
Welcome to
CJC MINING
Interactive Presentation
Crushers
Dump Trucks & Excavators
Drilling Rigs
Storage Tanks
Mills

CRUSHERS

The key equipment for effective production in a mine are the Primary, Secondary and Tertiary Crushers. They operate under extreme environmental conditions which can lead to badly contaminated oil and ISO cleanliness levels as high as 27/25. The recommended level should be 16/14 (100 times lower) if the crushers are to operate reliably and efficiently.

Cases

- Kumba Iron Ore's Sishen Mine South Africa
- Codelco, Chile
- Minera Escondida, Chile

Pay Back

- Pay Back, Codelco, Chile

Reference List

- Crushers

Gallery

- Images

Kumba Iron Ore's Sishen Mine
Gear Oil Symons CrusherSouth Africa

THE SYSTEM
7 Symons Crushers, 90 tonnes
Oil volume: 1400 L
Oil type: Gear Oil, ISO VG 150

THE PROBLEM
High ingress of dirt particles into the lube oil system through a water flow seal under the crusher head. Extreme metallic and dust particles contamination is always present in the crusher.

THE SOLUTION
CJC™ Filter Separator
PTU3 27/108 P-E2H1PW
Flow rate of 400 L/h,
2 x 4.4 kW pre-heaters
4 x BLAT 27/27,
Capacity 16 litres of contaminants and oxidation residues.

THE RESULT
FINANCIAL BENEFITS
Numerous benefits in wear reduction. Replacement of bronze bushings alone for each crusher costs EUR 35,000. Normally, each set would be replaced up to 2 times per year, but at Sishen they have only changed it one time per year after installation of the CJC™ Filter Separator.

	Before CJC™ Filtration	After Three Months of CJC™ Filtration
ISO Code	24/22	16/11
Water, PPM	52,000	40

Comment from:
Senior Tribologist at Anglo American, Mr. Dave J. Gamble:
The CJC™ Filter will release benefits as reduced downtime for maintenance, greatly reduced wear and consequent failures, increased availability, utilisation and production. All together, this results in extended oil life time.
This filter can easily clean the oil according to my recommendations, which is 16/14 on this type of application.

Corporación Nacional del Cobre Codelco
División El Teniente - Chile

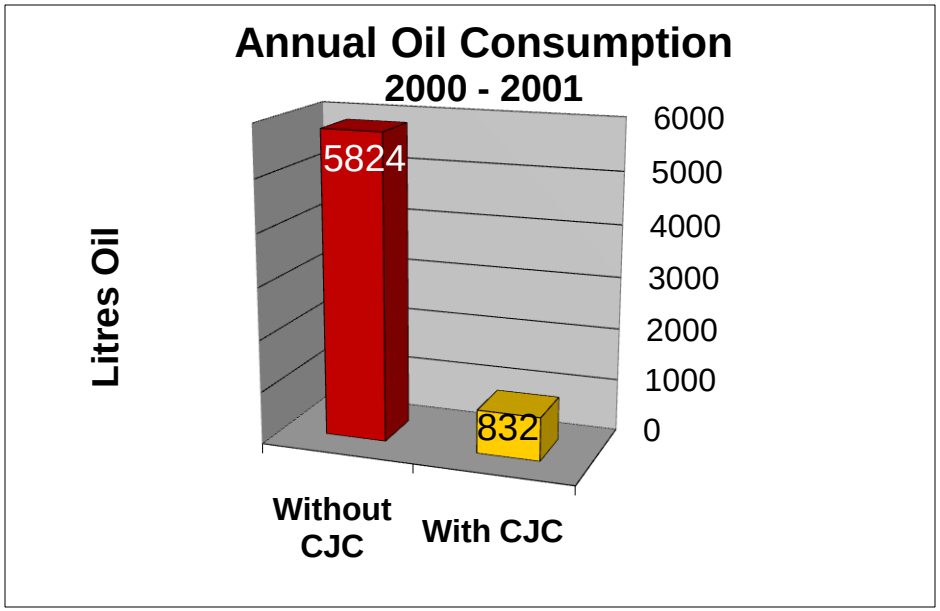
THE SYSTEM
Metso Symons 7. Cone Crusher
(for medium and fine crushing of minerals)
Oil volume: 1000 L
Oil type: ISO VG68

THE PROBLEM
The machinery is placed under high temperatures (40°C) in a very dusty environment resulting in high Oil contamination. At the same time the system present unexpected shutdowns.

THE SOLUTION
CJC™ Fine Filter HDU 27/54 P fitted with 2 CJC™ Filter Inserts B 27/27 (3 µm absolute).

Each CJC™ Filter Insert is capable of removing oxidation products, solid particles and water, and has a dirt holding capacity of 4 litres per insert.

THE RESULT
Test was performed at crushers No 3 without a CJC filter and crusher No 4 with a CJC filter running at the same time, showed that after 500 hours of filtration the oil consumption went down from 5,824 L to 832 L.



Minera Escondida Chile

THE SYSTEM

Mark: Fuller
Model: 60” x 89”
Oil volume: 4000 L
Oil type: ISO VG 320
Capacity: 6,000 Ton/h

THE PROBLEM

The system suffered from grossly contaminated oil resulting in oil changes every 30 to 60 days and frequent, costly spare part replacement. - ISO Code: 25/23/22

THE SOLUTION

CJC™ Fine Filter HDU 427/108 mounted with drain tank.
Pre-heater: 8.8 KW
Control panel with operation hour counter
Automatic air vent
Improve ISO Code – below 22/20/19
144 kg of solids is taken out 3-4 times per year utilizing CJC filter inserts

