

RESPA SD / SDX

HVAC PRECLEANER + FILTRATION + PRESSURISER (PFP) TECHNOLOGY



CONVENTIONAL HVAC FILTRATION / PRESSURISER DESIGN CONCEPTS & FUNCTIONS



Mobile Plant / HVAC / Filtration- Background

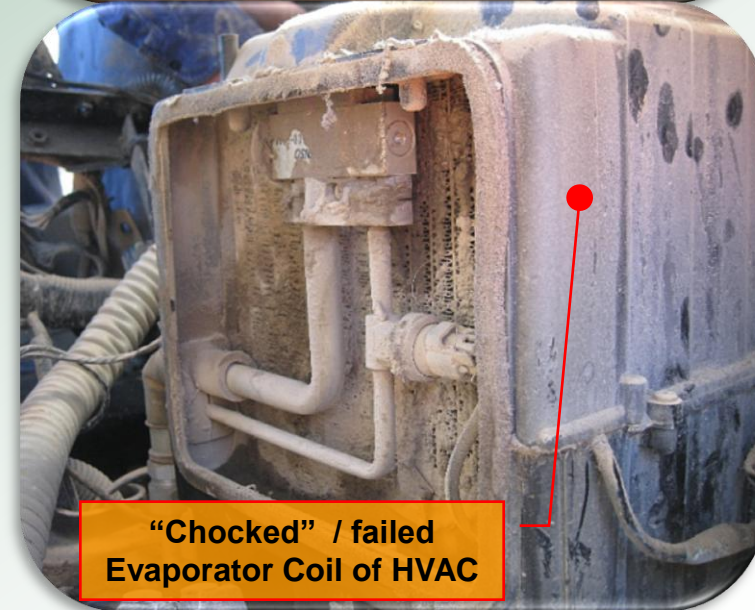
- ❑ Mobile / Fixed Cabins are subjected to "dusty" contaminated operating environments- eg Mining, Quarrying, Construction, Earthmoving, Fertiliser, Cement, Agriculture, Timber & many other Industries.
- ❑ These environments contain airborne particulate / fibres that can cause severe lung disease (silicosis) & other short & long term health issues.
- ❑ Filtration Panels / Cartridges of conventional Mobile / Fixed Cabin HVAC Systems are not adequately sealed or / & do not use Filter Media that promote OEL / PEL compliancy.
- ❑ Conventional HVAC Filtration Systems are not adequate to handle high volumes of dust / fibres for long periods of time.



Mobile Plant / HVAC / Filtration- Costs

- ❑ Also subsequent costs to operations are massive & in the hundreds of \$millions for:
 - ⇒ Filter Media & Labour Costs.
 - ⇒ Premature replacement of HVAC components.
 - ⇒ Associated loss of Productivity.
 - ⇒ Health Compliancy.
- ❑ HVAC (Heating, Ventilation & Cooling) designs for Fixed & Mobile Cabins have the same principal objectives:
 - ⇒ Comfort for the Operator: Heating & Cooling.
 - ⇒ Health: / Safety: Provide Fresh / Clean Air supply.

Internal Recirculation
Panel Filter- blocked
after only 100 hours.



"Chocked" / failed
Evaporator Coil of HVAC

RESPA SD / SDX – PFP

(Precleaners + Filtration + Pressurisers)

Quality Cabin Air System



RESPA **SD**- External Air Supply PFP- Primary Functions

- ❑ The primarily functions of the RESPA **SD** PFP is to:
 - ⇒ Preclean & Filter the External Air supply to OEL / PEL compliancy levels (extraction of respirable particulate 0.3 micron @ 99.97% efficiency).
 - ⇒ Offset "air leakage" & to maintain the correct positive pressure within to stop particulate entering the Cabin.
 - ⇒ Provide "fresh" air supply to the Cabin so as to offset CO2 concentrations that can contribute to "micro- sleeps" & fatigue.



RESPA **SDX**- Recirculation Air Supply PFP- Primary Functions

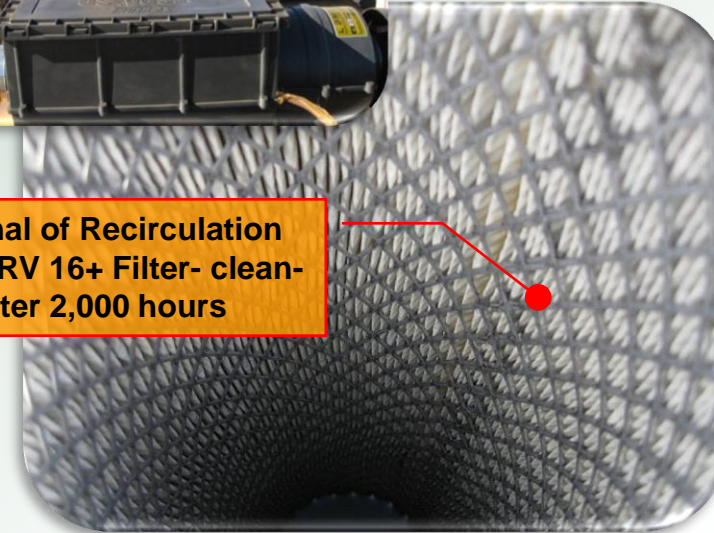
❑ The primarily functions of the RESPA **SDX** PFP Unit is to:

