

Diesel Particulate Matter (DPM) Control Technologies

Last updated: 02/01/2018 (Updates Highlighted in Yellow)

Discontinued Filters are highlighted in Blue

Table I: Paper/Synthetic Filters

Table II: Non-Catalyzed Particulate Filters, Base Metal Particulate Filters, Specially Catalyzed Particulate Filters, and High Temperature Disposable Filters

Table III: Catalyzed (Platinum Based) Diesel Particulate Filters

Note: These tables are not all-inclusive and only contain companies who have contacted MSHA in order to list their control technologies.

Table I: Paper/Synthetic Filters

The filters listed below have been evaluated by MSHA and are deemed to be essentially identical (under section 72.503(c)) to the standard paper filter that was previously tested by an independent laboratory for MSHA. MSHA will accept use of these filters as evidence of compliance with the applicable emission limits in sections 72.500 - *Emission limits for permissible diesel-powered equipment*, 72.501 - *Emission limits for nonpermissible heavy-duty diesel-powered equipment, generators and compressors*, or 72.502 - *Requirements for nonpermissible light-duty diesel-powered equipment other than generators and compressors* when properly installed on diesel-powered equipment.

The control device shall be installed and maintained in accordance with the filter supplier's specifications. This includes use at the supplier's specified exhaust gas temperature limit. The limits specified in this table are either 185°F or 302°F to correspond with the Part 36 temperature limits for machines using either water bath scrubbers or dry heat exchangers, respectively, to cool the exhaust gas. Where the filter supplier has not provided information to MSHA on the exhaust gas temperature limit (either 185°F or 302°F), the purchaser needs to contact the filter supplier for this information.

In choosing filters intended for use on permissible machines, contact the machine manufacturer and the filter supplier to ensure the filter is compatible with the machine and sized properly for the engine exhaust flow, temperature, and desired operating life and that the filter meets any specific MSHA approval requirements for filters used on that machine. The filter must be installed and maintained in accordance with the machine manufacturers, the engine manufacturers and the filter supplier's specifications.

In choosing filters intended for use on non-permissible machines, the filters must be used with exhaust gas cooling systems that limit the exhaust gas temperature to either the filter supplier's specified limit or 302°F, whichever is lower. The efficiency of the filters in Table I is not accepted as meeting the emission limits in sections 72.501 or 72.502 at exhaust gas temperatures above 302°F. Refer to Table II for filters that can be used at higher exhaust gas temperatures and their DPM filtration efficiencies.

The filter tests are performed in a consistent manner on as-received filter samples. However, filter surface area/face velocity and filter life (loading time or number of allowable cleanings) are not considered even though they may affect the filter's in-use efficiency and the choice of a filter

for a specific application. The filter is evaluated to ensure that there are no obvious leaks or mechanical failures during the test, the exhaust backpressure does not exceed the engine manufacturer's limit during the test, and that no hazardous off-gassing or combustion occurs at the filter's maximum operating temperature. The test results below are preliminary and MSHA reserves the right to make additions or deletions to this list as new information becomes available.

Table I: Paper/Synthetic Filters

The filters listed in Table 1 are suitable for use up to a maximum limit of 60 inches of water pressure differential across a dirty filter.

| Filter Supplier | Filter Manufacturer | Filter Model | Exhaust Temperature Limitation, °F |
|---|----------------------------|--------------------------------------|---|
| Atlas Copco Wagner Attn: Dale Harnish 303-217-2817 | Atlas Copco | 5575074800 | Contact Filter Supplier |
| Baron Filtration Co. 800-760-3105 | Baron Filtration Co. | Media Spunbond | 185 |
| Luber-Finer 800-851-3641 | Luber-Finer | LAF3931, LAF3931 with fire retardant | Contact Filter Supplier |
| Caterpillar Global Mining, Contact your local Caterpillar Dealer | Caterpillar | 516372, 518404 | Contact Filter Supplier |
| Donaldson Corporation 800-374-1374 | Donaldson Company, Inc. | P530866, P539366, P549541, P620338 | Contact Filter Supplier |
| Donaldson Corporation 800-374-1374 | Donaldson Company, Inc. | P604516, P607123, P607124 | Contact Filter Supplier |
| Dry Systems Technologies® 630-427-2051 | Dry Systems Technologies® | M30, M40, M70 | 302 |
| Endustra Filter Manufacturers 800-521-1008 | Endustra | R020001 | 185 |
| Endustra Filter Manufacturers 800-521-1008 | Endustra | R030042, R030072, R030137, R040957 | 302 |
| Cummins Filtration 800-223-4583 | Fleetguard | AF25299, AF2590000 | 185 |
| WIX Filtration Corp / Affinia Group 704-864-6748 | WIX | 46860FR | Contact Filter Supplier |