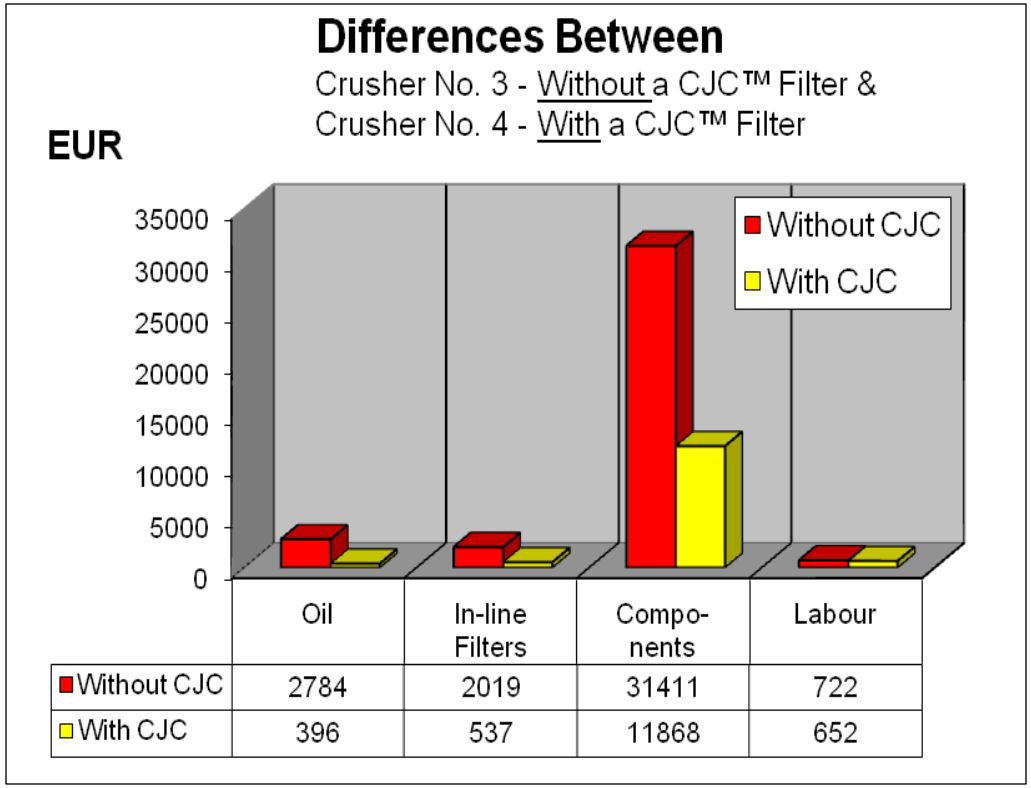
THE RESULT

With the CJC Off-line filtration the plant has less oil consumption, spare parts and less shutdowns in the itinerary lines.

Pay Back - Codelco, División el Teniente, Chile

Benefits For One Crusher

Item	Without CJC	EUR$	With CJC	EUR$
Oil, L	5,824	2,784	832	396
In-line Filters qty.	14	2,019	2	537
Components qty.	Gyratory inner Eccentric outer Socket liner 8	31,41 1	 3	11,868
Labour, hours	440	722	410	652
Total	36,936		**13,426**	

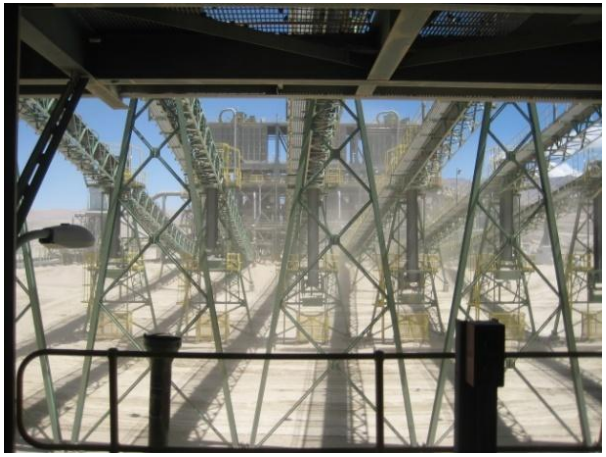


Savings per Year - With a CJC™ Offline Filter = 23,510 EUR

Extract of Reference List - CRUSHERS

Country	Customer	Site	Application	System Manufacturer	CJC™ Filter(s)	No of Filters
Australia	BHP	Area C Mine	Cone Crusher		HDU 27/54 P	2
Australia	Rio Tinto	Channer	Cone Crusher		PTU3 27/108 P	2
Australia	BHP	Mt Whaleback Mine	Cone Crusher		HDU 27/54 P	12
Australia	Tanami Gold Mine		Cone Crusher		HDU 27/27 P	2
Botswana	Debswana	Jwaneng Mine	Cone Crusher	IMS	HDU 27/81 MZ-E2PT	1
Botswana	Debswana	Jwaneng Mine	Cone Crusher	Symons	HDU 27/108 MZ-E2PT	1
Botswana	Debswana	Main Treatment Plant Jwaneng Mine	Cone Crusher	IMS	HDU 27/81 MZ-E2PT	1
Botswana	Debswana	Main Treatment Plant Jwaneng Mine	Cone Crusher	IMS	HDU 27/54 MZ-E2H1M	1
Botswana	Debswana	Plant No. 2 Orapa Mine	Cone Crusher	Symons	PTU3 27/54 P-EPTW	1
Canada	HudBay Minerals Inc.	Flin Flon	Cone Crusher	Symons	PTU2 27/27 PV-DE2H1PW	1
Canada	Teck Cominco Limited	Highland Valley Copper	Cone Crusher		HDU 27/27 M-85	5
Chile	Anglo	El Soldado	Cone Crusher	Symons	HDU 27/54 P	7
Chile	Anglo	Los Bronces	Cone Crusher	Symons	HDU 27/54 P	4
Chile	Anglo	Los Bronces	Cone Crusher	Symons	HDU 27/54	2
Chile	Anglo	Mineria Mantos Blancos	Cone Crusher	Symons	PTU3 27/81 MZ-EPW	1
Chile	CODELCO	Andina	Cone Crusher	Symons	HDU 27/54 P	3
Chile	CODELCO	El Teniente	Cone Crusher	Symons	HDU 27/54 P	11
Chile	CODELCO	El Teniente	Cone Crusher	Symons	HDU 15/25 PV	2
Finland	Talvivaara Mine		Cone Crusher	Sandvik	HDU 27/108 P-DP	1
Norway	Norsk Stein		Cone Crusher	Metso	HDU 27/27 P-P	4
Norway	Norsk Stein		Cone Crusher	Metso	HDU 27/27-E2H1	4
South Africa	Anglo	Frank	Cone Crusher	Symons	PTU3 27/81 P-E2PW	2
South Africa	Anglo	Klipcon	Cone Crusher	Symons	PTU3 27/81 P-E2PW	1
South Africa	Anglo	Rustenburg Section	Cone Crusher	Symons	HDU 27/81 P-DE2H1	1
South Africa	Anglo	Sishen Iron Ore	Cone Crusher	Symons	PTU3 27/81 MZ-E2H1PW	1
South Africa	Anglo	Vatenfall Concentrator	Cone Crusher	Symons	PTU3 27/81 P-E2PW	3
South Africa	Anglogold Ashanti	Savuka Gold Mine	Cone Crusher	Symons	HDU 27/81 P-E2H1P	1
South Africa	Anglogold Ashanti	Savuka Gold Mine	Cone Crusher	Symons	HDU 27/81 P-P	1
South Africa	Lonmin	Roland Concentrator	Cone Crusher	Symons	PTU3 27/54 P-EH1PW	3
South Africa	Lonmin	Roland Concentrator	Cone Crusher	Symons	HDU 27/81 P-DE2H1	1
South Africa	Lonmin	Western Platz Marinskie Plant	Cone Crusher	Symons	PTU3 27/81 P-E2PW	4

