



1 **TYPE EXAMINATION CERTIFICATE**

2 **Equipment Intended for use in Potentially Explosive Atmospheres**
3 **Directive 94/9/EC**

4 Type Examination Certificate Number : **BAS99ATEX3218**

5 Equipment: **W-DF200L TO W-DF355L CAGE INDUCTION MOTORS**

6 Manufacturer: **BROOK HANSEN**

7 Address: **Guiseley, Leeds, LS20 9NZ**

8 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

9 The Electrical Equipment Certification Service certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment of Category 3 intended for use in potentially explosive atmospheres given in Annex II to European Union Directive 94/9/EC of 23 March 1994.

The examination and test results are recorded in confidential Report N°

BASEEFA Certification Report No. 99(C)0424/2 dated 1 October 1999

10 Compliance with the Essential Health and Safety Requirements has been assessed by reference to:


EN 50281-1-1: 1998

except in respect of those requirements listed at item 18 of the Schedule.

11 If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

12 This TYPE EXAMINATION CERTIFICATE relates only to the design of the specified equipment, and not to specific items of equipment subsequently manufactured.

13 The marking of the equipment shall include the following:-

 **II 3 D** **T125°C** **T_{amb}** (see schedule)

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File No: EECS 0245/03/165

This certificate is granted subject to the general conditions of the Electrical Equipment Certification Service. It does not necessarily indicate that the apparatus may be used in particular industries or circumstances.



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DIRECTOR
27 October 1999



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Description of Equipment

Mechanical Construction ~ General

The machines are totally enclosed and have cast iron frames with external cooling fins and are category 3 dust protected machines suitable for use where dust layers are kept below 5mm.

They may be orientated horizontally or vertically and mounted from bolt-on cast iron feet or pads, or from an endshield adaptor at the drive end. This may, in turn, use a skirt base adaptor. These may be made from cast iron or fabricated from steel.

Combinations of these methods of fixing may be used as required.

The endshields are made of cast iron and are bolted to the ends of the frame. Drain holes are provided which are fitted with plugs whose screw threads are normally sealed.

Ventilation

An external cooling fan is fitted at the non-drive end which may be manufactured from cast iron, fabricated steel or "conductive" polypropylene. Rotational security is achieved by using a key and grub screws (metal fans) or key and tangs (plastic fans).

The fans are protected by a fan cowl fabricated from pressed steel secured to the frame with radial screws and lockwashers. An additional sheet steel cover is fitted outside the cowl as protection when the motor is mounted vertically.

If required the shaft may be extended at the non-drive end. If it passes through the fan cowl a 5mm nominal running clearance is maintained.

Where motors are provided without external fans they shall be tested and rated as appropriate. In the case of airstream rated motors the minimum air velocity for the motor surface is indicated on the rating plate.

Bearings

The machine bearings are housed in the endshields. Ball bearings are retained by an internal clamp at both ends. Where increased loads are driven, roller, duplex or angular contact bearings may be used. Garter type bearing housing seals made from silicone rubber are used and these are grease lubricated.

Terminal Enclosures

There are two sizes of terminal enclosure. Both, together with their lids, are made from cast iron. The larger enclosure may be used as an "oversize" enclosure for WDF250M and WDF280S frames by the addition of a cast iron or steel adaptor. The stator and auxiliary connections pass through a large access hole in the bottom of the enclosure and into the machine.



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Seals are provided between the lid and body of each enclosure, between the body and the machine and on the adaptor and gland plate. The seals are in the form of flat gaskets and are retained by adhesive. Gaskets between the body of the enclosure and frame adhere to the body as do those between the body and the lid. Those on the gland plate adhere to the glandplate (or spreader box). The enclosures may be mounted with the cable entry either along or across the axis of the machine from either end or side.

Where required, the terminal enclosure may be provided for remote mounting. In this case the motor terminal enclosure opening is covered by a plate or spreader box sealed by a 3mm thick rubber gasket. A similar gasket is used between any sealing plate and remote enclosure. The remote terminal enclosure may be one of the schedule enclosures or any suitable BASEEFA certified enclosure.

Stator and Rotor

The stator and rotor are formed from punched laminations. Whilst the stator is pressed into the frame, the rotor bars, endrings and internal fan wafters are formed by pressure die-casting using aluminium or an aluminium alloy. The core thus formed is shrunk or pressed onto the main motor shaft.

Stator/Rotor air gap

The air gap for any machine in the range is determined by the pole number and the supply frequency.

Electrical Construction

Stator

The stator may be wound for 2, 4, 6, 8 or more poles. The stator windings are of circular section copper wire having a Class F insulation. Details of this and other insulating materials are given in schedule drawing A00471. The stator may be operated at up to the Class F temperature limit.

Main Terminals

Seven main terminal arrangements are used for the range of machines. These are fully described in the schedule drawings.

The first uses six M10 steel terminals fitted into a moulded glass-filled nylon board and is shown on drawing A00472. This arrangement is rated at 180 Amps maximum.

The second arrangement consists of a further moulded glass-filled nylon board with holes through which are fitted M10 terminal screws. These are secured in place with locknuts. This arrangement is shown on A00479 and is rated at 180 Amps maximum.

The third of the small enclosures carries up to 12 terminals. These are mounted in groups of 6 M8 terminals each of which is moulded into a common HD Phenolic board.

This is shown on drawing A00477.



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The first of the larger enclosures, shown on A00473, has 6 M10 terminals formed from screws secured by locknuts through a moulded thermosetting glass-filled phenolic board. Provision is made for "snap-in" phase barriers if required.

The second is shown on A00478 and carries up to 12 terminals. In this case the terminal board is made from phenolic paper laminate through which the M10 terminal screws pass. The heads of the screws are recessed into the underside and the screws are fitted with locknuts.

