IECEx TEST REPORT
IEC 60079-0
Explosive atmospheres – Part 0:
Equipment – General requirements

ExTR Free Reference Number ..... :	Intertek Project Number: 11051283
Compiled by + signature (ExTL) .... :	R. Antram
Reviewed by + signature (ExTL).... :	V K Varma
Date of issue ..... :	21st February 2011
Ex Testing Laboratory (ExTL) ..... :	Intertek Testing and Certification Ltd
Address ..... :	Intertek House, Cleeve Road, Leatherhead KT22 7SB, UK
Applicant's name..... :	BEKA Associates Limited
Address ..... :	PO Box 39, Hitchin, Hertfordshire, SG5 2DD
Standard..... :	IEC 60079-0:2007, 5th Edition
Test procedure ..... :	IECEx System
Test Report Form Number ..... :	ExTR60079-0_5C (released 2010-08)

Instructions for Intended Use of Ex Test Report:
An Ex Test Report provides a clause-by-clause documentation of the initial evaluation and testing that verified compliance of an item or product with an IEC Ex standard. This Ex Test Report is part of an ExTR package that may include other Ex Test Report, Addendum and National Differences documents, along with a single ExTR Cover. An Ex Test Report is to be compiled and reviewed by the ExTL. The Issuing ExCB indicates final approval of the Ex Test Report as part of the overall ExTR package on the associated ExTR Cover.

Possible test case verdicts:

- test case does not apply to the test item .....:N / A
- test item does meet the requirement .....:Pass

General remarks:
The test results presented in this Ex Test Report relate only to the item or product tested.

- "(see Attachment #)" refers to additional information appended to this document.
- "(see appended table)" refers to a table appended to this document.
- Throughout this document, a point is used as the decimal separator.

The technical content of this Ex Test Report shall not be reproduced except in full without the written approval of the Issuing ExCB and ExTL.

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
1	SCOPE	This report covers the testing of Beka 'D' Field Mounting Enclosures Part No. CI 100-06 Iss 1 for use in the presence of combustible dust and gas at extended temperatures. The enclosure is intended for use within the temperature range -40˚C to +70˚C. Testing was performed to the following Clauses: Clause 7.2 Clause 25 Clause 26.4 Clause 26.8 Clause 26.9 To keep this document concise all unused clauses have been removed.	
2	NORMATIVE REFERENCES		
3	TERMS AND DEFINITIONS		
7.2	Thermal endurance		
7.2.1	Tests for thermal endurance	External visual examination of all units after the thermal endurance (heat and cold) tests indicated no evidence of any condensation inside the enclosures and no signs of degradation or distortion of the enclosure materials or structure on both 43-2101 and G8B GRP designs. Cover and Panel securing screws remained tight.	Pass

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
7.2.2	Material selection	The enclosures measuring approx 210mm(h) x 140mm(w) x 90mm max (d) are of a robust moulded plastic design and are manufactured from either a G8B or 43-2101 Glass Reinforced Plastic. The enclosure consists of a rear mounting box to which the front case moulding assembly incorporating the toughened glass window, optional keypad or keypad blanking panel and lower terminal cover is fitted. Cover and panels are secured in position with screws which attach to threaded metal inserts which are moulded in position. Both the toughened glass and keypad panels are sealed in position with adhesive and other removable cover and panel interfaces use compressible silicon rubber sealing strips (fitted and glued into grooves) for sealing. These seal against a raised lip on mating parts. For testing purposes standard commercial blanking plugs were fitted to the three threaded gland positions. **In accordance with the requirements of both BS EN 60079 and BS EN 60529 the enclosure was classified as Category 1 for the purposes of the dust ingress test**	Pass
25	COMPLIANCE OF PROTOTYPE OR SAMPLE WITH DOCUMENTS	The 'D' Field Mounting Enclosures submitted for tests (Picture Number 1 and 2, Appendix B) were manufactured in accordance with drawing No. CI 100-06 Issue 1, dated 16 Feb 2010, a copy of which is reproduced in Appendix A. Sample enclosures consisted of the following material types: 4 off Menzolite Fremix 43-2101 DMC Glass Reinforced Polyester (Customer designation 43-2101) 1 'D' enclosure with glass window no keypad 2 'D' enclosure with glass window no keypad 3 'D' enclosure with glass window and keypad 4 'D' enclosure with glass window and keypad 4 off IDI Beetle G8B Glass Reinforced Polyester (Customer designation G8B) 5 'D' enclosure with glass window no keypad 6 'D' enclosure with glass window no keypad 7 'D' enclosure with glass window with keypad 8 'D' enclosure with glass window with keypad	Pass

