



**TEST REPORT
LIMIT STATE DESIGN CAPACITIES FOR WILMAPLEX MINI
GRIPS MG57 FOR JD4 TIMBER JOINT GROUP**

CLIENT:

**WILMAPLEX PTY LTD.
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TESTING AUTHORITY:

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JOB NUMBER: WILMAPLES/15/004

REPORT NUMBER: 15/006

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**This Test Report refers to testing only one sample
This Test Report can only be reproduced in full**

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1. Introduction

Monash University was commissioned by Wilmaplex Pty. Ltd. to evaluate the design capacity of Wilmaplex mini grip for JD4 timber group connections using MGP10 radiata pine. Tests were undertaken for MG57 at the structures laboratory at Monash University, Clayton Campus, and computations were undertaken to determine the design capacities of the mini grip as detailed in this report.

2. Executive summary of test results

Table 1 Load capacities of Wilmaplex MG57 Mini Grips derived from testing.

Joist hanger Code	Fixing (Nails) per mini grip	Load capacity (kN) for a pair of mini grips as tested
MG57	2	4.12

Note: 2 of 3.15x35mm galvanized flat head Wilmaplex nails on each face were used. Mini Grips are always used in pairs, See Figure 1. Values in Table 1 are statistically analysed test values, in accordance with AS1649, no capacity or short term duration factors were applied.

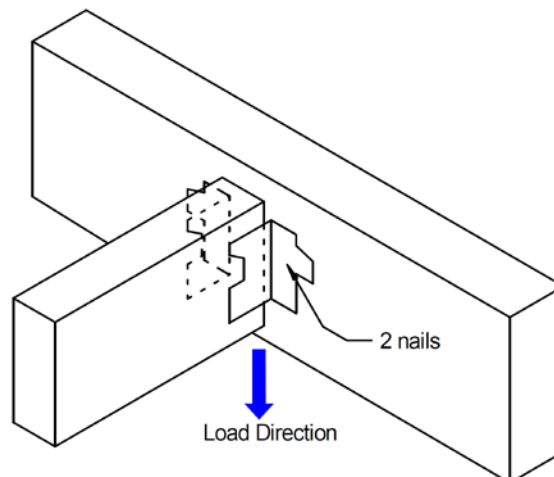
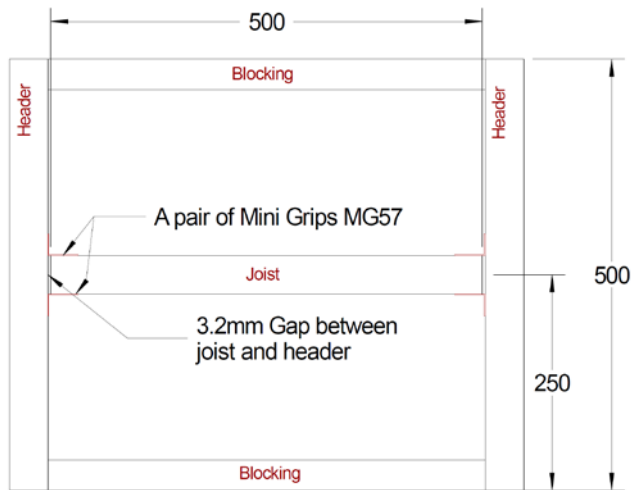


Figure 1 Mini Grip connection details

3. Test specimens

All test specimens were prepared at Monash University, using MGP10 treated radiata pine, which was sourced locally. Wilmaplex flat head galvanized nails of 35x3.15mm were used. Wilmaplex MG57 Mini Grips were driven manually into the joints. Monash was not involved in the manufacturing or selection of nails and Mini grips. The results within this report refer to the specimens tested only, and shall not be used in any manner that implies an endorsement of the product or manufacturer by Monash University. Test specimens were prepared in accordance with ASTM D7147, see Figure 2. Test data were analysed in accordance with AS1649. A total of 3 specimens were prepared and tested.



Header size 120x45mm
Blocker size 70x45mm



Figure 2 Mini Grip test specimen details

4. Testing methodology

Test procedures were carried out in accordance with ASTM D7147. A downward load was applied onto the joist and the relative displacement between the header and the joist were measured, see Figure 3 for a typical test setup.

