

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Generator**

with type designation(s)
ECO38, -40, -43, -46 and ECP32, -34, 3 phases, 4 poles, single or double bearings, brushless A.C. generator.

Issued to

M.E.C.C. ALTE S.P.A.
CREAZZO VI, Italy

is found to comply with
DNV GL rules for classification – Ships and offshore units

Application :

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

Enclosure class	IP 23(IP45)
Insulation class	H
Temp. class	B, F or H
Voltage class	Up to 690 V (star connection)
Power class	Up to 3226 kVA
Frequency class	50 or 60 Hz
Speed	1500 or 1800 RPM

This Certificate is valid until **2021-06-23**.

Issued at **Høvik** on **2017-02-15**

DNV GL local station: **Venice**

Approval Engineer: **Nicolay Horn**

for **DNV GL**

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.

Certificate No: **TAE000017N**
 File No: **821.10**
 Job Id: **262.1-006761-4**

Name and place of manufacturer

M.E.C.C. ALTE S.P.A.
 CREAZZO VI, Italy

M.E.C.C. ALTE U.K. Ltd. Oakham, Rutland,
 United Kingdom

Product Description

ECO38, -40, -43, -46 and ECP32, -34, 3 phases, 4 poles, single or double bearings, brushless A.C. generator.

Enclosure class:	IP 23 or IP 45
Winding insulation:	Class H
Temperature rise limits:	Class B, F or H
Voltage class:	Up to 690 V (star connection)
Power class:	Up to 3226 kVA
Frequency class:	50 or 60 Hz
Speed:	1500 or 1800 RPM

Rating class H: [kVA] Amb 45°C								
Type	50 Hz			60 Hz				
	380 V	400 V	415 V	440 V	450 V	460 V	480 V	690 V
ECP32 2S4	33,6	33,6	33,6	40,3	40,3	40,3	40,3	40,3
ECP32 3S4	40,8	40,8	40,8	49	49	49	49	49
ECP32 1M4	48	48	48	57,6	57,6	57,6	57,6	57,6
ECP32 2M4	60	60	60	68,6	70,6	72,6	72,6	72,6
ECP32 3L4	72	72	72	82,3	84,4	86,4	86,4	86,4
ECP32 4L4	76,8	76,8	76,8	88	90	92	92	92
ECP34 1S4	81,6	81,6	81,6	97,9	97,9	97,9	97,9	97,9
ECP34 2S4	101	101	101	121	121	121	121	121
ECP34 1L4	130	130	130	144	150	156	156	156
ECP34 2L4	144	144	144	163	168	173	173	173
ECP34 3L4	149	154	154	177	180	184	184	184
ECO38 1S4	173	173	173	211	211	211	211	211
ECO38 2S4	192	192	192	230	230	230	230	230
ECO38 3S4	216	216	216	259	259	259	259	259
ECO38 1L4	230	240	230	288	288	288	288	288
ECO38 2L4	278	288	288	326	336	346	346	346
ECO38 3L4	336	336	336	403	403	403	403	403
ECO40 1S4	384	384	384	432	446	461	461	461
ECO40 2S4	432	432	432	490	504	518	518	518
ECO40 3S4	480	480	480	557	566	576	576	576
ECO40 1L4	528	528	518	605	619	634	634	634
ECO40 1.5L4	595	595	595	672	693	714	714	714
ECO40 2L4	653	653	653	749	766	783	783	783
ECO40 VL4	720	720	720	864	864	864	864	864
ECO43 1S4	768	768	768	922	922	922	922	922
ECO43 2S4	893	893	893	1018	1044	1071	1071	1071
ECO43 1M4	984	984	984	1181	1181	1181	1181	1181
ECO43 2M4	1104	1104	1008	1248	1296	1344	1344	1344
ECO43 2L4	1248	1248	1248	1423	1460	1498	1498	1498
ECO43 VL4	1344	1344	1344	1613	1613	1613	1613	1613

