



**BUREAU
VERITAS**

APPROVAL CERTIFICATE

M63077/21/MN/mn

IT FILE 21.IT.3989562.138

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TYPE APPROVAL CERTIFICATE

1. General:

Name and address of the factory: FIERRE S.r.l. – Via Vigentina 110B – 27100 - Pavia

Type(s) of product and component manufactured: FI-HEG HIGH EXP. FOAM GENERATOR

Type Tests witnessed on March 20, 2024 by M. Nicoletti

2. Type description:

- High Expansion Foam Generator **Model FI-HEG**
- EN13565
- Mixing ratio : 3%
- Fire fighting foam used : PROFREE 3F AR 3-3
- Burned substance : ACETONE

3. Conclusion:

After examination of the following documents:

- test reports for type approval n° M63023/24/MN/mn dated 20/03/2024

the undersigned, Inspector to Bureau Veritas, certifies that the above type meets the applicable requirements

This entire approval cycle remains valid as long as no significant changes are made to the audited facility, its production rate and its quality system. These conditions shall be assessed and certified once per year by means of a Factory Approval Audit.

This approval is an integral and indissociable part of the certification process managed by Bureau Veritas as defined in BV procedure GM SI 210.

Attachments:

- all the examined documents with BV "Reviewed" stamp,
- BV Report M63023/24/MN/mn

Inspected by:

Name: M. Nicoletti

Signature...

Date of issue: March 20, 2024

Expiring date: March 19, 2027

Inspection centre: BV Milan

Checked by:

Name: D. Zaina

Signature...





TEST REPORT FOR TYPE APPROVAL

1. General:

Name and address of the factory: FIERRE Srl – Via Vigentina 110B – 27100 - Pavia

Type(s) of product and component manufactured: FI-HEG HIGH EXP. FOAM GENERATOR

Factory Audit Report: ISO 9000 Certificate no. 11777/04/S issued by RINA Exp. 2025-10-12

Type Tests witnessed on March 20, 2024 by M. Nicoletti

2. List of examined documents:

- General Arrangement Dwg. FI-HEG 4
- High expansion foam test procedure No. 26072021
- EN13565

3. Observations and results:

- test conditions:
 - Mixing ratio 3%
 - Fire fighting foam used PROFREE 3F AR 3-3
 - Burned substance ACETONE
 - Local area 50,2 m²
 - Analysed test duration t = 98"
 - Pressure at the equipment 5 bar
 - Height of foam achieved 6,20 mt.
 - EN 13565 coefficients CN 1,15 - CL 1,2
 - Volume produced 263 mc/ 1'
 - Generator flow rate 400 lpm @ 5 bar
 - Expansion ratio 1:658
- Test Report No.: FI-HEG4-2024



Document No.:
M63023/24/MN/mn
IT FILE 24.SF.7709492.139
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TEST REPORT FOR TYPE APPROVAL

4. Conclusion:

At the request of the above manufacturer, made by its application dated March 20, 2024 and within the general conditions of service of Bureau Veritas and the applicable requirements of BV procedures, the above type test was performed and the results were found satisfactory.

Attachments:

- Test Report No.: FI-HEG4-2024

Inspected by:

Name: M. Nicoletti

Signature: 

Date of issue: March 20, 2024

Inspection centre: BV Milan

Checked by:

Name: D. Zaina

Signature: 



