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TYPE ASSESSMENT AND TEST REPORT No.: XPL/13135/12.0402 REV 1

ZEST ELECTRIC MOTORS (PTY) LTD
PO BOX X10011
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Your Reference: J22300
Enquiries: D Maree
Date: 22 October 2012
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Revision 1

ELECTRICAL MOTOR

1. SCOPE

The examination, testing and certification of the equipment as mentioned below for compliance with the following standards:

SANS 60079-0: 2005 Ed 3 IEC 60079-0: 2004 Ed 4	"Electrical apparatus for explosive gas atmospheres, Part 0: General requirements"
SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3	"Electrical apparatus for explosive gas atmospheres, Part 15: Construction, test and marking of type of protection 'n' electrical apparatus"
SANS 61241-0: 2005 Ed 1 IEC 61241-0: 2004 Ed 1	"Electrical apparatus for use in the presence of combustible dust, Part 0: General requirements"
SANS 61241-1: 2005 Ed 1 IEC 61241-1: 2004 Ed 1	"Electrical apparatus for use in the presence of combustible dust, Part 1: Protection by enclosures 'tD'"

2. ASSESSMENT & CERTIFICATION REQUIRED

Environment: Gas : Group IIC
Dust : Conductive and Non-conductive dust
Temperature : 135°C
Zone : Zone 2/21
Hazardous locations for surface .

Sample Description:

One Sample of the motor was submitted for testing.

3. PRODUCT DESCRIPTION

Manufacturer : WEG
Supplier : Zest Electric Motors (Pty) Ltd
Type of Product : Electrical Motor
Model : WQuattro Frame sizes 63 to 355
Serial Number(s) : XPL/020512/DM01

General

The range of small induction motors has shaft center heights ranging from 63 to 355mm and comprises cast iron or aluminum frames for horizontal or vertical, foot and/or flange mounting. The flanges may be oversize or undersize as required and the shell provides a degree of protection of at IP65. The range covers 2 to 12 pole 3 phase windings for 50 or 60Hz and is designed for connection to supplies up to 1000V for Ex n applications, and up to 1100V for Dust only applications, for duty type S1 or S2. Two speed motors are also included in the range.

Bearing Arrangements

Spigots are machined at either end of the stator frame onto which the machined spigot housings of cast iron end frames are fitted. The end shields carry the bearing arrangements, which are ball, angular contact or roller bearings, and may be grease or oil lubricated. Optional bearing insulation is available and the bearing housings may be cast or fabricated.

Stator

The stator core packs are built from insulated steel laminations, which are clamped together. The wound and impregnated stator assembly is secured in the stator frame by an interference fit.

Rotor

The rotor core packs, which are built from insulated steel laminations, are interference fit onto the steel shaft. The rotor cage is die-cast aluminum and balancing of the rotor is achieved by fixing washers to cast studs on the aluminum rotors. Double shaft extensions are included in the range. The construction of the rotor is assessed against Table 6 of IEC 60079-15:2010 and appropriate action taken if the results dictate it is required.

Terminal Arrangement

The motors are fitted with separate bolt-on cast iron terminal boxes fitted with bolt-on covers incorporating a gasket, which is glued to one surface. Main terminal boxes contain cast polyester resin/fiber glass insulator blocks incorporating steel terminal studs, earthing terminals and optionally auxiliary terminals. Auxiliary terminal boxes contain component certified terminals.

Details of which are shown below:

Manufacturer Type Certificate Number
IECEX PTB 07.0007U
PTB99ATEX3117U
WAGO Type 264 IECEX PTB 04.0003U
PTB98ATEX3129U
Phoenix Type MZ (D) KEMA98ATEX0545U
K1M5, K1M6, K1M8, K1M10,
K1M12, K1M16 PTB03ATEX1153U
WEG
WA 12/PA66,
WA (SINDAL)
WB 12/PA66 (160V), WB 12/PA66 (500V)
PTB06ATEX1078U

Optionally the auxiliary terminal box may be integrally cast with the main terminal box or be a bolt-on addition to the main terminal box. Any size of terminal box can be fitted to any of the frame sizes within the range as long as they are suitable rated for their intended use and it is physically possible to do so.

4. ASSESSMENT AND TEST RESULTS

The VERDICT is designated by one of the following:

C = Complied with the Requirement

NA = Requirement is Not Applicable to this Equipment

IEC 60079-0: 2004 Ed 4 SANS 60079-0:2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
1	Scope	X	X
2	Normative references	X	X
3	Terms and definitions	X	X
4	Apparatus grouping and temperature classification	X	X
5	Temperatures		
5.1	Environmental influences		
5.1.1	Ambient temperature	X	
The motor was intended for use in an ambient temperature range of -20°C to 40°C.			
5.1.2	External source of heating or cooling		X
None specified.			
5.2	Service temperature	X	
Refer to clause 26.5.1 of SANS 60079-0 on this report. A temperature test was conducted on the motor by Zest Electric Motors (Pty) Ltd and witnessed by Explolabs (Pty) Ltd.			
5.3	Maximum surface temperature		
5.3.1	Determination of maximum surface temperature	X	
The motor was intended for use in a Group IIC environment (refer to clause 26.5.1 SANS 60079-0 of this report).			
5.3.2	Limitation of maximum surface temperature		
5.3.2.1	Group I electrical apparatus		X
The motor was intended for use in a Zone 2/21 environment.			
5.3.2.2	Group II electrical apparatus	X	
After a temperature test was conducted, a temperature rating of T4 was allocated to the motor.			
5.4	Surface temperature and ignition temperature		X
This requirement (clause) was not evaluated by Explolabs (Pty) Ltd as the manufacturer shall introduce all requirements pertaining to this clause in to their installation and operating instructions.			
5.5	Small component temperature		X

IEC 60079-0: 2004 Ed 4 SANS 60079-0:2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
No small components were fitted to the motor.			
6	Requirements for all apparatus		
6.1	General	X	
The motor was evaluated to the requirements of SANS 60079-0 and SANS 60079-15.			
6.2	Mechanical strength of apparatus	X	
Refer to clause 26.4 for type testing results.			
6.3	Opening Times		X
The motor was not fitted with capacitors and therefore this requirement was not deemed necessary.			
6.4	Circulating currents	X	
A 75kW motor was submitted for testing. A larger range motor will only come into production at a later stage, at which time the requirements of this clause will be evaluated.			
6.5	Gasket Retention	X	
Adhesive was used to attach the gasket the terminal box cover.			
7	Non-metallic enclosures and non-metallic parts of enclosures		
7.1	General		
7.1.1	Applicability		X
The motor casing and terminal box was manufactured from cast iron.			
7.1.2	Specification of materials	X	
All non-metallic materials used are specified in the manufacturer's documentation submitted.			
7.1.3	Plastic materials		X
7.2	Thermal endurance		X
7.3	Electrostatic charges on external non-metallic materials of enclosures		
7.3.1	Applicability		X
7.3.2	Avoidance of a build-up of electrostatic charge		X
7.4	Threaded holes		X
8	Enclosures containing light metals		
8.1	Material composition		
8.1.1	Group I		X
The motor was intended for use in a Group II environment.			