- ⇒ Filter the Recirculation Air supply to OEL / PEL compliance.
- ⇒ Remove contaminants that ingress & become entrapped inside the Cabin from opening of doors / windows, Operator clothing, boots after alighting / entering the Cabin, etc.
- ⇒ Rapidly filter & replace the Recirculation air so as to protect the Operator from breathing such particulate.
- ⇒ Provide constant Recirculation flow of air over the Evaporator so as to induce a comfortable environment for the Operator.

RESPA SDX Recirculation Air
MERV 16+ Filter- after 2,000 hours



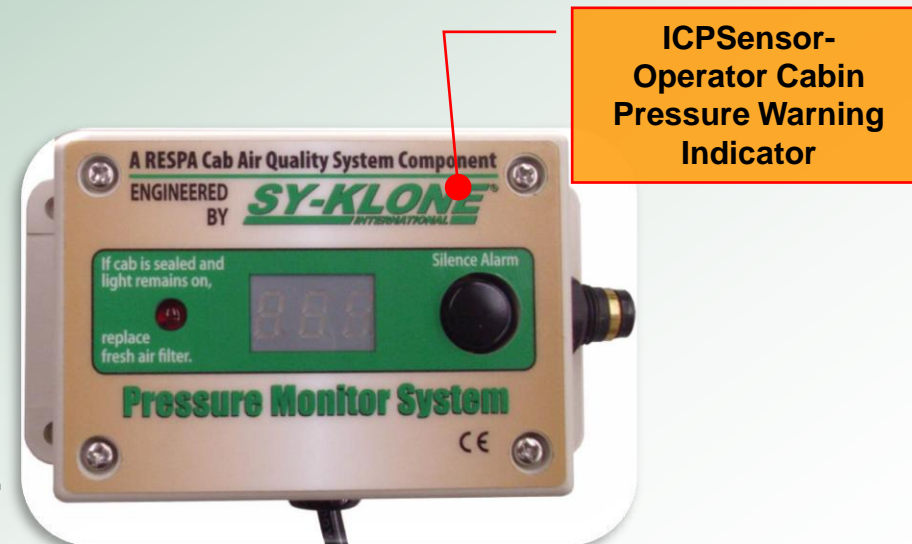
Internal of Recirculation
Air MERV 16+ Filter- clean-
after 2,000 hours



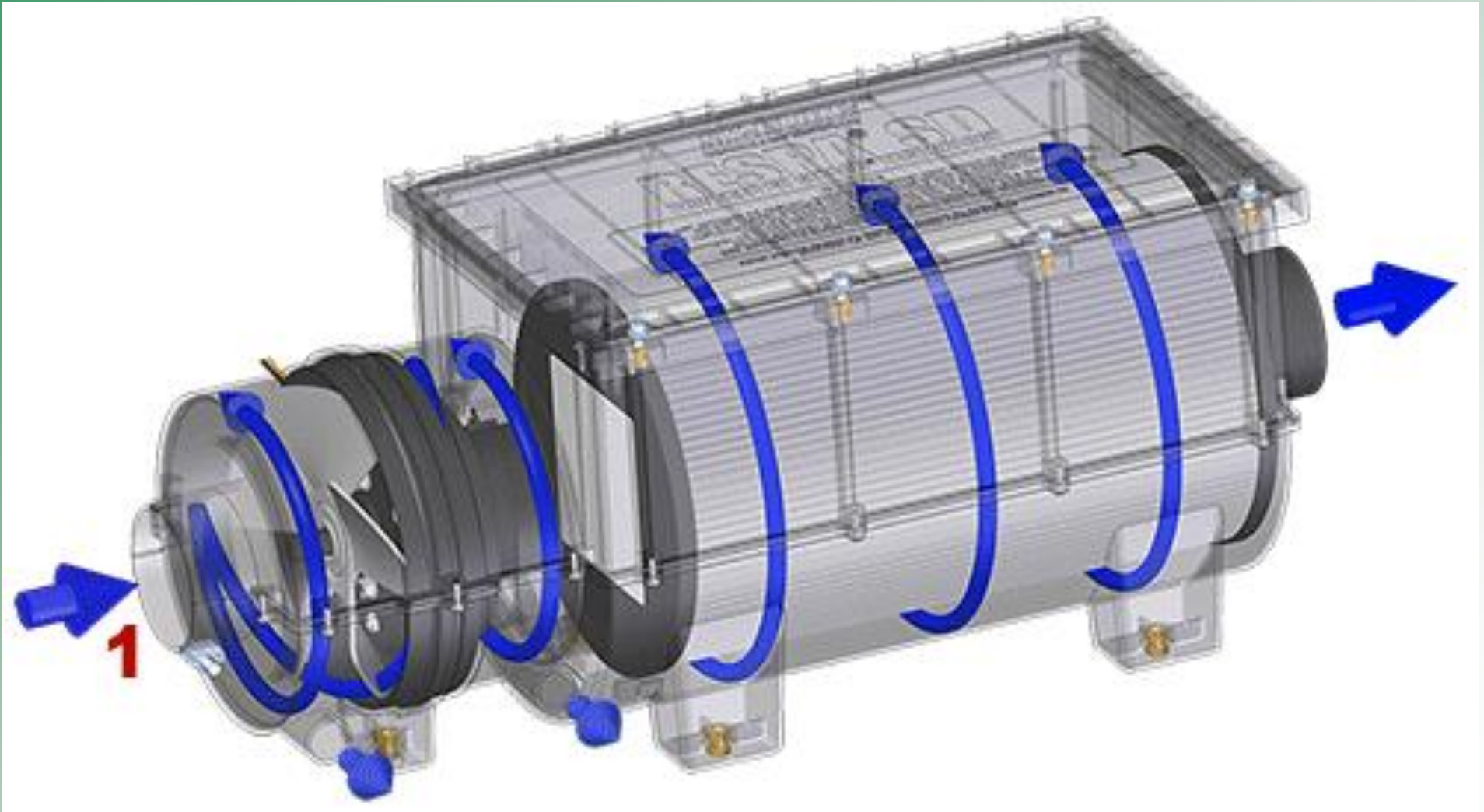
In- Cabin Pressure Monitor / Warning Sensor- Functions

