

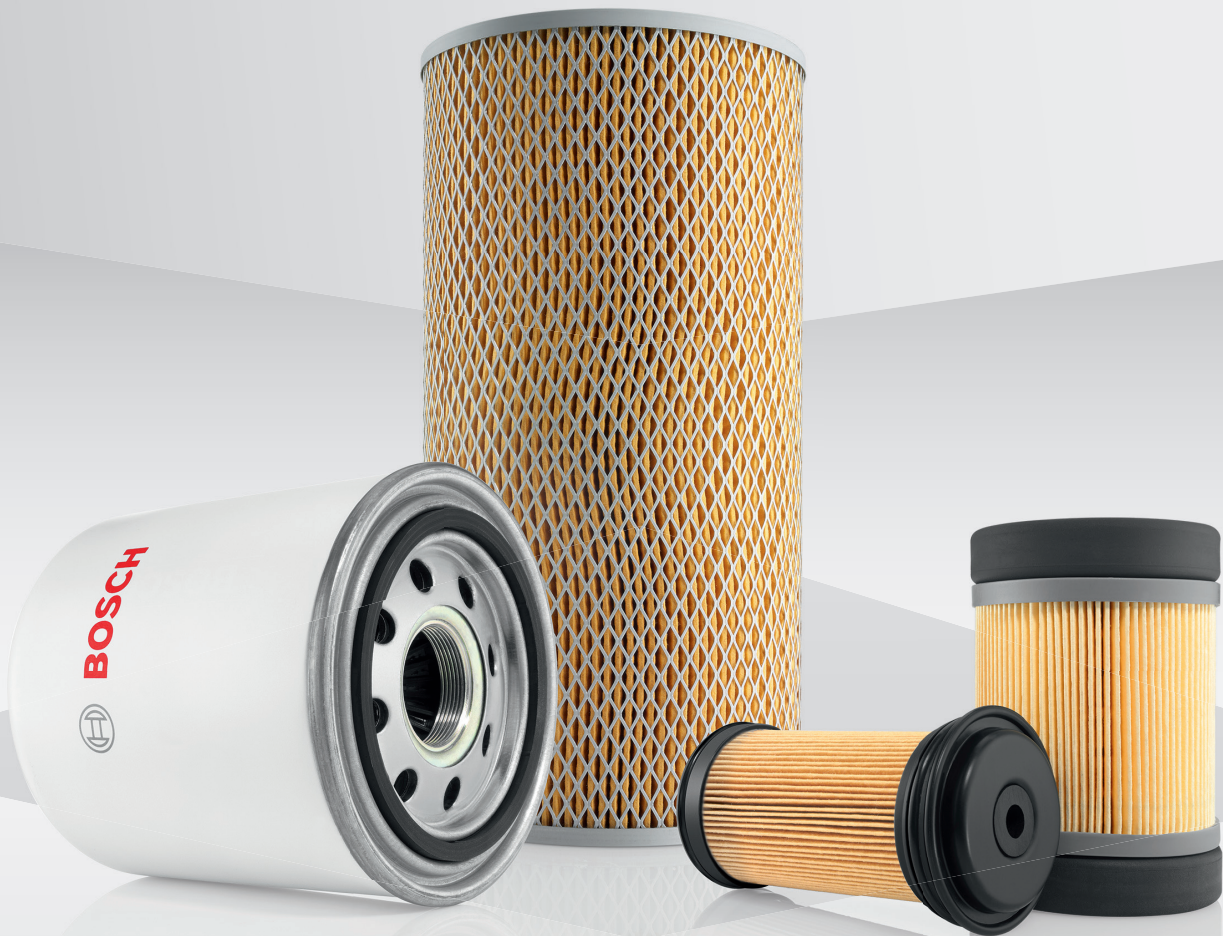


BOSCH

Invented for life

Commercial vehicle filters

No compromises in truck business



Commercial vehicle filters

Overview

When it comes to commercial vehicles, there is no room for compromises. That is why Bosch provides the complete range for many current types of commercial vehicles and engines.

Safety through outstanding product quality

High-quality materials, neat and accurate processing and well-defined quality checks – according to the same standards as for OE parts.

System competence

Bosch develops and produces diesel and Denox-tronic injection systems and therefore knows how to protect them.

Extensive range from a single source

Easier handling and ordering thanks to a comprehensive program, which is permanently updated.

High availability of goods

Bosch ensures good availability of its parts by means of an international sales and logistics network.









Strategic partner for the future







Suitable diagnostic solutions, training courses and seminars for wholesalers and workshops.



Commercial vehicle filters

Product range

			
Diesel filter	Oil filter	Air filter	Cabin filter
Bosch diesel filters protect the injection system. They reliably separate particles and water from fuel and contribute to optimum engine performance.	Bosch oil filters protect the engine. They reliably separate soot and metal abrasion from engine oil.	Bosch air filters protect the engine. They reliably separate particles from intake air and contribute to optimum engine performance.	Bosch cabin filters protect the vehicle occupants against pollen, fine dust as well as harmful and foul-smelling gases.
			

		
Air dryer cartridge	Denoxtronic filter	Special filters
Bosch air dryer cartridges protect the pneumatic system of commercial vehicles against damages. They dehumidify compressed air and reliably separate particles and oil mist thus reducing the risk of expensive downtimes.	Bosch Denoxtronic filters protect the Denoxtronic injection system. They reliably remove particles from AdBlue® thus contributing to correct dosing.	Special filters for special tasks – from coolant filters and oil mist separators to hydraulik/transmission filters.
		

Commercial vehicle filters

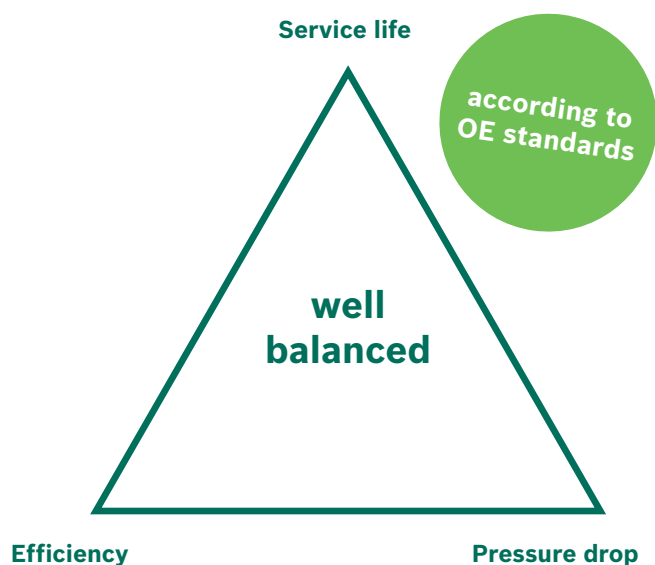
Quality requirements

Product quality is not negotiable; there can't be any compromises in this regard. Besides high-quality materials and excellent processing, this includes optimized alignment of the filter specifications. These specifications influence one another. They must thus be exactly geared to each other in order to ensure outstanding filter performance.

