TEST REPORT

Client	:	Interpower Coporation, 100 Interpower Ave., **OSKALOOSA IOWA**, 52577, USA
Manufacturer	:	Interpower Coporation, 100 Interpower Ave., **OSKALOOSA IOWA**, 52577, USA
Apparatus	:	Non-rewirable plug
Designation	:	045

Ratings assigned by the Manufacturer:

Rated Voltage	:	250 V ~
Rated Current	:	16 A

Tests have been carried out strictly in accordance with

VC 8008 *Compulsory specification for Plugs, socket-outlet and socket-outlet adaptors* Published by Government Notice R.1075 of 19 November 2010, which refers to SANS 164-0.

Date of Tests: 12 July 2011 to 08 August 2011

Conclusion

The sample has complied with the relevant requirements.

This report consists of:

Report form(s)	Pages 1-18
Diagram(s)	-
Information sheet(s)	-
Drawing(s)	-
Photograph(s)	Pages 19

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Olifantsfontein, 31 August 2011

1 Description of Sample

The sample consisted of twenty six (26) non-rewirable plugs moulded with flexible cords with the markings as indicated on page 19 of this report.

Flexible cords are marked as follows:

- H05VV-F ◁VDE▷ ◁HAR▷ REV RITTER
- HELUKABEL ◁VDE▷ ◁HAR▷ HO5VV-F 3G1 QMM 00931 CE
- HELUKABEL ◁VDE▷ ◁HAR▷ HO5VV-F 3G1,5 QMM 01204 CE

2 Test Method

Compulsory specification VC 8008 Plugs, socket-outlets and socket-outlet adapters published by Government notice No. R 1075 of 10 November 2010.

3 Sampling Procedure

The sample was new when submitted for testing by Interpower Corporation and allocated NETFA samples No. ML/105737 (A-Z).

Date sample received : 2010-05-07
Starting date of test : 2011-07-12
Completion date of test : 2011-08-06

4 Test Conditions

The tests were conducted at the National Electrical Test Facility, NETFA, at an altitude of 1 540 m.

5 Measuring Equipment

Refer to appendix A for a list of measuring equipment and tolerances.

6 Results

For detailed results see pages 3 to 17 of this report.

SANS 60884-1: 2006			
Clause	**Requirements-Test**	**Results-Remark**	**Verdict**
6	**Ratings**		
6.1	Preferred: - Voltage rating and - Current rating		250 V ~ 16 A
6.2	In a cord extension set, the rated current of the portable socket-outlet shall not be higher and rated voltage shall not be less than that of the plug		N/A
6.3	Accessories should preferably have a degree of protection IP20, IP40, IP44 or IP55		N/A
7	**Classification**		
7.1	Accessories classification: - Protection against harmful ingress of foreign objects - Protection against harmful ingress of water - Provision for earthing - Method of connection - Type of terminals	IP2X IPX0 With earthing contact Non-rewirable accessories Screwless	Complied
7.2	Socket-outlets classification		N/A
7.3	Plug classification	I	Complied

8	**Marking**		
8.1	Accessories shall be marked as follows: • Rated current • Rated voltage • Symbol of nature of supply • Manufacturers name • Type reference	16 A 250 V ~ Interpower 045	Complied
8.2	When symbols are used, they shall be as follows: - Amperes.....A - Volts.....V - Alternating current.....~ - Neutral.....N - Protective earth..... (earth symbol with a circle around it)		Complied
8.3	Fixed socket-outlets		N/A
8.4	Marking shall be easily discernible when the accessory is wired and assembled.		Complied
8.5	Terminals: - intended exclusively for the neutral conductor shall be indicated by the letter N, and - for the connection of the protective conductor shall be indicated by the earth symbol with circle around it.		Complied
8.6	Surface-type mounting boxes: IP code shall be marked on the outside of its associated enclosure.		N/A
8.7	Degree of protection shall be indicated either by marking or in a manufacturer's catalogue or instruction sheet.		N/A
8.8	Marking shall be durable and easily legible.		Complied

