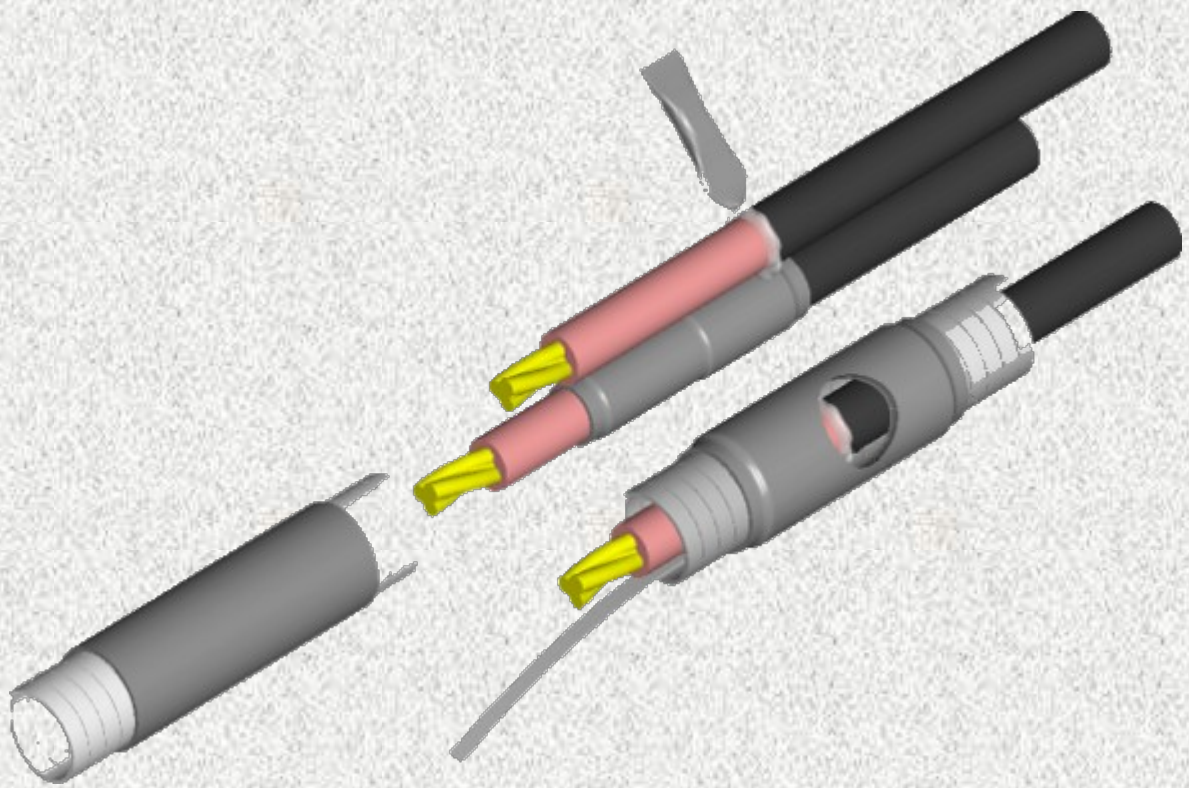




## Cold Shrink Stress Relief Tube



*Pioneering the Difference.*

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## Test Report

**DATE ISSUED:** 9 March 2023

**DEVICE TESTED:** AusProof KBX Cold Shrink Stress Relief Tubes rated 6.6 kV to 35 kV

**CLIENT'S NAME:** AusProof Pty Ltd  
6 Shona Avenue  
Gladstone  
Queensland 4680  
Australia

**CLIENT'S REFERENCE:** PO 87249

**TEST SPECIFICATION:** Client specified partial discharge tests and dielectric test.

**DATE OF TEST COMPLETION:** 9 March 2023

**SUMMARY OF RESULTS:** Cable samples tested exhibited less than 2 pC partial discharges when fitted with KBX Cold Shrink Stress Relief Tubes  
Dielectric strength of the KBX Cold Shrink Stress Relief Tubes exceeded 15 kV/mm  
Refer to the results section of this report for further details.