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Rating class H: [kVA] Amb 45°C								
Type	50 Hz			60 Hz				
	380 V	400 V	415 V	440 V	450 V	460 V	480 V	690 V
ECO46 1S4	1440	1440	1440	1650	1690	1730	1730	1730
ECO46 1.5S4	1584	1584	1584	1804	1852	1900	1900	1900
ECO46 2S4	1730	1730	1730	1970	2020	2080	2080	2080
ECO46 1L4	2016	2016	2016	2300	2360	2420	2420	2420
ECO46 1.5L4	2208	2208	2208	2515	2580	2650	2650	2650
ECO46 2L4	2400	2400	2400	2730	2800	2880	2880	2880
ECO46 VL4	2592	2688	2592	2956	3043	3131	3226	3226

Rating class F: [kVA] Amb 45°C								
Type	50 Hz			60 Hz				
	380 V	400 V	415 V	440 V	450 V	460 V	480 V	690 V
ECP32 2S4	30,8	30,8	30,8	37	37	37	37	37
ECP32 3S4	37,4	37,4	37,4	45	45	45	45	45
ECP32 1M4	44	44	44	52,8	52,8	52,8	52,8	52,8
ECP32 2M4	58,2	58,2	58,2	62,9	64,7	66,5	66,5	66,5
ECP32 3L4	66	66	66	75,4	77,3	79,2	79,2	79,2
ECP32 4L4	70,4	70,4	70,4	80,6	82,5	84,3	84,3	84,3
ECP34 1S4	74,8	74,8	74,8	89,8	89,8	89,8	89,8	89,8
ECP34 2S4	92,4	92,4	92,4	111	111	111	111	111
ECP34 1L4	118	118	118	132	137	142	142	142
ECP34 2L4	132	132	132	150	154	158	158	158
ECP34 3L4	135	140	140	163	166	169	169	169
ECO38 1S4	158	158	158	194	194	194	194	194
ECO38 2S4	176	176	176	211	211	211	211	211
ECO38 3S4	198	198	198	238	238	238	238	238
ECO38 1L4	211	220	211	264	264	264	264	264
ECO38 2L4	255	264	264	299	308	317	317	317
ECO38 3L4	308	308	308	370	370	370	370	370
ECO40 1S4	352	352	352	396	409	422	422	422
ECO40 2S4	396	396	396	449	462	475	475	475
ECO40 3S4	440	440	440	510	519	528	528	528
ECO40 1L4	484	484	475	554	568	581	581	581
ECO40 1.5L4	546	546	546	616	635	655	655	655
ECO40 2L4	598	598	598	686	702	718	718	718
ECO40 VL4	690	690	690	829	829	829	829	829
ECO43 1S4	704	704	704	845	845	845	845	845
ECO43 2S4	818	818	818	933	957	982	982	982
ECO43 1M4	902	902	902	1082	1082	1082	1082	1082
ECO43 2M4	1008	1008	920	1133	1180	1227	1227	1227
ECO43 2L4	1144	1144	1144	1304	1338	1373	1373	1373
ECO43 VL4	1232	1232	1232	1478	1478	1478	1478	1478
ECO46 1S4	1300	1300	1300	1470	1520	1560	1560	1560
ECO46 1.5S4	1452	1452	1452	1653	1697	1741	1741	1741
ECO46 2S4	1540	1540	1540	1750	1800	1850	1850	1850
ECO46 1L4	1825	1825	1825	2070	2130	2200	2200	2200
ECO46 1.5L4	2024	2024	2024	2305	2365	2429	2429	2429
ECO46 2L4	2160	2160	2160	2450	2520	2600	2600	2600
ECO46 VL4	2375	2463	2375	2709	2789	2870	2957	2957

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For class B rating temperature rises, multiply class H rating by 0,792
 For degree of protection IP45 (fitting an air inlet filter and air outlet filter), multiply class H rating by 0,74. For 50°C ambient temperature, multiply class H rating (or class F, or class B) by 0,97.

Application/Limitation

The generators are to be installed and tested in accordance with the Rules.

