GOVERNMENT APPROVED INSPECTION AUTHORITY

Mining And Surface Certification (Pty) Ltd

2015/021934/07

THIS CERTIFICATE IS ISSUED AS AN I.A. CERTIFICATE IN TERMS OF THE MINE HEALTH AND SAFETY ACT, ACT NO 29 OF 1996 (AND REGULATIONS), THE OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993) AND REGULATION 17 OF THE ELECTRICAL MACHINERY REGULATIONS

IA CERTIFICATE	MASC MS/19-8013X	**Issue**	2
Issue Date	30 May 2022 2020	**Expiry Date**	30 May 2025
***Based on Certificate No**	IECEx BAS 13.0008X IECEx BAS 13.0045X IECEx BAS 13.0142X IECEx INE 16.0044X IECEx INE 16.0060X	**Issue / Variations / Amendment**	3 3 5 3 3
Requested by	ZEST WEG Group, 47 Galaxy Avenue, Linbro Business Park, Sandton, South Africa		
Manufacturer	See applicable Base certificate*		
Description	See “Annex A” below		
Equipment	Refer to Table 1 Annex A below	**Type**	Refer to Table 1 Annex A below

MARKING: **Original marking as per certificate * remains applicable.** **IA number to be added.**	**Type** **Ex Marking** **IA Number** **Warnings**	Refer to Table 1 Annex A below Refer to Table 1 Annex A below MASC MS/19-8013X See Base Certificate * and original marking

Compliance:

The equipment as described above has been allocated the rating Explosion Protected ‘as above’ utilizing the SANS/IEC Standards:

- SANS (IEC) 60079-0 2019 General requirements
- SANS (IEC) 60079-1 2015 Flameproof enclosures “d”
- SANS (IEC) 60079-7 2019 Equipment protection by increased safety “e”
- SANS (IEC) 10086-31 2014 Equipment dust ignition protection by enclosure “t”

Note: This certificate covers only the listed standards and does not imply compliance to any other standard, related or inferred. It is up to the manufacturer to ensure that the product complies to all relevant standards for the application.

Special conditions of safe use “X”:

- See “Annex A” below

Conditions of manufacture:

- See “Annex A” below

F. van Wyk
TECHNICAL OFFICER

M. Erasmus
TECHNICAL SPECIALIST

This certificate covers all units sold as long as the QAR/QAN remains valid.
According to the relevant requirements of the MHS Act and the OHS Act, production units of explosion protected equipment are required to comply with third party quality assurance (an approved mark scheme or batch testing by an accredited test laboratory).

Apparatus in hazardous locations is subject to the following provisions as applicable, which shall be adhered to:
SANS 10086 requirements;
Any conditions mentioned in the above report
Any restrictions and conditions enforced by the chief inspector of mines or chief inspector of factories
Any relevant requirements of the MHS Act.

Mining And Surface Certification (Pty) Ltd
Unit 5 Lelyta Park, 45 Jurg Ave, Hennopspark Ext 87
Centurion, 0157

