

# EXPLOSION VENTING DEVICES FOR EXHAUST GAS SYSTEM





**THE LEADER OF  
SAFETY EQUIPMENT**

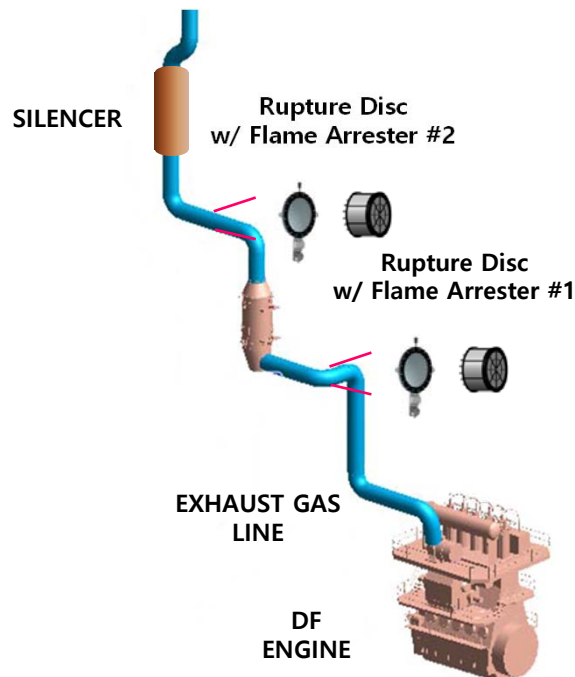
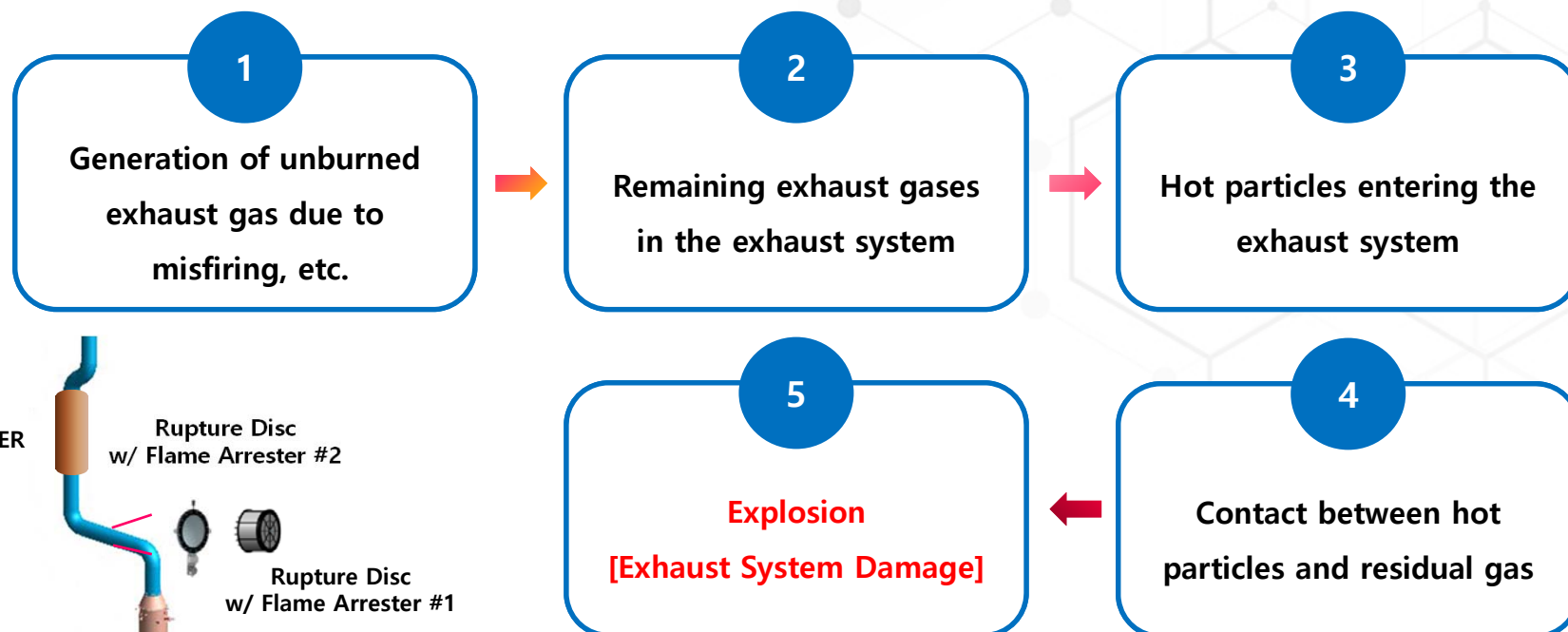
## **CONTENTS**

1. PURPOSE OF INSTALLATION
2. SHIP CLASSIFICATION REQUIREMENT
3. PRODUCT SPECIFICATIONS AND FEATURES
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# 1. PURPOSE OF INSTALLATION

## The Need for Explosion Venting Device

【 Explosion process inside the exhaust system 】



Installing explosion venting device can help protect your exhaust system from explosions.

## 2. SHIP CLASSIFICATION REQUIREMENTS

### IACS Requirements (IACS UR M82 : 2023.03)

M82

#### **M82** (Mar 2023) **Type Testing Procedure of Explosion Relief Devices for Combustion Air Inlet and Exhaust Gas Manifolds of I.C. Engines Using Gas as Fuel**

### IACS RULE

These are the IACS rules for explosions inside exhaust pipes, the draft data of which is used by each classification company (DNVGL, ABS, LR, etc.) as the only test standard for safety devices against explosions in exhaust pipes.

#### 2021.01 IACS UR M78 DRAFT

The standards for safety devices installed in engine exhaust systems were ambiguous.

This was not a mandatory requirement of the classification society as it only specified safety devices installed on the manifold.



