for technical experts

Reduction on soot and unburned asphaltenes on oil fired boiler's heat exchangers.

Systems for lower operating costs, fuel savings and emissions reduction.

all photos and diagrams in this presentation
(except photo of Christ in Rio)
we get on our equipment and from our customers.
www.energy-saving-technology.com

Why am I reading this presentation?

1. At my fuel oil boilers, **nozzles and heat exchangers are constantly clogged**. By reducing the quality of fuel, they clogged even faster ...

2. Clogging exchangers cause of smoke, increasing fuel consumption and more harmful emissions.

3. Cleaning the boiler - a long and costly procedure and I want to increase the interval between cleanings.
4. Cleaning the boiler carries the risk of damaging the heat exchangers and I want to reduce it.

5. I do not want to use chemical additives in fuel or reduce the amount of expensive additives.

6. I'm looking for proven technical solutions, reliable, simple, low-cost in installation and operation, with a quick payback period.

8. I want to offer a good solution and make money.

7. I know a lot of boiler-houses that have **constant problems with the HFO burning**. Smoke, sludge, permanent sticking soot and unburned coke on heat exchangers, boilers stopping, cleaning and repair of equipment

We know how to solve these problems in full or in part, but **the best in the former USSR**.

Example - The Company RUSAL in Guinea. 2010 year.

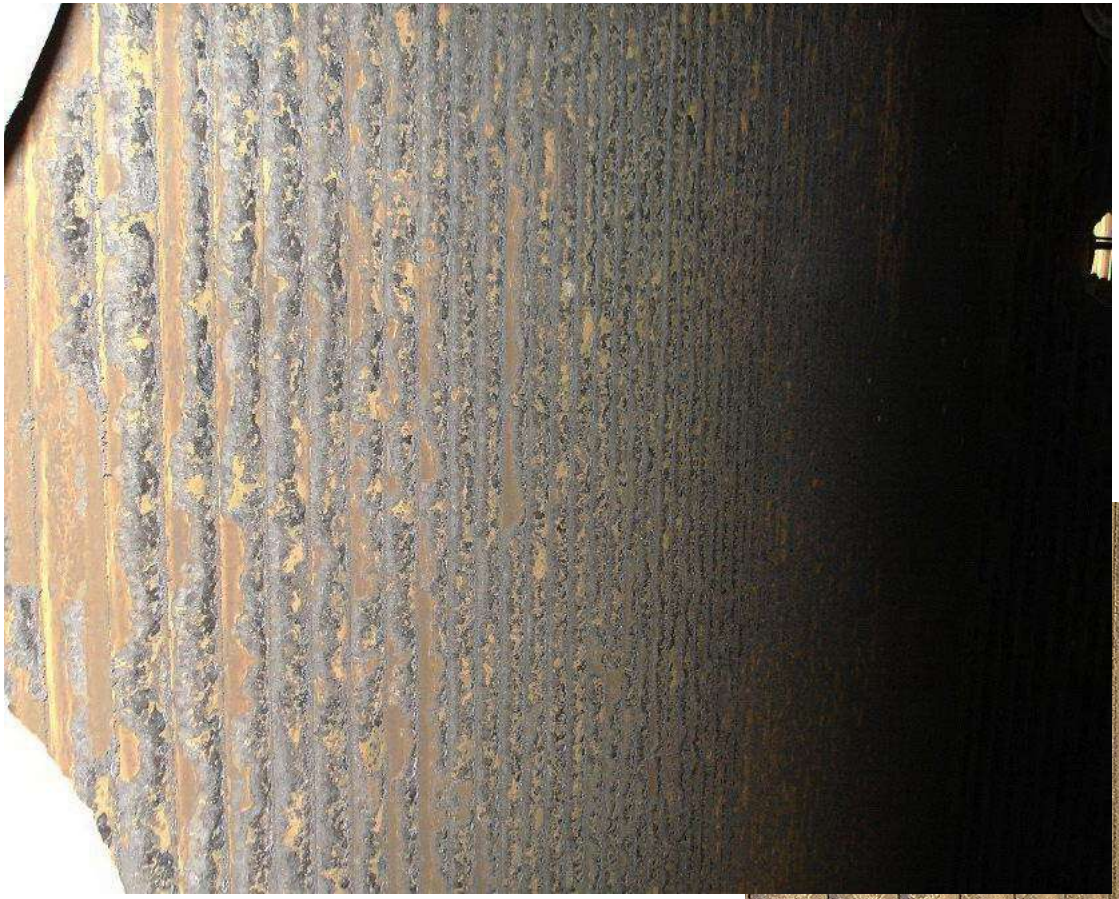
Boilers:
-1 boiler consumption of 15 m3 of HFO p/h (BKZ 160-9.8-490M)
- 3 boilers, consumption of 8 cubic meters p/h. (FOSTER WEELER)

Fuel Type –
heavy fuel oil slurry.

Example –
The Company RUSAL
in Guinea. 2010 year.

Before and after installation
of our equipment.

The test time is 2 months.



Example –
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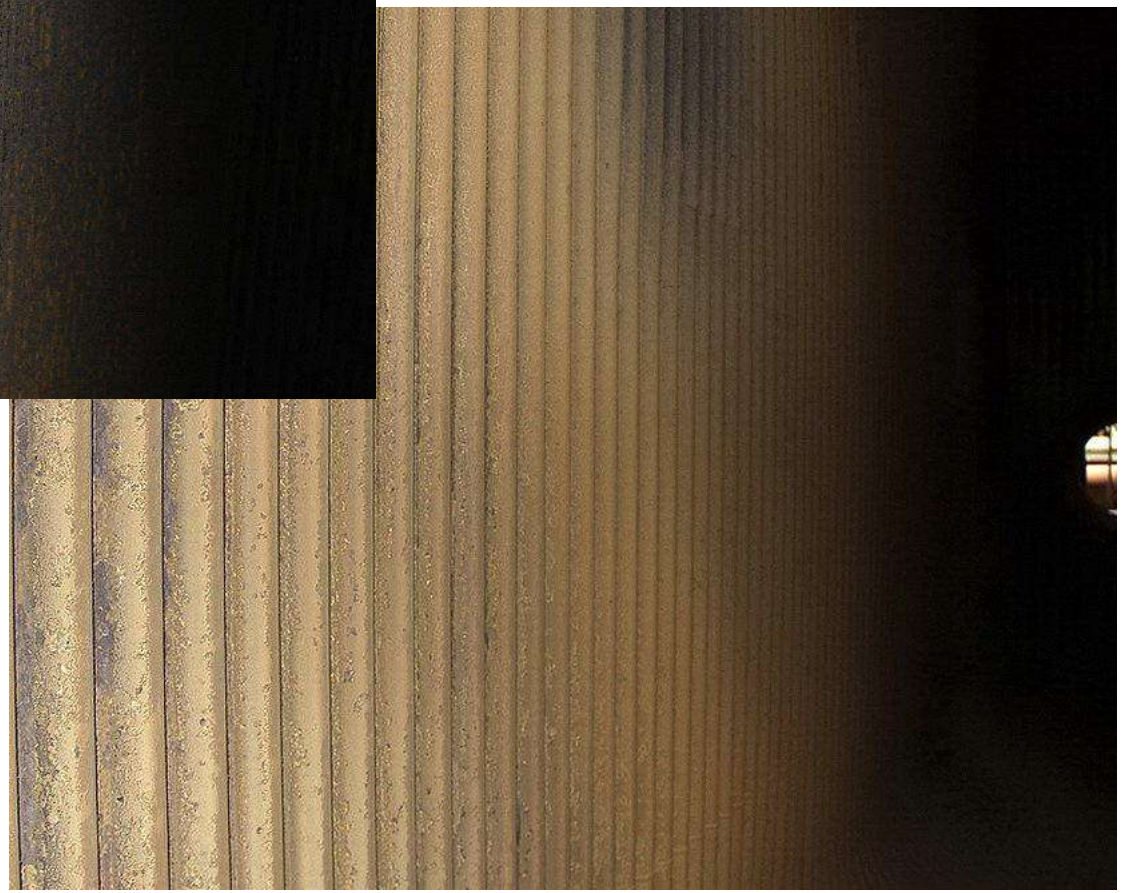
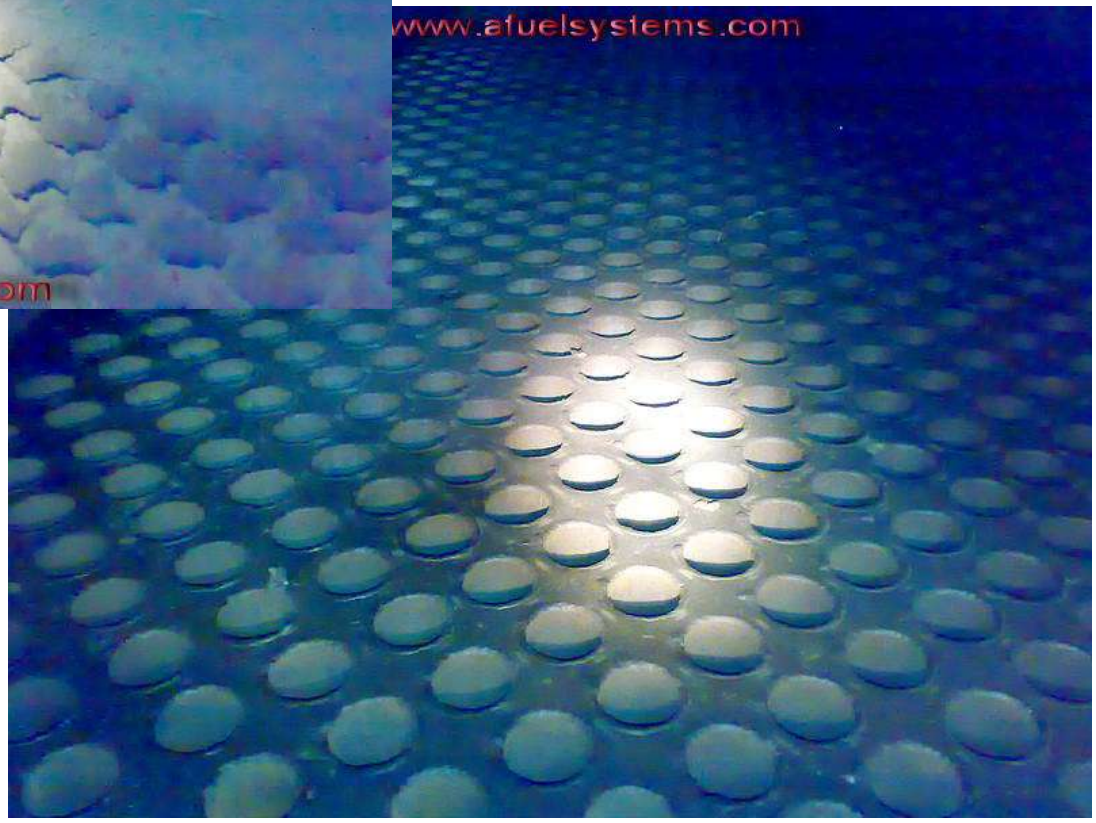


Before and after
installation of our equipment.
Side screens.
Test time 2 months.