Gallery – CRUSHERS



Country:
Chile

Mine:
El Abra

Application:
Crusher

Country:
Chile

Mine:
El Abra

Application:
Crusher

Country:
Chile

Mine:
El Abra

Application:
Crusher

Country:
Chile

Mine:
Los Pelambres

Application:
Crusher

Gallery – CRUSHERS

Country:
Chile

Mine:
Escondida

Application:
Crusher

Country:
Chile

Mine:
Escondida

Application:
Crusher

Country:
Chile

Mine:
Cerro Verde

Application:
Crusher

Country:
South Africa

Mine:
Sishen Iron Ore

Application:
Crusher

Gallery – CRUSHERS

Country:
Finland

Mine:
Talvivaara

Application:
Sandvik Crusher

Country:
Finland

Mine:Talvivaara

Application:
Sandvik Crusher

Country:
Finland

Mine: Talvivaara

Application
Sandvik Crusher

DUMP TRUCKS & EXCAVATORS

Earth moving equipment operates under extreme operating conditions. The exposure to extreme weather, a dusty environment and high vibration can severely stress the sensitive system components.
The particle contamination in the oil is often very high. Problems also occur with moisture due to frequent start/stops. Furthermore, the harsh operation conditions cause oil degradation, leading to reliability issues and lost production.

Cases

- Sunrise Dam, Australia, CAT Dump trucks
- Minera Diputada, Chile
- Corporación Nacional del Cobre, Chile

Pay Back

- Sunrise Dam, Australia, CAT Dump trucks

Reference List

- Mobile Machinery

Gallery

- Images

Sunrise Dam, Anglo Gold Ashanti Australia CAT Dump Trucks

THE SYSTEM
Caterpillar 793C Dump Truck

THE PROBLEM
Harsh working conditions and oil extremely contaminated with dust from the transportation and storage. To reduce the contamination of the oil the client was changing the oil frequently.

THE SOLUTION
14 CJC™ Fine Filters HDU 15/25 PV

Mounted on
CAT 793C Dump Truck

Systems: Differential – Transmission – Hydraulic

Fine Filter HDU 15/25 PV
Inserts: BG 15/25
Pump: 45-120 Ltr/Hr
Motor: 24V DC

THE RESULT
- Low wear rates compared to pre-trial results
- Stabilized oil viscosities
- Reduced oil oxidization
- Reduced oil consumption

After the trial, a plan was implemented to install CJC™ Offline Filtration systems on all vehicles in the fleet

Compañia Minera Disputada de las Condes, "Los Bronces" , Chile

THE SYSTEM

Transmission system on the Dresser dumper Nº21.
Oil volume: 2 x 40 L
Oil type: Synthetic oil ISO VG 220

THE PROBLEM

Due to the harsh working conditions the oil was extremely contaminated with both wear metals and abrasive dust from the environment. The only way to reduce the contamination level was by changing oil frequently.

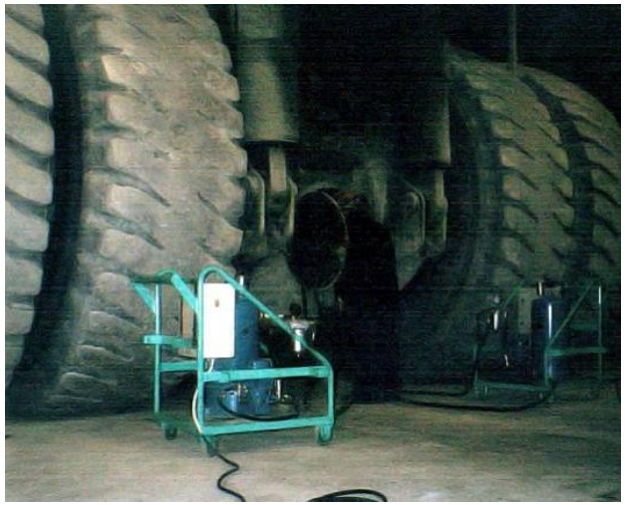
THE SOLUTION

In order to arrest the problems quickly two CJC™ Fine Filter HDU 27/54 EH1PTM were installed.

Inserts B 27/27

THE RESULT

After 45 minutes of filtration the oil contamination level decreased 3 ISO codes and iron was reduced by 37%.Theoretical the above reduction in contamination will result in 3 times longer lifetime on both transmission system and oil.



	Before	After
Particles > 5 µm	47,490	9,233
Particles > 15µm	967	43
ISO	23/17	20/13
Iron	61 ppm	38 ppm

Comments:
"The oil in the transmissions are cleaned up to the level of new oil in only 2 hours."

Corporación Nacional del Cobre Codelco/Finning Division Radomiro Tomic, Chile

THE SYSTEM

Lube oil system on the diesel engine of a Caterpillar excavator type D10R. Engine type 3412TA with a power output of 570 hp

Oil volume: 60 L
Oil type: 15 W 40

THE PROBLEM

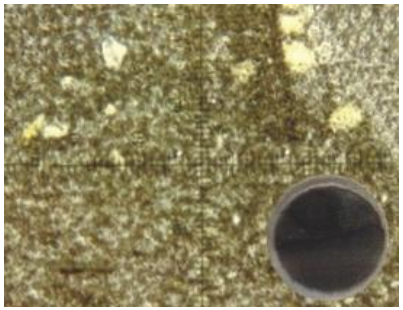
The customer experienced frequent failure of the injection pump due to high contamination of the lubricating oil.

THE SOLUTION

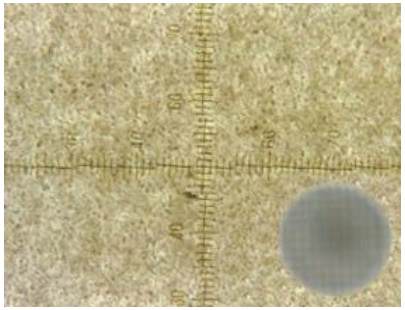
CJC™ Fine Filter HDU 27/27 PV with a 24 V DC motor installed off-line on the engine sump. Filter Insert A 27/27

THE RESULT

The filter unit has reduced the contamination to a level 4 times lower than when new oil was introduced. This has arrested the problem and increased the life time of the injection pump and oil dramatically.



