



IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

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Certificate No.: **IECEX BAS 19.0036X** Page 1 of 3 [Certificate history:](#)

Status: **Current** Issue No: 0

Date of Issue: 2019-05-20

Applicant: **Bharat Bijlee Limited**
No.2, MIDC, Thane-Belapur Road
Airoli, Navi Mumbai
400-708
India

Equipment: **Range of 3 Phase A.C. Squirrel Cage Induction Motor**

Optional accessory:

Type of Protection: **Flameproof**

Marking: **Ex db IIB T6..T4* Gb (Tamb = -20°C to +**°C) *See schedule**

Approved for issue on behalf of the IECEX
Certification Body:

R S Sinclair

Position:

Technical Manager

Signature:
(for printed version)

Date:

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2. This certificate is not transferable and remains the property of the issuing body.
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Rockhead Business Park
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United Kingdom





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Page 2 of 3

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Manufacturer: **Bharat Bijlee Limited**
No.2, MIDC, Thane-Belapur Road
Airoli, Navi Mumbai
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India

Additional
manufacturing
locations:

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

IEC 60079-1:2014-06 Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
Edition:7.0

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Report:

[GB/BAS/ExTR19.0084/00](#)

Quality Assessment Report:

[GB/BAS/QAR19.0004/00](#)



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Page 3 of 3

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EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

The F80 to F315 series are Squirrel Cage Induction Motors. The motors comprise stator frame and end covers. The stator frames are fitted with main terminal box and auxiliary terminal box or alternatively an accessory box can be fixed on the main terminal box. The terminal box is attached to the stator frame and "lead wires" are brought inside the terminal box for connection to the external supply through the moulded terminal bushings cemented inside the terminal box.

The method of cooling is TEFC (Totally enclosed fan cooled). The motors are fitted with external cooling fans and fan covers at the non-drive end. The motor frame, end covers and bearing covers are manufactured from cast iron grade FG200 alternate material can be, cast iron grade FG260, mild steel (grade-E250) or SG Iron 450/10. Shaft material is carbon steel EN8, alternate material can be EN24/EN57, stainless steel SS304/SS316 or forged steel grade 35C8/45C8/55C8. The shaft is mounted on grease lubricated ball bearings and provided with shaft seals at both the ends. The end shields are fastened to the motor frame by socket head cap screws on each side. All metric fasteners used for assembling the motor are high tensile carbon steel socket head cap screws of property class 8.8 with minimum yield stress of 640 MPa.

The clearance between fan and all stationary parts is more than 5 mm. The fan guard meets the requirements of IP20 and the mechanical strength requirements of the reference standard. The rotor is die cast aluminium type, alternatively permanent magnets may be embedded in the rotor core. The squirrel cage induction motor with embedded permanent magnet in the rotor core are known as "Line Start Permanent Magnet Synchronous Motors".

Space heaters may be fitted to the overhang and energized with suitable power rating. A specific condition of use is that the heaters must only be switched on when the motor is de-energized.

The stator windings consist of enamelled copper wire suitable for insulation class F or better and impregnated with suitable varnish. PTC thermistors can be provided with the motors for thermal protection.

See Annex.

SPECIFIC CONDITIONS OF USE: YES as shown below:

1. The manufacturer has maintained more stringent gaps than those required by the standard. The user must refer to manufacturer before carrying out any repairs or refurbishment to the equipment.
2. Space heaters (if provided) shall be energized only after disconnecting main supply of motor.
3. The fastening screws shall be of high tensile carbon steel socket head cap screws of property class 8.8 with minimum yield stress of 640 MPa.
4. When PTC thermistors are used, they shall be connected into a control circuit such that the motor is disconnected from the supply in the event of a winding reaching the temperature rating of the thermistor as listed in Table 5 of this certificate.

Annex:

[IECEx BAS 19.0036X-ANNEX.pdf](#)

Rating:

These ranges of motors are manufactured in different ratings as shown in the table 1 below with three phase electrical supply, The motors are rated up to 690 V, 50/60 Hz & S1 duty with a supply variation no more than $\pm 5\%$ on frequency and $\pm 10\%$ on voltage or combined variation of $\pm 10\%$ (corresponding to Zone B in IEC 60034-1 clause 7.3).