9	**Checking of dimensions**	
	Gauges	Complied
	Measurements	Complied

1ST SAMPLE		
Plug (SANS 164-1:2007)		
Tests	**Results (mm)**	**Requirements (mm)**
Diameter of pins, mm		
- Earth	8,70	8,7 ± 0,04
- Live	7,04	7,05 ± 0,04
- Neutral	7,04	7,05 ± 0,04
Height of pins, mm		
- Earth	28,90	29,0 ± 0,6
- Live	20,62	21,1 ± 0,6
- Neutral	20,81	21,1 ± 0,6
Distance between pins, mm		
- Live - Earth	28,66	28,6 nom
- Live - Neutral	25,45	25,4 nom
Height of Insulation sleeves, mm		
- Earth	6,34	6,8 max
- Live	9,11	10,0 max
- Neutral	9,34	10,0 max

2nd SAMPLE		
Plug (SANS 164-1:2007)		
Tests	**Results (mm)**	**Requirements (mm)**
Diameter of pins, mm		
- Earth	8,70	8,7 ± 0,04
- Live	7,04	7,05 ± 0,04
- Neutral	7,04	7,05 ± 0,04
Height of pins, mm		
- Earth	28,89	29,0 ± 0,6
- Live	20,83	21,1 ± 0,6
- Neutral	20,82	21,1 ± 0,6
Distance between pins, mm		
- Live - Earth	28,67	28,6 nom
- Live - Neutral	25,39	25,4 nom
Height of Insulation sleeves, mm		
- Earth	6,30	6,8 max
- Live	9,44	10,0 max
- Neutral	9,35	10,0 max

3rd SAMPLE		
Plug (SANS 164-1:2007)		
Tests	**Results (mm)**	**Requirements (mm)**
Diameter of pins, mm		
- Earth	8,70	8,7 ± 0,04
- Live	7,04	7,05 ± 0,04
- Neutral	7,04	7,05 ± 0,04
Height of pins, mm		
- Earth	28,95	29,0 ± 0,6
- Live	20,81	21,1 ± 0,6
- Neutral	20,88	21,1 ± 0,6
Distance between pins, mm		
- Live - Earth	28,62	28,6 nom
- Live - Neutral	25,45	25,4 nom
Height of Insulation sleeves, mm		
- Earth	6,34	6,8 max
- Live	9,26	10,0 max
- Neutral	9,40	10,0 max

Clause	Requirements-Test	Results-Remark	Verdict
10	**Protection against electric shock**		
10.1	Socket-outlets: - Live parts are not accessible, even after removal of parts which can be removed without the use of a tool.		N/A
	Plugs: - Live parts shall not be accessible when the plug is in partial or complete engagement with a socket-outlet.		Complied
	Compression test for each specimen of plug or portable socket-outlet, - Force = 150N - Time = 5min		Complied
10.2	Parts which are accessible shall be made of insulating material		Complied
10.3	Shall not be possible to make contact between a pin of a plug and a live socket-contact of a socket-outlet while any other pin is accessible. - Test temperature = (35 ± 2)^{0}C - Force = 75 N		N/A
10.4	External parts of plugs shall be of insulating material and the overall dimensions of rings, if any, shall not exceed 8mm.	Insulating material	Complied
10.5	Shuttered socket-outlets shall be so constructed that live parts are not accessible.		N/A
10.6	Earthing contacts, if any shall be so designed that they cannot be deformed by the insertion of a plug		N/A
10.7	Socket-outlets with increased protection shall be so constructed that, when mounted and wired as in normal use, live parts shall not be accessible.		N/A

11	**Provision for earthing**		
11.1	Earth connection made before the current-carrying contacts become live		Complied
	Current-carrying pins shall separate before the earth connection.		Complied
11.2	Earthing terminals of rewirable accessories shall comply with clause 12		N/A
11.3	Accessible mental parts of fixed socket-outlets shall be permanently and reliably connected to the earthing terminal		N/A
11.4	Socket-outlets, having an IP code higher than IPX0 shall be provided with an internal fixed earthing terminal		Complied
11.5	Connection between earthing terminal and accessible metal parts shall be of low resistance		Complied
11.6	Fixed socket-outlets according to item b) of 7.2.5: shall have the earthing socket contact and its terminal electrically separated from any metal mounting means		N/A

12	**Terminals and terminations**	
12.1	General: - Rewirable plugs and rewirable portable socket-outlets shall be provided with terminals with screw clamping, - Non-rewirable accessories shall be provide with soldered, welded, crimped or equally effective permanent connections (termination)	Complied
12.2	Terminals with screw clamping for external copper conductors	N/A
12.3	Screwless terminals for external copper conductors	Complied