ANNEX A

TABLE 1

Equipment Part No	Ex Rating	Certification
W22X Frame size 71 and 80	**IECEx:** Ex db IIC T4 Gb Ta -55°C to +80°C Ex tb IIIC T125°C Db Ta -55°C to +80°C IP65 (see schedule) Ex db I Mb	**IECEx BAS 13.0008X**
W22X Frame size 90 to 132	**IECEx:** Ex db IIC T4 Gb Ta -55°C to +80°C or Ex db eb IIC T4 Gb Ta -55°C to +80°C Ex tb IIIC T125°C Db Ta -55°C to +80°C IP65 (see schedule) Ex db I Mb Ex db eb I Mb	**IECEx BAS 13.0045X**
W22X Frame size 160 to 200	**IECEx:** Ex db IIC T4 Gb Ta -55°C to +80°C or Ex db eb IIC T4 Gb Ta -55°C to +80°C Ex tb IIIC T125°C Db Ta -55°C to +80°C IP65 (see schedule) Ex db I Mb Ex db eb I Mb	**IECEx BAS 13.0142X**
W22Xdb Frame size 225 and 250	**IECEx:** Ex db IIB or IIC T6...T2Gb Ex db eb IIB or IIC T6...T2 Gb Ex db I Mb Ex db eb I Mb Ex tb IIIC T85°C... T300°CDb IP55/56/65/66	**IECEx INE 16.0060X**
W22Xdb Frame size 280 – 355	**IECEx:** Ex db IIB or IIC T6...T2Gb Ex db eb IIB or IIC T6...T2 Gb Ex db I Mb Ex db eb I Mb Ex tb IIIC T85°C... T300°CDb IP55/56/65/66 T.amb: -55°C up to +80°C for size 280 for gases T.amb: -20°C up to +80°C for size 315 and 355, for gas group IIC T.amb: -55°C up to +80°C for size 315 and 355, for gas group IIB T.amb: -55°C up to +80°C for dusts	**IECEx INE 16.0044X**

Mining And Surface Certification (Pty) Ltd Reg No: 2015/021934/07
Directors: Roelof Viljoen & Francois du Toit
Unit #5, Lelyta Park, 45 Jurg Avenue, Hennopspark Ext 87, Centurion, 0157
P.O. Box 14344, Clubview, 0014
Tel: 012 653 2959 ◊ Fax: 086 605 8568
e-mail: **info@masc-ex.co.za**

DESCRIPTION OF EQUIPMENT:

W22X Frame Size 71 to 80

The range of induction motor of frame size 71 and 80 (and NEMA equivalent) comprises of a stator frame, endshields and main and auxiliary terminal boxes all fabricated from cast iron. The single ended drive shaft has an external cooling fan at the non-drive end. All cover fasteners are grade 8.8/12.9 steel or grade A2/4-70 or 80 stainless steel.

The frames are provided with a terminal neck for the main terminal box. A single auxiliary terminal box may be attached to the side of the main terminal box.

The motors have rolling element bearings,are foot or flanged mounted for horizontal and vertical use and may be provided with anti- condensation heaters rated up to 7.5W.

The motors are rated from 220V to 1140V when supplied with an Ex db terminal box. With a frequency of 50Hz/60Hz or variable frequency up to a maximum of 120Hz when supplied from a type PWM inverter manufactured by WEG or any other inverter having identical parameters affecting the thermal performance of the motor. The maximum voltage on the auxiliary terminals is 440V.

The motors have a maximum rating as indicated below for use in a maximum ambient temperature of 40°C when continuously rated for S1 duty and connected to a 3 phase supply having form and symmetry not worse than that defined in IEC 60034-1 and operated within the defined voltage and frequency limits for Zone B.

Frame size	71	80
Maximum output (kW)	0.75	1.5
Poles	2-12	2-10

The motors are de-rated in accordance with the manufacturer's instructions for use with variable frequency supplies, a maximum ambient temperature between 40°C and 80°C, altitudes above 1000m, S2 to S9 duty and a service factor of 1.0 to 1.25.

The motors can be provided with various seal arrangements and materials for ingress protection IP55, IP56, IP65 and IP66 to a maximum temperature of 160° C.

Options include a double ended shaft,integral leads, anti-condensation heaters, thermal protectors, and a breather-drain to IECEx CSA 12.0005U.

Cable entry holes are provided as specified on the certified drawings for the accommodation of flameproof cable entry devices,with or without the interposition of a flameproof thread adapter. Unused entries are to be fitted with suitable certified flameproof stopping plugs.