IEC 60079-0: 2004 Ed 4 SANS 60079-0:2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
8.1.2	Group II	X	
As stated in the documentation supplied by the manufacturer, all materials used were specified and complies with the requirements of the clause.			
8.2	Threaded holes		X
9	Fasteners		
9.1	General	X	
As shown in the manufacturer's documentation, all parts are bolted down with adequate bolts (fasteners).			
9.2	Special Fasteners		X
This is not a requirement of SANS 60079-15.			
9.3	Holes for special fasteners		
9.3.1	Thread engagement		X
This is not a requirement of SANS 60079-15.			
9.3.2	Tolerance & Clearance		X
This is not a requirement of SANS 60079-15.			
9.3.3	Hexagon socket set screws		X
This is not a requirement of SANS 60079-15.			
10	Interlocking devices		X
None used.			
11	Bushings		X
No bushings were fitted to the motor.			
12	Materials used for cementing		X
No cementing material was used.			
13	Ex components		
13.1	General		X
The motor was not certified as an Ex component.			
13.2	Mounting internal to apparatus		X
13.3	Mounting external to apparatus		X
14	Connection facilities and terminal compartments		
14.1	General	X	

IEC 60079-0: 2004 Ed 4 SANS 60079-0:2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
Refer to the manufacturers drawings.			
14.2	Connection space	X	
Refer to the manufacturers drawings.			
14.3	Type of protection	X	
The terminal box was certified as Ex nA and Ex tD.			
14.4	Creepage and Clearance	X	
Refer to the manufacturers drawings.			
15	Connection facilities for earthing or bonding conductors		
15.1	Internal	X	
Refer to the manufacturers drawings.			
15.2	External	X	
Refer to the manufacturers drawings.			
15.3	Apparatus not requiring earthing		X
Adequate earthing was applied to the motor.			
15.4	Size of conductor connection	X	
The size of the internal earth cable shall be as stated in this table.			
		Cross-sectional area of phase conductors, S mm ²	Minimum cross-sectional area of the corresponding protective conductor, S _p mm ²
		S ≤ 16	S
		16 < S ≤ 35	16
		S > 35	0.5 S
External earth connectors shall have a protective conductor of at least 1.5mm ² .			
15.5	Protection against corrosion	X	
15.6	Secureness		
16	Entries into enclosures		
16.1	General	X	
16.2	Identification of entries	X	
16.3	Cable glands	X	
Only approved cable glands and only cable glands mentioned in the manufacturer's installation instructions may be used on the motor.			
16.4	Blanking elements	X	

IEC 60079-0: 2004 Ed 4 SANS 60079-0:2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
Only approved blanking elements, conforming to the manufacturer's installation instructions may be used.			
16.5	Conductor temperature	X	
Only adequate rated cable, as per the manufacturer's installation instructions may be used.			
17	Supplementary requirements for rotating electrical machines		
17.1	Fans and fan hoods	X	
Refer to the manufacturer's documentation.			
17.2	Ventilation openings for external fans	X	
17.3	Construction and mounting of the ventilating systems	X	
17.4	Clearances for the ventilating system	X	
17.5	Materials for external fans and fan hoods	X	
17.6	Equipotential bonding conductors		X
18	Supplementary requirements for switchgear		
18.1	Flammable dielectric		X
No switchgear was fitted to the motor.			
18.2	Disconnectors		X
18.3	Group I – Provision for locking		X
18.4	Doors and covers		X
19	Supplementary requirements for fuses		X
The motor was not fitted with any fuses.			
20	Supplementary requirements for plugs and sockets		
20.1	Interlocking		X
Only approved cable glands and only cable glands mentioned in the manufacturer's installation instructions may be used on the motor.			
20.2	Energized plugs		X
None used.			
21	Supplementary requirements for luminaires		
21.1	General		X
A motor was submitted for testing. None fitted.			
21.2	Covers		X
21.3	Special lamps		X

IEC 60079-0: 2004 Ed 4 SANS 60079-0:2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
22	Supplementary requirements for caplights and handlights		
22.1	Group I caplights and handlights		X
A motor was submitted for testing.			
22.2	Group II caplights and handlights		X
23	Apparatus incorporating cells and batteries		X
No cells and batteries were fitted to the motor.			
23.1	Batteries		X
23.2	Cell types		X
23.3	Cells in a battery		X
23.4	Ratings of batteries		X
23.5	Mixture of cells		X
23.6	Interchangeability		X
23.7	Charging of primary batteries		X
23.8	Leakage		X
23.9	Connections		X
23.10	Orientation		X
23.11	Replacement of cells or batteries		X
24	Documentation	X	
All documentation supplied by the manufacturer was evaluated and was found to comply.			
25	Compliance of prototype or sample with documents	X	
The documentation submitted was evaluated to the equipment and to the requirements of SANS 60079-0, SANS 60079-1, SANS 61241-0 and SANS 61241-1.			
26	Type Tests		
26.1	General	X	
All tests as specified were conducted. If tests were omitted the reason shall be stated in the specific clause.			
26.2	Test configuration	X	
All tests were conducted in the most unfavorable test configuration.			
26.3	Tests in explosive test mixtures	X	
All gasses used by Explolabs have purity level of 95% or higher.			

IEC 60079-0: 2004 Ed 4 SANS 60079-0:2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
26.4	Tests of enclosures		
26.4.1	Order of tests		
26.4.1.1	Metallic enclosures, metallic parts of enclosures and glass of parts of enclosures	X	
All tests were performed in the specific test sequence.			
26.4.1.2	Non-metallic enclosures or non-metallic parts of enclosures		
26.4.1.2.1	Group I electrical apparatus		X
The motor was intended for use in a Group II environment.			
26.4.1.2.2	Group II electrical apparatus		
The fan of the motor can be manufactured of polypropylene with a surface resistance of $\leq 10^9\Omega$.			
26.4.2	Resistance to impact	X	
The impact test was conducted on the motor fan cover as this was considered to be worst case. The test was conducted at 7J.			
26.4.3	Drop test		X
The motor is not a hand held device.			
26.4.4	Acceptance criteria	X	
The damage done after the resistance to impact test did not invalidate (impair) the protection of the motor.			
26.4.5	Degree of protection (IP) by enclosures		
26.4.5.1	Test procedure	X	
An IP65 test was conducted on the motor. Refer to clause 8.2.1.2 of SANS 61241-1 for test results.			
26.4.5.2	Acceptance criteria	X	
The damage done after the testing did not invalidate (impair) the protection of the motor.			
26.5	Thermal tests		
26.5.1	Temperature measurement	X	
A temperature test was conducted on the motor. A maximum temperature of 90.2°C at an ambient temperature of 20.6°C was obtained.			
26.5.2	Thermal shock test		X
No glass parts were fitted to the motor.			
26.5.3	Small component ignition test		
26.5.3.1	General		X
No small components were fitted.			

IEC 60079-0: 2004 Ed 4 SANS 60079-0:2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
26.5.3.2	Procedure		X
26.5.3.3	Acceptance criteria		X
Seeing that none of the mechanical tests were conducted, the acceptance criteria are also not required.			
26.6	Torque test for bushings		
26.6.1	Test procedure		X
No bushings were used on the motor.			
26.6.2	Acceptance criteria		X
Seeing that none of the mechanical tests were conducted, the acceptance criteria are also not required.			
26.7	Non-metallic enclosures or non-metallic parts of enclosures		
26.7.1	General		X
The non-metallic part did not form part of the enclosure. Only the fan part of the motor was manufactured of a plastic material.			
26.7.2	Temperatures during tests		X
26.8	Thermal endurance to heat		X
26.9	Thermal endurance to cold		X
26.10	Resistance to light		
26.10.1	Applicability		X
26.10.2	Test procedure		X
26.10.3	Acceptance criteria		X
26.11	Resistance to chemical agents for Group I electrical apparatus		X
26.12	Earth continuity		X
26.13	Surface resistance test of parts of enclosures of non-metallic materials	X	
The maximum tip speed of the fan is 5.53m/s. This test only applies if the tip speed is greater than 50m/s.			
26.14	Charging tests		
26.14.1	Introduction		X
26.14.2	Principle of the test		X
26.14.3	Samples and apparatus		X
26.14.4	Ambient conditions		X
26.14.5	Conditioning		X