13	**Construction of fixed socket-outlets**	N/A

14	**Construction of plugs and portable socket-outlet**		
14.1	Non-rewirable portable accessories shall be such that: - the flexible cable cannot be separated from the accessory without making it permanently useless, and - the accessory cannot be opened by hand or by using a general purpose tool.		Complied
14.2	Pins of portable accessories - Shall have adequate mechanical strength		Complied
14.3	Pins of plugs shall be: - locked against rotation, - not removable without dismantling the plug, - adequately fixed in the body of the plug…		Complied
14.4	Earthing contacts and neutral contacts of portable socket-outlets shall be locked against rotation and removable only with the aid of a tool, after dismantling the socket-outlet.		N/A
14.5	Socket-contact assemblies shall have sufficient resilience to ensure adequate contact on plug pins…		N/A
14.6	Pins and socket-contacts shall be resistant to corrosion and abrasion.		Complied
14.7	The enclosures of rewirable portable accessories shall completely enclose the terminals and the ends of flexible cable.		N/A
14.8	Rewirable portable accessories shall be designed in such a way that terminal screws or nuts cannot become loose and fall out…		N/A
14.9	Rewirable portable accessories with earthing contact shall be designed with ample space for slack in the earthing conductor…		N/A
14.10	Terminals of rewirable portable accessories and terminations of non-rewirable accessories shall be located or shielded in such a way that loose wires from a conductor in the accessory will not present a risk of electric shock.		Complied
14.11	For rewirable portable accessories		N/A
14.12	For rewirable portable socket-outlets accessories and non-rewirable non-moulded on portable accessories. It shall not be possible to remove covers, cover-plates or parts of them intended to ensure protection against electric shock without the use of a tool.		Complied

14.13	If covers of portable socket-outlets...		N/A
14.14	Screws intended to allow access to the interior of the accessory shall be captive		N/A
14.15	The engagement face of plugs shall have no projections other than the pins, when the plug is wired and assembled as for normal use.		Complied
14.16	Portable socket-outlets		N/A
14.17	Portable accessories of IP code higher than IP20		N/A
14.18	Portable socket-outlets having means for suspension		N/A
14.19	Combinations of portable accessories and switches, circuit-breakers or other devices		N/A
14.20	Portable accessories shall not be an integral part of lampholders		Complied
14.21	Plugs classified exclusively as plugs for equipment of class II may be rewirable or non-rewirable shall comply with SANS 60884-1:2006		Complied
14.22	Components, such as switches and fuses, incorporated in accessories		N/A
14.23	If a plug is an integral part of plug-in equipment		N/A
14.24	Plugs shall be shaped in such a way and/or made of such material that they can easily be withdrawn by hand from the relevant socket-outlet		Complied
14.25	Membranes in inlet openings of portable accessories shall meet the requirements of 13.22 and 13.23.		N/A

15	**Interlocked socket-outlet**	N/A

16	**Resistance to ageing, protection provided by enclosure and resistance to humidity**		
16.1	Resistance to ageing: Accessories shall be resistance to ageing. - Temperature at (70±2) ^{0}C for seven days(168 h), - Relative humidity of between 45% and 55 % for four days (96 h), After the test, the specimens shall show no damage.		Complied
16.2	Protection provided by enclosures - Enclosure shall provide protection against access to hazardous parts, harmful effects due to ingress of solid foreign objects and harmful effects…		Complied
16.3	Resistance to humidity: Accessories shall be proof against humidity which may occur in normal use. - Relative humidity of between 91% and 95 % for two days (48 h)		Complied

17	**Insulation resistance (I.R) and electric strength (H.V)**		
	The insulation resistance and electric strength shall be adequate		Complied
17.1	The insulation resistance test, - Rated current (16A) - Test voltage (500 V), - Duration (1 min). The insulation resistance shall be not less than 5MΩ, except for items g) and h) of clause 17.1.1, where the resistance shall not be less than 2MΩ.		Complied
17.2	The electric strength test, - Rated voltage (250V), - Test voltage (2 000V). - Duration (1 min) No flashover or breakdown shall occur during the test		Complied

18	**Operating of earthing contacts**	
	Earthing contacts shall provide adequate contact pressure and shall not deteriorate in normal use.	Complied

