



SIGMA

BUILT FOR THE TOUGHEST AIR CONDITIONS

INTRODUCING COST SAVING HVAC TECHNOLOGY



BUILT FOR THE TOUGHEST AIR CONDITIONS



Performance

Reliability

Technology

Innovation

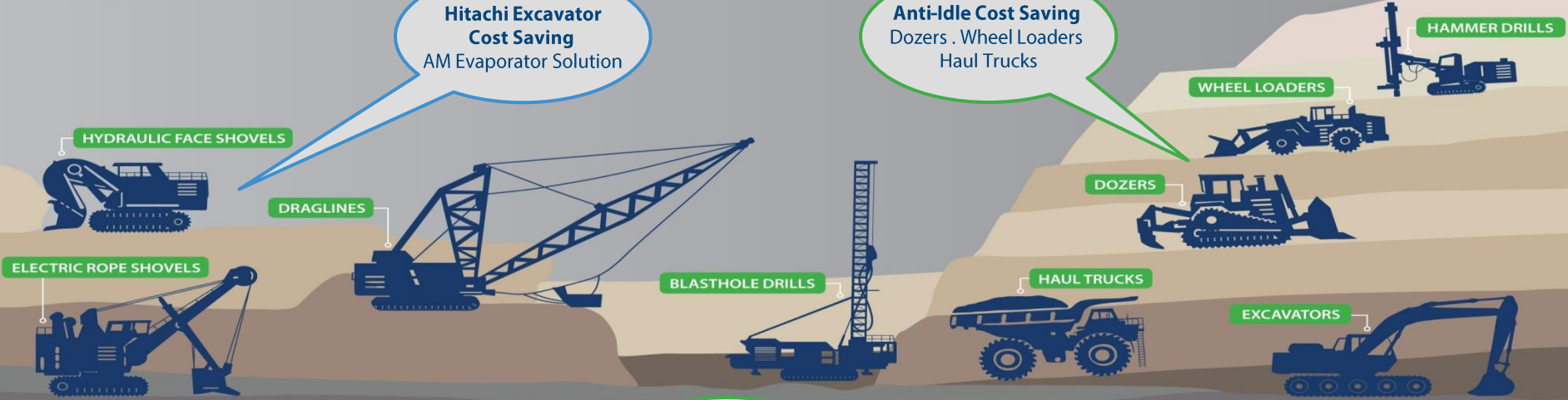


Knorr-Bremse Group

How we fit into the landscape.

