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PROGRAM INFORMATION BULLETIN NO. P05-20

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SUBJECT: Evaluation of Diesel Particulate Matter Aftertreatment Devices on
Non-Permissible, Heavy-Duty, Diesel-Powered Equipment,
Compressors and Generators

Who needs this information?

This Program Information Bulletin (PIB) affects underground coal mine operators using diesel-powered equipment, manufacturers of diesel-powered underground mining equipment (including manufacturers of exhaust after-treatment control devices and systems), miners' representatives, and Mine Safety and Health Administration (MSHA) personnel.

Why is MSHA issuing this bulletin?

This bulletin explains how MSHA:

1. Evaluates diesel particulate matter (DPM) aftertreatment devices on non-permissible, heavy-duty, diesel-powered equipment, compressors and generators after January 1, 2006; and
2. Reviews information available on high temperature disposable particulate filters (HTDPFs) and Paper/Synthetic filters accepted by MSHA as DPM aftertreatment devices.

How will MSHA determine if a DPM control is effective

After January 1, 2006, MSHA will:

1. Review information contained in the mine operator's diesel inventory (inventory), as required to be maintained by 30 CFR 72.520;
2. Assess whether the DPM control's collection efficiency selected for the diesel engine reduces the amount of DPM emitted to compliance levels;
3. Evaluate the conditions under which the DPM device is being used; and
4. Determine if those conditions are in accordance with the manufacturer's specifications established for acceptance of the device as a DPM control.

MSHA will evaluate whether a DPM filter is being used within the manufacturer's temperature limitations by determining the exhaust gas temperature using the following test procedure:

- 1) Conduct the test when the engine is producing the maximum exhaust gas temperature. This test condition should be the same as that established by the mine operator to conduct the undiluted exhaust emissions weekly test required under 30 CFR 75.1914(g). This test condition is normally produced using torque converter stall or hydrostatic transmission load.
- 2) Measure the peak exhaust gas temperature in the undiluted exhaust using an electronic hand-held thermocouple instrument with a maximum 6 inch, J type thermocouple attached.
- 3) Place the thermocouple into the undiluted exhaust stream using an exhaust port near the inlet of the DPM exhaust filter and after any exhaust cooling device. The exhaust port must be located to permit measurement of the exhaust gas temperature before entering the DPM aftertreatment device but after any exhaust cooling device. This may be the same port that the mine operator uses to determine the exhaust gas emissions concentrations for 30 CFR 75.1914(g). (Note: the thermocouple must not touch the wall of the exhaust pipe and should be as close as possible to the center of the exhaust pipe.)
- 4) Run the test for a minimum of 60 seconds to a maximum of 120 seconds or until the exhaust gas temperature is reasonably stable, whichever is less.
- 5) Record the identification of the machine being tested, the engine's serial number and the peak exhaust gas temperature measured.

What information is available on the filter efficiency and manufacturers' specifications for use of filters accepted by MSHA?

30 CFR Section 72.501(c) establishes the DPM emissions limit for this group of diesel-powered equipment. Proper selection of the DPM control ensures DPM emissions are reduced to or below the established limit. The manufacturers' specifications for the

HTDPF and Paper/Synthetic filters accepted by MSHA provide data on the efficiency of the filter unit and the conditions under which the filter must be operated to attain the stated efficiency.

For example, one manufacturer's specifications for use of their currently accepted HTDPF states that 80 percent efficiency is obtained when the maximum exhaust gas temperature is maintained at or below 650°F. The requirements of 30 CFR Section 72.503(d) would not be met if this HTDPF is used on machines that produce exhaust gas temperatures above 650°F or are not maintained in accordance with the manufacturer's specifications. Copies of the specification sheets for the two currently accepted HTDPFs are attached.

What can be done if the exhaust temperature exceeds the DPM filter specifications?

The mine operator has several options. These include reducing the diesel exhaust gas temperature through a device such as a scrubber or heat exchanger to maintain the exhaust gas temperature within the established limits, or installing and maintaining other types of controls such as ceramic diesel particulate traps.

Where can I find more information?

More information on diesel exhaust filters can be obtained from MSHA's Diesel Particulate Rules Single Source Page (<http://www.msha.gov/01-995/dieselpart.HTM>) and National Institute for Occupational Safety and Health's (NIOSH's) Mining Safety and Health Research Topics (<http://www.cdc.gov/niosh/mining>).