The connections to the stator leads in all cases are by "right angle lugs" crimped onto the leads and fitted over the top of the studs.

The nylon material used in the smaller terminal enclosures may also be used as a further moulding to cover the main terminals if required. It may also be formed into a slotted support with a barrier to hold the auxiliary terminals and to separate them from the main terminals.

In the above terminal arrangements there are no phase barriers and adequate physical separation is provided between terminal studs and other live parts. Flat terminal links may be used to interconnect the ends of stator windings.

The machines may also be supplied with loose leads in which case sufficient lead length for remaking the insulated crimp joints is provided or, alternatively, the terminal enclosures may be remotely mounted as shown on A00476.

In further arrangements shown on A00511 and 512 the terminals consist of component certified blocks or component certified rail mounted terminals. Again the schedule drawings fully describe the arrangements and list the relevant component approvals or certificates.

Auxiliary Terminals

The auxiliary terminals used with the three smaller main terminal assemblies consist of Wago "snap-in" modular screwless connectors. Internal connections are via a "fast-on" type of spade connection with pre-insulated crimped female connections on the motor auxiliary leads. External connections are made through the Wago "cage clamp" springs.

The other auxiliary terminals are Klippon KSD blocks coded EEx e by BASEEFA Component Certificate Ex 813105U, or Ex N by 4022U/B. Alternative terminals are the MK5/2, MK3/* and BK3. These are coded Ex N by 4020UB & 4021UB, whilst a further arrangement uses BARTEC terminals coded EEx e by PTB Component Certificate Ex 89C3150U.

A further alternative is to provide additional auxiliary terminal enclosures mounted on the side of the main terminal enclosure. This is made of cast iron or fabricated from steel and fitted with the terminal blocks as above.

Each type of main terminal arrangement has an earth terminal inside the enclosure, the external earth is provided on the motor frame itself.



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Auxiliaries

Heaters

Anti condensation heaters certified under BASEEFA Component Certificate No 4076UX may be used.

Thermistors / RTD's

One or more thermistors / RTD's may be embedded in each winding and in the bearing housing to provide monitoring / protection as required.

The auxiliaries are terminated on terminals as referred to above by Class F rated cable. They must be connected to ground when dielectric testing of the machine is carried out.

Ambient Temperature

The motors are designed for use in an ambient temperature range from -20°C to 40°C. This may be extended down to -45°C by making suitable design and material changes. In this case the certification plate described on drawing A22560 will be marked accordingly.

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SPECIAL CONDITIONS FOR SAFE USE

None

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Essential Health and Safety Requirements

All requirements are covered by compliance with EN 50281-1-1: 1998.

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DRAWINGS

Number	Issue	Date	Description
A00471C	C	11/5/99	Typical arrangement
A00472		29.9.97	Ex N terminal arrangements W-DF 200L - 280S
A00473		29.9.97	Ex N terminal arrangements W-DF 280M - 315L
A00474A	A	24/3/99	Rotor - fan clearance drawing
A00475A	A	24/3/99	Critical manufacturing drawings W-DF200L - 315L
A00476B	B	3.7.98	Alternative arrangements and terminations



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Number	Issue	Date	Description
A00477		29.9.97	Ex N terminal arrangements W-DF200L - 280S
A00478A	A	20.2.98	Ex N terminal arrangements W-DF280M - 355L
A00479		29.9.97	Ex N terminal arrangements W-DF 200L - 280S
A00511		29.9.97	Rekofa KS..A terminals
A00512		29.9.97	Klippon SAKG40 terminals
A00516		31/10/97	Rotor - fan clearance drawing W-DF355S - 355L
A00517		11/11/97	Critical manufacturing drawings W-DF355 S/M/L
A00578		18/3/99	Ex N terminal arrangements WDF200LX
A22560		11/5/99	Typical arrangement - dust proof motors

These drawings are common to BAS99ATEX2217

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BASEEFA List Keywords
23PHIMOT



1 **SUPPLEMENTARY TYPE EXAMINATION CERTIFICATE**

2 **Equipment Intended for use in Potentially Explosive Atmospheres**
3 **Directive 94/9/EC**

4 Supplementary Type Examination Certificate Number: **BAS99ATEX3218/1**

5 Equipment: **W-DF200L TO W-DF355L CAGE INDUCTION MOTORS**

6 Manufacturer: **INVENSYS BROOK CROMPTON**

7 Address: **Guiseley, Leeds, West Yorkshire, LS20 9NZ**

8 This supplementary certificate extends Type Examination Certificate No. BAS99ATEX3218 to apply to equipment designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

This Supplementary Certificate shall be held with the original Certificate.

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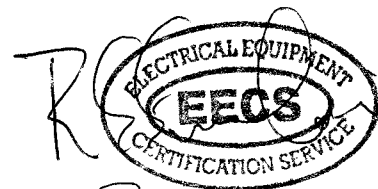
File No: EECS 0245/03/165

BASEEFA Certification Report No. 00(C)1062 dated 23 February 2001

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14 SUPPLEMENTARY TYPE EXAMINATION CERTIFICATE N° BAS99ATEX3218/1

Description of the Variation to the Equipment

VARIATION 1.1

To allow the following motor-drive combinations to be used:-

FRAME	POWER O/P (kW)	POLES	ABB INVERTER TYPE
W-DF225SN	37	4	ACS60100503
W-DF225MN	45	4	ACS60100603
W-DF315LN	154	4	ACS60402603

Report No.

00(C)1062

Special Conditions For Safe Use

None

Essential Health and Safety Requirements

See original certificate.

DRAWINGS

None.

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