SIGMA
BUILT FOR THE TOUGHEST AIR CONDITIONS

ABOVE GROUND



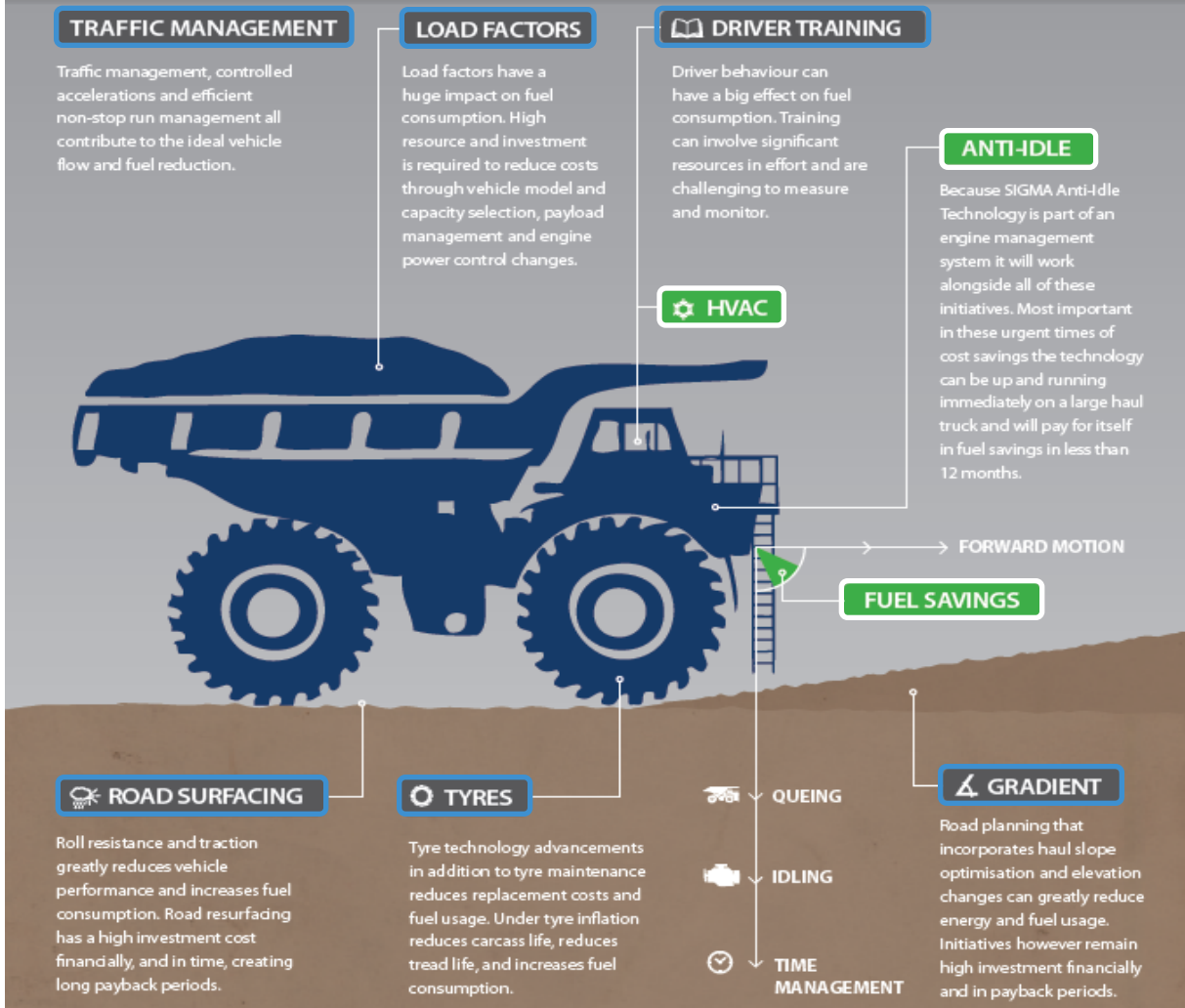
UNDERGROUND



FUEL REDUCTION INITIATIVES

Mines have long been investing in high-cost initiatives, focused on when machine are moving and requiring **larger & larger investments at diminishing returns...**

SIGMA consider factors that reduce fuel consumption whilst the machine is stationary, or at Idle and requires a **much smaller investment...**



SIGMA Anti-Idle TECHNOLOGY

Smart thinking.

'Smart Thinking' from Sigma

- ✓ Save fuel and keep the cabin cool
- ✓ Designed to integrate with your existing 24VDC HVAC system
- ✓ Sigma Anti-Idle Technology transfers machine idle time into thousands of dollars in **cost savings through...**



FUEL SAVING



REDUCE SERVICE INTERVALS



CO₂ REDUCTION

RETURN ON INVESTMENT IN LESS THEN 12-MONTHS

Machines with either large engine capacities and/or long idle periods, offer the **best return on investment** opportunity

Consider your mining class machines...



Haul Trucks



Wheel Loaders & Dozers



Blasthole Drills



Underground Trucks & Loaders



INTEGRATED TECHNOLOGY...AUTOMATED OPERATION

Sigma's Anti-Idle Technology will automatically turn the machine engine OFF and turn the Anti-Idle System ON to maintain comfortable in-cabin conditions...

- ✓ Initiates from Park Brake or Shift Lever position
- ✓ Monitors HVAC, Cabin & Ambient temperatures and pressures
- ✓ Safe machine warm down (Nominal 3-minutes)
- ✓ **Data Logging Capability** to validate the level of savings



SIGMA'S ANTI-IDLE TECHNOLOGY CONSISTS OF...

Standard Product with **optimized installation and setup** to suit requirements of the mine and machine...

