

PURSuing INCREASED CAPACITY AND HIGHER PRODUCT QUALITY

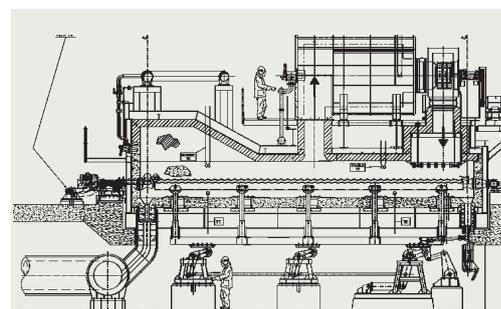
Modernization for the tube heat-treatment area at Southern Tube LLC will include installing a high-tech tempering furnace.

Southern Tube LLC (STL), a leading U.S. seamless finished tube supplier commissioned Danieli Centro Combustion (DCC) to engineer and manufacture a tempering furnace, for installation at its Houston, TX, operation.

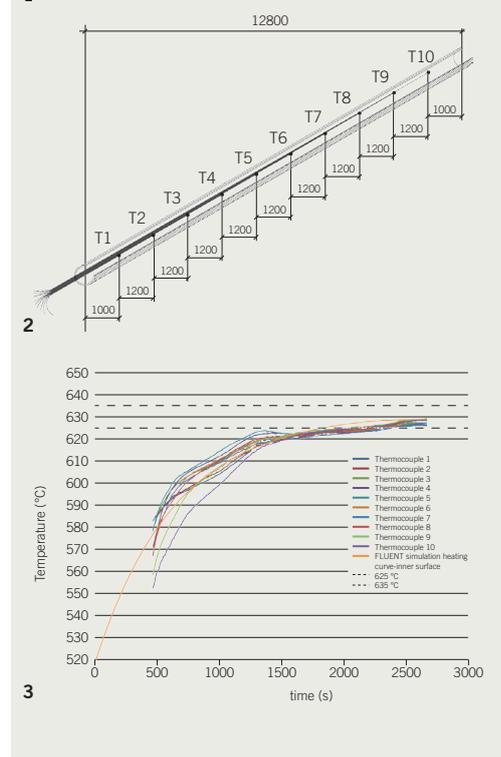
The new equipment will make possible substantial increases in productivity and quality for the product exiting the heat-treatment line. Normal operation of the heat-treatment line foresees the tube quenching process in the existing furnace and quenching devices, and the tempering process in a combination of existing and new equipment.

The new equipment represents cutting-edge tempering furnace technology, reheating tubes to the required temperature and maintaining them at this temperature for a pre-defined time (soaking time) in order to reach the desired metallurgical characteristics. To perform this efficiently and ensure excellent temperature uniformity, the furnace has a radiant section on the entry side, where direct flame burners are installed, and a convection section including a fume-recirculation system. Here, a large volume of fumes is maintained at constant temperature by burners installed in external chambers. These external chambers are equipped with burners that force the fumes back into the furnace using special centrifugal fans.

Heat transmission by convection guarantees very high tube-temperature uniformity as it passes through this furnace section. Performance tests carried out in March 2016 using thermocouples inserted into the tubes throughout the furnace process demonstrated high homogeneity across its entire length. All installed burners are the “ultra-low NO_x”



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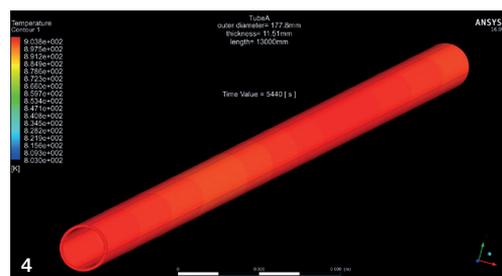
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1 Tempering furnace: longitudinal section.

2 Thermocouple disposition inside the test tube.

3 Comparison of simulated heating curve versus measured heating curve.

4 CFD simulation of the heating curve.



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type, a solution developed after accurate tests performed at DCC's R&D facilities to assess their ability to meet very strict local demands. The heat-treatment line is completed by a descaling station, including pumps, automatic valves, and spraying rings, also supplied by DCC, giving further proof of DCC's ability to develop and supply high-tech equipment that keeps pace with clients' increasingly demanding expectations ■