The cable entry devices, thread adapters and stopping plugs shall be suitable for the equipment, the cable and the conditions of use and shall be certified as Equipment (not a Component).When used in an explosive dust atmosphere the cable entry devices shall maintain the ingress protection of the enclosure

Variation 1.1

The motors may be alternatively marked for gas groups IIA, IIB, I, dust groups IIIB, IIIA, temperature classifications of T6, T5, T3 and T2 without an increase in ambient temperature above 80°C, ingress protection IP5X, IP6X, gas and dust only as indicated below.

Ex db I T* Ta - **°C to + **°C Mb

Ex tb III* T***°C Ta - **°C to + **°C Db IP**

Ex db I Mb

Optional conditions: VFD use T5 at 60°C ambient temperature and T6 at 50°C ambient temperature.

W22X Frame Size 90 to 132

The range of induction motor of frame size 90 to 132 (and NEMA equivalent) comprises a stator frame, endshields and main and auxiliary terminal boxes all fabricated from cast iron. The single ended drive shaft has an external cooling fan at the non-drive end. The terminal box cover fasteners are grade 8.8/12.9 steel or grade A2/4-70 or 80 stainless steel.

The frames are provided with a terminal neck for the integral main terminal box. A single auxiliary terminal box may be attached to the side of the main terminal box. The wall between the terminal box and the motor frame is provided with flameproof potted cable bushings for the winding tails and auxiliary cables for thermal sensors etc. The terminal boxes may be designated flameproof Ex db, or increased safety Ex eb.

The motors have rolling element bearings, are foot or flanged mounted for horizontal and vertical use and may be provided with anti- condensation heaters rated as indicated below.

The motors are rated from 220V to 1140V when supplied with an Ex db terminal box, or from 220V to 690V when supplied with an Ex eb terminal box, 50/60Hz or variable frequency up to a maximum of 120Hz when supplied from a type PWM inverter manufactured by WEG or any other inverter having identical parameters affecting the thermal performance of the motor. The maximum voltage on the auxiliary terminals is 440V.

The motors have a maximum rating as indicated below for use in a maximum ambient temperature of 40°C when continuously rated for S1 duty and connected to a 3 phase supply having form and symmetry not worse than that defined in IEC 60034-1 and operated within the defined voltage and frequency limits for Zone B.

Frame size	90	100	112	132
Maximum output (kW)	3.0	4.0	7.5	11.0
Maximum output (kW) with permanent magnet and VFD	4.5	7.5	11.0	22.0
Poles	2 to 12			
Heater (W)	11	11	22	30

The motors are de-rated in accordance with the manufacturer's instructions for use with variable frequency supplies, a maximum ambient temperature between 40°C and 80°C, altitudes above 1000m, S2 to S9 duty and a service factor of 1.0 to 1.25. Alternatively, the motors can be optionally VFD driven and T5 marked at 60°C ambient or T6 marked at 50°C ambient temperature.

The motors can be provided with various seal arrangements and materials for ingress protection IP55, IP56, IP65 and IP66.

Options include permanent magnet, a double ended shaft, integral leads, anti-condensation heaters, thermal protectors, forced ventilation and a breather-drain to IECEx CSA 12.0005U.

Cable entry holes are provided as specified on the certified drawings for the accommodation of flameproof cable entry devices, with or without the interposition of a flameproof thread adapter. Unused entries are to be fitted with suitable certified flameproof stopping plugs.

The cable entry devices, thread adapters and stopping plugs shall be suitable for the equipment, the cable and the conditions of use and shall be certified as Equipment (not a Component).

When used in an explosive dust atmosphere the cable entry devices shall maintain the ingress protection of the enclosure

W22X db Frame Size 160 to 200

The range of induction motor of frame size 160 to 200 comprises a stator frame, endshields and main and auxiliary terminal boxes all manufactured from cast iron. The single ended drive shaft has an external cooling fan at the non-drive end. The terminal box cover fasteners are grade 8.8/12.9 steel or grade A2/4-70 or 80 stainless steel.