Distribution: ☒ CLIENT

☐ MANUFACTURER

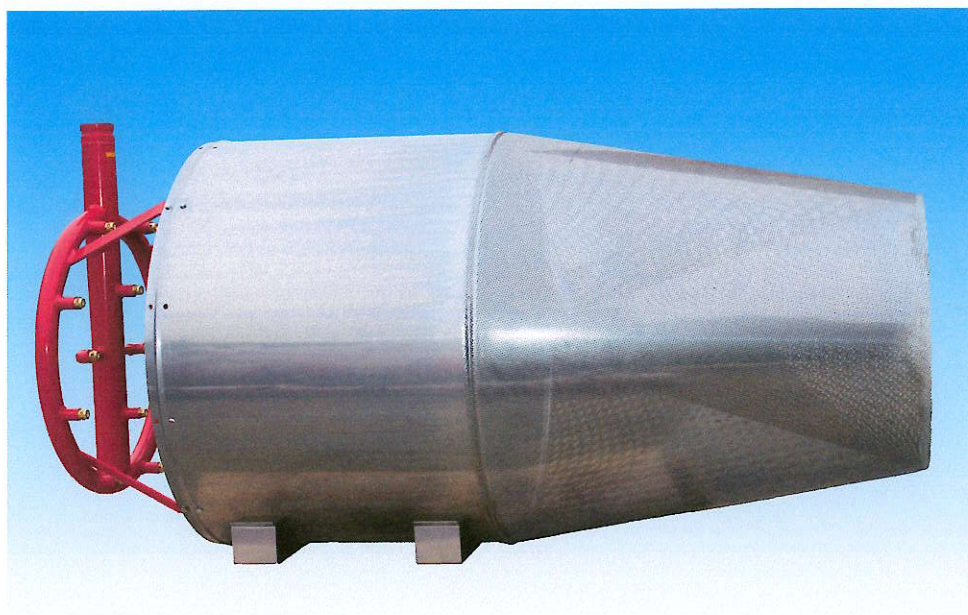
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Test Report No.: FI-HEG4-2024

TESTING PROCEDURES AND REPORTS HIGH EXPANSION FOAM GENERATOR Mod. FI-HEG 4

**Test witnessed by Bureau Veritas Inspector
Certificate n° M63022/24/MN/mn**



0	ISSUED	20-03-24	M.R.	M.R.	M.R.
REV.	DESCRIPTION	DATE	EDITED	VERIFIED	APPROVED

Fierre Srl

Registered Office and Administration: Via Vigentina 110/B – 27100 Pavia (PV)
VAT No. 01693540187 – Registered in Pavia company register under no. 1693540187
Tel +39 0382 957124 +39 0382 957125 Fax +39 0382 957126
E-Mail info@fierre.com info@pec.fierre.com Sito Web www.fierre.com

Test Report No.: FI-HEG4-2024

Introduction

This manual has been produced to test the correct operation of the high expansion foam generator model FI-HEG 4.

The test has been specifically carried out in an oversized area compared to the minimum size required by current standards, in order to simulate the actual conditions of a real installation, especially by taking into account a foam drop of 9 m high in order to assess the real impact of the extinguishing agent on the ground.

Test carried out in a Fire House of the following dimensions:

Area	6.65 x 7.55 Mt.
Height	9.990 Mt.
Height of installation	9.0 Mt.

The test has been carried out in compliance with the parameters of standards EN 13565-2, taking into account the volume to be saturated, including the multiplication factors CN and CL.

1 Hydraulic and Mechanical Tests

In compliance with standards EN 13565-1 ENCLOSURE "A" EN 13565 4.3.1, a hydrostatic tightness test at 16 bar for 60' has been carried out, followed by a mechanical tightness test at 36 bar for 1'. The tests have been successfully carried out on the manifold.



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Test Report No.: FI-HEG4-2024

2 Functional Tests

The first test carried out with water has specified the foam generator flow rate. With the second test carried out with foam, we have specified the equipment performance. The test has been carried out with hot and polluted air generated by acetone combustion.

Foam production, its correct mixing and the supply pressure have been tested with the following equipment:

- ✓ transit time flowmeter MANUFACTURER: BIEMME TECNOLOGIE INDUSTRIALI - MOD: TTFM100B-HH-NG - SERIAL NO.: 2018000011922
- ✓ Pressure meter MANUFACTURER: GEFRA – MOD: TK-E-1-M-B03D-M-V – TYPE: 2130X000X00
- ✓ Data recording PLC: MANUFACTURER: JUMO LOGOSCREEN nt – MOD: B 706581.1

The test have been carried out by continually recording the flow rate and pressure values by using TV cameras located inside different parts of the rooms. The video recordings have not been included in this report but can be viewed in Fierre S.r.l. offices.

