

2021

Water Treatment with OEI Magnetic Filtration



SOLVING TOMORROW'S CHALLENGES, TODAY.

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PROVEN AROUND THE WORLD

GLOBAL SUCCESSFUL ACROSS DIVERSE INDUSTRIES

OEI magnetic filtration is employed internationally by leaders in the oil and gas, mining, commercial and residential building, manufacturing, transportation, food, pharmaceutical, defense, petrochemical and marine industries. OEI magnetic filtration systems apply to engines, gearboxes, hydraulics and pneumatics, processed products, cooling systems and water systems. Each filter employs a magnetic filter element with a patented radial field configuration for high holding strength. These systems operate with minimal flow restriction and are proven to capture both ferrous and non-ferrous contamination in rotating equipment applications. The first OEI filtration system was installed in 2001 and has been proven successful in over 40 countries.

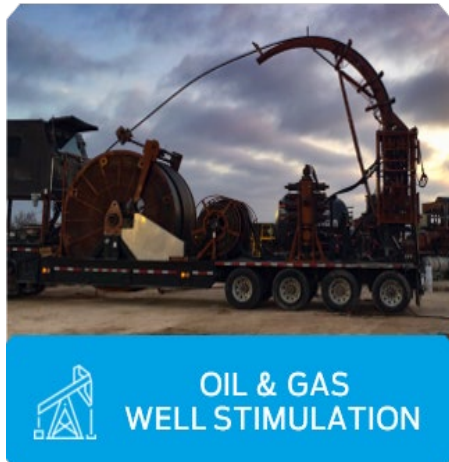
CANADIAN MANUFACTURING

OEI corporate headquarters and manufacturing facility is located in Calgary, AB, Canada. Global OEI authorized distributors are trained to aid in determining the most effective filtration solution for their application.

One Eye Industries Inc.
4344 12th Street SE
Calgary, AB
T2G 3H9



SERVING INDUSTRIES AROUND THE WORLD



APPLICATIONS



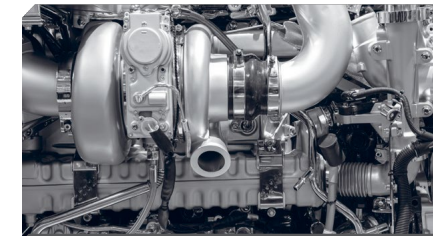
HYDRAULICS



PNEUMATICS



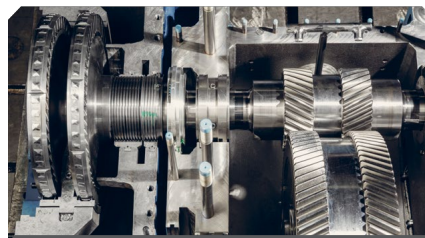
PUMPS



ENGINES



FUEL SYSTEMS



GEARBOXES



COMPRESSORS



TOTAL PROTECTION
KITS



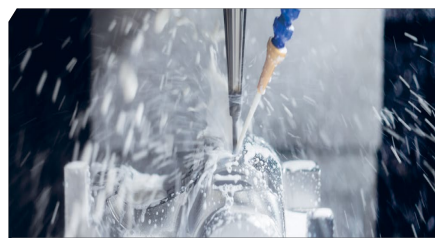
PROCESS & UTILITY
WATER SYSTEMS



PRODUCT LINES



PARTS WASHERS



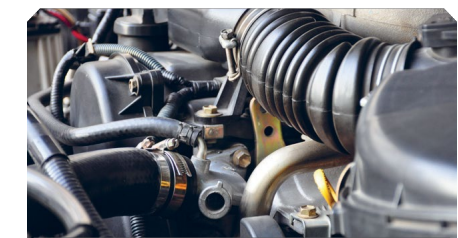
MILLING MACHINES



SUMPS & RESERVOIRS



HEAT EXCHANGERS



COOLANT LINES

WATER TREATMENT REQUIREMENTS IN SOUTH KOREA



INCHEON: TAINTED WATER CRISIS

Build up of aluminum, manganese, iron, lead and copper corrosion in municipal and residential water systems.

Problem:

- Corrosion in supply pipes / obsolete pipeline system.
- Built up corrosion in water tanks and reservoirs.
- Corrosion build up from boilers and chillers in buildings.
- Human error: maintenance technicians managing valves operating high fluid velocities (0.3 m/s – 0.68 m/s), allowing contaminants into clean water systems.
- Inefficient treatment of contamination throughout transmission process.



CONVENTIONAL WATER FILTRATION SOLUTIONS

Media Water Filters (Pleated, String)

Inconsistent particle size capture and require frequent changeout.

- Nominal rating* of 10 microns; this leaves contaminants < 10 microns to build up in pipes, reservoirs, heating and cooling systems. (Contamination < 4 microns is the primary source of equipment component wear.)
- Only meet nominal efficiency rating when close to bypass because captured contamination aids in filtration capability.

Reverse Osmosis Systems / Desalination Systems, UV Sterilizers

Focus is on filtration of bacteria and chemicals rather than the removal of wear particles such as iron or aluminum.

Chemical Dosing

Require inhibitors and prefiltration to protect pipework and components against corrosion.