IEC 60079-0: 2004 Ed 4 SANS 60079-0:2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
26.14.6	Determination of the most efficient charging method		
26.14.6.1	Method A: Rubbing with a pure polyamide cloth (Figure 6)		X
26.14.6.2	Method B: Rubbing with a cotton cloth		X
26.14.6.3	Method C: Charging by influence with a d.c. high-voltage power supply (Figure 8)		X
26.14.7	Assessment of discharge		X
26.15	Measurement of capacitance		
26.15.1	Test procedure		X
26.15.2	Acceptance criteria		X
27	Routine verifications and tests	X	
It is the manufacturer's responsibility to do the necessary routine verifications and to ensure that all electrical apparatus complies with the specification.			
28	Manufacturer's responsibility		
28.1	Certificate	X	
It is the manufacturer's responsibility to supply installation instructions with each unit offered for sale.			
28.2	Responsibility for marking	X	
It is the manufacturer's responsibility that the electrical apparatus shall be marked on the main part, in a visible place. This marking shall be legible and durable, taking into account possible chemical corrosion.			
29	Marking	X	
A drawing was submitted by the manufacturer that shows the method of attachment of the label and all relevant detail were supplied. Refer to clause 5 of this report.			
29.1	Location	X	
29.2	General	X	
29.3	Different types of protection	X	
29.4	Order of marking	X	
29.5	Ex components		X
29.6	Small apparatus and Ex components		X
29.7	Extremely small apparatus and Ex components		X
29.8	Warning markings	X	
29.9	Cells and batteries		X
29.10	Examples of marking	X	

IEC 60079-0: 2004 Ed 4 SANS 60079-0:2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
30	Instructions		
30.1	General	X	
The manufacturer's installation instructions satisfied the requirements of this clause.			
30.2	Cells and batteries		X
None used.			
Annex A (normative)	Ex cable glands		
A.1	General		X
Only approved cable glands may be used. Refer to the manufacturer's installation instructions for gland sizes.			
A.2	Constructional requirements		
A.2.1	Cable sealing		X
A.2.2	Materials		
A.2.2.1	Exposed parts		X
A.2.2.2	Elastomeric sealing rings		X
A.2.2.3	Filling compounds		X
A.2.3	Clamping		
A.2.3.1	General		X
A.2.3.2	Group II cable glands		X
A.2.4	Lead-in of cable		
A.2.4.1	Sharp edges		X
A.2.4.2	Point of entry		X
A.2.5	Release by a tool		X
A.2.6	Fixing		X
A.2.7	Degree of protection		X
A.3	Type tests		
A.3.1	Test of clamping of non-armoured and braided cables		
A.3.1.1	Cable glands with clamping by the sealing ring		X
A.3.1.2	Cable glands with clamping by filling compound		X
A.3.1.3	Cable glands with clamping by means of a clamping device		X

IEC 60079-0: 2004 Ed 4 SANS 60079-0:2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
A.3.1.4	Tensile test		X
A.3.1.5	Mechanical strength		X
A.3.2	Tests of clamping of armoured cables		
A.3.2.1	Tests of clamping where the armourings are clamped by a device within the gland		X
A.3.2.1.1	Tensile test		X
A.3.2.1.2	Mechanical strength		X
A.3.2.2	Tests of clamping where the armourings are not clamped by a device within the gland		X
A.3.3	Ageing test for material used for elastomeric sealing rings		X
A.3.4	Type test for resistance to impact		X
A.3.5	Test for degree of protection (IP) of cable glands		X
A.4	Marking		
A.4.1	Marking of cable entries		X
A.4.2	Marking of cable-sealing rings		X
Annex B (normative)	Requirements for Ex components		X
The motor was not certified as an Ex component.			

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
1	Scope		
2	Normative references		
3	Terms and definitions		
4	General		
5	Temperatures		
5.1	Environmental influences		
5.1.1	Ambient temperature	X	
The motor was intended for use in an ambient temperature range of -20°C to 40°C.			
5.1.2	External source of heating or cooling		X
None specified.			

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
5.2	Service temperature	X	
The motor's temperature was measured and a maximum temperature of 90.2°C was obtained. A T4 rating was applied to the motor.			
5.3	Maximum surface temperature		
5.3.1	Determination of maximum surface temperature	X	
5.3.2	Limitation of maximum surface temperature		X
5.4	Surface temperature and ignition temperature	X	
A T4 rating was applied.			
5.5	Small components		X
None used.			
6	Requirements for electrical apparatus		
6.1	General	X	
The motor was evaluated to the requirements of SANS 60079-0, SANS 60079-15, SANS 61241-0 and SANS 61241-1.			
6.2	Mechanical strength of apparatus	X	
An impact test was conducted on the motor. Refer to clause 26.4.2 of SANS 60079-0 for test results.			
6.3	Opening times		X
No capacitors were fitted to the motor.			
6.4	Circulating currents	X	
Each section of the motor shall have an earth strap fitted for motors with a frame size of 200 and grater.			
6.5	Gasket retention	X	
All gaskets are located inside grooves as noted on the manufacturer's drawings.			
6.6	Degree of protection of enclosure (IP)		
6.6.1	Minimum degree of protection	X	
The ingress protection test was conducted under report no: IECEx BAS 10.0099X.			
6.6.2	Degree of protection provided by installation		X
IP rating does not require a specific installation method to help to protect the apparatus.			
6.7	Clearances, creepage distances and separations		
6.7.1	General	X	
The motor was evaluated to the requirements of Table 2.			
6.7.2	Determination of working voltage	X	
As noted in the manufacturers documentation (drawing no: 10000764100), the motor range has a maximum working voltage of 1000V.			
6.7.3	Conformal coating		X
None used.			
6.7.4	Comparative tracking index (CTI)	X	

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
As noted on the manufacturers documentation (drawing no: 10000791210), the terminal box had a CTI value of 175.			
6.7.5	Measurement of creepage and clearance	X	
As shown in the manufacturers drawing no: 10000764100, the terminal blocks used had ribs in place. The minimum clearance was measured and found to be 8.47mm. The minimum crepage is 14.25mm.			
6.7.6	Compound filled cable sealing boxes		X
None used.			
6.8	Electric strength		
6.8.1	Insulation from earth or frame	X	
The motor has an insulation to frame/earth of 25kV.			
6.8.2	Insulation between conductive parts	X	
The motor has a minimum insulation value of 25kV.			
7	Non-metallic enclosures and non-metallic parts of enclosures		
7.1	General	X	
The motor casing and terminal box was manufactured from cast iron. All non-metallic materials used are specified in the manufacturer's documentation submitted.			
7.2	Thermal endurance	X	
7.3	Electrostatic charges on external non-metallic materials of enclosures	X	
7.4	Threaded holes		X
7.5	Thermal shock		X
No glass parts were fitted to the motor.			
7.6	Resistance to light		X
The external surface (housing) of the motor is manufactured of cast iron.			
8	Enclosures containing light metals		
8.1	Material composition		X
All light metals used are located on the inside of the motor housing.			
8.2	Threaded holes		X
9	Fasteners		
9.1	General	X	
As shown in the manufacturer's documentation, all parts are bolted down with adequate bolts (fasteners).			
9.2	Special fasteners		X
10	Interlocking device		X
None used.			
11	Bushings		X
No bushings were fitted to the motor.			
12	Materials used for cementing	X	
All material data are shown in the documentation supplied by the manufacturer.			
13	Ex components		X

