



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. E-9466
This Certificate consists of 5 pages

This is to certify that the

Generator

with type designation(s)

ECO 32, 38N, 40, 43N, 46 and ECP 34, 3 phases, 4 poles, single or double bearings, brushless A.C. generator.

Manufactured by

MECC ALTE

CREAZZO VICENZA, Italy

is found to comply with

Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

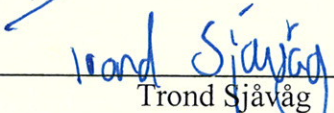
Application

Enclosure class	IP 23(IP45)
Insulation class	H
Temp. class	B, F or H
Voltage class	Up to 480 V
Power class	Up to 2880 kVA
Frequency class	50 or 60 Hz
Speed	1500 or 1800 RPM

Place and date

Høvik, 2009-04-06

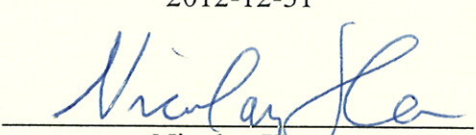
for **DET NORSKE VERITAS AS**


Trond Sjøvåg
Head of Section



Local Office
DNV Venice

This Certificate is valid until
2012-12-31


Nicolay Horn
Surveyor

Notice: 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.



Cert. No.: E-9466
File No.: 821.10
Case No.: 262.1-006761

Product description

ECO 32, 38N, 40, 43N and ECP 34, 3 phases, 4 poles, single or double bearings, brushless A.C. generator.

Enclosure class:	IP 23
Winding insulation:	Class H
Temperature rise limits:	Class B,F or H
Voltage class:	Up to 480 V
Power class:	Up to 2880 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
ECO 32 2S/4	33,6	33,6	33,6	40,3	40,3	40,3	40,3
ECO 32 3S/4	38,4	38,4	38,4	46,1	46,1	46,1	46,1
ECO 32 1L/4	48,0	48,0	48,0	57,6	57,6	57,6	57,6
ECO 32 2L/4	57,6	57,6	57,6	65,3	67,2	69,1	69,1
ECO 32 3L/4	67,2	67,2	67,2	76,8	78,7	80,6	80,6
ECP 34 1S/4	81,6	81,6	81,6	97,9	97,9	97,9	97,9
ECP 34 2S/4	101	101	101	121	121	121	121
ECP 34 1L/4	125	125	125	139	144	150	150
ECP 34 2L/4	144	144	144	163	168	173	173
ECO 38 1SN/4	173	173	173	211	211	211	211
ECO 38 2SN/4	192	192	192	230	230	230	230
ECO 38 3SN/4	216	216	216	259	259	259	259
ECO 38 1LN/4	230	240	230	288	288	288	288
ECO 38 2LN/4	278	288	288	326	336	346	346
ECO 38 3LN/4	336	336	336	403	403	403	403
ECO 40 1S/4	384	384	384	432	446	461	461
ECO 40 2S/4	432	432	432	490	504	518	518
ECO 40 3S/4	480	480	480	557	566	576	576
ECO 40 1L/4	528	528	518	605	619	634	634
ECO 40 1.5L/4	595	595	595	672	693	714	714
ECO 40 2L/4	653	653	653	749	766	783	783
ECO 43 1SN/4	768	768	768	922	922	922	922
ECO 43 2SN/4	893	893	893	1018	1044	1071	1071
ECO 43 1LN/4	1056	1056	1056	1210	1238	1267	1267
ECO 43 2LN/4	1248	1248	1248	1423	1460	1498	1498