Before CJC™ Filter



After CJC™ Filter

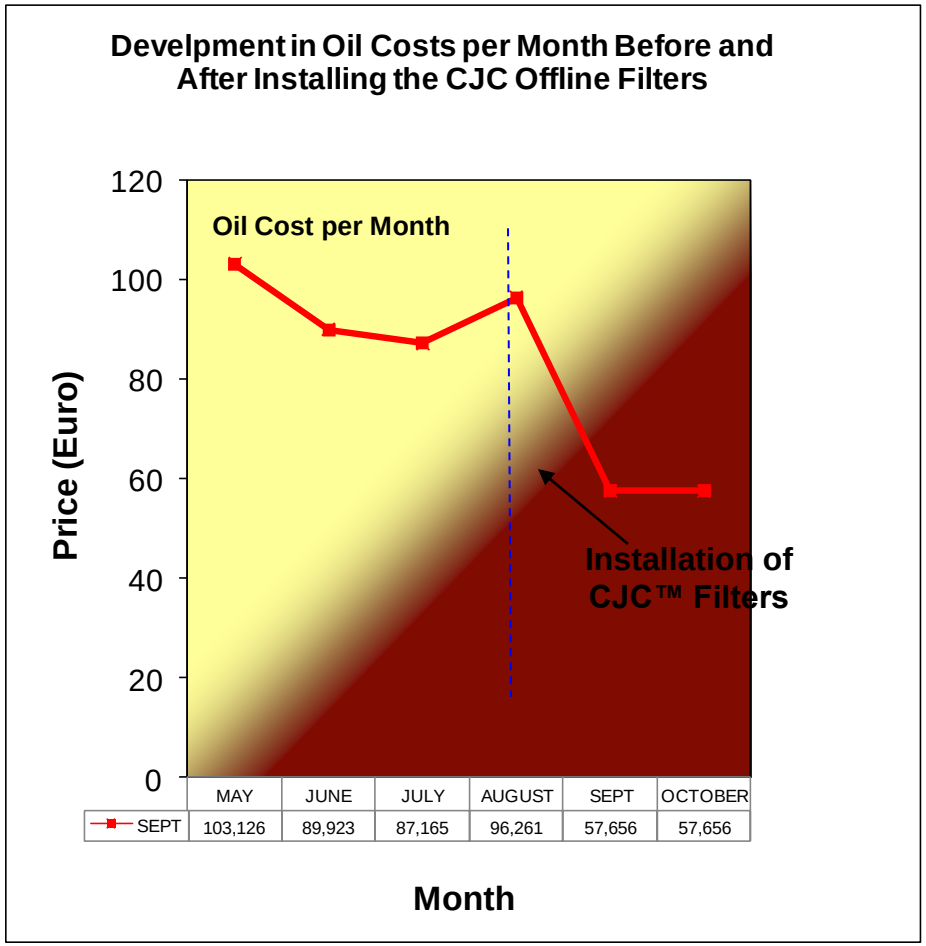
THE RESULT

	0 days New Oil	After 16 Days	After 23 Days
Particles > 5 µm	847,610	161,250	179,570
Particles > 15 µm	71,940	4,180	3,810
ISO	20/17	18/13	18/12
Insoluble, gr/L	0.663	0.519	0.210

Pay Back

Sunrise Dam, Australia CAT Dump Trucks

Reduce of oil costs:
45,470 Euro
per month



Extract of Reference List
DUMP TRUCKS & EXCAVATORS

Country	Customer	Site	Application	System manufacturer	CJC™ Filter System(s)	No of filter systems
Australia	Newmont	Callie Mine	Dump Truck (Rear axle)		HDU 27/54 P	2
Australia	KGCM		Dump Truck		HDU 15/25 PV	17
Australia	Mt Keith Leinster		Dump Truck		HDU 15/25 PV	1
Australia	Anglogold Ashanti	Sunrise Dam	Dump Truck		HDU 15/25 PV	21
Chile	Anglo	Los Bronces	Dump Truck	CAT	HDU 15/25 PV	3
Chile	Anglo	Los Bronces	Excavator (hydraulic)	LeTourneau	HDU 27/27 P	1
Chile	Anglo	Mineria Candelaria	Dump Truck	CAT	HDU 15/25 PV	2
Finland	E.Hartikainen		Excavator	Hitachi	HDU 15/25, VY	25
Finland	Talvivaara Mine		Dump Truck (hydraulic)	Hitachi	HDU 27/27 PV-P	1
Finland	Talvivaara Mine		Excavator (hydraulic)	Hitachi	HDU 27/27 PV-P	1
South Africa	Anglo	Sishen Iron Ore	Excavator (hydraulic)		HDU 27/27 P	1
South Africa	Anglo	Sishen Iron Ore	Excavator (lube)		HDU 27/27 PV	1

Gallery - Dump Trucks & Excavators

Country:
Chile

Mine:
Anglo, Los Bronces

Application:
Excavator

Country:
Chile

Mine:
Anglo, Los Bronces

Application:
Dump Truck

Country:
Chile

Mine:
Anglo, Los Bronces

Application:
Truck

Country:
Chile

Mine:
Diputada

Application:
Crusher

Gallery - Dump Trucks & Excavators

Country:
Chile

Mine:
Codelco, Salvado

Application:
Dump Truck

Country:
Chile

Mine:
Anglo, Soldado

Application:
Dump Truck

Country:
Chile

Mine:
Codelco
Chuquicamata

Application:
Dump Truck

Country:
Chile

Mine:
El Tesoro

Application:
Dump Truck

Gallery - Dump Trucks & Excavators

Country:
Chile

Mine:
Codelco

Application:
Dump Truck

Country:
Chile

Mine:
Codelco

Application:
Dump Truck

Country:
Chile

Mine:
Escondida

Application:
Dump Truck

Gallery - Dump Trucks & Excavators

Country:
Chile

Mine:
Codelco, Salvado

Application:
Dump Truck

Country:
Chile

Mine:
Anglo, Soldado

Application:
Truck

Country:
Chile

Mine:
Codelco
Chuquicamata

Application:
Dump Truck

Country:
Chile

Mine:
Codelco
Chuquicamata

Application:
Dump Truck

Drilling Rigs

Drilling Rigs in mines are operating under extremely rough environmental conditions leading to very contaminated oil systems. Recommended ISO level is 16/14, if the drilling equipment is to work reliably and effectively.

