

T.F. HUDGINS
INCORPORATED
SINCE 1967

MANN+HUMMEL

Diesel Emission Mining Solutions

MDEC 2007
Frank Stephan

T.F. HUDGINS
INCORPORATED
SINCE 1967

MANN+HUMMEL

MANN+HUMMEL

- 41 worldwide locations
- Turnover: 1.596 Million €uro
- Employees: 10.739

Protection mark acc. to ISO 16016

 **T.F. HUDGINS**
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 **MANN+HUMMEL**

T.F. Hudgins is a group of experts who specialize in proprietary, engineered products and related services that improve equipment productivity and reduce operating costs for a wide range of industrial applications.

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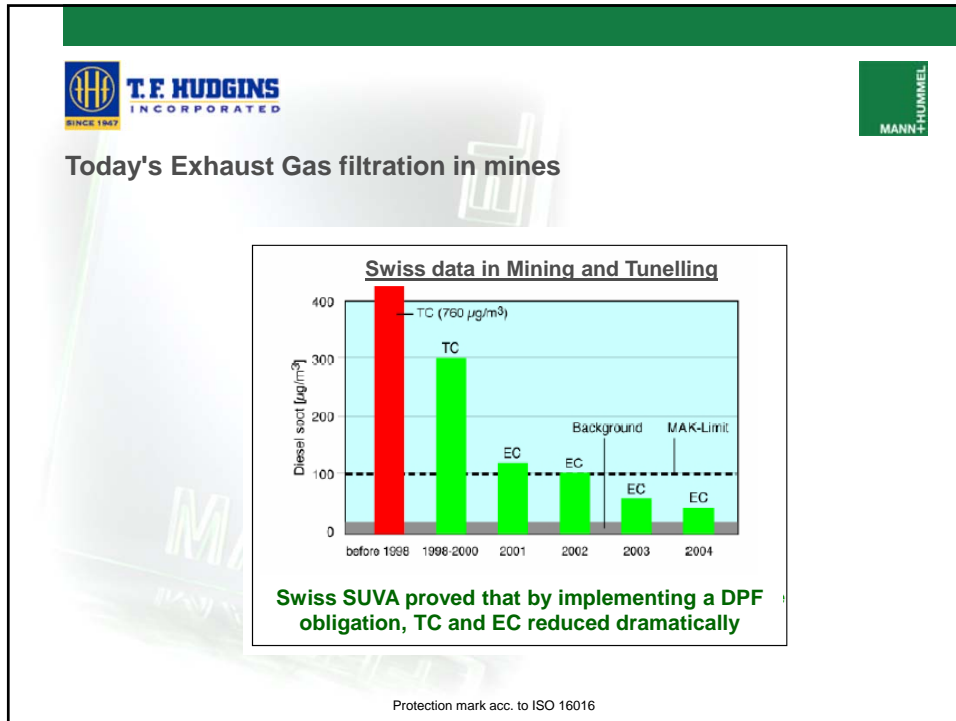
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Retrofit Portfolio

			
Air filtration <ul style="list-style-type: none">■ Intake air■ Cabin air■ Gas filtration■ Emission control	Liquid filtration <ul style="list-style-type: none">■ Oil filter■ Fuel filter■ Centrifuges■ Hydraulics	Oil filtration <ul style="list-style-type: none">■ CCV■ Vacuum filter	Exhaust filtration <ul style="list-style-type: none">■ Active DPF■ Passive DPF■ SCR

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- Today's Exhaust Gas filtration in mines**
- Low exhaust gas temperatures
 - Various DPF systems, mostly passive
 - Hassle with burning filters on work bench and cleaning
 - Low lifetimes of current filter systems
 - Current systems are creating NO₂
 - Bulky DPF systems – risk of damage
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SMF AR – Active, innovative DPF system