3 Test Result

Flow rate test:

Pressure (bar)	Flow rate (lpm)	K (lpm@1bar)
5	400	178,89



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Test Report No.: FI-HEG4-2024

Foam expansion test:

Mixing ratio	3%
Fire fighting foam used	PROFREE 3F AR 3-3
Burned substance	ACETONE
Local area	50,2 m ²
Analysed test duration	t = 98''
Pressure at the equipment	5 bar (records and chart file enclosed)
Height of foam achieved	6,20 mt.
EN 13565 coefficients	CN 1,15 CL 1,2
Volume produced	263 Mc / 1'
Generator flow rate	400 lpm @ 5 bar
Expansion ratio	1:658

4 Conclusion

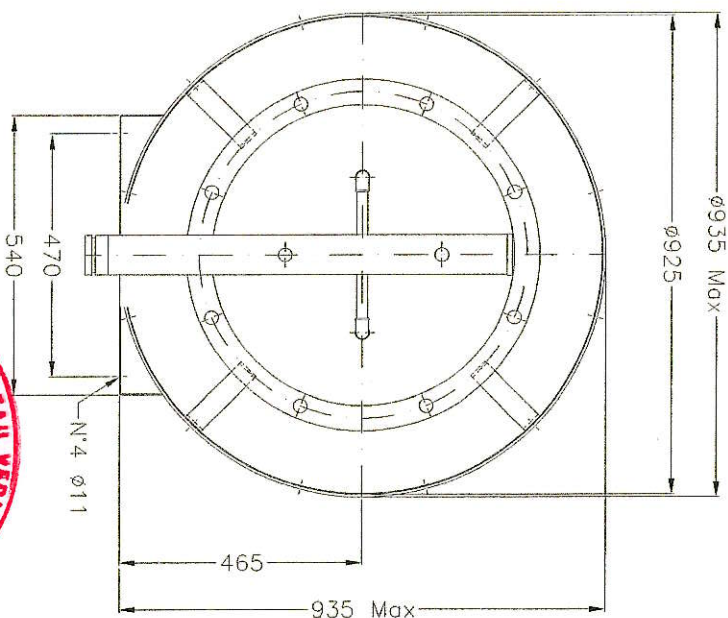
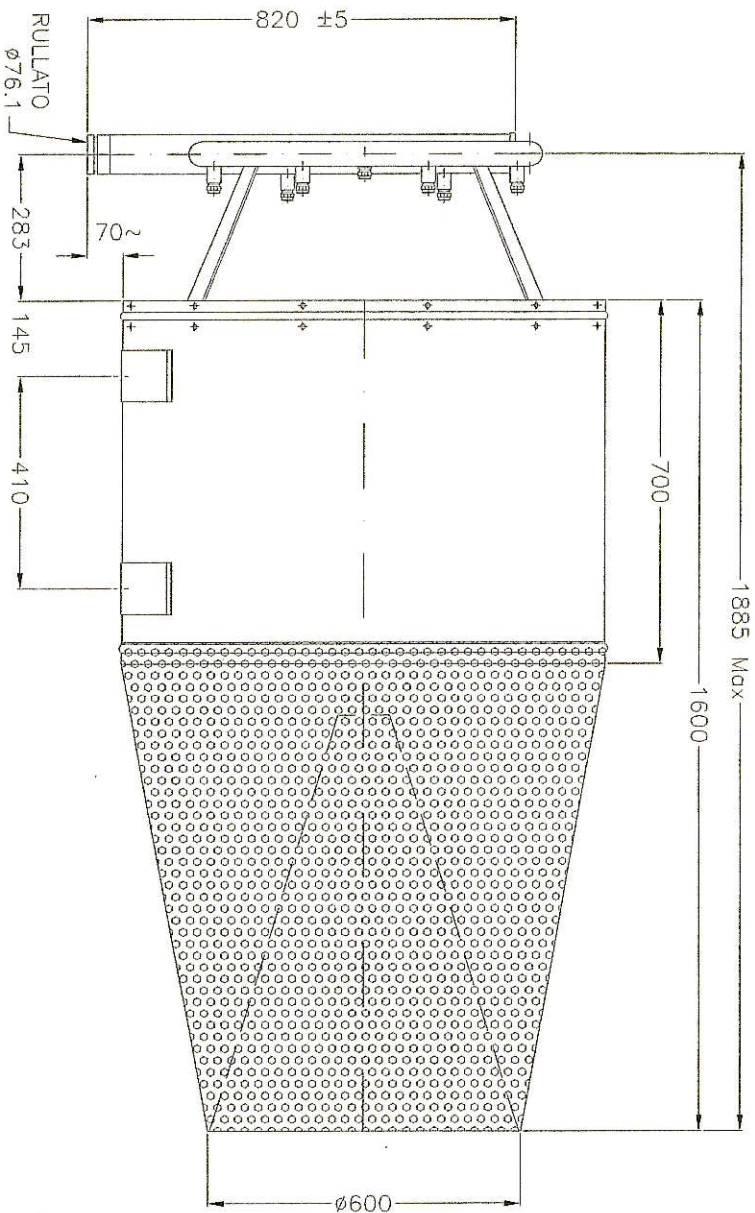
In date 20-03-2024, thanks to the presence of Bureau Veritas Inspector as witnessed Notified Body, we declare that the high expansion foam generator mod. FI-HEG 4 with a flow rate of 400 lt/min at 5 bar, performed an expansion ratio of 1:658 aspirating hot and polluted air generated by acetone combustion. Used foam concentrate has been PROFREE 3F AR 3-3 mixed at a 3%.

