Document RB-25

INDUSTRIAL APPLICATIONS OF CLEANING AGENT "rb bertomeu" belim F

- **Operation of air filter cleaning (in oil bath) in a power plant.**

- **Cleaning of metallic components by immersion.**

rb bertomeu S.L.
Technical Department
July 1999

Pol. Ind. Fondo de Llitera, Par. 82-83 - E-22520 Fraga, Huesca (España)
Tel. +34 974 47 48 04 / +34 630 43 08 43
www.rbbertomeu.es - rbbertomeu@rbbertomeu.es

CLEANING OPERATION OF THE AIR FILTER (IN OIL BATH) IN A POWER PLANT

June 1997

PRODUCT USED: Cleaning agent **"rb bertomeu" belim F**

TYPE OF FILTER : VULCAN - DELBAG KCA-208

SHAPE : Cylinder / truncated cone

DIMENSIONS	:	External Diameter of cylindrical section	: 1,630 mm.
		Total height of the filter	: 1,100 mm.
		Approx. Volume of filter	: 1,400 litres
FILTER LAYER	:	Thickness of the layer	: 165 mm.
		Approx. Volume of filter material	: 600 litres

In a Power Plant, equipped with engines of 6.3 MWe, it was necessary to clean the air filters supplying the air for combustion, as they had lost their capacity to an unacceptable degree, due to the dirt accumulated in the filter material.

The filter, Vulcan - Delbag type in oil bath, had a volume of filter material of some 600 litres, saturated in a paste of oil and dust mixed together, which needed cleaning to restore the surface of the filter and the passage of air.

From the outset, it was considered impractical to effect cleaning by immersing the filter in a bath of liquid, due to its volume (1.4 m^3), which would have required a suitable recipient as well as a large volume of solvent liquid.

It was also considered unwise to proceed to clean with water and detergent, as in previous experience this had proved unsatisfactory, a slow and inefficient operation, but, above all due to the large quantities of polluting waste water produced, which cannot and ought not to be drained into the public sewer nor into natural water courses.

The solution consisted of suspending the filter above a 200-litre drum without the lid, which contained the solvent and above which there was a "funnel" of suitable dimensions (see photographs). Using a small pump and a hose, with an applicator on its end, the solvent was pumped into the interior of the filter material and collected by gravity in the drum. This method provided a closed-circuit cleaning system.

Pol. Ind. Fondo de Llitera, Par. 82-83 - E-22520 Fraga, Huesca (España)
Tel. +34 974 47 48 04 / +34 630 43 08 43
www.rbbertomeu.es - rbbertomeu@rbbertomeu.es

The cleaning liquid used was as follows:

Total quantity in circulation: 100 litres
Composition : Cleaning Agent "rb bertomeu" belim F .... 50 %
Gas oil ..... 50 %

The cleaning operation was a success, the filter resulted completely free of paste, although the process was slow, because the pump volume was not large enough to permit operation with a larger applicator and at a greater pressure. Otherwise it would probably have been possible to significantly reduce the time spent (two days for one worker). However, according to information from the plant, if cleaning is performed using water and detergent, the operation is much slower and more arduous, producing a polluting effluent, which needs treatment before being disposed of.

With the use of our cleaning agent **"rb bertomeu" belim F**, polluting effluents are not produced, because at the end of the process, the liquid can be decanted so that the sediment of silicates of the dust settles. The liquid is then stored for re-use in cleaning or for mixing with fuel oil to be used as fuel in the plant itself.

Once the filter was clean, before fitting it back, it was cleaned quickly with water and detergent to remove the remains of the mixture of belim F and gas oil that impregnated the filter material.

The accompanying photographs show the equipment used and some details of the cleaning operation.

On the basis of this experience, we recommend the following modifications to the system used, in order to make it more efficient and speedier:

1- **Use the 200-litre drum without the lid, for simplicity's sake, as the tank for the cleaning liquid.**
2- **Increase to 150 or 170 litres the volume of cleaning liquid in circulation.**
3- **Maintain the same proportion of 50 % of "Cleaning Agent belim F" in the cleaning liquid.**
4- **Use a centrifugal pump with a minimum flow of 5-7 m^3/h, at a pressure of 6-8 Kg/cm^2 (a 2-3.5 kW pump)**
5- **Use an applicator with a minimum width of 50mm, to cover a greater surface area of the filter at each application, or use a full conical spray at 120º, keeping an outlet section of 7-8 mm^2 / m^3 of liquid.**
6- **Apply intermittently compressed air to the filter, at the maximum flow available, to facilitate loosening and shifting the dirt with the cleaning liquid.**

With the hindsight of the experience described, several cogeneration plants have cleaned the filter following a similar procedure.