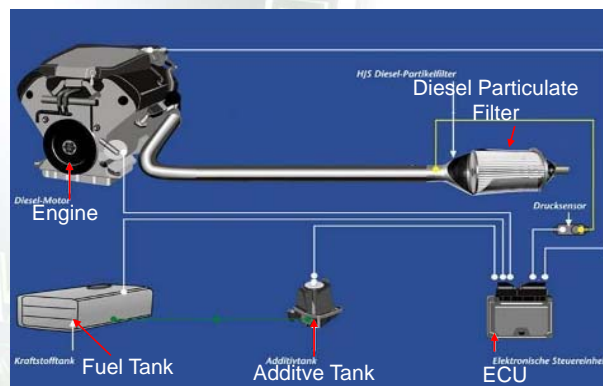
- Active burning of soot with heating coil
- Independent from exhaust gas temperature
- Enormous ash holding capacity
- Regeneration during operation
- Easy cleaning
- Small installation space
- Plug & Play



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System Layout



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Working Principle




Real Time Regeneration





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SMF[®]-AR installation examples





SMF[®]-AR filter fit into minimal space

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SMF[®]-AR installation examples

SMF-AR in mining loader



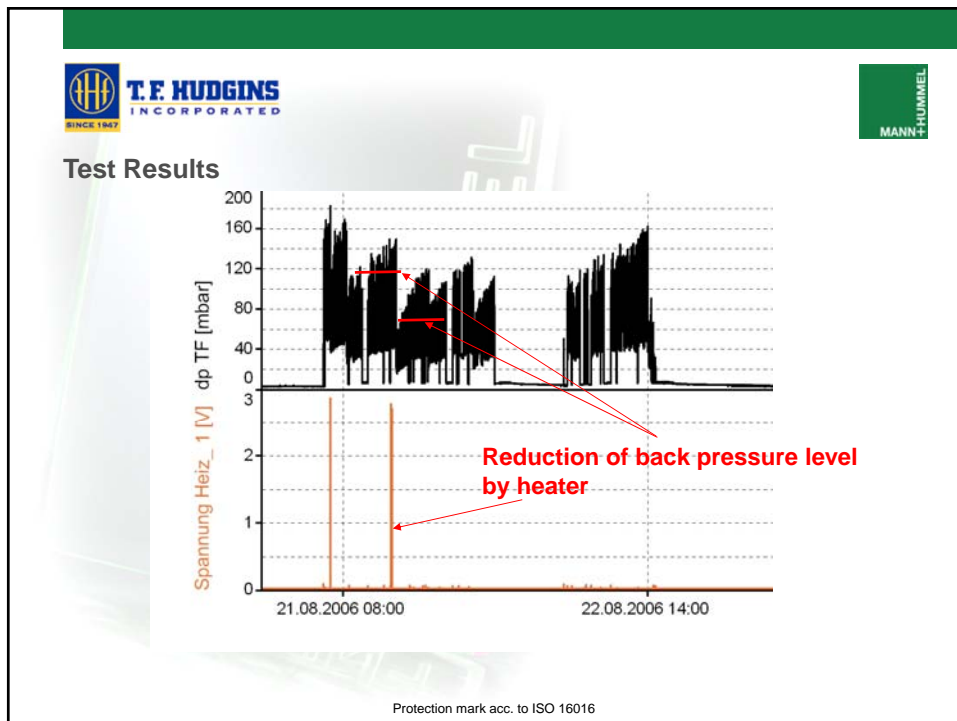
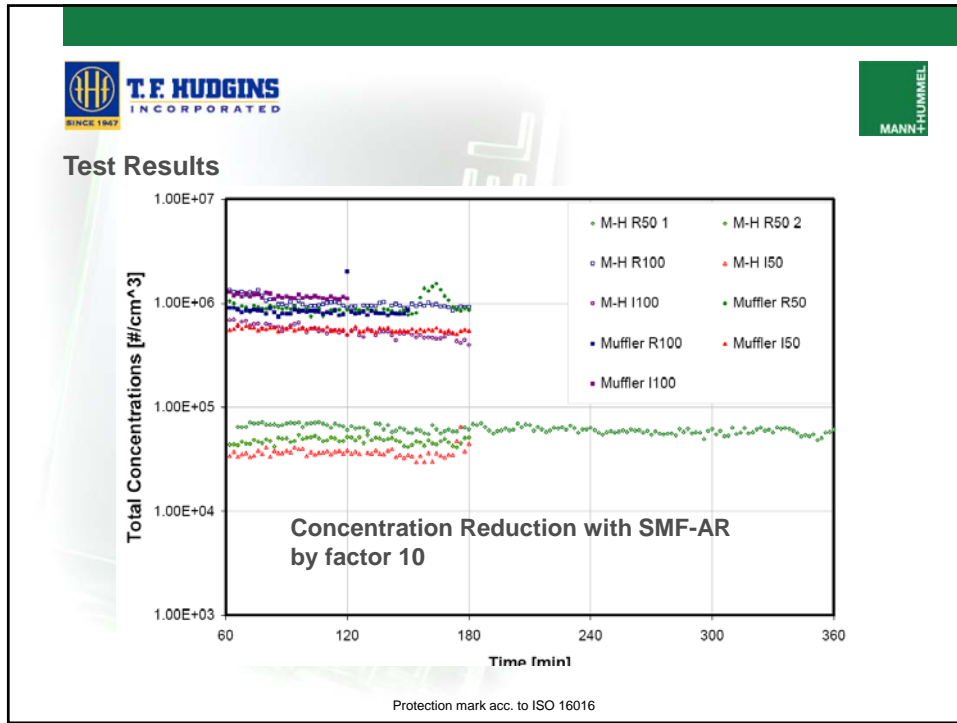
Protection mark acc. to ISO 16016