The frames are provided with a terminal neck for the main terminal box. A single auxiliary terminal box may be attached to the side of the main terminal box. The wall between the terminal box and the motor frame is provided with flameproof potted cable bushings for the winding tails and auxiliary cables for thermal sensors etc. The terminal boxes may be designated flameproof Ex db, increased safety Ex eb within the provisions of this report or increased safety terminal boxes as permitted on IECEx BAS 10.0099X.

The motors have rolling element bearings,are foot or flanged mounted for horizontal and vertical use and may be provided with anti- condensation heaters rated as indicated below.

The motors are rated from 220V to 1140V when supplied with an Ex db terminal box, or from 220V to 690V when supplied with an Ex eb terminal box, 50/60Hz or variable frequency up to a maximum of 120Hz when supplied from a type PWM inverter manufactured by WEG or any other inverter having identical parameters affecting the thermal performance of the motor. The maximum voltage on the auxiliary terminals is 440V.

The motors have a maximum rating as indicated below for use in a maximum ambient temperature of 40°C when continuously rated for S1 duty and connected to a 3 phase supply having form and symmetry not worse than that defined in IEC 60034-1 and operated within the defined voltage and frequency limits for Zone B.

Frame size	160	180	200
Maximum output (kW)	22	30	45
Poles	2 to 16		
Heater (W)	30	30	38

The motors are de-rated in accordance with the manufacturer's instructions for use with variable frequency supplies, a maximum ambient temperature between 40°C and 80°C, altitudes above 1000m, S2 to S9 duty and a service factor of 1.0 to 1.25.

The motors can be provided with various seal arrangements and materials for ingress protection IP55, IP56, IP65 and IP66.

Options include a double ended shaft,integral leads, anti-condensation heaters, thermal protectors,forced ventilation and a breather-drain to IECEx CSA 12.0005U.

Cable entry holes are provided as specified on the certified drawings for the accommodation of flameproof cable entry devices,with or without the interposition of a flameproof thread adapter. Unused entries are to be fitted with suitable certified flameproof stopping plugs.

The cable entry devices, thread adapters and stopping plugs shall be suitable for the equipment, the cable and the conditions of use and shall be certified as Equipment (not a Component)

When used in an explosive dust atmosphere the cable entry devices shall maintain the ingress protection of the enclosure.

W22Xdb Frame Size 280 to 355

The three phase Asynchronous motor type W22X, frame size 280, 315 and 355, is composed by frame, endshields , terminal box and auxiliary terminal box. It has "Ex db" or "Ex db eb" types of protection for gases or for mines and "Ex tb" type of protection for dusts.

The motor is made from cast iron minimum quality FC200, and the endshields are made from cast iron or welded steel. The frame has a neck where the main terminal box is connected, a single auxiliary terminal box may be connected on the side of the main box.

The main and auxiliary terminal boxes are made from cast iron, steel or stainless steel,and they may be protected by flameproof "db" type of protection or increased safety "eb" type of protection. An additional name plate could be fixed inside the boxes.

Allowed fasteners for terminal boxes are 8.8 or 12.9 quality steel screws or A2/A4-70/80 quality stainless steel screws. Between frame and terminal boxes a flameproof bushing is foreseen.

The motors may in addition be fitted with temperature sensors,anti-condensation heaters vibration sensors and breather-drain device covered by IECEx CSA 12.0005U. Surge arrester can be added only in "Ex db" boxes or in "Ex eb" terminal boxes. But for "Ex eb" terminal boxes, it must be certified and comply with the same minimum distance for terminals.

Different methods of cooling can be used as TEFC, TEBC, TEAO and TENV; an external fan can be installed. The motors get different degrees of protection from IP55 to IP66. The motor can be mounted horizontally or vertically, for vertical use a cowl for the fan is provided.

