

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Generator

with type designation(s)

**Type UCM 224, 274, HCM 434, 534, 634 and
PM734A/B/C/D/E/F and G 3 phases, 4 poles, single or 2 bearings
brushless A.C. generator.**

Issued to

**Cummins Generator Technologies
STAMFORD, United Kingdom**

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

**Product(s) approved by this certificate is/are accepted for installation on all vessels classed
by DNV GL.**

Enclosure class	IP 23
Insulation class	H
Temp. class	H, F or B
Voltage class	Up to 690 V
Power class	Up to 2245 kVA
Frequency class	50 or 60 Hz
Speed	1500 or 1800 RPM

This Certificate is valid until **2020-11-18**.

Issued at **Høvik** on **2017-01-05**

DNV GL local station: **Manchester**

Approval Engineer: **Nicolay Horn**

for **DNV GL**

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Andreas Kristoffersen
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:
Certificate No: **TAE000018X**

Product description

I) Type UCM 224 and 274, HCM 434, 534 and 634
phases, 4 poles, single or 2 bearings brushless A.C. generator.

Enclosure material:	Frame size 22 & 27 structure - sheet metal covers Frame size 4,5 and 6 : Steel plate
Enclosure class:	IP 23
Winding insulation:	Class H
Temperature rise limits:	Class B, Class F or Class H
Voltage class:	Up to 690 V
Power class:	Up to 1347 kVA (See Stamford Rating Book)
Frequency class:	50 or 60 Hz
Speed:	1500 or 1800 RPM

UC 22 / 27 Rating by Class F at 60 Hz (1800 R/min) Max*

Frame Size	kVA (380V)	kW (380V)	kVA (440V)	kW (440V)	kVA (600V)	kW (600V)	kVA (690V)	kW (690V)
UCM 224C	43.1	34.5	41.9	33.5	43.1	34.5	N/A	N/A
UCM 224D	51.3	41	50	40	51.3	41	N/A	N/A
UCM 224E	56.3	45	56.3	45	58.8	47	N/A	N/A
UCM 224F	68.8	55	68.8	55	71.9	57.5	N/A	N/A
UCM 224G	81.3	65	78.8	63	81.3	65	N/A	N/A
UCM 274C	93.8	75	92.5	74	95	76	N/A	N/A
UCM 274D	107.5	86	110	88	112.5	90	N/A	N/A
UCM 274E	125	100	131.3	105	137.5	110	125	100
UCM 274F	147.5	118	156	124.8	163	130.4	N/A	N/A
UCM 274G	166	132.8	186	148.8	181	144.8	N/A	N/A
UCM 274H	200	160	212.5	170	218.8	175	202	161.6
UCDM 274K	N/A	N/A	265	212	N/A	N/A	N/A	N/A

HC4 Rating by Class F at 60 Hz (1800 R/min) Max*

Frame Size	kVA (380V)	kW (380V)	kVA (440V)	kW (440V)	kVA (600V)	kW (600V)	kVA (690V)	kW (690V)
HCM 434C	250	200	245	196	255	204	265	212
HCM 434D	270	216	270	216	295	236	285	228
HCM 434E	N/A	N/A	325	260	345	276	320	256
HCM 434F	395	316	375	300	395	316	400	320

HC5 Rating by Class F at 60 Hz (1800 R/min) Max*

Frame Size	kVA (380V)	kW (380V)	kVA (440V)	kW (440V)	kVA (600V)	kW (600V)	kVA (690V)	kW (690V)
HCM 534C	410	328	450	360	460	368	460	368
HCM 534D	506	405	488	390	531	425	502	402
HCM 534E	555	444	588	470	590	472	606	485
HCM 534F	663	530	644	515	663	530	627	502

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HC6 Rating by Class F at 60 Hz (1800 R/min) Max*

Frame Size	kVA (380V)	kW (380V)	kVA (440V)	kW (440V)	kVA (600V)	kW (600V)	kVA (690V)	kW (690V)
HCM 634G	731	585	763	610	819	655	800	640
HCM 634H	814	651	863	690	863	690	N/A	N/A
HCM 634J	1038	830	988	790	1063	850	N/A	N/A
HCM 634K	1135	908	1113	890	1181	945	1218	974

II) Type PM734A/B/C/D/E/F and G, 3 phases, 4 poles, brushless A.C. generator.

Enclosure class:	IP 23
Winding insulation:	Class H
Temperature rise limits:	Class B, Class F or Class H
Voltage class:	190 to 690 V
Power class:	Up to 2245 kVA
Frequency class:	50 or 60 Hz
Speed:	1500 or 1800 RPM

Rating by class F at 60 Hz (1800 R/min) Star*

Frame Size	kVA (416V)	kW (416V)	kVA (440V)	kW (440V)	kVA (480V)	kW (480V)	kVA (690V)	kW (690V)
PM 734A	1015	812	1100	880	1170	936	1145	916
PM 734B	1110	888	1170	936	1280	1024	1270	1016
PM 734C	1390	1112	1480	1184	1540	1232	1500	1200
PM 734D	1480	1184	1580	1264	1645	1316	1580	1264
PM 734E	1690	1352	1800	1440	1875	1500	1675	1340
PM 734F	1910	1528	2035	1628	2120	1696	1925	1540
PM 734G	2020	1616	2155	1724	2245	1796	NA	NA

Application Limitation

In order to comply to IP23 enclosure, air outlets louvers are to be fitted.

The following derating from the standard ratings shall be made if the following configuration is made: Air inlet filter fitted: Derate by 5 %.

The generators listed in this Type Approval Certificate are including MX321 Automatic Voltage Regulator. If other AVR's are used test according to DNV GL Rules Pt.4 Ch.8 Sec.5 Table 2, item 4 and 7 must be performed for the actual application.

End user / system responsible must insure that the generator including the voltage regulator fulfills the DNV GL Rules Pt.4 Ch.8 Sec. 5 2.2. The adjustment of the AVR (I_{exc} max, droop, U/f, kneepoint) to be checked during commissioning on board.

This type approval certificate does not replace the requirement to DNV GL Product Certificate for units ≥ 300 kVA.

Type Approval documentation

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Tests carried out

Temperature at full load, High voltage, Insulation resistance, Overspeed, Winding resistance, Air gap, Overload, Excitation voltage, Voltage regulation and vibration (self excited).

Marking of product

Stamford – AC Generators from Cummins Generators Technologies – Type designation – Size.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection of factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Assessment to be performed at after **2 years** and after **3,5 years**.

END OF CERTIFICATE