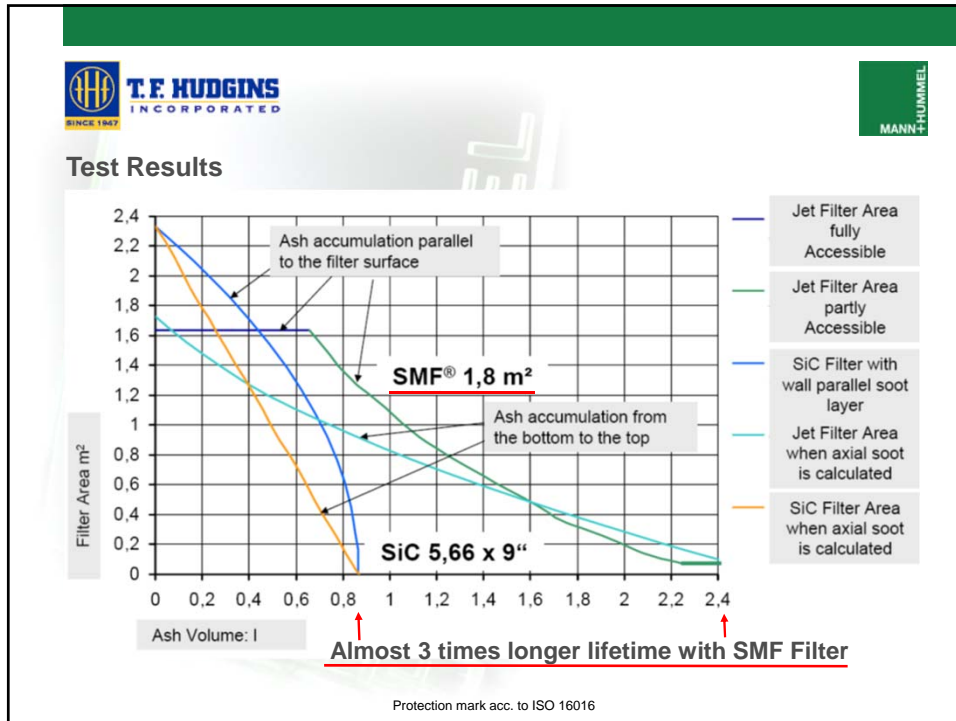


SMF-AR in Mining Tests



Protection mark acc. to ISO 16016





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- T. F. HUDGINS INCORPORATED**
SINCE 1947
- MANN+HUMMEL**
- ### Benefits of SMF[®]-AR filter
- VERT listed
 - NO₂ neutral => approved for mines
 - filter efficiency 99 % => removal of particles of 30-200 nm
 - High ash holding capacity => almost no cleaning needed
 - Life Time Element => No exchange filter needed
 - Easy cleaning => Reduction of maintenance costs
 - Regeneration during operation => No downtime for burning soot
- Protection mark acc. to ISO 16016