PARAMETERS RELATING TO THE SAFETY

Nominal supply voltages (for 50Hz or 60Hz):

Terminal box “db”	220V to 1140V
Terminal box “db eb”	220V to 1140V (CELMEX pins)
Terminal box “db eb”	220V to 1100V (PETERS pins)
Terminal box “db eb”	220V to 690V
Auxilary terminals	up to 440V

Frequencies:

Without frequency inverter	50Hz or 60Hz
With frequency inverter	up to 120Hz (2 poles)
Maximum speed	6300 rpm (all poles)

Powers:

The motors have a maximum rating as indicated in the table below, for use ina maximum ambient temperature of +40°C when rated for S1 duty and connected to a 3-phase supply in accordance with IEC 60034-1 and operated within the defined voltage and frequency limits for zone B:

Motor Size	280	315	355
Maximum output power	150 kW	345 kW	440 kW
Poles	2 to 24		
Heater power	140 W	140 W	174 W

The motors may be de-rated in accordance with manufacturer's instructions for use with variable frequency supplies, a maximum ambient temperature between +40°C and +80°C, altitudes above 1000 m, S2 to S9 duty and a service factor of 1.0 to 1.25.

Mining And Surface Certification (Pty) Ltd Reg No: 2015/021934/07
Directors: Roelof Viljoen & Francoius du Toit
Unit #5, Lelyta Park, 45 Jurg Avenue, Hennopspark Ext 87, Centurion, 0157
P.O. Box 14344, Clubview, 0014
Tel: 012 653 2959 ◊ Fax: 086 605 8568
e-mail: **info@masc-ex.co.za**

W22Xdb Frame Size 225 and 250

The three phase Asynchronous motor type W22X, frame size 225 and 250, is composed by frame, endshields, terminal box and auxiliary terminal box and it has "Ex db" or "Ex db eb" types of protection for gases or for mines, and "Ex tb" type of protection for dusts.

The motor is made from cast iron minimum quality FC200, the frame has a neck where the main terminal box is connected,a single auxiliary terminal box may be connected on the side of the main box. The endshields are made from cast iron or welded steel.

The main and auxiliary terminal boxes may be protected by flameproof "db" type of protection or increased safety "eb" type of protection. They are made from cast iron, steel or stainless steel.

For main and auxiliary terminal boxes, a nameplate could be fixed inside the boxes.

Allowed fasteners for terminal boxes are 8.8 or 12.9 quality steel screws or A2/A4-70/80 quality stainless steel screws between frame and terminal boxes a flameproof bushing is foreseen.

The motors may in addition be fitted with temperature sensors,anti-condensation heaters, vibration sensors and breather-drain device Ex certified. Surge arrester can be added in Ex "db" boxes or in Ex "eb" terminal boxes. But for Ex "eb" terminal boxes, it must be certified and comply with the same minimum distance for terminals.

Different methods of cooling can be used as TEFC, TEBC, TEAO and TENV; an external fan can be installed. The motors get different degrees of protection from IP55 to IP66. Motor can be mounted horizontally or vertically,for vertical use a cowl for the fan is provided.

PARAMETERS RELATING TO THE SAFETY

Nominal supply voltages (for 50Hz or 60Hz):

Terminal box “db”	220V to 1140V
Terminal box “db eb”	220V to 1140V (CELMEX pins)
Terminal box “db eb”	220V to 1100V (PETERS pins)
Terminal box “db eb”	220V to 690V
Auxilary terminals	up to 440V

Frequencies:

Without frequency inverter	50Hz or 60Hz
With frequency inverter	up to 120Hz (2 poles)
Maximum speed	6300 rpm (all poles)

Powers:

The motors have a maximum rating as indicated in the table below, for use in a maximum ambient temperature of +40°C when rated for S1 duty and connected to a 3-phase supply in accordance with IEC 60034-1 and operated within the defined voltage and frequency limits for Zone B:

Motor Size	225	250
Maximum output power	75 kW	90 kW
Poles	2 to 24	
Heater power	56 W	56 W

The motors may be de-rated in accordance with manufacturer's instructions for use with variable frequency supplies, a maximum ambient temperature between +40°C and +80°C, altitudes above 1000 m, S2 to S9 duty and a service factor of 1.0 to 1.25.