| Filter Supplier | Filter Manufacturer | Filter Model | Exhaust Temperature Limitation, °F |
|---|---|---|---|
| WIX Filtration Corp / Affinia Group 704-864-6748 | WIX | 46860FR | Contact Filter Supplier |
| ENK Industrial Ed Molish 205-744-5932 | ECO Environmental | ENK19-29160, ENK25-19175, ENK28-19145, ENK25-14175, ENK25-18175, ENK15-19230, ENK26-19220, ENK26-29225, ENK26-29180, ENK19-19205, ENK28-19165, ENK19-29185, ENK19-19160, ENK26-19185, ENK26-19200, ENK26-29200, ENK12-19175, ENK19-29190, ENK26-29175, ENK23-339160, ENK15-19185, ENK15-29185, ENK16-29115, ENK20-29250 | Contact Filter Supplier |
| Filter Service & Testing Corp. (Bunderson) 435-637-3567 | Filter Service & Testing Corp. (Bunderson) | FST-115-26, FST-110-28, FST-125-26C, FST-110-22C, FST-100-20, FST-90-16, FST-150-20, FST-220-26, FST-115-12.5, FST-115-12.875, FST-90-19.562 | Contact Filter Supplier |
| Freudenberg Filtration Technologies Attn: Chris Murray 270-498-5527 Chris.Murray@Freudenberg-Filter.com | Freudenberg Filtration Technologies, L.P. (Hopkinsville, KY) | PF72001 (formerly DA101) | Contact Filter Supplier |
| Freudenberg Filtration Technologies 270-498-5527 Chris.Murray@Freudenberg-Filter.com | Freudenberg Filtration Technologies, L.P. (Hopkinsville, KY) | DA600-LL | 302 |
| Getman Corporation 269-427-5611 | Getman | 605803, 605803 with 605807 pre-filter, 605810, 605811 | Contact Filter Supplier |
| Bersy SRL 390-376-290-122 bersy@bersy.it | Bersy SRL | UGET3+ | Contact Filter Supplier |
| Dry Systems Technologies® 630-427-2051 | Dry Systems Technologies® | Part #M30-411-21 (non-permissible only) | 302 |

Table II: Non-Catalyzed Particulate Filters, Base Metal Particulate Filters, Specially Catalyzed Particulate Filters, and High Temperature Disposable Filters

Contact the filter supplier to ensure the filter is compatible with the machine and sized properly for the engine exhaust flow, temperature, and desired operating life. The filter must be installed and maintained in accordance with the filter supplier's specifications. The test results below are preliminary and MSHA reserves the right to make additions or deletions to this list as new information becomes available.

| Non-Catalyzed Particulate Filters, Base Metal Particulate Filters, Specially Catalyzed Particulate Filters, and High Temperature Disposable Filters | Manufacturer | DPM Filtration Efficiency* |
|---|--|----------------------------|
| Non-Catalyzed Diesel Particulate Filters, Cordierite, Series FN | Clean Air Systems, Santa Fe, New Mexico 800-355-5513 | 85% |
| Non-Catalyzed Diesel Particulate Filter, Cordierite, Part Nos. 2000EC, 1800EC, 1500EC, 1100EC, 1050EC, 1000EC, 900EC, 700EC, 500EC | Nett Technologies Toronto, Canada 800-361-6388 | 85% |
| Non-Catalyzed Diesel Particulate Filter, Silicon Carbide, Series 3000ES, 2500ES, 2000ES, 1500ES | Nett Technologies Toronto, Canada 800-361-6388 | 87% |
| Non-catalyzed DPFs, Cordierite: GreenTRAP™ 100 UF (Reflects all sizes) | Nett Technologies Toronto, Canada 800-361-6388 | 85% |
| Non-catalyzed DPFs, Silicon Carbide: GreenTRAP™ 100 UX (Reflects all sizes) | Nett Technologies Toronto, Canada 800-361-6388 | 87% |
| Titan™ and Blue Sky™ (non-catalyzed) Sootfilter System, Silicon Carbide | DCL International Inc. Concord, Canada 800-872-1968 | 87% |
| Cattrap™ Diesel Particulate Filter (passively regenerated, base metal catalyst) Cordierite | CDTi Oxnard CA (800) 753-3212 neworders@cdti.com | 95% |
| Cattrap™ Diesel Particulate Filter (passively regenerated, base metal catalyst) Silicon Carbide | CDTi Oxnard CA (800) 753-3212 neworders@cdti.com | 95% |