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
The motor was not tested as an Ex component.			
13.1	Type of protection "n"		X
13.2	Mounting		X
13.3	Internal mounting		X
13.4	External mounting		X
14	Connection facilities and terminal compartment		
14.1	General	X	
Refer to documentation supplied by the manufacturer.			
14.2	Connection for external conductors		
14.2.1	Connection facilities	X	
The terminal compartment and all access openings were so dimensioned that the conductors can be readily connected and an approved enclosure was used.			
14.2.1.1	Terminals	X	
14.2.1.2	Permanently connected cable, provided with loose leads		X
14.2.2	Conductor accommodation	X	
14.2.3	Cable glands	X	
14.3	Internal connection facilities	X	
15	Connection facilities for earthing or bonding conductors	X	
Refer to the documentation supplied by the manufacturer.			
16	Entries into enclosures	X	
As noted on the manufacturers documentation.			
17	Supplementary requirements for non-sparking electrical machines		
17.1	General		
The manufacturer supplied an EC declaration of conformity document stating that the motor complies with all the requirements of EN 60034 ranges of standards.			
17.1.1	Machine enclosure	X	
17.1.2	Terminal boxes	X	
17.1.3	Conduit stopping boxes, cable sealing and dividing boxes	X	
17.2	Connection facilities for external conductors	X	
As per the documentation submitted by the manufacturer.			
17.3	Neutral point connections		X
17.4	Radial air gap	X	
Refer to manufacturer's drawing no: 10000769534 for the minimum radial air gap.			
17.5	Ventilation systems	X	
Refer to manufacturer's documentation.			
17.6	Bearing seals and shaft seals		
17.6.1	Non-rubbing seals and labyrinths	X	
17.6.2	Rubbing seals	X	

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
17.7	Rotor cages		
17.7.1	Rotor cages built from bars connected to end rings	X	
Refer to manufacturer's documentation.			
17.7.2	Cast rotor cages	X	
17.7.3	Assessment for possible air gap sparking		X
The motor has a duty type of S1 and S2. The motor was intended use in an ambient temperature range of -20°C to 40°C.			
17.8	Surface temperature limitation		
17.8.1	Prevention of thermal ignition	X	
The temperature rise during starting is not one of the factors when determining the temperature class if the duty type is S1 or S2 in accordance with IEC 60034-1. A T4 rating was applied to the motor.			
17.8.2	Operation with a frequency convertor or a non-sinusoidal supply		
17.8.2.1	Type test methods	X	
17.8.2.2	Type test	X	
17.8.2.3	Alternative type test by calculation		x
17.9	Additional requirements for machines with rated voltage greater than 1 kV		
17.9.1	General		X
17.9.1.1	Assessment and test		X
17.9.1.2	"As new" condition		X
17.9.1.3	High-voltage rated machines		X
17.9.2	Potential incendivity of the stator winding insulation system		X
18	Supplementary requirements for switchgear		X
None used.			
19	Supplementary requirements for non-sparking fuses and fuse assemblies		
19.1	Fuses		X
None used.			
19.2	Temperature class of an apparatus		X
19.3	Fuse mounting		X
19.4	Fuse enclosures		X
19.5	Replacement fuse identification		X
20	Supplementary requirements for non-sparking plugs and sockets		
20.1	Plugs and sockets for external connections		X
None used.			
20.2	Maintaining degree of protection		X
20.3	Plugs and sockets for internal connections		X
20.4	Sockets that do not have plugs inserted in normal operation		X
21	Supplementary requirements for non-sparking luminaire		
21.1	General		X
None used.			

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
21.2	Construction		
21.2.1	General		X
21.2.2	Enclosure of lamp		X
21.2.3	Mounting arrangement		X
21.2.4	Lampholders		
21.2.4.1	General		X
21.2.4.2	Bayonet non-sparking lampholders		X
21.2.4.3	Screw non-sparking lampholders		X
21.2.4.4	Bi-pin non-sparking lampholders		X
21.2.5	Auxiliaries		
21.2.5.1	General		X
21.2.5.2	Glow-type starters		X
21.2.5.3	Electronic starters and ignitors		X
21.2.5.4	Starter holders		X
21.2.5.5	Ballasts		X
21.2.6	Reflectors		X
21.2.7	Creepage distances and clearances		X
21.2.8	Terminals		
21.2.8.1	General		X
21.2.8.2	Looping connections		X
21.2.8.3	Internal connections		X
21.2.8.4	Screw type lampholder polarity		X
21.2.9	External and internal wiring		X
21.2.10	Endurance tests and thermal tests		
21.2.10.1	General		X
21.2.10.2	Thermal test (normal operation)		X
21.2.10.3	Thermal test (abnormal conditions)		
21.2.10.3.1	Temperatures except for windings		X
21.2.10.3.2	Temperatures for windings		X
21.2.10.4	Surface temperatures		
21.2.10.4.1	Restricted-breathing luminaires		X
21.2.10.4.2	Other luminaires		X
21.2.10.4.3	Illuminated surfaces		X
21.2.11	Resistance to dust and moisture		X
21.2.12	Insulation resistance and electric strength		X
21.3	Other apparatus containing light sources		X
22	Supplementary requirements for apparatus incorporating non-sparking cells and batteries		
22.1	Categorization of cells and batteries		X

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
None used.			
22.1.1	Type 1 cells and batteries		X
22.1.2	Type 2 cells and batteries		X
22.1.3	Type 3 cells and batteries		X
22.2	General requirements for cells and batteries of types 1 and 2		
22.2.1	Maximum capacity		X
22.2.2	Secondary cells		X
22.2.3	Cell connection		X
22.2.4	Discharge mode		X
22.2.5	Temperature		X
22.2.6	Creepage and clearance		X
22.2.7	Connections		X
22.2.8	Connecting cells in series		X
22.2.9	Deep discharge protection		X
22.2.10	Temperature test conditions		X
22.2.11	Battery packs		X
22.2.12	Battery pack connections		X
22.2.13	Cell electrolyte and gas release		X
22.2.14	Excessive load draw		X
22.3	Charging of type 1 cells and batteries		
22.3.1	Temperature range		X
22.3.2	Charger specifications		X
22.3.3	Charging separated cells or batteries		X
22.3.4	Charger limitations		X
22.3.5	Charging outside the hazardous area		X
22.4	Charging of type 2 cells and batteries		
22.4.1	Temperature range		X
22.4.2	Charger specifications		X
22.4.2.1	Charging separated cells or batteries		X
22.4.2.2	Charger limitations		X
22.4.2.3	Gassing during charging		X
22.4.2.4	Charging outside the hazardous area		X
22.5	Requirements for type 3 secondary batteries		
22.5.1	Types of permissible batteries		X
22.5.2	Battery containers		
22.5.2.1	Internal surfaces		X
22.5.2.2	Mechanical requirements		X
22.5.2.3	Creepage distances		X

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
22.5.2.4	Covers		X
22.5.2.5	Cell assembly		X
22.5.2.6	Liquid extraction		X
22.5.2.7	Ventilation		X
22.5.2.8	Plugs and sockets		X
22.5.2.9	Polarity marking		X
22.5.2.10	Other apparatus		X
22.5.2.11	Insulation resistance		X
22.5.3	Cells		
22.5.3.1	Lids		X
22.5.3.2	Support		X
22.5.3.3	Electrolyte maintenance		X
22.5.3.4	Expansion space		X
22.5.3.5	Filling and vent plugs		X
22.5.3.6	Electrolyte seals		X
22.5.4	Connections		
22.5.4.1	Intercell connections		X
22.5.4.2	Temperature assessment		X
22.5.4.3	Connector protection		X
22.6	Verification and tests		
22.6.1	Insulation resistance		X
22.6.2	Mechanical shock test		X
23	Supplementary requirements for non-sparking low power apparatus		X
None used.			
24	Supplementary requirements for non-sparking current transformers		X
None used.			
25	Other electrical apparatus		X
None used.			
26	General supplementary requirements for apparatus producing arcs, sparks or hot surfaces		X
None used.			
27	Supplementary requirements for enclosed-break devices and non-incendive components producing arcs, sparks or hot surfaces		
27.1	Type testing		X
27.2	Ratings		
27.2.1	Enclosed-break devices		X
27.2.2	Non-incendive components		X
27.3	Construction of enclosed-break devices		
27.3.1	Free internal volume		X

