Measurement of Pot Gas Exhaust Flowrate and Heat Loss

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Abstract

Pot duct exhaust flowrate is an important parameter in the control of pot emissions and pot heat balance. The exhaust flowrate must be sufficient to create large enough under-pressure in all areas under the hood to prevent the escape of under-hood gases to the potroom in regular operation as well as during anode changing and tapping. The exhaust gas temperature must also be acceptably low for the scrubbers. Pot exhaust rates and temperature are measured at regular intervals to confirm compliance with these requirements. The exhaust rates are determined from gas velocity measurements in the duct using Pitot tube at a certain number of traverse points across the duct diameter, which should follow international standards, such as ISO 3966:2008. In practice, to save time, the number of traverse points is most often fewer than required by standards, which depend on flow disturbances at the measurement location caused by nearby flow control damper and duct bends. In this paper, the measurements of duct flowrate according to the ISO 3966:2008 standard are compared with abridged ones used for regular flowrate control and the duct heat loss is determined as a function of duct flowrate in DX Technology pots, operating in Potline 8 at DUBAL – an operating subsidiary of Emirates Global Aluminium ("EGA").

Keywords: Aluminium electrolysis pot exhaust; measurement of duct gas velocities; ISO 3966:2008 standard; heat loss through pot gas exhaust duct.