#### 2023.03 IACS UR M82

Details on the safety devices installed in the engine exhaust system have been confirmed.

Safety devices that have received new classification certification must be installed to comply with the revised RULE standards.(Required application for ships Contract from 1 July 2024)

## 2. SHIP CLASSIFICATION REQUIREMENTS

### IACS Requirements (IACS UR M82 : 2023.03)

#### 1 Scope

To specify testing procedure for explosion relief devices for combustion air inlet manifold and exhaust gas manifold of internal combustion engines using gas as fuel.

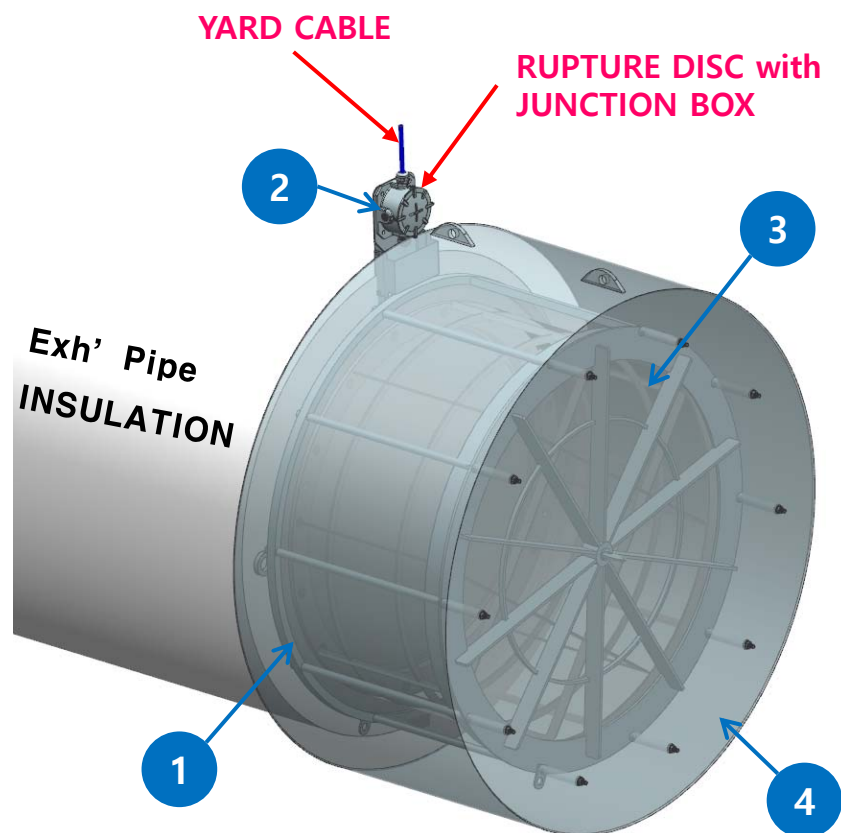
#### 2 Definitions

Definitions addressing gas as fuel as given in the UR M78, Safety of Internal Combustion Engines Supplied with Low Pressure Gas, apply.

Explosion relief device (ERD) means a device to protect a component against a determined overpressure in the event of a gas explosion. The device is fitted with a flame arrester and may be a valve, a rupture disc or other, as applicable.

### 3. PRODUCT SPECIFICATIONS AND FEATURES

#### Applicable Size and Part List



< PRODUCT INSTALLATION REFERENCE >

#### APPLICABLE SIZE

Exh' GAS PIPE SIZE	RUPTURE DISC SIZE	BURSTING PRESSURE
400A~800A	400A	200mbarg or 500mbarg @ Max. 600°C
850A~1200A	700A	

#### PART LIST

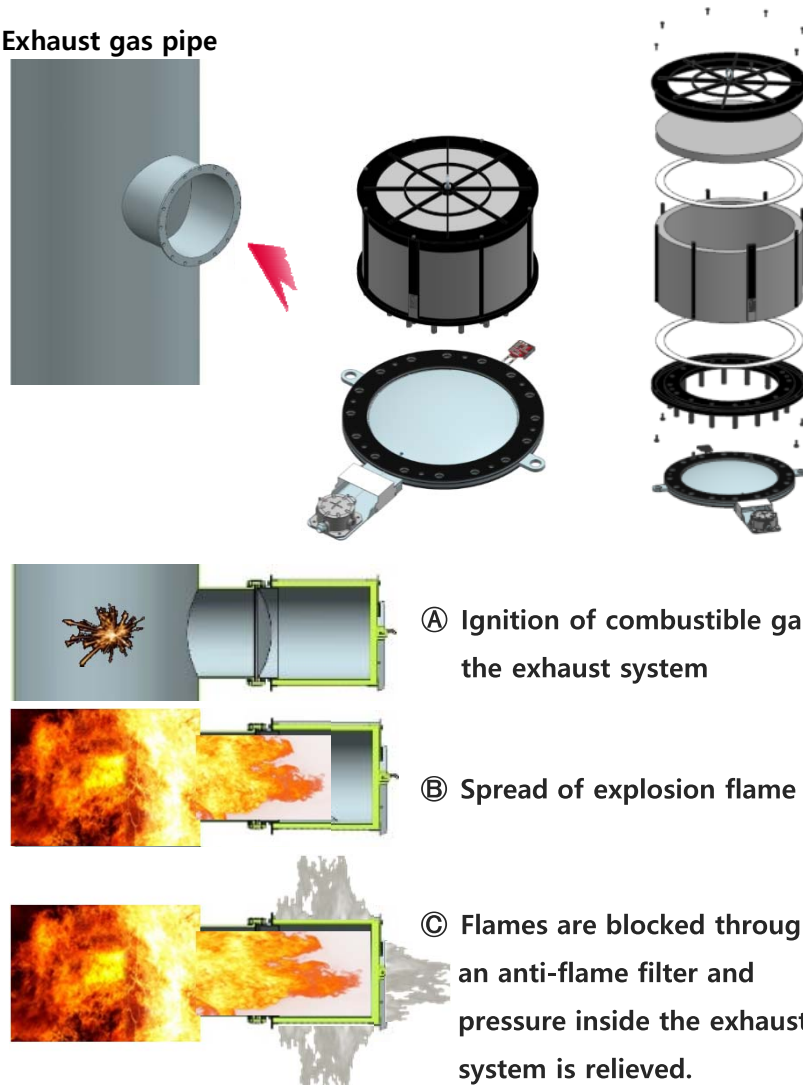
NO	ITEM NAME	MODEL	IMAGE
01	RUPTURE DISC	KSRPR	
02	BURST SENSOR	KSBS-C-H1	
03	FLAME ARRESTER	KSEVPL	
04	FLAME ARRESTER COVER	A-TYPE	