All tests reported herein have been performed in accordance with the Laboratory's scope of accreditation, Accreditation Number: 42

Approved Signatory: K Manson



Checked By: G I Dix



International Accreditation New Zealand (IANZ) has a Mutual Recognition Arrangement (MRA) with the National Association of Testing Authorities (NATA), Australia, such that both organizations recognize accreditations by IANZ and NATA as being equivalent. Users of inspection reports / certificates are recommended to accept inspection reports / certificates in the name of either accrediting body.

Report Number: PL1792-PD-1

## Testing notes

### Description of equipment tested

The following devices were submitted for partial discharge tests:

#### KBX Cold Shrink Stress Relief Tubes

Cold Shrink Tube Part number	Specified Cable diameters	Class	Tested cable diameter (mm) (total/insulation)
RS2484	11-25 mm	Small	19.9/17.8
RS2485	17-30 mm	Medium	29.5/28
RS2486	24-50 mm	Large	34.5/32.8

Client supplied cold shrink stress relief tubes and cable samples were used for the tests.

### The following personnel were present during testing:

Laboratory staff: K Manson and G I Dix

### Test Laboratory Atmospheric Conditions

Temperature 18 ( $\pm 4$ )°C.  
Pressure 101 ( $\pm 0.5$ ) kPa  
(Approximate height above local sea level is 30 m).

### Laboratory Equipment

Manually set 25cm sphere-gap;  
Biddle balanced partial discharge detector 665700 (Zm, PDS)  
Biddle partial discharge system master calibrator 6617250  
Oscilloscope  
Heafely 2000 pF discharge free 200 kV capacitor (Ck).  
Hipotronics 150 kV 150 kVA ac dielectric test set  
Resistive voltage divider and true RMS indicator (Hipotronics KVM300)  
Fluke 287 DVM  
Miscellaneous laboratory equipment including: assman hygrometer, barometer, and a mercury-in-glass thermometer.

### Measurement Uncertainties

Refer to the Laboratory accreditation details at [www.ianz.govt.nz](http://www.ianz.govt.nz) for information on measurement uncertainty.

## Test procedures, Results

### 1) Partial discharge tests

Test voltages were applied between the conductor and an earth connection at the centre of the cable sample using a Hipotronics 150 kV 150 kVA ac dielectric test set operated from the laboratory mains supply. The voltage was measured using a resistive voltage divider and true RMS indicator (Hipotronics KVM300).

Discharge levels were measured using a Biddle balanced bridge discharge detector. The bridge was balanced according to the bridge manufacturer's instructions. The measurements system was calibrated by injecting a known discharge between the conductor and the cable sheath. The system calibration was checked at 10 pC and at 100 pC. Background discharge levels were recorded. Discharge levels were measured using an oscilloscope and the bridge meter.

Test voltages were applied to the cable samples without Cold Shrink Stress Relief Tubes installed and with Cold Shrink Stress Relief Tubes installed

Discharge test voltages were based on the following system voltages:

Rated P-P voltage (V)	8700	15000	22000	25000	35000
Phase to earth (V)	5830	8660	12700	14440	20200
Discharge test voltage	5830	9526	13970	15884	22220

Background discharge level during the tests were less than 1 pC

Discharge levels (pC) without Cold Shrink Stress Relief Tubes installed:

Cable	Test Voltage(V)					Discharge Inception (kV, pC)	Extinction (kV)
	5830	9526	13970	15884	22220		
Small	<1	10	*	*	*	9.8 kV, >1000pC	7
Medium	*	*	*	*	*	5.8 kV, >1000 pC	4.8
Large	*	*	*	*	*	5.6 kV, >1000 pC	4.2

\* - test terminated before voltage reached due to excess PD (>1000 pC)

Discharge levels (pC) with Cold Shrink Stress Relief Tubes installed:

Sample, cable	Test Voltage (V)				
	5830	9526	13970	15884	22220
RS2484, Small	<1	<1	<1	<1	<1
RS2485, Medium	<1	<1.2	<1	<1.2	<1
RS2486, Large	<1	<1	<1.2	<1.2	<1.2

## 2) Dielectric strength

A voltage was applied to a sample taken from each of two Cold Shrink Stress Relief Tubes.

The test voltage was applied using two electrodes, the ground electrode was 76 mm diameter, the HV electrode diameter was 20 mm.

Voltage applied to each sample was increased at a rate of approximately 0.5 kV/second starting at 0 V until breakdown occurred. The test was carried out under oil.