*The nominal rating represents an efficiency figure or degree of filtration. A nominal rating example is “95% of 10 micron” – where the filter prevents 95% of all 10 micron and larger particles from passing through. However, the nominal rating method is generally discouraged. During testing, differing conditions like inconsistent pore sizes, operating pressure and contaminant concentration vary enough that the rating provides an inconsistent result and a lack of uniform measurement.

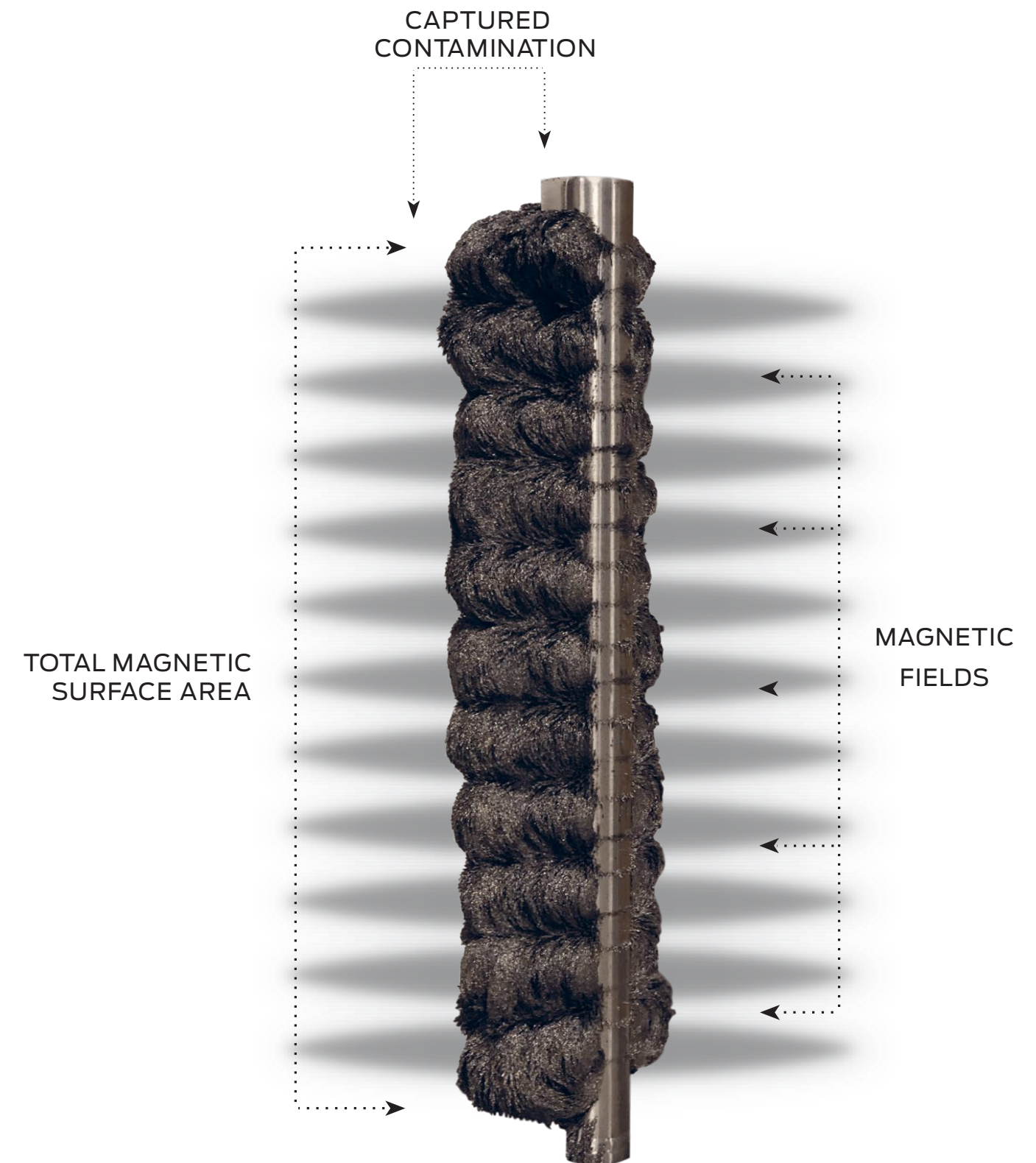
OEI MAGNETIC TECHNOLOGY

MAGNETIC FILTER ELEMENT

The patented, magnetic filter element attracts ferrous wear particles down to sub-micron sizes with up to 95%+ efficiency. The radial magnetic field design ensures a large surface area for contamination capture and high holding capacity of attracted contaminants.

Benefits

- Operationally efficient: operate with minimal flow restriction, continuous filtration in bypass, designed for installation requirements
- Capture non-ferrous contaminants through static particle adhesion and embedding.
- Environmentally responsible: cleanable and require minimal utilities



OEI WATER FILTER PRODUCTS

MAGNETIC FILTER SCRUBBER

Magnetic filter scrubbers employ a magnetic filter element in a specialty housing designed to operate with minimal flow restriction and maximum fluid exposure for high-efficiency filtration. Flow is regulated by the diameter of the inlet-outlet supply pipe as well as fluid velocity. These systems install on suction and return lines in high-pressure and low-pressure applications.

