



GAS CLEANING

COMPACT, TROUBLE FREE CYCLONE DUSTCATCHER

INTRODUCTION

Primetals Technologies patented Tri-Ax cyclone dustcatcher provides trouble free dust collection.

Dry dust collection from blast furnace gas has traditionally been carried out with a gravity dustcatcher. Environmental considerations have led to the increased use of cyclone type dustcatchers in recent years. Cyclones have the advantage of operating at a higher efficiency, in the region of 85%. This significantly reduces the sludge generation in the dirty water system of the wet stage of the gas cleaning plant.

TYPES OF CYCLONE

1. Tangential inlet
2. Axial inlet

The tangential cyclone design with a single inlet is well proven for dry dust collection. However, the issue with this design in the blast furnace application is the supporting of the downcomer. This must be done with either a substantial steel structure or a reinforced inlet to the cyclone, meaning it is normally only feasible on a 'green field project'.

The axial inlet design can support the downcomer like a traditional dustcatcher without the additional structure or reinforcing. However, the axial design is acknowledged as most appropriate for the separation of droplets from gases as opposed to solids/dust. The issue with axial cyclone design for the blast furnace application is the use of "mechanical guides" to induce the cyclonic effect. The guides are susceptible to choking in the case of moist dirty gas or wear in the case of dry dirty gas.



Figure 1: Triple inlet cyclone 3D model

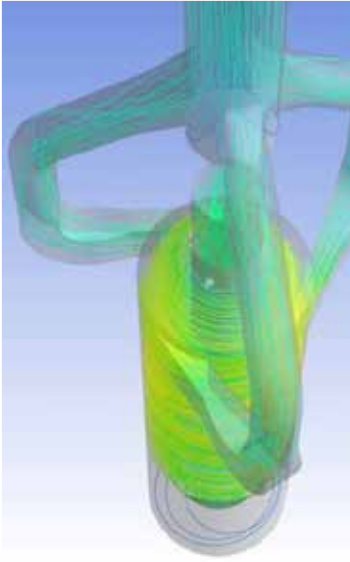


Figure 2: CFD modelling of Tri-Ax cyclone



Figure 3: Kardemir Tri-Ax cyclone

The Primetals Technologies patented Tri-Ax cyclone is designed to support the downcomer and provides conventional tangential cyclone inlets making it ideal for handling the dust in the blast furnace off gas.

The Tri-Ax cyclone solution also eliminates the need for additional support of the downcomer, removes the concerns regarding wear of unconventional axial cyclones and provides for optimal dust collection. The Tri-Ax design has the additional benefit of positive isolation of the blast furnace. Goggle valves can be installed in each of the arms that ensures ease for internal inspection or touch up repair work if required.

Positive isolation of this nature is recognized as the industry norm for allowing entry into a vessel and meets the increasing safety requirements of modern plant.

The Tri-Ax cyclone has now been operational for several years and has allowed Primetals Technologies to develop its own predictive model utilizing CFD (see figure 2). Regular site visits and support has allowed this model to be tuned to reflect actual site operating conditions. This model is now used to predict potential wear points for certain operating conditions and simulate how a new cyclone may perform in existing infrastructure.

Due to listed features the Tri-Ax cyclone is considered the ultimate dry stage gas cleaning solution for blast furnace operators.

MAIN BENEFITS

- Direct in-line support for downcomer
- Positive isolation of gas cleaning plant from blast furnace
- Direct replacement for troublesome axial cyclone top with guide vanes
- Optimum dry dust collection
- No moving parts
- No potential for blockage/swirl deterioration
- Ability to adjust the efficiency by the use of patented technology

Primetals Technologies
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