

# Optimizing the gas nitriding process with eductors

## A PNR Italia solution for mixing water in the heat treatment of metals



### SCENARIO FOR THE SECTOR

The role of nozzles and accessories in heat treatment of metals

Gaseous nitriding is a low-temperature thermochemical diffusion process used to increase the wear resistance, surface hardness, and fatigue strength of steel and ferrous metal materials through nitrogen diffusion.

Generally, this treatment is applied to gears, crankshafts, camshafts, puncture rollers, valve parts, springs, extrusion screws, die casting tools, stamping dies, aluminum extrusion dies, injectors, and plastic molds.

The nitriding process consists of several phases during which the spray nozzles and eductors play an essential role:

- Immersion of the pieces to be treated in a degreasing tank with an alkaline solution at 50-60 °C for 45 minutes and stirring by mixing nitrogen from below;
- Immersion of the pieces in a rinsing tank to remove the soap;
- Immersion in a second tank with a low percentage of passivant and water at room temperature for about 15 minutes;
- Rinsing with water from the same tank;
- Drying.

### THE PROBLEM OF OUR CLIENT

Our customer is specialized in controlled gas nitriding heat treatments and induction hardening with innovative and reliable solutions.

He requested to equip the gas nitriding process first degreasing tank with a water agitation system.

### PNR ITALIA SOLUTION

PNR Italia's technical department designed a water agitation system consisting in two lines of 4 ejectors for a total of 8 along the entire height of the tank.

The volume of the tank, filled with liquid at 3m, is 12 m<sup>3</sup> of water solution, which is 12000 L.