- ❑ The primary functions of the In- Cabin Pressure Sensor is to monitor the Cabin Pressurisation so as indicate / warn:
 - ⇒ If the cabin is not properly sealed: If the optimum positive pressure is not maintained within the Cabin then contaminants can enter exposing the Operator to harmful airborne debris
 - ⇒ If the cabin is properly sealed & the Pressure Sensor / Monitor still indicates reduced pressure, it is time to replace the Filter Element.

- Audible Alarms- Pressure Loss.
- Visual Alarm- Pressure Loss.
- Visual LED Read- out of Cabin Pressure.
- Variable Alarm- Pressure 0-200 pascals
- Algorithms to avoid false alarms.
- Pressure signal output for integration to Telematics.



RESPA PFP Technology- How it Works?



WORKSAFE NOSH: 1003- 1995

OEL (Occupational Exposure Limits)

LEGISLATIONS COMPLIANCE



SAFEWORK NOSH: 1003 OEL Compliance

- ❑ The current standards legislates that OEL (Occupational Exposure Limits) for RCS is not to exceed:
 - ⇒ 0.1 mg / M3 air TWA (Time Weighted Average) for a 8 hour shift.
 - ⇒ A 12 hour shift the Brief & Scala adjusted calculation, $OEL < 0.05 \text{ mg/ M3 (TWA)}$.
 - ⇒ Health surveillance authorities apply ALARA & state if OEL exceeds 50% of the allowable (adjusted) OEL limits control measures are to be implemented.
 - ⇒ That is for a 12 hour shift basis- with control measures- OEL should not exceed $>0.025 \text{ mg / M3 (TWA)}$

OEL compliance is not just for RCS (Respirable Crystalline Silica)- but also other particulate (& fibres) that maybe within Respirable particulate such as asbestos, nickel, alumina, etc. The NOHSC: 1003 should be referenced to ascertain respective particulate OEL (Occupational Exposure Limits).

RESPA **SD** / **SDX** HVAC- PFP- Validation

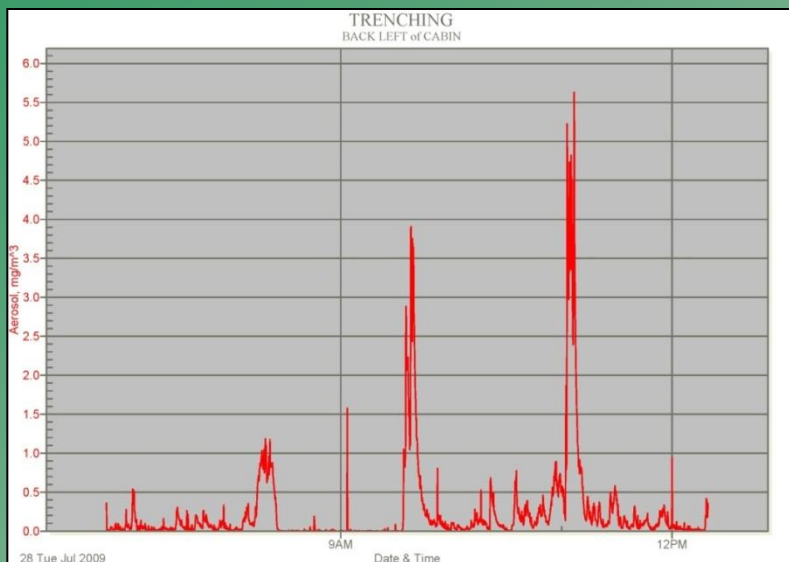
❑ RESPA **SD** / **SDX** has been tested by:

⇒ QME (Queensland Mines & Energy)- Health Surveillance Unit have completed Field Evaluations & recommends RESPA **SD** / **SDX** for new & retrofitting existing Mobile & Fixed Plant.