Seal failures in the cooling system cause water contamination, particle contaminations from dust, and oil degradation, all resulting in wear on cylinders and components as well as consequent frequent service and replacement of components.

Cases

- El soldado, Chile
- E. Hartikainen - Finland

Pay Back

- ISO Code & Life Extension

Reference List

- Drilling Rigs

Gallery

- Images

Compañia Minera Disputada “El Soldado” - Chile

El soldado, Chile
E. Hartikainen - Finland

THE SYSTEM

Drilltech drilling machine for the copper production site with a hydraulic system

Oil volume: 900L
Oil type: ISO VG 46 oil

THE PROBLEM

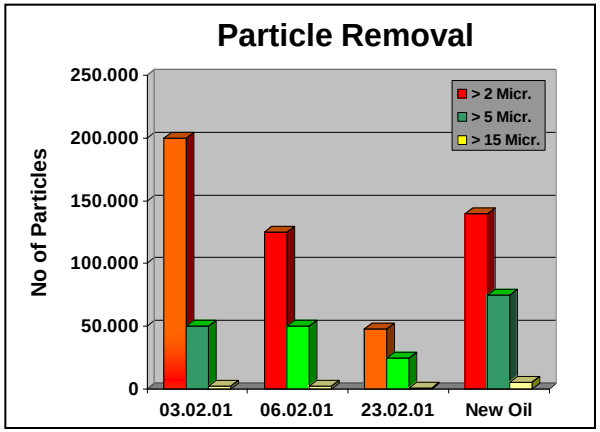
The cleanliness level of the hydraulic system in the drilling machine was 2½ times above the recommended level.
Water: 209 ppm
ISO Class: 18/16/14

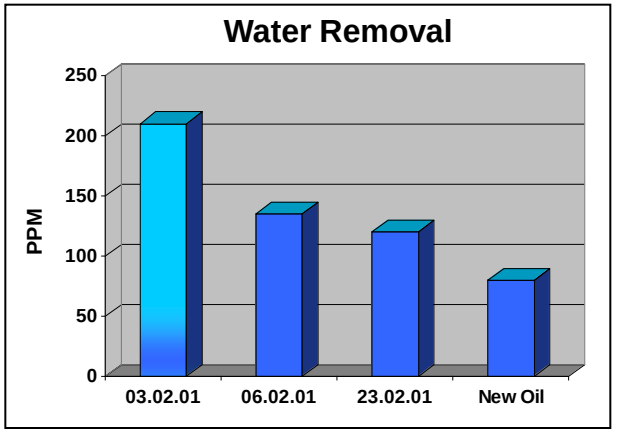
THE SOLUTION

CJC™ Fine Filter HDU 27/27 PH was installed off-line on the system tank. The Fine Filter is equipped with a **CJC™ Filter Insert B 27/27**.

THE RESULT

After 15 days of continuous operation utilizing the CJC™ Fine Filter the particles larger than 2 micron had decreased from 201,000 to 41,000 particles per 100 ml of oil, which corresponds to ISO class 16/15/10. This is cleaner than new oil supplied by oil companies and the recommended cleanliness classes for the hydraulic systems.





Atlas Copco Drill Rigs
E. Hartikainen - Finland

THE SYSTEM

Atlas Copco Drill Rigs

Oil volume: 400 litres
Oil type: Mobil DTE M 13
Viscosity: ISO VG 32 cSt

THE PROBLEM

The drill rigs are working in a very rough and dusty environment resulting in very high contamination level of the oil - way above the recommended level.

This lead to unforeseen breakdowns.

THE SOLUTION

CJC™ Fine Filter HDU 15/12
Insert: BG 15/12
Motor: 3x400V, 50Hz
Pump flow: 20 L/h
Motor: 24V DC

After 6 month of filtration with CJC the oil cleanliness is **ISO 13/12/10**, which is very good and exceeds the recommended levels

THE RESULT

	Before filter installation	After 1 Month	After 6 Months
Type of oil	Mobil DTE M 13	Mobil DTE M 13	Mobil DTE M 13
Particles > 2 µm	596.344	78.242	6.868
Particles > 5 µm	265.512	39.762	3.220
Particles > 15 µm	43.150	3.850	975
ISO	**20/19/16**	**17/16/12**	**13/12/10**

ISO Code & Life extension, “El Soldado” - Chile

Current Machine Cleanliness (ISO Code)	Expected Cleanliness level (ISO Code)									
	21/19/16	20/18/15	19/17/14	18/16/13	17/15/12	16/14/11	15/13/10	14/12/9	13/11/8	12/10/7
24/22/19	2 1.6 1.8 1.3	3 2 2.3 1.7	4 2.5 3 2	6 3 3.5 2.5	7 3.5 4.5 3	8 4 5.5 3.5	>10 5 7 4	>10 6 8 5	>10 7 10 5.5	>10 >10 >10 8.5
23/21/18	1.5 1.5 1.5 1.3	2 1.7 1.8 1.4	3 2 2.2 1.6	4 2.5 3 2	5 3 3.5 2.5	7 3.5 4.5 3	9 4 5 3.5	>10 5 7 4	>10 7 9 5.5	>10 10 10 8
22/20/17	1.3 1.2 1.2 1.05	1.6 1.5 1.5 1.3	2 1.7 1.8 1.4	3 2 2.3 1.7	4 2.5 3 2	5 3 3.5 2.5	7 4 5 3	9 5 6 4	>10 7 8 5.5	>10 9 10 7
21/19/16		1.3 1.2 1.2 1.1	1.6 1.5 1.5 1.3	2 1.7 1.8 1.5	3 2 2.2 1.7	4 2.5 3 2	5 3 3.5 2.5	7 4 5 3.5	9 6 7 4.5	>10 8 9 6
20/18/15			1.3 1.2 1.2 1.1	1.6 1.5 1.5 1.3	2 1.7 1.8 1.5	3 2 2.3 1.7	4 2.5 3 2	5 3 3.5 2.5	7 4.6 5.5 3.7	>10 6 8 5
19/17/14				1.3 1.2 1.2 1.1	1.6 1.5 1.5 1.3	2 1.7 1.8 1.5	3 2 2.3 1.7	4 2.5 3 2	6 3 4 2.5	8 5 6 3.5
18/16/13					1.3 1.2 1.2 1.1	1.6 1.5 1.5 1.3	2 1.7 1.8 1.5	3 2		
17/15/12						1.3 1.2 1.2 1.1	1.6 1.5 1.5 1.4	2 1		
16/14/11							1.3 1.3 1.3 1.2	1 1		
15/13/10								1.4 1.2 1.2 1.1	1.8 1.5 1.6 1.3	2.5 1.8 2 1.6

