CJC™ Mining Sector

Oil Filtration Systems for removal of particles, water and oil degradation products from hydraulic fluids, lubrication oils and diesel fuel oils

"Maximum Uptime of Your Mining Equipment"

Rough Environment

FACT: The Condition of Oil will

C.C.JENSEN
Cleaning oil for more than 60 years.

Availability & Reliability
80% of all system breakdowns are related to contaminated oil. Clean oil helps you avoid downtime.

Most Common Benefits:

- Cleaning oil, tanks, gearboxes and systems while they are in operation
- Reduced downtime – less planned as well as unscheduled shutdowns
- Industry lowest cost per kilo dirt removed
- Short pay-back time
- Reduced maintenance costs
- Enhanced process stability and efficiency
- Reduced wear on pumps, cylinders, bearings, etc.
- Avoid diesel bugs
- Increased oil and component lifetime
- Significant reduction in use of in-line filters (up to several hundred percent reduction)

Crushers

Lube oil, gear oil hydraulic oil

Extreme contamination of the oil systems with particles and water causes critical downtime and high replacement costs for these cost-intensive components. It is common to see crusher shutdowns because dirt needs to be shovelled out of the tanks.

Mills

Lube oil, gear oil

Huge loads on bearings and gears lead to wear. Dirt and water ingress damage the system components. Depending on the process, increased temperatures can also accelerate the oil ageing. It is common to see mill shutdowns because dirt needs to be shovelled out of the tanks.

Dump Trucks & Excavators

Hydraulic oil, gear oil, lube oil, diesel fuel oil

Changing operation conditions and rough environments entail dirt and condensate in the oil. Unclean diesel destroys needle valves and injector pumps rapidly. Unclean oil and varnish seize proper operation of hydraulic systems. Diesel bugs block in-line pressure filters.

Drilling Equipment

Hydraulic oil

Dirt and water in the oil systems cause wear, corrosion and erosion on pumps, cylinders and valves. Oil degradation products result in malfunction of critical components.

- Smooth Filtration

Determine Uptime and Life of Machinery!

If You Think...

- You have to shut down your system three times or more per year to shovel out dirt from tanks, *or*
- You change in-line filters almost daily, *or*
- You have to change bearings two or three times per year

... then we have News for You!!!

Transformers

Tap changer oil, transformer cooling oil

Too high soot level in the tap changer reduces the oil's resistivity which enables electric short circuits. Too high water level in the transformer cooling oil indicates significantly higher water level in the paper insulation. Water destroys the insulation paper which will force the transformer to be taken out of service.

Conveyor Belts

Gear oil, hydraulic oil

In addition to the dirt ingress from the environment, gear and hydraulic oil systems in conveyor belts are contaminated with wear particles and oil degradation products.

Mineral Processing

Hydraulic oil

In every stage of mineral processing, maintenance of the fluid systems can enhance process stability and efficiency.

Storage Tanks

Lube oil, hydraulic oil, and diesel fuel oil

Oil and fuel are already contaminated with particles and condensate by transportation and transferring. During storage, diesel can additionally be polluted with microbes due to high condensation from transfer and transportation. Diesel will during storage form water condensate, which will create microbes (diesel bugs).

What do we do differently than other filtration systems?

- We clean oil, tanks, gearboxes and systems while they are in operation
- We remove particles, water and varnish
- We filter down to 0.8 micron
- Our filters have industry highest dirt holding capacity
- Filter insert can be changed without system shutdown
- We do not only clean the oil, but also remove dirt from your tanks, pipes, gearbox, etc.
- Since our filters also clean the entire system, we typically eliminate up to 80% of shutdowns because cleaning tanks is no longer needed

Risk of Failure on Your

Nowhere are the level of contamination and

The Main Cause for Equipment Breakdown

80% of all breakdowns, machinery repair and maintenance costs are caused by too highly contaminated system oils and fluids. Hydraulic fluids, lube oil and fuel carry destructive solids, corrosive sediments and water to the various sensitive components of the system. Since mining is an extremely dirty and rough environment, proper oil care will have significant impact on reliability and lifetime of equipment and fluids ►

CJC™ PTU3 27/81

CJC™ HDU 2x27/108

Crushers

The key equipment for effective production in a mine are the primary, secondary and tertiary crushers.

