

IMPROVED COIL COATING THROUGH IR-RADIATION PROCESS: THE ECCO PROJECT

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Coil coating is an important industrial process, widely applied in steel and metal alloy production and is characterized by big facilities and large primary energy consumption. A major part of the overall plant size and the energy demand of coil coating facilities is associated with the drying/curing process in the curing oven, which is the bottleneck concerning the increase of the production capacity. In this process, organic solvents are vaporized from the applied liquid coating film and since they are flammable, the usually applied curing ovens with convective air drying technology have to be operated far below the Low Explosive Limit (LEL), due to safety constraints.

ECCO proposes a novel solution for the curing oven operation, where the metal strip is heated by IR-radiation and the curing oven is operated well above the Upper Explosive Limit (UEL), meaning that the drying/curing process takes place in an atmosphere mostly consisting of solvent vapours. A potentially self-sustainable process can be thus achieved in terms of energy, since solvent vapours are used as fuel in IR radiant porous burners, replacing fossil fuel (typically natural gas) consumption. The enhanced characteristics of the porous burners also guarantee the complete combustion of solvent vapours, assuring near to zero VOC emissions.

This fuel-flexible and modular solution will lead to a size/production capacity ratio reduction of 70% and a reduction of investment and operating costs of at least 40% each. Starting from previous activities at TRL 4, an interdisciplinary approach is foreseen, to bring this technology to TRL 6 and realize a prototype furnace at industrially relevant size and environment.

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