



# Simtars Engineering, Testing and Certification Centre

Test Report No: E09/0035

## 1.0 Equipment Description

The Type LT Sealsafe flexible metallic liquidtight conduits are of composite construction consisting of a flexible metallic internal sleeve, a cord packing and a PVC outer jacket. Drawings detailing the construction of the conduit are listed in Section 6.0.

The conduits covered by this test report are listed in Table 1 below.

Table 1: Conduits in range

Part No.	Jacket/Outer Sheath Material	Nominal Size (mm)	Minimum I.D. (mm)	Outside Dia. (mm)
LT16	PVC	16	12.0	17.5 to 18
LT20	PVC	20	16.0	20.8 to 21.3
LT25	PVC	25	21.0	26.2 to 26.7
LT32	PVC	32	26.5	32.8 to 33.4
LT40	PVC	40	35.0	41.4 to 42.2
LT50	PVC	50	40.5	47.4 to 48.3
LT63	PVC	63	51.5	59.4 to 60.3

## 2.0 Test Specification

2.1 The conduits were assessed and tested to AS/NZS 2053.1: 2001 and AS/NZS 2053.8: 1995

2.2 The following clauses of AS/NZS 2053.1 were applied:

1, 2, 3, 4, 5.1(c), 5.2(b), 5.3(d), 5.4(d), 5.5, 5.6(a), 5.7(b), 5.8, 5.8.1, 5.8.2, 5.8.5(b), 6.4, 7, 8.1, 9.1, 9.3, 9.6, 10, 11, 13.1, 13.2, 13.3, 13.6.1, 13.6.2, 13.6.3 and Appendices A, D and E

2.3 The following clauses of AS/NZS 2053.8 were applied:

1, 2, 3, 4, 5, 6, 6.1, 6.2, 7, 7.101, 7.102, 8, 9, 9.3, 9.101, 10, 11, 13 and Appendices AA, BB and CC

2.4 Unless specified otherwise, all assessment and testing was conducted in accordance with the requirements of clause 4 of AS/NZS 2053.1 on each size of conduit listed in Table 1 above.

## 3.0 Test Results

### 3.1 Dimensions and Form

The conduits are designated according to their nominal size in accordance with clause 7.101 and Table 101 of AS/NZS 2053.8. Refer to Table 1 above.

The inside diameter of the conduits complied with the requirements of clauses 7.102 and AA4 when tested in accordance with Appendix AA of AS/NZS 2053.8.

### 3.2 Construction

When inspected in accordance with clause 8.1 of AS/NZS 2053.1, the inside and outside surfaces of the sample conduits were found to be free from burrs, defects and sharp edges likely to damage a cable.

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**3.3 Resistance to Compression**

Samples of conduit were tested for resistance to compression in accordance with Appendix A of AS/NZS 2053.1 and clause 9.3 of AS/NZS 2053.8. The samples of conduit were conditioned at  $20\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$  for 10 hours immediately before the tests.

The conduits complied with the requirements of clause A4 of AS/NZS 2053.1 and clause 9.3 of AS/NZS 2053.8 when tested with a compression force of 1250 newtons for a heavy duty rating (refer to Classification of Conduits Table 4).

**3.4 Pull-out Strength of Joints**

The pull-out strength of the joints between the conduits and their associated fittings was tested in accordance with clause 9.6 and Appendix D of AS/NZS 2053.1.

The sample conduits complied with the requirements of clause D3 of AS/NZS 2053.1, had not separated or pulled out of the fittings and, the conduits and fittings had not fractured after being subjected to a downward force of  $(160 \pm 2)$  newtons for 5 minutes.

**3.5 Flexing Test**

Samples of conduit were subjected to flexing tests in accordance with clause 9.101 and Appendix BB of AS/NZS 2053.8.

The samples of conduit showed no signs of structural damage when inspected with normal vision, without magnification, and complied with the requirements of clause BB4 of AS/NZS 2053.8 after being subjected to 5000 flexings at the rate of approximately 40 flexings per minute.

The flexing tests on the 16, 20, 25, 32 and 40 mm conduits were conducted at an ambient temperature of  $20\text{ }^{\circ}\text{C}$  to  $30\text{ }^{\circ}\text{C}$ . Refer to Section 5.1, Additional Information, for tests on the 50 mm and 63 mm conduits.

**3.6 Resistance to Heat**

Samples of conduit were tested for resistance to heat in accordance with clause 10 and Appendix CC of AS/NZS 2053.8. The conduits were placed in the test chamber at a temperature of  $(105 \pm 2)\text{ }^{\circ}\text{C}$  and tested in accordance with clause CC3 with a load of 8 kg for Very Heavy duty rating.

The conduits complied with the requirements of clause CC4 when checked with the appropriate test gauges at room temperature and achieved a Very Heavy rating (refer to 3.3 Resistance to Compression above and Classification of Conduits Table 4).

**3.7 Resistance to Burning**

Samples of conduit were tested for resistance to burning in accordance with clause 11 and Appendix E of AS/NZS 2053.1 and clause 11 of AS/NZS 2053.8. The conduits were mounted in the test rig in accordance with clause E2.1.1 and tested in accordance with clause E2.2 and E2.3 of AS/NZS 2053.1.

The conduits complied with the requirements of clause E2.4 and are classified as non-flame propagating (refer to Classification of Conduits Table 4).

The resistance to burning tests were conducted at an ambient temperature of  $28\text{ }^{\circ}\text{C}$ .

