

Mechanical Testing

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IN CONFIDENCE TO THE CLIENT

REPORT NO: MT-14/572

TESTING OF A "PURPLE LINE" 4000KG CAPACITY CARAVAN HYDRAULIC JACK

CLIENT: **PURPLE LINE PTY LTD**
ATTENTION: MALCOLM HILL
UNIT 5, 238 GOVERNOR ROAD
BRAESIDE VIC 3195

DATE OF TESTING: AUGUST 1ST TO NOVEMBER 12TH 2014

DATE OF REPORT: NOVEMBER 12TH 2014

TEST SPECIFICATION: AS/NZS 2693: 2007

TEST SYNOPSIS:

Two 4000kg capacity caravan hydraulic bottle jacks were delivered to the MTS Laboratory for assessment and performance testing. One of the jacks is shown in Fig. 1. The client provided the following identification details for the jack:

- *Article:* Two Stage Caravan Bottle Jack
- *Brand:* Purple Line
- *Capacity:* 4000kg
- *Extensions:* 100mm extension
150mm extension
- *Adapters:* Trailer-Mate Adapter
Ball Adapter

Testing was performed in accordance with the requirements of the following Australian Standard: AS/NZS 2693:2007 VEHICLE JACKS (CLAUSES 5.4, 5.5.2, 5.6.2, 5.7, 5.8, 6.2, 6.3, 6.4, 6.5, 6.6 & 6.7).

TESTING PROCEDURES AND RESULTS:

Specific Assembly Condition:

Specific engagement fitting with the Trailer-Mate adapter and jack head extension assemblies were attached to the original head cap of the jack as per instructions from the client, whereby the threaded rod of the head cap was screwed down, restricting the two sides of the collar, fitted around the rod, from vertical movement before fitting the extension over the collar.

Clause 5.4 Base Dimensions

The area of the base of the jack was calculated to be 167cm² (minimum requirement 130cm²).



FIG. 1
JACK SUBMITTED FOR TESTING

Head Cap Engagement, Stability and Minimum Height Testing

The Head Cap Engagement Test (Clause 5.5.2), Stability Test (Clause 5.6.2) and Minimum Height Test (Clause 5.8) were conducted using caravans with specified jacking engagement points on the chase, appropriate for the adapter of the jack (see Fig. 2 & 3) as following:

Trailer-Mate Adapter

Manufacturer – ‘Evernew Caravans’

Model – E Series

ATM – 3750kg

Ball Adapter

Manufacturer – ‘Supreme Caravans’

Model – Executive

ATM – 2596kg

The testing was conducted for the Trailer-Mate Adapter first and repeated for the Ball Adapter.

Clause 5.5.2 Head Cap Engagement Test

The jack was tested in accordance with the requirements of Appendix B3 of the specification.

The caravan, with its brakes disengaged, was raised using the jacking point on the caravan and in accordance with the Owner’s Manual provided by the Client, until there was a 25mm clearance between the ground and the fully inflated tyre of the wheel being lifted.

Subsequently an impulsive force was delivered to the head cap in the direction most likely to cause disengagement of the head cap from the jacking point. The impulsive force was applied via a 7kg mass attached to the end of a pivot arm of 600mm length, allowed to swing through an angle of 10 degrees from vertical (see Fig. 4 & 6).

Result: The jack satisfactorily sustained the impulsive force of 7kg and remained stable.

Test Criteria: The jack should remain stable and should not fall when subjected to the impulsive force of 7kg.

Clause 5.6.2 Stability Test

The jack was tested in accordance with the requirements of Appendix B4 of the specification.

Stability tests were also conducted using the caravan with the brakes disengaged. The caravan was raised to a height sufficient to allow removal of the wheel being lifted, fitted with a fully inflated tyre. With the caravan raised, a force of 220N was applied gradually to the caravan at a height of 700mm above the ground in the direction most likely to cause the caravan to move and become unstable. This pulling force was maintained for thirty (30) seconds.

Result: The jack satisfactorily sustained the 220N frontal and rear pulling force to the caravan.

Test Criteria: The jack should remain stable and should not fall when subjected to 220N pulling or pushing force.

Clause 5.8 Minimum Height

The jack was tested in accordance with the requirements of Clause 5.8.1 and 5.8.3 of the specification.

The jack was capable of lifting the caravan from a position where one wheel with a completely deflated tyre was resting on the ground to a position where a replacement wheel with a new, fully inflated tyre was fitted (see Fig. 5 & 7).

Clauses 5.7, 6.2 & 6.3 Prevention of Overtravel, Durability and Ease of Operation

The jack’s prevention of overtravel, durability and ease of operation was tested in accordance with the requirements of Appendix C4.1 of the specification.

The jack was subjected to one lifting cycle, by lifting a load equal to its nominated capacity.