⇒ NIOSH (National Institute Occupational Safety & Health- CDC- USA) have completed extensive Field & Laboratory Evaluations & recommend RESPA **SD** / **SDX** for new & retrofitting to existing Mobile Plant

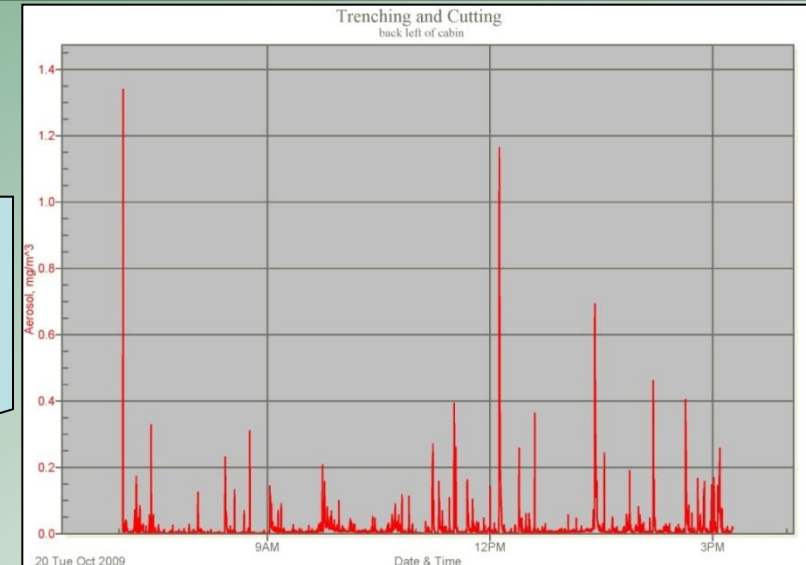
Complete reports can be downloaded from our web site
www.lsmtechnologies.com.au

RESPA SD / SDX- OEL Compliance Legislation



After RESPA SD / SDX

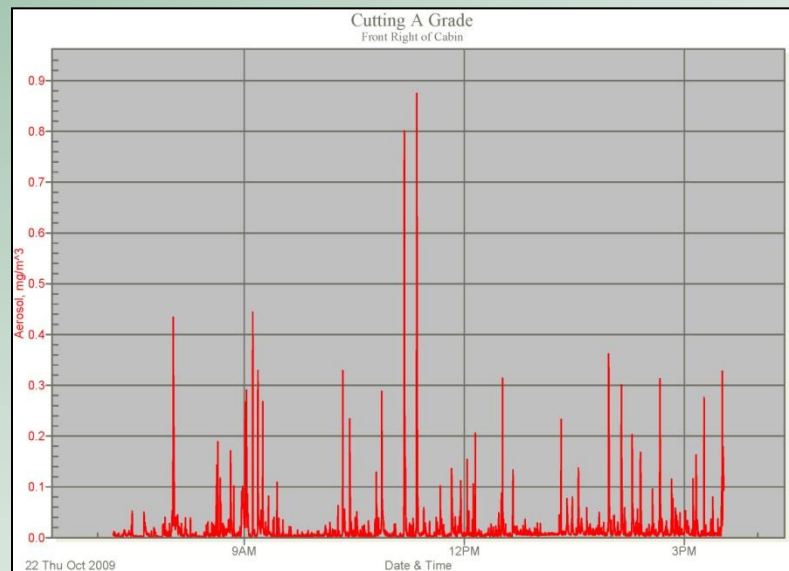
- RD of >0.03 mg / M3
- 3 x times $<$ Adj OEL
- Time-line exposure low



