



Marine & Offshore

Certificate number: 18429/D1 BV

File number: ACM220/0302/003

Product code: 7309I

*This certificate is not valid when presented without the full attached schedule composed of 7 sections*

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## TYPE APPROVAL CERTIFICATE

*This certificate is issued to*

**Advanced Flow Solutions Inc., d/b/a Corken**  
Oklahoma City, OK - UNITED STATES OF AMERICA

*for the type of product*

**GAS COMPRESSOR**

Single stage, double acting, vertical gas compressor, type "891"

**Requirements:**

BUREAU VERITAS Rules for the Classification of Steel Ships NR467, Pt D, Ch 9, Sec 4  
IMO IGC code

*This certificate is issued to attest that 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: 25 Aug 2027**

**For Bureau Veritas Marine & Offshore,**

At BV PORT EVERGLADES CENTRE, on 28 Oct 2024,

Flavio Rosas

***This certificate was created electronically and is valid without signature***



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) 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) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said 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.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 3 page(s)

## THE SCHEDULE OF APPROVAL

### 1. PRODUCT DESCRIPTION :

Single stage, double acting, vertical gas compressors, type "891"

#### Design features:

		FD891	FT891
Inlet		2" Class 300 RF Flange	2" Class 300 RF Flange
Outlet		2" Class 300 RF Flange	2" Class 300 RF Flange
Bore of cylinder		4.5 in (113 mm)	4.5 in (113 mm)
Stroke		4.0 in (101.6 mm)	4.0 in (101.6 mm)
Piston displacement	Minimum at 400 RPM	56.6 cfm (96.2 m <sup>3</sup> /hr)	56.6 cfm (96.2 m <sup>3</sup> /hr)
	Maximum at 850 RPM	120.3 cfm (204.4 m <sup>3</sup> /hr)	120.3 cfm (204.4 m <sup>3</sup> /hr)
Maximum working pressure		450 psia (32.1 bar)	450 psia (32.1 bar)
Minimum drive power		45 hp 33.6 kW	45 hp 33.6 kW
Maximum road load		7000 lbf (3175 kg)	7000 lbf (3175 kg)
Minimum design temperature		-20°F (-28.9°C)	-20°F (-28.9°C)
Maximum outlet temperature		350 °F (177 °C)	350 °F (177 °C)

#### Materials:

Head, cylinder and cylinder cap	Ductile Iron ASTM A536
Crosshead guide, crankcase	Gray iron ASTM A48, Class 30
Flange	ASTM A36 carbon steel
Piston rod	1045 steel, Nitrotec
Piston	Ductile iron ASTM A536

### 2. DOCUMENTS AND DRAWINGS :

2.1 - As per the Manufacturer's documentation:

- Model FD/FT891: Installation, Operation & Maintenance Manual "D and T-Style Double-Acting Gas Compressors", ref. IJ110H dated September 2022.

2.2 - As per the Manufacturer's drawings (outline dimensions):

- N° 703-BV dated 17 August 2022 (model FD891)
- N° 704-BV dated 17 August 2022 (model FT891)

2.3 - FEA Analysis:

- Simulation of 4851 dated April 8, 2022

2.4 - Charpy impact testing justification n°P06-000 revision A dated 07/08/2021

### 3. TEST REPORTS :

None.

**4. APPLICATION / LIMITATION :**

4.1 - The compressors type "FD891" may be used on Liquefied Gas Tankers for the following gases:  
Propane, Butane, hydrocarbon mixtures\* (LPG), Butylene, Isobutylene and Propylene.

4.2 - The compressors type "FT891" may be used on Liquefied Gas Tankers for the following gases:  
Propane, Butane, hydrocarbon mixtures\* (LPG), Butylene, Isobutylene, Propylene, Ammonia (anhydrous), Vinyl Chloride Monomer, 1,2-Butadiene (stabilized), 1,3-Butadiene (stabilized), Butadiene (stabilized) or Butadienes, Isoprene (stabilized), Isobutane (with 0.1% or more 1,3-Butadiene), Trimethylamine (anhydrous).

\*Hydrocarbon mixtures defined as mixtures of Propane and Butane in any proportions

4.3 - **ADVANCED FLOW SOLUTIONS INC., D/B/A CORKEN** requirements are to be considered for toxic and/or suffocating gases when the compressor is installed in spaces with ventilation not specifically designed to keep the gas concentration below safe levels for human exposure.

4.4 - The compressors type "891" are suitable for non-cryogenic use (running temperature not below -20°F (-28°C)).

**5. PRODUCTION SURVEY REQUIREMENTS :**

5.1 - The vertical gas compressors type "891" are to be supplied by **ADVANCED FLOW SOLUTIONS INC., D/B/A CORKEN** in compliance with the type and the requirements described in this certificate.

5.2 - This type of product is within the category IBV of Bureau Veritas Rule Note NR320.

5.3 - BV product certificate is required.

5.4 - Manufacturing processes of the cast irons are to be approved by BV based on ASTM standards and a testing program considering the relevant requirements of the IMO Guidelines MSC.1/Circ.1622 and the BV NR 480.

5.5 - For information, **ADVANCED FLOW SOLUTIONS INC., D/B/A CORKEN** has declared to Bureau Veritas the following production site:

**ADVANCED FLOW SOLUTIONS INC., D/B/A CORKEN**  
**9201 N. I-35 Service Rd. Oklahoma City, OK 73131**  
**UNITED STATES OF AMERICA**

**6. MARKING OF PRODUCT :**

The product or packing is to be marked with Manufacturer name, type, designation and Bureau Veritas' Marks.

**7. OTHERS :**

7.1 - It is **ADVANCED FLOW SOLUTIONS INC., D/B/A CORKEN**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

7.2 - This Certificate supersedes the Type Approval Certificate N° 18429/D0 BV issued on 06/03/2023 by the Society.

\*\*\* END OF CERTIFICATE \*\*\*