



ERC PRODUCT RANGE FOR HEAVY FUEL OIL

ERC Dosing Systems and satamin - additives for heavy fuel oil fired boilers

ERC has specialized in the manufacturing, sale and application engineering of additives for fuel oils and solid fuels for the combustion optimisation, corrosion prevention and emission reduction. Many years of practical experience, scientifically proved facts and data, patents at home and abroad guarantee the effectiveness of our products and our concept.

The market situation

The quality of heavy fuel oil for industrial users has declined significantly in recent years. At the same time, plant operators have to comply with more and more stringent pollution control regulations.

The changes in heavy fuel oil quality (in particular, the increased asphaltene concentrations) have led to considerable problems in everyday practice:

- Uneconomical boiler operation due to high level of excess air.
- Failure to meet the prescribed emission limits for particulate matter and NO_x due to the increased formation of soot and flue coke.
- Emission of soot flakes and corrosion of boiler surfaces because the acid dew point is exceeded.
- Thick, persistent deposits leads to increased cleaning and maintenance requirements.

Solutions to problems

ERC GMBH has developed special additives to solve a whole variety of problems, and the company has the necessary technical applications knowledge at its disposal. In this way, ERC is in a position to ensure that all varieties of heavy fuel oil can be fired within the legal limits and achieve a 5 % improvement in energy output through more complete combustion and cleaner combustion surfaces.

Our special scope of service

satamin technology includes a great range of active substances and dosing systems to be combined and adjusted to specific combustion problems.

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ERC - the Emission Reduction Concept

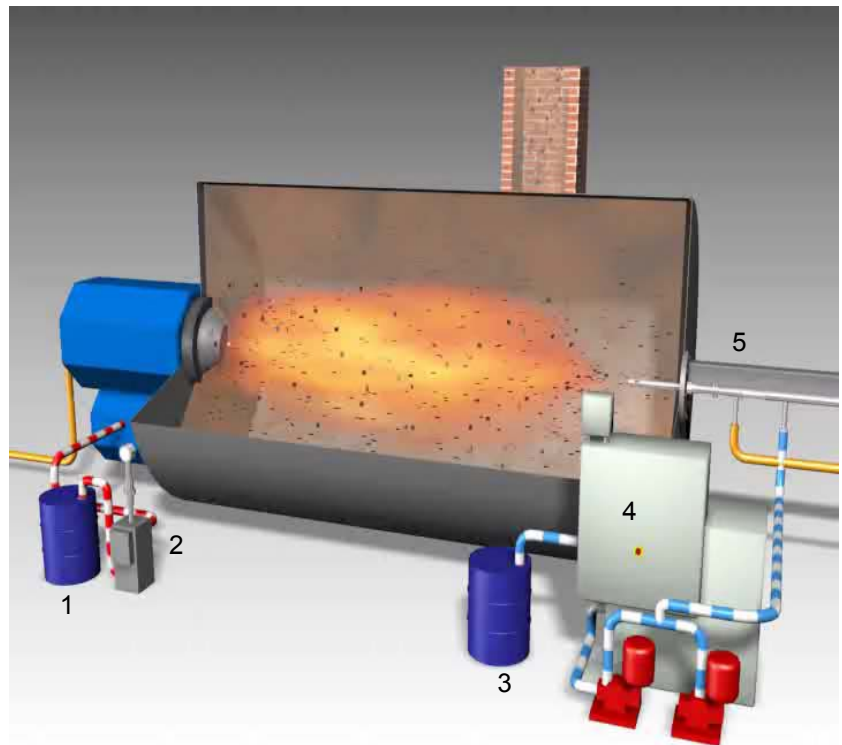
ERC comprises two interlinked systems:

1. The primary system

ERC's proven satamin technology offers an effective solution to the problems of particles, soot, SO^A and CO_x. satamin Primary additives are added to fuel oil immediately before combustion takes place in the burner. This leads to a decisive improvement in combustion performance and enables the statutory emission limits to be met. Furthermore, the use of satamin Primary additives creates a good basis for subsequent NO_x reduction.

2. The secondary system

With this electronically controlled system the liquid, water-soluble additive range of secondary additives for the reduction of the NO_x emission is sprayed directly into the flue gas. The additive input is regulated according to boiler output (load) and NO_x concentration. The system is simple in design and easy to install. As in the case of all ERC emission-reducing additives, satamin Secondary additives and the load and NO_x controlled metering system have been approved by TUV, the German technical authority.