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
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	The 'D' Field Mounting Enclosures utilise a glass window which meets the requirement for tests of metallic enclosures, metallic parts of enclosures and glass parts of enclosures. The ingress protection of enclosures shall also meet the requirements of BS EN 60529:1991 including amendments 1 and 2 for an IP rating of IP6X (dust tight) and IPX6 (Protection against high pressure water jets) *The order of testing was as follows:* • Thermal endurance to heat at 95°C and 90% RH for 4 weeks followed by thermal endurance to cold at -50°C for 24 hours as specified in clause 26.8 and 26.9 respectively. • Impact tests at 7J on the GRP enclosure and 4J on the window at -50°C as specified in clause 26.4.2. • IP66 as specified in clause 28.4.5 and to the requirements of 13.4 and 14.2.6 of EN 60529:1991 including amendments 1 and 2.	Pass
26.4.1.2	Non-metallic enclosures or non-metallic parts of enclosures	This required that the 'D' Field Mounting Enclosures meet the requirements of tests for none metallic enclosures and non metallic parts of enclosures and that the ingress protection of enclosures shall also meet the requirements of BS EN 60529:1991 including amendments 1 and 2 for an IP rating of IP6X (dust tight) and IPX6 (Protection against high pressure water jets)	Pass
		The order of testing was as follows: • Thermal endurance to heat at 95°C and 90% RH for 4 weeks followed by thermal endurance to cold at -50°C for 24 hours as specified in clause 26.8 and 26.9 respectively. • Impact tests at 7J on the GRP enclosure and 4J on the window at -50°C as specified in clause 26.4.2 IP66 as specified in clause 28.4.5 and to the requirements of 13.4 and 14.2.6 of EN 60529:1991 including amendments 1 and 2	

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict
26.4.2	Resistance to impact	Impact tests were conducted immediately after the thermal endurance to cold test at -50°C and prior to disassembly of the enclosures. The windows were subjected to a 4J impact tests both in the centre and at the corners of the glass panels (one impact only on each window) with no resultant cracking or breakage. The GRP enclosures (both G8B and 43-2101) including the keypads were subjected to a 7J impact tests along joints and on keys.	Pass
26.4.3	Drop test	The enclosure is not handheld or portable.	N/A
26.4.4	Acceptance criteria	There was no visible damage to any of the enclosures following the impact testing.	Pass
26.4.5	Degree of protection (IP) by enclosures		
26.4.5.1	Test procedure	**Dust Ingress Test (IP6X)** Enclosures 1 to 4, (43-2101 GRP) were tested together. With 20mbar applied to the inside of the enclosures flow rates being drawn through each individual enclosure were minimal therefore the duration of the tests was 8 hrs for all units. One of the blanking gland plugs was replaced with a suitable gland fitting to apply the under pressure to the enclosures. Enclosures 5 to 8 (G8B GRP) were tested together. With 20mbar applied to the inside of the enclosures flow rates being drawn through each individual enclosure were minimal therefore the duration of the tests was 8 hrs for all units. **Water Ingress Test (IPX6)** The enclosures were mounted in the normal operating position on a suitable frame, this was then mounted on a turntable set to rotate at 1 rev/min. The ambient air and water temperatures were then taken, these were 11.5˚C and 10.1˚C respectively, a distance of 2.5m to 3m was then measured from the enclosures. From this position a water stream of 100 L/min was focused on the enclosures spraying the enclosures from all practical directions, the test was run for 3 minutes.	Pass
26.4.5.2	Acceptance criteria	Upon inspection of the enclosures carried out immediately after the tests, no dust or water was found to have entered the enclosures as a result of the test.	Pass

