Certificate of Compliance

Certificate: 70040688 (170351) **Master Contract:** 170351

Project: 70040688 **Date Issued:** 2015-07-31

Issued to: **Bel Fuse Inc.**
206 Van Vorst St
Jersey City, New Jersey 07302
USA

Attention: Editha S. Vergara

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

Issued by: Juan-Carlos Olivera, MSc.

PRODUCTS

CLASS – 5311 11 - POWER SUPPLIES - Component Type (CSA 60950-1-07-2nd Ed)
CLASS – 5311 91 - POWER SUPPLIES - Component Type (UL 60950-1-2nd Ed) - Certified to U.S. Stds

For details related to rating, size, configuration, etc. reference should be made to the CSA Certification Record or the descriptive report.

Component type power supplies intended for use with Information Technology and Business Equipment, where the suitability of the combination is to be determined by CSA Group.

Certificate: 70040688 **Master Contract:** 170351

Project: 70040688 **Date Issued:** 2015-07-31

AC/DC Switching Power Supply, Model LPM409 Series; rated Input: 100-240 V ac, 8.5-3.5 A, 50-60 Hz; Output: maximum 700 W or Input: 200-240 V ac, 5.3-4.5 A, 50-60 Hz; Output: Maximum 900 W; specified as follows:

LPM	4	09	-	E	F	G	H	-	X
I	II	III				IV			V

I – Model Series: LPM

II – Number of Slots: 4

III – Maximum Output Power:

09 = 900 W

IV – Output Modules:

Module	Model Name	Nominal Output Voltage (V dc)	Voltage Range (V dc)	Maximum Output Current (A)	Maximum Output Power (W) *
E	LPM126-OUTA1-5	5	2.0 to 5.3	53	265
F	LPM126-OUTA1-12	12	5.2 to 15	22	265
G	LPM126-OUTA1-24	24	14 to 30	11	265
H	LPM126-OUTA1-36	36	29 to 44	7.4	265
J	LPM126-OUTA1-48	48	43 to 54	5.5	265
K	LPM109-OUTA1-10	10	1.5 to 15	6	90
L	LPM109-OUTA1-20	20	3 to 32	3	90
M	LPM118-OUTA2-10	10	2x 1.5 to 15	2x 6	2x 90
N	LPM118-OUTA2-20	20	2x 3 to 32	2 x 3	2x 90
0	-	Blank Panel Slot Cover			

Note: Any module may be placed on any slot location.

*Maximum output power of modules are derated based on operating ambient and input voltage. See below for details:

1) Module E: LPM126-OUTA1-5
   Maximum 225 W for input voltage from 85-150 V ac, 40°C ambient
   Maximum 175 W for input voltage from 85-264 V ac, 50 to 70°C ambient

2) Module F, G, H: LPM126-OUTA1-12, LPM126-OUTA1-24, LPM126-OUTA1-36
   Maximum 225 W for input voltage from 85-150 V ac, 50°C ambient
   Maximum 175 W for input voltage from 85-264 V ac, 70°C ambient

3) Module K, L: LPM109-OUTA1-10, LPM109-OUTA1-20

Maximum 45 W for input voltage from 85-264 V ac, 70°C ambient

4) Module M, N; LPM109-OUTA2-10, LPM118-OUTA2-20
Maximum 90 W for input voltage from 85-264 V ac, 70°C ambient

V – Optional Suffixes (denoting non-safety critical options)

APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No 60950-1-07, +Am.1:2011 +Am.2:2014	–	Information Technology Equipment - Safety - Part 1: General Requirements
UL 60950-1-2014	–	Information Technology Equipment - Safety - Part 1: General Requirements

