Cladco Profiles Ltd.

C AND Z PURLIN SUPPORT TESTING

DOCUMENT REFERENCE: DR-5974
PROJECT FILE REFERENCE: P10313

Prepared for: Cladco Profiles Ltd.
Stanhope House, 9-10 Fore Street, Holsworthy, Devon, EX22 6DT

Unit D4, Poole Hall Business Park, Poole Hall Road, Ellesmere Port, Cheshire, CH66 1UA, United Kingdom
T: +44 (0) 1244 794 104 **F:** +44 (0) 1244 794 204
E: Info@sts-group.co.uk

Offices Located at: Chester | Ellesmere Port
Website: https://www.sts-group.co.uk

Document Control and Information

Document Title	**P10313 – DR-5974 – Internal Support Testing Report v1.0**
Author	Mr. Curtis Barrow, Specialist Technical Services (U.K) Limited
Client	Cladco Profiles Ltd.
Document Status	First Issue
----------	----------

Revision History

Version	Date	Reason for Issue
v0.0	17/04/2025	Draft for Internal Review
v1.0	17/04/2025	First Issue for Comment
----------	----------	----------

Distribution List

Name	Role
Ms. Amy Lett	Customer Support & Quality Manager, Cladco Profiles Ltd.
----------	----------
----------	----------
----------	----------

* END OF PAGE *

CONTENTS

* END OF PAGE *

1.0 Introduction

Specialist Technical Services (U.K.) Limited (hereafter referred to as *STS-UK Group*) was commissioned by Cladco Profiles Ltd. to undertake a comprehensive series of structural tests on cold-formed steel *C*- and *Z*- section purlins of varying lengths and section depths. The testing program was designed to evaluate the structural performance and load-carrying capacity of internal support conditions in continuous span configurations.

All testing activities were conducted under controlled laboratory conditions at STS-UK's in-house structural testing facility and executed entirely by STS-UK's own directly employed and trained technical personnel. The objective of the program was to generate quantitative data that could be used to analyse the bending resistance, stiffness, and overall behaviour of purlin systems continuous over multiple unsupported spans, in accordance with the client's testing specifications and relevant industry standards.

Prior to testing, each purlin specimen was visually inspected to ensure it was free from damage, deformation, or manufacturing defects that could influence performance. Following completion of each test, a secondary inspection was carried out to identify any evidence of local buckling, yielding, or permanent deformation resulting from load application. All results, observations, and associated measurements were recorded in accordance with the prescribed test protocol and subsequently analysed to determine the structural resistance and failure characteristics of the tested systems.

The testing was carried out at the following address:

Site Address: Unit 4, Poole Hall Business Park, Poole Hall Road, Ellesmere Port, CH66 1UA

Dates of Testing: 1st to the 5th of September 2025

2.0 Methodology

The structural performance of the purlins was evaluated through a series of full-scale laboratory tests conducted under uniformly distributed loading conditions. The primary objectives of the testing program were to assess the global load–deflection behaviour, determine stiffness characteristics, and establish ultimate load-carrying capacities under both serviceability and failure conditions.

Each purlin specimen was simply supported at both ends, with end restraints designed to eliminate lateral and torsional movements while allowing free vertical rotation. The supports were configured to simulate realistic boundary conditions typically encountered in service while ensuring that the applied loading induced pure bending along the span without undesirable secondary effects.

* END OF PAGE *

A uniformly distributed load was applied using a system of spreader beams spaced at 1.0 m intervals along the span. This arrangement ensured an even transfer of load from the hydraulic rams to the specimen and minimised the occurrence of local stress concentrations. The number of spreader beams used for each test was proportional to the overall span length of the purlin, thereby maintaining a consistent load distribution ratio across all specimens. Each spreader beam was aligned accurately along the longitudinal axis of the purlin to promote a uniform bending moment profile.

The applied load was generated through a series of 5-tonne capacity hydraulic rams connected to a manifold system that allowed simultaneous and proportional pressurisation. This ensured that the loading remained uniformly distributed across the full length of the specimen throughout the test duration. Load application was controlled incrementally, with pauses at predefined intervals to record deflections and monitor structural response characteristics, including local web buckling, flange distortion, and potential onset of lateral–torsional instability.

Testing was continued beyond the peak load to capture post-ultimate behaviour and the descending branch of the load–deflection curve. The test was terminated once the applied load had decreased to approximately 10% below the maximum recorded value, ensuring that the full collapse mechanism was captured.

Vertical displacements were recorded at multiple locations along the span using high-precision draw-wire displacement transducers, each calibrated to a resolution of ±0.1 mm. Load data were acquired via inline load cells integrated with the hydraulic system. All data were logged continuously through a computer-controlled data acquisition system operating at a minimum sampling rate of 5 Hz, allowing accurate characterization of stiffness degradation and nonlinear behaviour throughout the loading cycle.

