



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **M-12356**

This is to certify that the
Refrigerant Compressor

with type designation(s)
SMC 104 S/L/E, 106 S/L/E, 108 S/L/E, 112 S/L/E, 116 S/L/E, TSMC 108 S/L/E, 116 S/L/E, SMC 100 MK 4 series, HPC 104/106/108

Manufactured by
Johnson Controls Denmark ApS
Højbjerg, Denmark

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

Application
Refrigeration piston compressors

Type
SMC 104 S/L/E, 106 S/L/E, 108 S/L/E, 112 S/L/E, 116 S/L/E, TSMC 108 S/L/E, 116 S/L/E, SMC 100 MK 4 series
HPC 104/106/108

Max. working press.:
discharge side: 28 bar,
suction side: 20 bar

Operating media
R22, R134A, R290, R 404A, R407C,
R507, R600A, R717, R1270

discharge: 40bar ,
suction:25 bar

R22, R134A, R290, R 404A, R407C,
R507, R600A, R717, R1270, R744

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

Refrigerant piston compressors

One stage:

SMC 100 MK 4 series
 SMC 104L (4 cyl.)
 SMC 106L (6 cyl.)
 SMC 108L (8 cyl.)
 SMC 112L (12 cyl.)
 SMC 116L (16 cyl.)
 SMC 104E (4 cyl.)
 SMC 106E (6 cyl.)
 SMC 108E (8 cyl.)
 SMC 112E (12 cyl.)
 SMC 116E (16 cyl.)
 SMC 104S (4 cyl.)
 SMC 106S (6 cyl.)
 SMC 108S (8 cyl.)
 SMC 112S (12 cyl.)
 SMC 116S (16 cyl.)
 HPC 104
 HPC 106
 HPC 108

Two stage:

TSMC 108L (8 cyl.)
 TSMC 116L (16 cyl.)
 TSMC 108S (6LP cyl. + 2HP cyl.)
 TSMC 116S (12LP cyl. + 4HP cyl.)

Application/Limitation

	Max working pressure [bar]		
	Discharge side	Suction side	
SMC	28	20	R22, R134A, R290, R404A, R407C, R507, R600A, R717, R1270
TSMC	28	20	R22, R134A, R290, R404A, R407C, R507, R600A, R717, R1270
HPC	40	25	R22, R134A, R290, R404A, R407C, R507, R600A, R717, R1270, R744, R507

Type Approval documentation

Drawing No.	Rev.	DNV No.	Title
3121-244	9	58	Crank Shaft SMC 106 E, Cyl. Shaft end, machined
3121-247	5	59	Crank Shaft SMC 108 E, Cyl. Shaft end, machined
3121-250	6	60	Crank Shaft SMC 112 E, Cyl. Shaft end, machined
3121-253	10	61	Crank Shaft SMC 116 E, Cyl. Shaft end, machined
3121-256	4	62	Crank Shaft SMC 104 E, Cyl. Shaft end, machined
3121-260	10	63	Crank Shaft for T/CMO 38 Machined
3121-271	9	64	Crank Shaft SMC 112S, Cyl. Shaft end, machined
3121-275	8	65	Crank Shaft SMC 116S, Cyl. Shaft end, machined
3121-278	4	66	Crank Shaft SMC 104L, Cyl. Shaft end machined

3121-281	4	67	Crank Shaft SMC 106L, Cyl. Shaft end machined
3121-284	5	68	Crank Shaft SMC 108L, Cyl. Shaft end machined
3121-287	6	69	Crank Shaft SMC 112L, Cyl. Shaft end machined
3121-290	8	70	Crank Shaft SMC 116L, Cyl. Shaft end, Machined
3121-397	3	76	Crank Shaft SMC/HPC 104 S Machined
3121-398	3	77	Crank Shaft SMC/HPC 106 S Machined
3121-399	5	78	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