Example –
The Company RUSAL
in Guinea. 2010 year.



Before and after
installation of our equipment.

Air heater.
Test time 2 months.

Fuel quality and the resulting economic benefits from our equipment – direct fuel economy 4.1%.

DEN/service technique et production
Suivi rendement activateur de mazout

Суточные объемы производства перегретого пара и потребления мазута на котле №5

Показатели до установки гомогенизатора TRGA-2-15G

Date / дата	CHAUD-5 / котел №5			
	mazout / мазут		vapeur/ пар (t)	cons.spécifique / удельный расход мазута (кг/t)
	(m3)	(t)		
01.08.2010	206	198,8	2739	72,578
02.08.2010	205	197,8	2733	72,384
03.08.2010	206	198,8	2743	72,472
04.08.2010	206	198,8	2748	72,340
05.08.2010	205	197,8	2708	73,052
06.08.2010	205	197,8	2711	72,971
07.08.2010	208	200,7	2752	72,936
08.08.2010	212	204,6	2734	74,828
09.08.2010	228	220,0	2848	77,254
10.08.2010	214	206,5	2780	74,284
11.08.2010	212	204,6	2730	74,938
12.08.2010	203	195,9	2623	74,684
13.08.2010	205	197,8	2692	73,486
14.08.2010	211	203,6	2780	73,243
15.08.2010	208	200,7	2742	73,202
16.08.2010	197	190,1	2480	76,655
17.08.2010	205	197,8	2675	73,953
18.08.2010	214	206,5	2782	74,231
19.08.2010	216	208,4	2824	73,810
20.08.2010	198	191,1	2594	73,658
21.08.2010	216	208,4	2868	72,678
22.08.2010	215	207,5	2834	73,209
23.08.2010	214	206,5	2821	73,205
24.08.2010	148	142,8	1947	73,354
25.08.2010	Остановка котла и монтаж гомогенизатора			
26.08.2010				
27.08.2010				
28.08.2010				
29.08.2010				
30.08.2010				
31.08.2010				
Mois /месяц	4957,0	**4783,5**	**64888,0**	**73,719**

Показатели после установки гомогенизатора TRGA-2-15G

Date / дата	CHAUD-5 / котел №5			
	mazout / мазут		vapeur/ пар (t)	cons.spécifique / удельный расход
	(m3)	(t)		
01.09.2010				
02.09.2010	84	81,1	1006	80,577
03.09.2010	207	199,8	2866	69,698
04.09.2010	211	203,6	2904	70,115
05.09.2010	214	206,5	2939	70,265
06.09.2010	221	213,3	2954	72,195
07.09.2010	221	213,3	3025	70,501
08.09.2010	220	212,3	3016	70,391
09.09.2010	219	211,3	3003	70,375
10.09.2010	219	211,3	3017	70,048
11.09.2010	217	209,4	2997	69,872
12.09.2010	220	212,3	3014	70,438
13.09.2010	221	213,3	3030	70,384
14.09.2010	221	213,3	3026	70,478
15.09.2010	219	211,3	2998	70,492
16.09.2010	209	201,7	2784	72,444
17.09.2010	145	139,9	1957	71,500
18.09.2010	Аварийная остановка котла из за порыва экранной трубы заднего экрана топки			
19.09.2010				
20.09.2010				
21.09.2010				
22.09.2010	172	166,0	2270	73,119
23.09.2010	201	194,0	2778	69,822
24.09.2010	202	194,9	2798	69,668
25.09.2010	200	193,0	2764	69,826
26.09.2010	199	192,0	2733	70,265
27.09.2010	200	193,0	2714	71,113
28.09.2010	201	194,0	2749	70,558
29.09.2010	203	195,9	2684	72,986
30.09.2010	200	193,0	2703	71,402
Mois /месяц	4242,0	**4093,5**	**57879,0**	**70,726**

Среднее снижение удельного расхода мазута на тонну произведенного пара на котле	**2,994**	**кг/t**
	4,1	**%**

Фактические показания параметров измерялись штатными приборами входящими в нижний уровень АСУТП котла:
- расход перегретого пара (ANUBAR)
- расход мазута (KROHNE UFM 3030K/2MHz)

Расчет посуточных величин производился верхним уровнем системы АСУТП котла **" Honeywell".**

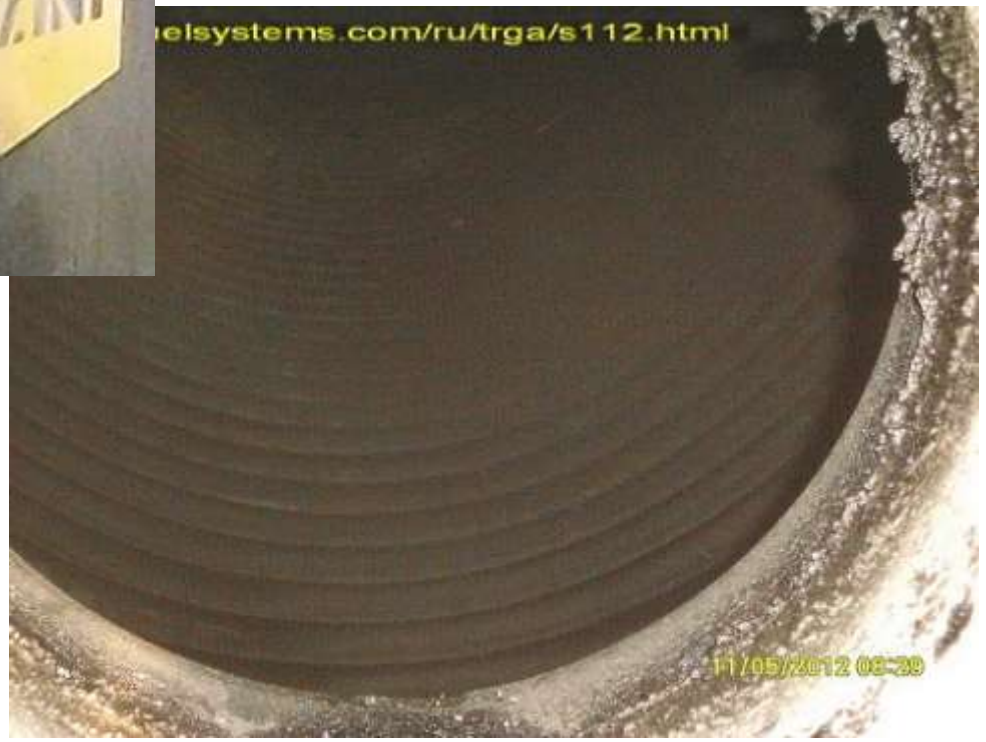
We know how to solve these problems in full or in part, but **the best in the former USSR**.

Example - cardboard factory Aleppo, Syria. 2012 year.

Boiler –
1 boiler with consumption
of 1 m3 of HFO p/h
(MINGAZZINI)

Fuel type –
high-viscosity heavy fuel oil.

Photo - firebox control for 30 days.



No smoke, minimal deposits on the nozzle for 30 days, which are easily removed with a brush for 15 minutes.
www.afuelsystems.com/ru/trga/s228.html

No smoke, all heat exchangers are clean, minimal consumption of fuel oil - all are satisfied.

We know how to solve these problems in full or in part, but **the best in the former USSR**.

Example – Windalco, Jamaica, 2013-2017.

Boilers –
4 boilers with consumption of 8 m3 of HFO p/h

Fuel -HFO №6

Photos - a deposit on boiler hatch and in pipes.

Example - Windalco, Jamaica. 2013-17 year.

Feature - simultaneous use TRGA homogenizer and additives in the fuel.

Before and after
installation of our equipment.

The right screen.
The test time is 10 months.

Example - Windalco, Jamaica. 2013-17 year.

Feature - simultaneous use TRGA homogenizer and additives in the fuel.

Before and after
installation of our equipment.

The left screen and the bottom of the furnace.
The test time is 10 months.

We know how to solve these problems in full or in part, but **the best in the former USSR**.

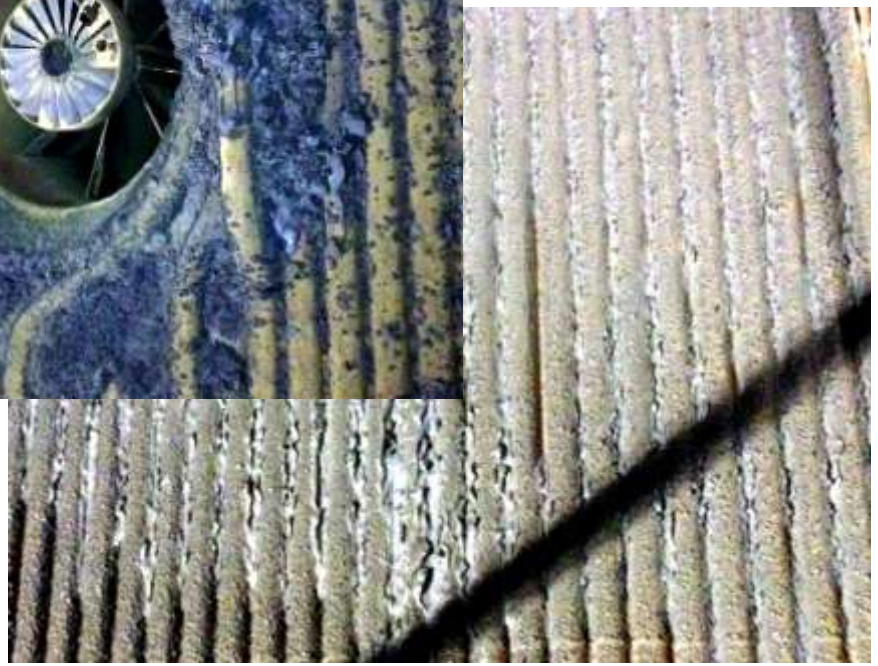
Example - Nickel Plant, Guatemala. 2016 year.

Boiler: 1 boiler consumption 25 m3 of HFO p/h

Fuel type - heavy tar oil.

In the stage of waiting for our answer to the sent proposal. 6 months ...