All functional and quality tests are performed according to the same standards applied to original equipment parts.



Magic triangle of filtration



Service life (dust retention capacity):

the amount of particles a filter is able to retain before reaching the change interval – should be as high as possible

Efficiency (particle separation rate):

the ratio of the number of particles retained by the filter to the number entering the filter, expressed as a percentage – should be as high as possible

Pressure drop (differential pressure):

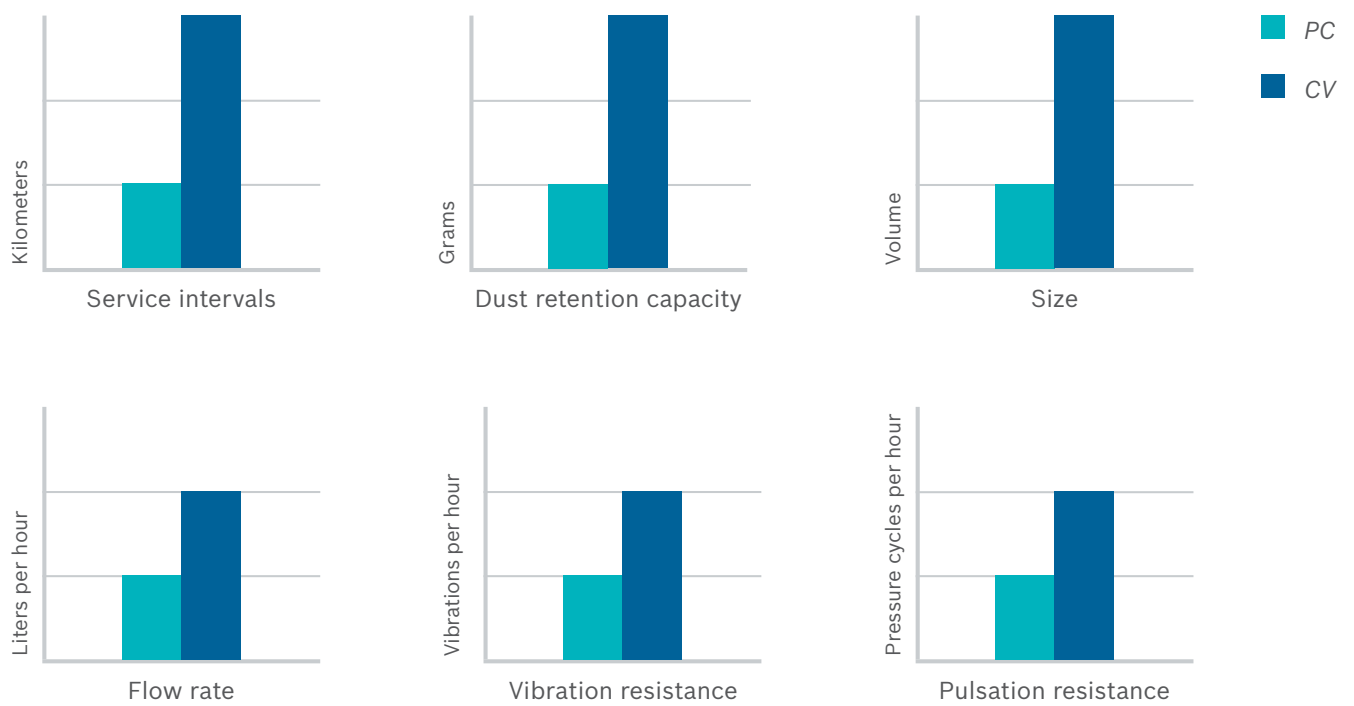
the difference in fuel/oil/air pressure between filter inlet and outlet – should be as low as possible

Commercial vehicle filters

Quality requirements

Commercial vehicles are almost always on the road. This means all filter types are constantly strained and – in case of international transport – it also implies significant variations in fuel quality in different countries. As a result, commercial vehicle filters need to meet technical requirements being two to three times higher than those placed on passenger car filters.

Technical requirements* of passenger car and commercial vehicle oil filters in comparison



*according to OE requirements, approximated values



Did you know?

Every year, some

371 thousand

commercial vehicles with more than 6 tons of GVW circulate on South African roads.

eNaTIS

Diesel filters

Product details

Bosch diesel filters protect the injection system. They reliably separate particles and water from fuel and contribute to optimum engine performance.



Advantages at a glance

- ▶ **Excellent filter efficiency and reliable water separation** due to multilayered, microporous filter media
- ▶ **High dust holding capacity and low flow resistance** due to large filter surface
- ▶ **Moisture resistance and tensile strength** due to specially impregnated filter media
- ▶ **Protected against inner and outer leakage** due to high-quality processing and usage of resistant materials

Change diesel filters regularly as specified by the vehicle manufacturer!

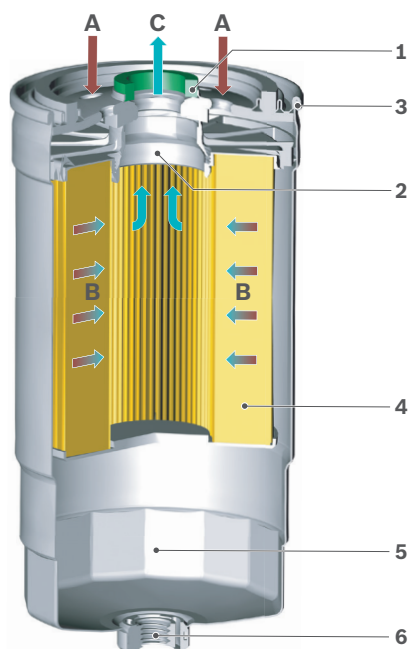


Possible consequences of silted-up filters:

- ▶ Loss of engine power or even engine standstill
- ▶ Impairment of the fuel supply
- ▶ Impairments to the output of the fuel pump or even a short-circuit
- ▶ Internal corrosion of engine components

