DESCRIPTION

Falchem walnut shell are organic materials with controlled particle size used for cleaning blades of gas side of exhaust-gas turbochargers in modern diesel engines. The specific structure of Falchem walnut shells is such that when injected by means of compressed air upstream in the gas side of the turbine it causes a slight abrasive action which maintains the turbine is always clean.

Once injected in the turbine Falchem walnut shell burn and disappear into the atmosphere through the stack without causing any detrimental chemical reaction. Although that method is efficient it presents a number of drawbacks such as reduction of the rpm of the engine during the entire cleaning process, which causes a loss of speed. Furthermore there is always the risk of forming corrosive acids in presence of sulfurous residuals in the discharge duct.

*WITH FALCHEM WALNUT SHELL IT IS NOT NECESSARY TO REDUCE THE SPEED OF THE ENGINE.

*THERE IS NO RISK OF CORROSION DUE TO ACID FORMATION.

When used regularly, Falchem walnut shells increase significantly the time between maintenance services. Obviously, maintaining the turbine in a perfectly clean condition gives trouble-free operation and improves efficiency.

DOSAGE

Follow the instructions of the manufacturer of blower turbines. As an indication, an average dosage for a 8,000 to 10,000 HP engine would be 0.6-0.8 dm³ of Falchem walnut shell injected daily in the blower turbine.

PACKING

Bag of 20kgs.
Instead of water, dry solid bodies in the form of granules like Falchem walnut shell are used for cleaning. A certain quantity of them, depending on the turbocharger size, is blown by compressed air into the exhaust gas lines before the gas inlet casing. On account of their hardness and composition (natural solid granules size 1.3-1.7mm.) Falchem walnut shells have an excellent mechanical cleaning effect (soft blast). As a rule, a turbine should be cleaned every 24 to 48 hours of operation.

PRINCIPLE
Falchem walnut shell is blown by compressed air into the exhaust pipes before the turbocharger. This method of cleaning should be employed every 24 – 48 hours of full-load operation. The interval between cleaning operations depends on the degree of contamination and on the increase in exhaust gas temperature after the turbine. Cleaning must be repeated if the gas temperature after the turbine on full load rises to 20°C (20k) above the mean temperature. For a turbocharger with several gas inlets, the inlets should be cleaned one after the other. On engine with several turbochargers, these should be cleaned one after the other.

The gas inlet temperature before the turbine must not exceed 580-590°C (853-863 K) in order to prevent severe burning of the Falchem walnut shell before the turbine. Since it is not possible to remove thick coatings with relatively small quantities of Falchem walnut shell, this method must be used more frequently. Injection of the Falchem walnut shell into the turbine is best performed at high turbocharger speed, to ensure efficient mechanical cleaning.

INSTALLATIONS OF FALCHEM WALNUT SHELL CLEANING SYSTEM
- Before each gas inlet, an adequately dimensioned pipe flange has to be selected and installed in the exhaust gas line (welded or cast eye).
- Manufacture of containers (same number as gas inlets) as shown in the following drawing (welded assemblies).
- Mount the fittings such as valves and the like.
- The container has to be mounted with the strap provided for this purpose at an easily accessible location, the cock or gate valve being at least 300 mm above the corresponding pipe flange in the exhaust gas line. Maximum distance between cock or gate valve and pipe flange/exhaust gas line: 1 meter.
- Arrange the compressed-air pipe to the container.
- Mount a connecting pipe (outside diameter: 16m, inside diameter: 12m, maximum length 1 meter), preferably of stainless steel and possibly with a bend radius R of at least 150mm.
CLEANING PROCEDURES
For engine with several turbochargers, clean one after the other as follows:
1. Close safety valve, tighten the valve cap. Open the cock/gate valve.
2. Open the compressed-air stop valve. Possible deposits and/or condensate in the connecting pipe are now blown out. Close the compressed-air stop valve after about 3 minutes.
3. Close the cock/gate valve.
4. Open the safety valve. The exhaust gas pressure in the container is thus relieved. Close the safety valve.
5. Remove the valve cap. Fill the container with the quantity of Falchem walnut shell product specified in the table next page.
6. Check on whether the safety valve is closed. If at all required, reduce the engine output so that the gas temperature before the turbine is < 590°C (863k).
7. Open the cock/gate valve.
8. Open the compressed-air stop valve. The previously filled in Falchem walnut shell are now blown in. Close the compressed-air stop valve after 1 to 15 minutes.
10. Open the safety valve. The exhaust gas pressure in the container is thus retrieved. Close the safety valve.
11. This procedure (item 1 to 10) has to be repeated for any further turbocharger.
12. Cleaning should than be repeated at periodical intervals of every 24 to 50 hours of operation.

