



Report to assess the safety and suitability of D-Line Cable Shelf when used as a stand for locating small electronic items

*R0024-01-C
D-Line Cable Shelf*

tested and approved



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1. General

Product Approvals has been engaged by D-Line (Europe) Ltd (affiliated to D-Line USA Inc) to perform static load testing of a prototype shelf bracket to enable an expert and impartial assessment of the safety and suitability of the D-Line Cable Shelf for use as a continuous stand for locating small electronic items; items to be up to 2.5 kg (5 lbs) equivalent *. Also, to test the risk of overheating from the stowage of energized cables in the cable compartment. The purpose is to check the fit-for-purpose suitability of the product, prior to being potentially launched in global marketplaces.

2. Product description



Shelf 190 x 160 mm (7.5 x 6.3") with cable stowage function and brackets, all made of polymer.

An adhesive product shall be included and may be used to fix the brackets to a wall.

* typical loads are hand-held tablet computers, mobile phones and digital music players.

3.1 Holding strength

The pair of brackets and shelf shall be tested for load-bearing capability.

The test shall assess if the bracket holds a typical full load safely without signs of deformation, failure or damage to the supporting structure. Failure will include gradual peeling from the top.

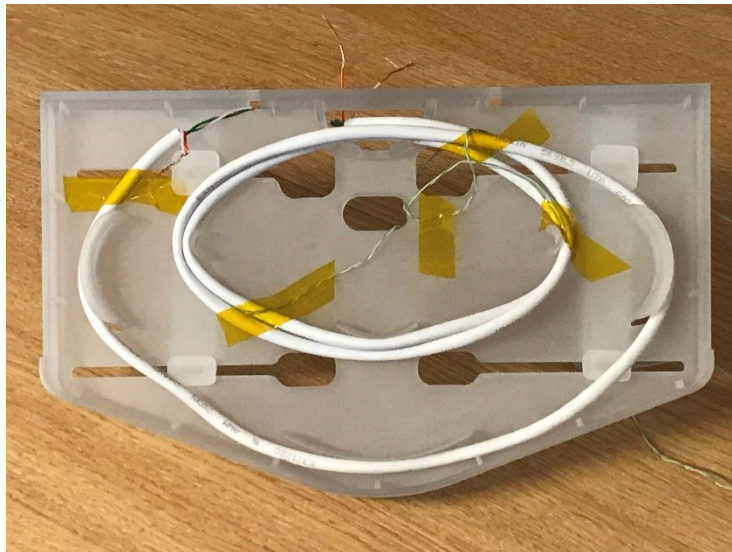
Criteria, Customer specified	Value / setup
Design load across two brackets	2.5 kg (5.5 lbs)
Test duration	45 days
Temperature	25 °C (77 °F)
Mounting method 1 – Sticky-back pads	It is, of course, impossible to exactly specify the conditions of adhering the backing pad to the support because the end-user may press the pad-backed component on with varying forces. A pressing force of 100 N (22.5 lbf) shall be used twice upon the vertical plane of the said component to replicate two strong presses by a thumb along its length.
Mounting surface, a) – Plasterboard skimmed then painted with common emulsion (water-based) paint	The 13 mm (0.5”) plasterboard shall represent a residential situation. An extra consideration is the paint smoothness. Paints are available in varying degrees of smoothness which range from matt, satin, silk, eggshell up to gloss finish. It is expected that smooth gloss would be best performing, so to reflect typical applications, a satin paint is used.
Mounting surface b) – Ceramic tile	A ceramic floor tile shall be used to represent a matt surface finish. It is again reasonable to expect the strongest adhesion from smoother tiles.
Mounting method 2 – Screwed directly	Wood screws into plywood. 6 mm (0.24”) heads so the screw heads shall be adequate to not pull through the hole in the bracket.

3.2 Heating by stowed cabling

This scenario is representative of likely use. An intended purpose of the shelf is to contain excess cable connected to the socket.

Common USB adapters output 2 amps. If a conductor is particularly small, heating will occur.

In this test, 3 amps shall be passed through 1 metre (3.3') of 0.5 mm² (24 AWG) flexible cable.



The test shall assess if a hazard occurs.

Insulation performance in mains cables is critical. In, for example, European standard EN 60335-1 the maximum acceptable temperature for PVC insulated cable is 70 °C (158 °F). In the USA the use of PE insulated cable sheaths can require a maximum temperature of 60 °C (140 °F).

To introduce a margin of safety, the test was to check the heat generated, with less than 55 °C (130 °F) being desired. This and any signs of deformation, failure or damage to the shelf shall be the fail criteria.

4. Results

Test 4.1 Holding strength

Vertical loading

Weight testing on the shelf (or equivalent on individual bracket)	Backing surface	Brackets fixed by	Result
2.5 kg (5.5 lbs)	Emulsion painted plasterboard with strong skim	sticky-back tab	Pass
5 kg (11 lbs)	Ceramic tile	sticky-back tab	Pass
2.5 kg (5.5 lbs)	Not applicable	screwed onto plywood through the 'hole'	Pass
10 kg (22 lbs)			Pass

Test 4.2 Heating by stowed cabling

At 25 °C (77 °F) ambient, the heat generated by the cable caused a slight temperature rise which did not affect the plastic after a stabilisation time of 10 minutes.

It was observed that when 3 A was drawn through the cable, the temperature increase was acceptable and poses no risk of damage or fire.

Location	Measured stabilised temperature	Result
Cable bundle (centre)	53 °C (127 °F) ($\Delta T = 23$ °K)	Pass
Shelf material	<50 °C (122 °F)	Pass

These values are suitably below 90 °C (194 °F) provided as the softening point of the ABS material used in the manufacture of the Cable Shelf

5. Conclusions

- The tests requested by the client have been a PASS.
- The sample complied with all testing applied in this report.
- Instructions could read:
Peel & Stick to hold up to 2.5 kg (5 lbs) on solid & smooth surfaces.
Screw mounting to hold up to 5 kg (10 lbs)
- The sticky pad type RP45 may damage fragile wall surfaces upon removal.
- Manufacturer to add any other safety messages to cover reasonably foreseeable misuse.

The test loads were applied continuously 24 hours x 45 days, with no signs of peeling from the top or deformation of the brackets that form the supporting structure. It is reasonable to expect the D-Line Cable Shelf would be suitable for holding the same tested loads for 365 days continuous; assuming all other test conditions remained exactly the same as stated herein.

7. Disclaimer

This report and supporting research presents our findings within the scope of this assignment and available data and time. We are not guarantying absolute compliance of a design or parts of a design to a particular standard, but we do endeavour to reduce risk of construction-related compliance problems being discovered at a later stage.

Report by
Thomas King BEng MIET
Product Safety Consultant



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Reviewed by
Neil Busby TMIET FSEng
Product Safety Consultant



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Photographs



Tile test



Plasterboard & Paint test



Other bracket designs in the range