Australian Government
National Measurement Institute
Bradfield Road, West Lindfield NSW 2070

Interim
Certificate of Approval
NMI 6/14H/5

VALID FOR VERIFICATION PURPOSES UNTIL 8 JUNE 2013

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

Railweight Model Weighline TSR4000 Train Weighing-In-Motion Instrument

submitted by Downer EDI Engineering Power Pty Ltd
480 Victoria Road
GLADESVILLE NSW 2111

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI R 106, *Automatic Rail Weighbridges*, dated July 2004.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern provisionally approved – interim certificate issued	2/04/09
1	Pattern approved – interim certificate issued	8/09/09
2	Pattern & variant 1 approved – certificate issued	15/10/09
3	Pattern & variant 1 amended (pattern & Test Procedure) – notification of change issued	22/10/10
4	Pattern & variant 1 amended (Test Procedure) – variant 2 approved – certificate issued	6/05/11
5	Variants 3 & 4 provisionally approved – interim certificate issued	8/03/13

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with approval number 'NMI 6/14H/5' and only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificates No S1/0/A or No S1/0B.

This approval shall NOT be used in conjunction with General Certificate No 6B/0.

Special Conditions of Approval:

For this type of instrument, the ability to perform (and continue to perform) within specified maximum permissible errors can depend substantially on characteristics of the rail alignment and the stability of the material on which the rail sleepers rest (whether ballast, concrete footings or some other arrangement). However the National Measurement Institute is unable to clearly define particular requirements for material on which the rail sleepers shall rest.

It is the responsibility of the submittor to exercise control over any installation to ensure compliance with this approval and to ensure performance (and continued performance) within the appropriate maximum permissible errors.

The ability to perform within specified maximum permissible errors can also depend on characteristics of the rail vehicles being weighed (for example wagons with 'flat wheels', rubbing brakes or stiff couplings can be detrimental to performance). Consequently rail operators have a responsibility to ensure adequate maintenance of the rail vehicles (otherwise maximum permissible errors may not be able to be met).

In the event of unsatisfactory performance, allowable accuracy classes or modes of operation may need to be altered, additional conditions imposed or this approval may be withdrawn.

Special Conditions of Approval: (Provisional approval – variants 3 and 4)

This approval is limited to one (1) instrument the location of which is to be advised to NMI prior to any installation or verification of the instrument.

The instrument purporting to comply with this approval shall be marked with approval number 'NMI P6/14H/5' and only by persons authorised by the submittor. (Note: The 'P' in the approval number may be a temporary marking.)

The approval will remain provisional pending completion of satisfactory testing and evaluation.

The submittor shall provide NMI with copies of test results from the initial verification and all subsequent tests.

In the event of unsatisfactory performance, or of suitable test results not being received by NMI the approval may be cancelled (or altered).

The submittor shall implement such modifications as required by NMI. In the event that such modifications (if any are required by NMI) are not made to the satisfaction of NMI prior to the dates agreed, this approval may be withdrawn.

Instruments shall be verified annually.

1. Description of Pattern — provisionally approved on 2/04/09 approved 8/09/09

The Railweight model Weighline TSR4000 weighing instrument for the determination (by measurement of wheel forces) of the mass of wagons and hence the total mass of a train, when weighed in motion.

Note: Certificate of Approval 6/14H/5 dated 6/05/11 and its Technical Schedules dated 15/10/09 and 6/05/11 describe the pattern and variants 1 & 2.

4. Description of Variant 3 — provisionally approved on 8/03/13

The Railweight model Streamline TSR4000 weighing instrument, which is similar to the pattern, but uses two Streamline model STRMLNAU16 or STRMLNAU18 weighing transducer pairs rather than the Weighline transducers described for the pattern.

The instrument is approved for class 2 wagon weighing and class 2 train weighing, with a speed range of 0.1 to 3 km/h.

The Streamline weighing transducers utilise force transducer elements (four elements for each weighing transducer, each having a number of strain gauges bonded to them) which are bolted on to the rail (in accordance with the manufacturer's procedures) and hence result in the rail becoming a weighing transducer. A weighing transducer paircomprises a weighing transducer for each wheel of an axle. Different weighing transducer models (see Table 2 below) are formed according to the rail type.

TABLE 2

Rail type	48 kg, 50 kg, 60 kg, AS50, AS60, AS68, 56E1/113A, UIC54, UIC60, 115lb RE, 132lb RE	60 kg, 68 kg, 72 kg, AS60, AS68, UIC60, 136lb RE
Weighing transducer	Streamline STRMLNAU16	Streamline STRMLNAU18
Capacity of weighing transducer	16 t	18 t
Minimum capacity of weighing transducer	2.4 t	2.7 t

The weighing transducers are designed to form part of the continuous rail line in which the system is installed and are positioned between the rail supports (e.g. sleepers). Lengths of rail incorporating the weighing transducers may be welded or bolted (using 'fish plates') into the rail line.

Instrument specifications vary according to the capacity of the weighing transducer as shown in Table 3 below. In addition the instrument specifications are limited by the requirements of NMI R 106, Automatic Rail Weighbridges, dated July 2004 – in particular clauses 2.3 and 2.5, which restrict minimum and maximum wagon weights according to the value of scale interval (d) chosen. The value of scale interval (d) chosen shall be 50, 100, 200 or 500 kg.

TABLE 3

Maximum capacity of instrument (per axle)	2 × capacity of weighing transducer
Minimum capacity (per axle)	2 × minimum capacity of weighing transducer (from Table 2 above)
Maximum wagon weight	No. of axles × maximum capacity of instrument (or less). However the maximum wagon weight shall not exceed 600d.
Minimum wagon weight	No. of axles × minimum capacity (or more)

3. Description of Variant 4 provisionally approved on 8/03/13

The Railweight model Streamline TSR4000 weighing instrument, which is similar to variant 3, but using 3 or 4 Streamline model STRMLNAU16 or STRMLNAU18 weighing transducer pairs, rather than the two pairs described in variant 3.

The instrument is approved for class 2 wagon weighing and class 2 train weighing, with a speed range of 0.1 to 10 km/h.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.

Dr A Rawlinson

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