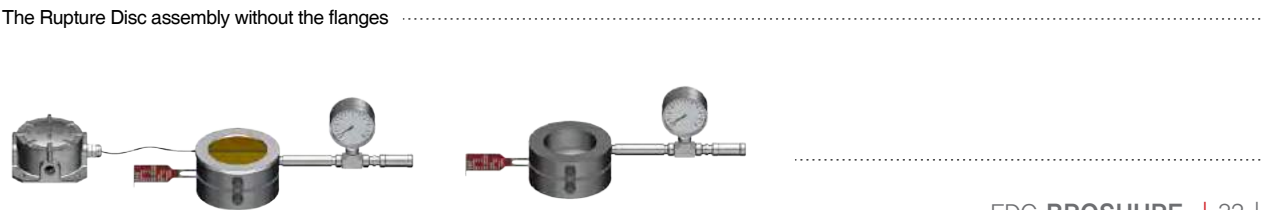
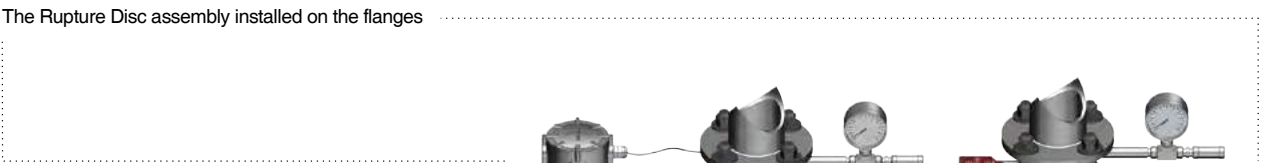
HOLDER TYPE	IMAGE	FLANGE FACING	ASSEMBLY TYPE	FEATURES
PRE ASSEMBLY TYPE		<ul style="list-style-type: none">▪ R.F▪ F.F▪ RJT▪ T.G▪ Male & Female Type	Side Link Plate	<ul style="list-style-type: none">▪ FDC Standard▪ Tightening : Stud Bolt / Nut의 Fastening force▪ Simple Design & Low Cost
PRE ASSEMBLY TYPE		<ul style="list-style-type: none">▪ R.F▪ F.F	Pre Assembly Bolt	<ul style="list-style-type: none">▪ FDC Standard▪ Tightening : Stud Bolt / Nut의 Fastening force▪ Simple Design & Low Cost
SEMI PRE TORQUE TYPE		<ul style="list-style-type: none">▪ R.F▪ F.F	Pre Torque Bolt	<ul style="list-style-type: none">▪ FDC Standard▪ Self Tightening▪ Reasonable Cost
PRE TORQUE TYPE		<ul style="list-style-type: none">▪ R.F▪ F.F▪ RJT▪ T.G▪ Male & Female Type	Pre Torque Bolt	<ul style="list-style-type: none">▪ FDC Standard▪ Self Tightening▪ High Cost

FDC'S RUPTURE DISC ASSEMBLY FOR FLANGE

HOLDER DIMENSION TABLE

HOLDER					
	FS TYPE	KS TYPE	H TYPE	SS TYPE	BFS TYPE
APPLICABLE RUPTURE DISC	KSRRK KRSR KRSR KRSRST KSRRCH(D)	KSRR	KSROH(D)	KSRC KSRICT	KSBBKH

