

# Test Report

## Engineering and Materials

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**Report No:** 54080580     **DRAFT**  
**Client:** R & S Grating Pty Ltd  
**Address:** 55 Southern Road Mentone Victoria 3191  
**Attention:** Stephen Hockham  
**Date:** 28 February 2008

### Testing of a Weave Grate to AS 3996

#### 1 Introduction

R & S Grating requested HRL Technology to carryout a Type test on a grate access cover to Australian Standard AS3996 Access covers and grates (AS3996). The grate is of weaved V design as shown in Figure 1 with specified properties as follows:

- Span opening – 915mm x 450mm. The grate is supported on the short sides only;
- Straight bar cross section = 65mm x 12mm. Weave bar cross section = 50mm x 12mm.
- CO = 450;
- Class D
  - Serviceability Load = 140kN;
  - Ultimate limit state design load = 210kN;
  - Maximum allowable deflection at serviceability load = 10mm;
  - Allowable permanent set = 1mm

Testing of the grate was carried out on the 25 February 2008

#### 2 Methodology and Procedure

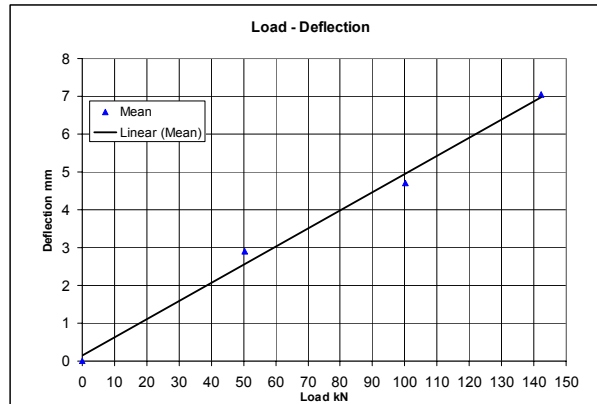
The test procedure used for testing the grate was as outlined in Appendix C of AS 3996 using a specially designed hydraulic test press as shown in Figure 2. A calibrated HRLT 25t load cell (Molen) and a strain gauge indicator were used to monitor the load. A calibrated dial gauge with 0.01mm resolution was used for the displacement measurements.

As the grate to be testing was of a V design, it was decided to test a flat grate of identical construction initially for the Serviceability Load case. The Ultimate limit state design load was applied to the flat grate, a modified flat grate and a V grate.

### 3 Test Results

#### 3.1 Serviceability Design Load - Deflection

The average deflection at the serviceability load of 140kN was 6.9mm (average of five loadings). A load/deflection graph for the flat grate is shown below. Assessment of the result indicates that a V grate of the same construction would have a smaller deflection at load.



#### 3.2 Serviceability Design Load – Permanent set

The permanent set after the application of 5 load cycles of 140kN was 0.2mm

#### 3.3 Ultimate Limit State Design Load

The Ultimate limit state design load was applied to the flat grate, a modified flat grate and a V grate with the following results:

- flat grate – just failed to sustain a load 210kN;
- modified flat grates, one with two bars of 85mm depth and one with two bars of 100mm depth, Figure 3 – sustained a load of 210kN with no visible damage except for permanent set of approximately 10mm to 15mm;
- V grate – sustained a load 210kN – one weld was found to be cracked (poor welding).

### 4 Conclusion

The above results indicate that the above V grate (915mm x 450mm with 65mm x 12mm straight bars and 50mm x 12mm weave bars) complies with the requirements of Class D of AS 3996.

**Harry Better FIEAust; CPEng**  
**Principal Engineer**



Figure 1 – V grate



Figure 2 – Testing rig with flat grate



Figure 3 – Underside of modified flat grate



Figure 4 – Underside of flat grate