The above data has been obtained by applying standards EN 13565-1 and 13565-2

5 Enclosures

- ✓ Continuous pressure reading (the discharge seconds are shown in green)
- ✓ Pressure chart
- ✓ System sketch





CARATTERISTICHE TECNICHE

Technical characteristic

CORPO : ACCIAIO INOX

Body : Stainless Steel

CONO EROGATORE : ACCIAIO INOX

Delivery cone : Stainless Steel

SUPPORTI : ACCIAIO INOX

Supports : Stainless Steel

COLLETTORE ALIMENTAZIONE : ACCIAIO AL CARBONIO

Feeding Reiser : Carbon Steel

UGELLI : OTTONE - (N°8 HEG-2) - (N°10 HEG-3) - (N°10 CPD2940 + N°2 CPD2740 HEG-4)

Nozzles : Brass - (N°8 HEG-2) - (N°10 HEG-3) - (N°10 CPD2940 + N°2 CPD2740 HEG-4)

CONNESSIONE : FLANGIA PN16 / FILETTATURA Gas / RULLATURA Ø76

Connection : Flange PN16 / Threaded Gas / Grooved Ø76

PESO TOTALE TEORICO : 60 Kg.

Theoretic total weight : 60 Kg.

VERNICIATURA SOLO CROCCERA PORTA UGELLI : ROSSO RAL 3000 Sp.=>100 Micron

Painting, only feeding reiser : Red RAL 3000 Thk.=>100 Micron

QUANTITA' RICHIESTA : N° PEZZ
Required quantity : N° piece
PORTATA/DELIVERY : (400 Lt./min @ 5 Bar HEG-4)

TITOLO: GENERATORE AD ALTA ESPANSIONE MOD. FI-HEG
Object: MOD. FI-HEG HIGH EXPANSION GENERATOR

REV. N°	DESCRIZIONE/DESCRIPTION	DISSEGNO/DR.N.	D.L.	R.M.	DATA/DATE
0	EMESSO PER INFORMAZIONE	-	-	-	-
CLIENTE:	DISSEGNO/DR.N.	CONTRATTO/CK.D.	SCALA/SCALE	APPROVATO/APP.D.	DATA/DATE
Customer:	CONTRATTO/CK.D.	D.L.	COMM. N°/JOB N°	FORMATO/SIZE	A3
-	APPROVATO/APP.D.	R.M.	ORD. N°	-	-
-	DATA/DATE	-	DS. N°/DWG N°	-	-

PIERRE

S.R.L.

VIA VICENTINA N° 110 B
27100 PAVIA - ITALY

Le misure sono espresse in mm / All the dimensions are in mm MATERIELE: equivalente o superiore di tipo indicato / MATERIAL: equivalent or superior as the type indicated	LAUBRAZIONI MECCANICHE	FINO A/UP TO 315	> 315 < 1000	> 1000 < 2000	> 2000 < 4000	OLTRE/OVER 4000	RICETTA/PLANE AREA 125/250 MMH
MACCHINING	± 0.1	± 0.3	± 1.2	± 2	± 3	± 5	ANIS ORIENT SURFACE FINISHES 125/250 MMH
CARATTERI/CARACTERITY	FINO A/UP TO 1000 ± 1	OLTRE/OVER ± 1.5 x 10 METRO	AMCQU/ANGLES	FINO A/UP TO 6 ± 1.1	> 6 < 30 ± 10	> 30 < 120 ± 20	OLTRE/OVER 30

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ROSSO - 0.5 | GRIGIO - 0.18 | VERDE - 0.35 | CAVIO - 0.7 | BLU - 0.15 | MAGENTA - 0.25 | BIANCO - 0.25 | 8 - 0.09 | 9 - 0.09