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
27.3.2	Continuous operating temperature (COT) requirements		X
27.3.3	Seal protection		X
28	Supplementary requirements for hermetically sealed devices producing arcs, sparks or hot surfaces		X
29	Supplementary requirements for sealed devices or encapsulated devices producing arcs, sparks or hot surfaces		
29.1	Non-metallic materials		X
29.2	Opening		X
29.3	Internal spaces		X
29.4	Handling		X
29.5	Resilient gasket and seals		X
29.6	Encapsulating compounds		X
29.7	Thickness of encapsulant		X
29.8	Type tests		X
30	Supplementary requirements for energy-limited apparatus and circuits producing arcs, sparks or hot surfaces		
30.1	General		X
30.2	Associated energy-limited apparatus		X
30.3	Energy-limited apparatus		X
30.4	Self protected energy-limited apparatus		X
30.5	Separation of conducting parts		X
30.6	Plugs and sockets		X
30.7	Protection against polarity reversal		X
30.8	Requirements for components on which energy limitation depends		
30.8.1	Ratings of components		X
30.8.2	Fuses		X
30.8.3	Shunt safety components		X
30.9	Battery powered apparatus		X
30.10	Marking and documentation		X
31	Supplementary requirements for restricted-breathing enclosures protecting apparatus producing arcs, sparks or hot surfaces		
31.1	General		X
31.2	Test point for restricted-breathing apparatus		X
31.3	Test point exemption		X
31.4	Gasket and seal requirement		X
31.5	Non-resilient seals		X
31.6	Maintenance considerations		X
31.7	Internal fans		X
32	General information on verification and tests	X	

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
All documentation supplied by the manufacturer was evaluated and was found to comply. The motor was subjected to all tests considered necessary.			
33	Type tests		
33.1	Representative samples	X	
The motor was subjected to all tests considered necessary.			
33.2	Test configuration	X	
All tests are done in the most onerous conditions.			
33.3	Tests for enclosures on which the type of protection depends		
33.3.1	Order of tests		
33.3.1.1	Non-metallic enclosures and non-metallic parts of enclosures (other than glass and ceramic)		X
The external surface of the motor was manufactured of cast iron.			
33.3.1.2	Metallic enclosures, metallic parts of enclosures and glass and ceramic parts of enclosures	X	
The motor was subjected to all tests considered necessary.			
33.3.2	Thermal endurance tests		
33.3.2.1	Thermal endurance to heat		X
33.3.2.2	Thermal endurance to cold		X
33.3.3	Mechanical strength tests		
33.3.3.1	Tests for resistance to impact	X	
Refer to clause 26.4.2 of SANS 60079-0 for test results.			
33.3.3.2	Drop test for hand held apparatus		X
Not a hand held device.			
33.3.3.3	Criteria for compliance	X	
The damage done after the resistance to impact test did not invalidate (impair) the protection of the motor.			
33.3.4	Tests for degree of protection (IP code) by enclosures		
33.3.4.1	Test		
33.3.4.1.1	General	X	
The manufacture submitted documentation indicating that the motor was in compliance with IEC 60034-5.			
33.3.4.1.2	Mounting		X
33.3.4.1.3	Category determination		X
33.3.4.1.4	Test conditions		X
33.3.4.1.5	Dielectric strength test		X
33.3.4.1.6	Drain holes and ventilation openings		X
33.3.4.2	Criteria for compliance supplementary to IEC 60529		
33.3.4.2.1	Dust ingress		X
33.3.4.2.2	Water ingress		X
33.4	Test for enclosed-break devices and non-incendive components		
33.4.1	Preparation of enclosed-break device samples		X
33.4.2	Preparation of non-incendive component samples		X

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
33.4.3	Test conditions for enclosed-break devices and non-incendive components		
33.4.3.1	General		X
33.4.3.2	Enclosed-break device		X
33.4.3.3	Non-incendive components		X
33.5	Tests for sealed devices and encapsulated devices		
33.5.1	Conditioning		X
33.5.2	Voltage test		X
33.5.3	Tests on devices with free space		X
33.5.3.1	Apparatus for leakage test on sealed devices		X
33.5.3.2	Leakage test on sealed devices		X
33.5.4	Test for encapsulated devices for luminaires		
33.5.4.1	Thermal cycling test		X
33.5.4.2	Dielectric withstand test		X
33.5.5	Test for sealed devices for luminaires		X
33.6	Assessment and test of energy-limited apparatus and circuits		
33.6.1	General		X
33.6.2	Test conditions		X
33.6.3	Variable components		X
33.7	Tests for restricted-breathing enclosures		
33.7.1	Apparatus with provision for routine checking of restricted-breathing properties		X
33.7.2	Apparatus without provision for routine checking of restricted-breathing properties		X
33.7.3	Apparatus where the nominal volume of the enclosure changes due to pressure		X
33.8	Test for screw lampholders		X
None used.			
33.9	Test for starter holders for luminaires		X
None used.			
33.10	Tests for electronic starters for tubular fluorescent lamps and for ignitors for high pressure sodium or metal halide lamps		
33.10.1	General		X
None used.			
33.10.2	Moisture resistance, insulation and electric strength test		X
33.10.3	Cut-out device test		X
33.10.4	Life test (failed lamp)		
33.10.4.1	Ignitor thermal endurance test		X
33.10.4.2	Evaluation criteria		X
33.11	Test for wiring of luminaires subject to high-voltage impulses from ignitors		X

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
None used.			
33.12	Mechanical shock test for batteries		
33.12.1	General		X
None used.			
33.12.2	Test procedure		X
33.12.3	Evaluation criteria		X
33.13	Insulation resistance test for batteries		
33.13.1	Test conditions		X
33.13.2	Evaluation criteria		X
33.14	Additional ignition tests for large or high-voltage machines		
33.14.1	Test for cage rotor construction		
33.14.1.1	General		X
33.14.1.2	Rotor cage ageing process		X
33.14.1.3	Ignition test		X
33.14.2	Test for stator winding insulation system incendivity		
33.14.2.1	General		X
33.14.2.2	Test conditions		X
33.14.2.3	Steady state ignition test		X
33.14.2.4	Impulse ignition test		X
34	Routine verifications and tests		
34.1	General	X	
It is the manufacturer's responsibility to do the necessary routine verifications and to ensure that all electrical apparatus complies with the specification.			
34.2	Specific routine tests		
34.2.1	Electric strength test	X	
This test shall be conducted on each newly manufactured or repaired motor. A routine electric strength test of 3000V shall be conducted on the motor for a duration of at least 100ms.			
34.2.2	Alternate dielectric strength test		X
34.2.3	Restricted-breathing routine test		X
34.2.4	Routine tests for electronic starters and ignitors		X
35	Marking		
35.1	General	X	
The electrical apparatus shall be marked on the main part in a visible place. This marking shall be legible and durable, taking into account possible chemical corrosion. Refer to clause 5 of this report.			
35.2	Additional marking for batteries		X
35.3	Examples of marking ³	X	
Refer to clause 5 of this report.			
35.3.1	Warning markings	X	

SANS 60079-15: 2006 Ed 3 IEC 60079-15: 2005 Ed 3			
Clause	Description	VERDICT	
		Comply	N/A
36	Documentation	X	
The manufacturer supplied adequate documentation.			
37	Instructions	X	
The manufacturer shall supply installation instructions with each unit offered for sale.			