They can not find money .... for a project with a payback period of 2-2.5 months…



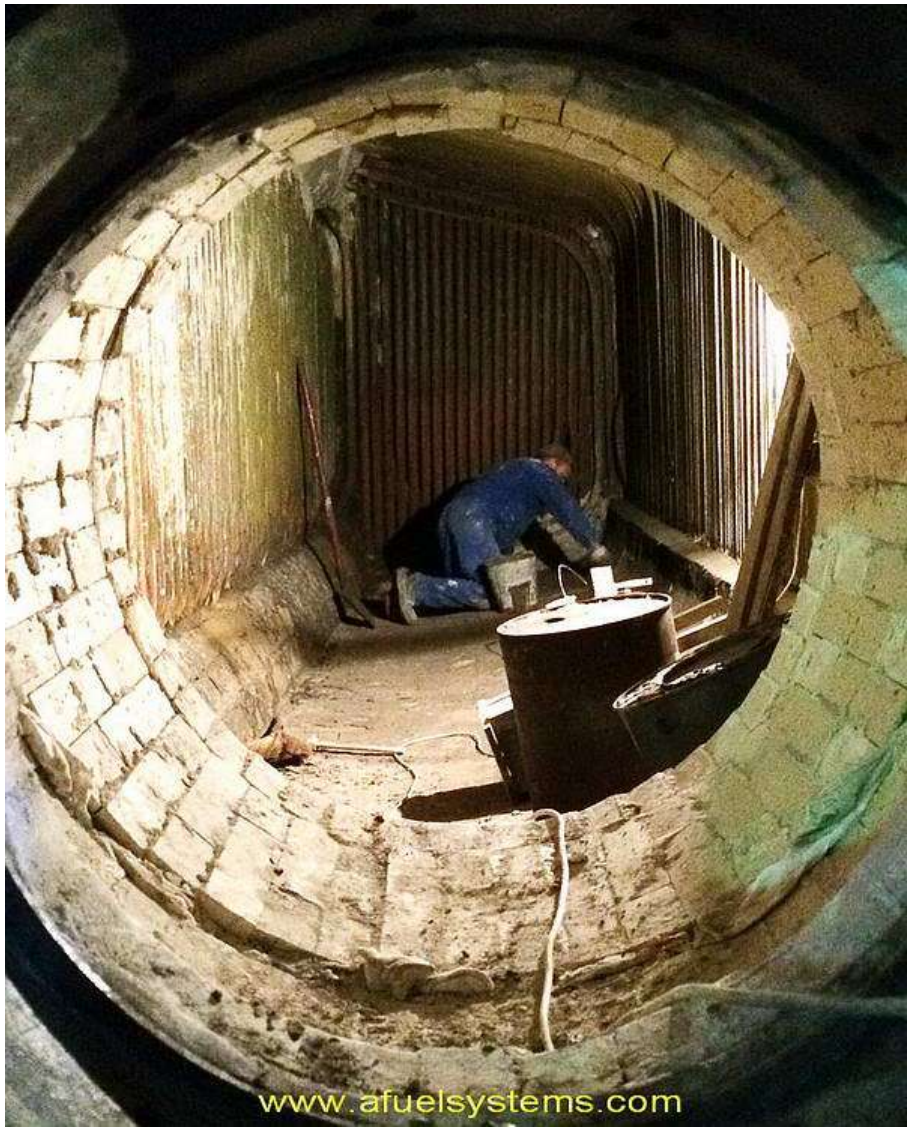
We know how to solve these problems in full or in part, but **the best in the former USSR**.

Example - oil terminal Eximnefteprodukt, Odessa, 2013-2017.

Boilers:
-2 boilers with a consumption of 1 m.cub. HFO p/h (DE 25)
-2 boilers with a consumption of 1 m.cub. HFO p/h (Holman Boiler)

The fuel type is M100 black oil + watered oil sludge from its own tanks. Works successfully from 2013.

Deposit on heat exchangers after 6 months of boiler operation. The deposit is brittle and can be easily removed by tapping.

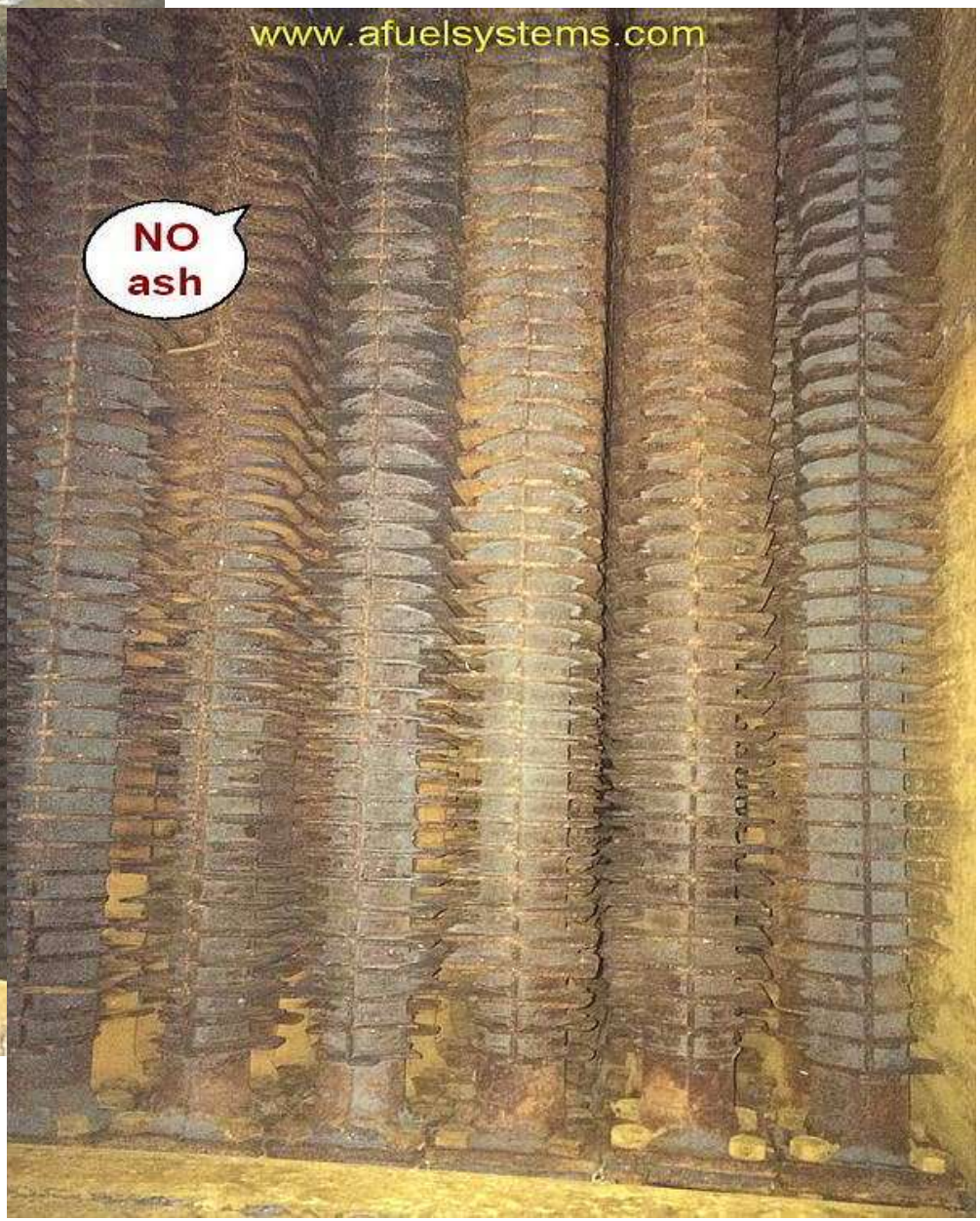


Cleaning boiler "before" – long, hard and mechanical removal of the soot.

Boiler cleaning "after" - tapping and removing bt broom.

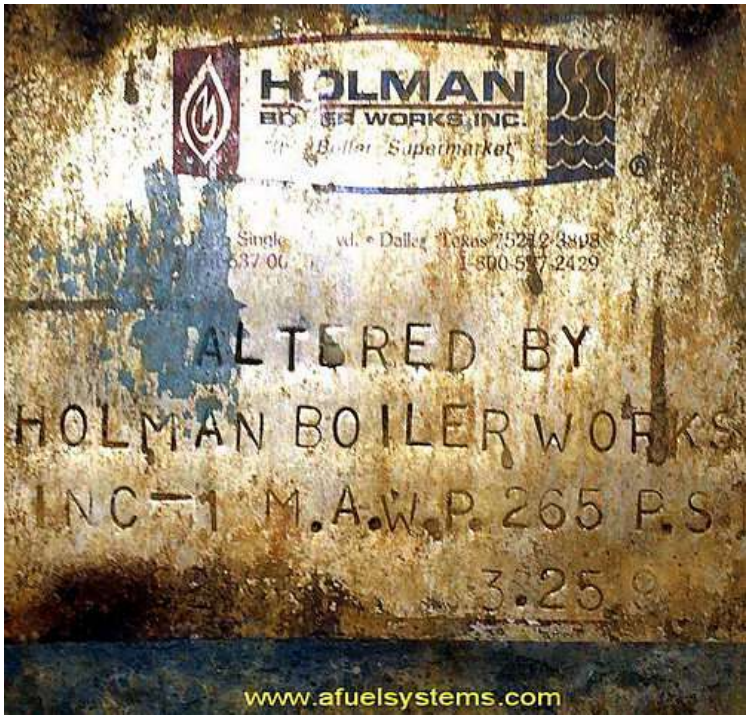
This fuel is combusted completely, leaving on the surface the minimum amount of dry ash which can be easily removed.

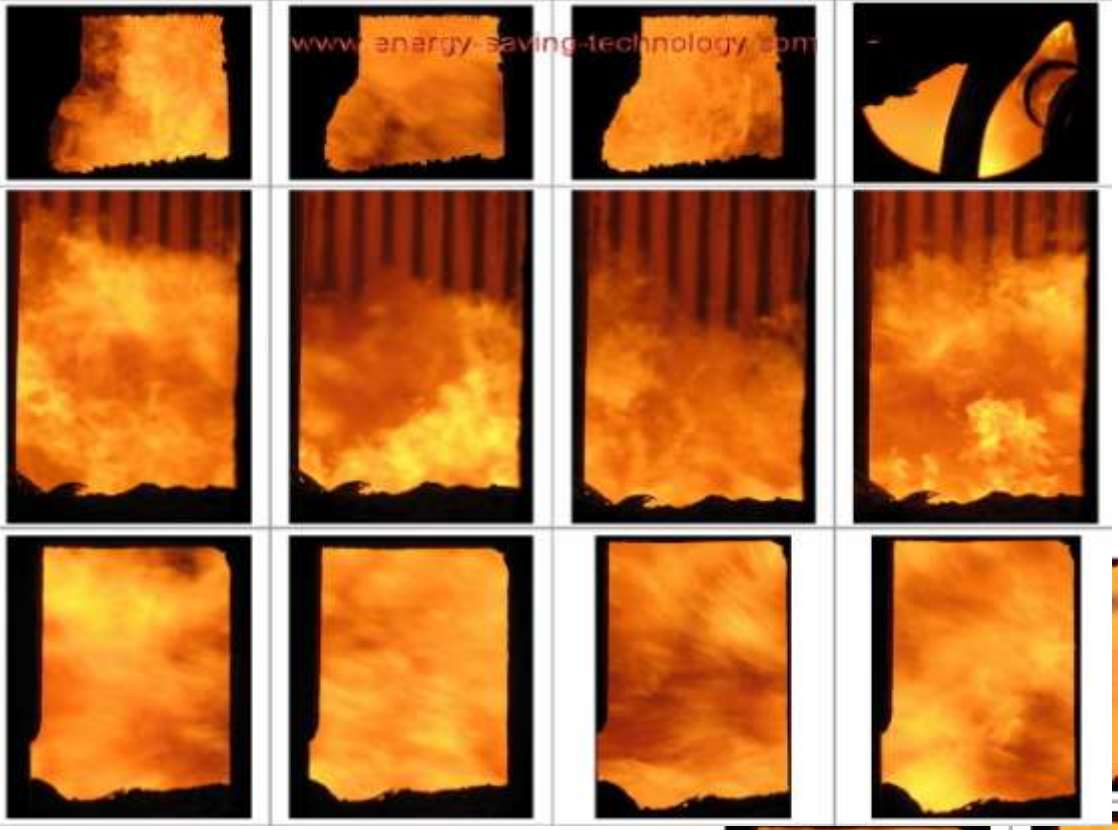
Top - economizer, after 11 months of continuous operation with our equipment (fuel –mixture HFO and sludge).



the minimum amount of dry ash, which can be easily and quickly removed ...

