After replacing the burners (26 radiant and 6 lateral) in two combustion zones of the 350-tph No. 2 Walking Beam furnace, the measured furnace emissions dropped by more than 50%.

December 2012: Danieli Centro Combustion’s Ultra Low NOx burners were installed successfully on the 350-tph walking beam furnace No. 2 in the hot-strip mill at AM Fos-sur-Mer, France. All the burners in two different combustion zones were replaced: lateral burners in zone 5 (bottom heating zone); radiant roof burners in zone 6 (top heating zone). All the new burners have been performing successfully, thus making it possible to proceed to complete the burner replacement in the furnace’s remaining combustion zones, with the further expectation of retrofitting the Nos. 1 and 3 walking-beam furnaces.

**Burners characteristics**
- Two ultra low-NOx MAB-PP 400 side burners -4,100 kW each- equipped with pilot burners so as to work effectively under all furnace temperature ranges;
- Four MAB 400 low-NOx side burners -4,100 kW each- for furnaces functioning with temperatures above 850 °C;
- Twenty-two RAD-VG 3.8 low-NOx roof burners -1,200 kW each- for furnaces functioning with temperatures above 850 °C.
- Burners are designed to work with both natural and coke oven gas (COG).

**Achievements**

The successful performance of the burners in Danieli Centro Combustion’s R&D Test Facility using COG to reproduce industrial operating conditions allowed for consequent testing on site and, under the same operating conditions, measured furnace emissions dropped by more than 50%. Registered carbon monoxide (CO) values were equivalent to zero. Once all burners in all six combustion zones are replaced, furnace NOx emissions will drop a further 25%, to give a total reduction of 75%.
Advanced Burner Technology

DCC proposes a wide range of burners, either wall- or roof-mounted, designed for gaseous fuels (from 1,000 to 22,000 kcal/Nm³) or liquid fuels (heavy and light fuel oil), all offering maximum flexibility and minimized environmental impact.

Lateral burners
FXB, MAB and MAB-FL™

Radiant roof burners
RAD-VGL, RAD-VGL low NOx and RAD-FL™

High-speed burners
TFB-SIK™ and TFB-REK™

Thanks to our leading-edge burner design, DCC customers benefit from the following advantages:

>Minimized emissions (NOx, CO), complying with the most severe regulations;
>Use of low-cost fuels (coke-oven gas; blast furnace gas; producer gas; heavy fuel oil);
>Reduced fuel consumption and CO₂ emissions;
>Optimal flame pattern (flame shape and temperature uniformity).

Fuel characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference fuel</td>
<td>Coke Oven Gas (COG)</td>
</tr>
<tr>
<td>H₂S content</td>
<td>3,000 mg/Nm³ max</td>
</tr>
<tr>
<td>Naphthalene content</td>
<td>70 mg/Nm³ max.</td>
</tr>
<tr>
<td>Tar content</td>
<td>50 mg/Nm³ max.</td>
</tr>
<tr>
<td>LCV</td>
<td>4,200 to 4,600 kcal/Nm³</td>
</tr>
<tr>
<td>Pressure in main collectors</td>
<td>68 - 70 mbar</td>
</tr>
<tr>
<td>Pressure at burner inlet</td>
<td>30 mbar min</td>
</tr>
</tbody>
</table>

1. RAD-VGL8 roof burner.
2. MAB 400 side burner.
4. Assembly of MAB 400 burners.
5. RAD-VGL burners ready for delivery.