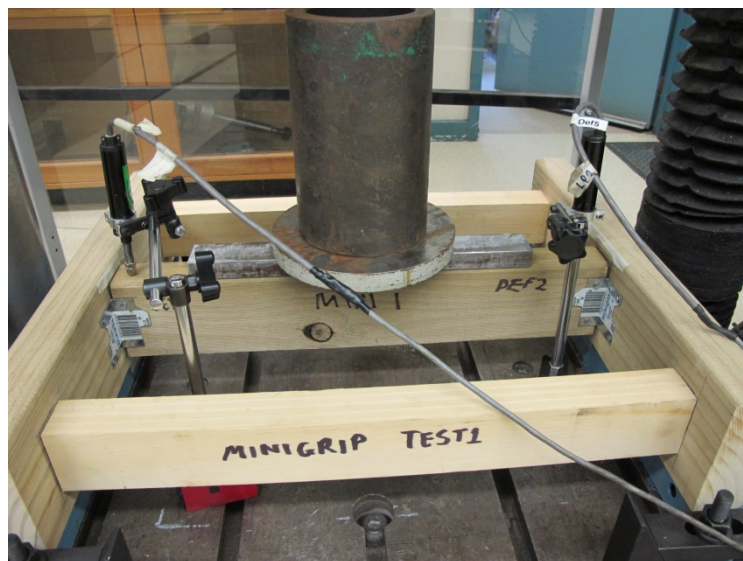


Figure 3 Mini Grip test setup

Test data were analysed in accordance with Appendix B of AS1649.

5. Test results and analysis

Specimen ID	Maximum load x_i , N	$\log x_i = y_i$	y_i^2	Load at 3.2mm deflection
1	11051	4.04	16.35	6537
2	12093	4.08	16.67	6400
3	10373	4.02	16.13	6314

$$s = \sqrt{\left[\frac{n \sum y_i^2 - (\sum y_i)^2}{n(n-1)} = 0.00865 \right]}$$

s is the standard deviation of the logarithmic values.

$\bar{y} = \frac{\sum y_i}{n}$, where n =number of specimens tested=3 and \bar{y} is the mean logarithmic value = 4.05

For $n < 10$, $y_{5\text{percent}} = \bar{y} - t_{0.1} s \sqrt{\left(1 + \frac{1}{n}\right)} = 4.02$ = the logarithmic of the 5th percentile

lower probability limit (*LPL*)

For Category D fasteners, AS1649, Clause 3.2.6

$ULL_1 = \frac{P_1}{5N} = 521$, P_1 is the 5th percentile LPL of maximum loads, N =total number of fasteners=4 for a pair of Mini Grips.

$ULL_2 = \frac{P_2}{8N} = 349$, P_2 is the average of maximum loads, N =4.

$t_{0.1}$ is the value tabulated for $(n-1)$ degrees of freedom and a probability of 0.1=2.92.

$R_{bwl} = \text{lowest}(ULL_1, ULL_2) = 349$ N =Basic working load capacity per nail.

The limit state characteristic load capacity $R_k = 2.95R_{bwl} = 1030$ N per nail.

The average load at 3.2mm =1604N, which is not the critical value, therefore $R_k = 1030$ N

6. Load-Displacement charts

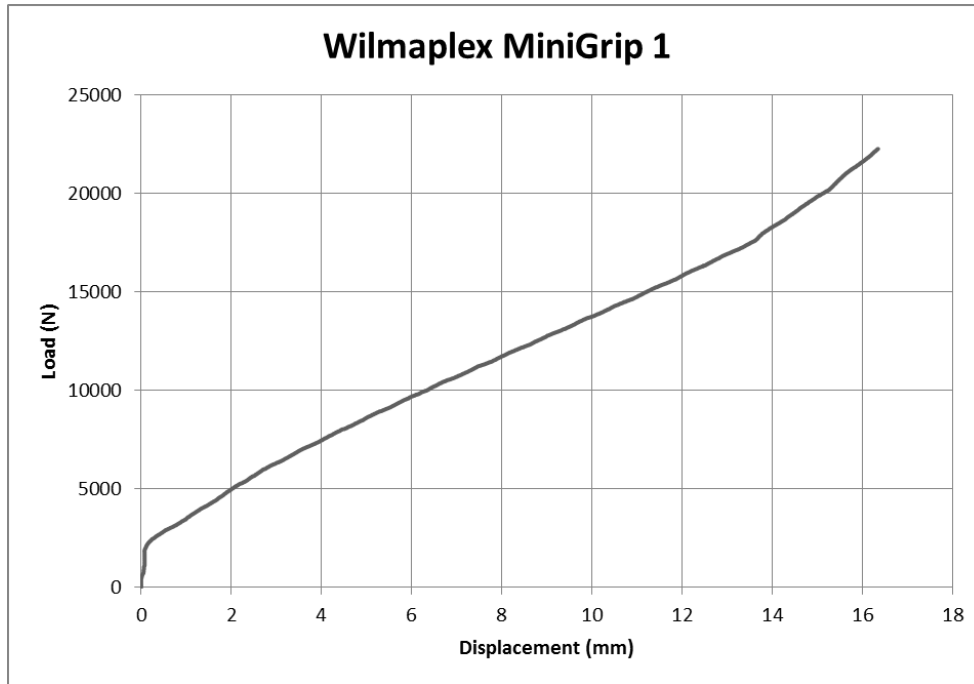


Figure 4 Load vs displacement for specimen 1.