* END OF PAGE *

3.0 Results

Upon a brief visual survey of the products to be tested, no areas of the systems raised concern. There were no signs of visual damage at the time of survey in which could be deemed to influence the overall result or performance of the purlins under testing in the manner indicated.

C Purlin Results Table

Test Number	Length, L (m)	Height (mm)	Maximum Load (kN/m)	Maximum Displacement (mm)
1	9	200	0.80	35.6
2	9	175	0.67	34.6
3	9	140	1.10	37.2
4	8	200	0.75	47.5
5	8	175	0.78	42.8
6	8	140	0.79	35.1
7	7	200	1.00	32.66
8	7	175	1.18	34.6
9	7	140	1.33	27.3
10	6	200	0.90	44.6
11	6	175	1.18	28
12	6	140	1.19	26.8
13	5	200	1.12	26
14	5	175	1.42	23.8
15	5	140	1.57	21.4
16	4	200	1.68	25.7
17	4	175	1.92	21.6
18	4	140	2.07	2
19	3	200	2.24	19
20	3	175	2.28	16.9
21	3	140	2.45	16.14
22	2	200	2.47	19
23	2	175	2.69	15.6
24	2	140	2.80	8.4

Table 1 – Z Purlin Results

* END OF PAGE *

Z Purlin Results Table

Test Number	Length, L (m)	Height (mm)	Maximum Load (kN/m)	Maximum Displacement (mm)
1	9	200	0.75	26.8
2	9	175	0.77	24.2
3	9	140	0.79	22
4	8	200	0.64	20.6
5	8	175	0.75	19
6	8	140	0.80	18.8
7	7	200	1.29	30.92
8	7	175	1.41	24.9
9	7	140	1.51	19.14
10	6	200	2.09	24.5
11	6	175	2.20	22.7
12	6	140	2.30	16.94
13	5	200	2.57	26.96
14	5	175	2.96	22.5
15	5	140	3.15	21.3
16	4	200	3.96	24.29
17	4	175	4.11	23.4
18	4	140	4.45	19.8
19	3	200	6.08	19.2
20	3	175	6.20	15.2
21	3	140	6.48	13.6
22	2	200	9.84	15.9
23	2	175	10.07	13.11
24	2	140	10.51	11.95

Table 2 – C Purlin Results

* END OF PAGE *

4.0 Conclusion

Following the completion and analysis of all test results, it was determined that each purlin successfully fulfilled the loading sequence and performance requirements as stipulated by the Client's testing specification.

A preliminary visual inspection of all purlin specimens was conducted prior to testing to confirm that no physical defects, surface damage, or manufacturing irregularities were present that could influence structural performance. A subsequent post-test inspection was also undertaken to assess the extent of any deformation, buckling, or localised distress resulting from load application. No evidence of pre-existing or test-induced damage was observed that could be considered detrimental to the accuracy or validity of the test outcomes.

All specimens demonstrated satisfactory behaviour under the prescribed load sequence, maintaining structural integrity and achieving the expected performance throughout the testing program.

The adopted methodology provides a reliable and repeatable means of proof-load testing, ensuring robust compliance with the Client's requirements. Furthermore, the procedure facilitates the generation of accurate and representative data regarding the true load–deflection and performance characteristics of each purlin tested.

	Name	**Signature**	**Date**
Created By: Technician	Curtis Barrow	CB	18.09.2025
Checked By: Technical Director	Andrew Gore		18.09.2025