Diesel filters

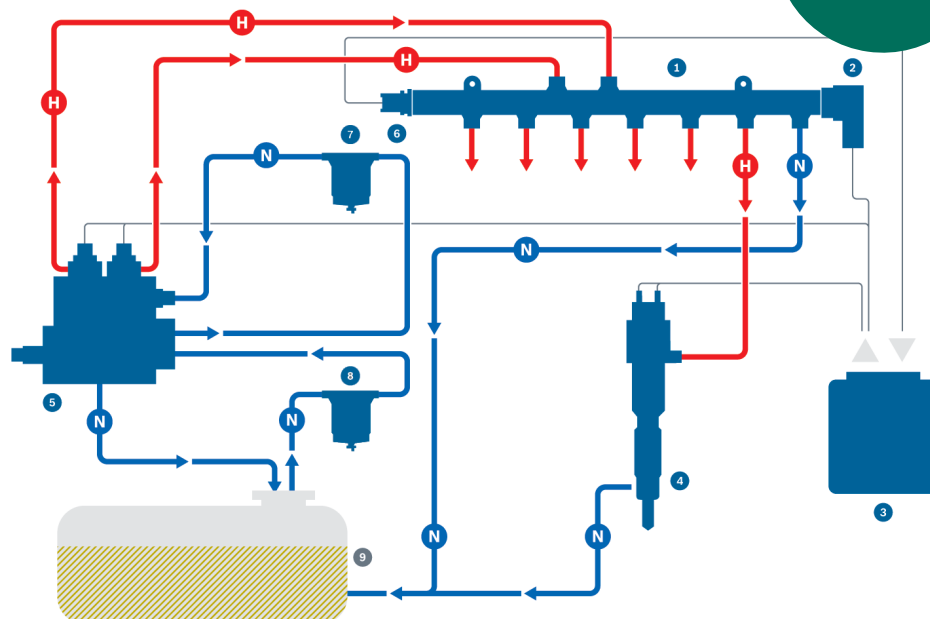
Technology



Design and operation

- 1 Seal
 - 2 Threaded connection
 - 3 Double beading
 - 4 Multilayer filter media
 - 5 Water accumulation chamber
 - 6 Water drain screw
- A Inflow of contaminated diesel
 B Dirt and water filtration of diesel
 C Cleaned diesel is conducted to the engine

Common-rail system for up to 2,500 bar



Bosch system competence

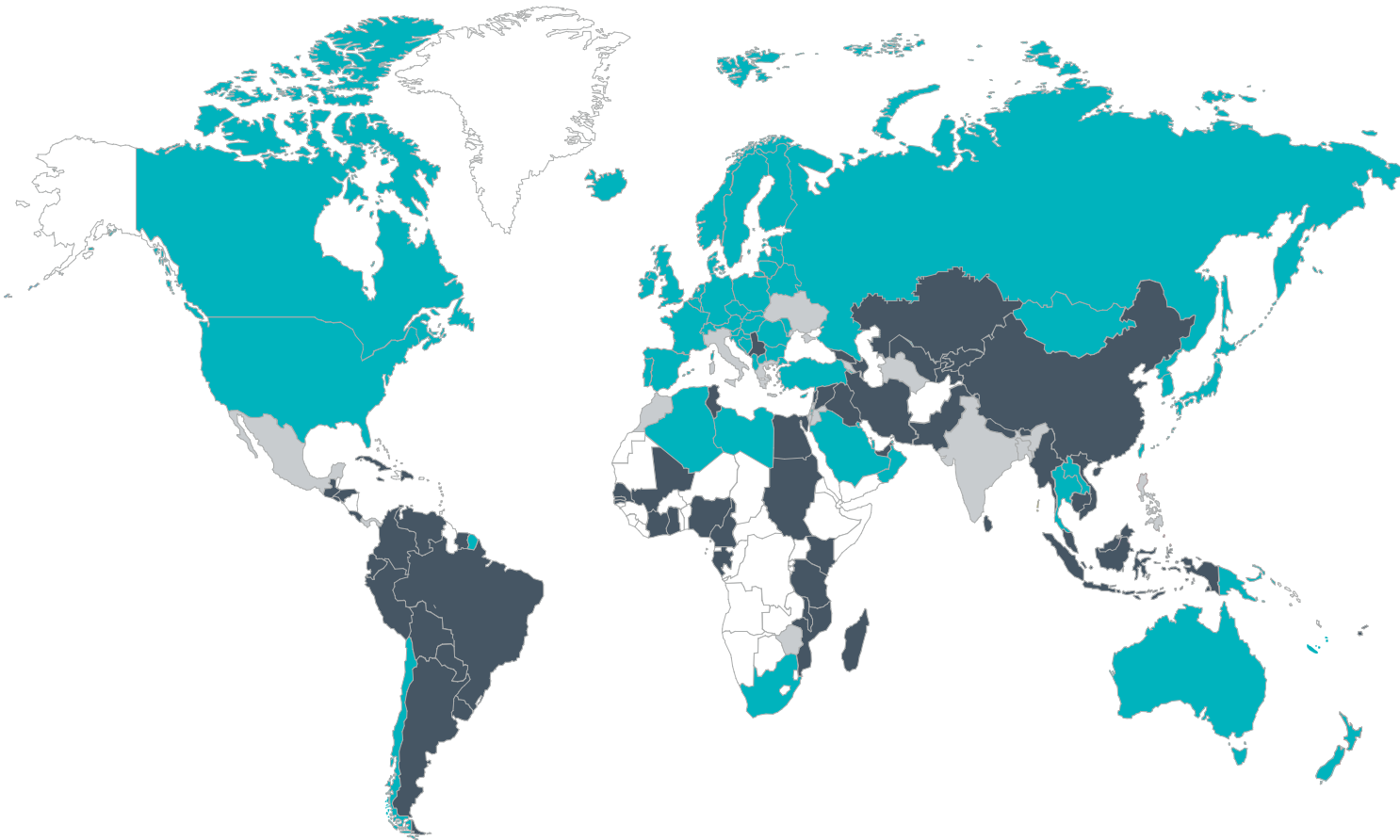
- 1 High-pressure rail
 - 2 Pressure control valve
 - 3 Electronic engine control unit
 - 4 Solenoid-valve injector
 - 5 High-pressure pump
 - 6 Rail pressure sensor
 - 7 Fuel filter
 - 8 Prefilter
 - 9 Tank
- H High pressure
 L Low pressure
 — Electrical connection
 Fuel

Diesel filters

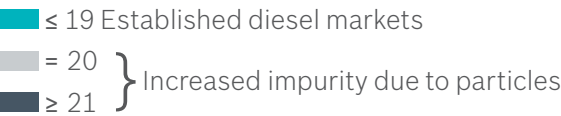
Technology

Because of varying diesel quality

In global terms, the quality of diesel varies considerably. Depending on the region and the climatic conditions, the concentration of water and dust may be extremely high. Bosch thus provides various diesel filters exactly geared to the individual diesel qualities of the respective country.



