

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Fire Damper**

with type designation(s)

FDS(FGS)-P/E, FGS-A0-1, PFGD-A0SS-1, EFGD-A0-1, EFGD-A0SS-2, PFGD-A0MS-1, FGSM-A0-1 and FDR-P/E

Issued to

HI AIR KOREA Co., Ltd.
Gimhae-si Korea, Republic of Korea

is found to comply with

Det Norske Veritas' Offshore Standards**Det Norske Veritas' Rules for Classification of Ships****Det Norske Veritas' Interpretation of SOLAS 1974 Convention as Amended****Application :****Approved for use in ducts penetrating class A-0 decks/bulkheads.****Application/Limitation: see overleaf.**This Certificate is valid until **2019-06-30**.Issued at **Høvik** on **2015-09-24**DNV GL local station: **Gimhae**for **DNV GL**Approval Engineer: **Martin Gjelstad**

Petter Langnes
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Product description

"FDS(FGS)-P/E, FGS-A0-1, PFGD-A0SS-1, EFGD-A0-1, EFGD-A0SS-2, PFGD-A0MS-1, FGSM-A0-1 and FDR-P/E" are fire dampers with the following specifications:

"FDS(FGS)-P/E and FGS-A0-1 and PFGD-A0SS-1"

Pneumatic, electrical spring operated rectangular fire damper, with damper casing made of 3 mm (SS400 or stainless steel) or 5 mm (SS400) steel sheets for the minimum sized and maximum sized damper respectively. Damper blades are made of 2.5 mm stainless steel sheets (single skin) or 1.5 mm stainless steel sheets (double skin). The damper is fitted with automatic Actuator of "Type- SR52 to SR200" (from Valbia) with a thermo bulb trigger "JOB" type F-3 (fails at 68, 93 or 141 °C) and manual release.

The fire damper is to be bolted to the coamings with bolts at a maximum spacing of 150 mm apart, or fully welded.

The damper may alternatively be fitted with Actuator of type "SFU-S2" (from Belimo), "RedMax-5 10SF to 50SF" (from Schischek), "ExMax-5. 10SF to 50SF" (from Schischek), RS50-RS210 (from Emico) or "InMax-5. 10SF to 50SF" (from Schischek) and thermo bulb trigger of type "HAK-FB-01" (fails at 72 °C or 105 °C).

Approved sizes:

Type of damper	Insulation/Limitation	Min. size (W x H x L mm)	Max. Size (W x H x L mm)
FDS(FGS)-P/E multi-blade (6)	The damper coaming that penetrate through on exposed side, are to be insulated with approved A-60 insulation.	150 x 150 x 300	1200 x 1400 x 300
FDS(FGS)-P/E single-blade	The damper coaming that penetrate through on exposed side, are to be insulated with approved A-60 insulation.	150 x 150 x 300	150 x 150 x 300
FGS-A0-1 multi-blade (7)	No insulation. Only double skin (1.5 mm) damper blades.		1200 x 1400 x 300
PFGD-A0SS-1 multi-blade (7)	No insulation. Only double skin (1.5 mm) damper blades.		1200 x 1400 x 300

Length of coaming FDS(FGS)-P/E and FGS-A0-1: 675 mm.

Length of coaming PFGD-A0SS-1: 600 mm.

For further details, see the approved drawings listed below (page 5).

"EFGD-A0-1 and EFGD-A0SS-2"

Electrical spring operated rectangular fire damper, with damper casing made of 3 mm stainless steel sheets. Damper blades are made 1.5 mm stainless steel sheets (double skin). The damper is fitted with automatic Actuator of "BF24-T" (from Belimo) with a thermo bulb trigger "JOB" type F-3 (fails at 68, 93 or 141 °C) and manual release.

The fire damper is to be bolted to the coamings with bolts at a maximum spacing of 150 mm apart, or fully welded.

The damper may alternatively be fitted with Actuator of type "BF230-T" (from Belimo), "SFU-S2" (from Belimo), "RedMax-5 10SF to 50SF" (from Schischek), "ExMax-5. 10SF to 50SF" (from Schischek), or "InMax-5. 10SF to 50SF" (from Schischek).

Approved sizes:

Type of damper	Insulation/Limitation	Max. Size (W x H x L mm)
EFGD-A0-1 multi-blade (7)	No insulation. Only double skin (1.5 mm) damper blades.	1200 x 1400 x 300
EFGD-A0SS-2 multi-blade (7)	No insulation. Only double skin (1.5 mm) damper blades.	1200 x 1400 x 300

Length of coaming: 600 mm.

For further details, see the approved drawings listed below (page 5).

"PFGD-A0MS-1 and FGSM-A0-1"

Pneumatic operated rectangular fire damper, with damper casing made of 3-10 mm (stainless steel). The damper is fitted with one transvers and one longitudinal mullion. Damper blades are made 1.5 mm stainless steel sheets (double skin). The damper is fitted with automatic Actuator of "Type- SR52 to SR200" (from Valbia) with a thermo bulb trigger "JOB" type F-3 (fails at 68, 93 or 141 °C) and manual release.

The fire damper is to be bolted to the coamings with bolts at a maximum spacing of 150 mm apart, or fully welded.

The damper may alternatively be fitted with Actuator of type "RS50-RS210" (from Emico) and thermo bulb trigger of type "HAK-FB-01" (fails at 72 °C or 105 °C).

