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MNM DFP Frequently Asked Questions

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1. I have several identical pieces of diesel equipment performing identical tasks. One of these is using a active DPF. Do I need to get temperature traces on each one?

It is advisable to get exhaust temperature profiles/traces for each vehicle that is to use a DPF. However, with active DPFs, which are designed to collect and store the soot for removal at the end of the shift by a regeneration process, the exhaust temperature is not critically important.

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2. I have several identical pieces of diesel equipment performing identical tasks. One of these is using a passive DPF. Do I need to get temperature traces on each one?

Yes, you must obtain exhaust temperature traces for each vehicle that is targeted to receive a passively regenerating DPF system. Successful outcomes with passive regenerating systems depend on frequent instances of sufficiently high exhaust temperatures every shift to burn off the soot collected by the DPF. Small variations in engine condition and engine loadings (for example caused by difference in the pitch of the path traveled) may enough to lower exhaust temperatures below that for spontaneous regeneration of the DPF.

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3. What is runaway regeneration and how can it be avoided?

Runaway regeneration, uncontrolled regeneration, and thermal runaway, all refer to uncontrolled burning of a large quantity of soot accumulated in the filter media of a diesel particulate filter. It is caused by a series of events starting with overloading the DPF with soot at exhaust temperatures not sufficient to cause regeneration, followed by a period of high exhaust temperature that ignites the soot, and followed finally by low power or idle operation of the diesel which raises the oxygen level of the exhaust. The overloading of the DPF can be easily detected by back pressure monitoring. Thermal runaway can easily cause filter temperatures that will melt the filter media or cause thermal stresses (high localized temperatures surrounded by cool temperatures) that crack the filter, or both.

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4. Can I reassign or relocate a piece of equipment with a passive DPF installed without doing another temperature trace?

No. If a piece of equipment is successfully using a *passive* regenerating DPF in one operational scenario, and is moved to a different location where the pitch of the ramps may be different, or the tasks being performed are different, exhaust temperature traces should be obtained for the new deployment. If the exhaust temperatures are not sufficient to support passive regeneration, the DPF will continue to load with soot. Excessive loading creates excessive exhaust back pressure (the back pressure alarm should come on) and the DPF system must be removed from the equipment and regenerated manually. An attempt to use the engine at excessive back pressures may result in damage to the engine, increased soot and CO emissions, increased exhaust temperatures, and possibly the [uncontrolled regeneration](#) of the DPF, resulting in the possible destruction of the DPF.

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5. What is the filtration efficiency of DPFs?

The filtration efficiency of a DPF depends upon what is measured. For whole DPM (which includes sulfates and water attached to the sulfates) the reported efficiencies for wall-flow monoliths are about 85% for cordierite and 87% for silicon carbide. Tailpipe measurements (over the MSHA certification cycle and in field DPF installations with engines loaded by torque converter stall) of elemental carbon using the same filter and analysis used in sampling for compliance has revealed reductions better than 99%. Reductions for organic carbon, in those same measurements, are somewhat less at 90 to 95%. However, the organic carbon is not sampled efficiently by the quartz filter media used in compliance sampling. Definitive field measurements of DPF filtration performance will be made by NIOSH in late spring of 2003.

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6. Where can I get help with exhaust temperature profiling?

Help is available from several sources: Several DPF suppliers will help you with collecting exhaust temperatures. Also, any of the following are available to offer advice: MSHA's Approval and Certification Center (contact Jim Angel at 304-547-2064, angel-james@msha.gov or George Saseen at 304-547-2072, saseen-george@msha.gov) and NIOSH in Pittsburgh (contact George Schnakenberg at 412-386-6655, gschnakenberg@cdc.gov or Aleksandar Bugarski at 412-386-5912, abugarski@cdc.gov) You should also join the "Diesels-Underground" list server and post your question there.

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7. How can one join the "Diesels-Underground-L" list server?

You can join the "Diesels-Underground-L" list server by sending an email message to listserv@listserv.cdc.gov

with the following line as the only line in the body of the message:

JOIN DIESELS-UNDERGROUND-L *your name*

where you substitute your name for *your name* in the line. Try to eliminate any other text in the body of the message (signature lines, etc.)

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This document was authored by George Schnakenberg, Jr. in consultation with Aleksandar Bugarski, both with NIOSH, It was reviewed by Larry Patts of NIOSH and James Angel of MSHA. It represents the state of knowledge at the time of writing. Please address any comments about this

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