Benefits

- Minimal flow restriction allows for suction line installation and pump protection.
- High holding capacity allows for extended planned maintenance periods.
- Acts as an effective predictive maintenance tool if contamination is collected and analyzed to determine sources of equipment component wear.



OEI WATER FILTER PRODUCTS

ADD-VANTAGE 9000: STAINLESS STEEL

The ADD-Vantage 9000 includes OEI’s patented magnetic filter element as well as a stainless steel cloth element. Systems are optimized for fluid viscosity, flow volume, flow rate, temperature, mobility, and mounting requirements.

“Inside-out” flow control designs are recommended because the magnetic filter element is the primary filter. Its high holding capacity allows for extended operating life of the stainless steel cloth element which minimizes bypassing and extends cleaning intervals.

Part Number	Flow Rate @ 68 cSt	Pressure Rating
9ADV9-VS116	10 gpm (38 L/min)	< 5 bar (72 psi)
9ADV9-VS216	10 gpm (38 L/min)	< 5 bar (72 psi)
9ADV9-VS220	20 gpm (76 L/min)	< 5 bar (72 psi)



OEI WATER FILTER PRODUCTS

MAGNETIC FILTER SCRUBBER: INLINE

Magnetic filter scrubbers employ a magnetic filter element in a specialty housing designed to operate with minimal flow restriction and maximum fluid exposure for high-efficiency filtration. Flow is regulated by the diameter of the inlet-outlet supply pipe as well as fluid velocity. With a billet aluminum housing, this scrubber installs inline for low-pressure, light viscosity, low-flow applications.

Part Number		Flow Rate	Pressure Rating
5IL04	Single-pass	2 gpm (7.6 L/min)	6.9 bar (100 psi)
	Multi-pass	4 gpm (15.1 L/min)	
5IL05	Single-pass	3 gpm (11.4 L/min)	6.9 bar (100 psi)
	Multi-pass	6 gpm (22.7 L/min)	
5IL905	Single-pass	3 gpm (11.4 L/min)	6.9 bar (100 psi)
	Multi-pass	6 gpm (22.7 L/min)	



CASE STUDY

GOVERNMENT OF KAZAKHSTAN, 2019

Application

Municipal pipelines and buildings

Problem

Traditional filtration is unable to adequately clean particulate under 10 microns in size from municipal and national water pipelines, reservoirs and buildings operations. Corrosion build up in these systems has lead to polluted drinking water and equipment failures.

Solution

Test OEI Magnetic Scrubbers in various locations to:

- Reduce ferrous and non-ferrous contamination.
- Improve boiler water and chiller water cleanliness.
- Reduce conventional filter replacement.
- Protect water system components from wear contamination and corrosion.
- Compare filtration efficiency against competitor magnetic filtration solutions.