| Non-Catalyzed Particulate Filters, Base Metal Particulate Filters, Specially Catalyzed Particulate Filters, and High Temperature Disposable Filters | Manufacturer | DPM Filtration Efficiency* |
|---|--|-------------------------------|
| Catrap TM Plus Diesel Particulate Filter (passively & actively regenerated, base metal catalyst) on board regeneration, Silicon Carbide | CDTi Oxnard CA (800) 753-3212 neworders@cdti.com | 95% |
| Catrap TM Plus Diesel Particulate Filter (passively & actively regenerated, base metal catalyst) off board regeneration, Silicon Carbide | CDTi Oxnard CA (800) 753-3212 neworders@cdti.com | 95% |
| Unikat Combifilter TM (actively regenerated), on board regeneration, Cordierite | CDTi Oxnard CA (800) 753-3212 neworders@cdti.com | 85% |
| Unikat Combifilter TM (actively regenerated), on board regeneration, Silicon Carbide | CDTi Oxnard CA (800) 753-3212 neworders@cdti.com | 87% |
| Unikat Combifilter TM (actively regenerated), off board regeneration, Cordierite | CDTi Oxnard CA (800) 753-3212 neworders@cdti.com | 85% |
| Diesel Particulate Filter (non-catalyzed with fuel additive), Cordierite, Model Numbers. SXS-B, SXS-B/F A, and SXS-E | Catalytic Exhaust Products, LTD 800-551-5525 | 85% |
| PERMIT TM FBC Filter System (specially catalyzed with fuel borne catalyst), Cordierite | Clean Air Systems, Santa Fe, New Mexico 800-355-5513 | 85% |
| PERMIT TM FBC Filter System (specially catalyzed with fuel borne catalyst), Cordierite Installed on a Deutz-MWM Model 916 Diesel Engine | Clean Air Systems, Santa Fe, New Mexico 800-355-5513 | 87% |
| High Temperature Disposable Exhaust Filter Part Number P604516 | Donaldson Company, Inc. 800-374-1374 | 83% max. temp. 650°F |

| Non-Catalyzed Particulate Filters, Base Metal Particulate Filters, Specially Catalyzed Particulate Filters, and High Temperature Disposable Filters | Manufacturer | DPM Filtration Efficiency* |
|---|--|---------------------------------------|
| Filter Service & Testing Corp. (Bunderson) FST-115-26, FST-110-28, FST-125-26C, FST-110-22C, FST100- 20, FST-90-16, FST-115-12.5, FST-115-12.875, FST-90-19.562 | Filter Service & Testing Corp. (Bunderson) 435-637-3567 | 80% max. temp. 650°F |
| Rypos HDPF/C Filter System, Model RH-305-M-C, Sintered Metal Fiber, Electrical heating for on board regeneration | Rypos Incorporated, Holliston, MA 508-429-4552 | 80% |
| Nett Catalyzed Diesel Particulate Filter with NO ₂ Suppressant (Passive Regeneration), Cordierite Model Nos.: SN500, SN700, SN900, SN1000, SN1050, SN1100, SN1200, SN1500, SN1800, and SN2000, SN1300 | Nett Technologies Inc. Mississauga, ON, Canada 800-361-6388 | 85% |
| Nett Catalyzed Diesel Particulate Filter with NO ₂ Suppressant (Passive Regeneration), Silicon Carbide Model Nos.: SO500, SO700, SO900, SO1000, SO1050, SO1100, SO1200, SO1500, SO1800, and SO2000 | Nett Technologies Inc. Mississauga, ON, Canada 800-361-6388 | 87% |
| Catalyzed DPFs with NO ₂ Suppressant, Cordierite: GreenTRAP™ 100 SN (Reflects all sizes) | Nett Technologies Inc. Mississauga, ON, Canada 800-361-6388 | 85% |
| Catalyzed DPFs with NO ₂ Suppressant, Silicon Carbide: GreenTRAP™ 100 SO (Reflects all sizes) | Nett Technologies Inc. Mississauga, ON, Canada 800-361-6388 | 87% |
| Mann Hummel Industrial Filters, Model SMF-AR, Sintered Metal Fiber, Electrical heating for on-board regeneration with EnerBurn EC 5931 A fuel additive from EnerTeck Chemical Corporation | Mann Hummel Industrial Filters, Ludwigsburg, Germany 269-329-3900 | 81% |
| HUSS DPF Type MK with diesel burner, Silicon Carbide wall flow filter | HUSS Palm Springs, CA 888-360-4877 | 91% |
| MINE-X SOOTFILTER® Model DBM, Cordierite with Base Metal, Part Nos. 5U51, 5U52, 5U53, 5U55, 5U56, 5U57, 5U58, 5U59, 5UG5, 5UY3 | DCL International Inc. Concord, Canada 800-872-1968 | 93% |

