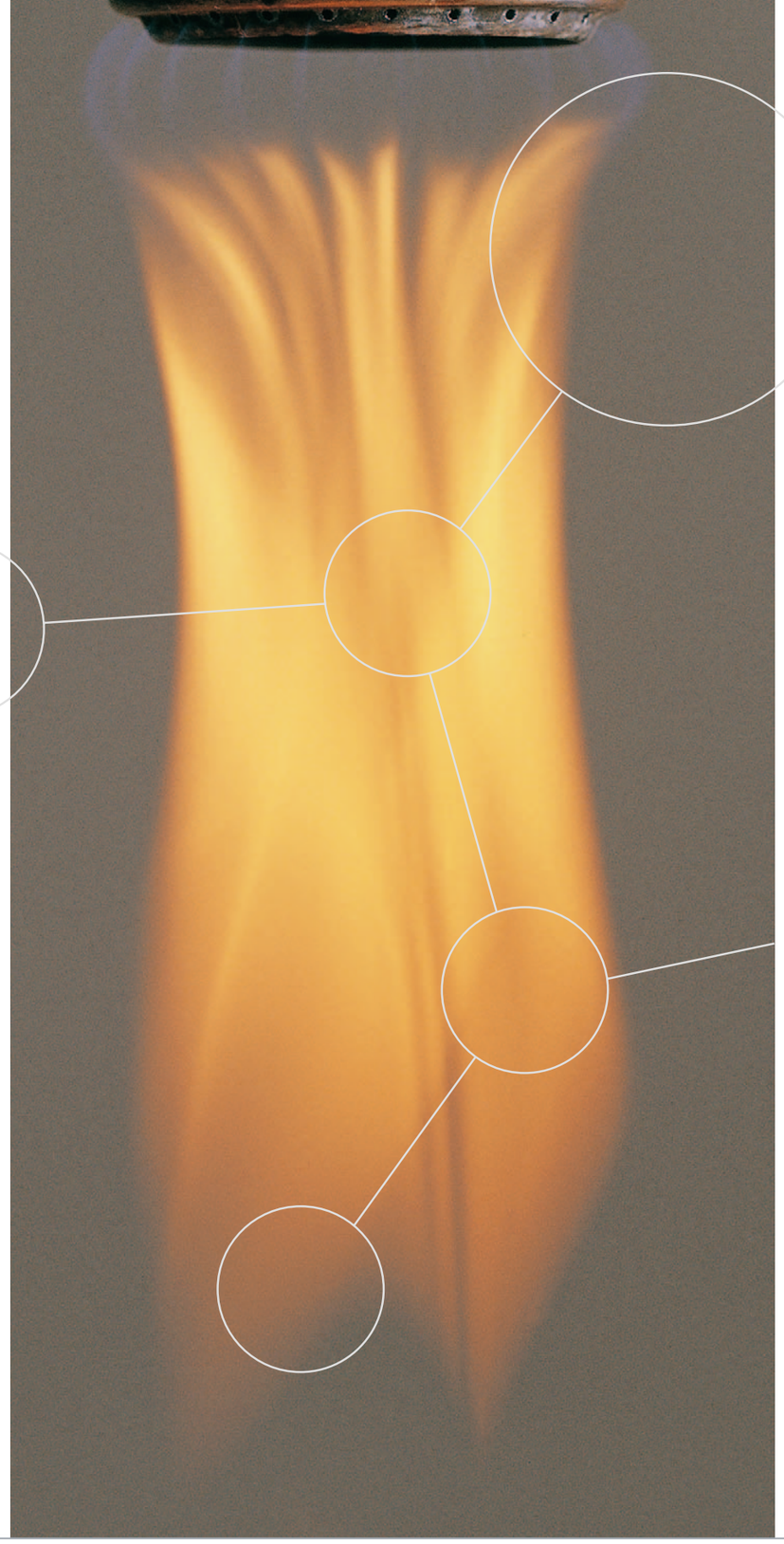
- Innovative, proven solutions tailored to customer needs
- Guaranteed, advanced technology plus operational experience
- Engineering capabilities for project implementation
- Designs for a cleaner, safer environment
- Engineering, sales and customer-support centres in 16 countries

Outokumpu Technology is always close at hand when an expert is needed



Outokumpu Flash Smelting

reliable and proven, environmentally sound

Outokumpu Flash Smelting technology offers environmentally sound technique for copper, nickel and lead production with lower investment and unit operating costs.