Hydraulics and Diesel Engines | Rolling Element Bearings

Journal Bearings and Turbo Machinery | Gear Boxes and others

Before	After
18/16/13	16/15/10

Extract of Reference List
DRILLING RIGS

Country	Customer	Site	Application	System manufacturer	CJC™ Filter System(s)	No of filter systems
Australia	BHP	Area C Mine	Drilling Rig		HDU 27/27 PV	4
Australia	Beta Hill Decline		Drilling Rig	Sandvik	HDU 15/25 PV	1
Australia	Guildford Mine		Drilling Rig		HDU 27/54 MZ	2
Australia	Paraburdoo Mine		Drilling Rig		HDU 27/27 PV	4
Chile	Anglo	El Soldado	Drilling Rig	Drilltech	HDU 27/27 P	2
Chile	Finning CHILE	Codelco - RT	Drilling Rig	CAT	HDU 27/27 P	4
Chile	Finning CHILE	Los Pelambres	Drilling Rig	CAT	HDU 27/27 P	2
Chile	Minera Michilla	Tocopilla	Drilling Rig	CAT	HDU 27/27 P	4
Finland	E. Hartikainen		Drilling Rig	Atlas Copco	HDU 15/25 VY (by-pass)	2
Finland	Kalliorakennus		Drilling Rig	Sandvik	HDU 15/25	2
Finland	YIT		Drilling Rig	Sandvik	HD HDU 15/25 PV-P	1
Finland	Skanska		Drilling Rig	Junttan	HDU 15/25	1
Finland	SRV Viitoset		Drilling Rig	Normet	HDU 15 /25	1
Germany	Bergbau-Bohrgesellschaft Rhein-Ruhr mbH	Recklinghausen	Drilling Rig		HDU 27/27	1
Germany	Gewerkschaft Walter	Essen	Drilling Rig		HDU 27/27	3
Germany	Gewerkschaft Walter	Essen	Drilling Rig		HDU 27/54	3

Gallery - DRILLING RIGS

Country:
Chile

Mine:
Anglo, El Soldado

Application:
Drilling Rig

Country:
Chile

Mine:
Collahuasi

Application:
Drilling Rig

Country:
Chile

Mine:
Collahuasi

Application:
Drilling Rig

Country:
Chile

Mine:
Collahuasi

Application:
Drilling Rig

Gallery - DRILLING RIGS

Country:
Chile

Mine:
Radomirotomic

Application:
Drilling Rig

Country:
Chile

Mine:
El Soldado

Application:
Drilling Rig

Country:
Chile

Mine:
Pelambres

Application:
Drilling Rig

Storage Tanks

Oil delivered to storage tanks is generally contaminated with particles, water and sludge. Oil cleanliness levels of ISO 23/21/19 are common.

Installation of a CJC™ Offline Filtration System will clean the oil in the tanks to the cleanliness level required by the machine manufacturers (trucks, dozers, excavators). The recommended ISO cleanliness level is 19/16/13, which enhances the performance of the machinery immediately.

Cases

- Minera el Tesoro, Antofagasta, Chile
- Diesel Storage Tank, Gas turbine
- Minera candelaria, Shell, Chile

Pay Back

- Diesel filtration Thermoelectric, In-line vs Depth Filters

Reference List

- Storage Tanks

Gallery

- Images

Minera el Tesoro, Antofagasta - Chile

THE SYSTEM

Four tanks for storage of new oil.

Tank volume: 10,000 L each
Oil type: SAE 10-30-60 and 15W40

Tanks are topped-up with 5,000 L of new oil every 15 days.

THE PROBLEM

When the oil arrives in trucks it is highly contaminated from the transportation process. Caterpillar and other manufactures of earth moving equipment recommend a cleanliness code of ISO 16/13, with the purpose of maintaining the reliability and economical operation of their equipment, i.e. drilling machines, dumpers etc

THE SOLUTION

The installation of a **CJC™ Fine Filter** on each tank

Filters installed:

SAE 10: **HDU 27/81 MZ-EPT**
SAE 30: **HDU 27/108 MZ-EH1PT**
SAE 60: **HDU 2x27/108 GP- EH1P**
15W40: **HDU 27/108 MZ-EPT**

CJC™ Filter Insert B 27/27:
Dirt holding capacity: 4 kg
Water absorption capacity: 2 L

Cleanliness Level of New Oils	
Type of Oil	**ESSO Lab.**
	ISO 4406 C Laser
Essotrans 10W	18/15/11
Essotrans 30W	18/16/14
Essotrans 60W	20/18/13
Essolube XT3 W0	21/18/13

ESSO Chile:

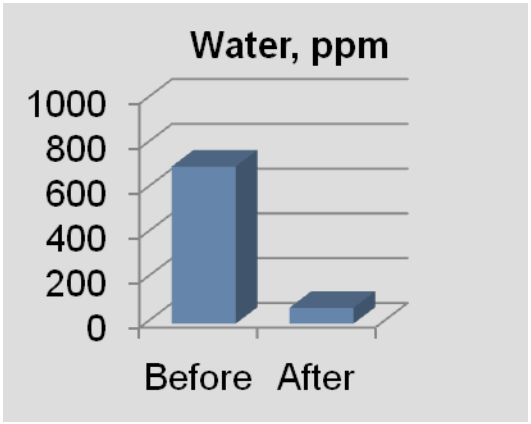
The benefits of a filter system maintaining the clean oil as described, and in combination with a suitable mechanical pumping system, can be seen in the extended lifetime of mechanical components of the earth moving equipment. This is partially due to the substantial reduction of particles greater than 6 micron.