It successfully works for 4 years – Clean heat exchangers, no smoke, no corrosion when burning watered oil sludge (8%) in Russian (DE 25) and American (RILEY UNION Holman Boiler Works Inc.) boilers with light and heavy, high-quality and shocking fuel.





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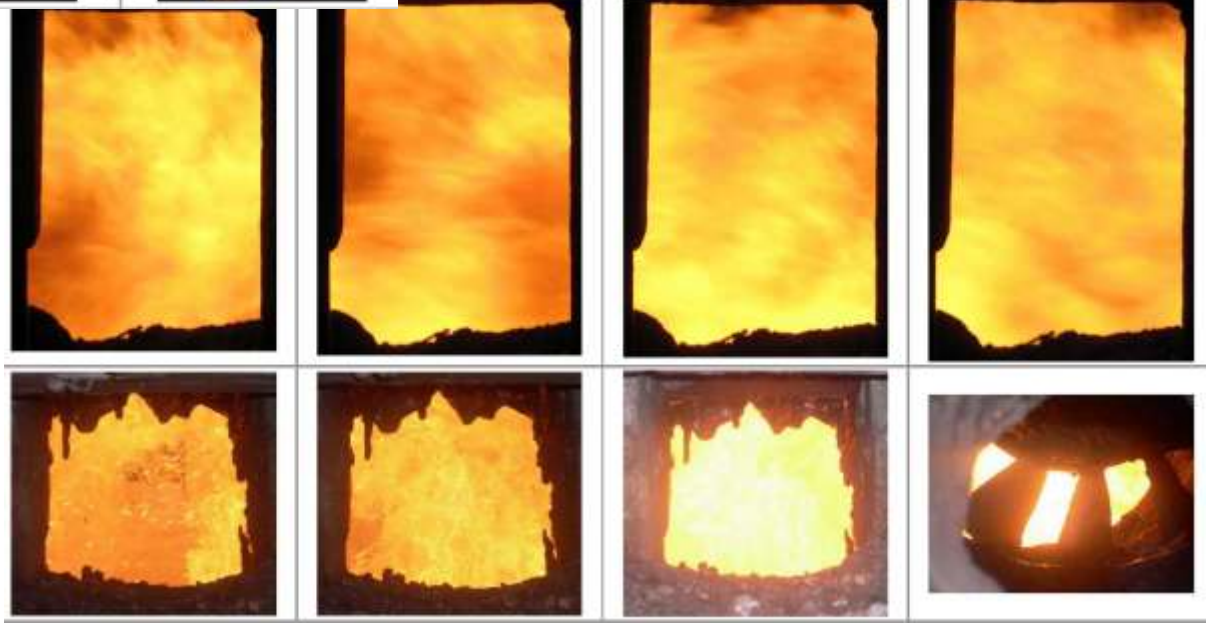
Example – Zaporozhe Iron-ore Combine, 2010-2012.

Boilers:
-2 boilers DKVR 10/13
(0.3-0.7 cub. m. HFO p/h)
- 2 boilers DKVR 20/13
(0.7-1.3 cub. m. HFO p/h)
Fuel type - M100 (HFO#6)
with triple quantity of mechanical impurities . HFO combustion before and after.



Left screen after 3 months of work. Report.

ЗАО «ЗАПОРОЖСКИЙ ЖЕЛЕЗОРУДНЫЙ КОМБИНАТ»

УТВЕРЖДАЮ:
Главный энергетик
ЗАО «Запорожский ЖРК»
Ю.Н.Безручко
«13» 04 2010г.

ОТЗЫВ
о результатах работы гомогенизатора ТРГА-10
на участке «Котельная» Энергоцеха ЗАО ЗЖРК.

В отопительный период 2009-2010гг. участок «Котельная» Энергоцеха ЗАО ЗЖРК столкнулся с проблемой некачественного топлива. Закупленный мазут состоял из смеси мазута М-100, коксохимического мазута, загрязненного обводненного нефтешлама, с большими включениями твердых трудно сгораемых частиц и высокой степенью обводнения (до 20%). Кроме того, эта смесь содержит волокна, которые являются частью разрушенных тканевых фильтров. Сжигание котельного топлива с такими характеристиками засоряет форсунки, загрязняет внутренние поверхности котла, увеличивают унос тепла за счет большого количества несгоревших частиц, увеличивает содержание вредных примесей в дымовых газах.

Было принято решение о монтаже кавитационного струйного гомогенизатора ТРГА-5 (ООО «Техснабкомплект сервис», г.Запорожье).

В процессе эксплуатации было установлено, что данное устройство не обеспечивает необходимый проток мазута для одновременной работы 4-х котлов (2 ДКВР-10/13 и 2 ДКВР-20/13). По согласованию с производителем была произведена замена гомогенизатора ТРГА-5 на ТРГА-10 с большей производительностью. На новом устройстве, из-за внутреннего гидравлического сопротивления, падение давления мазута после гомогенизатора достигает 2 кгс/см^2.

Использование кавитационного струйного гомогенизатора ТРГА-10:

- позволяет изготавливать устойчивые водно-топливные эмульсии,
- обеспечивает полное сжигание мазута,
- измельчает твердые частицы, находящиеся в мазуте, за счет чего эти частицы не засоряют форсунки и сгорают, не откладываясь на внутренних поверхностях котла,
- снижает потребление мазута,
- увеличивает к.п.д. котла и интервалы между очисткой форсунок,
- снижает количество вредных выбросов при сжигании мазута.

Качество обработки мазута и минимальное энергопотребление гомогенизатором ТРГА-10 производства ООО «Техснабкомплект сервис» г.Запорожье, позволяет сжигать обводненный мазут, используя энергию штатного, подающего на форсунки мазутного насоса.

Начальник Энергоцеха ЗАО ЗЖРК С.Е. Гасв

И.о. нач. участка «Котельная»
Энергоцеха ЗАО ЗЖРК А.Ю. Постоялко

Reminder :

all photos and scans in this presentation are received on our equipment and from our customers

Our sites

www.afuelsystems.com

www.energy-saving-technology.com

https://www.youtube.com/user/andrewrubanut/videos?shelf_id=0&sort=dd&view=0

Our technology provides:

Heavy fuel savings, suspension processes sulfuric acid corrosion, reducing smoke, odors, decreased CO, Sox. Possibility of burning watered and substandard HFO, waste of its transportation, washing of cisterns.

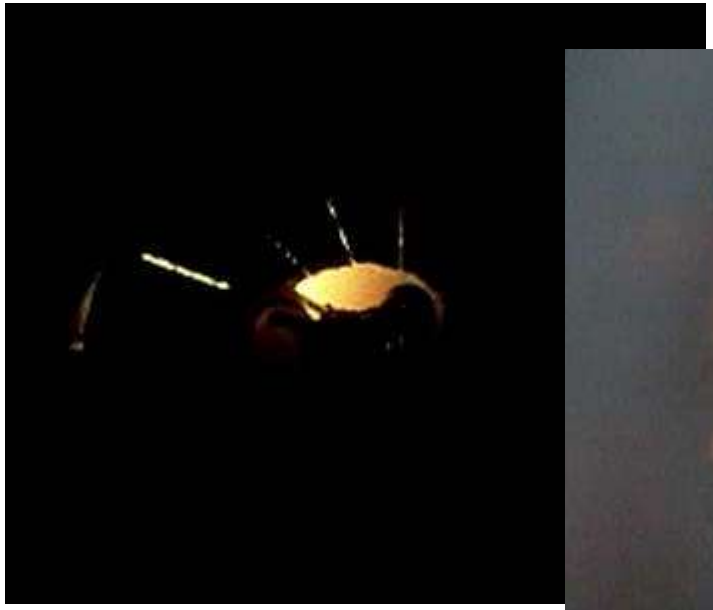
Reduction clogging in heat exchangers, its maintenance, minimization specific consumption for a long time, increases the inter-repair period of boilers, injectors, filters and pumps.

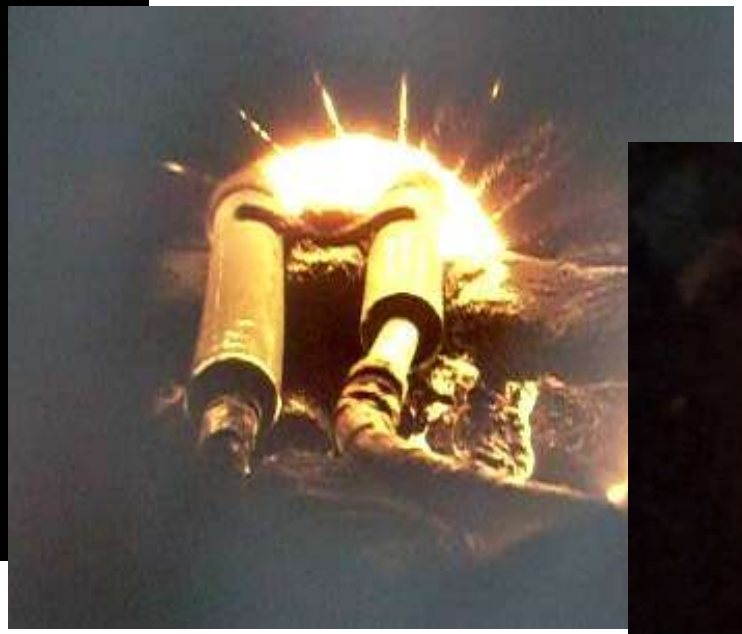
We solve these problems for a long time, successfully and on boilers of any design.

Economic effect **$60,000 - $600,000** for one boiler* per year.
(* depending on the amount of fuel oil burned, from 1 up to 10 tons p/h)

The same boiler - but more calories and energy in fuel and less specific consumption and costs

Work time is 3-4 years.
Some models work for 8 years.
Warranty is 1-2 years.
Payback time is
much less than 1 year.
We offer increase your income on the basis of our equipment and practical knowledge.





Burning of black oil in an industrial boiler – before, after and always. With our equipment.

<u>Objects</u> - industrial boilers and furnaces, cement plants, mines, dairy and sugar factories, power stations, refinery, heat power plant, energy ship…

The main difference - high reliability, long-term effective work with heavy fuels, high quality processing fuels with a viscosity up to 1200 cSt ..