### 3. PRODUCT SPECIFICATIONS AND FEATURES

#### Characteristics of Explosion Venting Device

Exhaust gas pipe



#### Instant operation and Safe discharge

- The safest explosion protection device that instantly releases the maximum amount of explosive expansion gas and pressure.
- Blocks flame and releases only pressure and smoke

#### Safe design

- Leak-free and non-fragment design

#### Temperature shielding structure

- Blocks the temperature inside the exhaust pipe

#### Cost reduction

- **A full opening Rupture disc with Excellent Venting Efficiency allows the only one set of rupture disc is enough per Engine.**

#### Easy to install


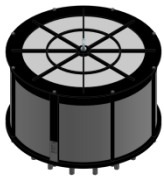
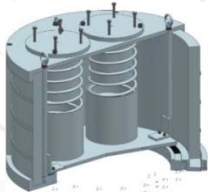
- Easy to install and assemble

#### Live monitoring

- Real-time status monitoring possible by applying an integrated sensor disc

## 4. PRODUCT COMPARISON DATA




Explosion Venting Device Comparison Table

	RUPTURE DISC	FLAME ARRESTER	EXPLOSION RELIEF VALVE
IMAGE			
LEAKAGE	Zero Leakage. * Confirmed in 450°C environment	N/A	Zero Leakage. (Applicable only for low pressure operation)
MAINTENANCE	<ol style="list-style-type: none"> <li>Visual inspection</li> <li>Replace with a new product after rupture</li> <li>Burst Sensor can be replaced individually</li> </ol>	<ol style="list-style-type: none"> <li>Visual inspection</li> <li>Can be reused (3 times)</li> <li>SPARE PART can be replaced if necessary</li> </ol>	<ol style="list-style-type: none"> <li>Visual inspection</li> <li>Self-repair is not possible if problems occur with the sealing or flame filter after an explosion.</li> </ol>
REMARK	<ol style="list-style-type: none"> <li>Monitorable sensors</li> <li>Fast pressure release</li> <li>Mechanical integrity</li> <li>Prevention of secondary damage due to addition of flame prevention function</li> <li>Application of temperature shielding structure</li> <li>Possible to install in explosion-proof area (Zone 1)</li> </ol>	<ol style="list-style-type: none"> <li>Quick pressure release</li> <li>Mechanical integrity</li> <li>Prevent secondary damage due to flame suppression function</li> <li>No need to install additional piping</li> <li>Low maintenance costs as only filter parts can be replaced</li> <li>Possible to install in explosion-proof area (Zone 1)</li> </ol>	<ol style="list-style-type: none"> <li>Automatic opening and closing function</li> <li>Flame suppression function prevents secondary damage</li> <li>Continuous exhaust gas emissions occur depending on operating pressure</li> <li>Flame filter cannot be replaced</li> <li>Since there is a possibility of continuous exhaust gas emissions, it is necessary to install a gas detection facility for worker safety.</li> </ol>






## 4. PRODUCT COMPARISON DATA

Dimension Comparison Table-01

	FDC	Company 'F'	Company 'H'
PRODUCT IMAGE 400A	A same scale of actual appearance dimension		
			
DIMENSION	MODEL : KSEVPL-400A O.D : Ø 660 H : 390mm WEIGHT(KG) : 45	MODEL : GEX-DN400 PN10 O.D : Ø 565 H : 603mm WEIGHT(KG) : 47.5	MODEL : 565EVM O.D : Ø 735 H : 419mm WEIGHT(KG) : 250

## 4. PRODUCT COMPARISON DATA

Dimension Comparison Table-02

	FDC	Company 'F'	Company 'H'
PRODUCT IMAGE 700A	A same scale of actual appearance dimension		
			
DIMENSION	MODEL : KSEVPL-700A O.D : Ø 935 H : 495mm WEIGHT(KG) : 92	MODEL : GEX-DN800 PN10 O.D : Ø 1015 H : 1062mm WEIGHT(KG) : 167	MODEL : 735EVM O.D : Ø 910 H : 680mm WEIGHT(KG) : 420