What is the background for this bulletin?

MSHA's diesel particulate matter rules for underground coal mines established new emission limits for DPM over a phased-in schedule. Aftertreatment devices must reduce DPM levels to those specified in 30 CFR Part 72. MSHA provides information to assist mine operators in choosing the correct diesel particulate filter for their specific machine application. Equipment manufacturers and MSHA provide information concerning the limitations of DPM controls to reduce diesel particulate based on test data. Information concerning MSHA's testing of DPM filters related to potential fire hazards is covered in PIB No. P05-01.

Who are the contact persons for this bulletin?

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What is the authority for this bulletin?

30 CFR Part 72 Subpart D and 30 CFR Part 75 Subpart T.

Who will receive this bulletin?

Program Policy Manual Holders
Miners' Representatives
Underground Coal Mine Operators
Special Interest Groups

Attachment



High Temperature Exhaust Filter For Diesel-Powered Equipment

**When you need a durable,
high efficiency exhaust
filter that captures diesel
particulate matter, call
Donaldson.**

Accepted
for use by
MSHA*

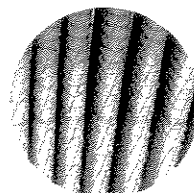


Part No. P604516

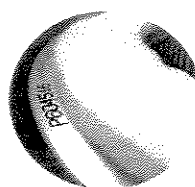
This proprietary design requires installation of a retrofit filter housing. An engineering drawing of the filter is available upon request.

Features

- Reinforced filter media with wire backing maximizes performance and durability
- Water-resistant filter media can eliminate the need for de-misters when used with water-bath exhaust conditioners
- All materials are engineered to withstand high temperature operations and are non-combustible
- High temperature gasket material insures proper sealing
- Open-ended filter design allows for multiple filter operation (stacked end-to-end or side-by-side)
- Filter size maximizes performance and minimizes operating costs



Close-up of reinforced
filter media



Close-up of filter gasket

*Please read the CAUTION statement on reverse side
before purchasing.*

* Meets U.S. Department of Labor, Mine Safety & Health Administration (MSHA) application criteria for permissible (MSHA Table 1) engines that limit exhaust gas temperature to 302°F or less AND non-permissible (MSHA Table 2) engines that limit exhaust gas temperature to 650°F or less.
Ref: www.msha.gov/01-995/Coal/DPM-FilterEfflist.pdf

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CAUTION!

Diesel emissions (such as carbon, unburned fuels, etc.) can ignite at temperatures below the rated filter limits. Ensure proper safeguards are in place to protect against damages resulting from ignition and/or uncontrolled regeneration.

Exhaust Filter Service Life

Engine emission rates and exhaust temperatures affect overall filter life. Emission rates vary with many factors, including; engine age, level of maintenance, fuel quality, exhaust flow and duty cycles. Engines should be well maintained and calibrated regularly to maximize service life.

Exhaust temperatures within MSHA's permissible application range have little or no impact on filter material life. Higher exhaust temperatures will degrade filter materials over time.

Specifications**Product Attributes**

Part No.: P604516

Dimensions

Outer diameter: 12.74" (324mm)

Inner diameter: 8.38" (213mm)

Length: 26.00" (660mm)

Weight: 16.5 lbs. (7.5 kg)

Exhaust Flow

Maximum exhaust flow:
400 acfm per filter

Multiple filters must be used to accommodate higher airflows. Contaminant collects on the inner liner of the filter (reverse flow filtration).

Maximum Pressure Drop

40" H₂O maximum pressure drop across the filter. Do not exceed total system backpressure limits as defined by the engine manufacturer.

Installation Guidelines

- Do not use this filter in applications that produce exhaust gas temperatures at the filter inlet in excess of 650°F.
- Position the filter housing and exhaust outlet to maintain a minimum distance of 12 inches from un-shielded flammable material.
- Avoid localized areas of high exhaust flow through the filter element via a filter housing of an "end outlet" or multiple "side outlet" design. The minimum total area of the side outlet(s) must be two times greater than the inlet section area.
- Install an in-line temperature sensing device ahead of the filter housing to alert the operator should exhaust temperatures exceed 650°F.

Note: The filter media contains trace amounts of vegetable oils that may produce light smoking during initial heat-up. Individual components of the off-gassing have been analyzed and are non-toxic.



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55440-1299

www.donaldson.com

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up to 650° F

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resulting in
significant cost saving