Pol. Ind. Fondo de Llitera, Par. 82-83 - E-22520 Fraga, Huesca (España)
Tel. +34 974 47 48 04 / +34 630 43 08 43
www.rbbertomeu.es - rbbertomeu@rbbertomeu.es

However, it must be noted that due to a break in the filter material caused when dismantling one of the filters (probably due to defects in the method of dismantling, as it was the first time it was carried out in this plant) the firm which installs this type of filters, VULCAN, stated that it was preferable to clean them without dismantling the packet of filter material. Recently, in 1999, this new system has been used successfully in a cogeneration plant equipped with the same type of air filter. The operation was performed following the same procedure as that described above, but with the following differences.

a- **The packet of filter material was not dismantled, remaining in its normal position.**
b- **The truncated-cone section of the upper part of the filter was not dismantled, in order to expose the filter material so as to perform the cleaning directly with the applicator of belim F.**
c- **Previously all the oil contained in the filter was removed. This oil was re-introduced into the filter on completion of its cleaning.**
d- **The cleaning agent belim F pumped towards the filter was collected, after draining, in the lower part of the body of the filter (where the oil is situated), without mixing with the oil that had already been extracted.**
e- **From the lower part of the filter, the belim F was delivered, via a different pump (a low-pressure pump, as it was only for transferring it) to the tank of the cleaning agent to close the circuit by pumping it towards the filter material with the pressure pump.**

On completion of the cleaning with a mixture of **"rb bertomeu" belim F** and gas oil, the operation continued as usual with a last washing with water and detergent to remove the remains of the solvent and a final blowing with air. The operation was carried out with complete ease, and the filter resulted absolutely clean, as if the operation had been performed by dismantling the packet of the filter material.

Pol. Ind. Fondo de Llitera, Par. 82-83 - E-22520 Fraga, Huesca (España)
Tel. +34 974 47 48 04 / +34 630 43 08 43
www.rbbertomeu.es - rbbertomeu@rbbertomeu.es

CLEANING METALLIC COMPONENTS BY IMMERSION

April 1999

PRODUCT USED : Cleaning agent **"rb bertomeu" belim F**

TYPE OF BATH : Drum with inner basket, designed by **rb bertomeu S.L.**

DIMENSIONS : Inner Diameter of basket: 410 mm.
Total height of the basket: 500 mm.
Maximum content of cleaning agent: 100 litres

MATERIAL : Carbon steel

The **cleaning agent "rb bertomeu" belim F** , is product designed for the cleaning of metallic components which have been impregnated with organic residues originating in petroleum (See Table of Specifications), which are increasingly being used with success in plants that use fuel oil and other oils (cogeneration plants, steam boiler, dryers, etc.).

En the Table of Specifications of the cleaning agent, it indicates that in the case of components to be cleaned which have firmly adhered residues, it is recommendable to submerge them for a period (1 hour approx.) to obtain the most effective cleaning possible. This operation can also be performed even though the residues may not be especially resistant, simply for the sake of convenience.

rb bertomeu S.L. has designed, to facilitate the cleaning of metallic components by immersion in **"rb bertomeu" belim F**, a recipient o container that can be supplied at the request of the client.

This recipient is made of carbon steel and is made up of the following elements:

1 – A vertical cylindrical drum, slightly conical towards the bottom, with a lid with a spring-action closure.

2 – An inner basket inside the drum made of perforated sheet metal, with supporting feet at the bottom and handles at the top end to make handling easy.

Pol. Ind. Fondo de Llitera, Par. 82-83 - E-22520 Fraga, Huesca (España)
Tel. +34 974 47 48 04 / +34 630 43 08 43
www.rbbertomeu.es - rbbertomeu@rbbertomeu.es

The design took into account the fact that the components for cleaning can be of small to medium size (from bolts and screws up to elements of approx. 0.5m in length) and that the equipment should be easy to handle by the operators, as well as a compact size.

The components to be cleaned are placed in the inside of the drum containing **cleaning agent "rb bertomeu" belim F**. The dirt that is continually loosened, and which is not soluble in the cleaning agent, is gradually deposited at the bottom of the tank, leaving the bottom of the basket free and gradually taking up the space between the bottom of the basket and the tank itself, given that the basket has its support legs.

On completion of the cleaning process, the basket is removed, allowing it to drain briefly above the drum, so as not to spill any of the cleaning agent. Once the components have been extracted, **cleaning agent "rb bertomeu" belim F** remains in the drum ready for future cleaning operations. At the bottom of the drum residues will accumulate which can be removed from the bath periodically by decantation. In this way, the cleaning agent can be re-used several times, replacing the small amount that may be lost by evaporation, and all the while it clearly retains its power as a cleaning agent.

When the recipient is not being handled, it is advisable to keep it closed with the spring-action lid to prevent the evaporation of the **"rb bertomeu" belim F**, for both economic and safety reasons (it must be remembered that all cleaning agents give off inflammable vapour).

The first tests of this cleaning system were carried out in a Cogeneration plant with great success in its reception from the maintenance personnel. The photographs included herein correspond to these tests and show in precise detail the components of the recipient and the placing of a number of components in the basket.

Pol. Ind. Fondo de Llitera, Par. 82-83 - E-22520 Fraga, Huesca (España)
Tel. +34 974 47 48 04 / +34 630 43 08 43
www.rbbertomeu.es - rbbertomeu@rbbertomeu.es