

Wielki sukces



Powyżej: Pompa szlamowa Warman® AHF z systemem ciągłego usuwania powietrza (CARS)

Z prawej strony: Yara Siilinjärvi, Finlandia



BRANŻA

Wydobywca – fosforany

ZAMAWIAJĄCY

Yara Siilinjärvi, Finlandia

URZĄDZENIE

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Warman® froth pump helps make new technology project at Yara a success

Background

With around 12,000 employees in more than 50 countries, Yara is a worldwide supplier of mineral fertilisers, industrial chemicals and environmental protection products.

Yara's Siilinjärvi mine in Finland opened in 1979 and is Western Europe's only phosphate mine. Each year, the mine produces around 1,000,000 tonnes of phosphate (apatite concentrate), which is processed into phosphoric acid in Siilinjärvi, and further into fertilisers and feed phosphates in Yara's plants in Finland and Norway.

Weir Minerals has supported Yara Siilinjärvi for over 30 years and Warman® pumps are working successfully across the plant.

The Challenge

Recently, Yara introduced new flotation technology to improve the utilisation of fine particles from ore material at their mine.

Typically, ore extracted from the Yara mine contains 10 per cent apatite, 20 per cent

calcium carbonite and 65 per cent phlogopite, which is hard to separate. Chemicals have to be used in the separation process to help keep the froth stable, but sometimes the froth will not collapse and overflows, creating difficult unstable pumping conditions.

Pumping froth slurry is a challenging task for a centrifugal slurry pump especially in an unstable flotation process which suffers from the huge variations of FVF (Froth Volume Factor) up to 2.5.

Our standard horizontal Warman® 6 E-AHF froth pump was working well in stable conditions of FVF less than 1.5.

However in unstable conditions, when FVF exceeded 1.8, the pump was not working as efficiently and there was room for improvement.

The Solution

The Weir Minerals engineering team worked closely with the customer to trial design options aimed at improving the performance of the pump. There was a slight improvement, but it was not enough to cope with the extreme froth conditions.



Top: Warman® AHF Froth Pump with Continuous Air Removal System (CARS)

A recently designed pump had been engineered using Weir Minerals' leading edge technology and suited the customer's needs perfectly. The Warman® advanced centrifugal froth pump with CARS (Continuous Air Removal System) is designed to handle separation and removal of gas in a two-stage process.

In the first stage, the flow inducer blade of the pump impeller promotes movement of the froth slurry into the impeller eye, while creating pre-rotation for initial separation of high gas, containing fraction towards vent holes located on the impeller back shroud. A secondary inducer is shaft mounted and located behind the impeller, in the gas collection chamber.

In the second stage, the secondary inducer promotes axial movement of the gas containing mixture out of the chamber vent. At the same time, it rotates the mixture inside the chamber for additional separation of solids back to the process by the centrifugal action of the main impeller back vent. This arrangement does not rely on tight running clearances.

The Results

Adding innovative technology to the proven line of Warman® heavy duty froth pumps gave a stable performance, and there was no need for additional froth

volume factor reduction.

The superior efficiency of the new Warman® 6 E-AHFC pump design allowed the use of a smaller size motor. The pump enabled more efficient pumping, particularly for slurry with high FVF – up to 4.0 – and reacted quickly when the froth conditions changed, without air locking the impeller eye.

There was no product loss due to sump overflow and CARS venting back to the suction tank.

“Weir Minerals made a huge effort to solve our pumping problems. The new Warman froth pump has helped us complete the technology project and achieve maximum benefit from flotation without any restriction due to froth pump performance.”

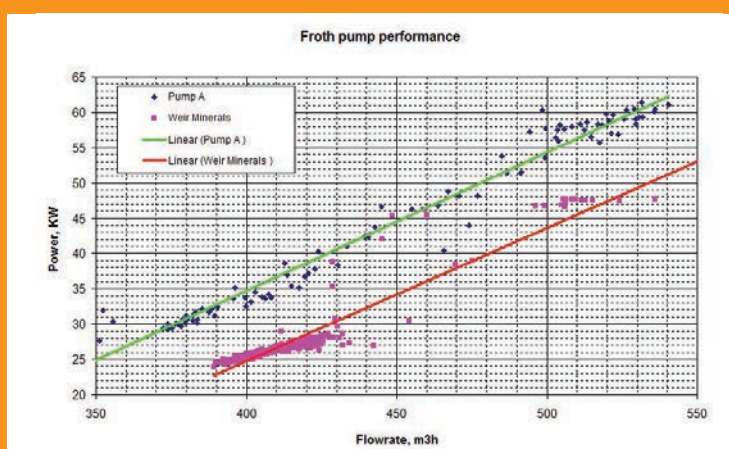
Olli Pere, Yara Project Manager at Siilinjärvi

Duty Information

Pump	6 E-AHFC
Flow	400 - 550m ³ /h
Head	13.0m
Slurry specific gravity	1.1
Pump speed	540rpm
Motor installed	45KW

THE PRODUCT

- Based on the Warman® AH™ or Warman® L series pump design
- Existing Warman® AH™ or Warman® L series pumps can be converted to Warman® AHF/MF/LF froth pumps with only a few modifications
- Inducer blade impeller for positive froth feed
- Enlarged high efficiency slurry throatbush to maximise the inlet size and reduce NPSH required
- Standard Warman® AH™ or Warman® L pump mounting and flange center lines
- Available in 2" through to 22" pump discharge sizes



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