

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 tend 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 AST 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 A5 pyrometer joins the family of innovative products developed by AST for use in the aluminum forging industry.

Accurate measurement of aluminum parts during the forging process is vital to ensuring quality products. Even minor changes in the billet temperature can cause deterioration in the mechanical properties of the forged part by creating internal stresses and deformations.

Therefore, AUTOMOTIVE PARTS MANUFACTURERS demand accurate measurements of each forged billet coming in and out of the press.

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

Unlike contact probes, ASTs' non-contact optical pyrometer measures temperature within less than a second and is, therefore, the most suitable instrument for forging applications.

Furthermore, the AST 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 and more), for quality assurance purposes.

Technical specifications:

Measurement Range: 105°C - 1600°C

High sensitivity and accuracy: $\pm 1\%$

Locating the A5-IN:

There are a few possible locations for the AST-pyrometer model:

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

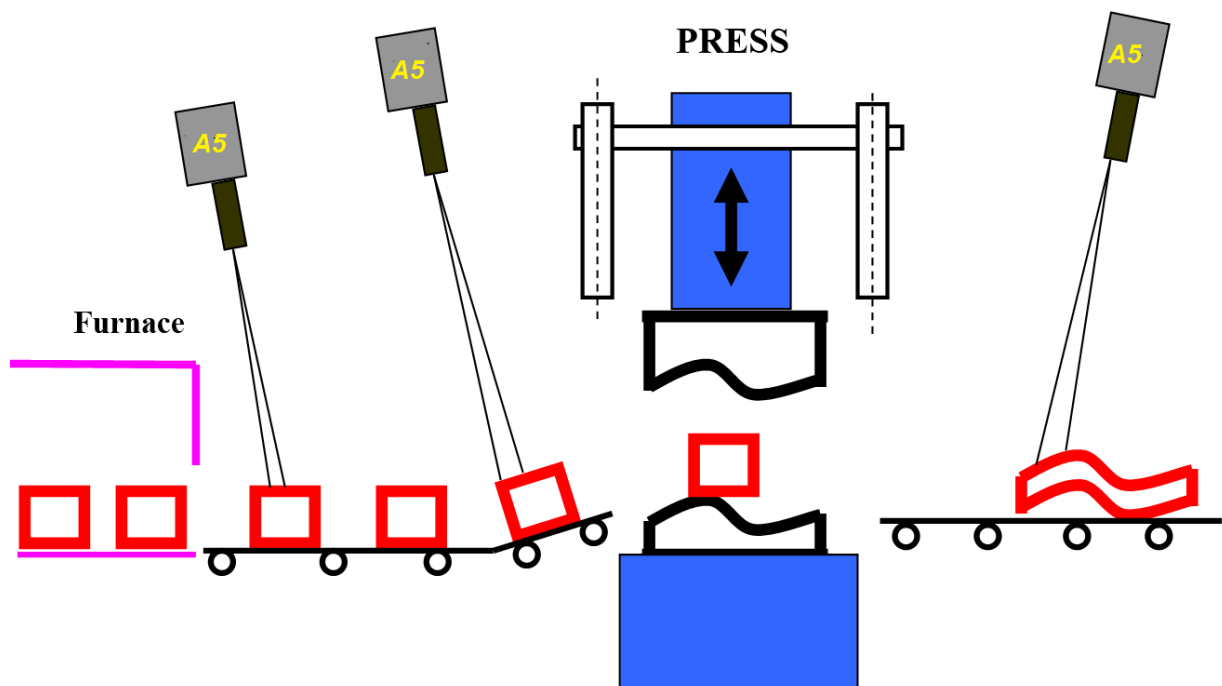


Figure 1

Conclusions:

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

AST. specializes in non-contact true temperature measurement, offering pyrometers showing the exact temperature in different locations of aluminum forging and extrusion processes. These devices significantly improve product quality while increasing productivity.

Comparison between AST Measurements to contact probe (thermocouple)

No of reading	Contact Probe	A5
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

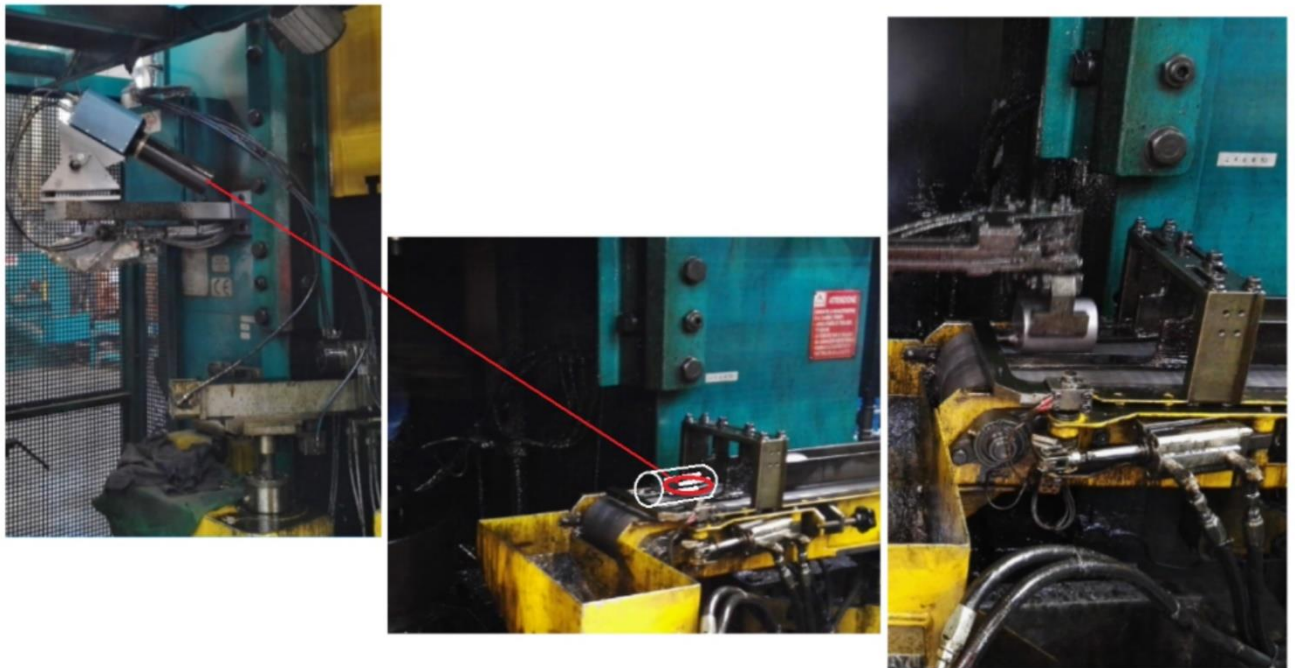


Figure 2



Figure 3