

# F-Series HPGR

## successful prospect for Ivrindi Gold

### The benefits of the HPGR for leaching

- Ability to produce a finer product PSD compared to conventional crushers
- Microcracking of the particles can lead to high (percent) recovery of minerals
- Microcracking enhances leach kinetics, resulting in faster recovery of the minerals

### Background and objective

Ivrindi Gold is a new mining and enrichment project in Western Turkey owned by TUMAD Mining Industry and Trade. The company chose to optimise its output with equipment that could deliver a large throughput. They performed a feasibility study that indicated heap leaching to be the suitable process for their site. Then they commissioned laboratory research to discover the type of equipment that was best suited for their process and material. Laboratory tests confirmed that they needed an HPGR.

The customer wanted a supplier they could trust to provide all major equipment they would need for their new plant, including a jaw crusher, a cone crusher, screens and other machinery. They chose to work with us because of the quality of FLSmidth equipment and technical support, and the positive relationship they had with our regional team.



We have been very happy with the performance of the F-Series HPGR from FLSmidth. It does exactly what we wanted it to do—it enables cost-effective gold recovery.

HASAN YÜCEL

General Manager of TUMAD Mining Industry and Trade

### Defining the project

The mine already knew that it needed a heap leaching process and that an HPGR would be an important part of their plant design. FLSmidth worked with them to establish the flowsheet of their process to attain the desired product size of -6 mm (-0.25 in) while also focusing on a large throughput.

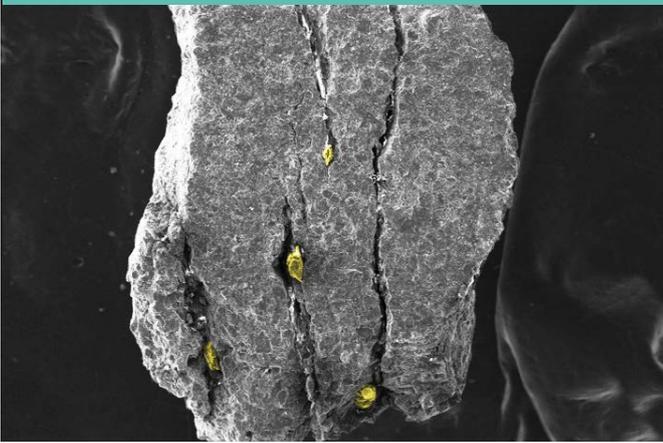
In addition to supplying, installing and commissioning the necessary equipment for the process, we committed to provide site service and training for site personnel.

# Exceptional equipment and technical support during every step of the process

## The solution

The F3200-W at Tümad was the first of our F-Series HPGRs. Large capacity units designed specifically for mining duty and could easily meet the 1139 MTPH fresh feed rate that Ivrandi Gold required. The HPGR exposes feed material to a high pressure for a short amount of time. This causes the rock to crack and cleave along grain boundaries. The pressure also causes microcracks in the remaining larger particles. Microcracks work like canals to get the leaching solution to trapped ores, and they increase the leach kinetics.

Lab photo of microcracked particle



## HPGR and plant design details

- HPGR and plant design details
- Model: F3200-W HPGR
- Roll dimensions: 2.2 m dia. x 1.5 m
- Installed power: 4000 kW (2 x 2000 kW)
- Ore type: gold ore with high quartz content
- Design capacity (fresh feed): 1139 tph
- Feed size: 45 mm x Ø
- Product size: -6 mm (screen underflow)

Ivrandi Gold is the proud owner of the of the biggest HPGR ever built for a gold heap leach operation and it is also the first HPGR in Turkey's mining industry.

## The results

We engineered, detailed, manufactured, delivered and installed the equipment within the project schedule despite snowy conditions encountered during transportation and installation. The project team headquartered in Ankara, Turkey and the engineering teams in Austria and the USA worked together to make this first of its kind HPGR a success.

The on-site team assembled the majority of the HPGR in approximately 30 days even though the weather was an obstacle. This accomplishment is due to both the expertise of the team and the F-Series frame design that is made for the easiest possible shipping and installation.

After successfully commissioning the HPGR and other equipment, we have continued to support Ivrandi Gold with other technical needs and supply the spare parts that keep their new plant running smoothly. Hasan Yucel, General Manager of TUMAD Mining Industry and Trade said, "FLSmidth has been a consistently reliable and dedicated technical partner, not only in terms of the technology supplied but also in the way they prioritise customer service throughout this project and continue to do so with services and spare parts.

### For the complete project, we supplied:

- Apron feeder—2.4 × 8.0 m (7.9 × 26.2 ft)
- Vibrating grizzly—BRU200/450
- Primary jaw crusher—TST 1900
- 3 double-deck Ludowici® screens—3.6 × 7.3 m (11.8 × 24.0 ft)
- Secondary cone crusher—Raptor® 1300
- Tertiary mill—F3200-W HPGR

As a direct result of the successful installation and operation of the F3200-W HPGR at Ivrandi Gold, two identical units were sold to a project in Russia in 2020.

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