This equipment operates under extreme environmental conditions which can lead to badly contaminated system with ISO cleanliness levels as high as 29/27/25. The recommended level should be 18/16/14 (100 times lower) if the crushers are to operate reliably and efficiently.
Seal failures cause water and particle contamination and oil degradation. The combination of all contaminants results in wear of system parts and component failure and frequent oil changes.
These failures lead to unscheduled stoppages and unbudgeted replacement of parts. This is particularly relevant for sensitive components such as bushings, socket liners and bevel gears. Most importantly, the effect of contaminated oil is down-time and lost production!

When CJC ™ Offline Oil Filters have been installed on crushers, there is no need to shovel dirt out of the tanks!!

CJC™ HDU 27/108

CJC™ Desorber D30

Mills

Mills in mines operate under extremely rough environmental conditions

Operating under extremely rough environmental conditions leads to very contaminated oil resulting 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, in order to match recommended cleanliness.

The lube oil system is most often contaminated by oil degradation products, silica dust, and water. The result of this contamination can be extremely expensive repair and downtime. The most sensitive components are bearings and bronze bushings found in the system.

Mining companies, who have installed CJC™ Oil Filters on their mills, have saved 50% in maintenance costs due to longer lifetime of equipment and critical parts!

Mining Equipment

cost of downtime as high as within mining!

► The main cause is wear induced by contamination through solid particles, water and oil degradation products. Oil degradation products - "soft contaminants" - are precursors to the sticky varnish that deposits on metal surfaces. It is a common perception that in-line oil filtration is sufficient. However it is the smaller particles - below 10 micron - which do most harm to a system. You will only see the real effect of oil filtration once you remove the small particles.

Clean Oil is a Must!

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.
Moisture and condensate is formed due to frequent start/stops.
Furthermore, the harsh operation conditions cause oil degradation, leading to reliability issues and lost production.
By installing CJC™ Filters these problems will be reduced to a minimum.
Sensitive components such as hydraulic pumps, motors, transmission gears, steering systems and injector pumps will operate more efficiently and for longer hours, thus increasing reliability and equipment lifetime.
For all systems, it is possible to reduce oil changes and maintenance costs, thereby achieving fast pay back on investment!
In cases where a permanent filter cannot be installed, a mobile flushing unit can clean the vehicle's oil systems while it is in for service.

For all systems, it is possible to reduce oil changes and maintenance costs, thereby achieving fast pay back on investment!

CJC™ Heavy Duty Series:

CJC™ HD HDU 15/12

CJC™ HD HDU 15/25

CJC™ MFU Mobile Flushing Unit

Storage Tanks

Oil cleanliness levels of ISO 23/21/19 are common

Oil delivered to storage tanks is generally contaminated with particles, water and sludge. Oil cleanliness levels of ISO 23/21/19 are common. This is above the recommended cleanliness level of most equipment manufacturers, and oil filtration needs to take place before being put into operation.
Many mines change in-line filters every day which is expensive - it does not have to be this way.
Installation of a CJC™ Offline Oil 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.
The above mentioned facts are also applicable to diesel oil storage, where the diesel bugs (microbial contamination) are a major problem.
The key to reliable machinery & effective production is clean oil and diesel!

The key to reliable machinery & effective production is clean oil and diesel!

CJC™ PTU3 2x27/108

CJC™ HDU 427/108

Satisfied Customers

Problem solving & preventive maintenance are keywords in the mining industry

Kumba Iron Ore's Sishen Mine, South Africa

A CJC™ Filter Separator installed on one of the crushers at Kumba Iron Ore's Sishen Mine in the Northern Cape, South Africa

Senior tribologist at Anglo American, Mr. Dave J. Gamble

"The CJC™ Filter will give benefits such as reduced downtime for maintenance, greatly reduced wear and consequent failures, increased availability, utilisation, and production. Together, this results in extended oil lifetime"

Problem

Significant ingress of contaminated particles into the lube oil system through a water flow seal under the crusher head, also causing significant water ingress into the lube oil system.