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Thank you
For your interest



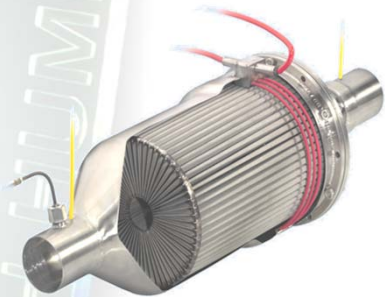
**WE PROVIDE A
SOOT FREE
MINING ENVIRONMENT**

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 **T.F. HUDGINS**
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BACK UP



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Service und Maintenance in comparison

SMF **Cordierit**



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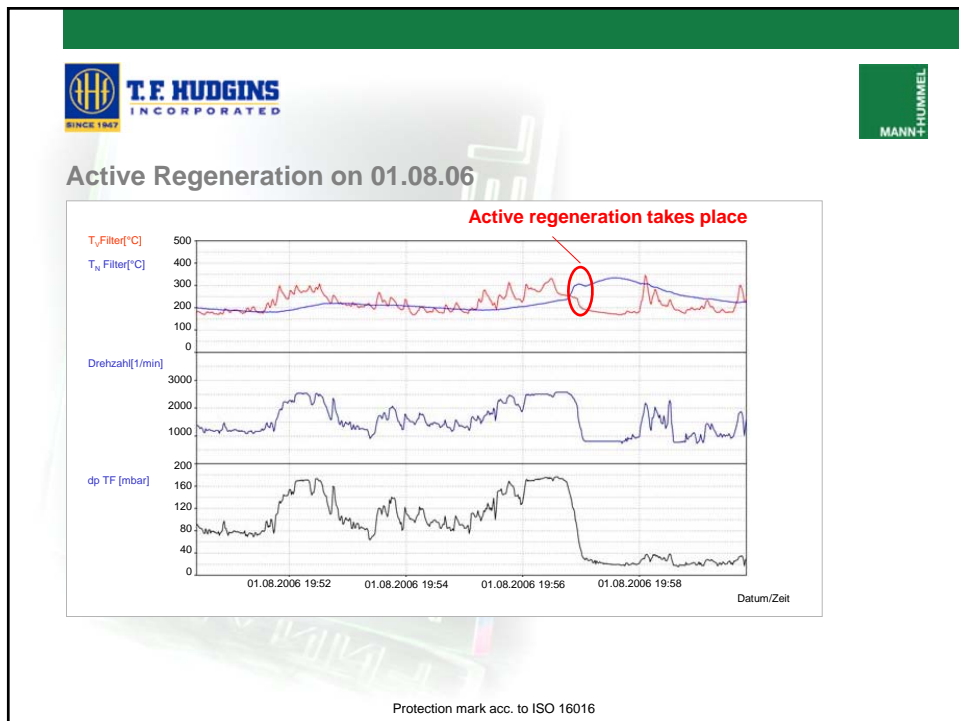
SMF®-AR
replaces muffler