26.8	Thermal endurance to heat	The enclosures were subjected to 4 weeks at 95˚C with 90% RH. On inspection, once completed, there was no major degradation to any sample.	Pass

26.9	Thermal endurance to cold	The enclosures were subjected to -50˚C for 24 hours, the impact testing was then performed.	Pass

IEC 60079-0			
Clause	Requirement – Test	Result – Remark	Verdict

Measurement Section, including Additional Narrative Remarks (as deemed applicable)

The thermal endurance was done in accordance with 7.2 of IEC 60079-0:2007

Thermal Endurance to Heat (Clause 26.8)

The enclosures were subjected to 4 weeks at 95°C and 90% relative humidity. On inspection once completed there was no major degradation to any sample.

Thermal Endurance to Cold (Clause 26.9)

The enclosures were subjected to 24 hours at -50°C. On inspection once completed there was no major degradation to any sample.

The impact test was done in accordance with 26.4.3 of IEC 60079-0:2007

Impact tests were conducted immediately after the thermal endurance to cold test at -50°C and prior to disassembly of the enclosures. The windows were subjected to a 4J impact tests both in the centre and at the corners of the glass panels (one impact only on each window) with no resultant cracking or breakage. The GRP enclosures (both G8B and 43-2101) including the keypads were subjected to a 7J impact tests along joints and on keys.

The ingress protection rating was tested in accordance with IEC 60529:1992 for the manufacturer requested rating of IP66.

Dust Ingress Test (IP6X)

Enclosures 1 to 4, (43-2101 GRP) were tested together. With 20mbar applied to the inside of the enclosures flow rates being drawn through each individual enclosure were minimal therefore the duration of the tests was 8 hrs for all units. One of the blanking gland plugs was replaced with a suitable gland fitting to apply the under pressure to the enclosures.

Enclosures 5 to 8 (G8B GRP) were tested together. With 20mbar applied to the inside of the enclosures flow rates being drawn through each individual enclosure were minimal therefore the duration of the tests was 8 hrs for all units. On completion the enclosures were immediately inspected, there was no ingress of dust in any of the samples.

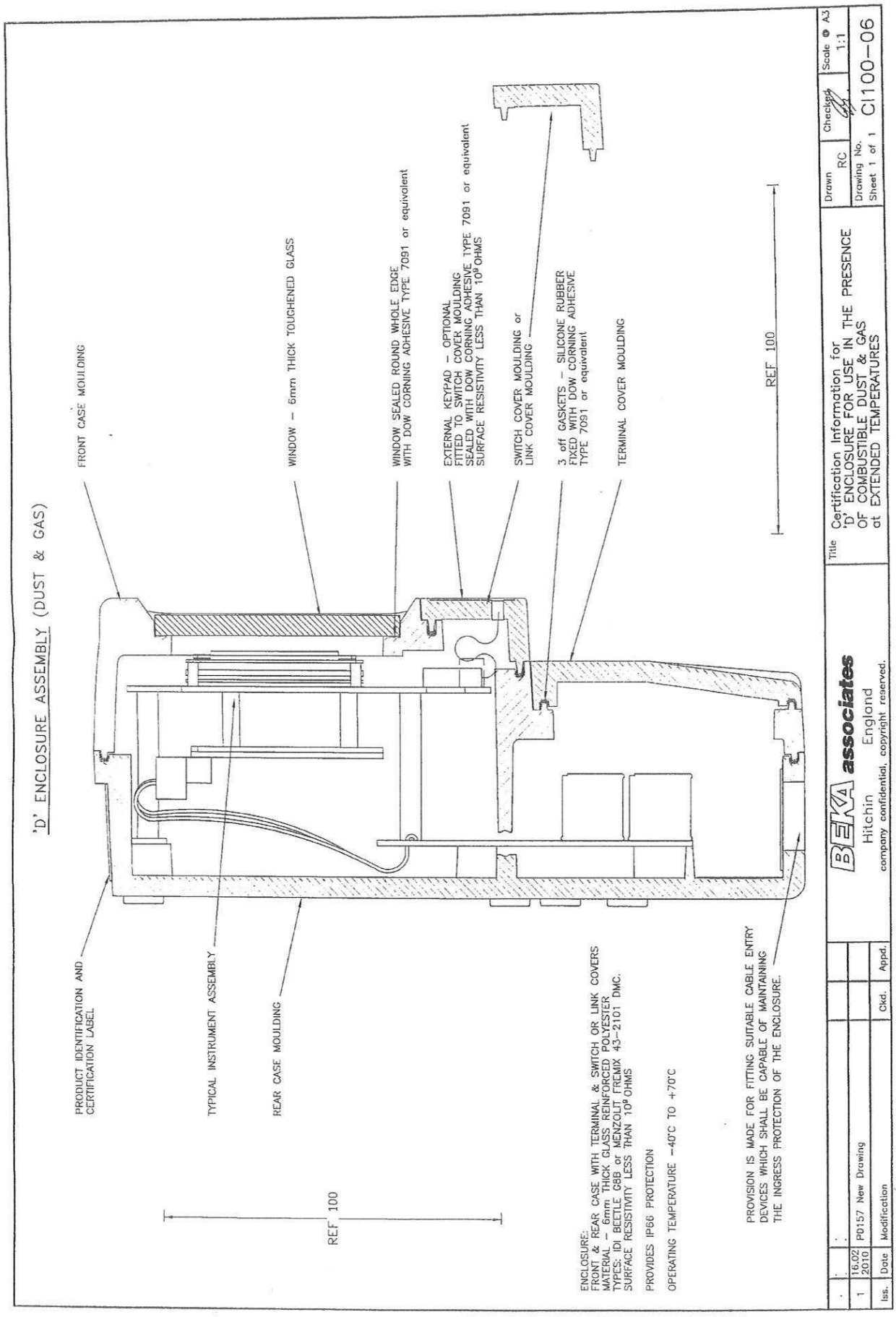
Water Ingress Test (IPX6)