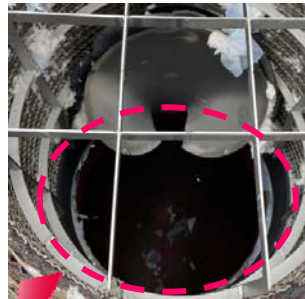
## 4. PRODUCT COMPARISON DATA

### Comparison of Test Results – Appearance after Operation

#### Rupture Disc + Flame Arrester



< Appearance after explosion >



< Open photo >

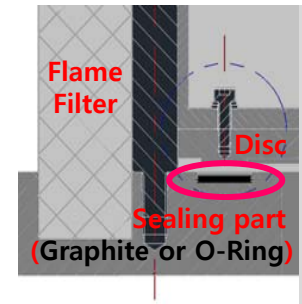
Full  
Open

Fastest Pressure Relief among ERDs

#### Explosion Relief Valve



< Appearance after explosion >



< Valve structure description >



< Inside the valve >

Sealing parts  
fragments

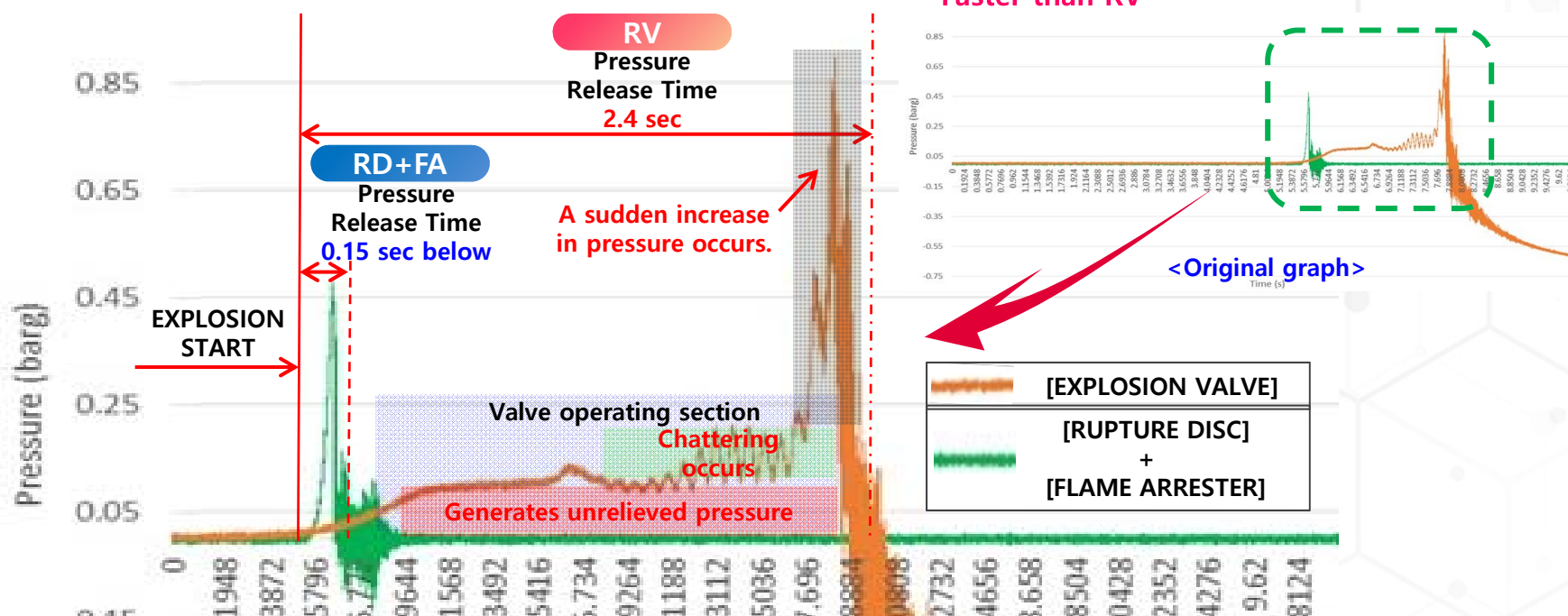


< Valve internal details >

Sealing parts  
loss

## 4. PRODUCT COMPARISON DATA

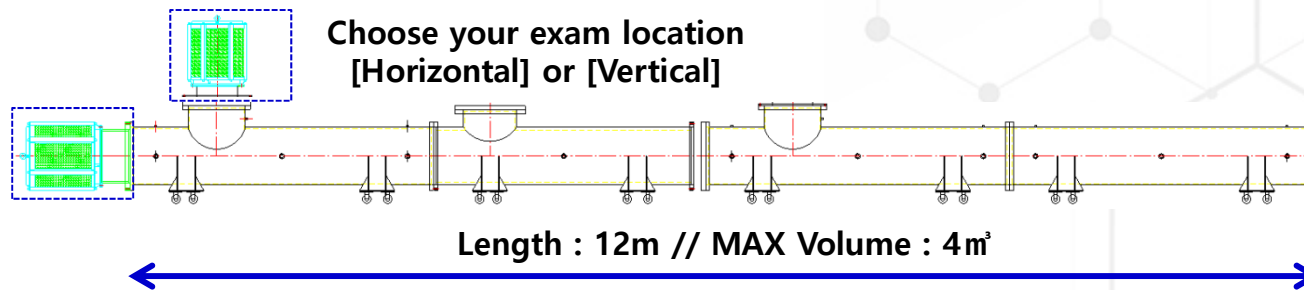
### Comparison of Test Results – Pressure graph


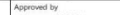



Product	Pressure release time	Max pressure	Note
RUPTURE DISC + FLAME ARRESTER	0.15 sec	0.47 barg	<ol style="list-style-type: none"> <li>1. The pressure is quickly released</li> <li>2. Excellent for relieving maximum pressure after explosion</li> </ol>
EXPLOSION RELIEF VALVE	2.4 sec	0.9 barg	<ol style="list-style-type: none"> <li>1. It takes a long time to release the pressure.</li> <li>2. After explosion, the maximum pressure inside the test pipe becomes very high.</li> </ol>

## 5. FACILITIES STATUS


## Based IACS UR M82, Explosion Test Facility



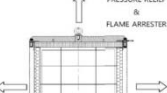
 			
<h2>Test Procedure of Flame Arrester (KSEVP)</h2>		Doc No: FDCS-HNH-04 Date : 2022.07.21	
Written By : B.HJUNG		Approved By : J.S.PARK	
		Total Pages : 4 Rev : 1	

- PURPOSE**  
 It is applied to product inspection and explosion test for Explosion Venting Device KSEVP
- COVERAGE**  
 It is applied to the Explosion Venting Device KSEVP supplied to Hyundai Engine.
- PRODUCT SHAPE(EXTERNAL & INTERNAL)**