#### INDUSTRY

Steel and metal industry



#### APPLICATION

Liquid mixing and agitation



#### PROBLEM

Gaseous nitriding incomplete plant



#### SOLUTION

System of 2 lines with eductors

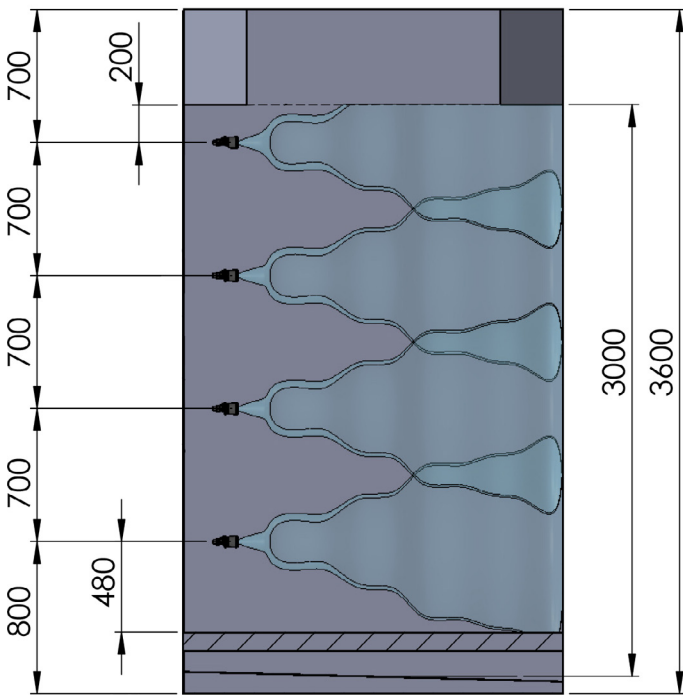


## ADVANTAGES FOR OUR CLIENT

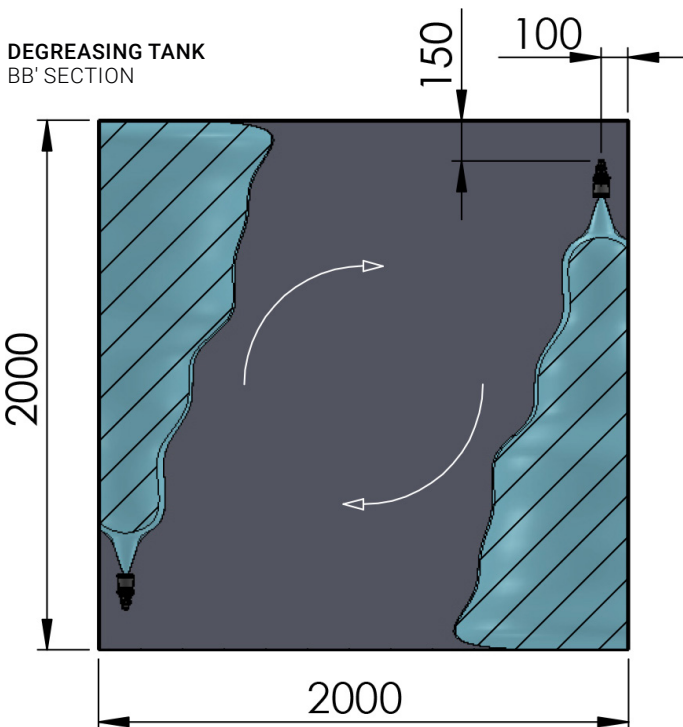
The two eductors lines guarantee a continuous solution recirculation, ensuring an excellent result.

UPB eductors are energy-saving products, usually installed in tanks and pressurized to spray the solution or mixture. This flow creates a strong depression to drag inside four times the volume of liquid, mix it with a solution inside the nozzle and spray it back into the tank at high speed.

### DEGREASING TANK AA' SECTION



### DEGREASING TANK BB' SECTION



## FOCUS ON THE PRODUCTS

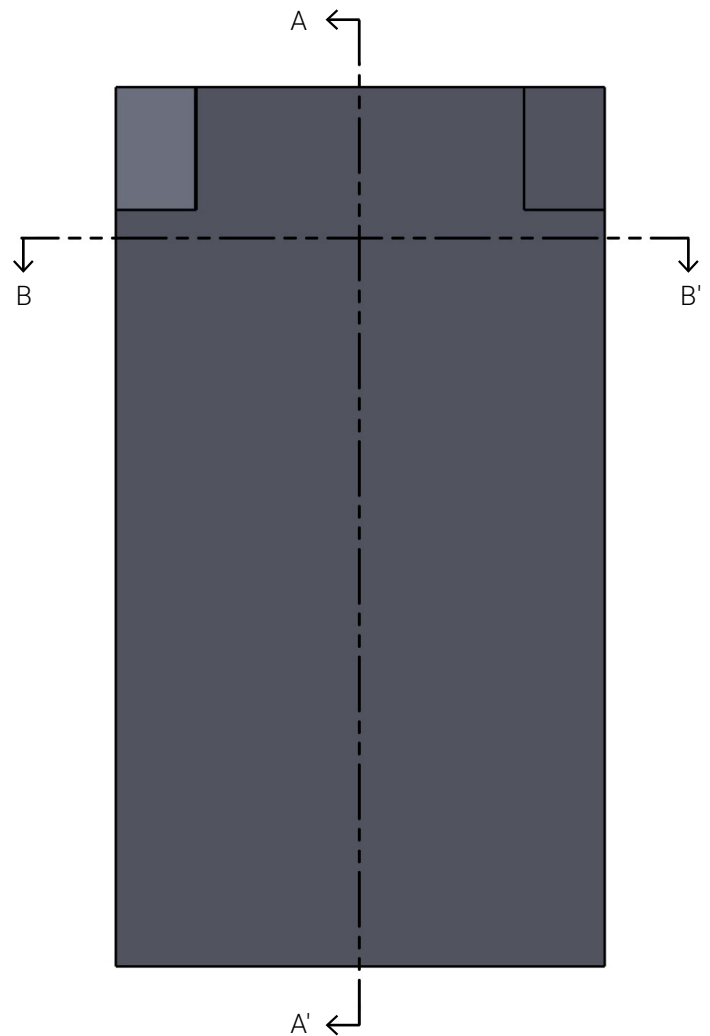


### UPB MIXING EDUCTOR

These eductors enable the circulation of large volumes of liquid and are ideal for continuous blending and stirring of liquids or solutions in tanks.

### PERFORMANCES SYSTEM

@PW= 3 BAR	UNIT OF MEASURE	THEORETICAL VALUE
FLOW RATE SINGLE EDUCTOR	L/MIN	109
FLOW RATE EDUCTORS LINE	L/MIN	109 x 4 = 436
FLOW RATE SYSTEM	L/MIN	436 x 2 linee = 872



### DEGREASING TANK LATERAL VIEW

**PNR Italia**

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