Possibility of installation and maintenance works by customer staff, real experience of successful operation for **8** years, tests, analyzes, **certificates for use in Ukraine, EU and Russia.**

Works on the principle –
- install and forget.

TRGA init, for
power or boiler station.
Working from
01.09.2009 to 10.02.2017.

For HFO economy, reduction of harmful emissions, recycling condensate water and sludge, increasing boiler efficiency.
www.afuelsystems.com

main difference from analogues

1. **Reliable and proven.** Works long and does not break. Tested in the work of 10 years and at more than 150 industrial facilities in the condition of different fuels and poor maintenance.
2. Works on principle - **set - forget.**
3. **Low weight** 10-90 kg, (unlike other 200 kg). It savings in transport and installation costs.
4. **Can use add equipment** - pipes, pumps, valves and other - **from the customer location**.
5. **May be install and served by the customer's staff.**
7. **Different models** work on **heavy and light fuel**.
8. Operating data : pressure **2 - 40 bar**, temperature range "**-20 +250** ” degrees.
9. **High crushing effect**. **Working in aggressive fuels** - coke fuel, jet fuel, and various mixed fuels, may be used for blending biodiesel components comprising methanol and alkali and as a tool for intensifying mixing of liquids or blending.

systems for HFO economy

& oil sludge utilization

155 successful projects
2007 -2017, in Ukraine, Kazakhstan, Belarus, Russia, Syria, Croatia, Serbia, Belgium, Guinea, Jamaica, the Philippines.

award for the best realized project in Ukraine in the field of energy saving in 2009

diploma for the participation in the exhibition Energy Efficiency 2010, Ukraine

certificate Maritime Register of Ukraine on the use TRGA on marine engines and boiler installations, 2011

certificate Maritime Register of Ukraine on the use TRGA on marine engines and boiler installations, 2011

diploma for the participation in the exhibition of the latest energy saving technologies in the national Chamber of Ukraine 2011

ward for third place at the exhibition of the latest energy saving technologies in the national Chamber of Ukraine 2011

quality certificate for EU homogenisation TRGA (quality of production and operation) in 2011

Number in the register of goods and products in the European Union on the device TRGA

diploma for the participation in the exhibition Energy Efficiency, 2011, Ukraine

certificate of compliance ща Russian Federation on module for creating fuel compositions and nonchemical treatment of hydrocarbons 2012

Lloyd's Certificate for the right execution of repair and installation work on the ships of any class, Slovenia, 2012

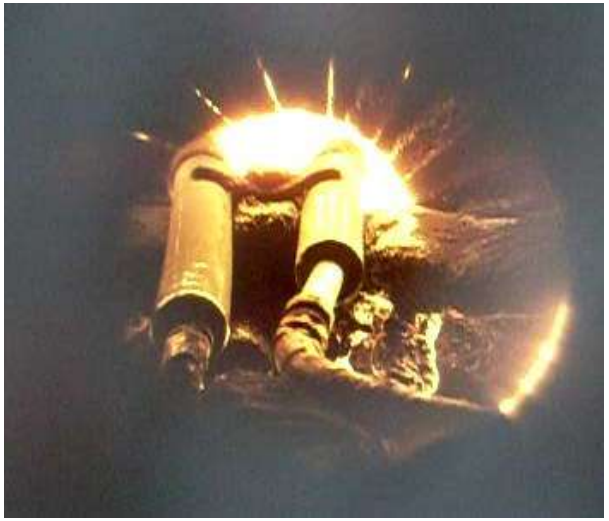
RTN Certificate of the Russian Federation on a series of devices TRGA the right to use TRGA in high risk industrial objects of Russia, Kazakhstan, Belarus. 2012

Awards, certificates and diplomas

Fuel, processed on our systems – **burns better, faster, completely.**

Waste and smoke remain less, the cost of buying fuel and maintenance is reduced.

This is our main competitive advantage.



Examples of fuel processed on our systems **- visual effects.**

Fuel processed by our system – burning better, waste and smoke are less, price for purchase/exploitation is lower.

This is our significant competitive advantage.

Examples of the fuel processing by our system - visual effects

diesel generator exhaust (standard automotive diesel fuel) - 20 minutes of work	diesel generator exhaust (automotive diesel after treatment with a mechanical activator TRGA) - 20 minutes of work
	
выхлоп дизельного генератора (стандартное автомобильное диз. топливо) - 20 минут работы	выхлоп дизельного генератора (автомобильное дизельное топливо после обработки механическим активатором ТРГА) - 20 минут работы

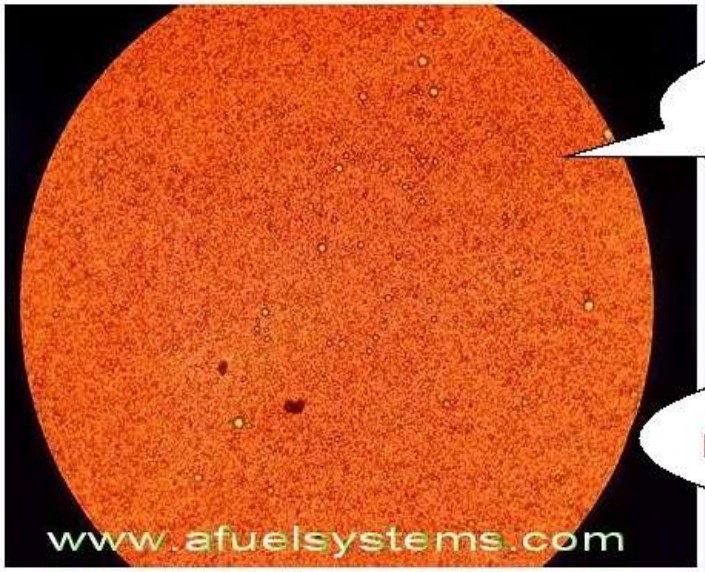
Our first test

on diesel generators with standard, light automotive diesel fuel.

Compare please :

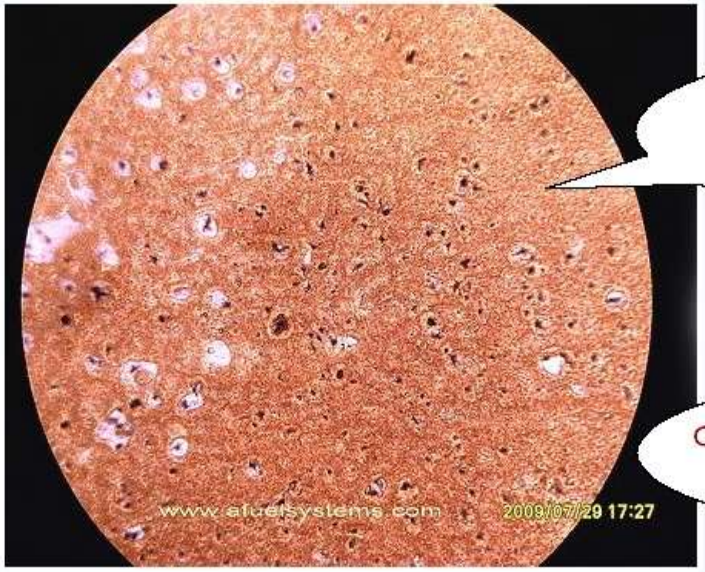
- amount of unburned particles
- completeness of combustion in engine.

