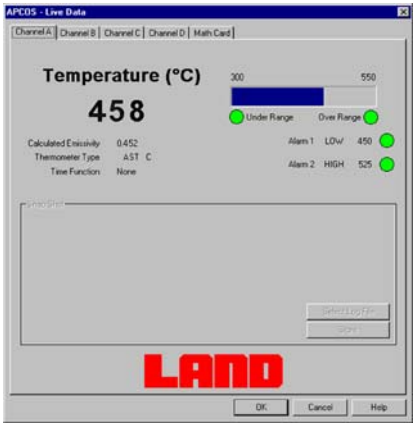


OPTIMISATION

As a result of experience gained from many site trials and installations, it has been found that slight variations are required in the temperature calculation coefficient values, in order to maximise the system accuracy at each measurement point. A unique feature of the AST thermometer is the ability to optimise each unit individually. This may then improve the measurement accuracy at each location. Optimisation requires a small number of temperature comparisons to be made on a representative sample of product

types, against the AST set-up unit. Optimisation is performed using APCOS (Application Processor Configuration and Optimisation Software), provided as standard with the LMG AR processor. APCOS processes data and submits an optimised solution for the temperature calculation.



A typical APCOS screen

SYSTEM SPECIFICATIONS

Thermometer type:	AST	Sealing:	IP65
Measurement range (specified)		Vibration:	3G any axis, 10 to 300Hz
AST:	300 to 550°C/570 to 1020°F (Mill Entry)	Processor type:	LMG AR
AST/4:	250 to 400°C/500 to 750°F (Mill Exit)		(1 to 4 thermometer I/O channels)
Response time:	1s to 98%	I/O card type:	AST I/O card
Target size:	98mm/3.9in at 2m/78.0in	Power requirements:	110 to 120V a.c. or 220 to 240V a.c., 48 to 62Hz, 35VA (max. with 4 thermometers)
Resolution:	2°C/4°F		
Absolute accuracy:	Better than 10°C/18°F after optimization (in application)	Signal processing functions	
System output:	0 to 20mA or 4 to 20mA (nominal load resistance 500 ohms, max load including wiring 600ohms)	Time average:	63% time constant adjustable 0 to 500s
Surface emissivity indication:	0 to 20mA covering emissivity range 0.00 to 1.00 Nominal load resistance 500 ohms, max load including wiring 600ohms) Alarm relays: contact rating 50V a.c./ d.c. at 0.5A max	Ambient temperature limits:	
Output update time:	30ms (thermometer channel output) 500ms (maths card output - optional)	Thermometer	5 to 45°C/40 to 110°F
		Processor	5 to 50°C/40 to 140°F
		Weight	
		Thermometer:	0.8kg/1.76lb approx
		Processor:	3.6kg/7.93lb approx
		EMC:	EN 50-082-2 (immunity), EN 50-081-1 (emission), IEC1010-1 (safety)
		For recommendations on thermometer sighting and mounting, refer to Land Instruments International.	

The Quality Management System at Land Instruments International Ltd is approved to ISO 9001:2000 for the design, manufacture, stockholding, in-house repair and site servicing of non contact temperature measuring instrumentation. Associated software is designed and developed in accordance with TickIT. The Quality Management System at AMETEK Land, Inc. is also approved to ISO9001:2000 and covers the engineering support and in-house repair facilities. LAND also operates extensive calibration services – with calibration traceable to National Standards. Calibration certificates are issued in compliance with ISO 17025:1999.



These products comply with current European directives relating to electromagnetic compatibility and safety (EMC directive 89/336/EEC; Low voltage directive 73/23/EEC).