Source: SGS World Wide Fuel Surveys summer 2006 to winter 2010/2011



Corrosion at the injector

Technology I Diesel filters



Water – the archenemy of injection systems

Any diesel fuel contains finely dissipated water. This water content depends on the fuel quality. Condensation inside the tank can increase the it even further. Insufficient water separation – e.g. by non-compliance with replacement intervals or use of cheap filters – can result in expensive corrosion damages on the engine, the high-pressure pump or even on the injectors.

Oil filters

Product details

Bosch oil filters protect the engine. They reliably separate soot and metal abrasion from engine oil.



Advantages at a glance

- ▶ **Long service life of filter and engine oil** due to multilayered, specially impregnated filter media
- ▶ **High dust holding capacity** due to large filter surface
- ▶ **Excellent filter efficiency** due to specially designed and well balanced filter components
- ▶ **Reliable engine lubrication** in almost all temperature and oil pressure conditions
- ▶ **No oil loss** by corrosion-resistant housing materials and seals made of special rubber

Change oil filters regularly as specified by the vehicle manufacturer!



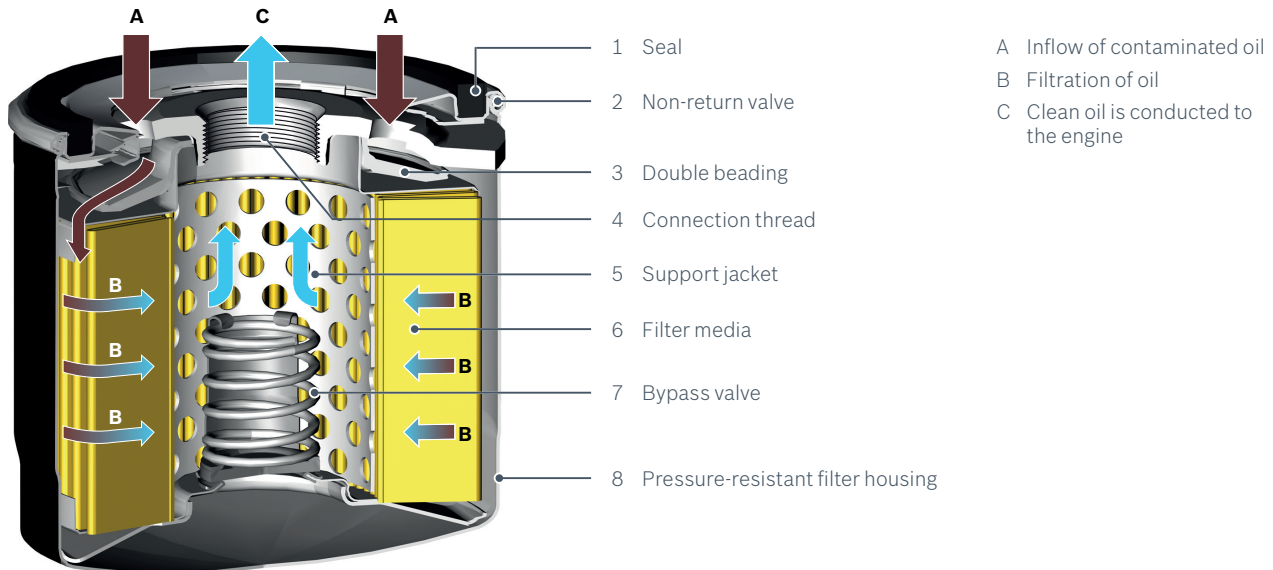
Possible consequences of silted-up filters:

- ▶ Premature engine wear or even engine damage
- ▶ Reduced engine performance
- ▶ Increased oil consumption

Oil filters

Technology

Design and operation



Bypass valve

- Ensures continuous oil supply for the engine at low ambient temperatures and protection when the filter is clogged at the end of service life through brief bypassing of the filter
- Less damage caused by impurities than by interrupted oil supply and cooling

Non-return valve

- Prevents idling of the oil filter after switching off the engine
- Immediate lubrication at restarts thanks to quick buildup of pressure



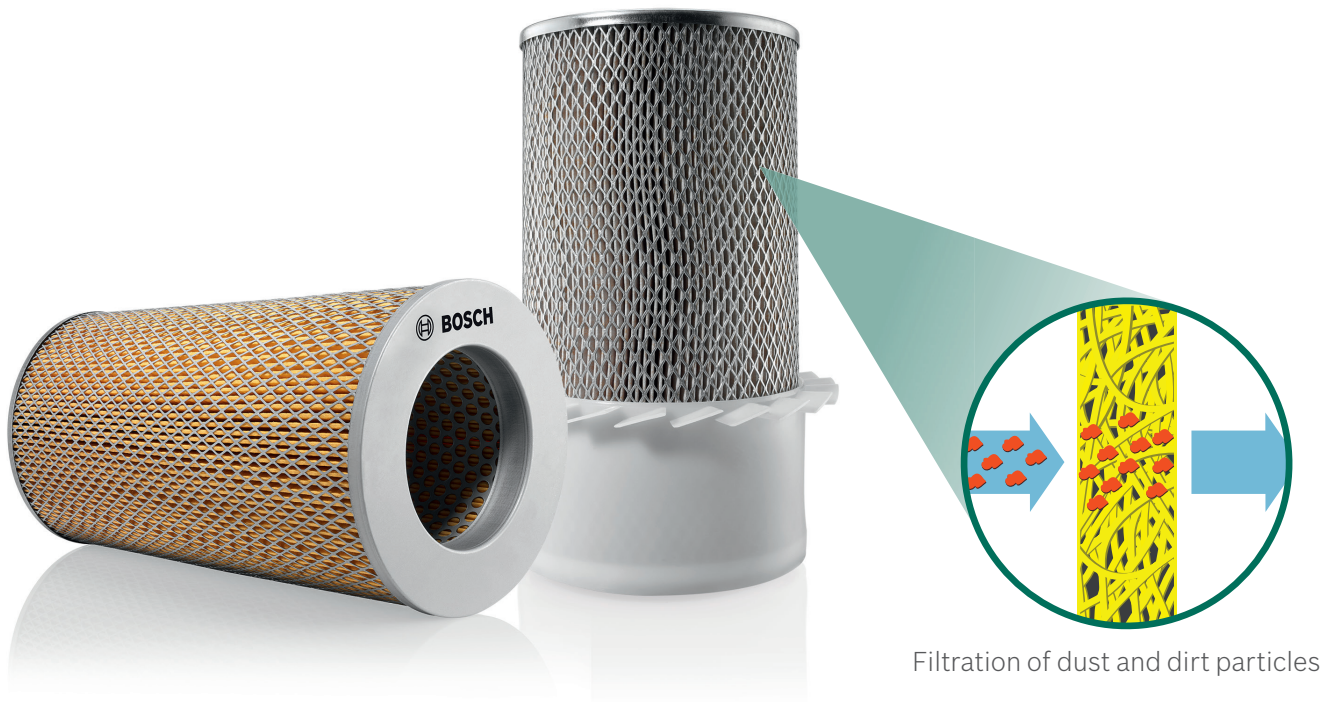
Combined main-flow/bypass filter in CV

- 100 % of the oil is filtered by the main flow filter
- In addition, 10 % of the oil are subject to a fine filtration at the bypass filter – slowing down oil aging

Air filters

Product details

Bosch air filters protect the engine. They reliably separate particles from intake air and contribute to optimum engine performance.