CONDITIONS OF ACCEPTABILITY

1. The power supply is to be installed only by trained service personnel, according to manufacturer installation instructions.
2. Evaluated for use in Pollution Degree 2 Environment, for ambient temperature of 40°C, 50°C and 70°C.
3. Temperature tests shall be considered for specific installation conditions in the end system.
4. Evaluated as Class I (earthed equipment). Reliable connection to protective earth shall be provided in the end use installation.
5. Spacings were evaluated for an operating altitude of max 10,000 ft (3048 m), based on IEC-60664-1 altitude correction factor.
6. Evaluated for connection to AC power with a branch circuit protector rated max 20 A. If used on a branch circuit with higher rating, additional testing shall be considered.
7. The front bezel has been evaluated and found compliant with requirements for FIRE, MECHANICAL and ELECTRICAL enclosure. Overall enclosure suitability is to be determined in the end system.
8. Output circuits in all modules are SELV and at hazardous energy levels (240 VA).
9. The input connector is suitable for field wiring.

Supplement to Certificate of Compliance

Certificate: 70040688 (170351) **Master Contract:** 170351

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
70040688	2015-07-31	AC/DC Switching Power Supply, Model LPM409 Series. (C/US) (transferred from 173688 - 2412039 and upgraded to include Am2).

CERTIFICATE

No. P15220207

Order No. 291975

Product	AC-DC switching power supply
Applicant	Bel Fuse Inc. 206 Van Vorst St. Jersey City, NJ 07302 USA
Manufacturer	Bel Fuse Inc. 206 Van Vorst St. Jersey City, NJ 07302 USA
Factory	☑ See page 2
Ratings	Input: 100-240Vac, 8.5-3.5A, 50-60Hz or 200-240Vac, 5.3-4.5A, 50-60Hz
Trade mark	bel POWER SOLUTIONS & PROTECTION a bel group
Model / Type Ref.	LPM409 Series
Principal characteristics	Output: 700W Maximum or 900 W Maximum ☐ See next page(s)
A sample of the product was tested and found to be in conformity with	OFF EN 60950-1:2006;A11;A1;A12;A2
Validity	This certificate documents conformity with the standards shown, and also applies as license for use of Nemkos name and certification mark. The certificate and license is valid as long as the applicable conditions are complied with, and provided that any changes to the product are notified to Nemko for acceptance prior to implementation. New standards or amendments to the standards may imply that the product design must be updated and/or that re-testing and re-certification is necessary.
Additional information	☐ See next page(s) The abovementioned certified equipment complies with current regulatory requirements regarding electrical safety in Norway and other EU/EEA member states, as far as this can be checked. Compliance with requirements regarding building-in, protection against electric shock and Electromagnetic Compatibility (EMC) must be checked when the equipment is built-in a completed product or forms a part of a complete system.
Additional model(s)	☐ See next page(s)

Date of issue 10-09-2015

Juan Z. Kleppenes

Certification Department

Nemko AS
Gaustadalléen 30, P.O. Box 73 Blindern, 0314 Oslo, Norway
TEL +47 22 96 03 30 FAX +47 22 96 05 50 EMAIL info@nemko.com
ENTERPRISE NUMBER NO974404532

CERTIFICATE

No. P15220207

Factories:

Avnet Technology Solutions
6700 W MORELOS PL
CHANDLER, AZ 85226
USA

Bel Power Solutions, s.r.o.
Areal ZTS 924
01841 Dubnica nad Vahom
Slovakia

Sonitrones S A De CV Arrow Electronics Inc
Blvd Luis Donaldo Colosio #1179
84048 Nogales
Mexico

Master Electronics
610 East 10th Street
Oakland, CA 94606
USA

Date of issue 10-09-2015

Juan Z. Kleppenes
Certification Department

Nemko AS
Gaustadalléen 30, P.O. Box 73 Blindern, 0314 Oslo, Norway
TEL +47 22 96 03 30 FAX +47 22 96 05 50 EMAIL info@nemko.com
ENTERPRISE NUMBER NO974404532

Ref. Certif. No.