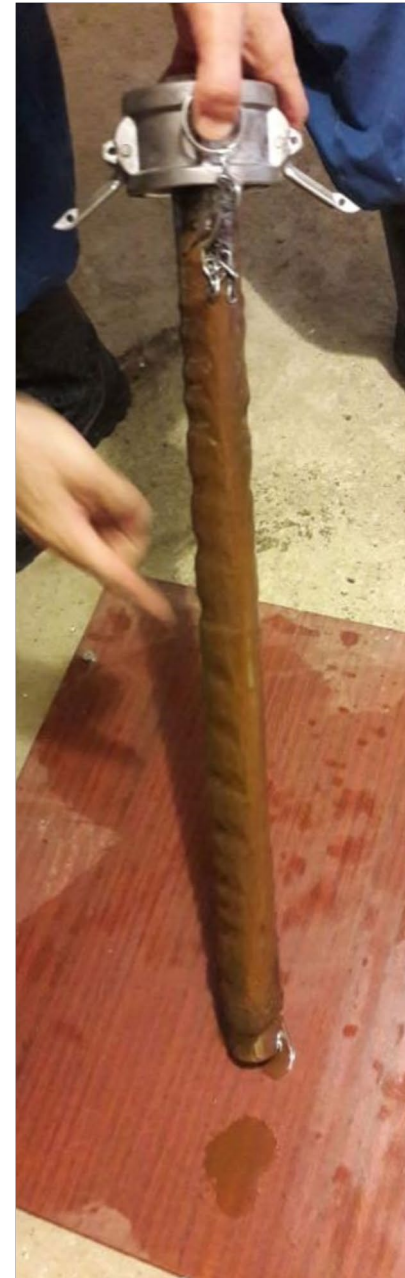


CASE STUDY

GOVERNMENT OF KAZAKHSTAN, 2019

Results

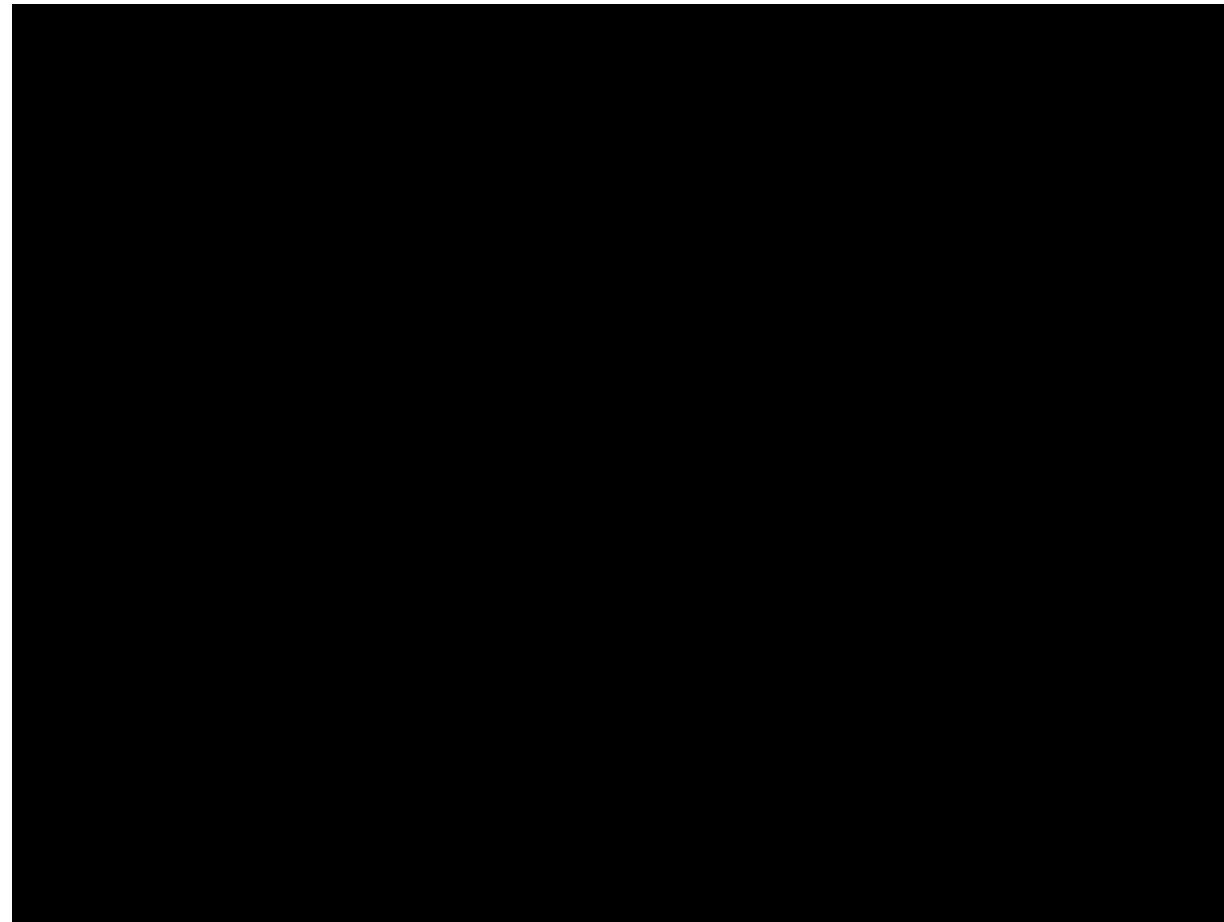
- The water had visible levels of contamination before magnetic filtration; after filtration, the water purity was evidently clear.
- The contaminants collected on the magnetic filter element were sent to a laboratory; analysis results demonstrated a dramatic decrease of iron, magnesium and other elements.
- The government of Kazakhstan is planning to install OEI magnetic filters statewide on major water infrastructure including pipelines, buildings, and other locations.