Infrared Temperature Measurement

An AMETEK® Company

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LAND



AST

ALUMINIUM STRIP
THERMOMETER

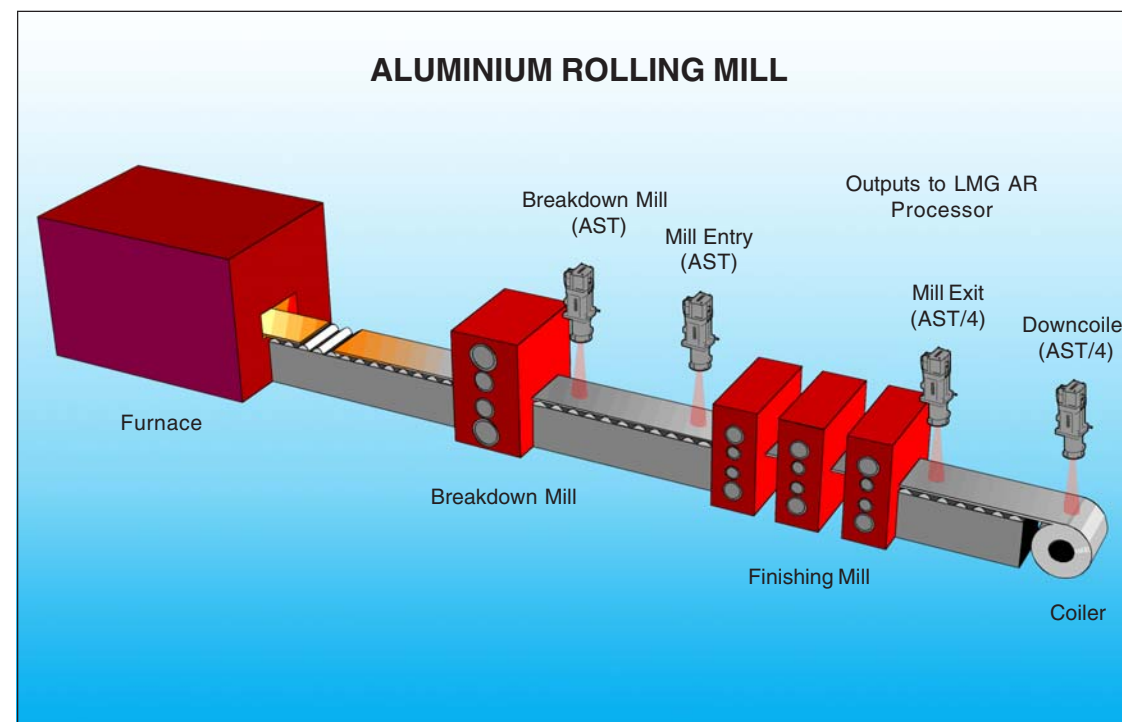
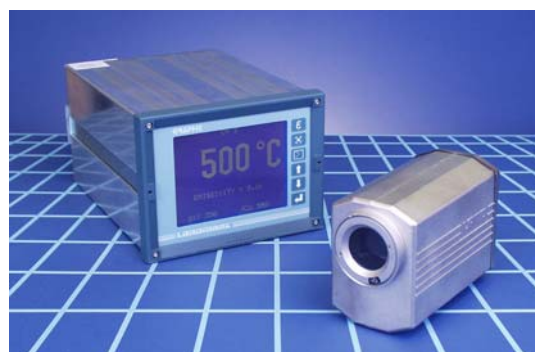
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LAND

TRUE ALUMINIUM TEMPERATURE WITH THE NEW ALUMINIUM STRIP THERMOMETER ... AST

The Land Aluminium Strip Thermometer system is specifically designed to provide the aluminium hot rolling industry with a solution to one of its most difficult problems - accurate and reproducible temperature measurement of bright, semi-finished hot alloy strips.

The Land Aluminium Strip Thermometer (AST) is a unique infrared thermometer which is used in conjunction with an intelligent signal processor (LMG AR) to produce accurate temperature measurement of hot alloy strip. AST is capable of providing more accurate temperature measurement than any other thermometer available.