Type Approval documentation

Drawings:

ECP32 B

Description	Draw. no
Overall dim. drawing form B3/B14	A9471_01
Overall dim. drawing form MD35	A9466_01
Shaft Drawing type S form B3B14	A9193_00
Shaft Drawing type S form MD35	A9196_00
Shaft Drawing type M form B3B14	A9194_00
Shaft Drawing type M form MD35	A9197_00
Shaft Drawing type L form B3B14	9238_12
Shaft Drawing type L form MD35	A5505_07

ECP34 A

Description	Draw. no
Overall dim. drawing form B3/B14	A9950_00
Overall dim. drawing form MD35	A8993_02
Shaft Drawing type S	A5546_03
Shaft Drawing type L	A5544_03

ECO38 A

Description	Draw. no
Overall dim. drawing form B3/B14	A9497_02
Overall dim. drawing form MD35	A9496_02
Shaft Drawing type S	A5825_04
Shaft Drawing type L	A5826_05

ECO40 B

Description	Draw. no
Overall dim. drawing form B3/B14	A9550_00
Overall dim drawing form MD35	A9551_00

Shaft Drawing type S form B3B14	A9449_01
Shaft Drawing type S form MD35	A9446_01
Shaft Drawing type L form B3B14	A9450_01
Shaft Drawing type L form MD35	A9447_01
Shaft Drawing type VL form B3B14	A9451_01
Shaft Drawing type VL form MD35	A9448_01

ECO43 A

Description	Draw. no
Overall dim. drawing form B3/B14	A9502_02
Overall dim. drawing form MD35	A9501_02
Shaft Drawing type S form B3B14	A4052_05
Shaft Drawing type S form MD35	A4049_05
Shaft Drawing type L form B3B14	A4050_05
Shaft Drawing type L form MD35	A4051_05
Shaft Drawing type VL form B3B14	A7916_01
Shaft Drawing type VL form MD35	A9222_00

ECO46 A

Description	Draw. no
Overall dim. drawing form B3/B14	A9504_03
Overall dim. drawing form MD35	A9503_03
Shaft Drawing type S form B3B14	A4641_11
Shaft Drawing type S form MD35	A4643_08
Shaft Drawing type L form B3B14	A4642_11
Shaft Drawing type L form MD35	A4644_08
Shaft Drawing type VL form B3B14	A9373_00
Shaft Drawing type VL form MD35	A9090_00

Test Reports:

Item:	Dated:	No. of pages
ECO 32 2S/4	28-11-05	8
ECP 34 1S/4	28-11-05	8
ECO 38 1SN/4	29-11-05	8
ECO 40 1S/4	05-12-05	9
ECO 43 1SN/4	28-11-05	9
ECO 32 3L/4	28-11-05	9
ECP 34 2L/4	28-11-05	9

Item:	Dated:	No. of pages
ECO 38 3LN/4	01-12-05	8
ECO 40 2L/4	30-11-05	9
ECO 43 2LN/4	30-11-05	9
ECO 46 1L/4	03-03-09	8
ECP32 2M4	18-12-15	9
ECP32 4L4	21-12-15	9
ECP34 3L4	25-05-16	9

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Item:	Dated:	No. of pages
ECO38 3L4	09-06-16	9
ECO40 VL4	31-05-16	9
ECO43 1M4	01-06-16	9

Item:	Dated:	No. of pages
ECO43 VL4	13-06-16	9
ECO46 VL4	21-03-16	17

Tests carried out

Overspeed, high voltage, winding resistance, temperature rise at full load, insulation resistance, overload, short circuit curve, no load test, voltage variation under transient condition tests and excitation voltage.

Marking of product

The products are to be marked with the following specifications:

- Manufacturers name and type designation
- Serial number and year of manufacture
- Voltage, frequency speed
- Power class (kVA) / current
- Winding insulation class
- Degree of protection

Periodical assessment

The scope of the periodical assessment survey 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 survey 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.

Survey to be performed at least every second year.

END OF CERTIFICATE