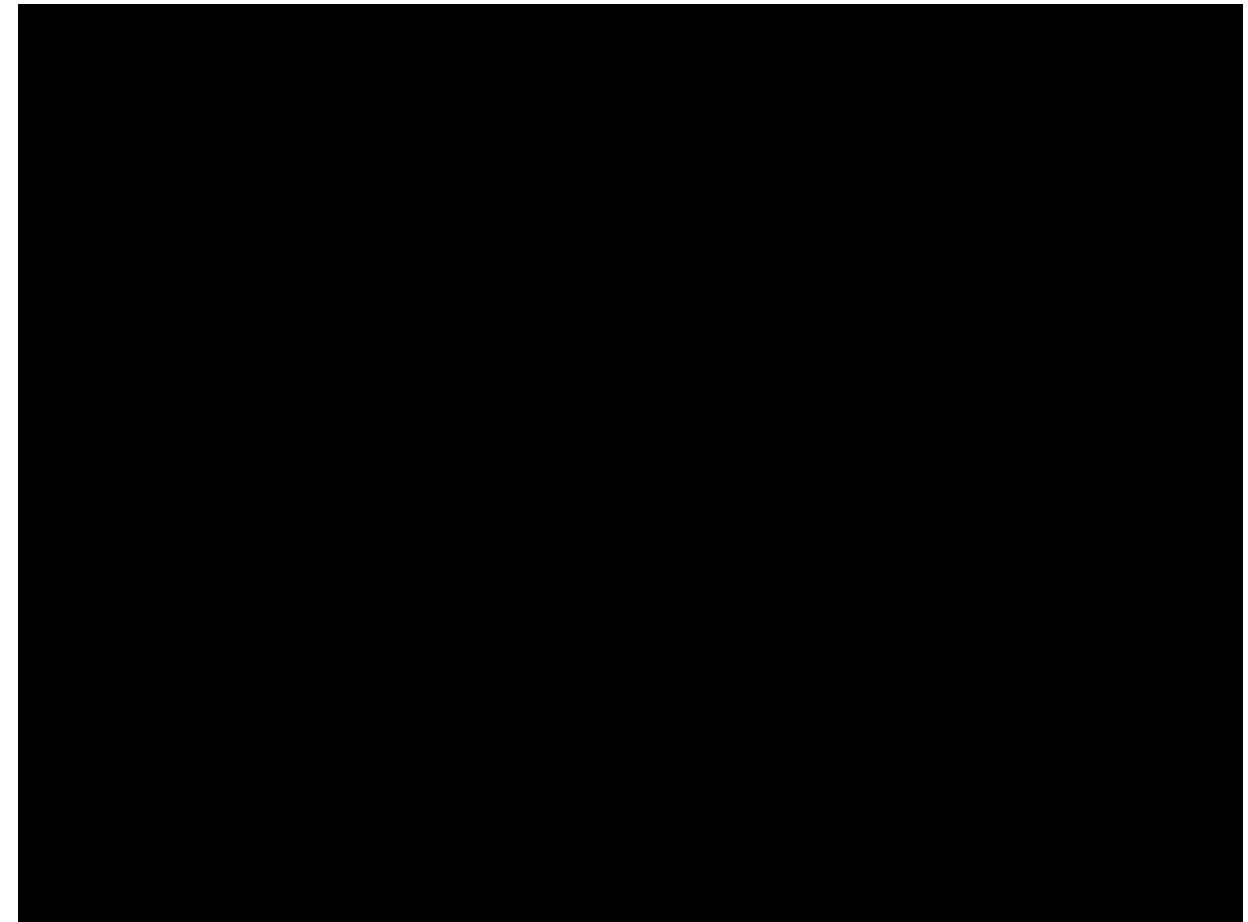
CASE STUDY

GOVERNMENT OF KAZAKHSTAN, 2019

Results



[View Video Online](#)




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CASE STUDY

GOVERNMENT OF KAZAKHSTAN, 2019

Results

Analysis Reports.



Испытательная лаборатория
Товарищество с ограниченной ответственностью «Батыс су арысы»
Юридический адрес: Республика Казахстан, 090005, г. Уральск, улица Сырыма Датова 4/4, тел: 8 (7112) 28-33-73
Фактический адрес: Саратовская трасса, 6 км. тел: 25-34-29
Аттестат аккредитации KZ.И.09.1715 от 05.04.2016г.

Кол-во страниц-1
Страница-1

ПРОТОКОЛ № 42 от 13.05.2019г.
Регистрационный № 1499,1500


Заявитель: АО «Жайыктеплоэнерго»
Наименование пробы: вода питьевая
Место отбора пробы: Котельная № 1
Акт отбора: № 85 от 13.05.2019г.
Дата отбора пробы: 13.05.2019г.
Дата выполнения анализов: начало 13.05.2019г. окончание 13.05.2019г.
Наименование средств измерений: анион 4100 сертиф.пов.№ВК-09-2467 (действителен до 12.10.2019г.), спектрофотометр ПЗ-5400ВИ сертиф.пов.№ВК-11-0071 (действителен до 12.10.2019г.), анализатор жидкости Флюорат 02-2М сертиф.пов.№ВК-09-2466 (действителен до 12.10.2019г.).
Условия проведения испытаний: температура 23,6 °С; влажность 74,0 %.

Химические испытания

Наименование определяемого ингредиента	НД на методы испытаний	Ед.изм	Фактическая концентрация	
			до фильтра № 1499	после фильтра № 1500
Жесткость общая	ГОСТ 4151-72	моль/м³	5,0	4,9
Кальций	ГОСТ 23268.5-78	мг/дм³	62,12	60,12
Магний	ГОСТ 23268.5-78	мг/дм³	23,1	23,1
Хлориды	ГОСТ 4245-72	мг/дм³	89,0	89,0
Мутность	ГОСТ 3351-74	мг/дм³	3,96	1,84
Железо общее	ГОСТ 4011-72	мг/дм³	0,3	0,21
pH	СТ РК ИСО 10523-2013	-	7,79	7,74

Протокол распространяется только на образцы, подвергнутые испытаниям.

Инженер:
Зав. ИЛ:



Е.А. Лытонина
А.Ж.Алекешова

Частичная перепечатка протокола без разрешения ИЛ ТОО «Батыс су арысы» запрещена

Испытательная лаборатория
ТОО «Опреснительный завод «Каспий»
Республика Казахстан, Мангистауская область,
г. Актау, Промзона 4, зд.74
Тел./факс: 8 7292 544-274, 544-688
e-mail: lab.caspiy@gmail.com

ДП ИЛ 02-11/Л-1

CASPIY
ОПРЕСНИТЕЛЬНЫЙ ЗАВОД

ПРОТОКОЛ ИСПЫТАНИЙ №7
от «17» мая 2019г.