1. Additives for the primary metering system.

2. Primary metering system

3. Additive for the secondary metering system

4. Secondary metering system

5. Mobile spray lance

 Test for Particles, NO_x Reduction and Efficiency Improvement with satamin Emission Report - Heavy Fuel Oil				
Plant operator		Terminal Hamburg		
Measuring point:		Boiler No. 1, chimney		
Boiler	Boiler			
Type:	Rotary Burner	Type: Three-pass boiler		
Oil throughput:	2 x 700 kg/h	Output 20 t/h		
Operating conditions				
	Reading 1	Reading 2	Reading 3	
Load setting	100 %	100 %	100 %	
Water temp./Steam pressure	°C/bar	250/15	250/15	250/15
Feedwater temperature	°C	105	105	105
Air temperature at burner intake	°C	25	25	25
Oil throughput	l/h	1350	1350	1350
Oil producer temperature	°C	86	86	86
Oil pressure - feed/return	bar	1,8	1,8	1,8
Air surplus	%	27	15	15
Time of Measuring		10:00	11:00	14:00
Combustion data				
Without/with satamin	Type	without	P 149	P 149/S 249
satamin concentrations		-	1 : 3500	1 : 3500 / 8 1%
soot number (Bacharach)		3	1	1
CO ₂ -concentration	Vol %	17,5	13,8	13,8
O ₂ -concentration	Vol %	4,3	3,0	3,0
Flue gas temperature	°C	178	170	170
Combustion efficiency	%	92,6	93,6	93,6
NO _x (3 % O ₂)	mg/m ³	210	670	440
CO (3 % O ₂)	mg/m ³	29	<10	<10
SO _x (3 % O ₂)	mg/m ³	1700	1700	1700
SO _x -concentration (Quickspot)	mg/m ³	50	<50	<50
Flue gas quantity p. kg oil	m ³ /kg oil	14,3	13,0	13,0
Particle quantity p. kg oil	mg	2235	445	445
Particle quantity (3 % O ₂)	mg/m ³ dry	158	32	32
Reduction in combustible particles	%	-	80	-
NO _x -reduction	%	-	-	38
Sheet:	Date of test	Present for operator	ERC technician	
1	03.05.1994	Ing. Wismann	Ing. Huber	



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Primary additives

The additive satamin 3107 has been specially designed for use with the fuel-oil grades currently available on the market, satamin 3107 enables all particulate emissions to be reduced, with the exception of the ash content inherent in the heating oil. The NO_x-reducing properties of satamin 3107 have been confirmed in numerous tests:

- In serial tests performed by the TÜV Essen Research and Development Centre satamin 3107 achieved the best test results among more than 10 competing products.

- satamin 3107 was tested in the course of a two-year research project carried out by the Institute für Verfahrenstechnik und Dampfkesselwesen (IVD) at Stuttgart University. The results were published at the VGB Conference "Power plants and the environment". The researchers concluded that satamin 3107 brought about a significant reduction in particular emissions from fuel-oil fired furnace plants. When used in the framework of primary measures, satamin 3107 also reduced NO_x.

- after carrying out exhaustive comparative measurements TÜV-Bayern concluded that- compared with a water-oil emulsion – satamin 3107 produces a considerably greater reduction in particle concentrations.

- TÜV-Wien confirms the environmental soundness of satamin 3107.

- In-situ granulometric analysis carried out by the Institute für Umweltschutz Dr. Graf AG, Bern, confirms the complete combustion of the fuel oil, with no increase in ultrafine particle emissions.

- TÜV Norddeutschland, Hamburg, emission limits achieved in accordance with the Technical Regulations on Air Quality (TA-Luft).

satamin 3126

satamin 3126 effectively neutralizes sulphuric acid and lowers the acid dew point, without at the same time leading to any considerable increase in particle emissions, satamin was one of three ERC additives tested by the Institute für Verfahrenstechnik und Dampfkesselwesen (IVD), Stuttgart. In tests involving a 85 MW boiler, the scientists established a 68% acid neutralisation. Moreover, satamin 3126 proved most effective in reducing soot flake emissions.

satamin 3101

satamin 3101 was specially designed for the application in heavy fuel-oil fired steam generating plants using a heavy fuel-oil with a high asphaltene content and residual oil.

Secondary additives

satamin 3700

This ERG product is a water-soluble additive. In combination with our so-called "secondary system" satamin 3700 reduces NO_x by up to 60% (see Emission Reduction Concept ERG).

satamin 3132

This special additive is a combined detergent and dispersant that keeps oil storage tanks, oil preheaters and oil lines clean. The major benefit of satamin 3132 is that dissolves sludge deposits in storage tanks.

Cost benefit situation

ERC's oil-soluble fuel oil additives produce immediate benefits:

- Thanks to the considerable reduction in boiler deposits and the reduction in excess air, the additives lead to measurable energy saving.

- Less maintenance is required which also leads to an appreciable cut in operating costs.