



Track Measurement
Services, training and products



Metrology equipment and services

Established in 2001 our Themit Welding Services division provides specialised track metrology resources and associated equipment for the measurement and inspection of rails, welds, track and track components.

But why measure track condition?

- Maximise track Safety
- Maximise passenger comfort
- Pro active Track maintenance with minimum life cycle costs

Services:

- Measurement of stress free temperature
- Measurement of Corrugations, Wear and Joint straightness
- Ultrasonic Inspection of welds
- Visual Inspection of Welded joints
- Training of VERSE operators
- Metallurgical Inspection of Welds

Specialist Measuring Devices

- Electronic Straightedges – **R2S** and **SEC**
- Rail straightness measuring lasers - **LSED**
- Track Geometry Trolley - **Trackscan**
- Digital Rail thermometer, temperature recorder **TEMPRECORDER**





Measurement of Stress Free Temperature – VERSE & RAILSAN

The STRESS FREE TEMPERATURE or NEUTRAL TEMPERATURE is a key track condition parameter defining the state of temperature linked rail stress and associated risk of track buckles or stability. Our track measurement team has been providing a service to measure SFT using the network Rail Approved VERSE equipment for over Ten years, during which time we have earned a world class reputation as the leading independent provider of VERSE measurement and operator training. We currently have five operators including two instructors and lead assessors, and offer the option of providing an operator to work with the customer's own track staff, or provide the full 4-5 man team.



Measurement of SFT using VERSE

The VERSE process is the only non-destructive measuring method currently approved by Network Rail. The method requires a 30m length of rail to be released from its fastenings and lifted using the VERSE frame under a fixed force of 10kN. The vertical rail deflection is measured accurately and together with the rail temperature, is used to calculate the SFT.

We are the only independent VERSE training agent approved by Network Rail and Vortok International and also offer a calibration service and technical support to operators we have trained.

Accuracy: +/- 1°C.

Productivity: 1 operator + 4 man track team
Two adjacent measurements within 60 minutes
2 km of track / shift measured at 400m intervals.

Data Output: Data logged on site – exceedences reported direct to track engineer
Download to PC – convertible to Excel
SFT Certificate issued within 48 Hours.

Benefits: Simple, reliable method
Robust equipment
Network Rail Approved
Does not require rail standards for calibration
Not affected by residual stresses.

Measurement of SFT using RAILSAN

The magnetic properties of ferromagnetic materials are affected by their internal stresses, and RAILSAN uses the interaction between an induced alternating magnetic field and the rail to calculate the longitudinal stress in the rail. By calibrating against rail standards it is possible to calculate the stress introduced by temperature change and hence measure the SFT. The magnetic field is applied and the resulting signal measured using a battery-powered and manually propelled portable measuring device, requiring no preparation of the rail, and minimal track occupation time.

Accuracy: +/- 3°C.

Productivity: 1 operator
50 measurements over 30-50 metres within 30 minutes.
0.5-1km of track / shift measured at 50 m intervals.

Data Output: Data logged on site – exceedences reported direct to track engineer
Download to PC
SFT Certificate issued within 48 Hours.

Benefits: No need to disturb the rails
Minimal track occupation time
Single operator
Rail can be in tension or compression
Can be deployed on tight curves
Can produce detailed survey of SFT.

Measurement of Track geometry

In addition to providing key data for track condition, measurement of the track geometry forms part of the quality control /inspection requirements for rails, rail joints, and welds. Our track team have a number of devices available to measure all types of track from conventional ballasted to embedded (tram and light rail)

Laser Straightedge – LSED

For surveying longitudinal rail straightness over a large span (up to 15m) our laser delivers rapid measurement of running surface and edge. All the data is analysed through a portable data-logger into which information on site, rail type can be input.

Technical information		Comment
Measured span	1-15m	50m unit in development
Accuracy	RS: +/-0.05mm, RE:+/-0.1mm	
Range	R.S: 44mm, R.E: 80mm	Min – max deviation
Curve limits	<5m span: 50m Radius	
	5 – 10m span: 200m Radius	
	10 – 15m span: 300m Radius	
Measuring time	8 – 10 secs	
Operating temp.	-20 – 50°C	
Weight	4kg	



Electronic Straightedges

Our electronic straightedges use a non contacting electromagnet to measure straightness across a 1 metre span. Measurement is fast and non disruptive and not affected by weather or rail surface condition. The data is transmitted via Bluetooth to a mobile hand held computer or data logger.

Additional information such as location, track type, temperature and upper or lower threshold values can be input into the computer. The measured profile is displayed on the computer for immediate assessment, and can be downloaded to a PC for archiving or further analysis.

The devices are supplied complete with a mobile pocket computer, batteries, chargers and software for analysis and presentation of the data, including templates for printing records or certificates of conformance.

Several models of straightedge are available – depending upon the number of records and accuracy that is required:



	SEC –RC	SED	R2S
Measured span	1000mm	1000	1000
No of measurements/ data points	200	334	500
Measuring range	+1.5 – -2.5mm	+3.0 – -2.0mm	+/- 1.0mm
Linearity	+/- 0.5%	+/- 0.5%	+/- 0.5%
Resolution	0.01mm	0.01mm	0.001mm
Accuracy	+/-0.02mm	+/-0.02mm	+/- 0.0005mm
Measuring time	6 secs	5 secs	6 secs
weight	5kg	15kg	5kg
Operating ambient temperature range	-5°C – 50°C	-5°C – 50°C	-5°C – 50°C
Battery life	300 records	300 records	300 records
Typical applications	Welds	Welds	Corrugations
	Joints	Joints	Welds
	Batter	Batter	Joints
	Wear	Wear	Wear

SED: Measures running surface and edge simultaneously

R2S: Designed for applications requiring greater accuracy – e.g. corrugation measurement

Thermit® Welding Metrology equipment

Track Geometry Trolley - TRACKSCAN

The portable TRACKSCAN trolley is a lightweight unit incorporating mechanical sensors to record key track parameters which include:

- Gauge
- Super-elevation
- Twist
- Versine
- Running Surface straightness
- Check rail alignment (gauge)
- Flangeway (grooved rail)

Technical Information	
Measuring distance	Up to 100km
Resolution	2.0mm
Track gauge - 1420 -1500mm	<1.0mm
Super- elevation	<1.0mm
Versine – base length: 1350mm	Range: +/- 2.0 mm - accuracy: +/- 0.025mm
Straightness – base length: 1610mm	Range: +/-2.0 mm - accuracy: +/- 0.01mm
Check Rail gauge – 1330 – 1405mm	<1.0mm
Flangeway - 30-140mm	<1.0mm
Operating ambient temperature	0 – 40°C
Operating time on battery	6 hours min
weight	45kg (assembled)



Monitoring of Temperature - TEMPRECORDER

The TEMPRECORDER has been developed to monitor the temperature adjacent to a Thermit weld to check welding procedure. Sensors are positioned 15cm and 50cm from the outer edge of the mould to measure the maximum temperature and cooling rate at each position. The data is stored in a mobile computer or data logger for transfer to PC for analysis or comparison with standard data.

Technical Information	
Measuring range (temperature)	0 – 350°C
Resolution	0.1°C
Accuracy	+/- 0.5°C
Operating time on battery	10 hrs
weight	1 kg



If you require further information about this equipment email: info@thermit-welding.com

www.thermit-welding.com



Thermit Welding (GB) Ltd.

87 Ferry Lane, Rainham
Essex
RM13 9YH
England

Telephone: +44 (0)1708 522626
Fax: +44 (0)1708 553806
info@thermitwelding.co.uk