The atmospheric conditions during the test were:

21 ±1 °C

101.5 ±1 kPa

68 % RH

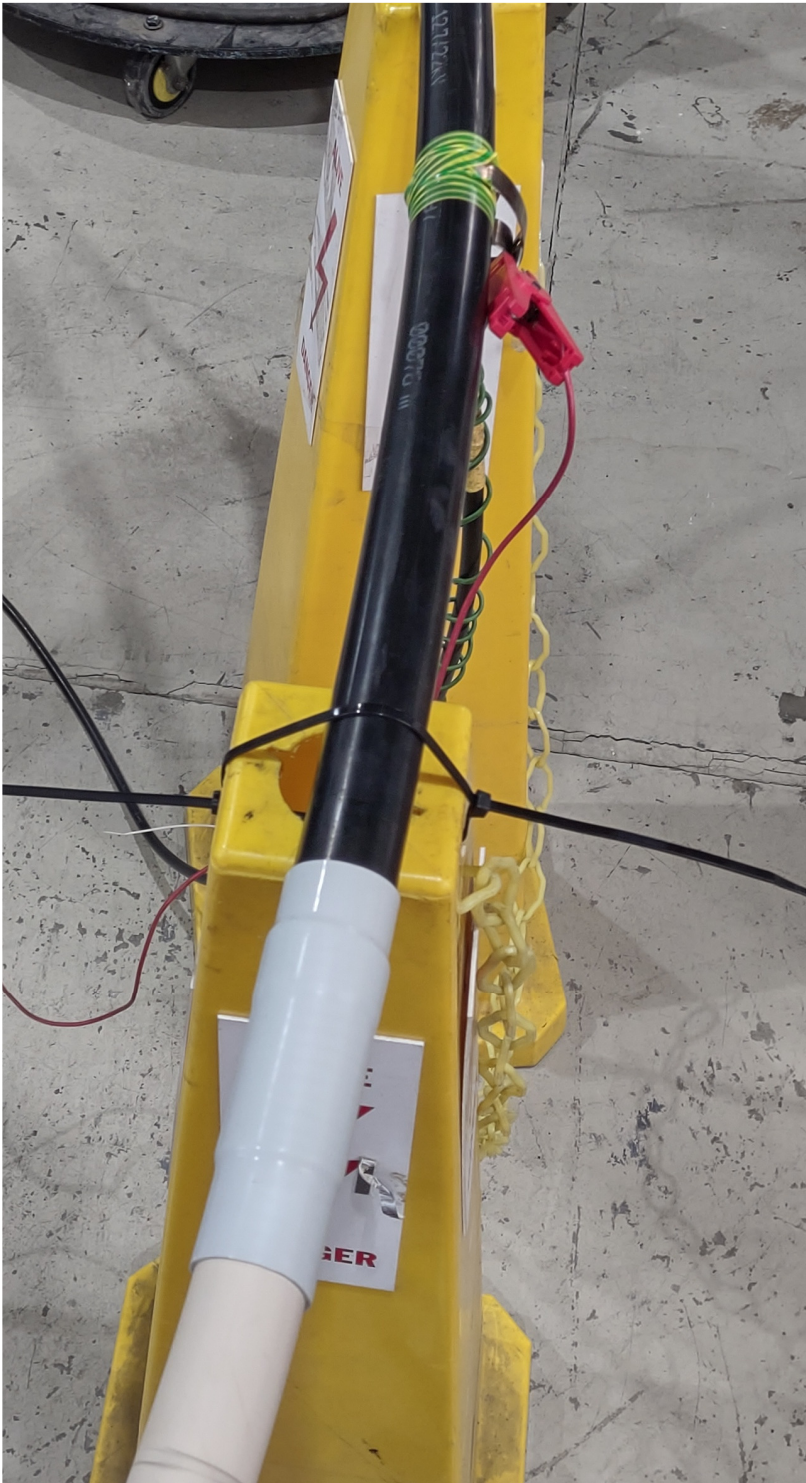
Sample	Average Sample Thickness (mm)	Breakdown Voltage (kV)	Dielectric Strength (kV/mm)
1	2.4	37.8	15.8
2	2.45	37.8	15.4

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**Pictures:**



Picture 1 Cable sample, Cold Shrink Stress Relief Tube not installed



Picture 2 Cable sample with Cold Shrink Stress Relief Tube installed