

## Mechanical Testing

- Tensile
- Compression
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- Structures
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- Structural Bearings

### LOAD TESTING OF RUBBER PROTECTION COVERS

CLIENT: Electriduct

#### TEST SYNOPSIS:

Three synthetic rubberised "CableSafe" cable protection covers were delivered to the Melbourne Testing Services laboratory for load testing. One of the covers is shown in Figure 1.

The Cover/Cable Protectors were identified to be:

1. 5 Channel Cover CS-05i
2. 3 Channel Cover CS-01i
3. 2 Channel Cover CS-02i

At the request of the client, the cable protection covers were to be proof load tested followed by destructive testing to determine their ultimate load capacity.

#### TEST PROCEDURE:

In lieu of an appropriate test standard, testing was conducted by applying a concentrated load to the middle of the cover. This was done to simulate, as close as possible, a concentrated load from a heavy vehicle i.e. a truck. The bearing area of the loading platen was 240mm x 240mm and in accordance with the platen size as specified in AS 3996-2006 ACCESS COVERS AND GRATES.

The cable cover was placed on the rigid base-plate of a calibrated universal testing machine. Compressive load was then applied at a constant rate until the nominated proof load was achieved. The load was maintained for **5 minutes** at which time the load was released and the cable cover examined for damage and signs of failure. A destructive load test was then conducted with the peak load recorded immediately prior to failure. Throughout testing load vs compressed displacement data was autographically recorded.



FIG.1.  
CABLE PROTECTION COVERS

**TEST COMMENTS:**

**5 Channel Cover (CS-05i)**

The 5 channel cable protection cover successfully supported a proof load of **45kN**  $\approx$  4.6 tonnes without collapse or visible sign of failure.

The ultimate test load recorded immediately prior to failure was **76kN**  $\approx$  7.7 tonnes with failure occurring by the collapse of the internal ribs.

**3 Channel Cover (CS-01i)**

The 3 channel cable protection cover successfully supported a proof load of **60kN**  $\approx$  6.1 tonnes without collapse or visible sign of failure.

The ultimate test load recorded just prior to failure was **81kN**  $\approx$  8.3 tonnes with failure occurring by the collapse of the internal ribs.

**2 Channel Cover (CS-02i)**

The 2 channel cable protection cover successfully supported a proof load of **30kN**  $\approx$  3.1 tonnes without collapse or visible sign of failure.

The ultimate test load recorded just prior to failure was **35kN**  $\approx$  3.6 tonnes with failure occurring by the collapse of the internal ribs

Upon release of the load the internal ribs of all cover assemblies rebounded to form their original shape. Examination of the covers after destructive testing did reveal evidence of scuffing and minor damage to the internal synthetic rubber ribs.

**TEST DATA:**

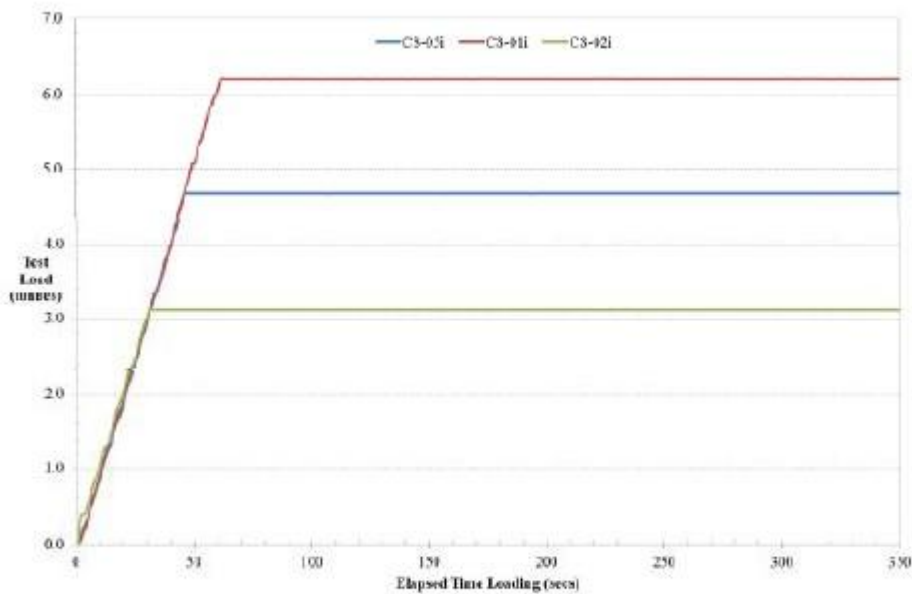
Proof load vs elapsed time curves are provided in Fig.4.



