

AP Technology™

AP60 and APXe:
A breakthrough in productivity,
energy consumption and emissions



AP60 pot

AP60 and APXe pots enable a step change in pot technology by overcoming the challenges of very high amperage (500-600kA). They are the result of years of continuous and focused efforts in R&D and pilot-scale operations.

On the right, AP60 performance test results

Both AP60 and APXe are based on the same optimised framework (busbars, shell and superstructure) and operating equipment. The anode assemblies, cathodes and linings, ventilation and gas flow differ to meet the respective needs of each technology.

| Feature | AP60 | APXe |
|------------------------------------------------------------|-------------------|------------|
| Busbar | Common | |
| Shell | Common | |
| Superstructure | Common | |
| Alumina feeding device | Common | |
| Anode assembly | High productivity | Low energy |
| Cathode and lining | High productivity | Low energy |
| Shell ventilation | High productivity | Low energy |
| Gas flow | High productivity | Low energy |
| Pot control system (ALPSYS™) | Common | |
| Equipment (pot tending assemblies, vehicles, ladles, etc.) | Common | |
| Building | Common | |

These two technologies deliver a dual performance pot solution:

- High labour productivity and low CAPEX/t for AP60
- Very low energy consumption and low OPEX/t for APXe
- Very low HF emissions

| | AP60 | | APXe |
|-------------------------------------|---------------------------------|----------------|------|
| | 1st generation (Jonquière 2014) | 2nd generation | |
| Current (kA) | 570 | 600 | 500 |
| Pot production (t/d) | 4.3 | > 4.5 | 3.7 |
| Specific energy consumption (MWh/t) | 13.3 | < 13.0 | 12.3 |

Phase 1 at Jonquière (Quebec): one year of operation

The first phase of the Jonquière smelter consists of a 38-cell plant (31 AP60 first-generation pots and 7 AP60 second-generation pots) with an annual production capacity of 60,000 tonnes of aluminium. This initial phase also includes the infrastructure required for the subsequent phases.

The last of the smelter's first 38 cells was started in December 2013. The smelter ran satisfactorily throughout 2014. The performance test of the first-generation AP60 technology was conducted in August 2014 during a period of 30 days and produced the excellent results summarised in the following table.

| Key indicator | Result |
|------------------------------------------|--------|
| Metal production (kg/p/d) | 4,407 |
| Amperage (kA) | 570.7 |
| Current efficiency (%) | 95.9 |
| SEC (kWh/t Al)* | 13,090 |
| Anode effect frequency (ae/p/d) | 0.02 |
| Roof vent fluoride emissions (kg F/t Al) | 0.21 |

* SEC computed for an industrial plant

Testing demonstrated an outstanding environmental performance for fluoride emissions (0.21 kg Ft/t Al) and anode effect rate (0.02 AE/pot/day). The improved fluoride emission performance is the result of the pot gas collection system's innovative design inside the superstructure, enhanced pot tightness compared to previous pot generations and the very stable pot behaviour.

In January 2015, Jonquière achieved an amperage of over 600kA in the smelter's boosted section.

“The performance of the AP60 cells over the past 12 months represents an all-time best for Rio Tinto Alcan's aluminium smelting technology. The optimised framework including busbars, shell and superstructure deliver a very high level of cost effectiveness compared to previous cell generations by ensuring benchmark productivity, low energy consumption and record low emissions.”

Claude Vanvoren

Vice President Technology and Research and Development

Technology sales department
725, rue Aristide Bergès - BP 7
38341 Voreppe Cedex
France

T +33 476 578 500
F +33 476 566 110

ap-technology.com

Rio Tinto Alcan head office
1188 Sherbrooke Street West
Montreal, Quebec H3A 3G2
Canada

T +1 514 848 8000
F +1 514 848 8115

riotintoalcan.com

Mailing address
PO Box 6090
Montreal, Quebec H3C 3A7
Canada

Production: tmdesign.ca
© Rio Tinto Alcan