



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **M-12357**

This is to certify that the
Refrigerant Compressor

with type designation(s)
CMO 24, CMO 26, CMO 28, CMO 34, CMO 36, CMO 38, TCMO 28, TCMO 38, , HPO 24, HPO 26, HPO 28

Manufactured by
Johnson Controls Denmark ApS
Højbjerg, Denmark

is found to comply with
Det Norske Veritas' Rules for Classification of Ships

Application

Type CMO 24, CMO 26, CMO 28, CMO 34, CMO 36, CMO 38, TCMO 28, TCMO 38	Max. working press.: HP (discharge side) : 28 bar LP (suction side) : 20 bar	Operating media R22, R134A, R290, R404A, R407C, R600A, R717, R1270
HPO 24, HPO 26, HPO 28	HP (discharge side) : 50 bar LP (suction side) : 25 bar	R744, R507

This Certificate is valid until **2017-12-31**.

Issued at **Høvik** on **2013-08-21**

DNV local station: **Aalborg**

Approval Engineer: **Svein-Olav Hannevik**

for **Det Norske Veritas AS**

Torbjørn Lie
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.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.

Product description

Reciprocating compressors

One stage, 4 cyl. CMO 24, CMO 34 and HPO 24
 One stage, 6 cyl. CMO 26, CMO 36 and HPO 26
 One stage, 8 cyl. CMO 28, CMO 38 and HPO 28
 Two stages, 6LP cyl. + 2 HP cyl. TCMO 28 and TCMO 38

Application/Limitation

	Max working pressure [bar]		
	Discharge side	Suction side	Operating media
CMO	28	20	R22, R134A, R290, R404A, R407C, R600A, R717, R1270
HPO	50	25	R744, R507

Type Approval documentation

Drawing No.	Rev.	Title
3121-366	5	Crank Shaft for CMO 34 Machined
3121-367	5	Crank Shaft for CMO 36 Mk3 Machined
3121-379	2	Crank Shaft for CMO/HPO 24 Machined
3121-380	4	Crank Shaft for CMO/HPO 26 Machined
3121-381	4	Crank Shaft for CMO/HPO 28 Machined
3121-397	3	Crank Shaft SMC/HPC 104 S Machined
3121-398	3	Crank Shaft SMC/HPC 106 S Machined
3121-399	5	Crank Shaft SMC/HPC 108S Machined

Marking of product

The product to be marked with manufacturer's name or trademark and type number identification.

Periodical Assessment

For retention of the Type Approval, a DNV surveyor shall perform a survey every second year and before the expiry date of this certificate to verify that the conditions of the type approval are complied with.

The objective of the Periodical Assessment is to verify that the conditions for the Type Approval are not altered since the Type Approval Certificate was issued. The main scope of the Periodical Assessment will normally include:

- Verification of the Type Approval applicant's production and quality system w.r.t. ensuring continued consistent production of the Type Approved products at the Type Approval applicant's own premises and at other companies that are given the responsibility for manufacturing of the products.
- Review of the Type Approval documentation and that this is still used as basis for the production
- Review of possible changes to the design, the material and the performance of the product
- Verification of the product marking.

In cases where the Type Approved product is manufactured at other companies, the Periodical Assessment shall verify that the Type Approval applicant has a quality control system for consistent production at their licensees/subcontractors. Furthermore Periodical Assessment shall be carried out randomly at these companies.

When a Type Approved product is manufactured at other companies, the Type Approval applicant takes the sole responsibility for the conformity of the product to the applicable requirements.

Other conditions

The approval does not include driving member, controller unit or connected instrumentation.

END OF CERTIFICATE