

Alumina Distribution and Transport System to Pots Retrofitted in EGA Jebel Ali Potlines 5 and 6

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Abstract



EGA Jebel Ali has planned retrofitting of their existing potlines 5 and 6 with a continuous alumina distribution and transport system for secondary alumina to each pot to reduce dependency on cranes, to improve potroom atmosphere for operators and eliminate anomalous emission from fume treatment plants due to crane breakdown. The existing pot super structures in the two potlines are CD20 technology with open-top alumina storage hoppers for crane filling. Crane feeding was replaced on the first 120 pots in February 2023 by a continuous alumina distribution and transport system, which delivers continuous alumina smoothly to each of the pots by the use of low-pressure fluidisation.

This paper reports the main observations, improvements and best-practices implemented to optimise operation of the pot feed system. As the system was integrated into operating potlines, early involvement of stake holders and end-users in the project development and design phase was imperative for successful implementation. The system is designed with continuous feeding as well as sequential draining and re-filling to avoid any potential build-ups of coarse material. This significantly reduces cleaning requirements. The ventilation of the fluidising air for the system is purposely designed to reduce the variations in material particle distribution along the potrooms, and to reduce the risk of dust carrying over to the fume treatment plants. Furthermore, the low-pressure fluidising air for the system minimises the air load added to the existing gas treatment centers. The continuous feeding of alumina to the pots allows for a constant feed rate to the fume treatment plants, which in turn improve their fluoride scrubbing efficiency. In addition, the constantly filled pots eliminate anode effects experienced due to empty pot storage hoppers. This design is tailor-made for easy and fast disconnection of individual pots in the event of replacing pot-super structures at pot cut-out.

The success of the retrofit of the continuous alumina distribution and transport system for the potlines is seen in reduced dependency on cranes, cleaner potroom atmosphere due to closed pot storage hoppers, and limited operator interaction.

Keywords: EGA Jebel Ali potlines 5 and 6, Operational efficiency, Retrofit of alumina transport system, Potroom atmosphere.

1. Introduction

EGA Jebel Ali has since 2017 evaluated and planned for a retrofit of their existing potlines 5 and 6 with a continuous alumina distribution and transport system to each pot to reduce dependency on cranes for feeding alumina to the pots. The 480 existing pot super structures in the two potlines are EGA CD20 (264 kA) technology with open-top alumina storage hoppers for crane filling.

A new transport and distribution system for alumina directly from each fume treatment plant (FTP) storage silo to the pots will eliminate anomalous emission from FTPs that can occur due to crane unavailability. Any stop in material distribution from the silos will reduce or eliminate storage capacity which in turn will reduce or even stop alumina output from the FTPs and result in increased emissions. A sealed alumina distribution and transport system will also improve potroom atmosphere for operators as the dust generated by crane filling to the open pot hoppers will be eliminated.

2. The Project

The project for the supply and installation of the continuous alumina transport and distribution system for bringing alumina directly from the storage silos to each of the 480 pot storage hoppers in potlines 5 & 6 was agreed upon by EGA and Norwegian Emission Abatement Technologies AS (NEATEC) in December 2021. Commissioning and start-up of the first 120 pots in Potline 5 took place in February 2023 and by June 2023 all the 240 pots in Potline 5 were operational with the new system. The remaining system for Potline 6 is scheduled for start-up by the end of 2023.

The system delivers continuous alumina smoothly from the fume treatment plant storage silos to each of the pots by the use of low-pressure fluidisation. The simplified process diagram for the system for 120 pots can be seen in Figure 1.

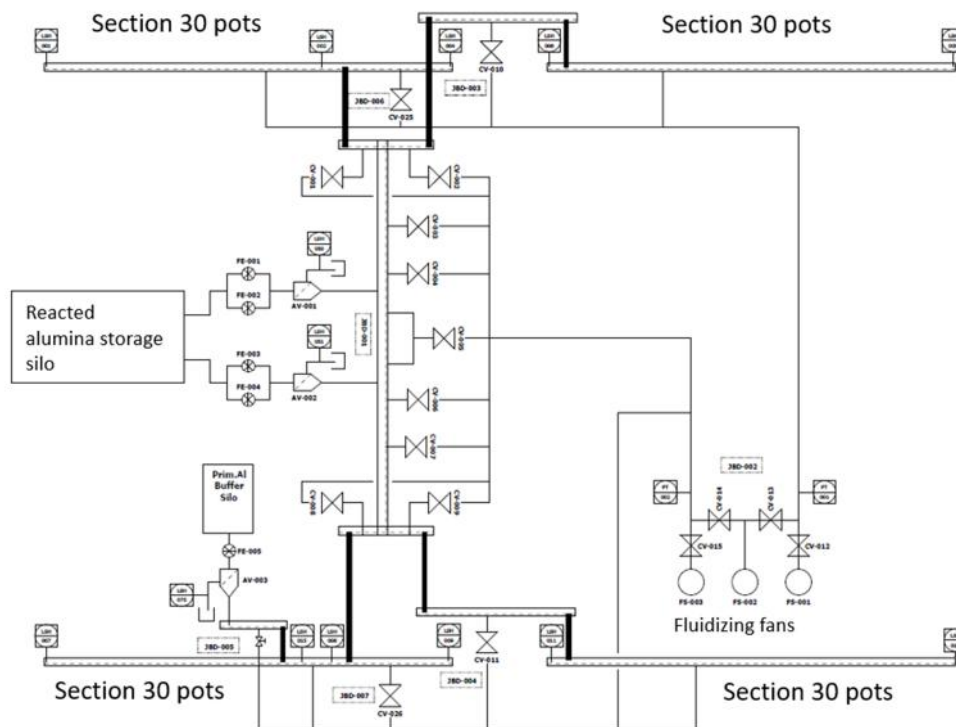


Figure 1. Simplified process diagram.