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GOVERNMENT APPROVED TEST LABORATORY

IN TERMS OF ARP 0108: "REGULATORY REQUIREMENTS FOR EXPLOSION PROTECTED APPARATUS"

IA CERTIFICATE

Date Issued: **02 May 2017**
*Expiry date: **02 May 2020**

Issue: 0

Ex – Type Examination Certificate

Certificate Number:	**S-XPL/17.0489 X**
Equipment:	**The W22 Range of Small Induction Motors**
Model / Type:	**Frame Sizes 63 to 355**
Applicant:	**Zest WEG Electric (Pty) Ltd** **PRIVATE BAG X 10011** **SANDTON** **2146**
Manufacturer:	**WEG Equipamentos Eletricos S.A**
Serial No:	All serial numbers imported between issued- and expire date and all serial numbers covered by a valid report or acceptable product certification mark.

Supplied by
Zest WEG Electric (Pty) Ltd
Identified by Inspection Authority number
S-XPL/17.0489 X

And as described in the Explolabs file number **XPL/18489/17.0489** is hereby certified "Explosion Protected **Ex nA IIC T4 (T3 when anti-condensation heaters are fitted) Gc Ex tc IIIB T125°C Dc IP (see schedule) Ex tb III C T125°C Db IP6X (see schedule) T_{amb} (see schedule)**", having been examined and inspected in accordance with the relevant requirements of South African Standards.

SANS 60079-0: 2012 Ed 5 **IEC 60079-0: 2011 Ed 6**	Explosive atmospheres Part 0: Equipment — General requirements
SANS 60079-15: 2010 Ed 4 **IEC 60079-15: 2010 Ed 4**	Explosive atmospheres Part 15: Equipment protection by type of protection "n"
SANS 60079-31: 2014 Ed 2 **IEC 60079-31: 2013 Ed 2**	Explosive atmospheres Part 31: Equipment dust ignition protection by enclosure "t"

Risk of ignition provided:

Protection afforded	**Equipment Protection Level (EPL)** **Group**	**Performance of protection**	**Conditions of operation**	**T class or Max Surface Temp (°C)**
Enhanced	Gc Group II	Suitable for normal operation	Equipment remains functioning in zone 2	T3 200ºC
High	Db Group III	Suitable for normal operation and frequently occurring disturbances or equipment where faults are normally taken into account	Equipment remains functioning in zones 21 and 22	T125ºC

Enhanced	Dc Group III	Suitable for normal operation	Equipment remains functioning in zone 22	T125ºC

1. GENERAL

The W22 Range of Small Induction Motors has shaft center heights ranging from 63 to 355mm and comprises cast iron or aluminium 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 least IP55 for equipment Group II and IP65 for equipment Group III applications. The range covers 2 to 12 pole 3 phase windings for 50 or 60Hz and is designed for connection to supplies up to 1000V, and up to 1100V for Dust only applications, for duty type S1 or S2. Two speed motors are also included in the range.

The W22 Range of Small Induction Motors has shaft centre heights ranging from 63 to 355mm (and NEMA equivalent) and comprises cast iron or aluminium 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 least IP55 for equipment Group II and IP65 for equipment Group III applications. The range covers 2 to 12 pole 3 phase windings for 50 or 60Hz and is designed for connection to supplies up to 1000V, and upto 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 aluminium and balancing of the rotor is achieved by fixing washers to cast studs on the aluminium 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/fibre glass insulator blocks incorporating steel terminal studs, earthing terminals and optionally auxiliary terminals.

Auxiliary terminal boxes contain IECEx component certified terminals. Details of which are shown below:

Manufacturer	Type	Certificate Number
BARTEC	07-9702-0*2*/****	IECEx PTB 07.0007U
WAGO	Type 264	IECEx PTB 04.0003U
Phoenix	Type MZ(D)	Another national or regional Ex conformity assessment Scheme.
WEG	K1M4, K1M5, K1M6, K1M8, K1M10, K1M12, K1M16	Another national or regional Ex conformity assessment Scheme.
	WA 12/PA66, WA (SINDAL) WB 12/PA66 (160V), WB 12/PA66 (500V)	Another national or regional Ex conformity assessment Scheme.

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.

Ventilation

Various methods of cooling are used including TEBC, TEFC, TEAO or TENV. For TEBC versions a separately IECEx certified blower motor is utilised and optionally an IECEx certified encoder may be attached to the main motor shaft.
External fans when used are manufactured from polypropylene, cast iron, bronze or aluminium containing less than 6% magnesium.

Windings
The low voltage motors are wound using polyester-imide enamel wire with the overhangs suitably insulated and tied with string in order to compact them and keep the insulation between phases in place.

