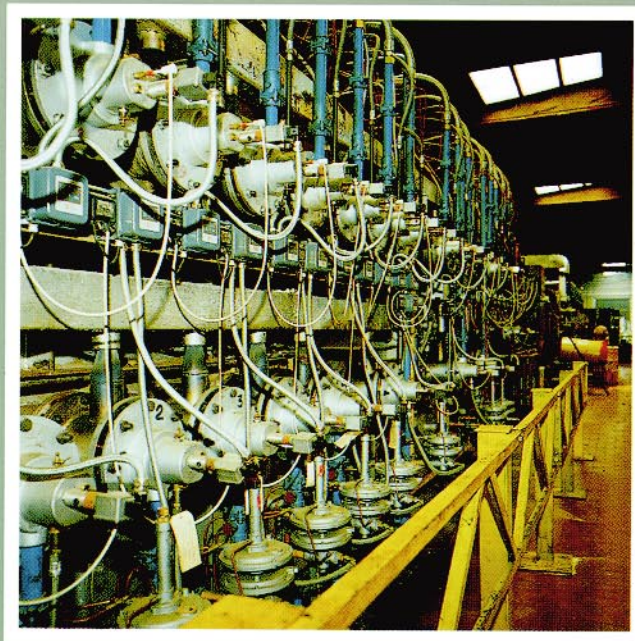


# NATURAL GAS AND THE MECHANICAL INDUSTRY



# INTRODUCTION

The ecological as well as energy advantages of natural gas have promoted the diffusion of gas-based technologies, aimed at rationalizing consumption, also in the mechanical industry.

One of the most important applications is the use of the natural gas furnace for the hardening and drawing of the steel used to make bolts and nuts.

The heat treatment is very expensive as for energy, because in order to obtain a material with adequate mechanical characteristics, the material must undergo a number of heating and rapid cooling cycles.

A very uniform distribution of the temperature in all parts of the furnace is necessary to carry out this process.

The modern, efficient heat exchange systems as well as the engineering of new gas burners have led to plants which satisfy all requirements as for the productive process and offer a high-quality, low-cost (especially when compared to electrical furnaces) product.

For the heat treatment of steel, the furnace is equipped with a group of natural gas-powered, recuperative, radiant tube burners. Thanks to the recycling of the heat, remarkable energy savings and economic advantages are guaranteed.

These burners may be installed in furnaces originally meant to be electrically powered.

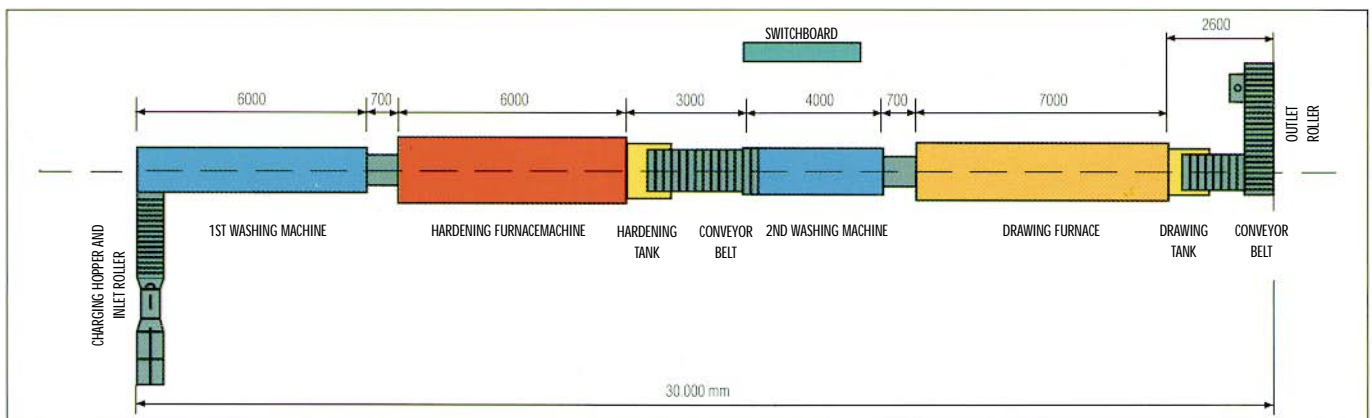
# NATURAL GAS POWERED, CONTINUOUS, FURNACE FOR THE HARDENING AND DRAWING OF STEEL USED TO MAKE BOLTS AND NUTS

## BONTEMPI VIBO S.P.A. - BERZO INFERIORE (BS)

Bontempi Vibo S.p.A. produces a wide range of high-quality, steel and stainless steel products (screws, nuts, bolts, etc.) sold all around the world.

The yearly output attains some 10,000 tons. Most of them are carbon steel, very high-resistant parts. Forming is followed by hardening and drawing which provide the product with the required characteristics.

The company has decided to replace the electrical resistors originally installed in the furnaces with natural gas-powered, recuperative, radiant tube furnaces in order to increase the efficiency of the company and optimize the use of energy.



### Information on the plant

Continuous furnace	Aichelin
Heat power	814 kW
Radiant burners	ESA S.r.l. Inc. Pyronics
Type of burners	recuperative
Material of radiant tube	INCONEL 600/AISI 310 S
Heat power of hardening area	523 kW
No. burners hardening area	24 transversal
Specific heat power of tubes	35 kW/m <sup>2</sup>
Temperature in hardening area	880° C
No. burners	15 transversal
Specific heat power of tubes	100 kW/m <sup>2</sup>
Temperature in drawing area	580° C
Hours/Year furnace in service	5,500
Start-up	March 1991

### Energy parameters

Fuel use index	70%
Primary energy saving compared to the electrical system	50%
Yearly saving on energy costs	60%

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