EXTERNAL

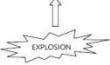


PRESSURE RELIEF &  
FLAME ARRESTER

KSEVP & KSPP  
ASSEMBLY














INTERNAL



EXPLOSION


- EXPLOSION TEST AND INSPECTION METHOD**
  - Explosion Test conditions**
    - Test product shape and size : 450A/100A – KSEVP & KSPP/ASSEMBLY
    - AIR/METHANE MIXTURE : A VOLUMETRIC METHANE CONCENTRATION OF 95%±5.0%  
 or PROPANE MIXTURE CONCENTRATION OF 42% ±2.5%

          		Doc. No.: FDCS-H08-04 Date: 2022-07-21 Total Pages : 4
<h2 style="text-align: center;">Test Procedure of Flame Arrester (KSEVP)</h2>		
Written by B.J.H/WJG	Approved by J.S.PARK	Rev 1


- 4.1.3 Ignition conditions and installation location: Electric Spark / Test Vessel Center
- 4.1.4 Test Vessel Condition: Shape : Lx $\phi$ 10 / Volume : 7000ml ± 15%
- 4.1.5 Pressure Transmitter : Ignition Vessel and Location Near the Test Product
- 4.1.6 Measuring Location(Methane): Both ends of the Test Vessel

4.2. EXPLOSION TEST

- a. Prepare a test vessel based on the size of the explosion test chamber and check whether there is any flammable gas remaining around the test site.  
 (Test Vessel Volume: 450A : 2m<sup>3</sup> / 600A:40m<sup>3</sup>)
- b. Respirator (Dic: K509) and Explosion Warning Device (KSEVP) are installed in the prepared Test Vessel, and unopened ports are shielded.  
 (Product Installation shape 450A : VERTICAL / 600A : HORIZONTAL )














~Horizontal Installation : 600A~










~Vertical Installation : 450A~

- c. After installing the ignition device and pressure sensor in the center of the test vessel, install an additional pressure sensor near the rupture disc.
- d. After installing the high-speed camera, thermal imaging camera, and video camera on site, check the operation status.
- e. Check the explosion test program of the control room and the operation status of the device.

 FDC Co., Ltd.  ISO 9001:2015  UL ENEC  SGS  TUV		 CE  CCC  VDE  UKCA 
<b>Test Procedure of Flame Arrester (KSEVP)</b>		Dic No : FQCS-HH-04
		Date : 2022.07.21
		Total Pages : 4
Written by <b>B.HUANG</b>	Approved by <b>J.S.MORRIS</b>	Rev <b>1</b>

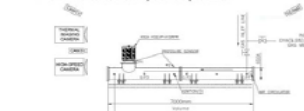
  


◀ K60A TEST CONFIGURATION ▶

      		Doc. No.: FDCS-HSE-004
		Date : 2022.07.21
		Total Pages : 4
Written By :	Approved By :	Rev :
B.JUJUNG	J.S.PARK	1

- Check the operation status of the ignition device of the test vessel.
- After opening all valves of the mixed gas supply line, let the methane flow.
- While checking the supply status of the mixed gas, set the methane concentration at the supply side and the end of the test vessel satisfies the condition of 93%±3% (impure concentration: 4.2%±0.2%), stop supplying the mixed gas.
- Close all valves of the test vessel and mixed gas supply line.
- Start recording of the imaging device and pressure measuring device and trigger the alarm to indicate the test.
- After pressing the ignition button, the Control Room operator proceeds with a countdown by voice, and in the event of an explosion, presses the record trigger button of the high-speed camera to activate it.
- After checking the explosion, the control room operator enters the site if there is no problem after checking the site through CCTV. After measuring the state of the combustible gas at the site, follow-up work is carried out.
- Stop recording of pressure measuring devices and imaging devices and retrieve equipment.
- Check the records and complete the explosion test.

The diagram illustrates the 450A Test Configuration. It shows a vertical cross-section of a test vessel. Key components include:

