

A NEW PYROMETER FOR THE TRUE TEMPERATURE MEASUREMENT OF ALUMINIUM BILLET AND BAR IN FORGING PROCESS

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Introduction

Temperature control plays an important role in any hot-working operation. Contact methods of measurement are often difficult as the probes tends to wear and maintenance of the probes can be time consuming and expensive. Non-contact measurement using infrared sensors has been tried many times but with only limited success on aluminum because of the low and variable emissivity. The 3T company in Israel has successfully developed an infra-red temperature measurement system that uses several different wavelengths and complex algorithms to accurately measure the temperature in the extrusion, forging, hot-rolling and casting of aluminum alloys.

The P3000 pyrometer joins the family of innovative products that have been developed by 3T - True Temperature Technologies for use in the aluminum forging industry.

Accurate measurement of aluminum parts during forging process is vital to ensure quality product. It is well established that even minor changes in the billet temperature can cause deterioration in the mechanical properties of the forged part, by creating internal stresses and deformations.

For that reason, **AUTOMOTIVE PARTS MANUFACTURERS** demand accurate measurement of each forged billet coming in and out the press.

Due to long response time of contact probe, and frequent probe tip maintenance, measurement with thermocouple is not applicable - a few seconds for each measurement will be very expensive in mass production.

Unlike contact probe 3Ts non-contact optical pyrometer, will measure temperature within less than a second, and therefore is the most suitable instrument for forging application.

Furthermore 3Ts optical non-contact pyrometer enables automatic, continuous, maintenance free temperature measurement.

Non-contact temperature measurement provides accurate consistent reliable reading, which can be recorded (via RS232 communication or analog 4-20mA), for quality assurance purposes.

Technical specifications:

Measurement Range: 300°C - 1000°C (572°F - 1832°F).

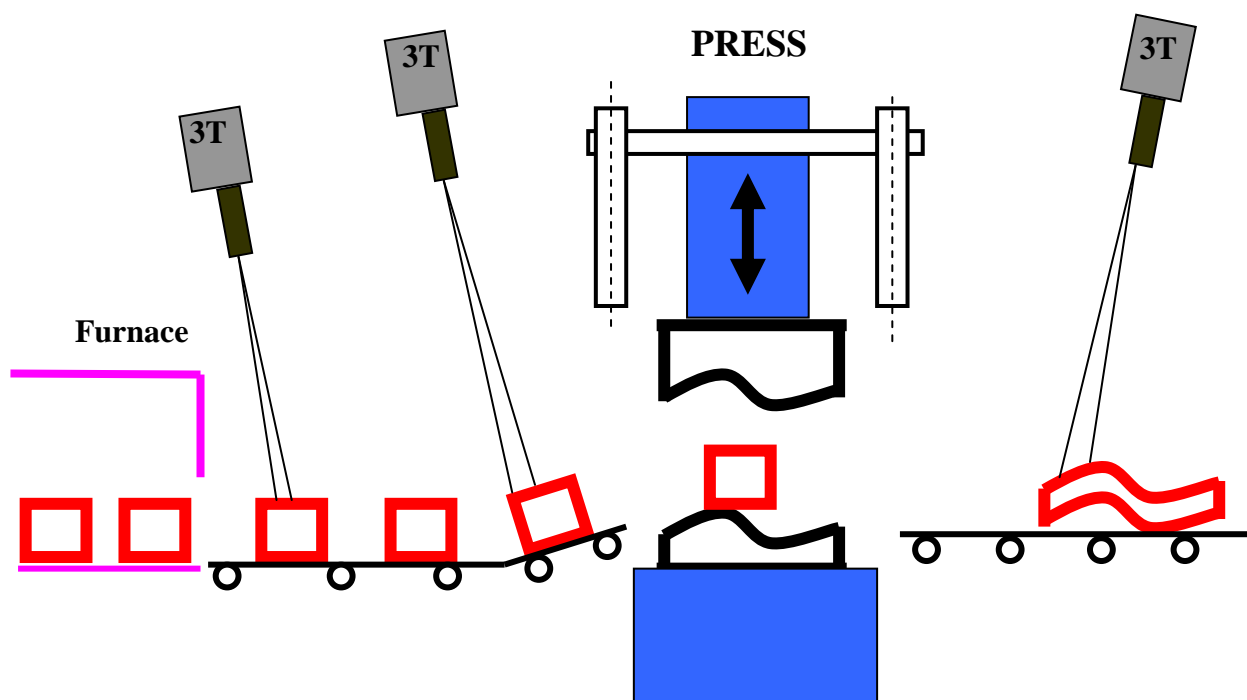
Emissivity range: 0.1 (300°C) to 1.0 (1000°C)

High sensitivity and accuracy: ±1%

Locating the P3000:

There are a few possible locations for 3T-pyrometer model P3000:

1. On the exit from the heating furnace
2. On the entry to forging press
3. On the exit from forging press (for temperature control of forged parts).



The pyrometer can be installed also on a linear motion scanning motor in order to measure and improve the temperature distribution uniformity of the billet. Data can be collected and analyzed through analog or digital outputs.

Conclusions:

The measurement of the temperature of the aluminum billet in the forging process is an important parameter affecting the physical and mechanical properties of the product. Therefore, when safety involved measurement of the temperature of each piece is necessary and mandatory.

3T – True Temperature Technologies Ltd. specializes in non-contact true temperature measurement, offering pyrometers that show the exact temperature in different locations of aluminum forging and extrusion process, and significantly improving product quality while increasing productivity.

Comparison between 3T P3000 and contact probe (thermocouple)

No of reading	Contact Probe	3T P3000
1	527	524
2	524	525
3	524	521
4	523	522
5	520	519
6	522	519
7	514	517
8	520	518
9	519	517