Prior to RESPA

- RD of >0.8 mg / M3
- 8 x times $>$ Adj OEL
- Time-line exposure high

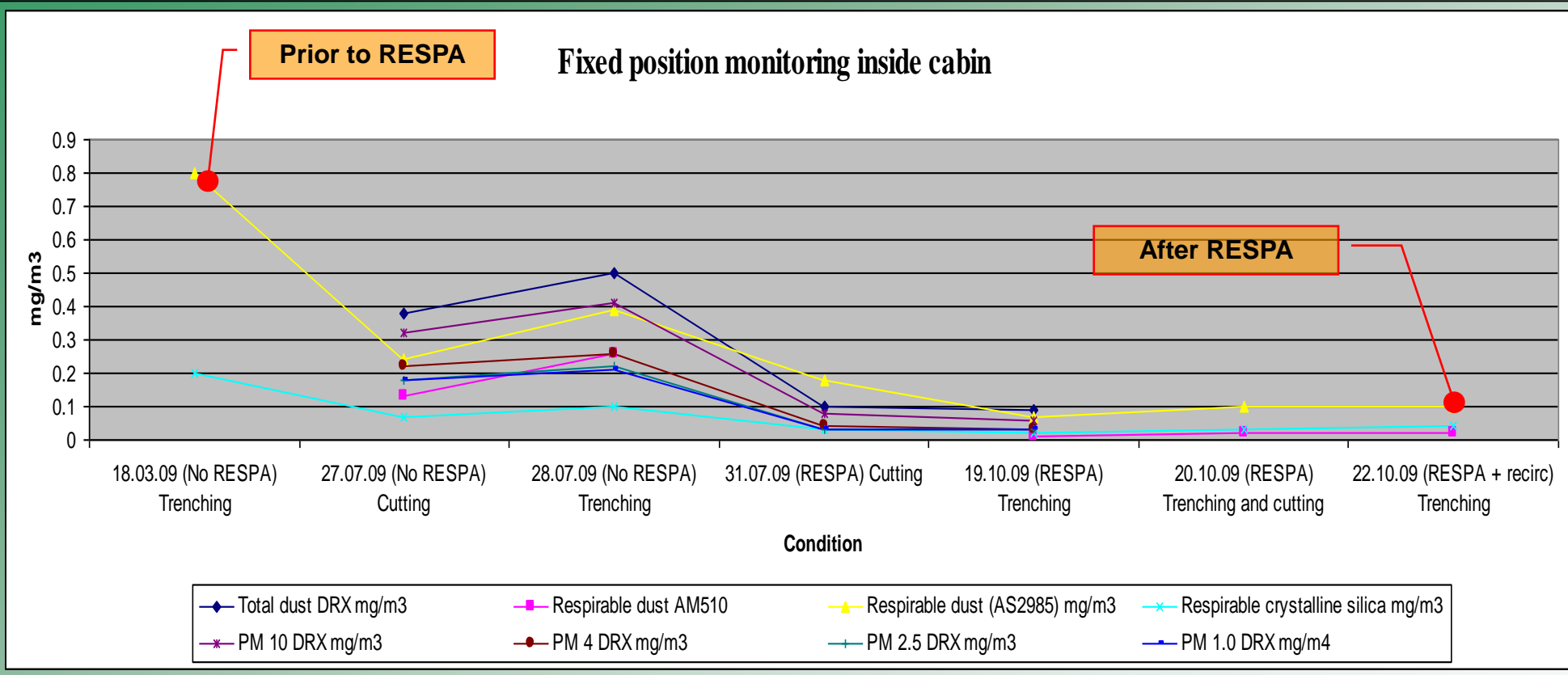
QME- Mines Expectorate Filed
Evaluations July- Dec 2009



After RESPA SD

- RD of >0.03 mg / M3
- 3 x times $<$ Adj OEL
- Time-line exposure eliminated
- Spikes indicate opening of Doors
Windows