The enclosures were mounted in the normal operating position on a suitable frame, this was then mounted on a turntable set to rotate at 1 rev/min. The ambient air and water temperatures were then taken, these were 11.5°C and 10.1°C respectively. A distance of 2.5m to 3m was then measured from the enclosures. From this position a water stream of 100 L/min was focused on the enclosures spraying the enclosures from all practical directions. The test was run for 3 minutes. On completion the enclosures were immediately inspected, there was no ingress of water in any of the samples.

Appendix A

Drawing No. CI100-06 Issue 1 dated 16.02.2010

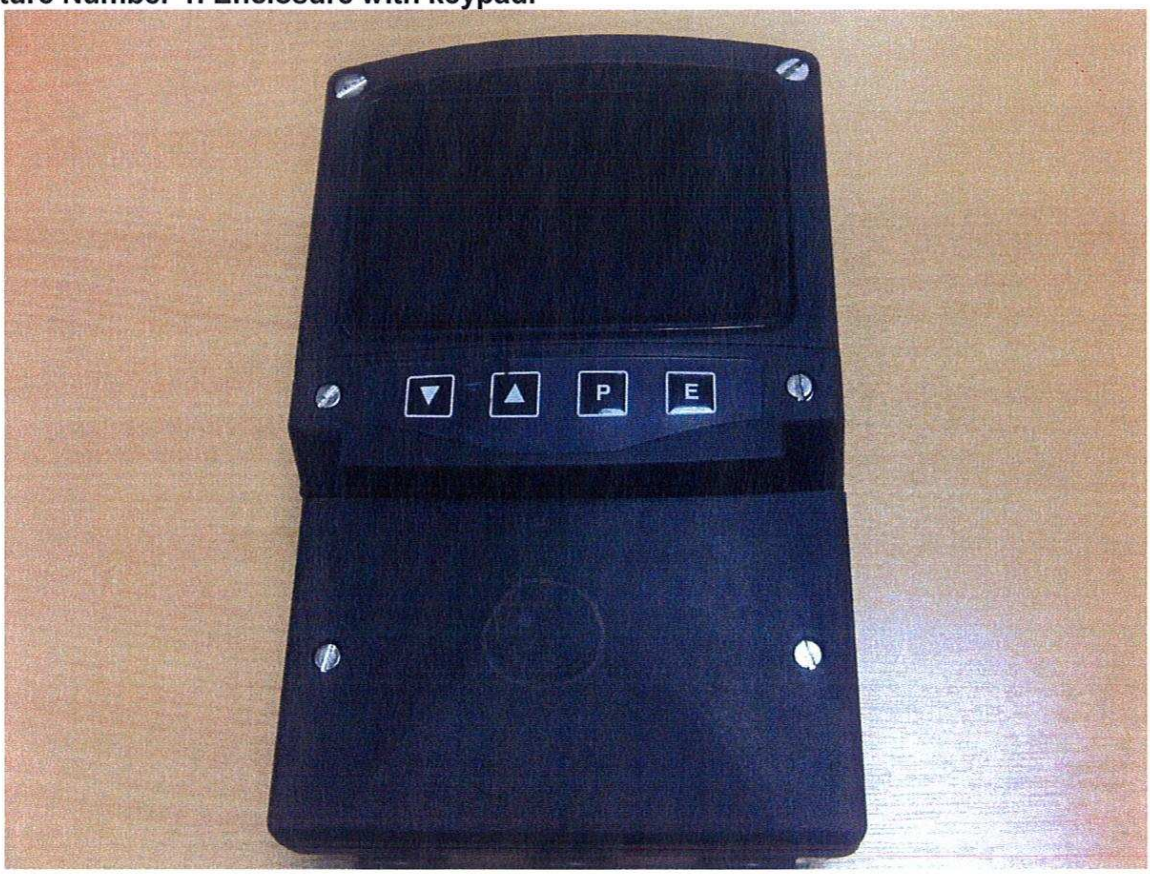
Certification Information for 'D' Field Enclosure for use in the presence of combustible dust and gas at extended temperatures.


'D' ENCLOSURE ASSEMBLY (DUST & GAS)
FRONT CASE MOULDING
WINDOW – 6mm THICK TOUGHENED GLASS
WINDOW SEALED ROUND WHOLE EDGE WITH DOW CORNING ADHESIVE TYPE 7091 or equivalent
EXTERNAL KEYPAD – OPTIONAL FITTED TO SWITCH COVER MOULDING SEALED WITH DOW CORNING ADHESIVE TYPE 7091 or equivalent SURFACE RESISTIVITY LESS THAN 10⁹ OHMS