| Non-Catalyzed Particulate Filters, Base Metal Particulate Filters, Specially Catalyzed Particulate Filters, and High Temperature Disposable Filters | Manufacturer | DPM Filtration Efficiency* |
|--|---|-------------------------------|
| Mann Hummel Industrial Filters, Model SMF-AR, Sintered Metal Fiber, Electrical heating for on board regeneration with DT-8 fuel additive and Ultra Low Sulfur Fuel | Mann Hummel, USA, Inc., 6400 S. Sprinkle Road Portage, MI 49002-9706 269-329-3900 | 99% |
| T.F. Hudgins, Stratus SMF-AR, Sintered Metal Fiber, Electrical heating for on board regeneration with DT-8 fuel additive and Ultra Low Sulfur Fuel | T.F. Hudgins, Inc. 4405 Directors Row Houston, TX 77092 713-682-3651 | 99% |
| Stratus SMF-FBC, Sintered Metal Filter, Fuel Borne Catalyst regeneration with DT-8 or DT-8I fuel additive and Ultra Low Sulfur Fuel | T.F. Hudgins, Inc. 4405 Directors Row Houston, TX 77092 713-682-3651 | 99% |
| Stratus SMF-DOC, Sintered Metal Filter, Ceramic Catalyst regeneration with no additive and Ultra Low Sulfur Fuel | T.F. Hudgins, Inc. 4405 Directors Row Houston, TX 77092 713-682-3651 | 99% |
| AirFlow Catalyst Systems, Model EZCat™ passively regenerated diesel particulate filter | AirFlow Catalyst Systems, Inc. 2144 Brighton-Henrietta Townline Road, Suite 700 Rochester, NY 14623, 585-295-1510 sales@AirFlowCatalyst.com | 93% |
| AirFlow Catalyst Systems, Model ACSMNC passively regenerated diesel particulate filter for special applications. | AirFlow Catalyst Systems, Inc. 2144 Brighton-Henrietta Townline Road, Suite 700 Rochester, NY 14623, 585-295-1510 sales@AirFlowCatalyst.com | 87% |
| AirFlow Catalyst Systems, Model MinNOCat™ passively regenerated diesel particulate filter | AirFlow Catalyst Systems, Inc. 2144 Brighton-Henrietta Townline Road, Suite 700 Rochester, NY 14623, 585-295-1510 sales@AirFlowCatalyst.com | 95% |
| PURIMAX- DBS-System automatic active on-board regeneration at low temp. / specially catalyzed for NO, NO2, NOx reduction / Silicon Carbide wall flow filter / Stainless Steel pre-catalyst. | PURI tech 69819 Rochester Road Cathedral City, CA 92234 815-931-2709 Phil.surma@puritechus.com | 97% |

| Non-Catalyzed Particulate Filters, Base Metal Particulate Filters, Specially Catalyzed Particulate Filters, and High Temperature Disposable Filters | Manufacturer | DPM Filtration Efficiency* |
|---|---|-------------------------------|
| GESi™ 6000 DPF - Catalyzed Cordierite Diesel Particulate Filter Part No's: 6K566X6, 6K75X8, 6K75X12, 6K90X12, 6K105X12, 6K12X12, 6K1125X14, 6K12X15 | Global Emissions Systems Inc. Whitby, Ontario, Canada 866-539-5080 contactus@gesi.us | 85% |
| Hug Engineering Mobiclean R™ passively regenerating diesel particulate filter with CleanCoat™ technology P/N's: R8a through R80a for use with ULSD fuel | Hug Engineering 123 Holmes Road, Units 1-3 Liberty Hill, TX 78642 512-548-6710 Sales@Hug-Engineering.com | 87% |
| Catalyzed Diesel Particulate Filter, Cordierite, Low NO ₂ series EnviCat® DPF 2058. | Clariant Corporation Needham, MA 781-433-5900 ron.stone@clariant.com | 85% |
| Continuously regenerating Silicon Carbide trap with oxidation catalyst BPF R620 | Bersy SRL Curtatone (MN) Italy 390-376-290-122 bersy@bersy.it | 97% |
| Silicon Carbide trap with off-board regeneration BPF R187 | Bersy SRL Curtatone (MN) Italy 390-376-290-122 bersy@bersy.it | 87% |