A simple test - two sheets of paper near the exhaust pipe

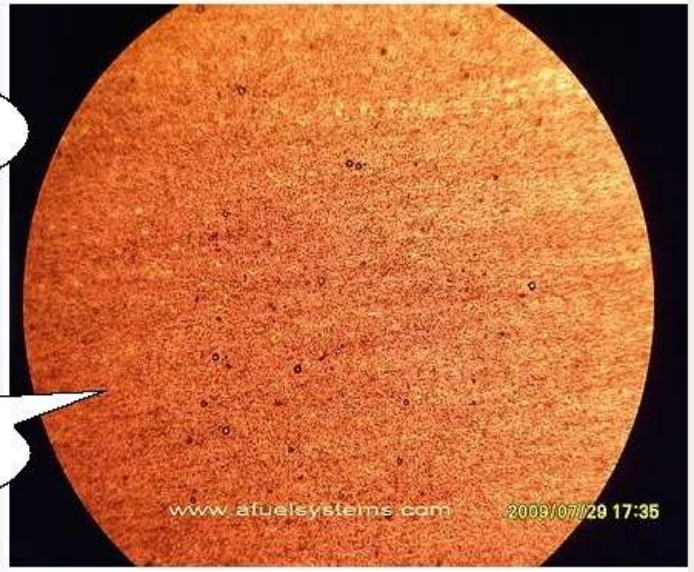


mazut M 100, a standard, before processing, focal ratio - 60

mazut M 100, after processing at TRGA, focal ratio - 60

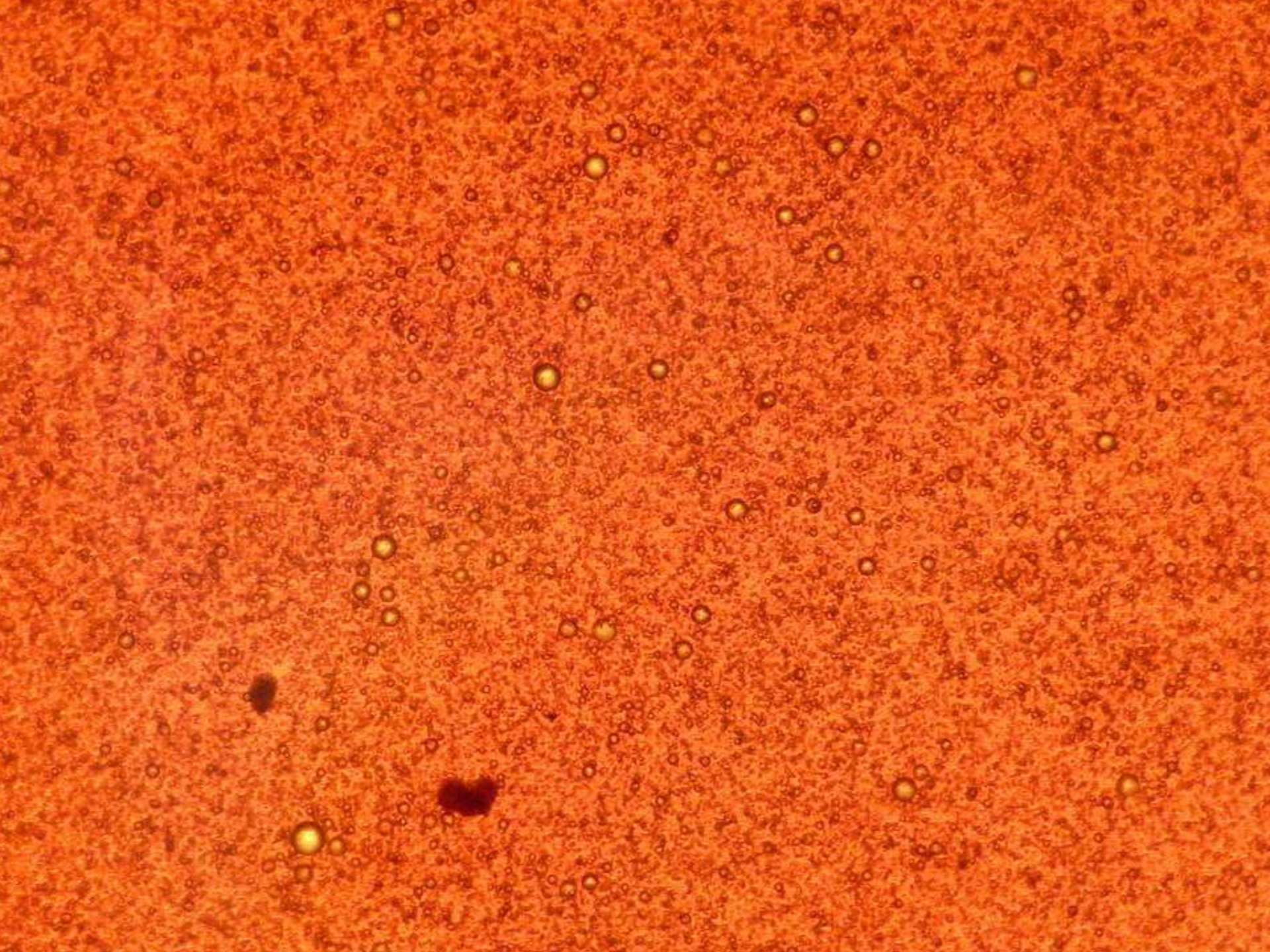


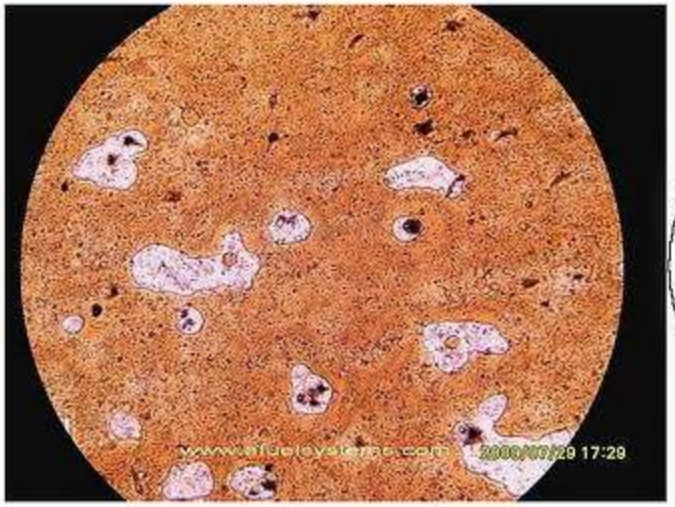
Coal tar, the original standard, focal ratio - 60



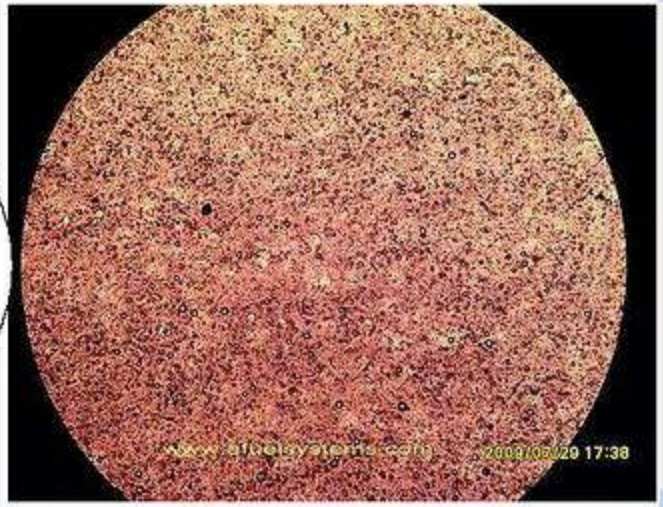
Coal tar, after treatment for TRGA, focal ratio - 60

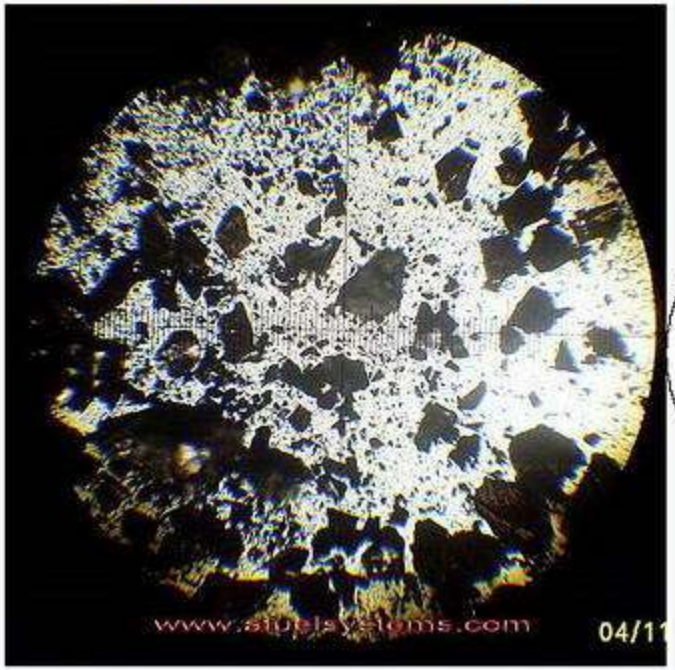
Examples of heavy fuel processing by PSSF system - M100 black oil, coal tar



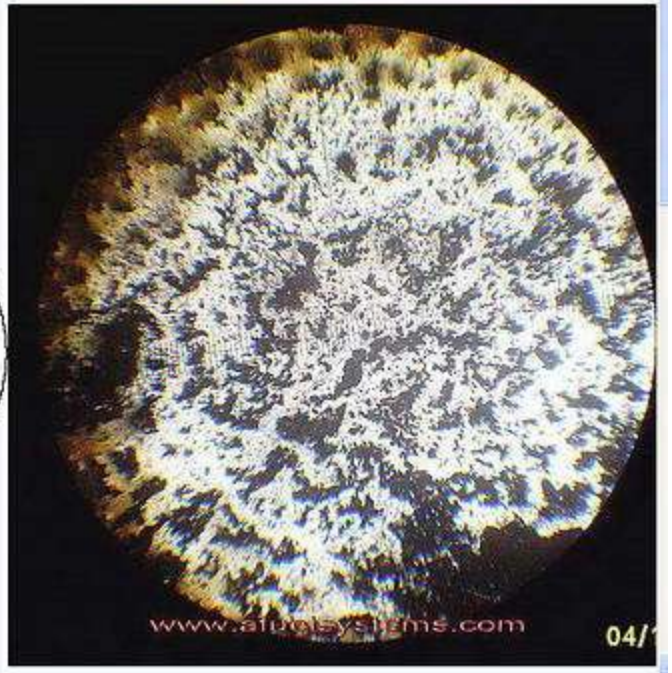


flooding coal tar before and after treatment ratio - 60





coal-water emulsion - before and after treatment ratio - 60



Examples of the fuel processing by our system - coal tar, hydrocarbon fuel

филиала ОАО «РЖД»
Адрес: 680032, г. Хабаровск, проспект 60 лет Октября.

Протокол № 2913
Результатов анализа мазута до установ

№ п\п	Наименование показателя	Норма по ТУ Марка мазута Ф5	Ф 12	40	100	Фактически	Ис
1.	Вязкость кинематическая при 50 °С, сСт , не более	36,2	89,0	-	-		ГОС
	Вязкость кинематическая при 80 °С, мм²\с, не более	-	-	59,0	118,0		
	Вязкость кинематическая при 100 ОС, мм²\с, не более	-	-	-	50,0	14,45	
2.	Зольность, %, не более - малозольный	-	-	0,04	0,05	0,08	ГО
	- зольный	0,05	0,10	0,12	0,14		
3.	Массовая доля механических примесей ,% , не более	0,10	0,12	0,5	1,0	0,595	ГОС
4.	Массовая доля воды, %, не более	0,3	0,3	1,0	1,0	2,8	ГОС
5.	Содержание водорастворимых кислот и щелочей	Отсутствие				отс	ГОС
6.	Массовая доля серы ,% , не более	2,0	0,6	3,5	3,5	1,98	ГО
7.	Температура вспышки, определяемая в открытом тигле, °С, не ниже	-	-	90	110	153	ГОС
8.	Температура вспышки в закрытом тигле, °С, не ниже	80	90	-	-		ГОС
9.	Температура застывания, ОС, не выше	- 5	-8	10	25		ГОС
10.	Плотность при 20°С , г\см³, не более	0,955	0,966	Не нормируется, определение обязательно		0,925	ГО
11.	Теплота сгорания, Дж\кг, не менее	41454	41454	39900	39900	39090	ГОС

Заключение: мазут марки 100 ГОСТ10585-99 не соответствует

филиала ОАО «РЖД»
Адрес: 680032, г. Хабаровск, проспект 60 лет Октября.

Протокол № 2914
Результатов анализа мазута после установки

№ п\п	Наименование показателя	Норма по ТУ Марка мазута Ф5	Ф 12	40	100	Фактически	Метод Испытания
1.	Вязкость кинематическая при 50 °С, сСт , не более	36,2	89,0	-	-		ГОСТ 33
	Вязкость кинематическая при 80 °С, мм²\с, не более	-	-	59,0	118,0		
	Вязкость кинематическая при 100 ОС, мм²\с, не более	-	-	-	50,0	15,20	
2.	Зольность, %, не более - малозольный	-	-	0,04	0,05	0,081	ГОСТ 1461
	- зольный	0,05	0,10	0,12	0,14		
3.	Массовая доля механических примесей ,% , не более	0,10	0,12	0,5	1,0	0,574	ГОСТ 6370
4.	Массовая доля воды, %, не более	0,3	0,3	1,0	1,0	0,9	ГОСТ 2477
5.	Содержание водорастворимых кислот и щелочей	Отсутствие				отс	ГОСТ 6307
6.	Массовая доля серы ,% , не более	2,0	0,6	3,5	3,5	1,96	ГОСТ 1437
7.	Температура вспышки, определяемая в открытом тигле, °С, не ниже	-	-	90	110	155	ГОСТ4333
8.	Температура вспышки в закрытом тигле, °С, не ниже	80	90	-	-		ГОСТ 6356
9.	Температура застывания, ОС, не выше	- 5	-8	10	25		ГОСТ 20287
10.	Плотность при 20°С , г\см³, не более	0,955	0,966	Не нормируется, определение обязательно		0,926	ГОСТ 3900
11.	Теплота сгорания, Дж\кг, не менее	41454	41454	39900	39900	39050	ГОСТ 21261

Заключение: мазут марки 100 ГОСТ10585-99 не соответствует по 4,11

Effect of increased caloric content of fuel oil is confirmed by analysis of Russian Railways in 2013 - the original HFO - water - 2.8%, processed HFO - 6.9%, but the calorie content is almost equal.
Fuel – HFO #6.