The operating force required to lift the initial cycle was 264N, using a 598mm long three piece tubular section operating handle (provided).

The jack was then subjected to 98 lifting cycles lifting a load equal to its nominated capacity (see Fig. 10 & 11). On completion of the 99th cycle the jack was subjected to a final cycle for which the operating force was 258N.

On completion of the test a visual examination showed no evidence of permanent deformation to any of the jack's components. The jack remained fully operable upon completion of testing.

The head cap of the jack was raised to the limit of its travel, with no load being applied, and tested for inducing overtravel as described in Appendix C4. No overtravel was recorded.

Clause 6.4 Lowering Test

The jack's lowering capability was tested in accordance with Appendix D of the specification.

The jack was loaded to the nominated capacity at the highest position of the head cap and then lowered by careful control of the lowering valve to the midpoint of travel. At this point lowering was stopped. The distance required to stop the head cap as a percentage of the full range of travel was 0.9%.

Clause 6.5 Loss of Height Test

The jack was tested for loss of height in accordance with Appendix E of the specification.

The jack, with its head cap raised to the midpoint of the range of travel, was placed between the parallel platens of a universal testing machine. A force of 39.23kN (nominated capacity) was applied to the head cap for thirty (30) minutes, after which time a loss of height of 2.5mm was recorded.

Clause 6.6 Overload Protection

A force of 387N (equal to 150% of 258N - the operating force recorded in the final cycle) was applied to the handle. The load lifted by the jack was 58.19kN with no activation of overload protection. If there is no overload protection fitted, this clause does not apply.

Clause 6.7 Overload Capacity Test

The jack's overload capacity was tested in accordance with Appendix F of the specification.

The jack, with its head cap raised to the midpoint of the range of travel, was placed between the parallel platens of a universal testing machine. A force of 78.45kN (twice the nominated capacity) was applied to the head cap (see Fig. 8), and maintained for one (1) minute with the following results:

- (a) The jack did not collapse.
- (b) Loss of height on removal of the test force was 0.9%.
- (c) The jack was capable of lifting a load of its nominated capacity through one lifting cycle using an operating force not exceeding 450N by a handle 598mm long.

The Trailer-Mate Adapter was then replaced with the Ball Adapter (see Fig. 9) and the Overload Capacity Test was repeated with the following results:

- (a) The jack did not collapse.
- (b) Loss of height on removal of the test force was 0.5%.
- (c) The jack was capable of lifting a load of its nominated capacity through one lifting cycle using an operating force not exceeding 450N by a handle 598 mm long.

TEST COMMENTS

Based on the results of the above test evaluation, the jacks, tested and reported herein, meet the requirements of AS/NZS 2693: 2007 Clauses 5.4, 5.5.2, 5.6.2, 5.7, 5.8, 6.2, 6.3, 6.4, 6.5 and 6.7.

Notes:

1. Marking and Instructions requirements Clauses 7 and 8 were not assessed.



FIG. 2
'E SERIES' CARAVAN WITH JACKING POINTS FOR TRAILER -MATE ADAPTER



FIG. 3
'EXECUTIVE' CARAVAN WITH JACKING POINTS FOR BALL ADAPTER



FIG. 4
HEAD CAP ENGAGEMENT TEST SET UP WITH TRAILER-MATE ADAPTER



FIG. 5
MINIMUM HEIGHT TEST WITH TRAILER-MATE ADAPTER



FIG. 6
HEAD CAP ENGAGEMENT TEST SET UP WITH BALL ADAPTER



FIG. 7
MINIMUM HEIGHT TEST WITH BALL ADAPTER



**FIG. 8
OVERLOAD CAPACITY TEST
WITH TRAILER-MATE ADAPTER**



**FIG. 9
OVERLOAD CAPACITY TEST
WITH BALL ADAPTER**



**FIG. 10
DURABILITY TEST
LOWEST POSITION**



**FIG. 11
DURABILITY TEST
FULLY RAISED POSITION**

Notes:

1. Melbourne Testing Services (MTS) Pty Ltd shall not be liable for loss, cost, damages or expenses incurred by the client or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Melbourne Testing Services Pty Ltd be liable for consequential damages including, but not limited to, lost profit, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested.
2. It remains the responsibility of the client to ensure that the samples tested are representative of the entire product batch.
3. MTS shall take no responsibility for the procurement and authenticity of the test product as described herein.
4. This report only indicates compliance of the jack in its state at the time of testing. It should not be taken as a statement that all similar jacks tested would also be found to comply.
5. It remains the responsibility of the client to ensure that the jack tested is representative of the entire product batch.
6. MTS shall take no responsibility for the interpretation or misinterpretation of the procedures or calculation methods as provided herein or for the appropriateness or validity of the test procedures for the test items described and reported herein.

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