Advantages at a glance

- ▶ **Long service life, excellent filter efficiency, moisture resistance and tensile strength** due to multilayered, specially impregnated filter media
- ▶ **High dust holding capacity and low flow resistance** due to large filter surface
- ▶ **Robust fold geometry** due to filter media with special embossing
- ▶ **Appropriate fit** due to precise dimensions and high-quality sealing materials

Change air filters regularly as specified by the vehicle manufacturer!



Possible consequences of silted-up filters:

- ▶ Increased fuel consumption
- ▶ Reduced engine power
- ▶ Increased pollutant emissions



Cabin filters

Product range & details

Bosch cabin filters protect the vehicle occupants against pollen, fine dust as well as harmful and foul-smelling gases.



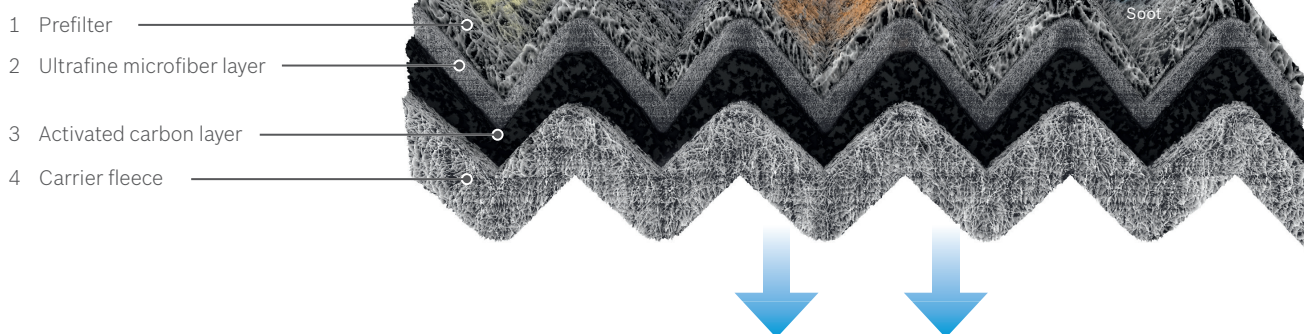
*Recommended replacement interval:
Cabin filters should be changed every
200 000 to 300 000 km. Please ob-
serve the manufacturer specifications!*

Function	Activated carbon filter	Standard filter
	Bosch activated carbon cabin filters – for noticeably purer and more pleasant air inside the car.	Bosch standard cabin filters – for clean air inside the car.
Separates foul-smelling and harmful gases (ozone, smog, exhaust gases)	●	
Separates pollen and fine dusts (up to 100% of 10µm)	●	●
Protects the air conditioning	●	●
Reduces dazzling effects	●	●
Coverage		
Advantages at a glance	<ul style="list-style-type: none">▶ Neutralizes reliably harmful and foul-smelling gases in an activated-carbon layer▶ Filters effectively fine dusts, soot and pollen in an ultrafine microfiber layer▶ Protects the air conditioner and improves the vision by reducing deposits	<ul style="list-style-type: none">▶ Filters effectively fine dust, soot and pollen in an ultrafine microfiber layer▶ Protects the air conditioner and improves the vision by reducing deposits

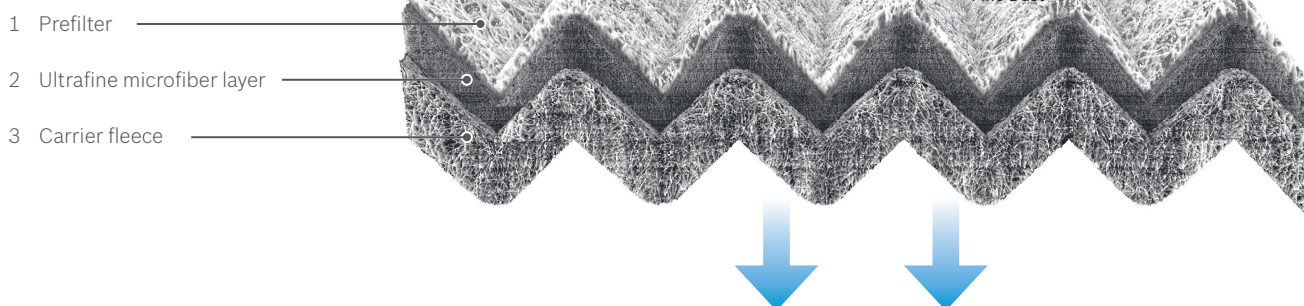
Cabin filters

Technology

Activated carbon filter



Standard filter



Possible consequences of silted-up filters:

- ▶ Poor vision due to misted windows, and thus reduced safety
- ▶ Increased concentration of pollutants inside the vehicle
- ▶ Allergic reactions, e.g. sneezing
- ▶ Restricted operation of the air conditioning system due to deposits on the evaporator



Did you know?

Activated carbon is made of coconut shells carbonized and crushed in a hermetically sealed environment. Water vapor with a temperature of

800° C

is used to create its sponge-like structure.

Denoxtronic filters

Product details

Bosch Denoxtronic filters protect the Denoxtronic injection system. They reliably remove particles from AdBlue® thus contributing to correct dosing.



Advantages at a glance

- ▶ **High particle separation rate** due to microporous filter medium with special impregnation
- ▶ **High dust retention capacity** due to large filter surface
- ▶ **Chemical resistance to aggressive AdBlue®** due to usage of high-quality materials
- ▶ **Frost resistance** due to compressible compensation elements

*Recommended replacement interval:
Depending on the circumstances of their application, Denoxtronic filters should be replaced every 120 000 to 320 000 km.
Please observe the vehicle manufacturers' specifications!*



Did you know?