The particle and water contamination of the oil in turn significantly contributed to component wear and subsequently large volumes of metallic particles being suspended in the lube oil as a result.

Solution

A CJC™ Filter Separator was installed with 4 x CJC™ Filter Inserts, capable of retaining up to 16 kg of particles.
The CJC™ Oil Filter removed 13 L of water in the first 24 hours, continuing to remove water for another 2 weeks. Within 3 months, the ISO level was brought down from 24/22 to an astounding 16/11.
The installation of the CJC™ Filter provided numerous benefits in wear reduction. Replacement of bronze bushings for each crusher alone costs around EUR 35,000, and are replaced up to twice a year. A reduction of 50% in wear reduces the cost by EUR 35,000 per crusher - and Kumba Iron Ore's Sishen Mine has 19 of these machines in their production.

Savings in bronze bushings: EUR 35,000 per crusher/year

Disputada de Las Condes CMD, Chile

SAG Mill Disputada de Las Condes CMD, Mining Company, Chile

Mr. Fernando Cavassa C, Grinding Maintenance Chief - CMD L.B.:

"The equipment was installed just to clean the oil periodically. However, due to the out-standing results, it has been installed to operate continuously."

Problem

The main lubricating system of 6,000 litres of oil was highly contaminated with pulp (ore-silica-water). The contamination caused numerous production stoppages.

Solution

A CJC™ Fine Filter with a dirt holding capacity of 8 kg was installed. The oil was passed through the filter only once. After seeing the instant visual improvements of the oil, CMD installed two additional CJC™ Filters.
After 5 days, the oil and storage tank was clean, avoiding any production stoppages, costing in the region of USD 90,000 per stop. CMD's investment costs including spares were USD 10,000.

Minera El Tesoro, Chile

CJC™ Oil Filters installed on storage tanks, Minera El Tesoro Chile

ESSO Chile

"Benefits of a filter system maintaining clean oil can be seen in the extended lifetime of mechanical components of earth moving equipment.
This is partially due to the substantial reduction of particles greater than 6 micron".

Problem

The Minera El Tesoro has four tanks for storage of new oil, with a capacity of 10,000 litres each. Every 15 days, the tanks are topped-up with 5,000 litres of new oil. When the oil arrives in trucks it is highly contaminated from the transportation process. Caterpillar and other manufacturers of earth moving equipment recommend a cleanliness level of ISO 19/16/13, with the purpose of maintaining reliability and economical operation of their equipment, i.e. drilling machines, dumpers, etc.

Solution

A CJC™ Fine Filter was installed on each tank, operating with a filtration of 3 µm absolute and 0.8 µm nominal. Each CJC™ Filter Insert has a dirt holding capacity of 4 kg and a water absorption capacity of 2 litres. The CJC™ Fine Filters absorb sludge/resin and oil degradation products as well.

Talvivaara Mine, Finland

E. Hartikainen Oy, Talvivaara Mine, Finland Atlas Copco, Drill Rig

Mr. Ari-Pekka Jormanainen, Project Manager E. Hartikainen Oy

"We have used CJC™ Offline Filters for many years. We now have 20-30 filters in operation. We take oil samples after installation of a filter and follow up with random samples – and the oil is always very clean."

Problem

General repair needs, erosion in pumps and cylinders.
Frequent oil changes and downtime.

Solution

After installation of CJC™ Offline Oil Filters, the benefits of improved cleanliness levels are a noticeable reduction in repairs and reduced erosion of pumps and cylinders. As a result, the expense of oil changes and service intervals is reduced.
The CJC™ Filter Inserts are generally changed twice a year, at the same time as when other service is needed. The pressure gauge on the filter makes it easy to supervise the dirt holding capacity.
The CJC™ Filters do not need any service other than the change of the filter inserts.

