

TYPE APPROVAL CERTIFICATE

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 5 series, , HPC 104/106/108

Issued to

**Johnson Controls Denmark ApS
 Højbjerg, Denmark**

is found to comply with

DNV GL rules for classification – Ships

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Type	Max. working press.:	Operating media
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 5 series	discharge side: 28 bar, suction side: 20 bar	R22, R134A, R290, R404A, R407C, R507, R600A, R717, R1270
HPC 104/106/108	discharge: 40bar , suction:25 bar	R22, R134A, R290, R404A, R407C, R507, R600A, R717, R1270, R744

Issued at **Høvik** on **2018-11-16**

for **DNV GL**

This Certificate is valid until **2022-12-31**.

DNV GL local station: **Aalborg**

Approval Engineer: **Amir Dzaferi**

**Oddvar Deinboll
 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.



Job Id: **262.1-006948-8**
 Certificate No: **TAM00000V0**
 Revision No: **1**

Product description

Refrigerant piston compressors

One stage:

SMC 100 MK 5 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 (4 cyl.)
 HPC 106 (6 cyl.)
 HPC 108 (8 cyl.)

Two stage:

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

Application/Limitation

Compressor types	Max working pressure [bar]		Operating media
	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

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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 GL surveyor shall perform an assessment after 2 years and after 3.5 years, to verify that the conditions of the type approval are complied with. A renewal assessment will be performed at renewal of the certificate.

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.

Other conditions

- The type approval is valid for compressor only. The approval does not cover driving member, control system, connected instrumentation and other connected components.
- Refrigerating compressors shall satisfy the requirements given in DNV GL rules for ship, Pt.6 Ch.4 Sec.10.

END OF CERTIFICATE