*Manufacturer's laboratory based efficiency (Not determined under in-mine test)

Table III: Catalyzed (Platinum Based) Diesel Particulate Filters

Caution: MSHA has identified the platinum based catalyzed particulate filters in listed in Table III as a source for generation of increased concentrations of Nitrogen Dioxide (NO₂) in the mine atmosphere. Actual in-mine NO₂ concentrations will be dependent on the mine's ventilation system. Refer to MSHA's Program Information Bulletin No. P02-4 (<http://www.msha.gov/regs/complian/PIB/2002/pib02-04.htm>) for additional information. For coal mine operators, MSHA's Program Information Bulletin No. P02- 7 (<http://www.msha.gov/regs/complian/PIB/2002/pib02-07.htm>) details the steps that must be taken to ensure that platinum based catalyzed filters installed prior to July 16, 2002 do not increase in-mine NO₂ concentrations.

After July 16, 2002, coal mine operators should not install filters listed in Table III.

| Catalyzed (Platinum Based) Diesel Particulate Filters | Manufacturer | DPM Filtration Efficiency* |
|--|--|-----------------------------------|
| Catalyzed Diesel Particulate Filters, Cordierite, FC, FD | Clean Air Systems, Santa Fe, New Mexico 800-355-5513 | 85% |
| DPX™ and DPX II™ Catalyzed Soot Filter System, Cordierite | Engelhard, Iselin, New Jersey 800-523-3599 | 85% |
| Catalyzed Diesel Particulate Filter, Cordierite, Part Nos. 2000SF/SE, 1800SF/SE, 1500SF/SE, 1100SF/SE, 1050SF/SE, 1000SF/SE/, 900SF/SE, 700SF/SE, 500SF/SE | Nett Technologies Toronto, Canada 800-361-6388 | 85% |
| Catalyzed Diesel Particulate Filter, Silicon Carbide, Series 3000SC/SS, 2500SC/SS, 2000SC/SS, 1500SC/SS | Nett Technologies Toronto, Canada 800-361-6388 | 87% |
| Cordierite: GreenTRAP™ 100 SF GreenTRAP™ 100 SE (Reflects all sizes) | Nett Technologies Toronto, Canada 800-361-6388 | 85% |
| Silicon Carbide: GreenTRAP™ 100 SX GreenTRAP™ 100 SS (Reflects all sizes) | Nett Technologies Toronto, Canada 800-361-6388 | 87% |
| Titan™ and BlueSky™ Sootfilter System, Silicon Carbide | DCL International Inc. Concord, Canada 800-872-1968 | 87% |
| MINE-X SOOTFILTER®, Cordierite, Part Nos. 5C51, 5S51, 5C52, 5S52, 5C53, 5S53, 5C55, 5S55, 5C56, 5S56, 5C57, 5S57, 5C58, 5S58, 5C59, 5S59, 5CG5, 5SG5, 5CY3, 5SY3 | DCL International Inc. Concord, Canada 800-872-1968 | 85% |

| Catalyzed (Platinum Based) Diesel Particulate Filters | Manufacturer | DPM Filtration Efficiency* |
|---|---|----------------------------|
| Purifilter TM (passively regenerated), Silicon Carbide | CDTi Oxnard CA (800) 753-3212 neworders@cdti.com | 87% |
| Purifilter TM Plus (passive and actively regenerated, on-board), Silicon Carbide | CDTi Oxnard CA (800) 753-3212 neworders@cdti.com | 87% |
| Cattrap TM OR (passively regenerated, DOC in front of base metal catalyzed DPF), cordierite | CDTi Oxnard CA (800) 753-3212 neworders@cdti.com | 85% |
| Catalyzed Diesel Particulate Filter, Cordierite, Model Numbers. SXS-CX and SXS-C | Catalytic Exhaust Products, LTD 800-551-5525 | 85% |

*Manufacturer's laboratory based efficiency (Not determined under in-mine test)