NO88359

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEME CEI DACCEPTATION MUTUELLE DE CERTIFICATS DESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE CERTIFICAT D'ESSAI OC

Product Produit	AC-DC switching power supply
Name and address of the applicant Nom et adresse du demandeur	Bel Fuse Inc. 206 Van Vorst St. Jersey City, NJ 07302 USA
Name and address of the manufacturer Nom et adresse du fabricant	Bel Fuse Inc. 206 Van Vorst St. Jersey City, NJ 07302 USA
Name and address of the factory Nom et adresse de l'usine Note: When more than one factory, please report on page 2 Note: Lorsque il y plus d'une usine, veuillez utiliser la deuxième page	☑ Additional information on page 2
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	Input: 100-240Vac, 8.5-3.5A, 50-60Hz or 200-240Vac, 5.3-4.5A, 50-60Hz
Trademark (if any) Marque de fabrique (si elle existe)	bel POWER SOLUTIONS & PROTECTION a bel group
Type of Manufacturer's Testing Laboratories used Type de programme du laboratoire d'essais constructeur	
Model / Type Ref. Ref. De type	LPM409 Series
Additional information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaire, peuvent être indiqués sur la deuxième page	Output: 700W Maximum or 900 W Maximum ☐ Additional information on page 2
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 60950-1(ed.2);am1;am2
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport dessais numéro de référence qui constitue partie de ce Certificat	291975

This CB Test Certificate is issued by the National Certification Body
Ce Certificat dessai OC est établi par l'Organisme **National de Certification**

Nemko
Gaustadalléen 30
NO-0373 Oslo, Norway

Date: 10-09-2015

Signature: Juan Z. Kleppenes
Certification Department

Avnet Technology Solutions
6700 W MORELOS PL
CHANDLER, AZ 85226
USA

Bel Power Solutions, s.r.o.
Areal ZTS 924
01841 Dubnica nad Vahom
Slovakia

Sonitrones S A De CV Arrow Electronics Inc
Blvd Luis Donaldo Colosio #1179
84048 Nogales
Mexico

Master Electronics
610 East 10th Street
Oakland, CA 94606
USA

Nemko
Gaustadalléen 30
NO-0373 Oslo, Norway

Date: 10-09-2015

Signature: Juan Z. Kleppenes
Certification Department

Test Report issued under the responsibility of

www.nemko.com

TEST REPORT

IEC 60950-1
Information technology equipment – Safety – Part 1: General requirements

Report Number.....: 291975

Date of issue.....: 04 September, 2015

Total number of pages.....: 66

Applicant's name.....: Bel Fuse Inc.

Address.....: 206 Van Vorst St., Jersey City, NJ 07302

Test specification:

Standard .....: IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013

Test procedure.....: CB-Scheme

Non-standard test method .....: N/A

Test Report Form No. ..... : IEC60950_1F

Test Report Form(s) Originator .....: SGS Fimko Ltd

Master TRF.....: Dated 2014-02

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description ..... :	AC-DC switching power supply
Trade Mark .....:	bel POWER SOLUTIONS & PROTECTION a bel group
Manufacturer.....:	Same as Applicant
Model/Type reference.....:	LPM409 Series (See General Product Information for exact model names)
Ratings.....:	Input: 100-240 Vac, 8.5-3.5 A, 50-60 Hz; Output: 700 W Maximum or : Input: 200-240 Vac, 5.3-4.5 A, 50-60 Hz; Output: 900 W Maximum

Testing procedure and testing location:		
CB Testing Laboratory:	**Nemko USA Inc.**	
Testing location/ address.....:	**2210 Faraday Ave. Suite 150, Carlsbad, CA 92008, USA**	
Associated CB Testing Laboratory:		
Testing location/ address.....:		
Tested by (name + signature).....:	George Daverin	
Approved by (name + signature).....:	Jeff Busch	

Report History:

Original report

List of Attachments (including a total number of pages in each attachment)**:**

Attachment 1: European Group Differences and National Deviations .....81 pages

Documented deviations contain individual national documents for several European countries that are included in the European Group Deviations. The European Group Difference: EN60950:2006/A11:2009/A1:2010/A12:2011/A2:2013 are considered “Normative”. The individual national documents (Denmark, Finland, Germany, Ireland, Norway, Spain, Sweden, Switzerland and United Kingdom) are considered “informative” and included at the manufacturer’s request.