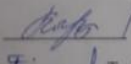
Страница 1 из 1

Заказчик, адрес: ГПП «КЖСА»
Основание для проведения испытаний:
Место отбора проб: 4-63 вход
Наименование/обозначение проб: Техническая вода
Кол-во точек отбора, кол-во проб: 1, 1 (1,0л)
Акт и дата отбора проб: 17.05.2019г.
Дата поступления в ИЛ: 17.05.2019г.
Дата проведения испытаний: 17.05.2019г.
НД на отбор: СТ РК ГОСТ Р 51593-2003
НД на продукцию: СТ РК 1432-2005
Вид испытаний: Химический анализ
Условия проведения испытаний: t: 24°C влажность: 58%

Результат испытаний:

№ п/п	Наименование показателей	Ед. изм.	Результат испытаний	НД на метод испытания	Нормативный показатель
2	3	4	5	6	
1	pH	ед. pH	7,9	ГОСТ 26449.1-85	-
2	Удельная электропроводность	мкСм/см	4890	СТ РК ИСО 7888-2006	-
4	Мутность	мг/л	10,38	ГОСТ 3351-74	-
5	Сухой остаток	мг/дм³	3104	ГОСТ 18164-72	-
6	Кальций	мг/л	45	ГОСТ 26449.1-85	-
7	Жесткость общая	мг-экв/л	5,0	ГОСТ 26449.1-85	-
8	Щелочность	мг/дм³	3,2	ГОСТ 26449.1-85	-
9	Железо	мг/дм³	2,09	ГОСТ 4011-72	-

Испытание проведено: лаборант хим. анализа
Зав. ИЛ ТОО «Опреснительный завод «Каспий»:



Есет Г.
Таубаева Г.Ж.

*Техническая вода вне области аккредитации.

Результаты протокола распространяются только на образцы, подвергнутые испытаниям.



CASE STUDY

POWER GENERATION COMPANY, USA

Application

Heated water pipeline

Results

Contamination shown in the pictures was collected after 3 months of operation.

The unit has been installed for 1.5 years and the customer is looking to install BPS magnetic separation systems on their glycol systems and heat exchangers.



CASE STUDY

BOW TOWER, CANADA

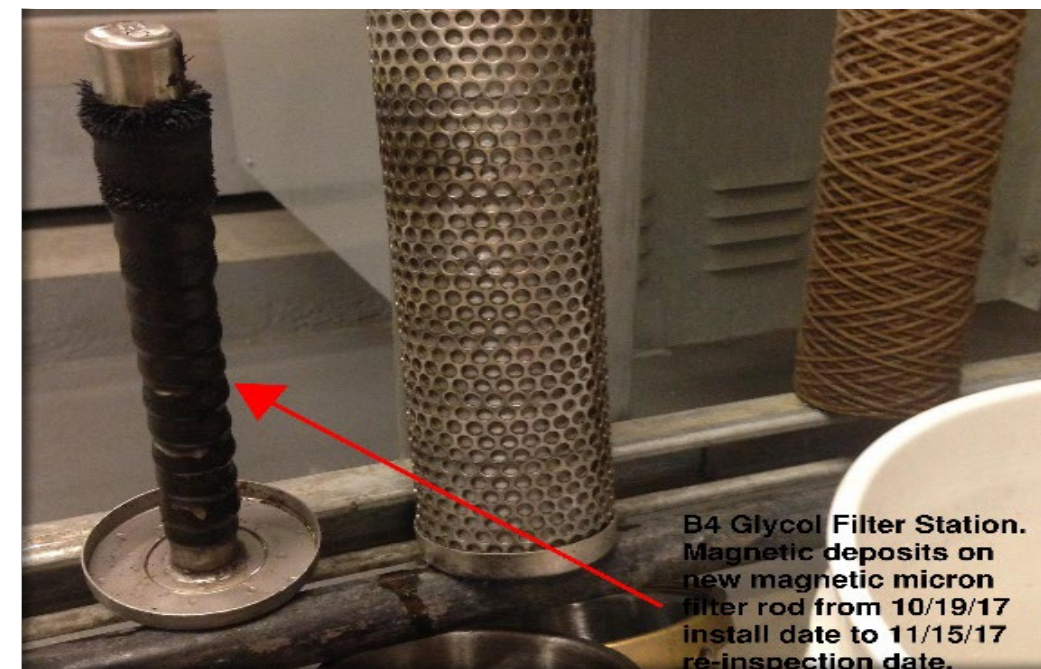
Filtration Efficiency Comparison Test

Compare the filtration efficiency of conventional filtration and magnetic separation by the magnetic separator systems upstream and downstream of conventional filters on the Primary Heating Loop, Condenser Water Loop, Lakos and Glycol Systems of the Bow Building.



Glycol Filter Station

- Installed downstream of conventional filter
- Contamination collected after 27 days.



Condenser Water Loop

- Installed downstream of conventional filter
- Contamination collected after 20 days.