TABLE 1

Frame size	Maximum Output in kW							
	2 Pole		4 Pole		6 Pole		8 Pole	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
F 80	1.1	1.3	0.75	0.90	0.55	0.60	N.A.	N.A.
F 90L	2.2	2.5	1.5	1.7	1.1	1.3	0.55	0.63
F 100L	3.7	4.3	2.2	2.5	1.5	1.7	1.1	1.3
F 112M	N.A.	N.A.	3.7	4.3	2.2	2.5	1.5	1.7
F 132S	7.5	8.6	5.5	6.3	3.7	4.3	2.2	2.5
F 132M	9.3	11	7.5	8.6	5.5	6.3	N.A.	N.A.
F 160M	15	17	11	13	7.5	8.6	5.5	6.3
F 160L	18.5	21	15	17	11	13	7.5	8.6
F 180L	22	25	22	25	15	17	11	13
F 200L	37	43	30	35	22	25	15	17
F 225S	N.A.	N.A.	37	40	N.A.	N.A.	18.5	20
F 225M	45	50	45	50	30	33	22	24
F 250M	55	60	55	60	37	40	30	33
F 280S	75	83	75	83	45	50	37	40
F 280M	90	100	90	99	55	61	45	50
F 315S	110	116	110	115	75	79	55	58
F 315M	132	140	132	140	110	115	90	95
F 315L	180	190	200	210	160	168	132	140

TABLE – 2

- Motors with S3/S4 duty, 150/300 starts/hour, CDF 25%, 40%, 60%, 50Hz/ 60Hz

Frame Size	Maximum Output in kW		
	4 Pole	6 Pole	8 Pole
F 80	0.75	0.55	N.A.
F 90L	1.5	1.1	0.55
F100L	2.2	1.5	1.1
F 112M	3.7	2.2	1.5
F 132S	5.5	3.7	2.2
F 132M	7.5	5.5	N.A.
F 160M	9.3	6.0	4.2

Frame Size	Maximum Output in kW		
	4 Pole	6 Pole	8 Pole
F 160L	12.5	9.3	6.0
F 180L	15.0	12.5	9.3
F 200L	24.0	17.0	12.0

- Motors with S3/S4 duty, 150 starts/hour, CDF 25%, 40%, 60%, 50Hz/ 60Hz

Frame Size	Maximum Output in kW		
	4 Pole	6 Pole	8 Pole
F 225M	33.0	22.0	16.0
F 250M	40.0	28.0	22.0
F 280S	52.0	35.0	30.0
F 280M	64.0	40.0	35.0

TABLE 3

The motor (*) temperature class and the maximum (**) ambient temperature ranges are as described in the table below:-

Frame size	*Temperature Class ** Max. Ambient Temperature °C			
	**40	**50	**55	**60
F 80	*T6	*T5	*T5	*T4
F 90L	*T5	*T5	*T4	*T4
F 100L	*T5	*T5	*T4	*T4
F 112M	*T5	*T5	*T4	*T4
F 132S	*T4	*T4	*T4	*T4
F 132M	*T4	*T4	*T4	*T4
F 160M	*T4	*T4	*T4	*T4
F 160L	*T4	*T4	*T4	*T4
F 180L	*T4	*T4	*T4	*T4
F 200L	*T4	*T4	*T4	*T4
F 225S	*T4	*T4	*T4	*T4
F 225M	*T4	*T4	*T4	*T4
F 250M	*T4	*T4	*T4	*T4
F 280S	*T6	*T5	*T5	*T4
F 280M	*T4	*T4	*T4	*T4
F 315S	*T4	*T4	*T4	*T4
F 315M	*T4	*T4	*T4	*T4
F 315L	*T4	*T4	*T4	*T4

ALTERNATIVE FEATURES / ALTERNATIVE PERMISSIBLE VARIATIONS WITH CONDITIONS WEHEREVER APPLICABLE

- 1) Class of insulation can be "H" or better.
- 2) Motors can have various mounting like foot mounting, face mounting, flange mounting, foot, flange/ face mounting, double flange mounting or pad / rod mounting.
- 3) Method of cooling may be TESC (Totally enclosed surface cooled), TEFC (totally enclosed fan cooled) or totally enclosed force cooled type. For self-ventilated motors in case of forced air stream application, the fan and fan cover shall be omitted. The motor used for force cooling should be IECEx/ATEX Zone 1 approved type with IP66 protection.
- 4) The position of terminal box with respect to mounting foot may be at 90° or 180° or at any intermediate angle.
- 5) The motor shaft may be offered with carbon steel EN8 material, alternate material can be EN24/EN57, stainless steel SS304/SS316 or forged steel grade 35C8/45C8/55C8.. The motor may be provided with shaft extension at non driving end.
- 6) Socket head cap screws of better property class then 8.8 and stainless steel material can be used
- 7) Deep groove ball / angular contact ball / cylindrical roller / Tapered roller bearings can be provided. Bearings can be of shielded type Z or 2Z/ZZ, sealed type RS or 2RS.
- 8) The rotor is die cast aluminum type, alternatively permanent magnets may be embedded in the rotor core. The squirrel cage induction motor with embedded permanent magnet in the rotor core are known as "Line Start Permanent Magnet Synchronous Motors".