Use of Variable Voltage Variable Frequency Drives

The W22 range of small motors may be operated with frequency inverters (variable speed drives) in the following conditions:
- For a motor to operate with the restriction of optimal flux the motor has to be IE2 High Efficiency rated or higher and the motoris to be supplier by a WEG inverter (Type CFW09 version 2.40 or higher, or the CFW11) and be de-rated according to WEG's de-rating curve.
- Use of WEG PWM inverters (variable speed drives) or equivalent brand with carrier frequency from 2000 Hz up to 20000 Hz,with a frequency range up to 100 Hz or in accordance with manufacturer's recommendations.
- When motors are operated below 50 or 60 Hz (nominal frequency) with constant torque loads, a de-rating factor as per WEG's de-rating Curve for Motors fed by Inverters shall be applied.
- Motors shall be fitted with thermal protective devices which shall be connected into the motor control circuit in order to maintain the T3 internal/external surface temperature class and/or the T125°C or T160°C external surface temperature classification for dust applications.

Auxiliaries
The auxiliaries which may be fitted to this range of machine are:-
- Anti-condensation heaters.
- Winding and bearing temperature detectors comprising RTD's, thermocouples, thermistors or thermostats.
- Vibration monitoring sensors.

Ambient Temperatures
The standard temperature range of the motors is -20°C to +50°C. By the choice of suitable materials and use of the de-rating data called up on the drawings an ambient range of -55°C to 80°C may be achieved. Individual motors must be marked according to the build of the unit.

Ingress Protection Rating

The ingress protection rating of the motors depend on the shaft seal used:

Shaft seal	IP rating
Lip or V ring	IP55
Oil	IP55 to IP66
Taconite labyrinth	IP55 and IP65
Labyrinth (W3)	IP55 to IP66
W Seal	IP55 to IP66
Inproseal	IP55 and IP65

Variation 0.1

The motors can be marked with an alternative surface temperature of T160°C.

2. INSTALLATION INSTRUCTIONS

It is the manufacturer's responsibility to supply installation instructions with each unit offered for sale as required by IEC/SANS 60079-0 Clause 30.

3. SPECIAL CONDITIONS FOR SAFE USE (denoted by X after certificate number)

1. 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 then type S1 or S2.

2. The installer must ensure that any equipment certified cable glands and stopping plugs fitted to the terminal boxes are suitably IECEx/ATEX approved. Any unused cable entries must be fitted with IECEx/ATEX certified stopping plugs. When installed the cable gland or stopping plug must maintain the marked IP rating of the enclosure.

3. All terminal nuts and screws, whether used or not, shall be correctly tightened.

4. When tightening supply connections care should be taken to maintain clearance distances.

5. On auxiliary terminals the conductor insulation shall extend to within 1mm of the terminal throat.

6. There shall be no loose conductor strands on any terminal.

7. 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. The stator RTDs and thermistors can be connected via a standard industrial controller provided that the controller is located in a safe area.

8. Anti-condensation heaters shall not be energised when the machine is energised.

9. 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.

10. Motors certified for dust only environments will have no restriction on the supply connections to any internal RTDs or thermistors.

Based on the following documentation: IECEx BAS 10.0099X

4. CONDITIONS OF CERTIFICATION

- All production units must be covered by a QAN (Quality Assurance Notification), Product Mark Scheme or batch evaluation.

5. MARKING

The following (or similar) information have to be clearly and permanently marked on all units:

Supplier : Zest WEG Electric (Pty) Ltd
Manufacturer : WEG Equipamentos Eletricos S.A
Equipment : The W22 Range of Small Induction Motors
Model/Type : Frame Sizes 63 to 355
Serial No. : ---
Ex Rating : Ex nA IIC T4 (T3 when anti-condensation heaters are fitted) Gc Ex tc IIIB T125°C Dc IP (see schedule) Ex tb III C T125°C Db IP6X (see schedule)
IA Certificate No : S-XPL/17.0489 X

This certification indicates compliance with R10.1 of the Mines Health and Safety Act and/or EMR 9(2) of the Occupational Health and Safety Act, provided that the apparatus is used as relevant in accordance with:

i) SANS 10086 and IEC/SANS 61241-14 requirements as applicable;
ii) Any conditions mentioned in the above report;
iii) Any relevant requirements and codes of practice enforced in terms of the Mine Health and Safety Act or Occupational Health and Safety Act; and
iv) Any restrictions and conditions enforced by the Chief Inspector of Mines or the Principal Inspector or the Chief Inspector: Occupational Health and Safety.
v) A revision certificate replaces all previous version of the certificate.
vi) * - Only covers equipment Imported between the “Issued” and “Expire” dates.
vii) If and when your QAN (Quality Assurance Notification) Certificate for your equipment manufacturer expires during the valid period of the IA Certification (issued for your equipment) and a new certificate is not submitted the existing IA Certification will then be cancelled. It is thus the client’s responsibility to always submit the updated and valid QAN certificate(s) to Explolabs (Pty) Ltd.

Responsible Testing Officer:

D Maree
Senior Testing Officer

Reviewed by:

H De Wet
Testing Officer

EXPLOLABS EXPLOSION PREVENTION SERVICES

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