

HOW DO I...

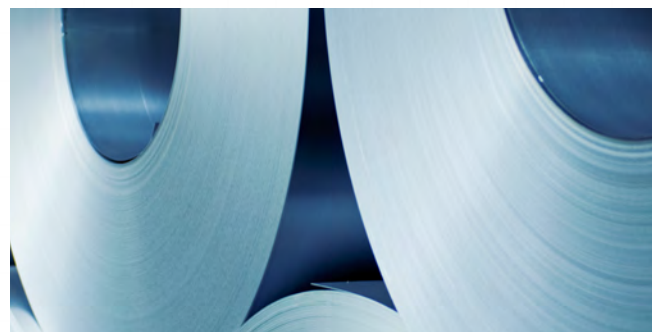
...reduce NO_x Emissions from my Batch Annealing Stack Furnace?

California Steel Industries (CSI) was interested in ways to improve fuel efficiency of their batch annealing operations without compromising emission requirements. Exceeding the requirements would simplify the approval process and improve the project timeline.

The emissions requirement called for carbon monoxide (CO) below 0.082 lb/MMBtu and oxides of nitrogen (NO_x) below 0.05 lb/MMBtu (90mg/m²).

Also, as part of the source test written by CSI, the emission requirements had to be met at three distinct firing positions: high (4.64 MMBtu/hr), medium (2.32 MMBtu/hr) and low (1.16 MMBtu/hr) fire.

To meet these emission requirements, a combustion system design was needed that combined improved emissions with the fuel efficiency of recuperation. A wide range of burner designs was reviewed from various manufacturers. Ultimately, the **1500 Series** burner design from Bloom Engineering Company was chosen as the only burner that would meet the requirements under all three firing ranges. Guaranteed values were then verified by laboratory test firing of the burner at the various levels of turndown.



50% // LOWER NO_x EMISSIONS*

[THAN MANDATED AT MAXIMUM FIRE]

***SAME PRODUCTION RATE**

79% // LOWER NO_x EMISSIONS*

[THAN PRE-EXISTING FURNACE]

***SAME PRODUCTION RATE**

**AVERAGE NO_x EMISSIONS BASED ON
17-HOUR ANNEALING CYCLE MODEL**

45

mg/m²/hr



**MAXIMUM
FIRE**

56

mg/m²/hr



**AVERAGE
FIRE**

61

mg/m²/hr



**MINIMUM
FIRE**

BLOOM
ENGINEERING

 **A Wabtec company**