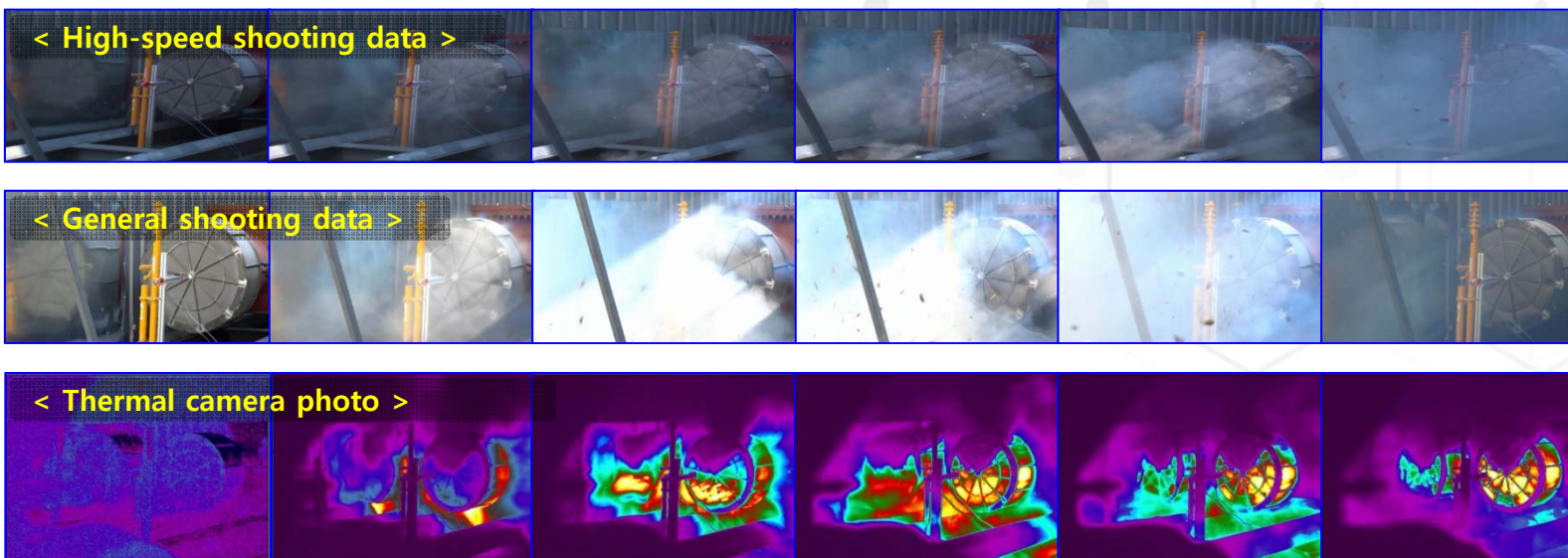
- Ignition Device**: Located at the top left, connected via a cable to the **Pressure Measuring Device**.
- Methane Supply Line**: Enters from the top left, passing through a valve and a pressure gauge before entering the vessel.
- Inert Gas Supply Line**: Enters from the bottom left, also passing through a valve and a pressure gauge.
- Pressure Measuring Device**: A sensor located inside the vessel, connected to a **Pressure Transducer** outside.
- Imaging Device**: Positioned above the vessel, pointing downwards to capture footage.
- Control Room**: Indicated by arrows pointing towards the vessel, representing the operator's position.
- Vessel Dimensions**: The total height is 1000mm, and the diameter is φ320±3.
- Internal Components**: Labels include "METHANE SUPPLY LINE", "INERT GAS SUPPLY LINE", "PRESSURE MEASURING DEVICE", "IMAGING DEVICE", and "CONTROL ROOM".

### ◁ Self-assessment criteria and testing equipment ▷



## 5. FACILITIES STATUS

### Based IACS UR M82, Explosion Test and Analysis #1



Environmental Measurement Result Data				
1.0m Distance Noise	Front 0.5m Discharge Pressure	Front 1.0m Discharge Pressure	Side 0.5m Discharge Pressure	Side 1.0m Discharge Pressure
126 dB	0.032 barg	0.046barg	0.16 barg	0.058barg

### < Results of Explosion test >

- 1> No flames are generated outside the product
- 2> No damage to KSEVPL product by opening of Rupture Disc



## 5. FACILITIES STATUS

### Based IACS UR M82, Explosion Test and Analysis #2

#### Analysis Results

- 1> As a result of the performance test of KSEVPL anti-inflammatory performance was satisfied.
- 2> There is no problem with durability even when used with a Rupture Disc at 0.5 barg open conditions.
- 3> Confirm that KSEVPL satisfies IACS UR M82 requirements.
- 4> As a result of testing the possibility of casualties when the explosion pressure was released using a mannequin, there was no damage to the mannequin.



< Mannequin photo after test >

# 6. PRODUCT CERTIFICATE

## Classification



**DNV**

TYPE APPROVAL CERTIFICATE

This is to certify that the Explosion relief device with type designation(s) Bursting disc KSRPR with flame arrester KSEVPL issued to **FDC Co. Ltd.** Gimhae-si, Gyeongsangnam-do, Korea is found to comply with DNV rules for classification – Ships Pt4 Ch.3

Application: Explosion relief device at an exhaust pipe for a

Issued at Hamburg on 2024-01-26  
This Certificate is valid until 2029-01-25  
DNV local unit:  
Approval Engineer: Sven Neddelen

This Certificate is subject to terms and conditions on back. Any signature, the validity date relates to the Type Approval Certificate and not to the LEGAL DISCLAIMER. Unless otherwise stated in the applicable certificate, the validity of the certificate is not affected by the signature of the approval engineer or the signature of the approval engineer or the signature of the approval engineer.

Form code: TA-201



**CERTIFICATE OF Product Design Assessment**

This is to certify that a representative of the Data **FD** 129, GOLDEN ROOT-F GIMHA

Product: Explosion Relief Valve w Model: KSRPR with KSEVPL Endorsements: Tier: 2 - PDA Issued

This Product Design Assessment (PDA) Certificate is the assessment of the product in the assessment are reviewed or until there is a change in the product design.

Acceptance of product is limited to the "Intended Standards".

This Certificate is valid for installation of the product or previous to the effective date of the ABS Rules for non-AUS units is subject to agreement between the parties.

NOTE: This certificate evidences compliance with rules of ABS Rules or manufacturer's standards. It is issued only for significant changes to the approved product with conditions as given in the ABS Rules or manufacturer's standards.

Certificate of Product Design Assessment Rev 3 of 1



**Type Approval Certificate**

This is to certify that the undetected product(s) in the relevant requirements of the Lloyd's Register

Manufacturer	FDC Co., Ltd.
Address	129, Golden Root-F, Gimhae-si, Gyeongsangnam-do, 50989, So
Type	Explosion Relief Valve
Description	Rapid explosion outlet for a plant or is an horizontal.
Trade Name	Explosion Relief Valve
Application	Marine
Specified Standard	Lloyd's Register Part 9, Chapter 9
Ratings	BNPS(200A) /
Other Conditions	1. The certificate is valid for a period of 5 years.

75 Fenchurch Street, London, EC3M 4BS, United Kingdom

Lloyd's Register Group Limited, its affiliates and subsidiaries referred to in this clause as 'Lloyd's Register', its registered office is at 25 Abchurch Lane, London, EC4A 3DF, United Kingdom. Lloyd's Register is not responsible for the provision of this information, and the conditions set out in that contract.