SIZE		Φ A		Φ B						H				
INCH	DN	FS/KS/SS/H	BFS	JIS 5K	JIS 10K	JIS 20K	ANSI 150 #	ANSI 300 #	ANSI 600 #	FS	KS	SS	BFS	H
1/2"	15	15	-	Φ 48	Φ 55	Φ 55	Φ 45	Φ 51	Φ 51	45	45	45	-	45
3/4"	20	20	34.5	Φ 53	Φ 60	Φ 60	Φ 54	Φ 64	Φ 64	45	45	45	45	45
1"	25	25	34.5	Φ 63	Φ 71	Φ 71	Φ 64	Φ 70	Φ 70	45	45	45	45	45
1 1/4"	32	32	-	Φ 75	Φ 81	Φ 81	Φ 73	Φ 79	Φ 79	45	45	45	45	45
1 1/2"	40	40	49.1	Φ 80	Φ 86	Φ 86	Φ 83	Φ 93	Φ 93	45	45	45	45	45
2"	50	50	61.1	Φ 90	Φ 101	Φ 101	Φ 102	Φ 108	Φ 108	50	50	45	50	45
2 1/2"	65	65	77.1	Φ 115	Φ 121	Φ 121	Φ 121	Φ 128	Φ 128	55	55	50	55	45
3"	80	80	90	Φ 126	Φ 131	Φ 137	Φ 134	Φ 146	Φ 146	60	60	50	60	45
4"	100	100	115.4	Φ 146	Φ 156	Φ 162	Φ 172	Φ 178	Φ 189	65	65	50	65	45
5"	125	125	-	Φ 181	Φ 187	Φ 200	Φ 194	Φ 213	Φ 238	75	75	-	-	45
6"	150	150	166.6	Φ 211	Φ 217	Φ 235	Φ 220	Φ 248	Φ 263	75	75	50	75	45
8"	200	200	218	Φ 257	Φ 267	Φ 280	Φ 276	Φ 304	Φ 317	90	90	60	90	45
10"	250	250	-	Φ 322	Φ 330	Φ 353	Φ 338	Φ 358	Φ 397	110	110	60	-	45
12"	300	300	-	Φ 367	Φ 375	Φ 403	Φ 408	Φ 419	Φ 454	130	130	80	-	45
14"	350	350	-	Φ 410	Φ 420	Φ 447	Φ 447	Φ 482	Φ 488	130	130	90	-	-
16"	400	400	-	Φ 470	Φ 483	Φ 507	Φ 510	Φ 536	Φ 561	160	160	90	-	-
18"	450	450	-	Φ 530	Φ 538	Φ 572	Φ 546	Φ 593	Φ 609	180	180	100	-	-
20"	500	500	-	Φ 580	Φ 593	Φ 627	Φ 603	Φ 651	Φ 679	205	205	100	-	-
24"	600	600	-	Φ 688	Φ 697	Φ 731	Φ 714.5	Φ 770.8	Φ 787.2	235	235	150	-	-

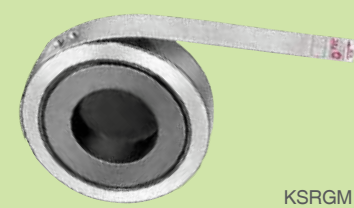


GRAPHITE DISC

GRAPHITE DISC

GRAPHITE DISC Features

- Made from a single piece of graphite which is impregnated with phenolic resin
- Easy to install and maintain
- Installed directly between standard flanges without holders
- Excellent corrosion resistance



KSRGM



KSRGI



KSRGD

KSRGM

- Ideal for low and intermediate burst ratings
- Counterboard side of the disc contacts the process media
- In case of vacuum condition, vacuum supports are available for ratings below 25 psig
- Insulated Units are supplied armored with required insulation and gaskets for service above 221°C to 371°C
- Armor is required for temperatures above 170°C

KSRGI

- Ideal for higher burst ratings
- Flat surface of the disc contacts the process media
- Armor is required for temperatures above 170°C
- TFE liner is available to extend corrosion resistance

KSRGD

- Setting two different pressures in the opposite directions (Double Acting Type)
- Optional liner is available to extend corrosion resistance
- Armor is required for temperatures above 170°C

Specification

Division	KSRGM	KSRGI	KSRGD
Standard	ASME Code sec VIII KS B ISO 4126, API RP520, KOSHA CODE, FDC standard		
Size	1/2" ~ 24"		1-1/2" ~ 24"
Set. Pressure	0.017 ~ 10 kg/cm ²	0.017 ~ above 70 kg/cm ²	0.017 ~ 0.49 kg/cm ²
Temperature	-179 ~ 371 °C		-179 ~ 221°C
Material	Graphite		
Fragment	Yes		
Process Media	Gas, Vapor, Liquid		
Max. Operating Ratio	90%		
Spark	NO		
Option	Flouropolymer sintered, Vacuum Support, Insulation, Armor, Gasket,	Flouropolymer sintered, Armor, Liner, External Type Vacuum Support, Gasket	Flouropolymer sintered, Armor, Liner, Gasket

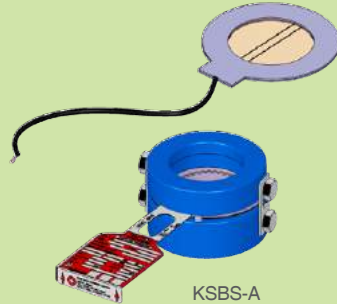
- Contact FDC for Set. Pressure details corresponding to each size

BURST SENSOR

BURST SENSOR

BURST SENSOR Features

- The Burst Sensor is a device indicating rupture disc activation.
- Upon rupture of the disc, alarm circuit is opened by the flowing media, and alarm system warns immediately.
- FDC Burst Sensor is usable over a wide range of temperatures and simply replaced along with the rupture disc.