Outokumpu Technology, P.O. Box 86, FIN-02201 Espoo, Finland
Tel. +358 9 4211, fax +358 9 421 3973
e-mail: info.technology@outokumpu.com

www.outokumpu.com

Flash Smelting technologies

offer new business opportunities to metal producers

1 Production Network maximizes Benefits

Clean environment

Outokumpu developed the Flash Smelting process half a century ago. It was first applied in 1949 in Harjavalta, Finland. Today, this process produces 50% of the world's primary copper and 30% of the world's nickel. Flash Smelting has been continuously improved. This state-of-the-art technology offers environmentally sound techniques for copper, nickel and lead production with low investment and operating costs.

Minimal unit operating cost

Flash Smelting technology is very flexible. An existing plant can be renovated to yield a threefold amount of copper or nickel with minimal new capital expenditure while simultaneously achieving a decrease in unit operating costs.

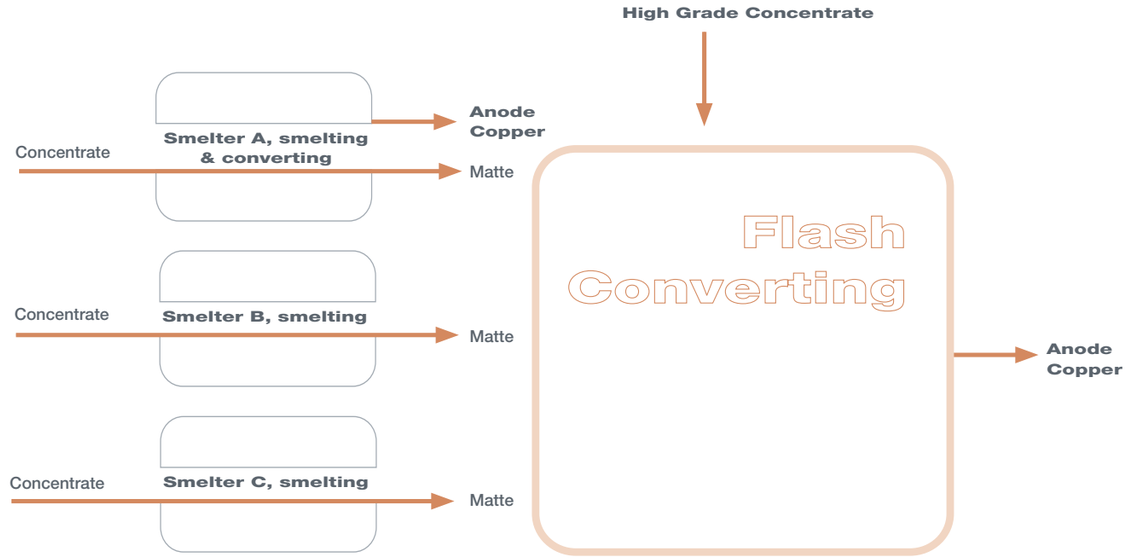
Continous development

The Flash Smelting process is continously developed to meet the needs of the industry, in collaboration with customers and Outokumpu's own research centre.

More profitable business options

Special features, such as flexibility, low energy consumption and eliminated sulphur emissions as well as economy of scale, have given Outokumpu Flash Smelting Technology a leading position in the copper production business. Outokumpu Flash Technology has become a benchmark for the copper and nickel industry.

Now Outokumpu Flash Technology has an even more important role – in addition to its technical and economical benefits, the process contributes to new, more profitable business options (e.g. Production Network) by maximizing the benefits of de-coupling smelting and converting and Direct Blister/Flash Converting Technologies.



Advantages of Flash Smelting

- Offers new business options for metal production
- Reliable and proven process and equipment
- Low investment and operating costs
- Capability to treat different qualities of raw materials with variable feed rates
- High recovery of valuable metals
- Meets the strictest environmental requirements
- The cleanest smelting method available
- Safe and easy working conditions

Worldwide

technology round-table, a large network of Flash Smelting users, regularly gathers to discuss key-note issues within the industry.

10th IFSC
23-29 June 2002, Helsinki, Finland

Outokumpu Flash Technology

has become a benchmark for the copper and nickel industry.

2 Milestones in development of Direct Blister Flash Smelting

Direct Blister Flash Smelting

The Direct Blister Copper Process is one of the most interesting applications of Outokumpu Flash Smelting Technology. In Direct Blister Flash Smelting the production chain is totally integrated. Blister copper can be produced directly by smelting the concentrate in a flash smelting furnace. The process offers new options for using different raw materials, thereby maximizing profit.