TA01.2.0



**TYPE APPROVAL CERTIFICATE**

This certificate is issued to **FDC CO., LTD.** Gyeongsangnam-do - KOREA (REPUBLIC OF) for the type of product **BURSTING DISCS** Bursting Disc KSRPR with Flame arrester KSEVPL ( DN200 / DN400 / DN700 )

Requirements: Bureau Veritas Rules for the Classification of Steel Ships

This certificate is issued to attest that the Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 07 Oct 2029

For Bureau Veritas Marine & Offshore, At BV PUSAN, on 07 Oct 2024

**FOR INFORMATION ONLY**

**PASSED**

This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent pages are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) shall be re-approved prior to being placed on board vessels to which the approved regulations or standards apply. This certificate is issued under the scope of the following conditions of Bureau Veritas Marine & Offshore: Bureau Veritas Marine & Offshore is not responsible for any liability arising out of errors or omissions which may be contained in this document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

BV Mod. A0 E 530 June 2017

This certificate consists of 2 page(s)

< CLASSIFICATION CERTIFICATE >

## 6. PRODUCT CERTIFICATE

### EU-Type Examination Certificate - IBExU GmbH

IBExU Institut für Sicherheitstechnik GmbH  
An-Institut der TU Bergakademie Freiberg

[1] EU-TYPE EXAMINATION CERTIFICATE - Translation

[2] Equipment or protective systems intended for use in potentially explosive atmospheres, Directive 2014/34/EU

[3] EU-type examination certificate number IBExU19ATEX2040 X | Issue 0

[4] Product: Flameless venting devices  
Type: KSEVR  
Size DN500

[5] Manufacturer: FDC Co., Ltd

[6] Address: 99, Seobu-ro 1293beon-gil  
Juchon-yon, Gimhae-si  
Gyeongsangnam-do  
REPUBLIC OF KOREA

[7] This product and any acceptable variation thereof is specified in the schedule to this certificate and the documents therein referred to.

[8] IBExU Institut für Sicherheitstechnik GmbH, notified body number 0637 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential test report IB-18-2-0176.

[9] Compliance with the essential health and safety requirements has been assured by compliance with: EN 14797 2006 EN 16009 2011 except in respect of those requirements listed at item [18] of the schedule.

[10] If the sign "X" is placed after the certificate number, it indicates that the product is subject to the specific conditions of use specified in the schedule to this certificate.

[11] This EU-type examination certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

[12] The marking of the product shall include the following:

$K_{st} \leq 100 \text{ bar} \cdot \text{m/s}$

IBExU Institut für Sicherheitstechnik GmbH  
Fuchsmühlweg 7  
09599 Freiberg, GERMANY

By order:  
(Dipl.-Ing. Willanowski)

IBExU Institut für Sicherheitstechnik GmbH  
Fuchsmühlweg 7  
09599 Freiberg, GERMANY

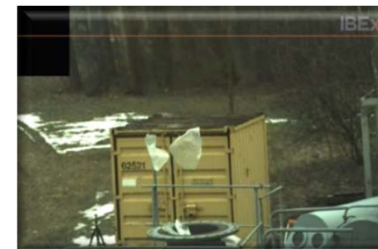
Tel.: +49 (0) 37 31 / 38 25 0  
Fax: +49 (0) 37 31 / 38 05 10

Certificates without signature and seal are not valid. Certificates may only be duplicated completely and unchanged. In case of dispute, the German text shall prevail.

Freiberg, 2019-04-12

Page 1/2  
IBExU19ATEX2040 X | 0

**PASSED**



**Foil Test**



**RD+FA Test**

**< IBEXU TEST REPORT >**

# 6. PRODUCT CERTIFICATE

## Product Performance Verification Test - Czech FTZU(DNV)

**FTZU**  
Ex

**Physical-Technical Testing Institute, s.p.**  
National Authority 210, Testing laboratory No. 1019  
accredited by CAI according to EN ISO/IEC 17025:2018

**TEST REPORT No.: 23.0231-47**

Test: Explosion Test

Applicant: FDC CO., Ltd.  
99 Seobu-ro 1293beon-gil Juchon-myeon Gimhae-si  
Gyeongsangnam-do 50877 Korea

Producer: FDC CO., Ltd.  
99 Seobu-ro 1293beon-gil Juchon-myeon Gimhae-si  
Gyeongsangnam-do 50877 Korea

Tested Subject: Flameless explosion relief device (ERD)  
Type: KSEVPL-200A

Design of Sample: -

Sample Number: 22654/1

Certificate Number: Wireless test

Delivery of Sample: 01.08.2023

Location of Performance of the Test: Premises of FTZU, s.p.

Testing Method: M82 (Mar 2023) IACS Req. 2023  
Test performed within the scope of flexible accreditation

Deviation of the Test Method: None

Present at the test: Mr. Byung Hyun, Jung, Mr. Woo Rae, Jo, FDC Co., Ltd.  
Mr. Tomáš Piontek, DNV Czech Republic

Responsible person: Ing. Petr Zapletal  
Deputy of the Laboratory

Date of issue: 05.09.2023

Elaborated by: Ing. Tomáš Štula, Ph.D.

Page: 1/9  
Number of annexes: 4+DVD

**PASSED**

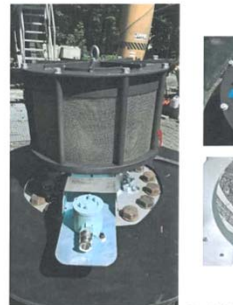
Test results mentioned in this test report relate to the items tested only and not replace any other documents. In any case the test report shall not be reproduced, except in full, without the written approval of laboratory. The laboratory shall not be responsible for information supplied by the customer and its possible effect the validity of results.  
Test results apply to the sample as received.