ATTENTION: It may occur that, during dry cleaning of the turbine, a small part of blown-in Falchem walnut shell escapes through the chimney in singed condition.

PRODUCT CHARACTERISTICS

APPEARANCE: Brown color, solid natural granules.

GRID: 8/12 & 12/20

CORROSIVE: None

ACTION

PACKING: Bags of 20kgs.

Nature of Special risks
And safety advice: None

Falchem walnut shell is produced from hard shells of fruit stones that have been stabilized by drying and degreasing. Ligneous residues and foreign matter such as mineral or metallic particles are eliminated.

Falchem walnut shell is the result of many years of practical experience in blending the raw material to achieve a highly homogeneous and efficient product.

No chemicals are used in our production process. The raw materials are only treated mechanically. Hence the use of Falchem walnut shells is perfectly safe and harmless.
# Falchem Walnut Shell Dosing Equipment

## Suggested Quantity of Falchem Walnut Shell (in dm³) per Turbocharger or Gas Inlet and Number and Size of Containers Required in Each Case

<table>
<thead>
<tr>
<th>Container Size</th>
<th>Volume (dm³)</th>
<th>Ø D (mm)</th>
<th>H (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>ca. 1</td>
<td>ca. 100</td>
<td>ca. 130</td>
</tr>
<tr>
<td>II</td>
<td>ca. 3</td>
<td>ca. 150</td>
<td>ca. 170</td>
</tr>
<tr>
<td>III</td>
<td>ca. 5</td>
<td>ca. 180</td>
<td>ca. 200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VInC</th>
<th>Quantity of Solids in dm³ per Turbocharger and Cleaning</th>
<th>1 Gas Inlet</th>
<th>2 Gas Inlet</th>
<th>3 Gas Inlet</th>
<th>4 Gas Inlet</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0.2...0.1</td>
<td>I 1</td>
<td>x0.5</td>
<td>I 2</td>
<td>each 0.15</td>
</tr>
<tr>
<td>200</td>
<td>0.3...0.4</td>
<td>I 1</td>
<td>x0.4</td>
<td>I 2</td>
<td>each 0.2</td>
</tr>
<tr>
<td>300</td>
<td>0.4...0.6</td>
<td>I 1</td>
<td>x0.6</td>
<td>I 2</td>
<td>each 0.3</td>
</tr>
<tr>
<td>400</td>
<td>0.6...1.0</td>
<td>II 1</td>
<td>x1.0</td>
<td>I 2</td>
<td>each 0.5</td>
</tr>
<tr>
<td>500</td>
<td>1.0...1.6</td>
<td>II 1</td>
<td>x1.6</td>
<td>II 2</td>
<td>each 0.8</td>
</tr>
<tr>
<td>600</td>
<td>1.6...2.0</td>
<td>II 1</td>
<td>x2.0</td>
<td>II 2</td>
<td>each 1.0</td>
</tr>
<tr>
<td>700</td>
<td>2.0...2.4</td>
<td>II 1</td>
<td>x2.4</td>
<td>II 2</td>
<td>each 1.2</td>
</tr>
<tr>
<td>716</td>
<td>2.4...2.8</td>
<td>III 1</td>
<td>x2.8</td>
<td>II 2</td>
<td>each 1.4</td>
</tr>
<tr>
<td>750</td>
<td>2.8...3.0</td>
<td>III 1</td>
<td>x3.0</td>
<td>II 3</td>
<td>each 0.9</td>
</tr>
</tbody>
</table>

* For those types of turbochargers, not all the gas inlets specified in this table are available.

**Remark:** If the solid bodies are blown in before the protection grid, the quantity of solids can be increased by 10 to 20%.