



PentoMag[®] 2550

A BETTER WAY TO BURN COAL

TECHNICAL INFORMATION

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PentoMag® 2550 Anti Slagging Coal Additive

Introduction

Power Stations import large quantities of coal to cover their demand of fuel, whereby various qualities are supplied, sometimes beyond the control of the operator. Burning coal from different sources means that the behaviour of the ash, its composition and melting temperature can vary very much. This is one of the reasons for slagging problems being present in many utility boilers.

To avoid slagging, power stations sometimes blend several coal qualities. Experience shows, however, that this procedure is not always successful and usually only delays the slag build-up. Furthermore, it is a costly attempt to solve a problem.

Usually the slagging starts on the firebox tubes or around the burners, then, once a first layer has formed, fouling occurs rapidly as the outside of the tubes is not cooled sufficiently anymore. As the temperature begins to increase, also ashes with higher melting points start to melt, leading to an exponentially growing formation of the build-ups. As the ashes are – during operation - in a sticky and molten form, they cannot be removed by sootblowing.

Slagging can be dangerous when big agglomerations (eyebrows) fall down from the burners or superheaters and damage the steam tubes on the bottom of the boiler. It has also led to boiler tripping when big lumps of ash fall into the water-cooled ash collectors, which results in the formation of steam and pressure increase in the firebox.

Development of PentoMag® 2550

Pentol has over 30 years of experience in the development and application of liquid and solid fuel additives used in utility boilers. PentoMag® 2550 was developed in close collaboration with the power industry and has proven to be extremely successful. First practical experience was made in 1984 in a large utility boiler in the Netherlands. Since then, the product effectiveness has been improved continuously to today's standard. At the time being, the experience with PentoMag® 2550 in many different applications allow us to say that slagging can be controlled almost completely in most boiler designs and with most coal qualities.

PentoMag 2550® is a stable suspension of scientifically selected beneficial chlorides and oxides. The product is easy to handle and non-toxic. All components are micronised by a proprietary method to provide a sub-micron, highly reactive product. The result is an extremely low feed-rate in the range of one liter per 20 tons of coal or less.



Application and Effects:

PentoMag® 2550 is added to the coal by a fully automatic feeding system. The feeding takes place onto the coal conveyer belt, between the coal storage and the day bunker. Normally this belt is in operation two or three times per day. An adjustable feed pump is automatically activated by the belt and feeds, whenever the belt is in operation. The dosing onto the coal belt has the advantage of easiness and furthermore, an excellent distribution of the product is obtained.

During the combustion the PentoMag® 2550 ingredients “evaporate” and diffuse into the ash, preventing the ash particles to bond together. The presence of metallic oxides enhances favourably this reaction. The result is, that no hard deposits are formed. Instead, dry, friable deposits are formed which can easily be blown away by soot-blowing,. The analysis of deposits from coal treated with PentoMag® 2550 shows, that the friability is 500 to 1000 times higher than from untreated coal.

Due to the extreme cleaning effect of PentoMag® 2550, it has been possible to keep many boilers in operation at maximum load over periods of one year or more. Untreated, the same boilers had to be taken out of operation every four weeks for cleaning:

Benefits:

- Longer intervals between outages for boiler cleaning
- No eyebrows on top of the burners
- Higher loads and higher temperatures are achieved without slagging. This is particularly important for boilers converted from oil to coal. There the combustion chamber generally is to small for optimum coal firing and down rating can be reduced.
- Flexibility to use a wider range of coal qualities.
- Solution for most slag related problems



Treatment cost with PentoMag® 2550

The cost of the treatment with PentoMag® 2550 is fully covered by the following effects:

- No reduction in heat exchange or heat transfer
Allows a constant power generation at design level
- Longer cleaning cycles result in effectively less down time for cleaning
- No danger of damaging bottom tubes by falling deposits and no tripping due to steam formation in the ash collectors allows more uptime of the boiler
- Higher flexibility for burning lower and cheaper quality coal
- Higher reliability and availability of the boilers

Dosing Equipment



A small storage tank with dosing and recirculation pump is installed near the coal conveyor.



The actual dosing point.





PentoMag® 2550

Description:

PentoMag® 2550 anti slagging coal additive is a stable suspension of scientifically selected beneficial oxides and oxychlorides in a specially compounded light oil.

It evaporates during combustion and prevents the ash particles to bond together. As a result, no hard deposits are formed and no boiler fouling occurs. The friability of deposits from coal treated with PentoMag® 2550 is 500 to 1000 times higher than from untreated coal.

Analysis:

Typical value:

Active ingredients:	1.280 gr./l	Oxides and Oxychlorides
Solid content:	70 %	(approx. value)
Specific gravity:	1.75 - 1.90 gr./l	(approx. value)
Viscosity:	700 – 1.200	cPs (mPas)
Flash Point:	110 °C	(Cleveland open cup)
Colour and odour:	Dark green, gas oil odour	
Erosiveness:	Minor	
Settling time:	Practically none, if prolonged storage product can be re-suspended easily	
Particle size:	Mostly sub-micron	
Delivery:	Drums 380 kg / bulk 1750 kg net	

Application:

PentoMag® 2550 is usually added to the coal on the conveyer belt by means of injection systems designed and supplied by Pentol GmbH.

The injection rate depends on boiler design, boiler load and coal analysis, and is typically 1 liter PentoMag® 2550 per 20 to 40 tons of coal.

Above mentioned data have been determined with utmost care and should be reliable. Nevertheless, any recommendations made are without guarantee, since conditions of use are beyond our control.



Questionnaire

If you are interested in a quotation for a PentoMag 2550 application, please provide us with your boiler data. Our sales team will propose a dosing system suitable for your plant.

1. GENERAL INFORMATION:

Company: _____

Address: _____

Name of Plant: _____

Person to contact: _____

Telephone: _____

Telefax: _____

E-Mail: _____

2. BOILER DATA:

Boiler Manufacturer: _____

Number of Boilers
for treatment _____

Kind of Boilers: _____

Size of Boiler
(Electrical Performance): _____

Boiler No.: _____

Steam Capacity / MW _____

Coal Type: _____

Fuel Coal Consumption
(each boiler): _____