Mining And Surface Certification (Pty) Ltd Reg No: 2015/021934/07
Directors: Roelof Viljoen & Francoius du Toit
Unit #5, Lelyta Park, 45 Jurg Avenue, Hennopspark Ext 87, Centurion, 0157
P.O. Box 14344, Clubview, 0014
Tel: 012 653 2959 ◊ Fax: 086 605 8568
e-mail: **info@masc-ex.co.za**

SPECIAL CONDITIONS OF USE (X):

W22X Frame Sizes 71 and 80, 90 to 132, 160 to 200:

- The flamepath gaps are less that those permitted by IEC60079-1 for gas group IIC and shall not be enlarged in service.
- The motors may be provided with integral leads, which must be suitably protected and terminated within an enclosure suitable for the conditions of use.
- When provided with a breather-drain to IECEx CSA 12.0005U the motors are excluded from Group I, and are limited to temperature classification T5 to T2 Ta -55 °C to + 50 °C , or T4 to T2 Ta -55 °C to + 80 °C , and have an IP rating of IP6X.
- The maximum surface temperature was determined without a dust layer. The end user shall prevent a dust layer forming on the motors.
- After de-energising a delay 60 minutes is required before opening.
- Cable glands shall be suitably IECEx certified as equipment.
- Only suitably certified cable gland and stuffing boxes can be fitted on the Group I terminal boxes. (Condition only applicable to frame size 160 to 200.)
- When fitted with the separated terminal box a suitably IECEx Ex equipment certified cable entry device may be provided by the manufacturer and installed with cable in compliance with IEC 60079-14.

W22X Frame Sizes 225 and 250, as well as 280 to 355:

- The motors may be provided with integral leads, which must be suitably protected and terminated within an enclosure suitable for the conditions of use.
- The maximum surface temperature was determined without a dust layer. If installed in dust area (group III), the end user shall prevent a dust layer forming on the motors.
- The breather element has a maximum heating of 45K, it can be installed on motor with maximum reference pressure of 30 bar, a free internal volume of 160 litres and it is allowed only for groups II or III. (Condition only applicable to frame sizes 280 to 355)
- The width of flameproof joints is greater than the values specified in the tables of the IEC 60079-1 standard. The depth engagement of flameproof joints is greater than the values specified in the tables of the IEC 60079-1 standard. The gap of the different flameproof joints is lower than the values specified in the tables of the IEC 60079-1 standard. For any repair, contact the manufacturer.
- The yield stress of the fastener elements of the flameproof terminal boxes must be equal to class 8.8 or 12.9 or stainless steel A2-70/80 or A4-70/80.

Conditions of Certification:

- This IA Certificate covers all units sold from the date of this document to the expiry date of this certificate.
- As per ARP 0108 a maximum three yearly review is required on this IA Certificate (expiry is determined as per the QAR/QAN/QMS expiry date).
- The apparatus must be additionally marked with the MASC marking details above.
- This approval only covers the equipment as certified above and does not include any scheduled additions or variations / amendments / new issues to the certificate(s), made after the above date.
- The equipment does not need to be re-tested when used on the conditions and with such restrictions as prescribed by the certificate on which this IA Certificate is based and any other conditions in this IA Certificate.
- The certification on which this IA Certificate is based must remain valid.
- The extent of the requirements in the ARP 0108 (or regulations), SANS 10108 and any other applicable regulations on the certification of the equipment must remain unchanged.
- The Ex quality assurance notification/report for the equipment must remain valid.

Conclusion:

From the above and the selective examination of the documentation, nothing contrary to the requirements of the applicable standards was found, provided that the equipment / component is used as described in the above document / certificate and according to the MASC conditions below. A MASC IA certificate is issued based on the work done as per the Base Certificate *. The routine tests for production units according to the Base Certificate * must be complied with (if applicable).