SWITCH COVER MOULDING or LINK COVER MOULDING
3 off GASKETS – SILICONE RUBBER FIXED WITH DOW CORNING ADHESIVE TYPE 7091 or equivalent
TERMINAL COVER MOULDING
REF 100
PRODUCT IDENTIFICATION AND CERTIFICATION LABEL
TYPICAL INSTRUMENT ASSEMBLY
REAR CASE MOULDING
REF 100
ENCLOSURE:
FRONT & REAR CASE WITH TERMINAL & SWITCH OR LINK COVERS
MATERIAL – 6mm THICK GLASS REINFORCED POLYESTER
TYPES: IDI BEETLE G8B or MENZOLIT FREMIX 43-2101 DMC.
SURFACE RESISTIVITY LESS THAN 10⁹ OHMS
PROVIDES IP66 PROTECTION
OPERATING TEMPERATURE -40°C TO +70°C
PROVISION IS MADE FOR FITTING SUITABLE CABLE ENTRY DEVICES WHICH SHALL BE CAPABLE OF MAINTAINING THE INGRESS PROTECTION OF THE ENCLOSURE.
Iss. | Date | Modification | Ckd. | Appd.
1 | 16.02.2010 | P0157 New Drawing
BEKA associates
Hitchin England
company confidential, copyright reserved.
Title
Certification Information for 'D' ENCLOSURE FOR USE IN THE PRESENCE OF COMBUSTIBLE DUST & GAS at EXTENDED TEMPERATURES
Drawn RC
Checked
Scale @ A3 1:1
Drawing No. C1100-06
Sheet 1 of 1

Appendix B

Pictures of Enclosure models supplied.

Picture Number 1. Enclosure with keypad.



Picture Number 2. Enclosure without keypad.