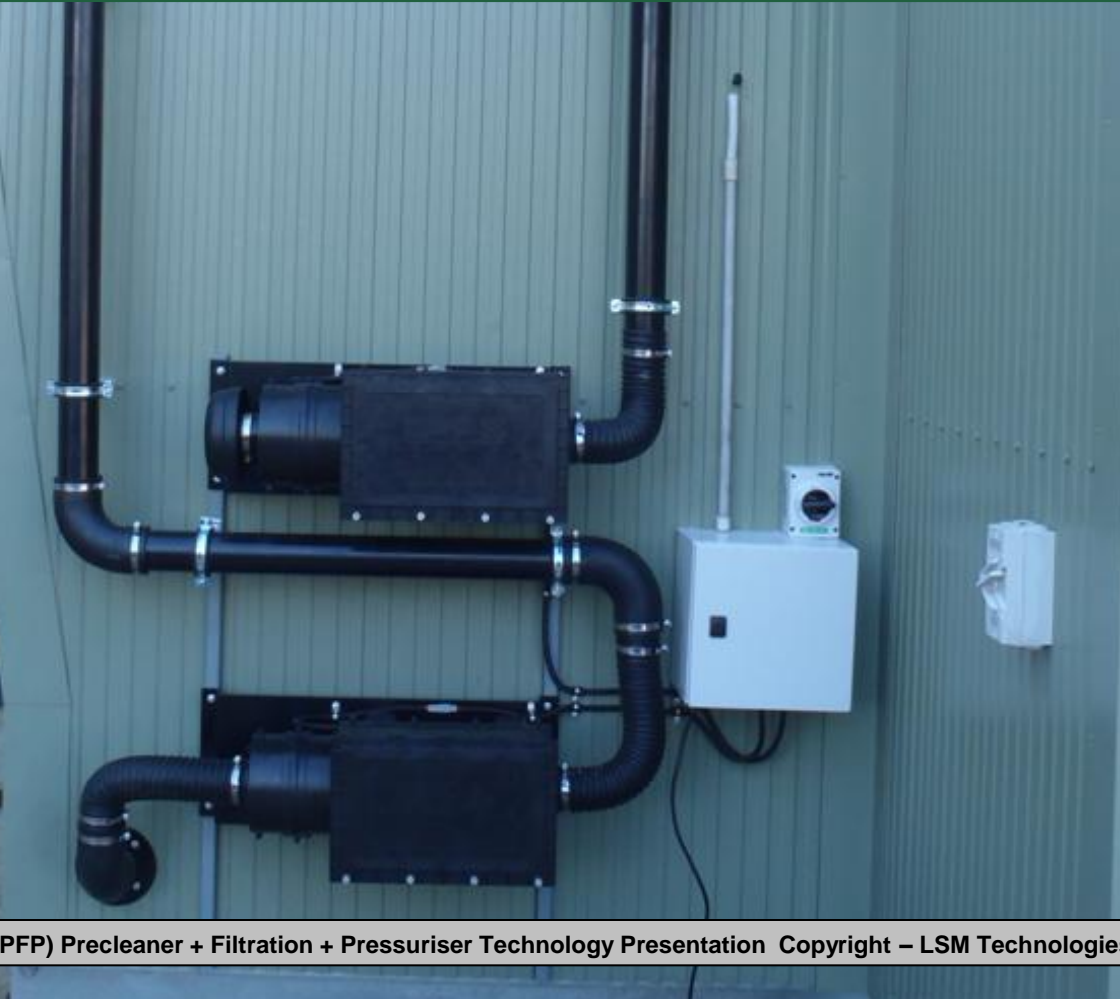
RESPA SD / SDX- OEL Compliance Legislation Testing



- ❑ RCS from 0.12 mg/m3 to 0.03 mg/m3 after the RESPA SD / SDX units had been installed.
- ❑ AIOH notes where exposure is likely to > 50% of OEL, control strategies should apply.
- ❑ Well below the adjusted exposure of 0.09 mg/m3 (50% = 0.045 mg / M3).

QME- Mines Expectorate Field Evaluations July- Dec 2009

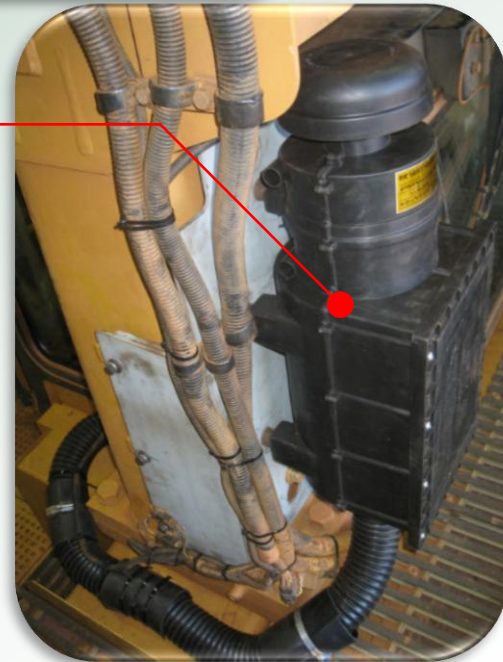
RESPA SD / SDX PFP EXAMPLES



Application Example- Iron Ore Site



**RESPA SD-
External Air Filter**



- ⇒ Filter Life of > 500 hours.
- ⇒ Extended HVAC service life.
- ⇒ Maintains Operator comfort.
- ⇒ Positive Cabin Pressure >70 pascals.