Diesel Storage Tank, Gas Turbine

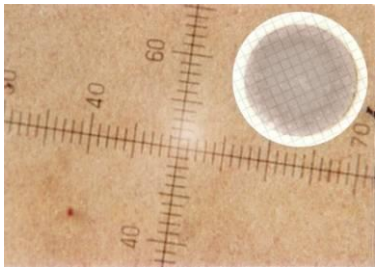
CUSTOMER
Power Station, Ireland

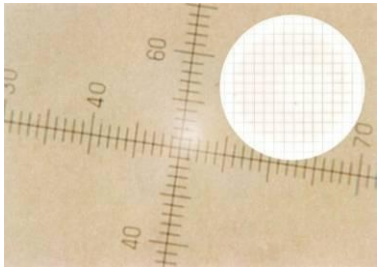
THE SYSTEM
Diesel backup storage tank.
Tank volume: 10,000,000 L

THE PROBLEM
3 times every year the power station run their gas turbine for 3-5 days on diesel to test their gas supply failure plan. Unfortunately, the diesel quality was not up to standard level for use in the turbine. The power station had no choice but to clean the oil. Large amounts of water, diesel bugs (microbial contamination) and particles were detected in the diesel oil, plus high levels of sodium and potassium.



THE SOLUTION
A **CJC™ Filter Separator PTU3 2x27/108 MZ** with a pump flow of 1,680 L/h was installed





	Before	After
ISO Code	15/14/11	15/13/10
Particles, 2 µm	28860	17041
Particles, 5 µm	13468	7696
Particles, 15 µm	1040	650
Water, ppm	702	71

Minera Candelaria
Shell - Chile

THE SYSTEM

Storage tanks for bulk oil filtration.
Tank: From 6 to 30 m^3

THE PROBLEM

The environment where the tanks are situated is highly contaminated with dust and the construction of the tanks is just as bad as the maintenance.

THE SOLUTION

CJC™ Fine Filters were installed:

- HDU 2 x 27/108
- HDU 27/108
- HDU 427/81

With the following accessories:

- Base tank
- Heater for oils SAE 30-50-60 and 15W40
- Optional heater for SAE 10
- Hour recorder
- Full control panel
- Air vent

THE RESULT

The requirements from Finning CAT to the Chilean mining company was ISO code 16/13 (18/16/13). After 8 days of operating the CJC offline Fine Filters they achieve an ISO code 14/12/8.

Number of particles per 100 ML	> 2 µm	9030
	> 5 µm	3283
	> 15 µm	226
Colour of Millipore membrane		White
ISO classification acc. 4406		**14/12/8**

Result after 8 days of Operation - 12 M3

Pay Back - Diesel Filtration Thermoelectric

CJC™ Off-line filters installed at Cenelca SA Valdivia, Chile in 2008.
Purpose was to:

- Improve the cleanliness code of the diesel by the CJC™ filters
- Reduce the consumption of the in-line filters
- Protection of the diesel injectors

After installation we did a comparison of costs with in-line and depth filters, and the result was as follows:

Pay back - Diesel Filtration Thermoelectric

Consumption of In-line Filters BEFORE installation of CJC™

2 x filters per day:

2 filters x 365 days = 730 Filters / year

Price each **EUR 378,-**

Running Cost per year:
EUR 275.940,-

Consumption of In-line Filters and CJC™ Depth Filters AFTER CJC™ Installation

Consumption of CJC™ filters: 34 filter changes per year

Cost of one filter change for HW 427/108 (16 inserts): EUR 4.104,-

34 filters x EUR 4.104,- = **EUR 139.536,-**

Consumption of In-line Filters after installation of CJC: 15 filters = **EUR 5.760,-**

Cost of CJC™ Investment:
50 m^3 = **EUR 102.525.-**

Running Cost per year:
EUR 145.296,-

Pay back time :

Less than a year

(only with savings on in-line filters)

Extract of Reference List
STORAGE TANKS

Country	Customer	Site	Application	System manufacturer	CJC™ Filter System(s)	No of filter systems
Australia	Rio Tinto	Argyle Mine Site	Storage Tank		HDU 2x27/108 GP	8
Australia	Paraburdoo Mine		Storage Tank		HDU 4x27/108 MZ	8
Chile	BHP	Minera Esperanza	Storage Tank		HDU 27/108 MZ	4
Chile	BHP	Minera Spence	Storage Tank		HDU 27/108	4
Chile	BHP	Minera Spence	Storage Tank		HDU 427/81 MZ	1
Chile	ESSO CHILE	Mantos Blancos	Storage Tank		HDU 2 X 27/108 GP	1
Chile	ESSO CHILE	Minera Quebrada Blanca	Storage Tank		HDU 27/81 MZ	1
Chile	ESSO CHILE	Tesoro	Storage Tank		HDU 27/81 MZ	1
Chile	ESSO CHILE	Tesoro	Storage Tank		HDU 27/108 MZ	2
Chile	ESSO CHILE	Tesoro	Storage Tank		HDU 2 x 27/108 GP	1
Chile	SHELL CHILE	Candelaria	Storage Tank		HDU 27/108 MZ	4
Chile	SHELL CHILE	Candelaria	Storage Tank		HDU 2 x 27/108 GP	1

Gallery - STORAGE TANKS

Country:
Chile

Mine:
El Tesoro

Application:
Storage Tanks

Country:
Chile

Mine:
El Tesoro

Application:
Storage Tanks

Country:
Chile

Mine:
Escondida

Application:
Storage Tanks

Country:
Chile

Mine:
Escondida

Application:
Storage Tanks

MILLS

Mills in mines operate under extremely rough environmental conditions leading to very contaminated oil that results in high ISO classes. The recommended ISO cleanliness level of the oil is 19/16/13, if the mills are to work reliably and effectively, and thereby add to a profitable production.

Typically, the CJC™ Fine Filters, Filter Separators, and Desorbers are installed on the lube oil systems containing 400-10,000 L of oil.

Cases

- Disputada Los Condes, Chile
- Pyhäsalmi Mine, Finland

Pay Back

- ISO Code & Life Extension

Reference List

- Mills

Gallery

- Images

Disputada de Las Condes CMD
Faena Los Bronces, Chile

Las Condes, Chile
Pyhäsalmi Mine, Finland

THE SYSTEM
Ball Mill SAG
Main lubricating system

Tank: 6,000 L
Oil: ISO VG 150

THE PROBLEM
The oil was highly contaminated with pulp (ore-silica-water). The contamination caused numerous of production stops

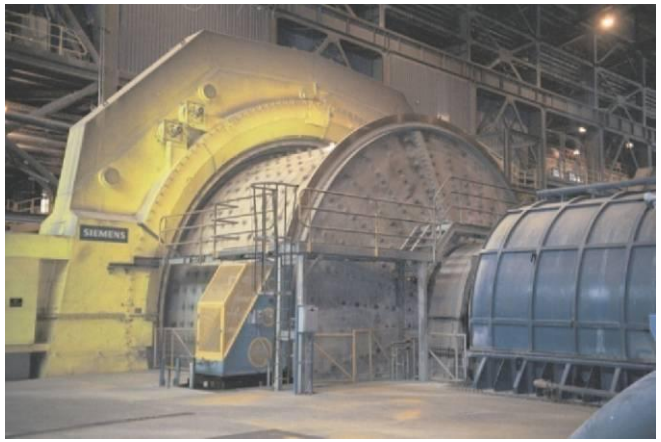
THE SOLUTION
2 CJC™ Fine Filter HDU 27/54.