KSBS-A



- GAS II 2G EX ib IIC T6 Gb
- DUST II 2D EX ib IIIC T135°C Db



KSBS-B



- GAS II 2G EX ib IIC T6 Gb
- DUST II 2D EX ib IIIC T135°C Db



KSBS-C



- GAS II 2G EX ib IIC T6 Gb
- DUST II 2D EX ib IIIC T135°C Db

KSBS-A

- Installed on the vent side of Rupture Disc Holder.
- Consists of alarm strip combined with copper conductors and gasket attached on each side.
- Upon rupture of disc, sensor film is cut. As result of this, the flow of current is cut off and it instantaneously notifies rupture disc activation.
- Gasket Material: Non-asbestos, Teflon and Graphite etc.

- Electrical Specifications
(Material with 1.5 meter extension cable)

Ui	Ii	Pi	Ci	Li
25,5 V	90 mA	0,63 W	0,01 nF	1,66 μH

KSBS-B

- Integrated directly into the rupture disc on the vent side
- Consists of alarm strip combined with copper conductors
- Upon rupture of disc, sensor film is cut. As result of this, the flow of current is cut off and it instantaneously notifies rupture disc activation.

- Electrical Specifications
(Material with 1.5 meter extension cable)

Ui	Ii	Pi	Ci	Li
25,5 V	90 mA	0,63 W	0,01 nF	1,66 μH

KSBS-C

- Integrated directly into the rupture disc on the vent side.
- Upon rupture of disc, sensor cable is cut. As result of this, the flow of current is cut off and it instantaneously notifies rupture disc activation.

- Electrical Specifications
(Material with 1.5 meter extension cable)

Ui	Ii	Pi	Ci	Li
25,5 V	90 mA	0,63 W	0,02 nF	1,24 μH

ACCESSORY

Pressure Gauge(P/G)	A measurement device which determines the pressure
Pressure Switch(P/S)	A device designed to monitor a process pressure and provide an output when a set pressure is reached
Excess Flow Valve(E.F.V)	A kind of check valve maintaining atmospheric pressure in the space between the rupture disc and the relief valve with a pressure gauge
Nipple, Tee, Plug, Reducer	Fitting for installation of P/G, P/S and E.F.V.
Stud Bolt & Nut	Tightening bolt & nut for In/Out Flange
Eye Bolt	A bolt which is attached to heavy holder so that ropes or cables are tied to it
Gasket	Sealing of In/Out Flange mating surface
J-Hook	J-shaped hooks installed at lower Holder
Jack Screw	It provides safe and easy installation of rupture discs by separating Inlet/Outlet flanges
Burst Sensor	A burst indicator providing instantaneous notification of rupture disc activation
Junction Box	Terminal box for connecting shield cable of burst sensor
Rain Hood	It protects Rupture Disc against foreign objects or rain inflow by installed onto downstream of the Rupture Disc exposed to the atmosphere
Heat Shield	Heat shield such as cerakwool and aerogel is attached to disc and helps disc to withstand the high temperature