19	**Temperature rise**		
	Accessories shall be so constructed that the temperature rise shall not exceed 45 K		Complied
	- Rated current (16A) - Test current (10A) - Duration (1h) Nominal cross-sectional area of conductors (0.75 mm^2)	11,1 K	Complied
	- Rated current (16A) - Test current (12A) - Duration (1h) Nominal cross-sectional area of conductors (1.0 mm^2)	16,4 K	Complied
	- Rated current (16A) - Test current (16A) - Duration (1h) - Nominal cross-sectional area of conductors (1.5 mm^2)	24 K	Complied

20	**Breaking capacity**		
	Accessories shall have adequate breaking capacity. - Test voltage (1,1Vn) - Test current (1,25In) - Power factor(0,6) and - Number of strokes(100) During the test, no sustained arcing shall occur and After the test, the specimens shall show no damage impairing their further use.		Complied

21	**Normal Operation**		
	Accessories shall withstand without excessive wear or other harmful effect, the mechanical, electrical and thermal stresses occurring in normal use. - Test voltage(rated) - Test current(rated) - Power factor(0,8) and - Number of strokes(10000) During the test, no sustained arcing shall occur and		Complied

22	**Force necessary to withdraw the plug**	N/A

23	**Flexible cable and their connection**		
23.1	- Rewirable plugs and rewirable portable socket-outlets shall be provided with a cord anchorage. - Non rewirable plugs and non rewirable portable socket-outlets shall be designed in such a way that the cable is maintained in position and the terminations are relieved from strain and twisting.	Non-rewirable plug	Complied
23.2	The effectiveness of the retention of the cable by the cord anchorage after the tests, - Number of the pull (100times) - Rated current (16A) - Force of 60N After the test flexible cable shall not been displaced by more than 2 mm		Complied
23.3	Non-rewirable plugs and non-rewirable portable socket-outlets shall be provided with a flexible cable complying with IEC 60227 or IEC 60245		Complied
23.4	Non-rewirable plugs and non-rewirable portable socket-outlets shall be designed in such a way that the flexible cable is protected against excessive bending where it enters the accessory.		Complied

24	**Mechanical strength**		
24.1	Impact test After the test, the specimen shall show no damage within the meaning of this standard.		N/A
24.2	Free fall test Non-rewirable accessories are tested as delivered - Free length (100mm) - Number of falls (1000) for mass not exceeding 100g,		Complied
24.3	Surface type socket-outlets...		N/A
24.4	Impact test - After the test, the specimen shall show no damage within the meaning of this standard.		Complied
24.5	Compression test - Shall show no damage within the meaning of this standard.		Complied
24.6	Screwed glands - After the test, the glands and the enclosures of the specimen shall show no damage within the meaning of this standard.		N/A
24.7	Plug pins provided with insulating sleeves - After the test, the pins shall show no damage which may affect safety or impair the further use of the plug.		Complied
24.8	Shuttered socket-outlets - After the test, the specimen shall show no damage within the meaning of this standard.		N/A
24.9	Rewirable multiple portable socket-outlets - After the test, the specimen shall show no damage within the meaning of this standard.		N/A
24.10	The plug is placed on a rigid steel plate		Complied
24.11	Barriers -The rod shall not pierce the barrier		N/A
24.12	Portable socket-outlet - Shall not break in a way which allows live parts to become accessible to the standard test finger.		N/A
24.13	Portable socket-outlets - Shall not break in a way which allows live parts to become accessible		N/A
24.14	Verification of retention of covers or cover-plates		N/A
24.15	Cover or cover plates		N/A
24.16	Cover or cover plates		N/A

24.17	Cover or cover plates		N/A
24.18	Force of 1N shall not enter more than 1,0 mm from the upper part of any groove, hole or reverse taper		N/A
24.19	The shrouds of portable socket-outlets are subjected to a compression test at an ambient temperature of (25+5) C in an apparatus similar to that shown in figure 38 of SANS 60884-1		N/A