Your Challenge

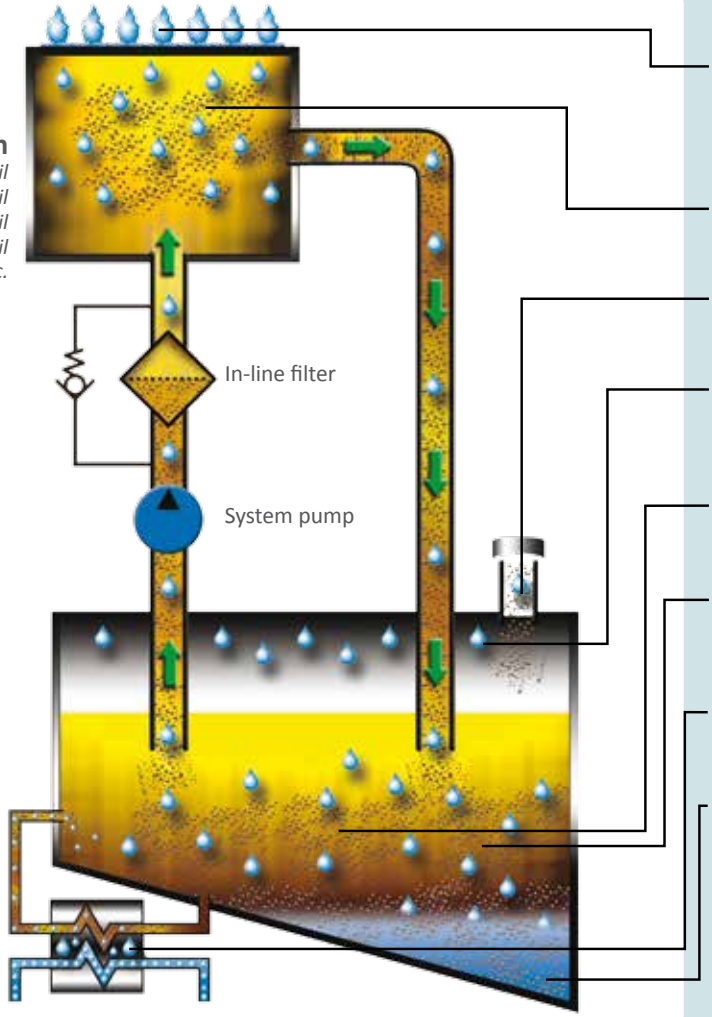
80% of all breakdowns in oil systems are related to contamination of the oil

Millipore membrane
- sample taken
before
installation of offline filtration

Optimum oil cleanliness can rarely be achieved by in-line filtration

Contamination of an oil system leads to various problems which can result in machine downtime, frequent repairs of equipment and reduced oil lifetime. All of which means inefficient production and unnecessary expenses spent on repair and oil change.

In-line Filtration



Contamination

External Environment
Water from the external environment enters the system via the elements, high-pressure water blasting, washing, etc.

Wear & Tear Particles
Wear particles are generated inside the oil system.

Air Vent
Particles and water ingress through the air vent.

Internal Environment
Water condensation in the oil reservoir, due to temperature variations.

Acid Produced by Oxidation
High temperature + contaminated oil = acid and resin.

Rust/Corrosion
Water initiates the formation of rust particles which are very hard and abrasive particles.

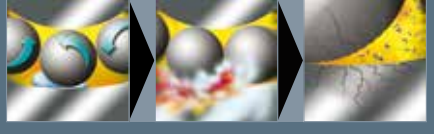
Cooler Leaking Water
A leaking cooler results in water ingress to the oil reservoir.

Varnish/Resin
Oil degradation products, micro particles and water are accumulated in the bottom of the oil reservoir.

Most Common Types of Contamination

Abrasive Wear
When clearance sized hard particles are wedged between movable metal parts, they destroy the metal surface further and can result in additional wear.

Cavitation & Pitting
Occurs in areas where water is present and oil is compressed; the water implodes, causing the metal surfaces to crackle and release more particles.



Oil Degradation
Oxygen, water and high temperatures lead to oil degradation, which is the precursor of varnish/resin. This results in sticky varnish that deposits on metal surfaces.