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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
ECO 32 2S/4	30,8	30,8	30,8	37,0	37,0	37,0	37,0
ECO 32 3S/4	35,2	35,2	35,2	42,2	42,2	42,2	42,2
ECO 32 1L/4	44,0	44,0	44,0	52,8	52,8	52,8	52,8
ECO 32 2L/4	52,8	52,8	52,8	59,8	61,6	63,4	63,4
ECO 32 3L/4	61,6	61,6	61,6	70,4	72,2	73,9	73,9
ECP 34 1S/4	74,8	74,8	74,8	89,8	89,8	89,8	89,8
ECP 34 2S/4	92,4	92,4	92,4	111	111	111	111
ECP 34 1L/4	114	114	114	128	132	137	137
ECP 34 2L/4	132	132	132	150	154	158	158
ECO 38 1SN/4	158	158	158	194	194	194	194
ECO 38 2SN/4	176	176	176	211	211	211	211
ECO 38 3SN/4	198	198	198	238	238	238	238
ECO 38 1LN/4	211	220	211	264	264	264	264
ECO 38 2LN/4	255	264	264	299	308	317	317
ECO 38 3LN/4	308	308	308	370	370	370	370
ECO 40 1S/4	352	352	352	396	409	422	422
ECO 40 2S/4	396	396	396	449	462	475	475
ECO 40 3S/4	440	440	440	510	519	528	528
ECO 40 1L/4	484	484	475	554	568	581	581
ECO 40 1.5L/4	546	546	546	616	635	655	655
ECO 40 2L/4	598	598	598	686	702	718	718
ECO 43 1SN/4	704	704	704	845	845	845	845
ECO 43 2SN/4	818	818	818	933	957	982	982
ECO 43 1LN/4	968	968	968	1109	1135	1162	1162
ECO 43 2LN/4	1144	1144	1144	1304	1338	1373	1373

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
ECO 46 1S/4	1440	1440	1440	1650	1690	1730	1730
ECO 46 2S/4	1730	1730	1730	1970	2020	2080	2080
ECO 46 1L/4	2016	2016	2016	2300	2360	2420	2420
ECO 46 2L/4	2400	2400	2400	2730	2800	2880	2880

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
ECO 46 1S/4	1300	1300	1300	1470	1520	1560	1560
ECO 46 2S/4	1540	1540	1540	1750	1800	1850	1850
ECO 46 1L/4	1825	1825	1825	2070	2130	2200	2200
ECO 46 2L/4	2160	2160	2160	2450	2520	2600	2600

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.



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Application/Limitation

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

Type Approval documentation

Drawings:

Dwg. No:	Dated:
A3072/09	03-05-2006
A3141/07	11-07-2006
A5647/03	18-10-2005
A5544/02	15-04-2005
A5006/02	10-02-2009
A5825/03	16-07-2008
A3073/03	09-04-2008
7906/04	15-05-2000
8313/05	10-05-2000
A4080/03	15-09-2003
A4049/03	15-04-2005
A4052/02	11-12-2007
A4524/04	15-09-2003
A4643/05	27-04-2004
A4644/05	27-04-2004

Dwg. No:	Dated:
A3057/11	03-05-2006
9238/09	11-07-2006
A5648/03	18-10-2005
A5546/02	15-04-2005
A5004/01	15-06-2004
A5826/03	09-04-2006
A3074/03	09-04-2004
7907/04	09-05-2000
A4083/02	05-11-2008
A4051/03	15-04-2005
A4532/04	15-09-2003
A4641/08	11-06-2008
A4642/08	11-06-2008

Dwg. No:	Dated:
A4891/01	03-05-2006
A4893/01	08-11-2005
A4895/00	28-08-2002
A4897/00	28-08-2002
8312/05	11-05-2000
A4954/02	16-07-2008
A4050/02	11-12-2007
A4956/01	19-12-2003

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 46 1L/4	03-03-09	8

Item:	Dated:	No. of pages
ECO 32 3L/4	28-11-05	9
ECP 34 2L/4	28-11-05	9
ECO 38 3LN/4	01-12-05	8
ECO 40 2L/4	30-11-05	9
ECO 43 2LN/4	30-11-05	9

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.



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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

Certificate retention survey

The scope of the retention/renewal 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