Rating chart of Line Start Permanent Magnet Synchronous Motors is as indicated in below Table-4 :-

TABLE 4

Frame size	Pole	Max output in kW
F112M	4	1.5
		2.2
F132S		3.7
		5.5
F132M		7.5
F160M		11
F160L		15
F180L		18.5
F200L		30

- 9) Motors can only be provided with space heaters, provided the maximum surface temperature of the space heater is well within the applicable temperature class of the motor.
- 10) The motors are continuously rated for S1 or S2-60 minutes duty as defined in EN/IEC 60034-1 for connection to three phase supply having form and symmetry at least as described in EN/IEC 60034-1.

Alternative temperature classifications with de-rated output , alternative duty cycles, dual voltage as indicated in Table 5 below

TABLE 5

Item	Temperature classification "T3"	Temperature classification "T4"	Temperature classification "T5"	Temperature classification "T6"	Condition
Standard output as Table-1	All outputs as Table-1	All outputs as Table-1	a) All outputs as Table 1 for frame 80-112M & frame 280S b) All outputs derated to 70% with 90 deg C thermistors in each winding for frame other than above frames.	a) All outputs as Table 1 for frame 80 & frame 280S. b) All outputs as table 1-derated to 50% with 80 deg C thermistor in each winding for frame other than above frames.	S1 & S2-60 minutes duty. 50/60 Hz
Insulation class F, H and above and temperature rise limited to class B	All outputs as Table-1	All outputs as Table-1	a) All outputs as Table 1 for frame 80-112M & frame 280S b) All outputs derated to 70% with 90 deg C thermistors in each winding for frame other than above frames	a) All outputs as Table 1 for frame 80 & frame 280S. b) All outputs as table 1-derated to 50% with 80 deg C thermistor in each winding for frame other than above frames.	S1 & S2-60 minutes duty. 50/60 Hz
Insulation class F,H and above and temperature rise limited to class F	All outputs as Table-1	All outputs as above Table-1 derated to 70% with 130 deg.C thermistor in each winding	Not applicable	Not applicable	S1 & S2-60 minutes duty. 50/60 Hz
Duty from S3 to S4	All outputs as Table-2 with 150°C thermistors in each winding	All outputs as Table-2 with 130°C thermistors in each winding	All outputs as Table -2 de-rated to 60% with 90°C thermistors in each winding	All outputs as Table -2 de-rated to 50% with 80°C thermistors in each winding	Insulation class F,H and above. Temperature rise limited to Class B or F. 50/60 Hz
Dual voltage with star/delta connections with flux and current densities as rated voltage	All outputs as Table-1	All outputs as Table-1	a)All outputs as Table 1 for frame 80-112M & frame 280S b) All outputs derated to 70% with 90 deg C thermistors in each winding for frame other than above frames.	All outputs as Table -1 de-rated to 50% with 80°C thermistors in each winding	S1 & S2 - 60 minutes duty. Insulation class F,H and above. Temperature rise limited to Class B or F. 50/60 Hz
Ambient temperature above 40°C up to 50°C	All outputs as Table-1	All outputs as Table-1	a)All outputs as Table 1 for frame 80-112M & frame 280S b) All outputs derated to 60% with 90 deg C thermistors in each winding for frame other than above frames	All outputs as Table -1 de-rated to 50% with 80°C thermistors in each winding	S1 & S2 - 60 minutes duty . Insulation class F ,H and above. Temperature rise limited to Class B or F . 50/60Hz.

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<p>Ambient temperature above 50 °C up to 60 °C</p>	<p>All outputs as Table-1</p>	<p>All outputs as Table-1</p>	<p>a) All outputs as Table 1 derated to 80% for frame 80-112M & frame 280S b) All outputs derated to 50% with 90 deg C thermistors in each winding for frame other than above frames</p>	<p>All outputs as Table -1 de-rated to 50% with 80 °C thermistors in each winding</p>	<p>S1 & S2 - 60 minutes duty . Insulation class F ,H and above. Temperature rise limited to Class B or F . 50/60Hz.</p>
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