Physical-Technical Testing Institute, s.p., Písek 1337/7, 716 07 Ostrava-Radvanice  
tel.: +420 595 223 111, +420 604 203 525, e-mail: [ftzu@ftzu.cz](mailto:ftzu@ftzu.cz), internet: [www.ftzu.cz](http://www.ftzu.cz)

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After test ERD pictures:



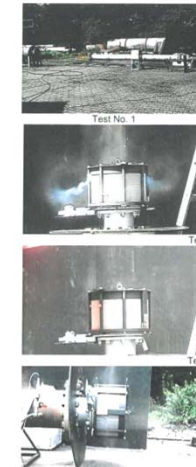
After Test No. 3

Test results mentioned in this test report relate to the items tested only and not replace any other documents. In any case the test report shall not be reproduced, except in full, without the written approval of laboratory. The laboratory shall not be responsible for information supplied by the customer and its possible effect the validity of results.  
Test results apply to the sample as received.

Physical-Technical Testing Institute, s.p., Písek 1337/7, 716 07 Ostrava-Radvanice  
tel.: +420 595 223 111, +420 604 203 525, e-mail: [ftzu@ftzu.cz](mailto:ftzu@ftzu.cz), internet: [www.ftzu.cz](http://www.ftzu.cz)

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Explosion pictures:

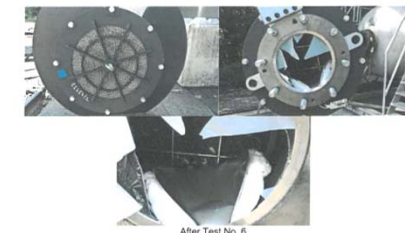


Test 6

Test results mentioned in this test report relate to the items tested only and not replace any other documents. In any case the test report shall not be reproduced, except in full, without the written approval of laboratory. The laboratory shall not be responsible for information supplied by the customer and its possible effect the validity of results.  
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After Test No. 6

Pictures of disassembled ERD:



Sample No. 22654/1 - After Test No. 4

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Test results apply to the sample as received.

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< FTZU TEST REPORT >



## 6. PRODUCT CERTIFICATE

### CE-ATEX Certificate

**EU - Type Examination Certificate**

(1) **Equipment and protective systems intended for use in potentially explosive atmospheres**

(2) **EU - Type Examination Certificate Number:**

**EPS 13 ATEX 1 577 X**

(4) **Equipment:** Burst sensor, type: KSB5-A, KSB5-B, KSB5-C

(5) **Manufacturer:** FDC CO., Ltd.

(6) **Address:** 89, Secho-ro 120beon-gil, Juchon-myeon, Gimhae-si, Gyeongsangnam-do, Korea

(7) This equipment and any acceptable variation thereto are specified in the documentation referred to.

(8) Bureau Veritas Consumer Products Services Germany GmbH, notified under 27 given in the Directive 2014/54/EU of the European Parliament and that this equipment has been found to comply with the essential health and safety requirements of the Directive. Further requirements of this Directive are given in Annex II of the Directive. The examination and test results are under the reference number 13TH0184.

(9) Compliance with the essential health and safety requirements has been verified.

**EN IEC 60079-0:2018**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is suitable for use in the presence of a flame front.

(11) This EU - Type Examination Certificate relates only to the design and construction of the equipment and its components. Further requirements of this Directive are given in Annex II of the Directive. The examination and test results are under the reference number 13TH0184.

(12) The marking of the equipment shall include the following:

KSB5-A, KSB5-B: II 2G Ex ib IIC T6 Gb  
KSB5-C: II 2G Ex ib IIC T135°C Db

KSB5-C-H1: II 2G Ex ib IIC T135°C Db

**Annex**

(13) **EU - Type Examination Certificate EPS 13 ATEX 1 577 X**

(14) **Description of equipment:**

Burst sensor (KSB5-A) installed in the upper side of Rupture Disc on When Rupture Disc is bursted by being over-pressure in Tank off which is shown throughout Monitoring Device.

Burst sensor (KSB5-B) installed with Rupture Disc is for rupture in Tank or Pipe. Sensor F1 throughout Monitoring Device.

Burst sensor (KSB5-C, KSB5-C-H1) integrated with Rupture Disc normally turned on. When Rupture Disc is being over-pressure in turned off which is shown throughout Monitoring Device.

**Electrical data**

Intrinsic safety parameters:

Gas			Dust		
UI	II	PI	UI	II	PI
20 V	0.309 A	1.55 W	20 V	0.250 A	
25 V	0.158 A	0.99 W	25 V	0.250 A	
30 V	0.101 A	0.76 W	30 V	0.250 A	

C: negligible  
L: negligible

(16) **Reference number:** 13TH0184

**EU - Type Examination Certificate EPS 13 ATEX 1 577 X**

**Revision 3**

(17) **Special conditions for safe use:**

The burst sensors have to be used with an intrinsically safe power supply.

The ambient temperatures for the corresponding temperature classes of type KSB5-C and KSB5-C-H1 are as follows:

Ambient temperature	Temperature class (gas)	T <sub>max</sub> for dust
-20 °C ≤ T <sub>amb</sub> ≤ +75 °C	T6	T80°C
-20 °C ≤ T <sub>amb</sub> ≤ +90 °C	T5	T100°C
-20 °C ≤ T <sub>amb</sub> ≤ +125 °C	T4	T135°C
-20 °C ≤ T <sub>amb</sub> ≤ +190 °C	T3	T200°C
-20 °C ≤ T <sub>amb</sub> ≤ +260 °C	T2	T300°C
Only KSB5-C-H1: -20 °C ≤ T <sub>amb</sub> ≤ +440 °C	T1	T450°C

(18) **Essential health and safety requirements:**

Met by compliance with standards.

Certification authority of explosion protection

Tuekheim, 2022-05-02

**PASSED**

< CE ATEX CERTIFICATE >

사 훈

정직·신뢰

We are making a company of  
trust with a unified heart.



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**Headquarters and 1st factory**

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