SANS 61241-0: 2005 Ed 1 IEC 61241-0: 2004 Ed 1			
Clause	Description	VERDICT	
		Comply	N/A
1	SCOPE		
2	NORMATIVE REFERENCES		
3	TERMS AND DEFINITIONS		
4	CONSTRUCTION		
4.1	General	X	
The motor was evaluated to the requirements of SANS 60079-0, SANS60079-15, SANS 61241-0 and SANS 61241-1.			
4.2	Principles for design and testing of apparatus for use in Zone 20		X
The motor is intended for use in a Zone 21 environment.			
4.3	Opening enclosures		X
The motor was not equipped with capacitors.			
4.4	Environmental conditions		X
No other environmental conditions were specified by the manufacturer.			
5	TEMPERATURES		
5.1	Maximum surface temperature	X	
After a temperature test was conducted, a temperature rating of T4 was allocated to the motor.			
5.2	Maximum surface temperature with respect to dust layers above 50 mm		X
The test for maximum temperature was conducted without a dust layer present.			
5.3	Ambient temperature	X	
The motor is intended for use in a normal ambient temperature range –20°C to 40°C.			
6	ENCLOSURE MATERIALS		
6.1	Non-metallic enclosures and non-metallic parts of enclosures		X
The non-metallic part did not form part of the enclosure. Only the fan part of the motor was manufactured of a plastic material.			
6.1.1	Material specification	X	
6.1.2	Plastic materials	X	
All non-metallic materials used are specified in the manufacturer's documentation submitted.			
6.1.3	Verification of compliance	X	
6.1.4	Thermal endurance		
6.1.4.1	Temperature index	X	
6.1.4.2	Endurance to heat and cold and light		X
6.1.5	Electrostatic charges		X
6.1.5.1	Material characteristics		X
6.1.5.2	Limited capacitance or grounding		X
6.2	Enclosures containing light metals		
6.2.1	Composition	X	
All light metals used are located on the inside of the motor housing.			

SANS 61241-0: 2005 Ed 1 IEC 61241-0: 2004 Ed 1			
Clause	Description	VERDICT	
		Comply	N/A
6.2.2	Threaded holes		X
7	FASTENERS		
7.1	Access to live parts	X	
As shown in the manufacturer's documentation, all parts are bolted down with adequate bolts (fasteners).			
7.2	Compatible material	X	
Refer to manufacturer's documentation.			
8	INTERLOCKING DEVICES		X
None used.			
9	BUSHINGS		
9.1	Prevention of turning		X
None used.			
9.2	Torque tests		X
10	MATERIALS USED FOR CEMENTING		
10.1	Documentation		X
None used.			
10.2	Thermal stability		X
10.3	Verification		X
11	Ex COMPONENTS		
11.1	General		X
The motor was not certified as an Ex component.			
11.2	Mounting		X
11.3	Internal mounting		X
11.4	External mounting		X
12	CONNECTION FACILITIES AND TERMINAL COMPARTMENTS		
12.1	Attached cables	X	
The motor was manufactured with a cable permanently attached. The symbol "X" will be added to the marking to indicate the need for adequate connection of the free end of the cable.			
12.2	Terminal access	X	
Ample connection space is available.			
12.3	Creepage and clearance	X	
As shown in the manufacturers drawing no: 10000764100, the terminal blocks used had ribs in place. The minimum clearance was measured and found to be 8.47mm. The minimum crepage is 14.25mm.			
13	CONNECTION FACILITIES FOR EARTHING OR BONDING CONDUCTORS		
13.1	Internal connection	X	
Refer to the documentation supplied by the manufacturer.			
13.2	External connection	X	
Refer to the documentation supplied by the manufacturer.			
13.3	Facility not required		X
Adequate earthing was applied on the inside of the motor.			
13.4	Effective connection	X	

SANS 61241-0: 2005 Ed 1 IEC 61241-0: 2004 Ed 1			
Clause	Description	VERDICT	
		Comply	N/A
The size of the internal earth cable shall be as stated in this table.			
	Cross-sectional area of phase conductors, S mm ²	Minimum cross-sectional area of the corresponding protective conductor, S _p mm ²	
	S ≤ 16 16 < S ≤ 35 S > 35	S 16 0.5 S	
External earth connectors shall have a protective conductor of at least 4mm ² .			
13.5	Effective contact	X	
13.6	Environmental		X
13.7	Use of light metal	X	
14	CABLE AND CONDUIT ENTRIES		
14.1	Intended use	X	
14.2	Construction	X	
Only approved cable glands, mentioned in the manufacturer's installation instructions may be used on the equipment.			
14.3	Integral part of the apparatus	X	
14.4	Prevention of twisting	X	
14.5	Method of attaching	X	
14.6	Blanking elements	X	
Only approved blanking elements, conforming to the manufacturer's installation instructions may be used.			
14.7	Branching point temperatures	X	
15	RADIATING EQUIPMENT		
None used.			
15.1	Lasers and other continuous wave source		X
15.1.1	Zone 20 and Zone 21		X
15.1.2	Zone 22		X
15.2	Ultrasonic sources		X
15.2.1	Zone 20 and Zone 21		X
15.2.2	Zone 22		X
16	SUPPLEMENTARY REQUIREMENTS FOR SPECIFIC ELECTRICAL APPARATUS – ROTATING ELECTRICAL MACHINES		
16.1	Ventilation openings for external fans	X	
16.2	Construction and mounting of the ventilating systems	X	
16.3	Clearances for the ventilating system for use in Zone 20 or 21	X	
16.4	Materials for external fans and fanhoods	X	
16.4.1	Electrostatic discharge	X	
16.4.2	Thermal stability of plastic materials for use in Zones 20 and 21	X	
16.4.3	Materials containing light metals for use in Zones 20 and 21	X	
17	SWITCHGEAR		
17.1	Flammable dielectric		X
None used.			
17.2	Interlocking		X
17.3	Indication of open position		X
17.4	Openings		X
18	FUSES		
None used.			

SANS 61241-0: 2005 Ed 1 IEC 61241-0: 2004 Ed 1			
Clause	Description	VERDICT	
		Comply	N/A
19	PLUGS AND SOCKETS		X
None used.			
19.1	Plugs and sockets construction		X
19.2	Bolted plugs and sockets		X
19.3	For Zone 21 and Zone 22		X
19.4	Plugs remaining energized		X
20	LUMINAIRES		
20.1	Light transmitting covers		X
A motor was submitted for evaluation and testing.			
20.2	Guards		X
20.3	Mounting		X
20.4	Covers		X
20.5	Parts remaining energized		X
20.6	Types of lamps		X
21	CAPLIGHTS, CAPLAMPS AND HANDLAMPS		
21.1	Leakage		X
A motor was submitted for evaluation and testing.			
21.2	Separate enclosures		X
22	APPARATUS INCORPORATING CELLS AND BATTERIES		
22.1	General		X
No batteries or cells were fitted to the motor.			
22.2	Connection of cells		X
22.3	Characteristics		X
22.4	Compatibility		X
22.5	Limits		X
22.6	Mixture of cells		X
22.7	Interchangeability		X
22.8	Re-charging		X
22.9	Different cells		X
22.10	Leakage		X
22.11	Method of connection		X
22.12	Orientation		X
22.13	Identification of replacement		X
23	VERIFICATION AND TESTS		
23.1	General	X	
The tests were conducted on the motor as applicable.			
23.2	Verification of documents		
23.2.1	General	X	
All documentation supplied by the manufacturer was evaluated and was found to comply.			
23.2.2	Compliance with standards	X	
The motor was tested in accordance with SANS 60079-0, SANS 60079-15, SANS 61241-0 and SANS 61241-1.			
23.3	Compliance of prototype or sample with documents	X	
The sample was evaluated to the documentation supplied by the manufacturer.			
23.4	Type tests		
23.4.1	General	X	
All tests were considered necessary. If certain tests were omitted the reason shall be stated in the specific clause.			
23.4.2	Mechanical tests		

