

Cold Tip Swirl (CTS)-Methanol Plant

Product Coding
PXXXXXXXXX

Introduction

Cold Tip Swirl (CTS) burners are critical components in autothermal reforming (ATR) units of methanol plants, where controlled partial oxidation and reforming reactions take place simultaneously. These burners are designed to ensure stable combustion, precise reactant mixing, and uniform temperature distribution within the reformer reactor. The design and detailed engineering of CTS burners are normally provided by internationally recognized process licensors. Euroslot Pars, relying on its long standing experience in high precision fabrication and special metallurgy, undertakes the manufacturing of specific burner components in strict compliance with licensor drawings and technical requirements.

Autothermal Reforming Process Overview

In autothermal reforming, a mixture of methanol, steam, and oxygen containing gas is converted into synthesis gas through a combination of partial oxidation and catalytic reforming reactions. Unlike conventional steam reforming, ATR is an energy-balanced process where the heat released from oxidation reactions supplies the endothermic reforming reactions. The CTS burner is installed at the top of the ATR reactor and is responsible for introducing the reactants in a controlled swirling flow pattern. This ensures rapid mixing, stable flame formation, and uniform heat release, which are essential to protect the catalyst bed and maintain optimal syngas composition for downstream methanol synthesis.

Features

- Precisely machined cold tip geometry to minimize thermal load on metallic components.
- Uniform flame shape and temperature distribution across the reactor cross section.

- Low pressure drop while maintaining stable combustion behavior.
- Fabrication in high grade heat resistant alloys suitable for severe reforming conditions.
- Full compliance with licensor drawings, tolerances, and quality standards.

Function

The CTS burner plays a central role in controlling the performance and safety of the autothermal reformer. Its main function is to introduce methanol, steam, and oxidant streams into the reactor with a strong swirling motion, ensuring immediate and homogeneous mixing.

The cold tip design protects the burner head from extreme thermal exposure by maintaining a relatively low metal temperature, which significantly extends service life. At the same time, the swirl pattern stabilizes the flame front, prevents localized hot spots, and provides a uniform temperature profile over the catalyst bed. This controlled reaction environment is essential for maintaining catalyst integrity, achieving the desired syngas composition, and ensuring long term, trouble free operation of the methanol plant.



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