Attachment 2: Miscellaneous Documentation, e.g. Photos, PWB Layout, Schematic etc. .....56 pages

(Not for publication – Engineering use only)

Summary of testing	
General	All comments relate to all models, unless specifically stated.
Power supply	The equipment is an enclosed, Class I switch mode power supply with universal AC input and multiple DC voltage outputs for building-in. This report covers multiple models and all comments / tests apply to all models unless otherwise indicated. Testing was conducted on various models as indicated.
1.1.2; The unit is intended to operate at an altitude of up to 3050 m.	This equipment is intended to be operated at an altitude of up to 3048 m, so the clearance is multiplied by the altitude correction factor (1.15), specified in table A.2 of IEC 60664-1 2nd Edition:2007-04. Refer to Tables 2.10.3 and 2.10.4.
1.7.2; Safety instructions.	Instructions and equipment markings related to safety are to be provided in a language, which is acceptable in the country in which the equipment is to be sold. English language verified.
1.7.2.4; IT power distribution systems.	The equipment complies with the requirements for connection to the Norwegian IT power systems. The following information should be given (but is not required) in the installation instruction: “This product is also designed for IT power system with Phase to Phase voltage 230V.”
2.7.4; Number and location of protective devices.	In Norway, IT power distribution system is used. Equipment with a single protective device is accepted in Norway. Other countries may have additional requirements.
2.7.6; Warning to service personnel.	After operation of the protective device, the equipment is still under voltage if it is connected to an IT-power system. A warning is required for service personnel. Norway does not require this warning.
5.2;Electric strength test	Increased test voltages for Basic insulation applied to the equipment based on measured working voltages.

Summary of testing:	
Tests performed (name of test and test clause):	**Testing location:**
1) Input Test 1.6.2	See page 2
2) Durability Test 1.7.11	
3) Energy Measurement (240 VA) 2.1.1.5	
3) Capacitance Discharge Test..... 2.1.1.7	
4) SELV Reliability Test..... 2.2	
5) Protective Bonding Test..... 2.6.3.4	
6) Humidity Test 2.9.2	
7) Working Voltage Measurement 2.10.2	
8) Hazardous Voltage Measurement 2.10.2	
9) Mechanical and Stress Relief Test 4.2	
10) Heating Test..... 4.5.1	
11) Touch Current Test 5.1	
12) Electric Strength Test..... 5.2.2	
13) Component Failure Test 5.3	
14) Abnormal Operation Test..... 5.3	
15) PS Output Overload and Short Test 5.3	
16) Transformer Overload Test..... Annex C	

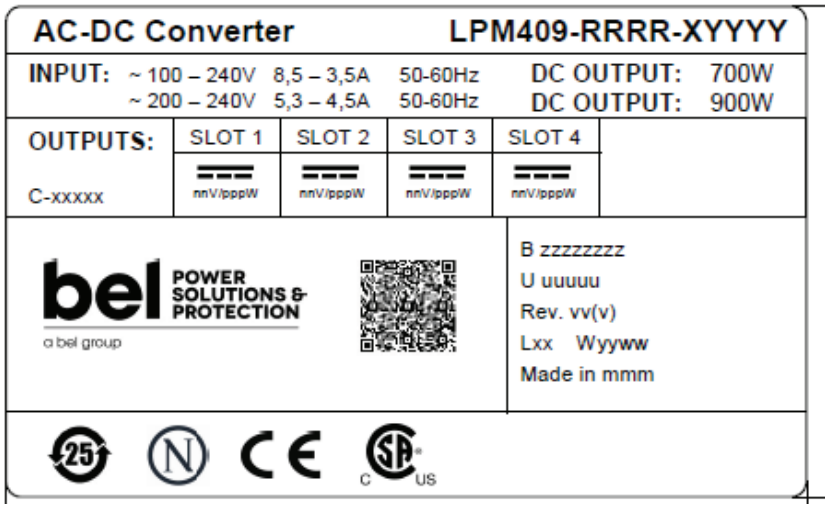
Summary of compliance with National Differences