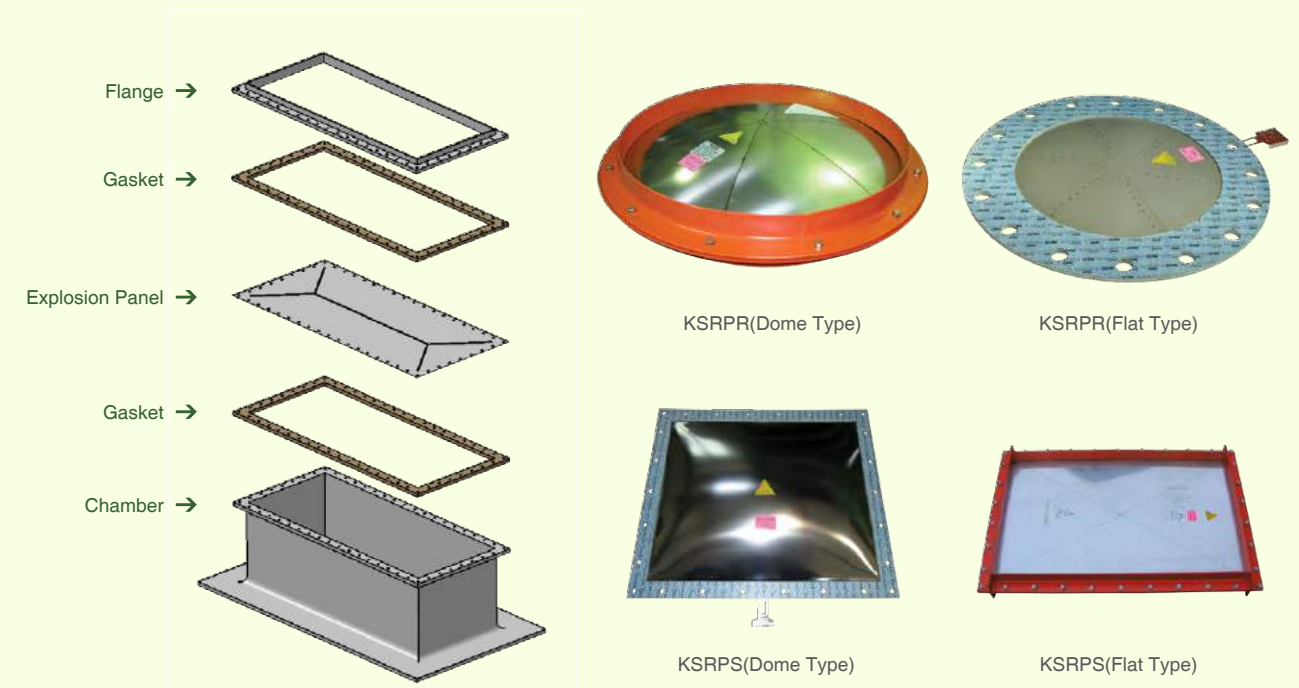
EXPLOSION PANEL

Explosion Panel Introduction

- Safety device for preventing equipments from damage by instantaneous release of pressure and flame which were increased in the process of deflagration before gas, powder, dust and other mixtures are progressed into detonation by ignition

Explosion Panel Features

- **Applicable equipment** : Silo, Bag Filter, RTO, Bucket Elevator, Duct, Hopper, etc
- **Fluids** : Dust, Gas, Powder, Mixture
- **Code** : NFPA 68, KOSHA CODE
- **Advantages**
 - Prompt operating in low pressure and reduction of pressure
 - Fast release to minimize the damage caused by expansion gas
 - Design for prevention of leakage and fragments
 - Easy to replace and low maintenance cost
 - Possible to select any quantity and installation location depending on the vessel size and the type of contents



N2 BLANKETING SYSTEM

What is the N2 Blanketing System?

- Control device to maintain a constant pressure state by injecting N2 gas, that is, inert gas to upper room of the tank

Functions of N2 gas

- It reduces evaporation loss of the products to minimize the formation of vapor in the tank
- It removes explosive factors by controlling hazardous gas ingredients such as oxygen from vapor space in the tank
- It prevents products from damage by inflow of unnecessary moisture and air
- It prevents explosion by controlling electrostatic spark
- It promotes delivery rate of product by decreasing of discharging time of product
- It prevents the modification of tank by controlling vacuum in the tank

Type

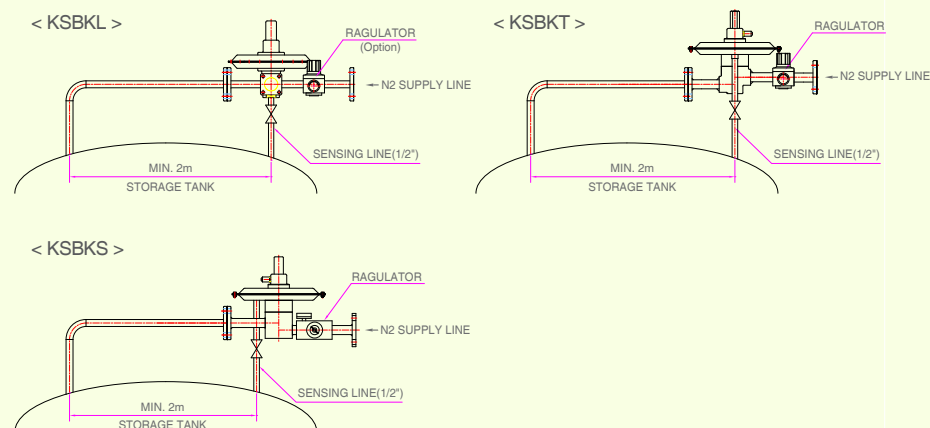
- KSBKL (Low capacity)
- KSBKT (High capacity)
- KSBKS (Ultra high capacity)