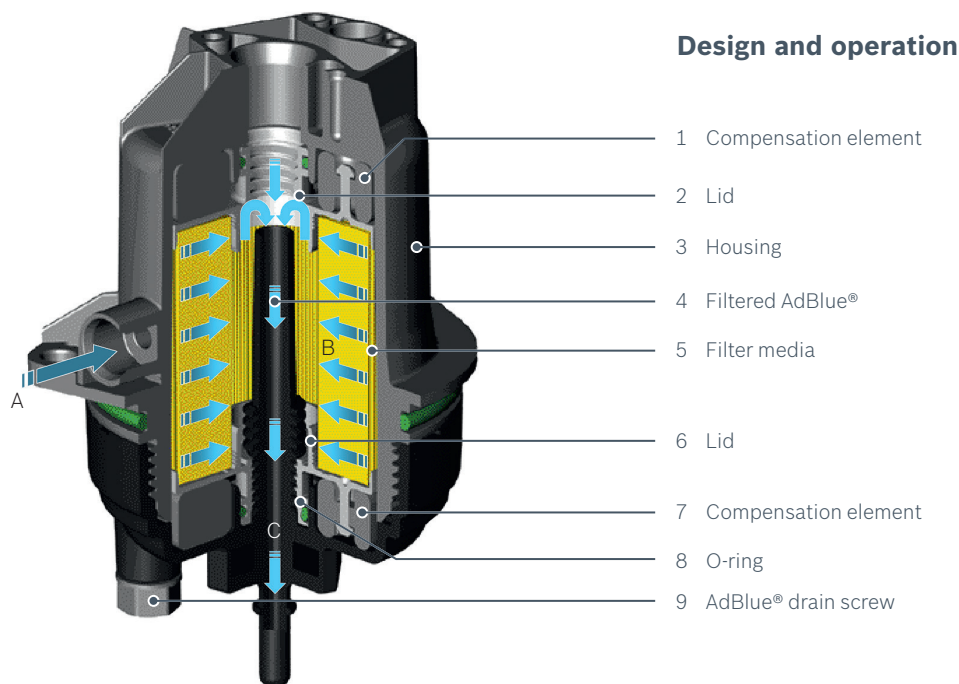
AdBlue® is a watery urea solution composed of up to 32.5 % urea and up to 67.5 % demineralized water. Due to its high water content, AdBlue® freezes and expands at just

-11° C.

In this case, compressible compensation elements prevent damage to both the filter and the supply module.

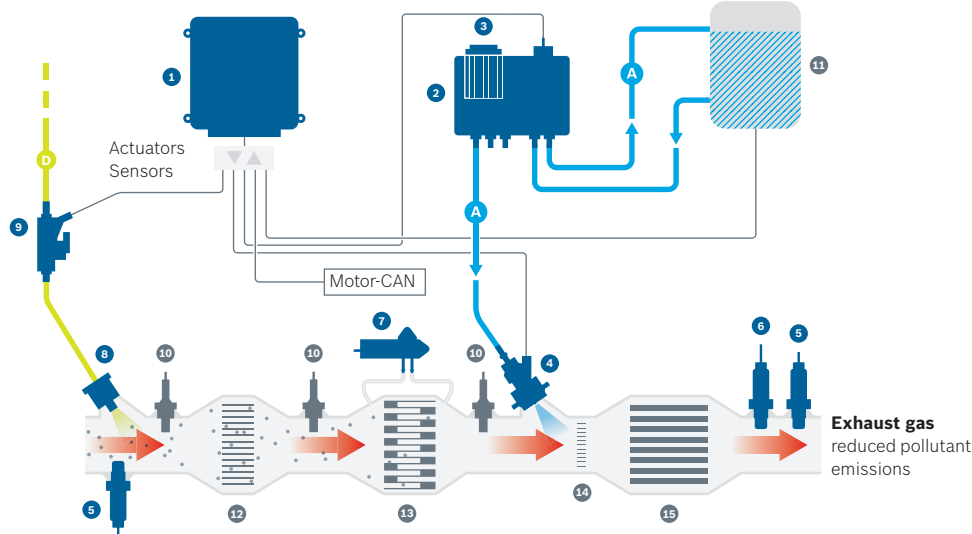
Denoxtronic filters

Technology



Denoxtronic exhaust-gas treatment and sensors (e.g. for DNOX 2.2)

Bosch system competence



Bosch components

Denoxtronic:

- 1 Dosing control unit / Electronic engine control unit
- 2 Supply module
- 3 Denoxtronic filter
- 4 Dosing module
- 5 NO_x sensor
- 6 Particulate matter sensor
- 7 Differential pressure sensor
- 8 Diesel injection unit
- 9 Diesel metering unit with shut-off valve

Other components

- 10 Exhaust-gas temperature
- 11 AdBlue® tank
- 12 Oxidation catalyst
- 13 Coated diesel particulate filter
- 14 Mixer
- 15 SCR catalytic converter with ammonia slip catalyst

A AdBlue®

D Diesel











— Electrical connection

■ Hot

Denoxtronic filters

Product range

Spare-part sets for repairs and servicing

Typ/KIT										
DNOX 1 Service	1 457 436 042		•	•		•	•	•		DAF, MAN, IVECO, Scania, Volvo
DNOX 1 Repair	F 00B H40 025					•	•		•	DAF, MAN, IVECO, Scania, Volvo
DNOX 2.1 Service	1 457 436 006	•	•			•	•			Case, IVECO, KHD, Renault, Volvo
DNOX 2.1 Repair	1 457 030 020								•	Case, IVECO, KHD, Renault, Volvo
DNOX 2.2 Service	1 457 436 088		•	•	•					Cummins, IVECO, Mack, Nissan, Renault, Volvo
DNOX 6.5 Service	1 457 436 039		•	•	•					Perkins, IVECO, CNH, JCB, Daimler India, CAMC (China)



Filter with compensation element



Compensation element with sealing function



Pre-filter



Filter element



Set of seals



Filter cover



Compensation element



Drain plug



Extraction tool



Replacement of Denoxtronic 2.1 filters

The filter is screwed onto the housing cover of the Denoxtronic supply module and is extracted from the housing along with the cover. In case the filter detaches from the cover or gets stuck at the housing, it can be extracted using the extraction tool.



Replacement of Denoxtronic 2.2 filters

Using the extraction tool, the filter is extracted from the Denoxtronic supply module. The matching extraction tool is included within the service kit.

Air dryer cartridges

Product details

Bosch air dryer cartridges protect the pneumatic system of commercial vehicles against damages. They dehumidify compressed air and reliably separate particles and oil mist thus reducing the risk of expensive downtimes.