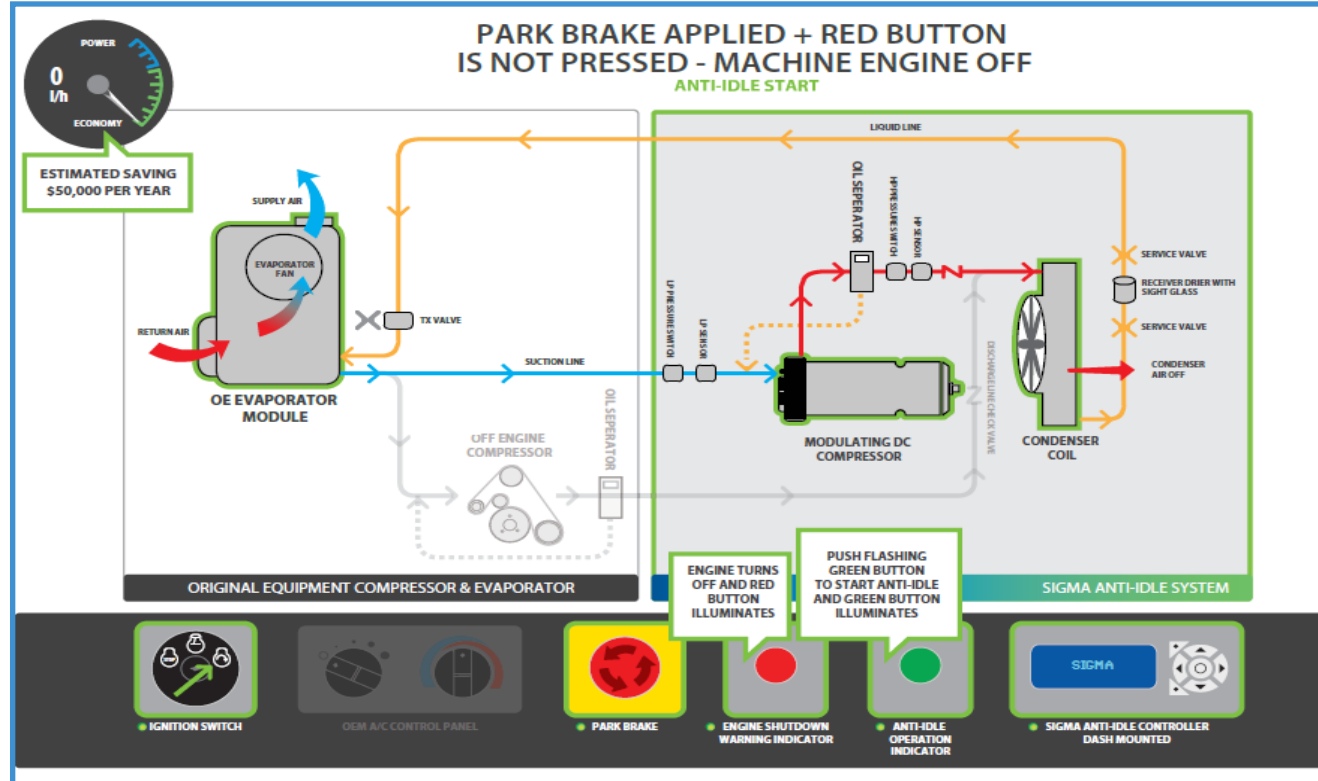
- ✓ Anti-Idle variable speed Compressor and Condenser Unit, can be matched to any OE evaporator
- ✓ **Anti-Idle 'Smart Thinking' PLC**, with optimized setup and **Data Capture Enabled**
- ✓ Mine and machine specific Installation Kit
- ✓ Service & Commissioning Interface



SIGMA INTEGRATED SOLUTION...

- ✓ Uses existing Factory Evaporator
- ✓ Replaces condenser with Anti-Idle System
- ✓ Integrated Operation & Control

See our Team for a
Demonstration...



LET'S CALCULATE YOUR SAVINGS

Sigma's **Anti-Idle Calculator** will estimate your Hitachi EH3500 fleet savings...