List of countries addressed:

Austria (AT), Australia (AU), Canada (CA), China (CH), Denmark (DK), Finland (FI), Germany (DE), Ireland (IE), Israel (IS), Korea (KR), Norway (NO), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH), United Kingdom (GB), United States of America (US)

☒ The product fulfils the requirements of:
EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013

Copy of marking plate: The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Calibration	All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Further information about traceability will be given on request.
Measurement uncertainty	Measurement uncertainties are calculated for all instruments and instrument set-ups given in this report. Calculations are based on the principles given in the standard EA-4/02 (Dec. 1999), IEC Guide 115:2007, Nemko routine L227 and other relevant internal Nemko-procedures. Further information about measurement uncertainties will be given on request.
Evaluation of results	If not explicitly stated otherwise in the standard, the test is passed if the measured value is equal to or below (above) the limit line, regardless of the measurement uncertainty. If the measured value is above (below) the limit line, the test is not passed - ref IEC Guide 115:2007, and Nemko routine L220. The instrumentation accuracy is within limits agreed by IECEE-CTL (ref. Nemko routine L227).

Test item particulars:	
Equipment mobility ..... :	[] movable [] hand-held [] transportable [] stationary [**X**] for building-in [] direct plug-in
Connection to the mains ..... :	[] pluggable equipment [] type A [] type B [**X**] permanent connection [] detachable power supply cord [] non-detachable power supply cord [] not directly connected to the mains
Operating condition ..... :	[**X**] continuous [] rated operating / resting time:
Access location ..... :	[] operator accessible [] restricted access location [**X**] Component (to be determined in the end system)
Over voltage category (OVC) ..... :	[] OVC I [**X**] OVC II [] OVC III [] OVC IV [] other:
Mains supply tolerance (%) or absolute mains supply values ..... :	90 to 264 Vac
Tested for IT power systems ..... :	[**X**] Yes (Norway only) [] No
IT testing, phase-phase voltage (V) ..... :	230
Class of equipment ..... :	[**X**] Class I [] Class II [] Class III [] Not classified
Considered current rating of protective device as part of the building installation (A) ..... :	16 A for Europe, 20 A for North America
Pollution degree (PD) ..... :	[] PD 1 [**X**] PD 2 [] PD 3
IP protection class ..... :	IPX0
Altitude during operation (m) ..... :	3048m
Altitude of test laboratory (m) ..... :	Mean sea level (MSL)
Mass of equipment (kg) ..... :	1.38Kg

Possible test case verdicts:	
- test case does not apply to the test object ..... :	N/A
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)

Testing ..... :	
Date of receipt of test item ..... :	July 2015
Date(s) of performance of tests ..... :	August 2015

General remarks:

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

"(see Enclosure #)" refers to additional information appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided...: ☒ **Yes** ☐ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... :

1)
Bel Power Solutions s.r.o
ArealZTS Dubnica n.Vahom c.924
01841 Dubnica nad Vahom
SLOVAKIA

2)
Avnet Technology Solutions
6700 W Morelos Place
Chandler AZ 85226
USA

3)
Master Electronics
610 East 10th Street
Oakland CA 94606
USA

4)
Arrow Electronics Inc.
Boulevard Luis Donaldo Colosio 1179
84048 Nogales, Sonora
MEXICO

General product information:

This test report is based on a TUV SUD test report Ref. No. SI1300016164-000 with appended CB cert Ref. No. DE 3 -500638, evaluated to the requirements of IEC 60950-1:2005 2nd ed. + A1:2009 + A2:2013. This test report includes addition evaluation of the power supply to the requirements of IT power systems and an engineering evaluation of the Leakage at the output of the PSU.

