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Paper and Ceramic DPM Filters - Engine Back Pressure Limits

Paper and ceramic filters are very effective at capturing diesel particulate matter (DPM) and preventing its potentially hazardous release into the mine environment. As these filters collect DPM, they plug up and the ability of the engines exhaust gases to pass through the filters decreases. This causes the engine back pressure, or the pressure in the exhaust pipe between the engine and the filter, to increase. Engine manufacturers set limits on the maximum back pressure in order to prevent damage to the engine. This back pressure can also have several other negative effects:

- The back pressure can cause the engine emissions of toxic gases to increase.
- The back pressure can cause the exhaust temperature to rise increasing the fire hazard.
- The back pressure can force particulate through the filter and into the mine environment creating a health hazard.
- The increased back pressure is related to an increased risk for a runaway regeneration of the DPM in a ceramic filter. This could melt the ceramic material.
- Insufficient accumulations of particulate on a filter (low back pressure) can prevent or reduce the effectiveness of active regeneration (cleaning of the filter).

It is critical for safety and health that the engine back pressure be monitored and that filters be changed when required.

Most filter manufacturers provide back pressure monitors and specifications for when a filter should be changed. These components must be installed and maintained.

One final note: *Back pressure gages are prone to clogging. This can result in inaccurate (low) readings.* Operators should know what readings to expect and watch for a malfunctioning gage. Back pressure gages should be checked weekly for proper operation.