Advantages at a glance

- ▶ **Large reserves for water absorption** due to usage of high-quality air dryer granulate
- ▶ **High resistance to pulsation and burst pressure** due to robust high-quality processing
- ▶ **Even longer service life of air dryer granulate** by integrated oil separator

*Air dryer cartridges shall be replaced annually.
Please observe the vehicle manufacturers' specifications!*



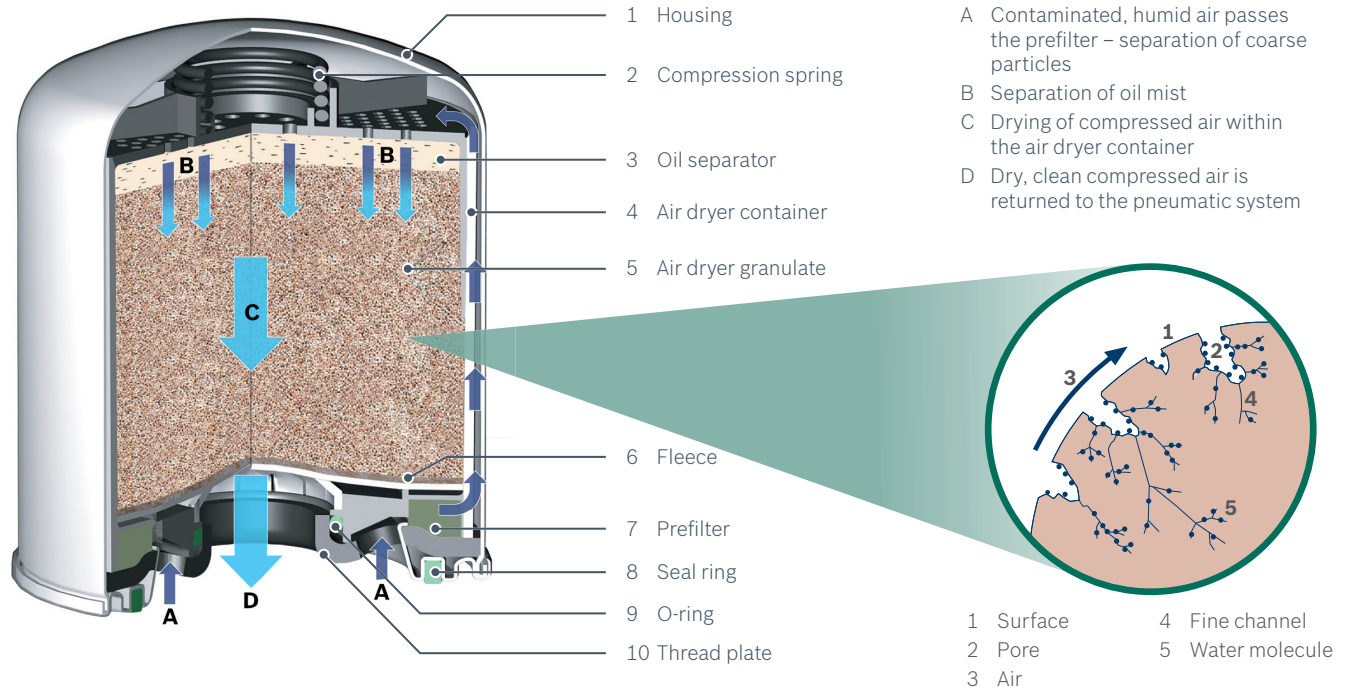
Possible consequences of poor dehumidification of compressed air

- ▶ Risk of malfunctioning valves due to frozen water – in case of cold weather
- ▶ Corrosion in air reservoirs as well as on valves and cylinders
- ▶ Erosion of oil lubricant film in brake-system components

Air dryer cartridges

Technology

Design and operation



Bosch air dryer cartridge

Oil mist is separated before reaching the air dryer granulate
 → water-absorption capability remains fully intact, extended service life

Other air dryer cartridges

Oil mist is separated after reaching the air dryer granulate
 → deteriorated water-absorption capability, reduced service life

Coolant filters

Product details

Bosch coolant filters protect the fine channels of the cooling system of commercial vehicles against deposits. They reliably separate particles and other residues from coolant, thus reducing the risk of expensive downtimes.



Advantages at a glance

- ▶ **High dust retention capacity** due to large filter surface and specially impregnated filter media
- ▶ **Long service life** due to corrosion-resistant housing and coolant-resistant seals
- ▶ **Prevents bacterial growth and acidification** by easily soluble chemical additives

Coolant filters should be replaced regularly and together with the oil filter. Please observe the vehicle manufacturers' specifications!



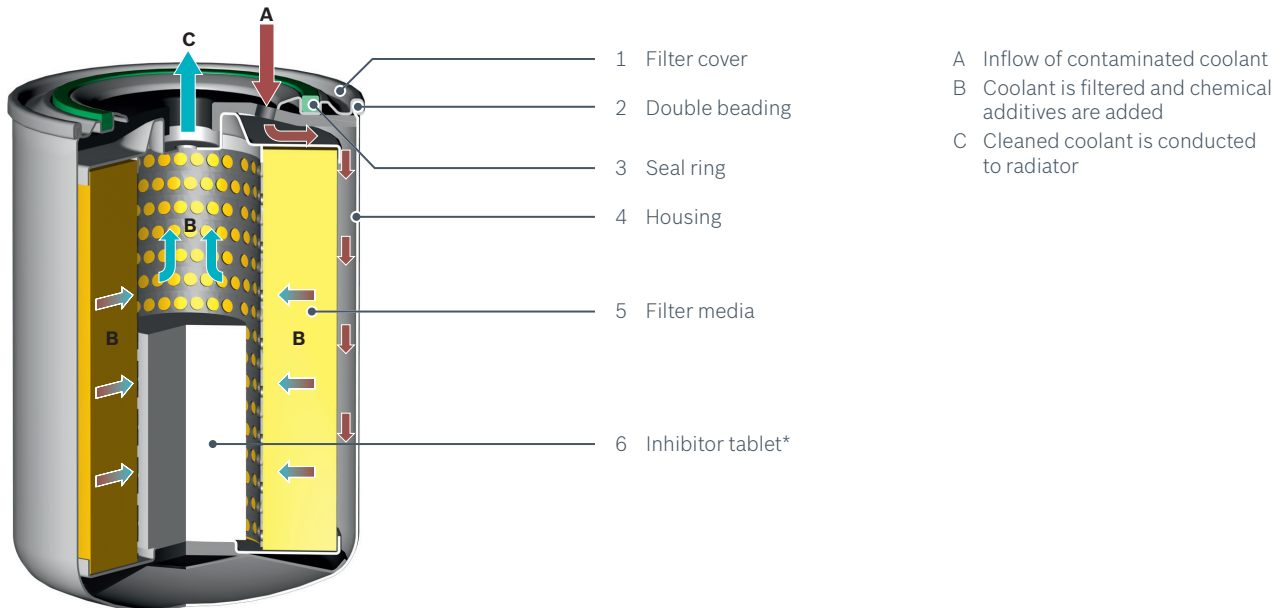
Possible consequences of insufficient coolant filtration

- ▶ Pitting (corrosion within the cooling system)
- ▶ Premature wear of the coolant pump
- ▶ Deposits of calcium and magnesium
- ▶ Acidification and bacterial growth
- ▶ Particle residues within the cooling system

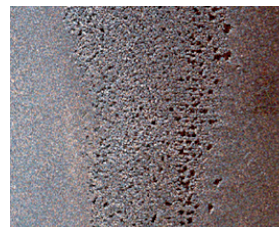
Coolant filters

Technology

Design and operation



* not standard



Insufficient coolant filtration can result in pitting. The result: damage to the cylinder due to corrosion.