Benefits

- ♦ Reduced re-annealing costs
- ♦ Reduced finishing costs
- ♦ AST can infer potential problems on preceding 'Breakdown Mill' operations, ie reduction in coolant
- ♦ Improved process control
- ♦ Accurate reliable temperature measurement to within $\pm 10^{\circ}\text{C}$ / 18°F after optimisation
- ♦ Improved accuracy over both single and dual wavelength thermometers

Features

- ♦ Automatically copes with varying alloy types and emissivities.
- ♦ Accurate optimisation using dedicated 'set-up' unit.
- ♦ Computer software to automate system optimisation.
- ♦ Highly reliable, drift-free measurement.
- ♦ The LMG AR Processor provides digital indication of temperature as well as 0 or 4 to 20mA analog outputs for connection to data recording or mill control equipment. An optional Maths Function Card permits mathematical comparisons to be made between thermometer inputs. Results may be used to drive outputs to the plant control system.
- ♦ Supports RS232C and RS485 serial communications.

Applications

The AST is highly effective in the following mill locations:

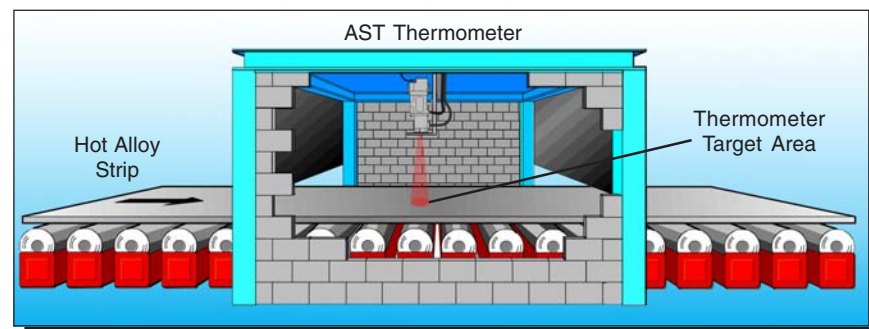
- ♦ Measurement at both entry and exit of the Finishing Mill
- ♦ Measurement at the Breakdown Mill (Reversing Rougher)
- ♦ Measurement at the Downcoiler



AST Optimisation Set-up Unit.



Aluminium rolling mill. (Photo courtesy of Alcan Rolled Products)



Schematic showing a typical AST thermometer installation.

The emissivity of bright alloy strip is known to vary in a complex way with alloy content, surface finish and temperature.

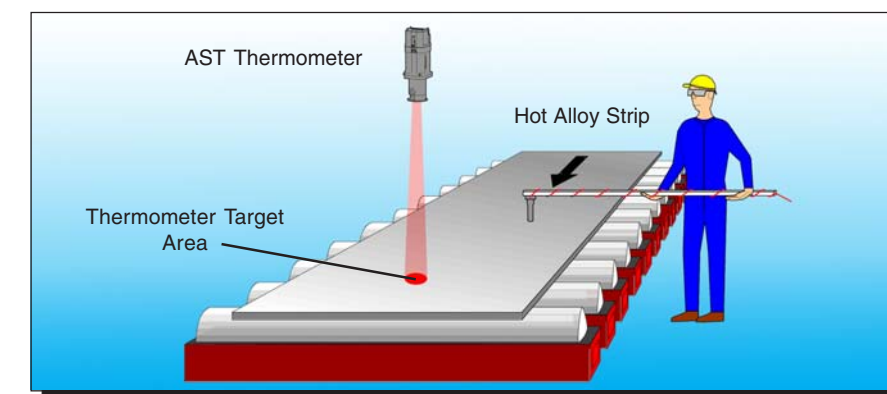
The AST is programmed with emissivity data based on extensive plant trials, delivering good measurement accuracy on installation. The AST uses this data to automatically assign values of emissivity to individual alloy types without external intervention such as emissivity inputs.

The accuracy of each AST can be further optimised in a given measurement location using the new APCOS (Application Processor Configuration and Optimisation Software). A 'set-up' unit is provided to facilitate this optimisation; and may also be used to test accuracy and derive settings for unusual alloy types.

Settings can be made on-line, via an RS232C or RS485 Serial Communications link.

AST has been shown to give remarkable temperature correlation with contact measurements, over a wide range of common alloy types in real mill conditions.

AST provides reliable, drift-free measurement necessary to optimise finishing mill control settings.



Schematic showing the manual optimisation process in operation on mill entry.