Our Solution

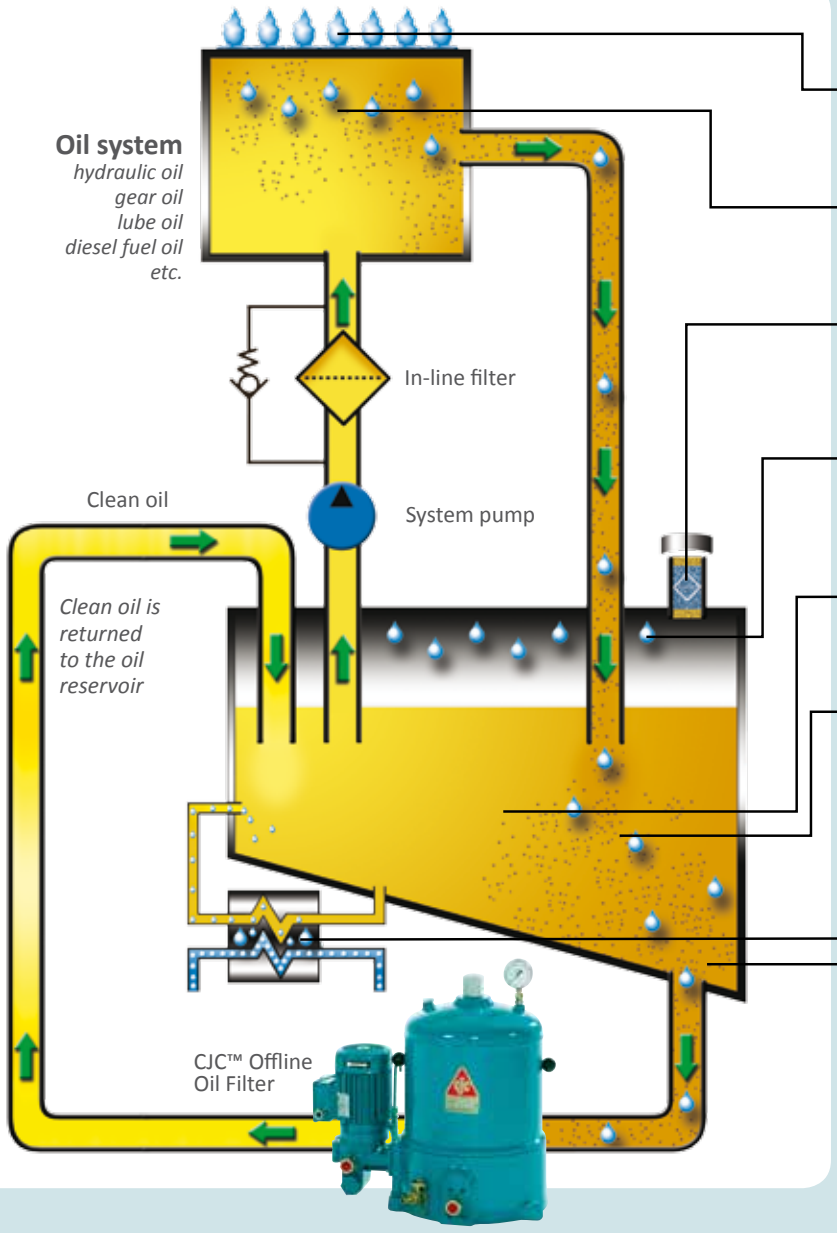
Clean oil and guaranteed success through offline filtration
- you avoid expenses on repairs and oil changes

One Filter - 4 Solutions

CJC™ Filter Inserts have a 3 µm absolute filtration ratio and will remove particles, water and oil degradation products in one and the same operation. The CJC™ Filter Insert has a very large dirt holding capacity. The CJC™ products are almost maintenance free and have a very low cost of operation.

Millipore membrane
- sample taken ***after*** installation of offline filtration

Offline Filtration



Contamination
- now under Control

External Environment
Water ingress from the environment is continuously removed from the system with CJC™ Filters.

Wear & Tear Particles
Wear and tear particles are still being created, but are removed by the CJC™ Oil Filter.

Air Vent
Ingress of contamination can be reduced by installing a breather with fine filtration and water absorbing media (silica gel).

Internal Environment
Water still condensates in the oil reservoir, but with the CJC™ Filters installed, the water is removed before it reaches critical system components.

Acid Produced by Oxidation
The risk of developing acids and oxidation by-products has been considerably reduced.

Rust/Corrosion
Contamination is still being created but is removed by the CJC™ Oil Filter.