For and on behalf of Specialist Technical Services (U.K) Limited

* END OF REPORT *

Appendix A – Photographic Evidence

Figure 1 – C Perlin Failure

Figure 2 – Z Perlin Failure

Figure 3 – C Perlin Failure

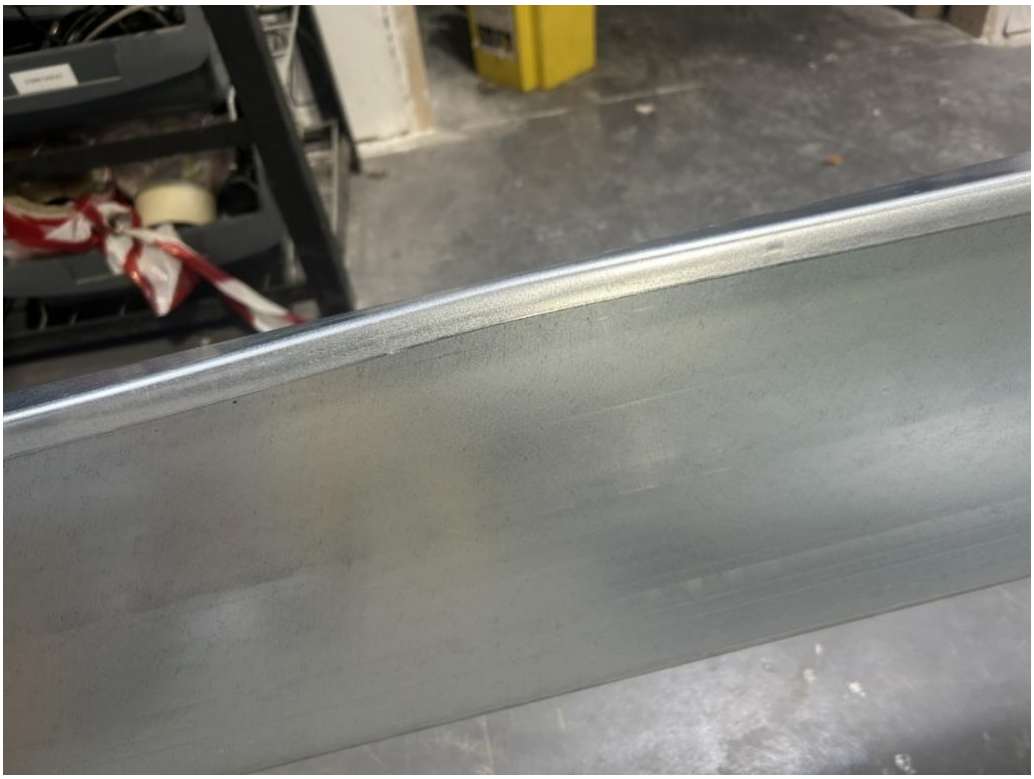

Figure 4 – Z Perlin Failure

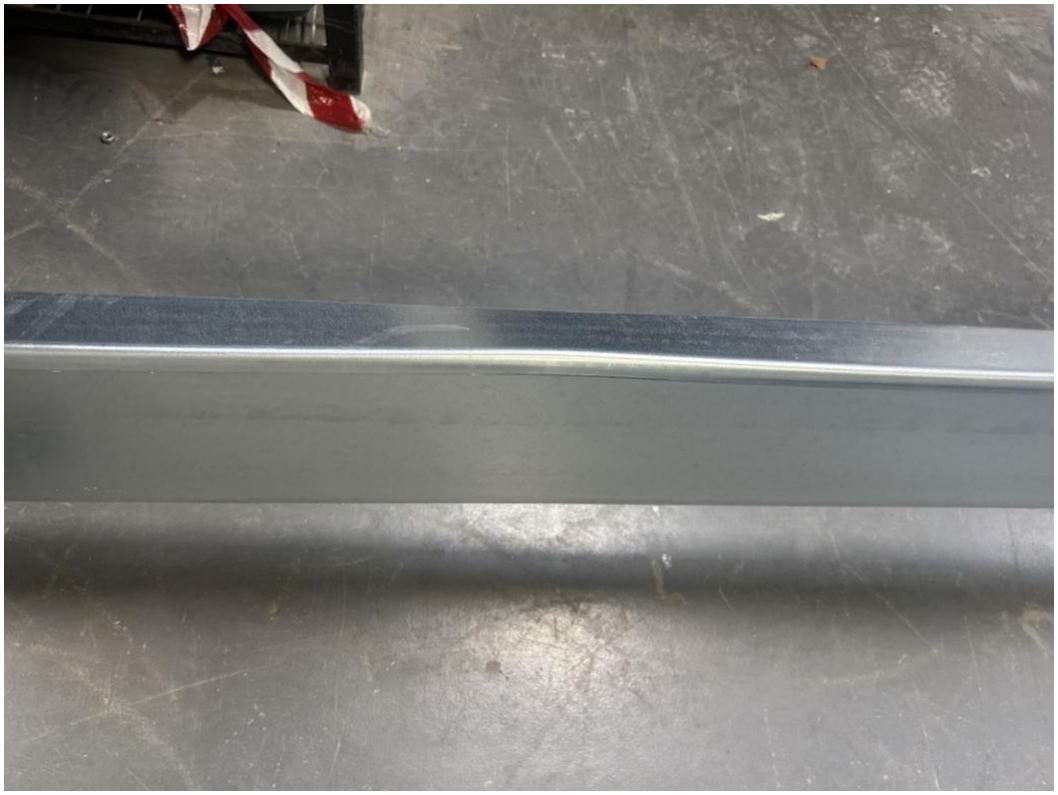

Figure 5 – Z Perlin Failure

Figure 6 – Z Perlin Failure