SANS 61241-0: 2005 Ed 1 IEC 61241-0: 2004 Ed 1			
Clause	Description	VERDICT	
		Comply	N/A
23.4.2.1	Test for resistance to impact	X	
The impact test was conducted on the motor fan cover as this was considered to be worst case. The test was conducted at 7J.			
23.4.2.2	Drop test		X
Not a hand held device.			
23.4.2.3	Verification	X	
The damage done after the resistance to impact test did not invalidate (impair) the protection of the motor.			
23.4.3	Test for dust exclusion (degree of protection)	X	
The ingress protection test was conducted under report no: IECEx BAS 10.0099X.			
23.4.4	Torque test for bushings in enclosures for use in Zone 20 or 21		X
None used.			
23.4.4.1	Measurement for maximum surface temperature	X	
After a temperature test was conducted, a temperature rating of T4 was allocated to the motor.			
23.4.4.2	Measurement for surface temperature under excess layer		X
The test was conducted with no layer present.			
23.4.4.3	Temperature control		X
23.4.5	Thermal shock test		X
No glass parts fitted.			
23.4.6	Tests of non-metallic enclosures or of non-metallic parts of apparatus for use in Zone 20 or 21		
23.4.6.1	Ambient temperatures during tests		X
23.4.6.2	Tests of enclosures or parts of enclosures in plastic materials		X
23.4.6.3	Thermal endurance to heat		X
23.4.6.4	Thermal endurance to cold		X
23.4.6.5	Resistance to light		
23.4.6.5.1	General		X
23.4.6.5.2	Tests not applied		X
23.4.6.6	Mechanical tests		X
23.4.6.7	Surface resistivity test		X
23.4.6.8	Ageing test for material used for elastomeric sealing rings	X	
A data sheet on the o-rings and rubber gasket materials were submitted for evaluation.			
24	ROUTINE VERIFICATIONS AND TESTS	X	
It is the manufacturer's responsibility to do the necessary routine verifications and to ensure that all electrical apparatus complies with the specification. Refer to SANS 61241-1 for the routine tests.			
25	MANUFACTURER'S RESPONSIBILITY	X	
It is the manufacturer's responsibility to supply installation instructions with each unit offered for sale.			
26	VERIFICATIONS AND TESTS ON MODIFIED OR REPAIRED ELECTRICAL APPARATUS	X	
Approved mark holders and test laboratories may conduct the testing and verification on repaired units. If modifications are made, this shall be brought to the attention of the test lab.			
27	CLAMPING TESTS OF CABLE ENTRIES FOR NON-ARMOURED AND BRAIDED CABLES		
27.1	Cable entries with clamping by the sealing ring		
27.1.1	Clamping test	X	
Only approved cable glands, mentioned in the manufacturer's installation instructions may be used on the equipment.			
27.1.2	Elastomeric sealing rings		X
27.1.3	Non-circular cables		X
27.1.4	Metallic sealing rings		X

SANS 61241-0: 2005 Ed 1 IEC 61241-0: 2004 Ed 1			
Clause	Description	VERDICT	
		Comply	N/A
27.1.5	Cable slippage		X
27.2	Cable entries with clamping by filling compound		
27.2.1	Clamping test		X
27.2.2	Compound		X
27.2.3	Cable slippage		X
27.2.4	Verification		X
27.3	Cable entries with clamping by means of a clamping device		
27.3.1	Types of cable		X
27.3.2	Samples		X
27.3.3	Test set-up		X
27.4	Tensile test		
27.4.1	Test set-up		X
27.4.2	Verification		X
27.5	Mechanical strength		X
27.5.1	General		X
27.5.2	Mechanical strength		X
27.5.3	Verification of sealing ring		X
27.5.4	Verification of compound		X
28	CLAMPING TESTS OF CABLE ENTRIES FOR ARMOURED CABLES		
28.1	Clamping tests where the armourings are clamped by a device within the gland		
28.1.1	General		X
No cable entries were certified as part of this approval.			
28.1.2	TENSILE TEST		X
28.1.3	Mechanical strength		X
28.2	Clamping tests where the armourings are not clamped by a device within the gland		X
29	MARKING		
29.1	General	X	
The electrical apparatus shall be marked on the main part in a visible place. This marking shall be legible and durable, taking into account possible chemical corrosion. Refer to clause 5 of this report.			
29.2	Marking of all electrical apparatus	X	
The motor shall be marked on the main part in a visible place. This marking shall be legible and durable, taking into account possible chemical corrosion.			
29.3	Multiple protection techniques		X
None used.			
29.4	Order of marking	X	
Refer to clause 5 of this report.			
29.5	Reduced marking		X
Refer to clause 5 of this report.			
30	EXAMPLES OF MARKING	X	
Refer to clause 5 of this report.			
30.1	Apparatus type of protection "mD" for use in Zone 20		X
30.2	Apparatus type of protection "iaD" for use in Zone 20		X
30.3	Apparatus type of protection "pD" for use in Zone 21		X
30.4	Apparatus type of protection "tD", Practice A (see IEC 61241-1); temperature tested under 500 mm dust layer, for use in Zone 21	X	
30.5	Apparatus type of protection "tD", Practice B (see IEC 61241-1) for use in Zone 22		X

SANS 61241-0: 2005 Ed 1 IEC 61241-0: 2004 Ed 1			
Clause	Description	VERDICT	
		Comply	N/A
30.6	Apparatus type of protection "tD", Practice A (see IEC 61241-1) for use in Zone 22		X

SANS 61241-1: 2005 Ed 1 IEC 61241-1: 2004 Ed 1			
Clause	Description	VERDICT	
		Comply	N/A
1	SCOPE		
2	NORMATIVE REFERENCES		
3	TERMS AND DEFINITIONS		
4	CONSTRUCTION		
5	Practice A and practice B	X	
Practice A was used.			
6	Supplementary requirements for electrical apparatus protected by enclosures for practice A for use in zone 20, 21 and 22	X	
As per SANS 10108, all Ex tD equipment has to have an IP rating of IP65.			
7	Supplementary requirements for electrical apparatus protected by enclosures for practice B for use in zone 20 or 21		
7.1	Joints		X
Practice A was used.			
7.1.1	Plain joints		
7.1.2	Spigotted joints		X
7.1.3	Gasketed joints		X
7.2	Operating rods, spindles or shafts		X
7.2.2	Running contact seals		
7.2.3	Power shafts		X
7.2.4	Operating rods		X
7.3	Clearance of bolts		X
8	Verification and tests		
8.1	General	X	
The motor was tested in accordance with SANS 60079-0, SANS 60079-15, SANS 61241-0 and SANS 61241-1.			
8.2	Type tests	X	
8.2.1	Test for dust exclusion by enclosures		
8.2.1.1	General	X	
Refer to clause 23.4.3 of SANS 61241-0 of this report.			
8.2.1.2	Dust-tight apparatus for practice A	X	
Refer to clause 23.4.4.1 of SANS 61241-0 of this report.			
8.2.1.3	Dust-protected apparatus for practice A	X	
8.2.1.4	Dust-tight apparatus for practice B		X
Practice A was used.			
8.2.1.5	Dust protected apparatus for practice B		X
8.2.2	Thermal tests	X	
Refer to clause 23.4.4.1 of SANS 61241-0 of this report.			
9	Marking		
Refer to clause 5 of this report.			