Today, Direct Blister Flash Smelting is suitable and profitable for lower-grade concentrates. The process is currently used on a commercial scale in Poland and in Australia. Outokumpu is committed to developing further and providing a profitable option for the production of blister copper from chalcopyrite concentrate within the next few years by focusing its research and development on this goal.

Direct Outokumpu Nickel (DON)

The DON process is a shorter and more flexible version of the early nickel flash smelting process chain. It was first put to commercial use in 1995 in Harjavalta, Finland.

The DON-process reduces the number of process steps by eliminating the Peirce Smith converters from the nickel smelting process. Now high-grade nickel matte is produced directly from the flash smelting furnace and metal alloy from the electric furnace. This reduces the investment, operating and maintenance costs significantly. The process ensures higher recovery of valuable metals (Ni, Co) from the raw materials, since there is no unnecessary internal material circulation.

The DON -process also improves working conditions in the smelter; because both Peirce-Smith converters and the ladle transfer of molten material are eliminated, as is the escape of sulphur-rich gas from converters and ladles to the aisle.

Flash Smelting and Kennecott-Outokumpu Flash Converting

Outokumpu Flash Smelting combined with Kennecott-Outokumpu Flash Converting is an integrated solution to attaining high-capacity smelting using the minimum of equipment and most effective emission control. The use of the Peirce Smith converting process, which is a costly and labour-intensive operation, is no longer needed.

High capacity combined with small size ensures low investment and operating costs. The process optimizes the productivity of existing installations, such as sulphuric acid plant, so that they can be used more efficiently with low unit operating costs.

Being a closed process, working conditions are improved and environmental emissions reduced because the technology eliminates the transfer of molten material.

It also provides new economic flexibility because it separates smelting and converting. High recovery of sulphur is possible thanks to the constant flow of high-strength sulphur-dioxide process gas from the flash furnaces. This brings savings in transportation and provides advantages in plant design and operation, as well as in Production Network.

Lead Flash Smelting

Advances have also been made in the Lead Flash Smelting. The process has already been tested on a production-scale at the pilot plant in Pori, Finland. The process meets the strictest standards for emissions and working conditions.

1960

- Direct to Blister Pilot Tests since 1960s

1970

- Adoption of Oxygen Enrichment at Flash Smelters in Harjavalta, Finland 1971
- Pilot tests for KGHM concentrate 1974
- Commissioning of the Flash Smelter producing blister copper in Glogow, Poland 1978

1980

- SMOC Patent: Flash Converting Concept 1983
- Pilot Tests for Olympic Dam Concentrate 1984
- Pilot Tests for high grade matte: Flash Converting 1984
- Commissioning of the Direct to Blister Flash Smelting at Olympic Dam, Australia 1988

1990

- Kennecott Utah Copper decide to build a Smelter based on Flash Smelting/ Flash Converting Technology 1992
- Commissioning of the Flash Smelting/Flash Converting at Kennecott, in Salt Lake City 1995
- Concept and piloting of Direct Blister Smelting from mixture of concentrate and matte since 1980s
- Testing and piloting of the Slag Cleaning since 1980s
- License and Supply Contract for Flash Smelting/ Flash Converting with Southern Peru Corp. 1999
- Commissioning of the Olympic Dam II Direct to Blister Flash Smelter 1999

2000

- Collaboration between Codelco-Outokumpu: DBF tests and studies 2000

Outokumpu's

long-term commitment to development, partnership and customer service ensures operation excellence in any business environment

4 Advantages of Outokumpu´s involvement in projects

New opportunities to improve profitability

Flash Smelting technology, the Best Available Technique (BAT) for the production of copper and nickel, offers new opportunities for both greenfield projects and modernization and expansion of existing production plants.

Successful technology transfer

By utilizing Outokumpu's experience in research, operation and engineering from the initial phase to start-up the last-minute changes or plant modifications can be avoided. When the complete process line is designed and delivered by Outokumpu the installation fulfils all process, operation, maintenance and environmental requirements. The plant reaches design production in the shortest time. And the latest improvements are always available to Outokumpu's customers.

Outokumpu as a business partner

Outokumpu is building long-term partnerships which ensure that the latest advances in the chosen technology are continuously available to their customers. In addition, the company is committed to continuous technological development in order to create new business opportunities with metal producers on a win-win basis.

Metallurgical solution
New business ventures

Successful Technology Transfer resulting in added value and profit

Added value

Profit
- Shorter implementation
- Faster profit
- Guaranteed performance
- Continuous development

3 Outokumpu has solid experience in engineering, procurement, construction and operation around the world