Diesel Fuel Savings = \$123,833 pa



Maintenance Saving = \$567,000 pa



Carbon Emission Savings = 208 Tons pa

**See our Team for a
Demonstration...**



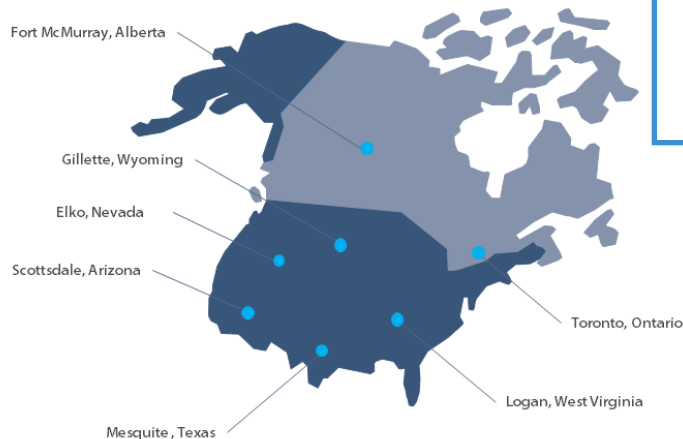
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MAKE	HITACHI	
MODEL	EH3500 HAUL TRUCK	
FUEL AT IDLE l/h	28	
TOTAL IDLE TIME as a % of Total Run Time	15	
IDLE TIME RECOVERABLE as a % of Total Run Time	50	
SHIFT DURATION (hr/day)	20	
OPERATING DAYS per year	315	
FLEET QTY	6	
COST OF FUEL cents per litre	156	
ANNUAL FUEL SAVINGS	\$123,833	
MACHINE OPERATING COSTS costs per hour	200	
ANNUAL OPERATING SAVINGS excluding fuel	\$567,000	RETURN ON INVESTMENT 2.61 Months
TOTAL IDLE TIME Minutes per Hour per Vehicle	9	TOTAL IDLE TIME Minutes per Day per Vehicle 180
IDLE TIME RECOVERABLE Minutes Reduced per Hour per Vehicle	5	IDLE TIME RECOVERABLE Minutes Reduced per Day per Vehicle 90
SERVICE INTERVAL OFFSET Total Hours Reduced per Year per Vehicle	473 hrs	CARBON EMISSION REDUCTION Tons per Year (2.03kg/l Diesel) 208 Tons

LET SIGMA SHOW YOU HOW...

Start the Conversation...

- ✓ **Speak with the Sigma Team**
- ✓ **Discuss with our Sigma Dealers**



www.sigma.hvac.com



SIGMA Aftermarket Solution





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Performance

Reliability

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Knorr-Bremse Group

How we fit into the landscape.

ABOVE GROUND

Hitachi Excavator
Cost Saving
AM Evaporator Solution

Anti-Idle Cost Saving
Dozers . Wheel Loaders .
Haul Trucks

HYDRAULIC FACE SHOVELS

DRAGLINES

ELECTRIC ROPE SHOVELS

BLASTHOLE DRILLS

HAMMER DRILLS

WHEEL LOADERS

DOZERS

HAUL TRUCKS

EXCAVATORS

UNDERGROUND

Anti-Idle Cost Saving
Underground Trucks
and Loaders

UNDERGROUND WHEEL LOADERS

UNDERGROUND MINING TRUCKS

HITACHI EXCAVATOR **COST SAVING** HVAC SOLUTION

'Smart Thinking' from Sigma

Designed to fix directly to the existing HVAC mounting rack of **Dash-5 & Dash-6 machines...**

- ✓ Reduce HVAC breakdowns and machine down time
- ✓ Eliminate the need to replace factory evaporators every year
- ✓ Reduce the number of services & maintenance activities performed



REPLACE **FACTORY** EVAPORATOR

Mine operators replace factory evaporators because...