For continuity, data from the original TUV report is included in this report, along with the additional evaluation referenced.

The subject equipment is a component type AC-DC switching power supply provided with metal enclosure, fan and input connector. The unit consists of mother board, EMI board, PFC board and six output module slots. Each module is provided with isolating transformer and output busbar terminals for output connection.

Model nomenclature:

LPM	4	09	-	E	F	G	X	-	X
I	II	III			IV				V

I - Product Series: LPM

II – Number of slots: 4

III – Maximum Output Power: 09= 900 W

IV - Output Module:

Module	Model Name	Nominal Output Voltage (Vdc)	Voltage Range (Vdc)	Maximum Output Current (A)	Maximum Output Power (W)
E	LPM126-OUTA1-5	5	2.0 to 53	53	265
F	LPM126-OUTA1-12	12	5.2 to 15	22	265
G	LPM126-OUTA1-24	24	14 to 30	11	265
H	LPM126-OUTA1-36	36	29 to 44	7.4	265
J	LPM126-OUTA1-48	48	43 to 54	5.5	265
K	LPM109-OUTA1-10	10	1.5 to 15	6	90
L	LPM109-OUTA1-20	20	3 to 32	3	90
M	LPM118-OUTA2-10	10	2x 1.5 to 15	2x 6	2x 90
N	LPM118-OUTA2-20	20	2x 3 to 32	2 x 3	2x 90
0		Blank Panel Slot Cover			

Note: Any module may be placed on any slot location.

*Maximum output power of modules are derated based on operating ambient and input voltage. Se e below for details:

1) Module E: LPM126-OUTA1-5
   Maximum 225 W for input voltage from 85-150 Vac, 40°C ambient
   Maximum 175 W for input voltage from 85-264 Vac, 50 to 70°C ambient

2) Module F, G, H: LPM126-OUTA1-12, LPM126-OUTA1-24, LPM126-OUTA1-36
   Maximum 225 W for input voltage from 85-150 Vac, 50°C ambient
   Maximum 175 W for input voltage from 85-264 Vac 70°C ambient

3) Module K, L: LPM109-OUTA1-10, LPM109-OUTA1-20
   Maximum 45 W for input voltage from 85-264 Vac 70°C ambient

4) Module M,N; LPM109-OUTA2-10, LPM118-OUTA2-20
   Maximum 90 W for input voltage from 85-264 Vac 70°C ambient

V - Optional Suffixes denoting non-safety critical options

Conditions of Acceptability:

Model(s) require:

1) The power supply is to be installed only by trained service personnel, according to manufacturer installation instructions.
2) Evaluated as Class I (earthed equipment). The power supply shall be properly bonded to the main protective earthing terminal in the end system.
3) Temperature tests shall be considered for specific installation conditions in the end system.
4) The front bezel has been evaluated and found compliant with requirements for FIRE, MECHANICAL and ELECTRICAL enclosure. Overall enclosure suitability is to be determined in the end system.
5) All modules output circuits are SELV and at hazardous energy level.
6) The input connector is not acceptable for field wiring; only intended for connection to mating connectors of internal wiring inside the end system.
7) The equipment was tested on a listed 20 A branch circuit. If used on a branch circuit with a greater rating, additional testing shall be considered.
8) The component was submitted by the manufacturer for use in a maximum air ambient of 40°C or 50°C (depending on module designation and input ratings) at full load and 70°C at 50% load.
9) The power supplies have been evaluated for use in a Pollution Degree 2 environment.

Abbreviations used in the report:

- normal conditions ..... N.C.
- functional insulation ..... OP
- double insulation ..... DI
- between parts of opposite polarity ..... BOP
- single fault conditions ..... S.F.C
- basic insulation ..... BI
- supplementary insulation ..... SI
- reinforced insulation ..... RI

Indicate used abbreviations (if any): ..... None