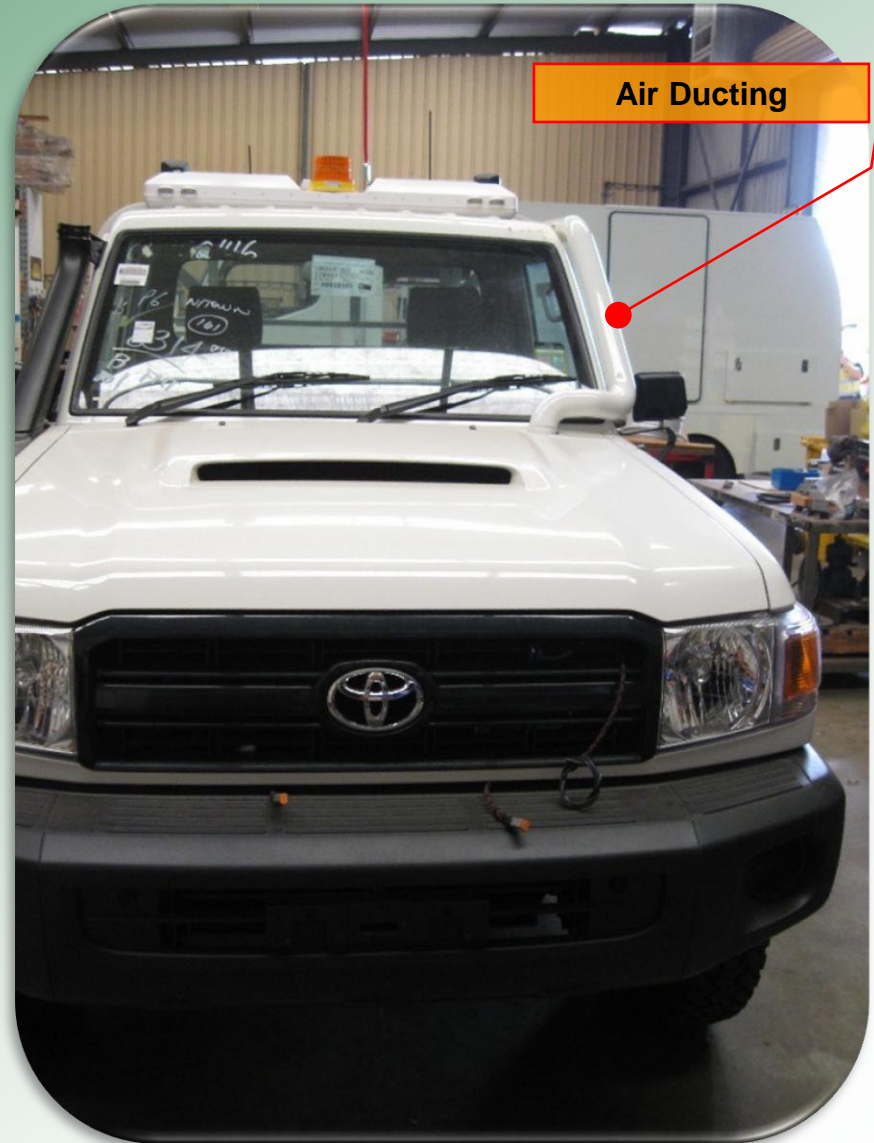
Application Example- Sandstone Quarry



- ⇒ Filter Life of >500 hours.
- ⇒ Extended HVAC service life.
- ⇒ Maintains Operator comfort.
- ⇒ Positive Cabin Pressure >70 pascals.



Application Example- Light Vehicles



- ⇒ Filter Life of + 1,000 hours.
- ⇒ Extended HVAC service life.
- ⇒ Maintains Operator comfort.
- ⇒ Positive Cabin Pressure >70 pascals.