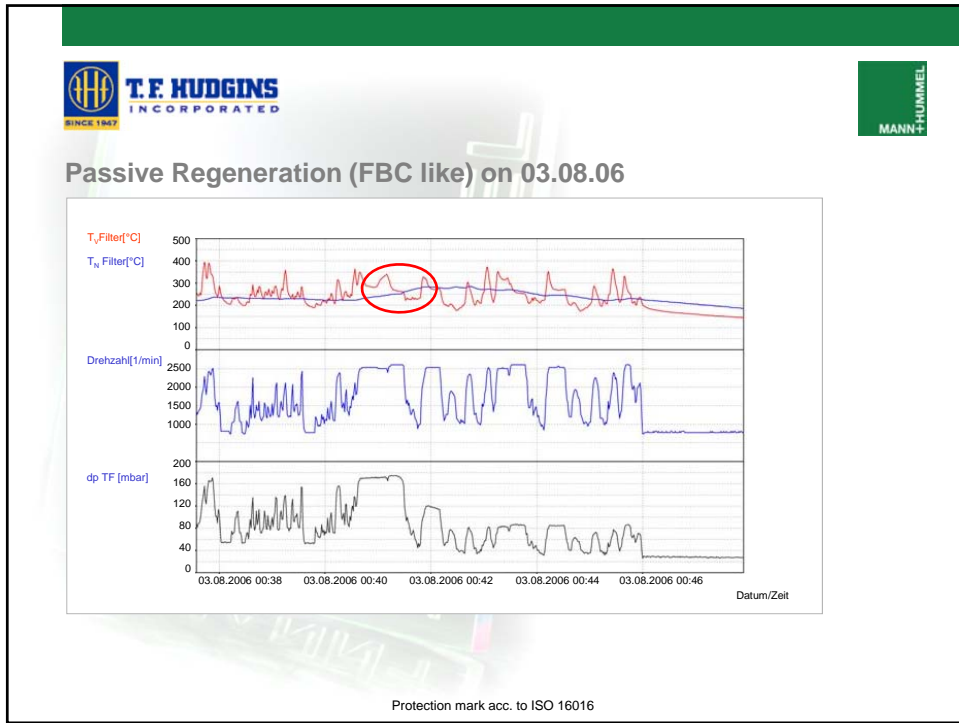




Additive tank (2,0 l)
beneath hood

ECU behind dash board

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Additive und Einspritzsysteme

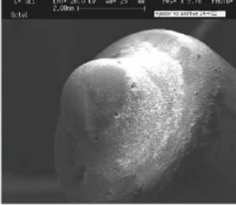


Figure 10 General view of injector from reference truck

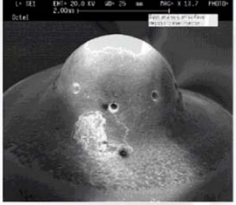


Figure 11 General view of injector from truck using F1

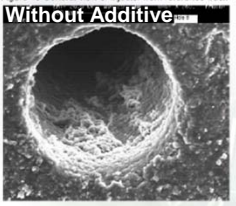


Figure 9 Hole of fuel injector from the reference truck

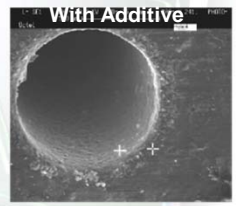
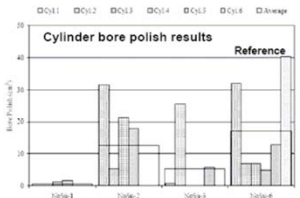


Figure 12 Hole of injector using F1

34 Source: 2004-01-0074, Results from a 1/4 million km, heavy-duty truck trail, using FBC, regenerated DPFs, P Richards, Associated Octel Company, W Kalischewski, Octel Deutschland GmbH



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Cylinder bore polish results



GARANTIEERKLÄRUNG

- The use of the FBC appeared to reduce the level of deposits on the tip of the fuel injectors.
- From regular lubricant analysis there was no apparent effect on engine wear rates as a result of using the DPF and FBC. This was confirmed by a complete engine strip-down.
- The components from each of the four trucks were very similar in wear condition and apart from the increase in bore polish evident for reference truck NoSu-6 there were no specific areas where increased wear was apparent in comparison to any of the other engines.

Test Results

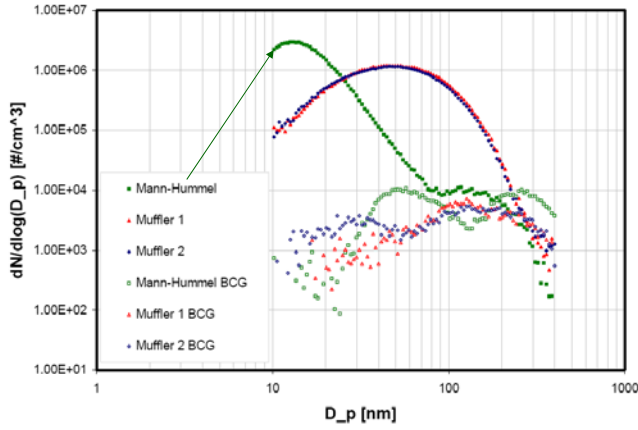


Figure 12. Aerosol size distribution measured during R100 tests

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Test Results

Table 9. Total mass concentrations measured by TEOM

Mode	Mann+Hummel SMF-AR		Muffler		Eff _{TEOM} %
	Downstream	Upstream	Downstream	Upstream	
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	
R50 2	52.0	39.3	152.9	20.2	90.5
R100	26.3	21.0	151.2	5.4	96.4
I50	18.0	12.2	109.0	5.7	94.4
I100	38.0	35.2	1058.8	13.4	99.7

High filter efficiency

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