Cooler Leaking Water
The leaking cooler can be repaired at scheduled overhauls as the CJC™ Oil Filters continuously remove water in large volumes.

Varnish/Resin
Oil degradation products and micro particles have now practically disappeared from the bottom of the oil reservoir.

Contamination Capacities

All CJC™ Filter Inserts have outstanding oil filtration capabilities with filtration degrees of 3 µm (micron) absolute. This means that 98.7% of all solid particles larger than 3 µm and approximately 50% of all particles larger than 0.8 µm are retained - in one single pass.

Capacities:	15/25 series:	27/27 Series:
Particles	2-4 kg	4-8 kg
Water	0,75 L	2 L
Varnish	1 L	4 L

Dirty and clean CJC™ Filter Inserts

Our Products

CJC™ Oil Filters - user-friendly design with low maintenance
- and we offer highly qualified technical back-up

Key Figures of the CJC™ Oil Filters

The CJC™ Oil Filters are offline depth filters for hydraulic oils, lube oils and diesel fuel oils.

CJC™ Oil Filters have a very high dirt holding capacity, and remove particles, water and oil degradation products, all in one and the same operation.

Our product range covers tailor made solutions for all system volumes.

The cleanliness level achieved and maintained by offline filtration means that the predicted lifetime of machine components and oil is expected to be extended 2-10 times!

Using CJC™ Offline Filters will have a positive effect on your maintenance budget as well as increase your productivity and reduce your energy consumption.

- all Advantages in Terms of Your total Economy!

CJC™ HDU Series

CJC™ Fine Filters are offline oil filtration systems with integrated circulating pumps for off-line installation. The filters are recognized around the world as highly efficient purification systems for mining applications.

CJC™ Fine Filters have a 3 µm absolute filtration ratio and remove particles, water and oil degradation products from hydraulic oils and lube oils - in one and the same operation.

CJC™ Heavy Duty HD HDU 15/12

CJC™ HDU 15/25

CJC™ Heavy Duty HD HDU 15/25

CJC™ MFU Mobile Flushing Unit

CJC™ HDU 27/27

CJC™ HDU 27/54

CJC™ HDU 27/108

CJC™ HDU 2x27/108

CJC™ HDU 427/108

C.C.JENSEN will back you up
- we have more than 60 years of experience!

CJC™ PTU Series

The CJC™ Filter Separators combine depth filtration with water separation and are used for water contaminated diesel fuel oils, hydraulic and lubricating oils.
The CJC™ PTU Series continuously remove water from oil in large volumes.

CJC™ PTU3 27/81

CJC™ PTU3 2x27/108

CJC™ Desorbers

The CJC™ Desorbers provide solutions for removal of water in mineral, synthetic and high viscosity oils.

The Desorbers remove water even from stable emulsions and from oils with a density above 1.

CJC™ Desorber D10

CJC™ Desorber D30

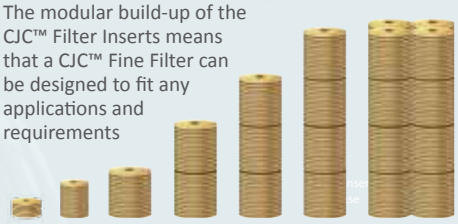
CJC™ Filter Inserts

All CJC™ Filter Inserts have a 3 µm absolute filtration ratio and will remove particles, water and oil degradation products.

- **Particles** down to 0.8 µm are retained in the unique CJC™ Filter Insert cellulose mass.
- **Water** is removed either by absorption or separation according to oil system requirements.
- **Oil degradation products** are removed by the attraction to the polar fibers.

Modular build-up

The modular build-up of the CJC™ Filter Inserts means that a CJC™ Fine Filter can be designed to fit any applications and requirements



ATEX Explosion Proof

CJC™ Oil Filters can be supplied as ATEX units for installation in explosive atmospheres. We are able to supply equipment for installation in Zone 1 and 2, gas group IIB and IIC. The individual layout of the filter units is based on the actual zone classification where the filter unit will be installed. Various voltages are available upon request.

Simple, effective and low maintenance
- will guarantee your success!

C.C.JENSEN
- Contact us Today!

1953-2013 60 years of increasing reliability & reducing costs

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