- ✗ Automotive style plastic case cracks, leading to dust ingress and shortens life
- ✗ Coils block within a short period of time, significantly reducing heating & cooling capacity
- ✗ Overhaul required multiple times per year, at high down time and high cost
- ✗ Annual replacement of evaporators to new, at high cost

Factory Evaporator

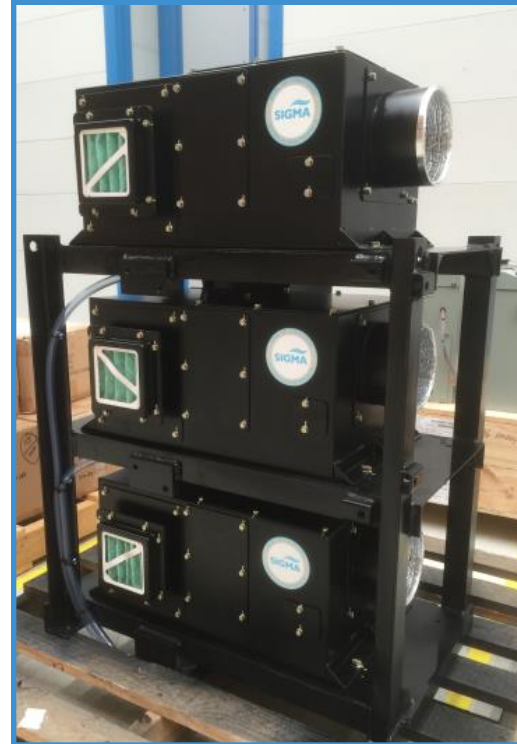


SIGMA COST SAVING HVAC SOLUTION

SIGMA's Aftermarket Evaporator delivers...

- ✓ Sigma "DNA" steel construction – long life, easily serviced, tough and durable
- ✓ Sigma Mine Spec Coils – no blocking in harsh, dust saturated mining environments
- ✓ Low level, simple service and maintenance requirement, saves cost
- ✓ Standard O-Ring refrigerant hose connections

SIGMA Aftermarket Solution



70% REDUCTION IN HVAC OPERATING COST...

Year	SIGMA Evaporator	Hitachi Evaporator	Annual Saving
0	New Product Install	New Product Install	Nil
1	Service Only	Overhaul & Replacement	\$22,000
2	Service Only + Hose Set	Overhaul, Replacement + Hose Set	\$31,500
3	Service Only	Overhaul & Replacement	\$22,000
4	Service Only + Hose Set	Overhaul, Replacement + Hose Set	\$31,500
5	Service Only	Overhaul & Replacement	\$22,000
6	Service Only + Hose Set	Overhaul, Replacement + Hose Set	\$31,500
7	Overhaul (Mid-Life)	Overhaul & Replacement	\$19,500

Potential Saving up to USD\$360,000 over the life of the machine. *

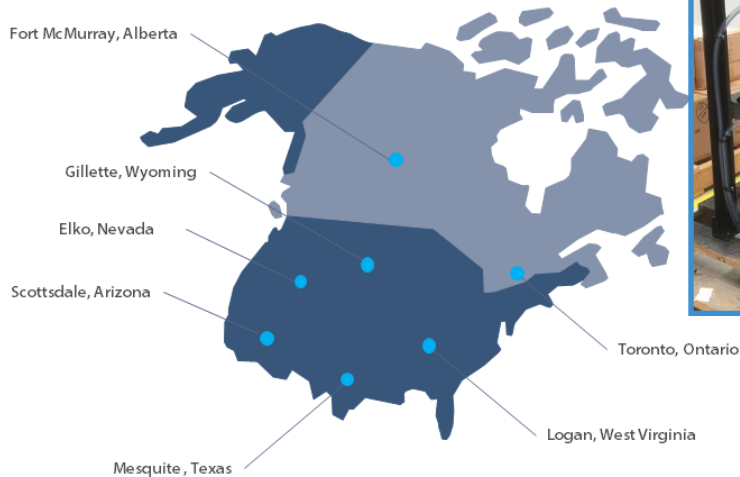
1. Assumption 15 year operating life. 2. Hitachi Evaporators. Annual 2 x full set Overhauls and 1 x full replacement. 3. Hose set replacement on both Sigma and Hitachi systems every 2 years. Sigma is an aftermarket hose set using compliant and readily available O-Ring Connectors. Hitachi is OE hose set with unique connectors estimated at \$15,000. 4. Sigma 'Service' includes replace filters, check system pressures and temperatures, clean coil, check fan motor.



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