Flow Capacity (Rated Flow)

[Measure : Nm³/h]

Model	Inlet Pressure						
	1 barg	2 barg	3 barg	4 barg	5 barg	6 barg	7 barg
KSBKL	64.7	105.2	145.2	184.7	223.6	262	299.8
KSBKT	240.6	367.4	493.6	493.6	744.6	869.4	993.9
KSBKS	871.3	1316.9	1650.9	1891.8	2058	2168	2240.3

Installation- Layout



EMERGENCY RELIEF HATCH - KSRH

EMERGENCY RELIEF HATCH - KSRH

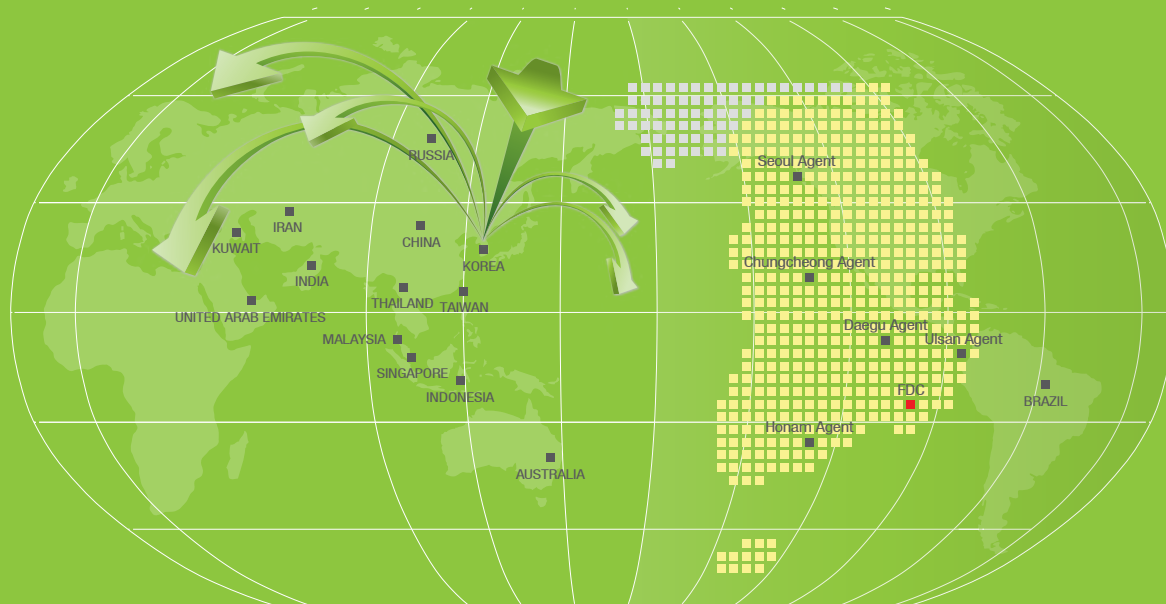
- A device for release the internal pressure with opening the cover by rupturing of tension rod when overpressure reaches more than allowable operating pressure by increasing of internal pressure of vessel
- Unlike general emergency venting device, it sets the required pressure by tension rod, and because it uses sealing diaphragm, it has excellent sealing capacity compared with the existing weight type, oil seal type and spring type
- Also, in case of oil seal type it has somewhat lower reliability because its setting pressure is not uniform by the difference of oil viscosity depending on temperature

Features

- Excellent sealing capacity and any leakage is not permitted
- Diaphragm is built in for sealing
- Available on LNG ship and ground tank mainly
- Possible to lower set pressure
- Maintenance cost is low because it is possible to reset by replacing some parts after rupturing



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