KTS Truck: ECU diagnosis for CV electronics

- ▶ KTS Truck module for trucks, vans, trailers and buses
- ▶ KTS Truck can be connected to the Bosch DCU range and all common laptops/PCs via the USB port
- ▶ Integrated Bluetooth connection with a large range of up to 100 m
- ▶ Bluetooth USB adapter included
- ▶ Sturdy housing



Oil mist separators

Product details

Bosch oil mist separators protect the engine intake duct of commercial vehicles – e.g. the turbocharger – against damages. They reliably separate oil mist and particles from returned blow-by gases thus reducing the risk of expensive downtimes.



Advantages at a glance

- ▶ **Highly efficient oil separation and permanent particle collection** due to multilayer microfiber filter media
- ▶ **Reduced engine oil consumption** due to recirculation of separated oil to the oil circuit
- ▶ **Energy-efficient** as the oil mist separator does not require any electric energy

In short-distance and distribution traffic, oil mist separators should be changed every 40 000 km; in long-distance traffic, they should be replaced every 80 000 km. Please observe the vehicle manufacturers' specifications!



How are blow-by gases formed?

During engine operation, gases flow out of the combustion chamber, through the construction-borne gaps between piston and cylinder wall and into the crankcase. Even with optimum sealing, these blowby gases make up approximately 0.5 % to 2 % of the entire gas volume inside the cylinders. Blow-by gases contain fuel residues, soot particles and oil mist.

Hydraulik/transmission filter

Product details

Bosch hydraulic/transmission filters protect the hydraulic system of commercial and off-highway vehicles against damages. They reliably separate particles and other residues from hydraulic oil thus reducing the risk of expensive downtimes.



Advantages at a glance

- ▶ **Long filter service life and high dust retention capacity** due to specially designed and well balanced filter components
- ▶ **High particle separation rate** due to filter media made of synthetic or glass fibers
- ▶ **No oil loss** by corrosion-resistant housing materials and seals made of special rubber

Hydraulic/transmission filters should be replaced every 500 to 1 000 hours of operation, at latest once a year. Please observe the vehicle manufacturers' specifications!



Properties of hydraulic fluids

Hydraulic fluid is used to transmit pressures in hydraulic systems. These pressures can be up to 400 bar, thus demanding hydraulic fluids to meet tough requirements:

- ▶ Low temperature sensitivity for viscosity (fluidity)
- ▶ Low compressibility
- ▶ Low tendency to form foams
- ▶ High shear stability, i.e. no rupture of the lubricant film – even if subject to high mechanical strains

“Racing implies a constant search for optimization potentials. A reliable partner is thus a huge support. Bosch workshop equipment and parts feature a particularly high quality. That’s material for professionals.”

Jochen Hahn



Team Hahn Racing

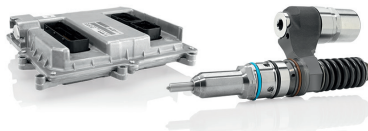
Successful with Bosch

Since 2000, Jochen Hahn’s participation at the FIA European Truck Racing Championship (ETRC) has been highly successful – bringing him five titles as European champion and two as vice champion since 2011. This success is facilitated by his Team Hahn Racing, a real family business run by him, his wife, his children and his parents. For several years, Bosch has been supporting Team Hahn Racing providing both technology and know-how. The European truck motor racing series ETRC is a real crowd-puller attracting more than 800 000 spectators at roughly eight events each year.

Bosch technology inside the race truck



Battery
Bosch S5 battery with PowerFrame® technology: more power right from the start



Diesel injection system
Diesel injection system with EDC7U control unit and unit injectors



Alternator
Heavy Duty alternator for reliable power supply



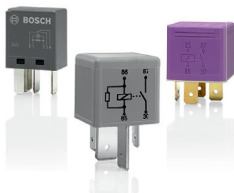
Ribbed V-belts
Bosch ribbed V-belts provide top performance in racing applications



Filters
The fuel-filter replacement box and the oil filter protect both the injection system and the engine



Sensors
Crankshaft, camshaft and intake-manifold pressure sensors provide accurately measured data



Relays
Bosch relays – invisible from the outside but extremely important for the race truck



Fuses
Bosch fuses protect cables, harnesses and devices against overloads or short circuits



Wiper
Bosch Aerotwin wiper blades – highly esteemed in racing for their high wiping performance

Team Hahn Racing

Successful with Bosch

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Bosch technology inside the race truck

- ▶ Bosch S5 battery with PowerFrame® technology: more power right from the start
- ▶ Diesel injection system with EDC7U control unit and unit injectors
- ▶ Heavy Duty alternator for reliable power supply
- ▶ Bosch ribbed V-belts provide top performance under racing conditions
- ▶ Fuel-filter replacement box and oil filter protect both injection system and engine
- ▶ Crankshaft, camshaft and intake-manifold pressure sensors provide accurately measured data
- ▶ Bosch relays – invisible from the outside but extremely important for the race truck
- ▶ Bosch fuses protect cables, harnesses and devices against overloads or short circuits
- ▶ Bosch Aerotwin wiper blades – highly esteemed in racing for their high wiping performance

Notes

Notes

Driven by efficiency

Bosch technologies are used worldwide in almost all vehicles. People, and assuring their mobility, is what we are focused on.

Therefore, we have dedicated the last 125 years of pioneering spirit and expertise in research and manufacturing to achieving this.

We continue to work on our unique combination of solutions for spare parts, diagnostic devices, workshop equipment and services:

- ▶ Solutions for efficient vehicle repairs
- ▶ Innovative workshop equipment and software
- ▶ The world's most comprehensive range of new and replacement parts
- ▶ Large network of wholesale customers, for quick and reliable parts supply
- ▶ Competent hotline support
- ▶ Comprehensive educational and training offers
- ▶ Targeted sales and marketing support

Find out more at:
bosch-automotive-aftermarket.com

**What drives you
drives us.**

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BOSCH
Invented for life