On this HFO quality, our systems work 12 months without clogging.
(Aluminum Plant in Guinea)

Different civilizations - the result of one - fuel, after our systems, burns better.

rbr-ecom JN

Datum Cas
28.11.08 15:47:49

Analiza plina

Vrsta goriva	Kurilno olje	
T-zraka	22	°C
T-plina	225	°C
O2	4,8	%
CO	113	mg/m³
NO	352	mg/m³
NOx	565	mg/m³
CO2	11.9	%
Eta	88.3	%
Izgube	11.7	%
Lambda	1.30	
Toc. ros.	46	°C

TOPLANE d.o.o. RIJEKA
Kozala 87
Tel.: 051 54 50 60
Fax.: 051 50 03 08

before CO = 113

After CO = 76

rbr-ecom JN

Datum Cas
28.11.08 16:36:11

Analiza plina

Vrsta goriva	Kurilno olje	
T-zraka	20	°C
T-plina	221	°C
O2	4.9	%
CO	76	mg/m³
NO	361	mg/m³
NOx	582	mg/m³
CO2	11.8	%
Eta	88.3	%
Izgube	11.7	%
Lambda	1.30	
Toc. ros.	46	°C

TOPLANE d.o.o. RIJEKA
Kozala 87
Tel.: 051 54 50 60
Fax.: 051 50 03 08

It was our first test in Croatia in November 2008

(fuel type - light heating oil, ideal of purity, 25 kilometers to the refinery)

Different civilizations – the result of one - fuel, after our systems, burns better.

Less smoke, less carbon, less corrosion, less sludge, less slag, less harmful emissions (Benzopyrene, CO, SO_2, Nox) **less costs to recycle** fuel residues and oily water – it is our standard results for the past 10 years.

Examples of processing sludge from open storage by our system.
Test - oil sludge **visually before and after treatment.**

Исходное сырье - нефтешлам открытого хранения.

Обработанное сырье - нефтешлам после гомогенизации

Examples of processing sludge from open storage by our system.
Test - oil sludge **burning before and after treatment.**

Qualitative changes in the fuel before and after treatment - comparison table - increased caloric reduction in viscosity, partial binding of sulfur. Philippines 2017

And some results that require additional research to determine borders of effect of, but can be explained. **This is the sulfur content.**

The first results summary:

	sulfur content	viscosity (cSt)	Calorific (BTU/lb)	density
Samp. No. 3 - original fuel	0.531	94.33	8,875	0.9822
Samp. No. 2 - original fuel processing by TRGA gomogeniztore 1 times.	0.458	77.84	10,786	0.9722
Percentage comparison	(-13.74%)	(-17.48%)	(+21.53%)	(-1%)
Samp. No. 1 - the starting fuel (HFO) **+ Diesel** 10% + processing by TRGA homogenizer	0.3	9	15.179	0.9103


Intertek

TEST REPORT

Customer: AMERICAN TECHNOLOGIES INC.

Sample Description As Declared:

Look analyzes below ...

Our industrial
TEST RESULTS is 2.44 - 4.1% fuel economy for industrial boiler, oven and on some types of ship engines and industrial diesel generators**.**

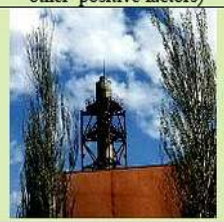
Boilers and power plants not only on land - but also **on the sea,**
on oil rigs on power ships, on ships with boiler power systems…

The same fuel, but more caloric and more energy.

The same objects, but lower specific fuel consumption and maintenance.

Works on the principle –
- install and forget.

But it works not only for open fire!

standard fuel burning & standard losses	or TRGA systems →	for **HFO mechanical treatment** for reduction of specific fuel consumption, sludge & emission
for platforms & power barges (with boilers and generators)		
Using standart HFO → **Get standard energy** → **& standard equipment wear.**	 	**With** TRGA systems **You using less Fuel** ← **But get the same energy** → **& less equipment wear.** ❖ 1-2 months for project. ❖ 2-4 years of successful and safe equipment working (up to 5 years). ❖ Compatible with all industrial boilers. ❖ Payback time 4-8 months.
Call us when you buy this. **We will provide HFO savings 2.66-4.1%,** sludge disposal, long work injectors and pumps, the absence of smoke and long cleaning interval for boiler, nozzles, filter, separator and heat exchangers. It works on land and at sea.		
You primitive burning 10 tonnes HFO p/h. (72 000 tns p/years) ?	**We can save 2.66-4.1% of HFO. we do it since 2007.** →	**Direct economy p/years is $ 648 000.00** (in price Apr. 2017, not including other positive factors)
	**TRGA technology.** Tested on 10 years on 152 successful projects in Russia, Serbia, Croatia, Romania, Guinea, Ukraine, Kazakhstan, Belarus, Tatarstan, Jamaica, Syria, the Philippines, Slovenia.	

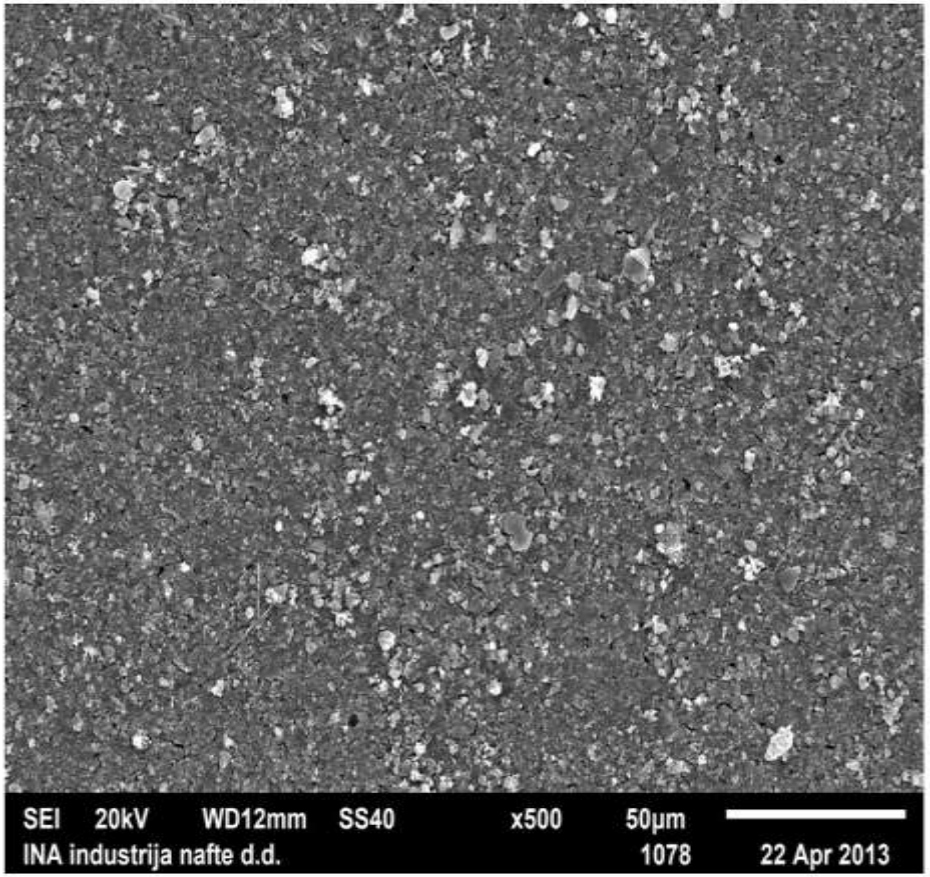
Problem with HFO quality for ships / platforms engines and diesel power plants more critical.

Problems with HFO the same - not complete burning, smoke, harmful emissions, equipment wear, slurry disposal, possibility of using cheaper fuel and reduction of fuel costs.

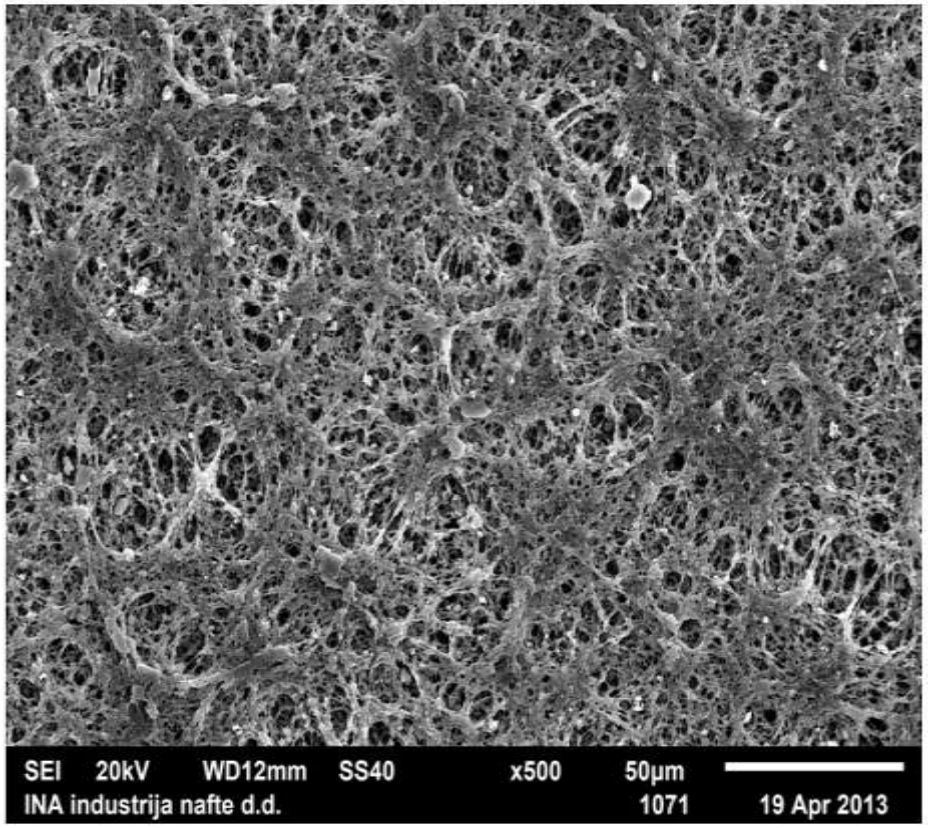
Test - our ship-board system for processing fuel on ships without additives.
It worked continuously, without maintenance and safety for the engine - 1.5 years.
Result: reduction viscosity and ash content, pour point, size dispersion of solid particles, carbon residue, reduction amount of sludge ("-95%"), removing clots. Fuel economy 4%. Reduced smoke and harmful emissions. Conducted by a certified laboratory in Slovenia.