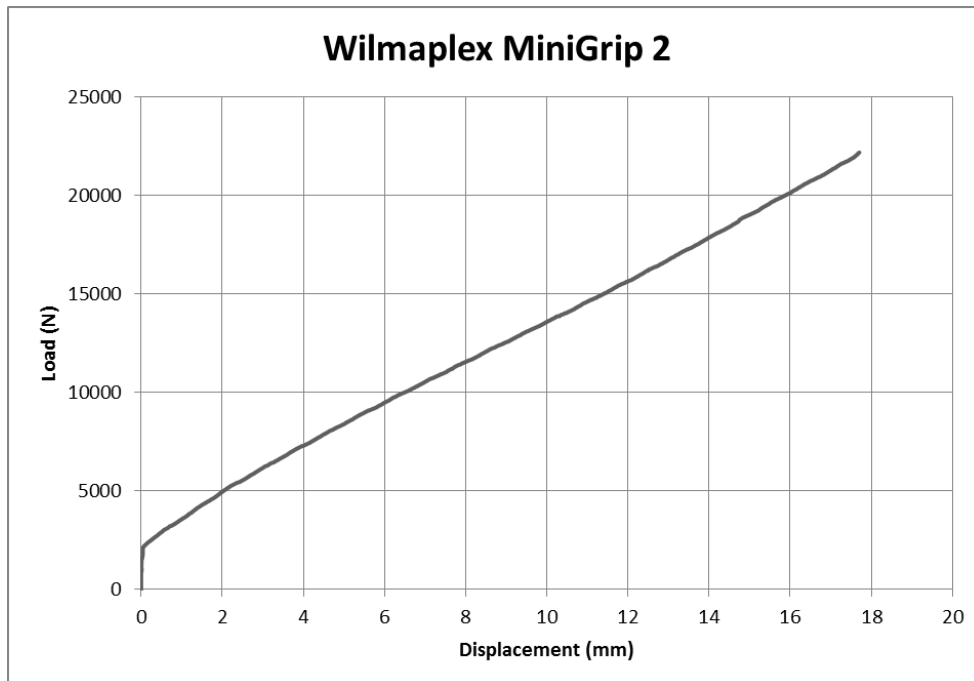


Figure 5 Load vs displacement for specimen 2.

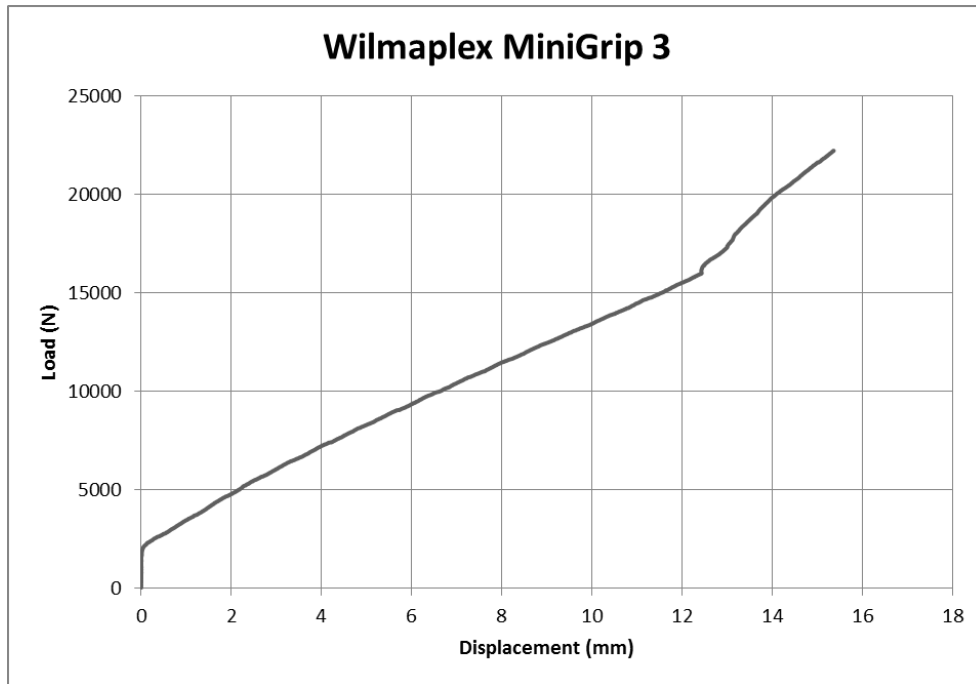


Figure 6 Load vs displacement for specimen 3.

7. Modes of failure



Figure 7 Typical failure of Mini grips, buckling of Mini Grip steel and bending of nails.