Cladco Profiles Ltd.

INTERNAL SUPPORT TESTING IN ACCORDANCE WITH THE BRITISH STANDARD EN 1993-1-3:2006

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v0.0	17/04/2025	Draft for Internal Review
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V2.0	12/05/2025	Final Issue

Distribution List

Name	Role
Miss Amy Lett	Customer Support & Quality Manager
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1.0 Introduction

Specialist Technical Services (U.K) Limited, herein known as STS-UK Group were commisioned by Cladco Profiles Ltd. to undertake a series of internal support tests on C and Z purlins with a variety of different lengths ang heights. All testing was carried out by STS-UK's own direct labour force. The purpose of the testing was to attain results and findings that could be analysed to determine the resistance of the perlins that is continuous over two or more spans. All systems tested were done so in accordance with the British Standard EN 1993-1-3:2006. Each component was briefly surveyed for damage before and after testing was carried out.

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: 2nd to the 8th of April 2025

2.0 Methodology

Internal Support Testing on Torsionally Restrained Beams

The test set-up in figure 1 was used for all testing undertaken.

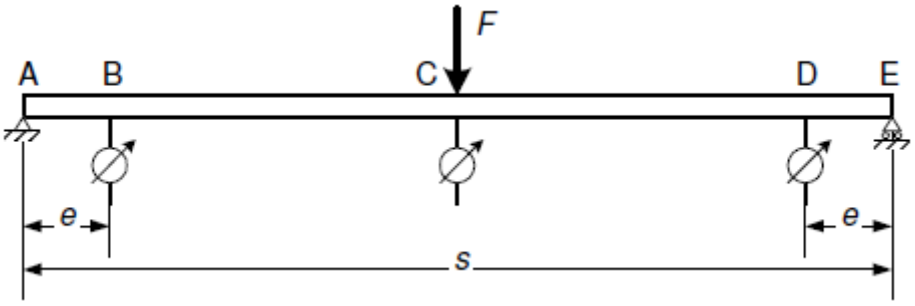

Figure 1 – Internal Support Test Set-Up

Supports **A** and **E** were roller supports with brackets either side of the purlins to minimise horizontal rotation whilst under load. Additionally, there were brackets placed at point **C** to further reduce lateral displacement.

Displacement was measured at points **B**, **C** and **D**. Points **B** and **D** were located a distance *e* from the end of the purlin which was selected to be 20% of the total length (L) of the purlin.

Test span *s* was selected to be the length of the purlin minus 50mm from either side of the purlin.

Testing continued past peak load until the applied load reduced to by 10% of its original value.

The load **F** was applied using a 10 Tonne hydraulic ram and all displacements were measured using highly accurate draw wire displacement sensors.

For each test, a support moment **M** was calculated. Using the following equation.

$$M = \frac{s\ R}{4}$$

Figure 2 – Moment Equation

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3.0 Results

Upon a brief visual survey of the barrier[s] 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 perlins under testing in the manner indicated.

Below are the tables of results, including all measurements taken, with the observed resistance and the corresponding support moment.

C Purlin Results Table

Test Number	Length, L (m)	Height (mm)	Maximum Load (kN)	Fmax Displacement at B (mm)	Fmax Displacement at C (mm)	Fmax Displacement at D (mm)	Support Moment, M (kNm)
1	9	200	3.08	42.88	77.11	35.46	6.85
2	9	175	3.50	60.90	118.78	53.3	7.79
3	9	140	2.81	75.13	149.39	61.19	6.25
4	8	200	4.28	43.70	83.20	43.14	8.45
5	8	175	4.29	68.65	108.72	56.76	8.47
6	8	140	3.57	89.56	151.89	71.71	7.05
7	7	200	4.61	34.13	72.01	36.31	7.95
8	7	175	4.02	36.96	76.60	39.98	6.93
9	7	140	3.79	50.01	105.53	57.90	6.54
10	6	200	3.75	48.85	51.25	16.05	5.53
11	6	175	4.25	19.02	57.96	39.92	6.27
12	6	140	3.09	28.88	78.17	63.68	4.56
13	5	200	5.18	9.13	40.33	27.12	6.35
14	5	175	5.09	18.23	52.75	35.90	6.24
15	5	140	3.74	39.99	57.21	30.88	4.58
16	4	200	9.84	16.72	27.00	6.14	9.59
17	4	175	6.47	9.86	38.16	23.53	6.31
18	4	140	5.49	18.62	49.67	31.66	5.35
19	3	200	6.45	3.51	21.55	11.24	4.68
20	3	175	4.10	6.72	30.04	15.21	2.97
21	3	140	3.39	21.50	34.68	10.69	2.46
22	2	200	4.48	11.20	18.87	11.76	2.13
23	2	175	4.33	9.29	14.61	11.58	2.06
24	2	140	3.68	8.72	20.74	31.31	1.75