Analysis of the documents - modify the properties of heavy hydrocarbon fuels

shipboard fuel IFO-180 (INA HR)	N		formal standart	original sample	1	2	3	4	comment
density at 15 °C	1	kg/m3	<= 991	947.6	945.7	945.7	948.1	949.6	agree
kinematic viscosity at 50 °C	2	mm2/s	<= 180	138.5	117.8	117.6	129.1	136	super
aromaticity index	3	(CCAI)	<= 860	820	820	820	821	822	agree
total sulfur content	4	% m/m	<= 4.5	1.59	1.56	1.57	1.54	1.49	agree
flash-point	5	°C	>= 60	92.0	94	94	> 100	> 100	*
amount of sediment	6	% m/m	<= 0.10	0.02	0.05	0.04	0.03	0.04	**
amount of coke residue	7	% m/m	<= 15.0	14.06	8.53	8.18	8.19	7.63	super
flow point	8	°C	<= 30	+30	+24	+24	+21	+24	super
amount of water	9	% v/v	<= 0.50	0.1	0.05	0.05	3	5.6	agree
amount of ash	10	% m/m	<= 0.07	0.04	0.04	0.03	0.04	0.04	agree
amount of vanadium	11	mg/kg	<= 200	125	122	120	115	112	super
amount of sodium	12	mg/kg	<= 50	4.93	7.25	7.85	5.72	5.34	***
amount of Al + Si	13	mg/kg	<= 50	5	5	5	5	5	agree
energy value	14	MJ/kg	-	-	41.02	41.02	39.7	38.88	agree
			standart	no add	no add	no add	+3% w	+6% w	



Slika 3. SEM mikrofotografija uzorka "0" , povećanje 500x



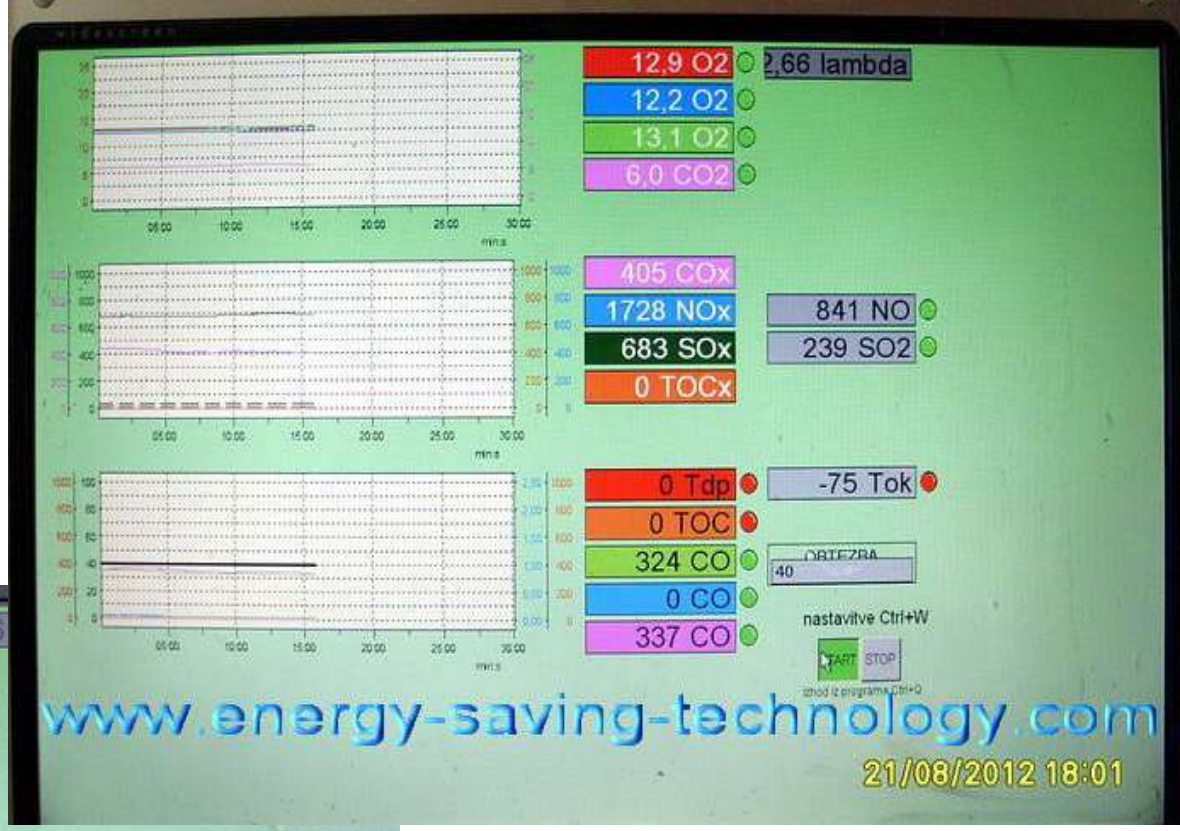
Slika 5. SEM mikrofotografija uzorka "5" , povećanje 500x

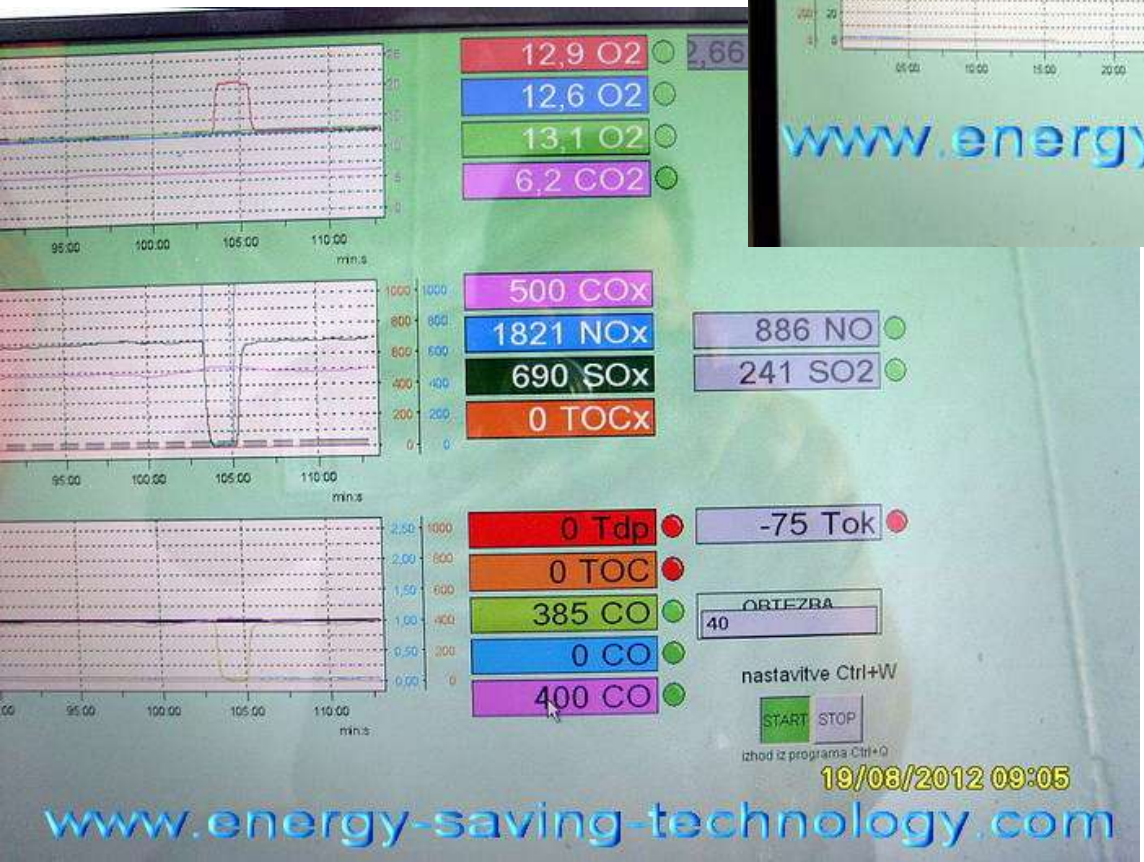
1. Left - laboratory filter is completely clogged by fuel residues from original ship fuel RME IFO 180.
2. Right – the same filter, but fuel after treatment 3 times by our system. It is clean, you can see the filter's structure only and single particles .

Photography

- changes before and after switching on our system.

(Oostende - Ramsgate Aug. 2012)





difference of emissions before and after

Photography

- visual changes in smoke before and after switching on our system on the ship

(Oostende - Ramsgate Aug. 2012)

Channel La Manche - full speed and full load

All traditional system of fuel preparation have common drawbacks:

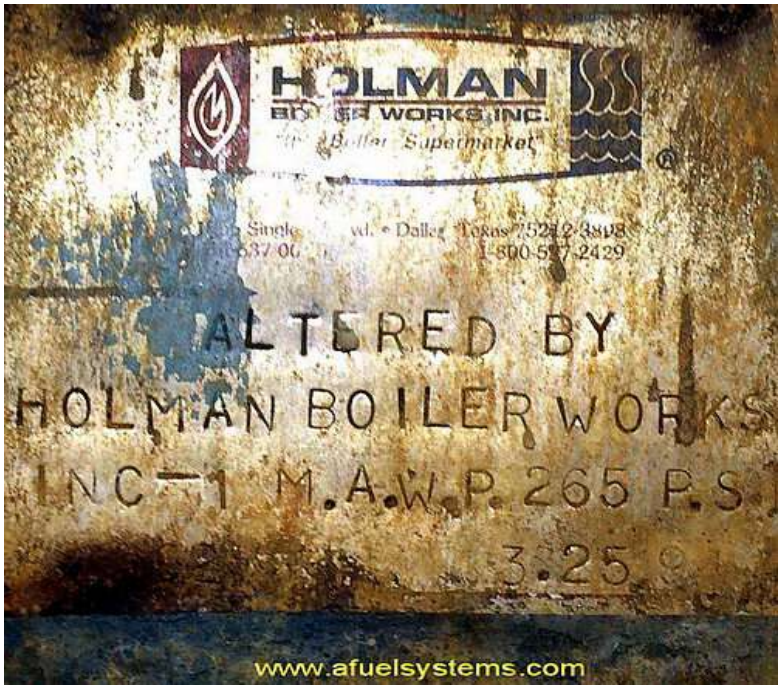
- After filtration (separation) of fuel, **part high molecular fuel moves to sludge tank;**
- It does **not provide complete removal of water**;
- Separation systems are **very expensive** to purchase and maintain.

type of equipment	dewatering	removal of solid particles in the fuel	loss of fuel
filter	**no** (water from the fuel is not removed)	satisfactory	moderate
separator	**good, but not ecselent** (the limit is caused by the fuel density)	good but not complete	**large, up to 3%**
PSSF system	**no** (water dispersity up to 3-5 microns)	**good** - dispersity up to 3-5 microns	**absent**

Our PSSF system - work continuously and without repair 1-2 years, converts 95% of sludge into fuel and totally not destroy the ship or diesel generator engine.

Our system - totally safe for diesel (HFO) **engine** (proved by supervision industrial diesel generator working during the 3 years) **and all boilers**.

Our systems work on old and new boilers, furnaces and engines, on the Russian, American, German and Italian power units, light and heavy, high-quality and shocking fuel.



Contact
5183898@ukr.net
andrruban@gmail.com

cell +(380)505183898
w.f. +(380)472313396
VIBER +380505183898
WhApp +380505183898
Gogol Str. 405,
Cherkassy, Ukraine,
18005.