CASE STUDY

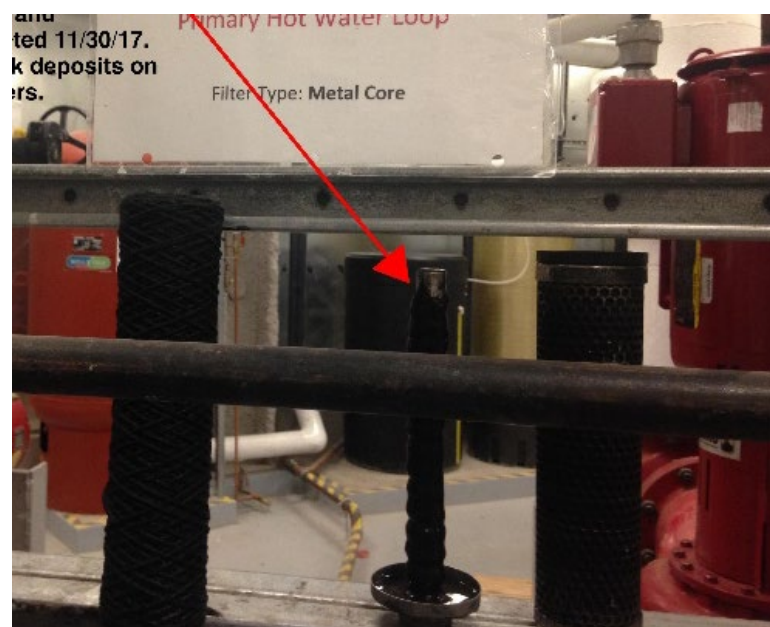
BOW TOWER, CANADA

Filtration Efficiency Comparison Test



Lakos Sand Filter

- Installed upstream of conventional filter
- Contamination collected after 15 days.



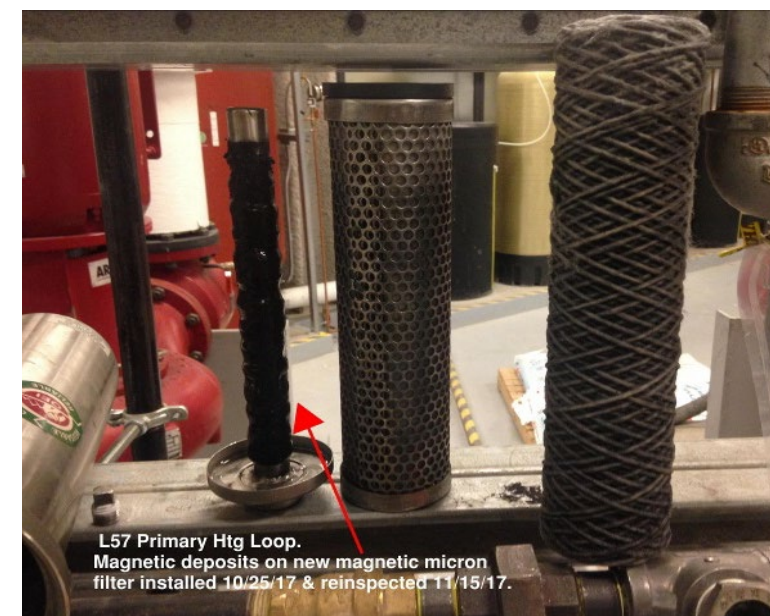
Primary Hot Water Loop

- Installed upstream of upstream filter
- Contamination collected after 13 days.



Primary Chilled Water Loop

- Installed upstream of conventional filter
- Contamination collected after 13 days.



Primary Heating Loop

- ❖ Installed downstream of conventional filter
- ❖ Contamination collected after 21 days.

CASE STUDY

MITSUBISHI MOTORS, SIGNAPORE

Application

Boiler system

Problem

High volumes of iron oxide resulting from corrosion entering the boiler system from the water supply line.

Solution

Install a magnetic y-strainer suction side of the water pump on a 2 week trial.

Results

Photos show the quality of the incoming water as well as the contamination captured after 1 week of operation.