Dirt holding capacity: 8 kg each
Heater: 3 kW
Pump flow: 400 litres/hour

THE RESULT
The oil was passed through the filter only once. After seeing the instant visual improvement of the oil CMD authorised payment for two CJC units.

The cost to CMD inclusive of spares was US$ 10,000.

In 5 days the oil and storage tank was cleaned, avoiding any production stoppages, which would have cost in the region of US$ 90,000.



Mr. Fernando Cavassa C, Grinding maintenance chief - CMD L.B.:
"The equipment was installed just to clean the oil periodically. However, due to the outstanding results, it has been installed to operate continuously."

Particles per 1 mL	Before CJC™ Filter	After CJC™ Filter	Tank, 5 days	Silica ppm	Iron ppm
2 - 5 µm	*)	*)	70,795	49	25
5-15 µm	697,670	42,317	18,877	13	8
15-25 µm	197,066	6,396	59	16	8
ISO Code 4406/1999	*/27/25	24/23/20	24/21/13	*) = uncountable	

Pyhäsalmi Mine
Finland

Las Condes, Chile
Pyhäsalmi mine, Finland

THE SYSTEM
Ball Mill SAG
Main lubricating system

Tank: 400 L
Oil: Mobil ISO VG 220 cSt

THE PROBLEM
The only way to reduce the contamination level was by changing oil every six months.

THE SOLUTION
CJC™ Fine Filter HDU 27/27 PV-DP

Insert: 1 x B 27/27

Pump: PV4-18-4 120 L/h

Motor: 3 x 400V, 50Hz

THE RESULT
The CJC Fine Filter has reduced the oil contamination to almost a tenth. This has arrested the problem and increased the life time of oil dramatically.
Theoretically the machine component life has increased by a factor of 1.5
(see next page)

	Before	After
ISO Code	20/19/14	17/15/10
Particles, 2 µm	578215	64454
Particles, 5 µm	315536	25012
Particles, 15 µm	8795	741

Cleanliness Level
ISO Codes & Life extension

Current Machine Cleanliness (ISO Code)	Expected Cleanliness level (ISO Code)									
	21/19/16	20/18/15	19/17/14	18/16/13	17/15/12	16/14/11	15/13/10	14/12/9	13/11/8	12/10/7
24/22/19	2 1.6 1.8 1.3	3 2 2.3 1.7	4 2.5 3 2	6 3 3.5 2.5	7 3.5 4.5 3	8 4 5.5 3.5	>10 5 7 4	>10 6 8 5	>10 7 10 5.5	>10 >10 >10 8.5
23/21/18	1.5 1.5 1.5 1.3	2 1.7 1.8 1.4	3 2 2.2 1.6	4 2.5 3 2	5 3 3.5 2.5	7 3.5 4.5 3	9 4 5 3.5	>10 5 7 4	>10 7 9 5.5	>10 10 10 8
22/20/17	1.3 1.2 1.2 1.05	1.6 1.5 1.5 1.3	2 1.7 1.8 1.4	3 2 2.3 1.7	4 2.5 3 2	5 3 3.5 2.5	7 4 5 3	9 5 6 4	>10 7 8 5.5	>10 9 10 7
21/19/16		1.3 1.2 1.2 1.1	1.6 1.5 1.5 1.3	2 1.7 1.8 1.5	3 2 2.2 1.7	4 2.5 3 2	5 3 3.5 2.5	7 4 5 3.5	9 6 7 4.5	>10 8 9 6
20/18/15			1.3 1.2 1.2 1.1	1.6 1.5 1.5 1.3	2 1.7 1.8 1.5	3 2 2.3 1.7				6 5
19/17/14				1.3 1.2 1.2 1.1	1.6 1.5 1.5 1.3	2 1.7 1.8 1.5				5 1.5
18/16/13					1.3 1.2 1.2 1.1	1.6 1.5 1.5 1.3				4 1.5
17/15/12						1.3 1.2 1.2 1.1				1.5 1.2
16/14/11										2 1.8
15/13/10								1.4 1.2 1.2 1.1	1.8 1.5 1.6 1.3	2.5 1.8 2 1.6

Hydraulics and Diesel Engines	**Rolling Element Bearings**
Journal Bearings and Turbo Machinery	**Gear Boxes and others**

Before:	20/19/14
After:	17/15/10

Extract of Reference List
MILLS

Country	Customer	Site	Application	System Manufacturer	CJC™ Filter(s)	No. of Filter(s)
Chile	Anglo	Mineria Mantos Blancos	Mill	FLS	HDU 27/27 P	3
Chile	Anglo	Los Bronces	Mill	FLS	HDU 27/54 P	5
Chile	CODELCO	ANDINA	Mill	FLS	HDU 27/108 MZ-E2PT	1
Chile	CODELCO	Chuquicamata - Planta SAG	Mill	FLS	HDU 27/54	2
Chile	CODELCO	Chuquicamata - Planta SAG	Mill	FLS	HDU 2X27/108	1
Chile	Lusic	Pelambres	Mill	FLS	HDU 2 x 27/81	1
Chile	Lusic	Pelambres	Mill	FLS	HDU 15/25 PV	1
Chile	FMI	Mineria Candelaria	Mill	FLS	HDU 427/54	2
Chile		Minera Meridian	Mill	FLS	HDU 27/54 P	1
Finland	INMET	Pyhäsalmi Mine	Mill		HDU 27/27 PV-P	1
Finland	INMET	Pyhäsalmi Mine	Mill		HDU 15/25 PV	1
South Africa	Lonmin	Western Platz Marinskie Plant	Mill		HDU 27/27 PV	1

Gallery - MILLS

Country:
Chile

Mine:
Mantos blancos-Anglo

Application:
Mills

Country:
Chile

Mine:
Mantos blancos-Anglo

Application:
Mills

Country:
Chile

Mine:
Mantos blancos-Anglo

Application:
Mills

Country:
Chile

Mine:
Codelco

Application:
Mills

Gallery - MILLS

Country:
Chile

Mine:
Los Pelambres

Application:
Mills