D20+, the New EGA Optimized Version of D20 Technology for Lower Energy Consumption

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Abstract

Emirates Global Aluminium (EGA) commenced operation in 1979 with 3 potlines of 120 D18 cells at its Jebel Ali site, then known as Dubai Aluminium. Today, with smelters at both Jebel Ali in Dubai and Al Taweelah in Abu Dhabi, EGA has an annual production of 2.5 Mt of primary aluminium. EGA has focused on technology development for over 25 years. As part of this work, in 2014 a project was launched to accelerate development of a more advanced cell design with minimum capital investment by modernising and improving EGA's existing CD20 and D20 cell technologies into D20+. The work in this paper demonstrates the evolution of the D20+ cell design from D20 Cell Technology. It also summarises the industrial performance after one year of operation in the boosted amperage section while targeting energy consumption of less than 13.0 DC kWh/kg Al. Further process optimization and feasibility analysis are in progress to fully assess the best path forward for industrial implementation of D20+ Cell Technology.

Keywords: EGA, D20+ Cell Technology, low energy reduction cells.

1. Introduction

Emirates Global Aluminium began production in 1979 as Dubai Aluminum with Kaiser P69 cell technology (and later upgraded to D18) in three potlines with 120 pots in each potline. Annual production in 1980 was 36 300 tonnes.

Since then, through amperage increases, brownfield and greenfield expansions, production has grown significantly. Today Emirates Global Aluminium operates two smelters – one in Dubai and the other in Abu Dhabi – and has a production capacity of 2.5 Mt per year.

EGA is currently expanding upstream and internationally. EGA is building a bauxite mine and associated export facilities in the Republic of Guinea in West Africa. In Abu Dhabi, EGA is building the UAE's first alumina refinery next to its Al Taweelah smelter.

EGA has focused on technology development for over 25 years to reduce the amount of energy required to produce each tonne of aluminium, saving costs and environmental emissions. Significant upgrades in the process at EGA have been achieved over the years to improve energy efficiency and carbon footprint and have resulted in lowering cell specific energy from 15.50 DC kWh/kg Al to less than 12.99 DC kWh/kg Al in its newest technologies: D18+, D20+ and DX+ Ultra (Figures 2 - 4) [1 – 3].

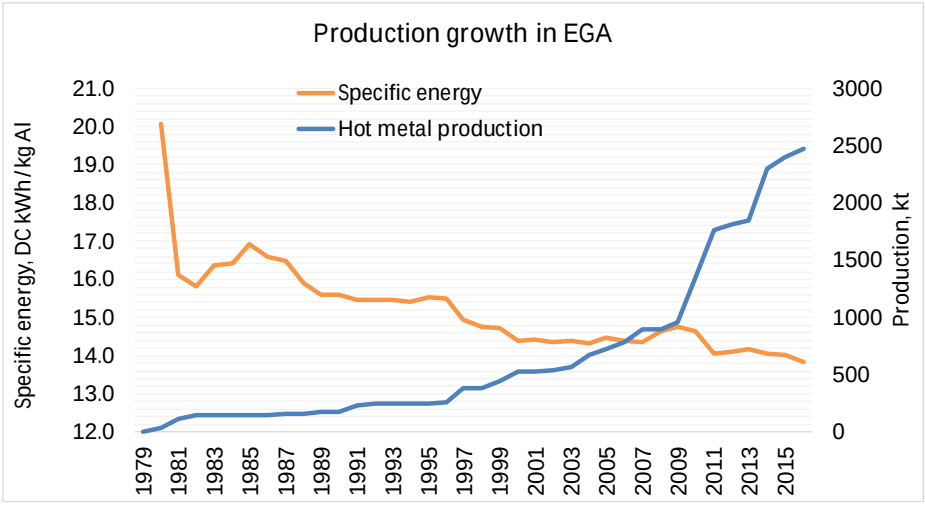

Figure 1. Production growth at EGA.

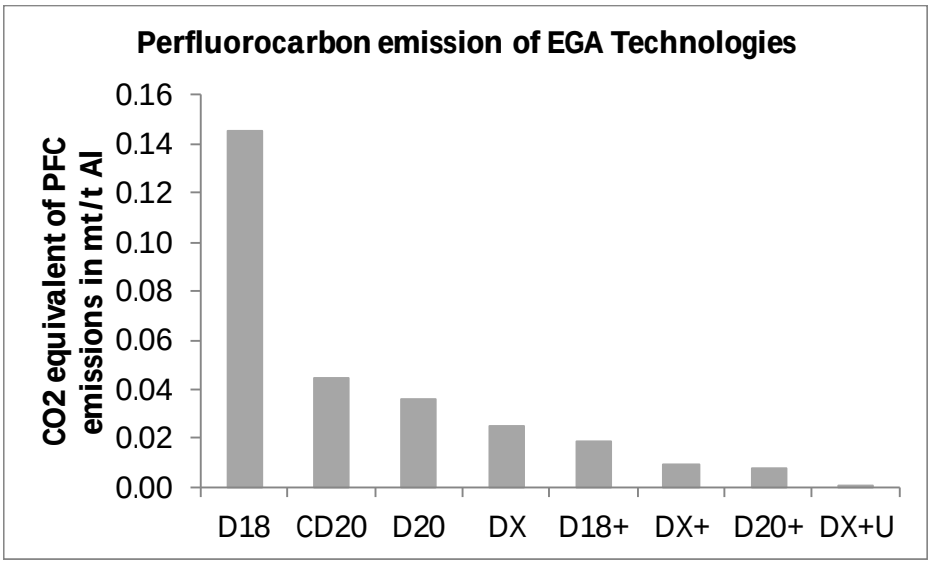

Figure 2. Perfluorocarbon (PFC) emissions across EGA technologies for the period from 1 June 2016 to 1 June 2017.

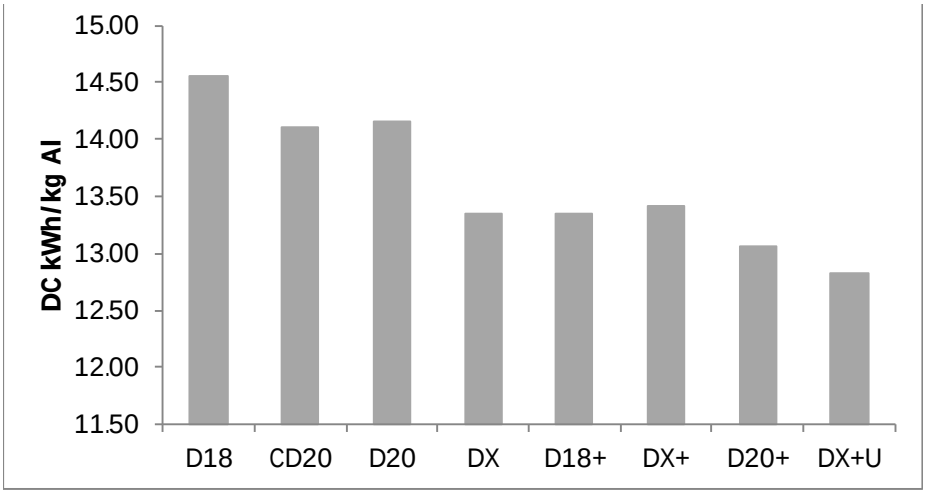

Figure 3. Specific energy consumption across EGA technologies for the period from 1 June 2016 to 1 June 2017.

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