CASE STUDY

SOLVAY CHEMICAL PLANT, ITALY

Application

De-mineralized water injection cleaning system

Problem

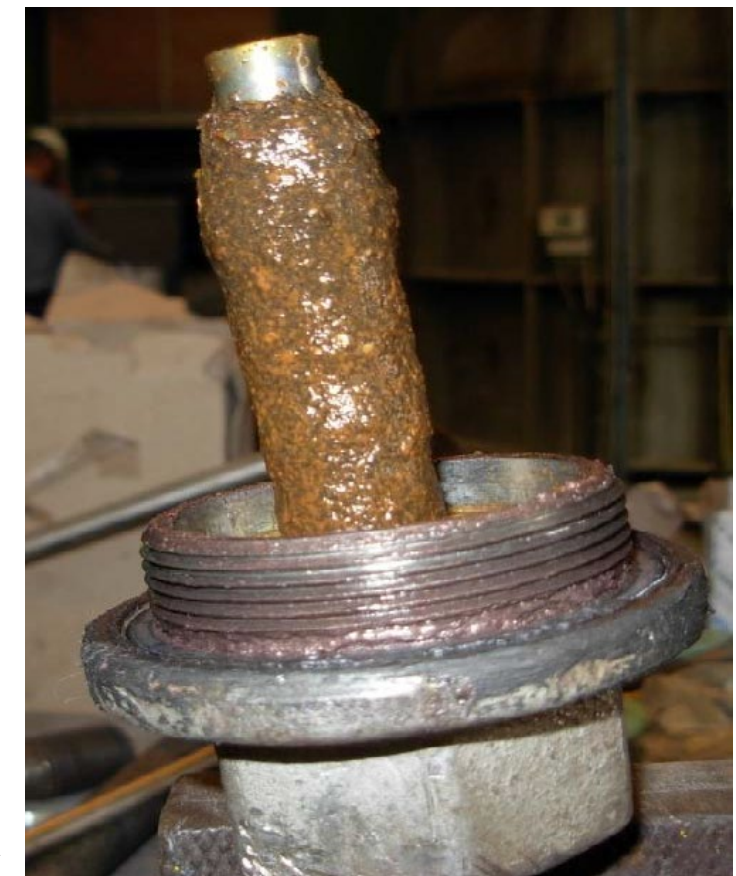
High levels of ferrous metal contamination including rust from stainless steel and cast iron piping.

Solution

Install 6 magnetic filter y-strainers on the steam turbine to decrease the amount of ferrous contamination.

Results

The photo shows the accumulation rust contamination captured on 1 magnetic filter element after 30 days in operation.





CASE STUDY

ENI, ITALY

Application

Offshore drilling platform, glycol separation unit

Problem

Contamination entering a 3000-7000 L glycol reservoir from a 32 km pipeline was degrading new glycol, reducing it's ability to cool and remove moisture from gas. The contamination would build up during transmission and storage from corrosion and erosion of carbon steel components.

The glycol system was unmanned and required a filtration solution requiring minimal maintenance and changeouts.

Solution

Install a magnetic scrubber after the reservoir to improve glycol quality.

Results

Analysis of contamination collected on the magnetic element showed 74% non-ferrous particles and 26% ferrous.

The glycol quality was significantly improved with minimal maintenance requirements.

Spectroscopic Analysis	
Iron	606 ppm
Chrome	17 ppm
Nickle	< 5 ppm
Manganese	12 ppm
Aluminum	93 ppm
Lead	< 5 ppm
Copper	24 ppm
Tin	< 5 ppm
Silver	< 5 ppm
Titanium	5 ppm
Silica	410 ppm
Sodium	26 ppm
Potassium	130 ppm
Vanadium	< 5 ppm
Calcium	14 ppm
Magnesium	64 ppm
Phosphorous	779 ppm
Zinc	30 ppm
Barium	86 ppm
Boron	45 ppm
Molibdenum	< 5 ppm
Cadmium	7 ppm



CASE STUDY

BAE ORDNANCE SYSTEMS, USA

Application

Gun powder manufacturing facility process water

Problem

BAE uses municipal water in the manufacturing of its gun powder. Because of corrosion of the carbon steel piping and components, the facility was unable to meet municipal water quality standards using conventional string filters.

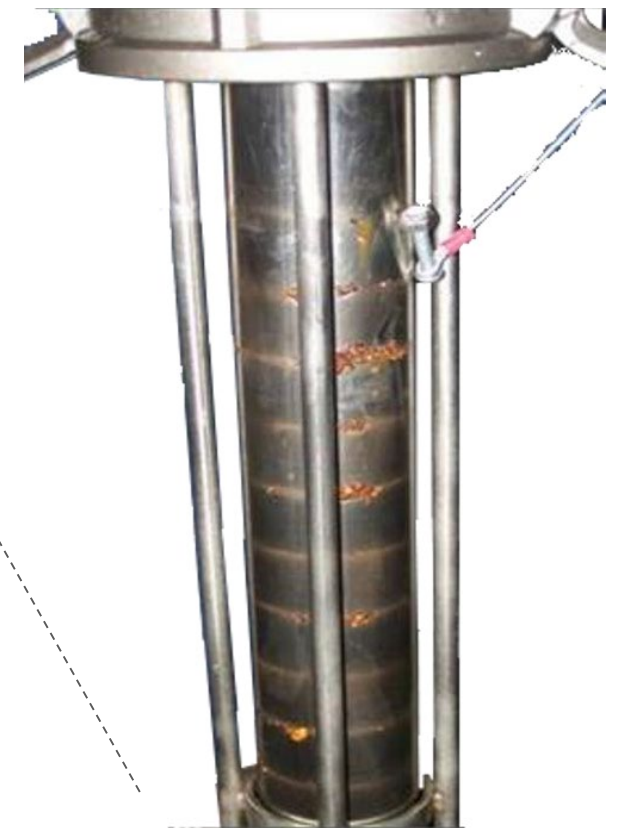
Solution

Compare filtration efficiencies by deploying a stainless-steel ADD-Vantage 9000 magnetic filter, rated to 460 gpm, upstream of the string filters to see how much contamination they missed.

Results

The photos show contamination collected after 2 weeks of operation.

The lead Process Chemical Engineer determined the test successful and BAE has since installed multiple OEI filters throughout the facility.





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