CONTIMELT

Project ID: EE./00251/80
Gefördert unter: ENG-ENALT 1C

NEW CONTINUOUS SMELTING AND REFINING PROCESS FOR COPPER

Von 1982-11-01 bis 1984-03-31

Projektdetails

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<th>Gesamtkosten:</th>
<th>Thema(en):</th>
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<td>EUR 5 730 980</td>
<td>1.6 - INDUSTRY</td>
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<th>EU-Beitrag:</th>
<th>Finanzierungsprogramm:</th>
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<td>EUR 1 719 294</td>
<td>DEM - Demonstration contracts</td>
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Ziel

The rising costs of energy and labour together with stringent environmental protection requirements have led to the development of new methods for non-ferrous metal extraction, in which there is a trend towards continuous production plants with a high specific output.

Contimelt is a new two-stage process for melting and refining copper. Compared to the traditional batchwise operated reverberatory refining furnace, Contimelt represents a continuous operation with a high melting/refining rate, saving energy and manhours and allowing close environmental control.

The total energy input for the Contimelt process amounts to only 50% of that required for the conventional reverberatory furnace. The heat losses in the off-gas volume are considerably less. The reduced volume of the hearth used for superheating and the good thermal use of the combustion gases in the shaft are the main reasons for the low heat consumption.

Because watercooled blocks at the transitional area shaft/hearth are necessary, some heat is lost with the cooling water. The need never to interrupt the operation of the furnace, and to keep repair costs to a reasonable level, suggested cooling blocks to be installed.

Therefore, as regards heat economy, the aspired goal could not be reached completely.

On the other hand a notable success could be recorded in view of the creation of a continuously operating melting and refining plant.

Previously with the reverberatory furnace, which took one charge at a time, 2 furnaces were required to run continuously 7 days a week in 3 shifts for a production which can be achieved by the new process in maximum 5 shifts. A further advantage results from contribution to a more human working environment due to the improved operating conditions. Furthermore, by reducing the off-gas volume, an environmental problem is considerably reduced.

The realized savings in energy and labour costs were compensated to a great extend by increased repair costs, caused by refractory wear.

Contimelt consists of two processing stages: the anode shaft furnace, in which the Cu-feed material (blister copper, anode scrap, copper scrap) is melted and refined, and the poling furnace, in which copper is poled (deoxidized) in a continuous flow. The molten copper is cast to anodes to be electrolytically refined in the tankhouse.

ANODE SHAFT FURNACE (ASF)

The anode shaft furnace consists of a small hearth furnace with a mounted shaft. The hot off-gases flow through the feed material in the shaft and heat it up in a countercurrent flow. As a result energy is saved in comparison with the conventional method. The firing system is divided into 3 burner sections (one of which is a pure oxygen-burner). The sections function independently of each other. By having one or more burners out of operation each area in the furnace can, as required, be heated to a different level.

The melting rate of the anode shaft furnace lies in the region of 50 - 100 t/h according to the ease of melting the charge and the oxygen enrichment.

The slag tapping opening is in the superheating area of the hearth furnace through which the slag is skimmed. The copper is tapped continuously and flows via a launder into the drum-type poling furnace.

POLING AND CASTING FURNACE (PCF)
The copper with a high oxygen content melted in the anode shaft furnace is deoxidized from 6000 g/t or even 9000 g/t to less than 1000 g/t of oxygen in the poling furnace. The poling furnace has a holding capacity of up to 80 tonnes of copper. The off-gas with a high proportion of unburnt gases is then afterburnt in a La-Mont boiler.

Two tuyeres using natural gas operate under the bath to pole the copper. The tuyeres and the taphole are situated so that poling and casting is continuous. The volume of poling gas that can be employed per tuyere is about 250 Nm3/h natural gas. The poled copper flows through a launder to two anode casting wheels.

OFF-GAS SYSTEM
For off-gas handling from the ASF and the PCF three ventilators with a total 140,000 m3/h suction rate are available, of which one is installed behind the waste heat boiler and the other two behind the filter.

A waste heat boiler and air preheater system is used to cool the combined off-gases of the ASF and PCF. The off-gases are finally ducted through a fresh air cooler, in which the off-gas temperature is further reduced by 80 to 100 deg C, and then injected through a conventional baghouse. The filter bags are cleaned with off-gas or fresh air, which flow via a ventilator countercurrent to the mainstream off-gas in the chamber which has to be cleaned.

The slag tap opening, copper taphole and forehearth, the launders and casting moulds are fitted with hoods under draught to avoid emissions. The skip hoist is covered and is also under draught. The whole volume of exhaust gases is taken straight into the filter.

AUTOMATIC CONTROL OF THE CONTIMELT PROCESS BY COMPUTER
The Contimelt plant is controlled by a central computer-HP 1000.

Koordinator

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