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## 3.8 Protection Against Ingress of Water and Solid Foreign Objects

Samples of conduit and a selection of appropriate fittings were assembled and tested to the requirements of AS60529 (AS1939) for protection against ingress of water and solid foreign objects in accordance with clauses 13.2 and 13.3 of AS/NZS 2053.1.

The conduit and fitting assemblies complied with the requirements of AS60529 (AS1939) and achieved a degree of protection rating of IP66.

## 3.9 Protection Against Moisture

Samples of conduit were conditioned and tested for protection against moisture in accordance with clause 13.6.2 of AS/NZS 2053.1.

The conduits complied with the requirements of clause 13.6.3 of AS/NZS 2053.1 and are classified as non-hygroscopic (refer to Classification of Conduits Table 4).

## 3.10 Summary of Test Results

The results for the tests described in Sections 3.1 to 3.9 of this report are summarised in Tables 2 and 3.

**Table 2: Summary of Test Results**

Conduit Part No.	Inside Diameter Test (Pass/Fail)	Compression Test (Pass/Fail)	Pull out Strength Test (Pass/Fail)	Flexing Test (Pass/Fail)	Resistance to Heat Test (Pass/Fail)
Report Section No.	3.1	3.3	3.4	3.5	3.6
LT16	Pass	Pass	Pass	Pass	Pass
LT20	Pass	Pass	Pass	Pass	Pass
LT25	Pass	Pass	Pass	Pass	Pass
LT32	Pass	Pass	Pass	Pass	Pass
LT40	Pass	Pass	Pass	Pass	Pass
LT50	Pass	Pass	Pass	Pass *	Pass
LT63	Pass	Pass	Pass	Pass *	Pass

\* Refer to Section 5.1, Additional information

**Table 3: Summary of Test Results**

Conduit Part No.	Resistance to Burning (Pass/Fail)	Protection Against Water Ingress (Pass/Fail)	Protection Against Ingress of Foreign Objects (Pass/Fail)	Protection Against Moisture (Pass/Fail)
Report Section No.	3.7	3.8	3.8	3.9
LT16	Pass	Pass	Pass	Pass
LT20	Pass**	Pass	Pass	Pass
LT25	Pass**	Pass	Pass	Pass
LT32	Pass	Pass	Pass	Pass
LT40	Pass**	Pass	Pass	Pass
LT50	Pass**	Pass	Pass	Pass
LT63	Pass	Pass	Pass	Pass

\*\* Not tested, however testing on other conduit sizes is considered representative

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## 3.11 Conclusion

All conduits listed in Table 1 comply with the requirements of AS/NZS 2053.1 and AS/NZS 2053.8. Refer to Tables 2 and 3 for test results.

## 4.0 Classifications and Markings

4.1 The classification of the conduits in accordance with clause 5 of AS/NZS 2053.1 is summarised in Table 4.

**Table 4: Classification of Conduits**

Conduit classified according to:	Classification
Material	Composite
Connection method	Non-threadable
Mechanical Properties	Heavy Duty
Suitability for bending	Flexible
Temperature	-10 °C to 105 °C
Flame propagation	Non-flame propagating
Electrical Characteristics	Without electrical continuity
Protection against ingress of water	IPX6 in accordance with AS60529 (AS 1939)
Protection against ingress of foreign objects	IP6X in accordance with AS60529 (AS 1939)
Protection against moisture	Non-hygroscopic

4.2 The information marked on the conduits in accordance with clause 6 of AS/NZS 2053.1 and AS/NZS 2053.8 is summarised in Table 5. The conduits are marked at 1 metre intervals in accordance with clause 6.2 of AS/NZS 2053.8. The markings are applied via ink jet and comply with the requirements of clause 6.4 of AS/NZS 2053.1.

**Table 5: Conduit markings**

Clause	Required Detail	Details marked on conduits
Clause 6.1 (a) of AS/NZS 2053.1 and AS/NZS 2053.8	Manufacturer/Vendor	Sealsafe
Clause 6.1 (b) of AS/NZS 2053.1 and AS/NZS 2053.8	Nominal size	16mm, 20mm etc. Refer to Table 1
Clause 6.1 (c) of AS/NZS 2053.1	The word 'Electrical'	Electrical
No requirement	Type identification	Type LT
Clause 6.1 (d) of AS/NZS 2053.1	Duty Rating	HD
Clause 6.1 (e) of AS/NZS 2053.1 and 6.1 (c) of AS/NZS 2053.8	Halogen-free if appropriate	-
Clause 6.1 (f) of AS/NZS 2053.1 and 6.1 (d) of AS/NZS 2053.8	Letter 'T' indicating protection against solar radiation if appropriate	-
Clause 6.1(g) of AS/NZS 2053.1 and 6.1 (e) of AS/NZS 2053.8	Minimum and Maximum service temperatures in °C	-10C/+105C
No requirement	Applied Standard	AS/NZS 2053.8

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**5.0 Additional Information**

5.1 Flexing tests on the 50 mm (LT50) and 63 mm (LT63) conduits to the requirements of clause 9.101 and Appendix BB of AS/NZS 2053.8 were conducted by ITACS and are documented in ITACS Test Report No. 4888R. The testing was conducted in accordance with clause 4 of AS/NZS 2053.1. Compliance was determined in accordance with clause 4.6 of AS/NZS 2053.1.

**6.0 Drawings**

The drawing below was assessed in the course of the preparation of this report.

Drawing No	Drawing Title	Rev	Date
1033	"Sealsafe" Liquidtight Conduit Dimensions	3	03 - 08 - 2009

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