VADEN® ORIGINAL

TECHNİCAL GUİDE

Compressor Repair and Gasket Kit: Faults, Replacement, Care

Diagnosing air compressor gasket failure on trucks: choosing the right repair kit scope, preparing surfaces, torquing correctly and extending seal life.

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The air brake compressor is the component that works hardest all day long on a heavy commercial vehicle, yet is talked about the least. When oily air keeps coming out of the air dryer, when system pressure no longer builds as quickly as it used to, or when a dried mixture of oil and carbon has collected around the compressor head, the first reflex in most workshops is to replace the complete compressor. In practice, however, the most common picture in the field is a compressor whose housing and crank assembly are still sound, but whose gaskets, valve plate and sealing elements have simply reached the end of their service life. This guide explains, from a workshop foreman's point of view, what a compressor repair and gasket kit is, how to read the fault, what removal and fitting discipline the job demands, and which maintenance habits extend the life of the kit.

This document has been prepared by the VADEN technical team on the basis of heavy commercial vehicle air brake service practice and OE manufacturer documentation. The values given here are general reference figures; for exact data such as tightening torque, working pressure, piston ring gap and surface tolerance, the current OE service manual matching the engine or chassis code of the vehicle is decisive. Last updated: September 2026.

What Is a Compressor Repair and Gasket Kit? Function and Working Principle

The Compressor Repair and Gasket Kit is the service set used when a heavy commercial vehicle air brake compressor is dismantled and refurbished; it consists of cylinder head and housing gaskets, valve plate gaskets, O-rings, sealing rings and, depending on type, the valve plate, spring and unloader sealing elements. Heavy commercial compressors typically operate at a cut-out pressure of 8-12.5 bar, and in most applications the gasket kit is renewed within the 250,000-400,000 km band.

The compressor repair and gasket kit is known by several names in catalogues and in the field: **compressor gasket kit**, **compressor repair kit**, **compressor overhaul set**, **valve plate kit** and, for the narrower versions, **head gasket set**. They are all members of the same product family with different scopes; the scope may change, but the selection criteria stay the same: compressor type, the OE number on the housing, and the cylinder or head configuration.

To understand the working principle you have to look at what the compressor actually does. Driven by the engine, the compressor draws in air with its piston, compresses it and delivers it through the intake and delivery valves on the valve plate to the air dryer and from there to the air tanks. The pressure regulator unloads the compressor once cut-out pressure is reached; when tank pressure drops, the compressor goes back into load. This cycle repeats every second the vehicle is running, and on every cycle the gaskets between the valve plate and the head are exposed both to pressure pulses and to the heat generated by compression.

This is exactly where the criticality of the part begins. At the moment of compression the air temperature on the delivery side can reach several hundred degrees at the compressor head, while engine coolant flows just a few centimetres away. In other words, the same gasket face has to separate very hot pressurised air from coolant across a very short distance. That is why the picture that emerges when a gasket becomes fatigued is not uniform: sometimes it appears as

an external air leak, sometimes as oil passing into the crankcase side, and sometimes as coolant seeping from the water jacket into the air side.

What does the kit typically contain?

- **Cylinder head gasket:** seals between the head and the valve plate so that the air and coolant passages remain separated.
- **Valve plate (intermediate plate) gasket:** sits between the plate and the block; it is the basis of the intake and delivery separation.
- **Housing / crankcase gasket:** used between the compressor housing and the engine mounting face or the bottom cover.
- **O-rings:** in the air, oil and coolant passages; size and material class are application specific.
- **Crankshaft / shaft seal:** provides oil sealing on the drive side.
- **Valve plate, valve reeds and springs:** included in wide-scope repair kits.
- **Unloader sealing elements:** plunger seal, spring and O-ring set.
- **Piston ring set and bearing components:** found only in full overhaul sets.
- **Sealing washers and locking elements:** single-use items are renewed at every removal.

Gasket kit, repair kit or a complete compressor?

The decision is made on the basis of three pieces of data: the condition of the housing, cylinder and piston wear, and the type of fault. If there is only a gasket-related air or oil leak, the cylinder bore is within tolerance and crankshaft clearance is normal, a gasket kit is sufficient. If the valve reeds are fatigued and pitting has started on the plate face, a wide-scope repair kit is needed. If there is visible scoring or ovality in the cylinder, or crankshaft and connecting rod clearance, the economically correct decision is a complete compressor. This distinction must be made by measurement, not by eye; the most common mistake in the field is fitting a new gasket kit to a worn housing and living through the same fault again a few months later.

Standards and normative framework

Although the compressor repair and gasket kit may not look like a safety part on its own, it is part of the air supply that directly determines the braking performance of the vehicle. On heavy commercial vehicles the brake system as a whole is assessed under **ECE R13**; for the air generation and storage side of the system **EN 286-2** (air tanks for road vehicles) and, for the cleanliness classification of compressed air, **ISO 8573-1** are widely used references. For sealing elements, O-ring size and tolerance families are generally based on the logic of **ISO 3601**. These standards do not give a direct part number for a product; which standard applies in which scope, and which class the part falls into, must be verified from the relevant OE catalogue.