Application Example- Cement Stockpile



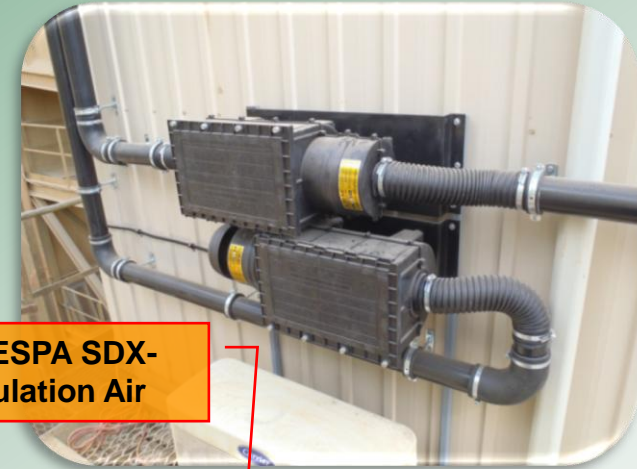
RESPA SD-
External Air

RESPA SDX-
Recirculation Air

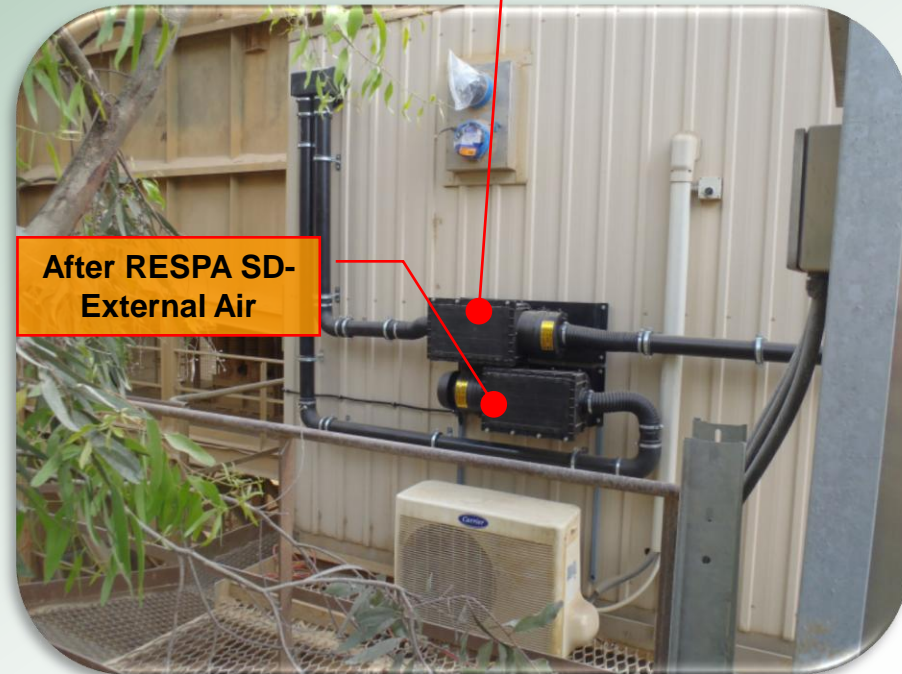


- ⇒ Filter Life of + 1,000 hours.
- ⇒ Extended HVAC service life.
- ⇒ Maintains Operator comfort.
- ⇒ Positive Cabin Pressure >70 pascals.

Application Example- Crusher Cabin



After RESPA SDX-
Recirculation Air



After RESPA SD-
External Air

- ⇒ Filter Life of > 1,000 hours.
- ⇒ Extended HVAC service life.
- ⇒ Maintains Operator comfort.
- ⇒ Positive Cabin Pressure .

RESPA- Applications- Other

Many other Vehicles / Industries:

- ⇒ Cranes.
- ⇒ Drill Rigs
- ⇒ Emergency Vehicles.
- ⇒ Council Vehicles.
- ⇒ Agricultural machines
- ⇒ Garbage Trucks.
- ⇒ Landfill Operations.
- ⇒ Military.
- ⇒ And many more.....!



Many other Applications:

- ⇒ Crusher Cabins.
- ⇒ High Voltage Electrical Cabinets.
- ⇒ Compressor Compartments.
- ⇒ Electric Motors / Alternators / Drives.
- ⇒ Electrical Control Rooms.
- ⇒ And Many More.....!



RESPA- Applications- Videos



LUBRICATION

DESIGN, INSTALLATION, TECHNICAL SUPPORT OF HIGH QUALITY ACL SYSTEMS & FLUID TRANSFER EQUIPMENT FOR ALL FIXED / MOBILE PLANT- KEEPING YOU ON THE MOVE.



Diaphragm/Pump Units



Heavy Duty Reels



Centralised Lubrication Systems

SAFETY + HEALTH

SELECT TECHNOLOGIES TO PROVIDE YOU WITH ENHANCED SAFETY, DAMAGE CONTROL AND PRODUCTIVITY.



Load Weighing/ Crane Anti-Collision



Safety Viewing Solutions



Safety Tyre Sealants



RESPA HVAC Filtration

MAINTENANCE + PRODUCTIVITY

UNIQUE TECHNOLOGIES TO REDUCE MAINTENANCE, INCREASE COMPONENT SERVICE LIFE AND ELIMINATE ASSOCIATED LOSS IN PRODUCTIVITY.



Desiccant Fluid/Tank Breathers



Tyre Protection Sealants



Engine Air Precleaners



Tyre Pressure Monitoring Systems



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- Extending **Critical Component Service Life**.
- Enhancing **Workplace Safety & Operator Health**.
- Reducing **Equipment Damage**.
- Increased **Productivity**.

Our web site has been designed as a Technical Resource, including **Customer References, Applications, Case Histories, Manuals, Tools** & much more. So as we may keep you informed with **News, Training Events & Updates**, please click **Register** above.

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- 23-Apr** Robertsons saves with RIDE- ON Tyre Sealants »
- 16-Mar** "Measuring and Managing Safety in Mining"- Criterion Conference Perth 28th 29th June 2011 »
- 10-Mar** IIR Conference 7th-9th March 2011- Operator Visibility + Proximity Detection + Collision Avoidance »
- 03-Mar** Glen Lewis joins LSM Technologies- Manager- Tyre Protection Systems Division »
- 28-Feb** Major Mining Company implements RESPA for Light Vehicles- as a Standard »
- 28-Feb** LSM Technologies- New DIY Fixed Cabin RESPA Kit »
- 28-Feb** Smoke Test proves RESPA- HEPA Filtration »
- 27-Feb** Filter Panels Vs RESPA on Wheel Loader in Toxic Gas Waste Plant »
- 25-Feb** DOUBLE- RESPA solves dust issues in large Quarry Crusher Cabins »
- 15-Feb** RESPA Solutions for Drill Rigs- an Interview with a Drill Operator »
- 25-Nov** New Orlaco Ruggedised LED-7" LCD with massive improvements »
- 13-Nov** Ride- on + Michelin Tyres- "Co- Exhibit / Co- Operation" XOne Tyres »