Table 1 – C Purlin Results

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Z Purlin Results Table

Test Number	Length, L (m)	Height (mm)	Maximum Load (kN)	Fmax Displacement at B (mm)	Fmax Displacement at C (mm)	Fmax Displacement at D (mm)	Support Moment, M (kNm)
1	9	200	2.85	40.41	65.25	33.87	6.34
2	9	175	3.68	44.19	90.28	39.54	8.19
3	9	140	2.39	41.29	84.03	46.04	5.32
4	8	200	2.34	32.89	55.01	29.38	4.62
5	8	175	3.66	40.59	83.87	43.83	7.23
6	8	140	2.73	61.90	85.63	52.82	5.39
7	7	200	2.95	29.11	55.91	32.32	5.09
8	7	175	3.33	36.80	76.61	39.36	5.74
9	7	140	2.98	48.96	76.22	41.29	5.14
10	6	200	4.18	23.90	53.61	30.23	6.17
11	6	175	4.18	37.27	70.39	33.13	6.17
12	6	140	3.17	25.06	63.87	36.29	4.68
13	5	200	2.16	36.34	105.85	36.34	2.65
14	5	175	2.42	38.59	87.07	36.57	2.96
15	5	140	1.94	32.54	81.11	32.54	2.38
16	4	200	2.75	18.83	58.55	30.24	2.68
17	4	175	2.17	24.14	59.33	30.40	2.12
18	4	140	2.00	22.95	37.41	26.46	1.95
19	3	200	2.33	16.81	27.25	22.13	1.69
20	3	175	2.16	16.33	36.38	23.76	1.57
21	3	140	1.95	13.83	29.56	21.19	1.41
22	2	200	2.54	6.26	25.69	16.20	1.21
23	2	175	3.58	11.89	31.91	20.32	1.70
24	2	140	1.96	18.03	40.30	19.60	0.93

Table 2 – Z Purlin Results

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C Purlin Measured Yield Table

Test Number	Length, L (m)	Height (mm)	Yield Strength (kN)
1	9	200	1.96
2	9	175	2.55
3	9	140	2.12
4	8	200	1.14
5	8	175	2.89
6	8	140	3.17
7	7	200	3.78
8	7	175	3.17
9	7	140	1.85
10	6	200	2.95
11	6	175	2.63
12	6	140	1.34
13	5	200	3.21
14	5	175	2.37
15	5	140	2.20
16	4	200	4.07
17	4	175	2.59
18	4	140	2.44
19	3	200	3.89
20	3	175	2.48
21	3	140	2.62
22	2	200	3.64
23	2	175	2.87
24	2	140	2.30

Table 3 – C Purlin Yield Results

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Z Purlin Measured Yield Table

Test Number	Length, L (m)	Height (mm)	Yield Strength (kN)
1	9	200	0.80
2	9	175	0.56
3	9	140	0.61
4	8	200	0.73
5	8	175	0.35
6	8	140	0.32
7	7	200	1.17
8	7	175	0.98
9	7	140	0.39
10	6	200	0.83
11	6	175	0.94
12	6	140	0.91
13	5	200	1.51
14	5	175	0.67
15	5	140	0.99
16	4	200	1.76
17	4	175	1.63
18	4	140	1.42
19	3	200	1.81
20	3	175	1.37
21	3	140	1.26
22	2	200	1.51
23	2	175	1.33
24	2	140	0.91

Table 4 – Z Purlin Yield Results

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4.0 Conclusion

After analysis of all the results. It can be said that all the tests successfully performed the loading sequence required by British Standard EN 1993-1-2:2006 and resistances, moment values and yield strength for each purlin was obtained.

Upon a brief visual survey of the purlin[s] to be tested, and post testing conclusions, 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 purlin[s] under testing in the manner indicated. All the purlins appeared to fulfil the loading sequence requirements of the British Standard EN 1993-1-2:2006, on this occasion.

This methodology provides robust compliance of proof load testing and delivers factual performance behaviour of each purlin tested.

	Name	**Signature**	**Date**
Created By: Technician	Benjamin Cartwright		12.05.2025
Checked By: Technical Director	Andrew Gore		12.05.2025

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

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Appendix A – Photographic Evidence

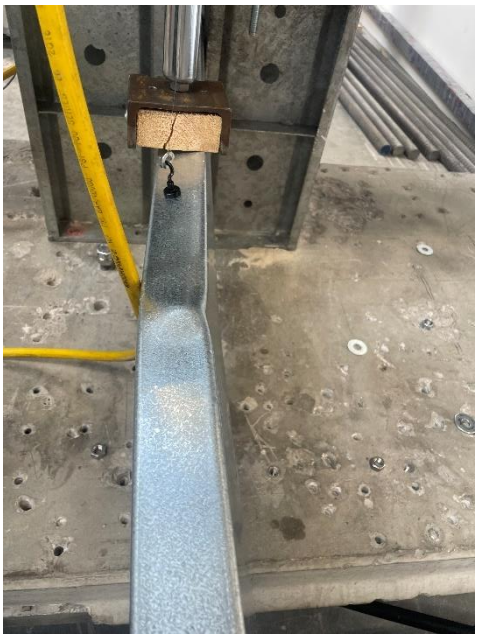

Figure 1 – C Purlin Failure

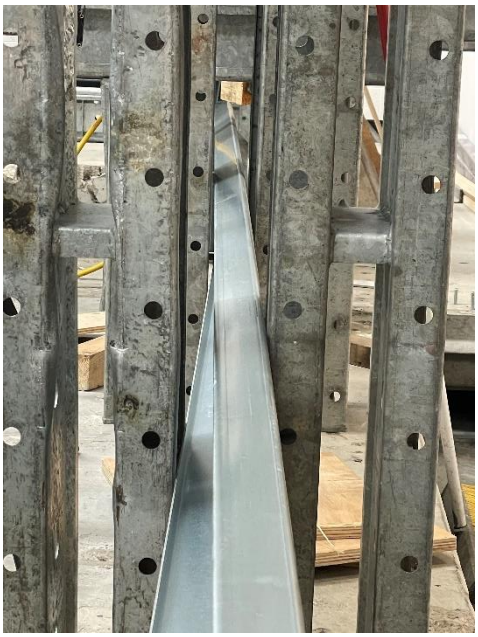

Figure 2 – Z Purlin Failure

Figure 3 – C Purlin Failure

Figure 4 – Z Purlin Failure

Figure 5 – Z Purlin Failure

Figure 6 – Z Purlin Failure