

EGA Story from Humble Beginnings to a Mega Smelter

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Abstract



Emirates Global Aluminium (EGA) started the first Kaiser P69 technology cells in Jebel Ali smelter in 1979 with annual production of 149 kt of metal in 1982 when the first three potlines were in operation. Since then, many smelter expansions, modernizations and innovations brought the total production of its two smelters in Jebel Ali and Al Taweelah to 2.501 Mt aluminium in 2021. The potline modernizations and expansions have used EGA's own cell technologies, developed inhouse since 1990: D18, CD20, D20, DX, DX+, DX+ Ultra, D18+ and D20+. Excellent CAPEX and OPEX performance led to the licensing of DX+ Ultra technology to ALBA for its Potline 6 expansion. This technology development was based on continuous innovation, supported by EGA's mathematical modelling and design engineering. Cell control systems are also the result of EGA's own development which culminated in the latest advanced Pot Control System (PCS), using standard programmable logic controllers (PLC) for easy maintenance and future development with increased HMI capabilities. The PLC based PCS is implemented in EGA's Al Taweelah Potline 3 using DX+ technology and in DX+ Ultra technology in ALBA's Potline 6. During all these years, EGA has been continuously reducing the impact of its aluminium production on the environment and made the production more sustainable with improvements in capture, cleaning and recycling. In 2018, EGA achieved world-benchmark low PFC emissions of 0.020 t CO₂ eq/t Al and fluoride emissions of 0.3 kg/t Al. Upstream, EGA established Guinea Alumina Corporation (GAC) in 2013, which makes EGA one of the biggest merchant suppliers of bauxite in the world, and also supplies bauxite to Al Taweelah alumina refinery, commissioned in 2019 and which produced 2.326 Mt of alumina in 2021. EGA also relies on its many Industry 4.0 initiatives in all of its activities to improve the sustainability, the efficiency and the profitability of the smelter of the future. The development of EGA from the modest beginnings in 1979 to an integrated global aluminum giant today will be described in the paper.

Keywords: Emirates Global Aluminium (EGA), Technology development and innovations, Potline expansions, Potline emissions control, Reduction of carbon footprint.

1. Introduction

Emirates Global Aluminium (EGA) started its operations in Jebel Ali smelter in 1979 as Dubai Aluminium Company Limited (DUBAL) with Kaiser P69 technology cells with annual production of 149 kt of metal in 360 cells in 1982 when the first three potlines were in operation. Since then, many smelter expansions, modernizations and innovations brought the total production of its two smelters in Jebel Ali and Al Taweelah to 2.501 Mt aluminium in 2021. The potline modernizations and expansions have used EGA's own cell technologies, developed inhouse since 1990: D18 replaced by D18+, CD20, D20, D20+, DX, and DX+ Ultra operating in Jebel Ali, and DX, DX+ and DX+ Ultra operating in Al Taweelah. Figures 1 and 2 show Jebel Ali smelter in 1990 and today. Figure 3 shows Al Taweelah potlines.



Figure 1. EGA's Jebel Ali smelter in 1990 with 4 potlines and 504 D18 cells.



Figure 2. EGA's Jebel Ali smelter in 2022 with 7 potlines, 6 cell technologies, 1577 cells.

Emirates Global Aluminium (EGA) is continuously striving to reduce the impact of its aluminium production processes on environment and make the production more sustainable. While increasing the production, the harmful emissions to the environment per tonne of aluminium have decreased due to improvements in capture, cleaning and recycling. In 2020, the greenhouse gas (GHG) emissions intensity from smelting and casting operations were 39.4 % lower than the global industry average. The future is in using renewable energy for production of aluminium. EGA has already started this journey by using solar power to produce CelestiAl solar aluminium.

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