25	**Resistance to heat**		
25.1	The specimens are kept for 1h in a heating cabinet at a temperature of (100±2)^{0}C		Complied
25.2	Parts of insulating materials of fixed socket-outlets necessary to retain current- carrying parts and parts of the earthing circuit in position, as well as parts of the front surface zone of 2 mm wide surrounding the phase and neutral pin entry holes: Ball pressure test at (125±2)^{0}C for 1h - after the test: diameter of impression < 2 mm...		Complied
25.3	For parts not necessary to retain current-carrying parts and parts of the earthing circuit in position, even though in contact with them: ball-pressure test (1 h) - after the test: diameter of impression , 2mm		Complied
25.4	Portable accessories: compression test (20 N) at (80±2) ^{0}C for 1 h by means of the apparatus shown in figure 38 - after the test: no damage		Complied

26	**Screws, current-carrying parts and connections**		
26.1	Connection, electrical or mechanical, shall withstand the mechanical stresses occurring in normal use.		Complied
26.2	Screws engaged in insulating material, operated when mounting the accessory during installation		Complied
26.3	Contact pressure shall not be transmitted through insulating material		Complied
26.4	Screws and rivets for electrical as well as mechanical connection shall be locked against loosening or turning		Complied
26.5	Current-carrying parts shall be of metal having, mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use.		Complied
26.6	Contacts subjected to a sliding action in normal use shall be of metal resistance to corrosion.		Complied
26.7	Thread-forming and thread-cutting screw shall not be used for the connection of current-carrying parts and may be used to provide earthing continuity if at least two screws are used for each connection		Complied

27	**Creepage distances, clearances and distances through sealing compound**		
27.1	Creepage distance, clearances and distances through sealing compound shall comply with table 23 of SANS 60884-1		Complied
27.2	Measurements made with and without plug fitted with and without conductors of largest c.s.a per table 3 fitted		Complied
27.3	Surface-type socket-outlets shall not have bare current-carrying strips at the back		N/A

28	**Resistance of insulating material to abnormal heat, to fire and to tracking**		
28.1	Resistance to abnormal heat and to fire		Complied
28.1.1	Glow-wire test: - Test temperature= 750^{0}C - Time = 30 seconds The specimen regarded as having passed the glow-wire test if - there is no visible flame and no sustained glowing, or if - flames and glowing at the specimen extinguish within 30 s after removal of the glow-wire. - There shall be no ignition of the tissue paper or scorching of the board.		Complied
	Heating test (pins with insulating sleeves)		Complied
28.2	Resistance to tracking: - No flashover or breakdown between electrodes shall occur before a total of 50 drops has fallen		Complied

29	**Resistance to rusting**		
	Ferrous parts shall be adequately protected against rusting - The surface shall show no signs of rust.		Complied

30	**Additional tests on pins provided with insulation sleeves**		
30.1	Pressure test at high temperature: - Force applied through the blade (2,5 N), - Temperature of heating cabinet (200±5)^{0}C, - Duration (2hours) Insulation remaining after the test shall not have been reduced by more than 50 % of its original value.		Complied
30.2	Static damp heat test		Complied
30.3	Test at low temperature: - Temperature(-15±2)^{0}C, - Duration (24 h)		Complied
30.4	Impact test at low temperature: - Mass of the falling weight (100±5)g - Temperature of a freezer (-15±2)^{0}C		Complied

N/A=Not applicable		

APPENDIX A

A.1 Measuring Equipment

The following equipment was used for the measurements:

Type of equipment	Make and model	SABS No.	Accuracy
Scale	Sartorius BP8100	26036	± 0,05 %
Vernier	Digital caliper	WW034264	± 0,02 mm
Omega stop watch	Omega UUT	13299	± 0,01 %
Impact hammer	MES 379	16828	± 3,0 %
Multimeter	Fluke 73	PP&E0004233	± 0,2 %
Megger 500V d.c.	Megger 2083832	14487	± 3,0 %
Oven	Gallenkamp	PP&E0004971	± 5,0 %
Temperature recorder	Yokogawa	PP&E0004209	± 2,0 %
High voltage test set	Foster	17920	± 0,2 %
Digital thermometer	Fluke 2175A	20940	± 5,0 °C

Calibration of this equipment is traceable to national standards.

A.2 Tolerance on Measurements

Temperature (glow wire) : 5,0 °C
Temperature (rise test) : 1,2 °C
High voltage test : 2,0 %

Current : 0,5 %
Voltage : 0,2 %
Weight : 0,05 %

Measurements : 0,02 mm
Resistance : 3,0 %
Time frequency : 0,01 %

Photograph No. 1
Top view of the sample

Photograph No. 2
Bottom view of the sample