Approved sizes:

Type of damper	Insulation/additional information	Max. Size (W x H x L mm)
PFGD-A0MS-1 multi-blade (10)	No insulation. Only double skin (1.5 mm) damper blades.	2500 x 2100 x 300
FGSM-A0-1 multi-blade (10)	No insulation. Only double skin (1.5 mm) damper blades.	2500 x 2100 x 300

Length of coaming FGSM-A0-1: 675 mm.

Length of coaming PFGD-A0MS-1: 600 mm.

For further details, see the approved drawings listed below (page 5).

"FDR-P/E"

Pneumatic, electrical spring operated circular fire damper, with damper casing made of 3 mm or 5 mm (SS400) steel sheets for the minimum sized and maximum sized damper respectively, and damper blade (single skin) made of 3 mm (SS400) steel sheets. The damper is fitted with automatic (Actuator of "Type- SR52 to SR200" (from Valbia) with a thermo bulb triggers "JOB" type F-3 (fails at 68, 93 or 141 °C) or "HAK-FB-01" (fails at 72 °C or 105 °C) and manual release. The damper coaming that penetrate through on exposed side, are to be insulated with approved A-60 insulation. The fire damper is to be bolted to the coamings with bolts at a maximum spacing of 150 mm apart, or fully welded.

The damper may alternatively be fitted with Actuator of type " SFU-S2" (from Belimo), "RedMax-5 10SF to 50SF" (from Schischek), "ExMax-5. 10SF to 50SF" (from Schischek) or "InMax-5. 10SF to 50SF" (from Schischek).

Length of coaming: 675 mm.

Approved sizes:

Type of damper	Insulation	Min. size (D x L)	Max. Size (D x L)
FDR-P/E	The damper coaming that penetrate through on exposed side, are to be insulated with approved A-60 insulation.	100 x 280 mm	315 x 420 mm

For further details, see the approved drawings listed below (page 5).

Application/Limitation

The arrangement of the fire damper and necessary insulation of damper frame and ducting in the vicinity of the partition is subject to approval in each case.

The damper shall be capable of being closed from both sides of the bulkhead or deck.

Minimum distance between adjacent coamings should not be less than 200 mm.

Each product is to be supplied with its manual for installation, use and maintenance.

Type Approval documentation

Certification in accordance with Standard for Certification No. 1.2, Type Approval, January 2013.

Test reports:

No. 20040174,
No. 20040175,
No. 20040176 and
No. 20040177, all reports dated 23 June 2004.
No. AK2014-0001 (FGS-A0-1: deck) dated 17 February 2014,
No. AK2013-0475 (FGS-A0-1: bulkhead) dated 17 February 2014,
No. AK2014-0585 (PFGD-A0SS-1, bulkhead) dated 26 December 2014,
No. AK2014-0579 (PFGD-A0SS-1, deck) dated 17 December 2014,
No. AK2014-0578 (PFGD-A0MS-1, deck) dated 17 December 2014,
No. AK2014-0588 (PFGD-A0MS-1, bulkhead) dated 17 December 2014,
No. AK2013-0474 (FGSM-A0-1, bulkhead) dated 17 February 2014,
No. AK2014-0003 (FGSM-A0-1, deck) dated 17 February 2014,
No. AK2014-0589 (EFGD-A0SS-2, bulkhead) dated 17 December 2014,
No. AK2014-0682 (EFGD-A0SS-2, deck) dated 29 January 2015,
No. AK2014-0484 (EFGD-A0-1, bulkhead) dated 1 September 2014,
No. AK2014-0366 (EFGD-A0-1, deck) dated 1 September 2014.
All from Fire Insurers Laboratories of Korea (FILK), Gyeonggi-Do, Korea.

Job Id:
Certificate No: **TAF000002W**

No. KOMERI-0402-12T083 and
No. KOMERI-0402-12T084 both dated 8 May 2012 from Korea Marine Equipment Research Institute,
Busan, Korea.

Drawings:

FDS-P-1/FDS-E-1 Rev. No. 0 dated 17 October 2005 (General arrangement).
FDS-P-120140-1/FDS-E-120140-1 Rev. No. 0 dated 17 October 2005 (FDS-PE 1200x1400).
FDS-P-1515-1/FDS-E-1515-1 Rev. No. 0 dated 24 April 2004 (FDS-PE 150x150).
FDR-P-1/FDR-E-1 Rev. No. 0 dated 17 October 2005 (General arrangement).
FDR-P-315-1/FDR-E-315-1 Rev. No. 0 dated 17 October 2005 (FDR-PE ø315).
FDR-P-100-1/FDR-E-100-1 Rev. No. 0 dated 17 October 2005 (FDR-PE ø100).
FGS-A0-1 Rev. No. 0 (8 pages) dated 18 November 2013.
FGSM-A0-1 Rev. 0 (8 pages) dated 18 November 2013.
EFGD-A0-1 Rev. 0 (8 pages) dated 10 May 2014,
EFGD-A0SS-2 Rev. 0 (8 pages) dated 5 September 2014,
PFGD-A0SS-1 Rev. 0 (8 pages) dated 5 September 2014,
PFGD-A0MS-1 Rev. 0 (8 pages) dated 5 September 2014.
All drawings are from the manufacturer.

Tests carried out

Tested according to IMO 2010 FTP Code part 3, and according to IMO FTPC Part 3 and in compliance with
IMO 2010 FTP Code Ch. 8.

Marking of product

The product is to be marked with name of manufacturer, type designation and fire-technical rating.

Periodical assessment

DNV's surveyor is to be given permission to perform Periodical Assessments at any time during the
validity of this certificate and at least every second year. The arrangement is to be in accordance with
procedure described in Standard for certification No. 1.2 Type Approval Item 4.