5. MARKING

The following (or similar) information had to be clearly and permanently marked on all unit(s) covered by this report:

Zest Electric Motors (Pty) Ltd

Electrical Motor

Model : WQuattro Frame sizes 63 to 355

Manufacturer : WEG

Serial No (s) : ----

Ex nA IIC T3 (200°C) and Ex tD A21 IP65 T125°C...T160°C

IA Number : S-XPL/12.0402 X

6. DOCUMENTATION

The following documents were provided as part of the approval:

No	Type	Description/Identification
1	WEG Drawings	Drg No: 10000841903
		Drg No: 10000812709
		Drg No: 10000769534
		Drg No: 10000882056
		Drg No: 10000829702
		Drg No: 10001261651
		Drg No: 10000825597
		Drg No: 10000829695
		Drg No: 10001069350
		Drg No: 10001068564
		Drg No: 10000824093
		Drg No: 10000764190
		Drg No: 10000764081
		Drg No: 10000791612
		Drg No: 10000810379
		Drg No: 10000810205
		Drg No: 10000809526
		Drg No: 10000808610
		Drg No: 10000821948
		Drg No: 10000813619
Drg No: 10000809195		
Drg No: 10000809041		
Drg No: 10000782532		
Drg No: 10000807863		
Drg No: 10000780290		
Drg No: 10000788277		
Drg No: 10000785710		

No	Type	Description/Identification
		Drg No: 10000803028
		Drg No: 10000795069
		Drg No: 10000807646
		Drg No: 10000792528
		Drg No: 10000779323
		Drg No: 10000791098
		Drg No: 10000781306
		Drg No: 10000807266
		Drg No: 10000765631
		Drg No: 10000764496
		Drg No: 10000765594
		Drg No: 10000764451
		Drg No: 10000769507
		Drg No: 10000769493
		Drg No: 10000764565
		Drg No: 10000764020
		Drg No: 10000764522
		Drg No: 10000791210
		Drg No: 10000764100
		Drg No: 10000769392
2	WEG Instructions manual for installation	Low and High voltage electric motors
3	Reduced Voltage Test	Delba job no: A120821
4	Belmec Technical Data Sheet	WEG DES TCE 44E R02
5	Laminate LMP-B Data Sheet	BTE 051 Rev01
6	WEG certificate	
7	WEG document	Test Instrument List of Electrical Laboratory I
8	WEG EC Declaration of Conformity	EMC Directive 2004/108/EC
9	Material for terminal blocks/plates Data Sheet PTB3.4-10/98	

7. CONDITIONS

7.1 SPECIAL CONDITIONS OF USE (X)

- The T3 internal/external surface temperature class and the T125°C or T160°C external surface temperature classification does not include motor starting or cover motors under duty cycle conditions other than type S1 or S2.
- The installer must ensure that any equipment, certified cable glands and stopping plugs fitted to the terminal boxes are suitably approved. Any unused cable entries must be fitted with certified stopping plugs. When installed the cable gland or stopping plug must maintain the marked IP rating of the enclosure.
- All terminal nuts and screws, whether used or not, shall be correctly tightened.
- When tightening supply connections care should be taken to maintain clearance distances.

- On auxiliary terminals the conductor insulation shall extend to within 1mm of the terminal throat.
- There shall be no loose conductor strands on any terminal.
- Motors designed for variable frequency drives are fitted with stator winding temperature detection devices that must be connected to the motor control circuit. For other starting methods, the connection of the winding temperature detectors is optional. However, when they are installed into the motor control circuit, they must be connected as simple apparatus into intrinsically safe circuits.
- Anti-condensation heaters shall not be energized when the machine is energized.
- Where auxiliary apparatus is fitted that is not covered by this certificate the installer and/or user, as appropriate, must ensure that it is suitable for the conditions of use and that it does not invalidate this certification.

7.2 CONDITIONS OF MANUFACTURE

Refer to Clause 28 of IEC/SANS 60079-0.

8. CONCLUSION

The sample(s) as described in Paragraph 3 above have COMPLIED with the requirements as set out in Paragraph 1.

The approved explosion protection rating of the equipment is: **Ex nA IIC T3 (200 °C) and Ex tD A21 IP65 T125 °C...T160 °C**

Inspection Authority Certificate Number: **S-XPL/12.0402**

9. VALIDITY

This report covers only the unit described in Paragraph 3 of this report. Other identical units will only be covered by:

- additional approvals covering all serial numbers, or
- approval of certified equipment under a product certification scheme accepted by the Department of Mineral Resources and/or the Department of Labour as relevant.

This type approval report remains valid unless modifications are made to the equipment without obtaining prior approval.

Responsible Testing Officer:



D Maree
SANAS Technical Signatory

Reviewed by:



JJ Joubert
Senior Testing Officer

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ANNEX TO CERTIFICATE NO S-XPL/12.0402 X

1. GENERAL

The range of small induction motors has shaft center heights ranging from 63 to 355mm and comprises cast iron or aluminum frames for horizontal or vertical, foot and/or flange mounting. The flanges may be oversize or undersize as required and the shell provides a degree of protection of at IP65. The range covers 2 to 12 pole 3 phase windings for 50 or 60Hz and is designed for connection to supplies up to 1000V for Ex n applications, and up to 1100V for Dust only applications, for duty type S1 or S2. Two speed motors are also included in the range.

Bearing Arrangements

Spigots are machined at either end of the stator frame onto which the machined spigot housings of cast iron end frames are fitted. The end shields carry the bearing arrangements, which are ball, angular contact or roller bearings, and may be grease or oil lubricated.

Optional bearing insulation is available and the bearing housings may be cast or fabricated.

Stator

The stator core packs are built from insulated steel laminations, which are clamped together. The wound and impregnated stator assembly is secured in the stator frame by an interference fit.

Rotor

The rotor core packs, which are built from insulated steel laminations, are interference fit onto the steel shaft. The rotor cage is die-cast aluminum and balancing of the rotor is achieved by fixing washers to cast studs on the aluminum rotors. Double shaft extensions are included in the range.

The construction of the rotor is assessed against Table 6 of IEC 60079-15:2010 and appropriate action taken if the results dictate it is required.

Terminal Arrangement

The motors are fitted with separate bolt-on cast iron terminal boxes fitted with bolt-on covers incorporating a gasket, which is glued to one surface. Main terminal boxes contain cast polyester resin/fiber glass insulator blocks incorporating steel terminal studs, earthing terminals and optionally auxiliary terminals. Auxiliary terminal boxes contain component certified terminals. Details of which are shown below:

Manufacturer Type Certificate Number

IECEX PTB 07.0007U

PTB99ATEX3117U

WAGO Type 264 IECEX PTB 04.0003U

PTB98ATEX3129U

Phoenix Type MZ (D) KEMA98ATEX0545U

K1M5, K1M6, K1M8, K1M10,

K1M12, K1M16 PTB03ATEX1153U

WEG

WA 12/PA66,

WA (SINDAL)

WB 12/PA66 (160V), WB 12/PA66 (500V)

PTB06ATEX1078U

Optionally the auxiliary terminal box may be integrally cast with the main terminal box or be a bolt-on addition to the main terminal box. Any size of terminal box can be fitted to any of the frame sizes within the range as long as they are suitable rated for their intended use and it is physically possible to do so.

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ANNEX TO CERTIFICATE NO S-XPL/12.0402 X

2. SPECIAL CONDITIONS OF USE (X)

- The T3 internal/external surface temperature class and the T125°C or T160°C external surface temperature classification does not include motor starting or cover motors under duty cycle conditions other than type S1 or S2.
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- All terminal nuts and screws, whether used or not, shall be correctly tightened.
- When tightening supply connections care should be taken to maintain clearance distances.
- On auxiliary terminals the conductor insulation shall extend to within 1mm of the terminal throat.
- There shall be no loose conductor strands on any terminal.
- Motors designed for variable frequency drives are fitted with stator winding temperature detection devices that must be connected to the motor control circuit. For other starting methods, the connection of the winding temperature detectors is optional. However, when they are installed into the motor control circuit, they must be connected as simple apparatus into intrinsically safe circuits.
- Anti-condensation heaters shall not be energized when the machine is energized.
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3. MARKING

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Zest Electric Motors (Pty) Ltd

Electrical Motor

Model : WQuattro Frame sizes 63 to 355

Manufacturer : WEG

Serial no. : ----

Ex nA IIC T3 (200 °C) and Ex tD A21 IP65 T125 °C...T160 °C

IA No. : S-XPL/12.0402 X

Responsible Testing Officer:



D Maree
SANAS Technical Signatory

Reviewed by:



JJ Joubert
Senior Testing Officer

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This report supersedes all previous documents bearing the reference no XPL/13135/12.0402.