**FIG.2**  
**LOAD TEST SET-UP**



**FIG.3**  
**CS02i UNDER 3.6 TONNE TEST LOAD**



**FIG.4**  
**PROOF LOAD VS ELAPSED TIME CURVES**

Test Items	The standard requests	Actual measurement result	Judge
General requirements	<p>The Cable Protector should to be mold into the integral whole part, the surface should be skid proof stripes. The surface should not have pore, scuffing, starved feeding and existing scrap rubber, the color should be consistently. The bore for expansible bolts should be counter bore. Each part of Cable Protector should be linked in dependable way.</p> <p>The width and height direction of Cable Protector should be looked like oblong or arc-shaped. Its width should be in (100mm±5mm) ~ (200mm±5mm) and the height should be in (100mm±2mm) ~ (200mm±2mm).</p>	<p>External appearance: Conforms to the requirement</p> <p>Size: Length: 900mm Width:615mm Height:105mm</p>	Qualified
Pressure resistance	The 20 tons truck pass on the installed Cable Protector at 40km/h, that will not be broken or ruptured.	Pass muster	Qualified
Maximum elongation	Maximum elongation should not be less than 200%	212%	Qualified
Tensile-strength	Tensile-strength should not be lower than 6.0 MPa	6.1MPa	Qualified
SHORE A Hardness	SHORE A Hardness should be in the A 65~ A85.	A77	Qualified
Wear Loss	Wear Loss should not be more than 0.8cm <sup>3</sup> /1.61km	0.28cm <sup>3</sup> /1.61km	Qualified
Shock elasticity	Shock elasticity should not be less than 20%	37%	Qualified
High temperature resistance	Testing the Cable Protector in 55℃±2℃ environment for 8h, the Cable Protector should not be discoloration, cracking, peeling off, warping, its maximum elongation and tensile-strength should still be passed muster.	<p>1.External appearance pass muster after experimenting.</p> <p>2.Maximum elongation: 202%</p> <p>3.Tensile-strength: 6.6MPa</p>	Qualified
Low temperature resistance	Testing the Cable Protector in -40℃±2℃ environment for 8h ,the Cable Protector should not be discoloration, cracking, peeling off, warping, its maximum elongation and tensile-strength should still be passed muster.	<p>1.External appearance pass muster after experimenting.</p> <p>2.Maximum elongation: 202%</p> <p>3.Tensile-strength: 6.1MPa</p>	Qualified
Acid-proof fog resistance	The sample will be placed in a salt spray chamber Salt Spray Test in concentration 5%±1%, in 35℃±2℃ , spraying 15 mins every 45 mins, 8h after the sample wash drying out after observation of specimen should not be discoloration, cracking, peeling off, warping, its Maximum elongation and Tensile-strength should still be passed muster.	<p>1.External appearance pass muster after experimenting.</p> <p>2.Maximum elongation: 202%</p> <p>3.Tensile-strength: 6.4MPa</p>	Qualified
Solvent resistance	Testing the Cable Protector in No.93 gasoline, No.0 kerosene and the SAE 5W-30 lubricants for 5 minutes respectively, the Cable Protector should not be broken or dissolved after testing.	Pass muster	Qualified