Scope of the repair and gasket kit by air brake compressor type (general reference; exact content varies by part number)

Compressor type	Common application example	Key items in the kit	Service note
Single cylinder, air cooled	Light and medium commercial, trailer and construction machinery applications	Head gasket, valve plate gasket, O-ring set	Narrow scope; flatness of the head face is critical

Compressor type	Common application example	Key items in the kit	Service note
Single cylinder, water cooled	Heavy commercial tractor unit and truck applications	Head and plate gasket, coolant passage O-rings, shaft seal	If the water-to-air separation fails, coolant leakage appears
Twin cylinder, water cooled	High air consumption tractor units, buses, crane-equipped vehicles	Twin head gasket set, valve reed and spring, unloader set	The two heads are torqued in sequence and in stages
Unloader controlled compressor	Modern Euro 5 / Euro 6 generation vehicles	Unloader plunger seal, spring, control O-rings	If unloading leaks, the compressor stays permanently in load
Full overhaul (major overhaul) set	High mileage compressor whose housing is still within tolerance	All gaskets plus piston rings, bearings and valve group	Not chosen before the cylinder dimension is verified

The compressor repair and gasket kit differs by production generation even within the same compressor brand: the valve plate pattern, the number of coolant passages and the O-ring sizes can change with a revision. Do not select the part by "vehicle model" alone; verify the OE number on the compressor housing, the number of cylinders and the cooling type (air or water). Laying the removed old gasket over the one in the new kit and comparing the hole layout is the cheapest check that can be made before assembly.

How do you tell a Compressor Repair and Gasket Kit has failed?

Compressor repair and gasket kit failures do not announce themselves as "the gasket has blown"; they show up as slow pressure build-up, oil coming out of the dryer, coolant loss or wetness around the compressor. The table below matches field symptoms with their likely causes and the verification method.

Compressor repair and gasket kit fault symptoms, likely causes and verification methods

Symptom	Likely cause	Check / verification
Air pressure builds very slowly, the compressor runs continuously	Valve plate gasket is leaking, valve reed is fatigued or the delivery side has an internal leak	Measuring the time taken to reach cut-out pressure from empty tanks; verifying that there is no external leak in the system
A constant oily, black mixture comes out of the air dryer	Piston ring and housing sealing has weakened, crankcase oil is passing to the delivery side	Collecting the dryer purge into a clean container and observing the oil content; checking the age of the dryer cartridge
Carbon and oil mixture building up around the compressor head	The head gasket is not seating under pressure pulses, there is torque loss or a surface defect	Cleaning the area and tracing the leak with soapy water while the engine runs; torque check of the head bolts
Coolant level is dropping with no visible external leak	The coolant passage O-ring or the water-to-air separation of the head gasket has failed	Pressure testing the cooling system; looking for coolant traces and smell in the compressor purge

Symptom	Likely cause	Check / verification
The compressor head runs unusually hot	Internal circulation on the delivery side, a restricted delivery line or continuous operation under load	Comparing head and outlet line temperatures with a non-contact thermometer; checking the line for restriction
Engine crankcase oil level rises or crankcase pressure increases	Passage between the housing/crankcase gasket and the shaft seal; unloader sealing is leaking	Monitoring the oil level; verifying that the compressor oil return line is clear
The compressor does not unload and stays in load after cut-out pressure	The unloader plunger seal is leaking, the control O-ring is fatigued	Monitoring control line pressure at the moment of cut-out; verifying the pressure regulator outlet separately
Oil leakage and oily dust sludge on the compressor drive side	The crankshaft/shaft seal has reached the end of its life or was damaged during fitting	Cleaning the area around the drive pulley and inspecting it again after a short run
Moisture in the brake system, water collecting in the tanks	Very hot air from an overheating compressor is overloading the dryer	Checking for water at the tank drain valves; measuring how long the compressor stays in load

Diagnosis with the build-up time test

The most practical way to measure compressor efficiency is the build-up time test. The system is fully drained, it is confirmed that there is no external leak, the engine is held at a defined speed and the time taken for the tanks to reach cut-out pressure is measured with a stopwatch. If the time is significantly above the figure given in the service manual for that vehicle, the internal efficiency of the compressor has dropped. The most critical precondition for this test is to establish beyond doubt that there is no external air leak before measuring; a leaking dryer or a loose fitting will make a sound compressor look guilty.

Oil carry-over or a tired dryer?

Oil coming out of the dryer does not on its own condemn the compressor. The same picture appears when the dryer cartridge has reached the end of its life. To distinguish between the two, a clean container is held under the purge outlet and several purge cycles are collected: a thin oil film is regarded as normal, whereas a constant, dark oil flow points to the compressor side. Before deciding, always ask about the replacement history of the dryer cartridge as well.

Cross-checking with pressure and temperature

The second step that firms up the diagnosis is reading pressure and temperature together. If the compressor outlet line runs hotter than normal but tank pressure builds slowly, an internal leak on the delivery side or a line restriction is highly likely. If pressure builds normally but the compressor does not unload after cut-out, suspicion shifts to the unloader sealing and the control line. Taking measurements with a calibrated test gauge rather than the gauge on the vehicle noticeably reduces the risk of a wrong diagnosis.

Standards and further reading

This subject is governed by the equipment rules for air-braked commercial vehicles. In the United States the federal air brake standard, FMVSS 121 (49 CFR 571.121) defines the reservoirs, protection and timing a compliant system must provide, and Europe applies the equivalent limits of UNECE Regulation No. 13. For further detail, see the illustrated reference guide at airbrakecompressor.com. Always confirm specific figures against the current regulation and the vehicle manufacturer service data.

Readers outside the United States should work from their own national framework: in the United Kingdom the braking system must be maintained under regulation 18 of the Road Vehicles (Construction and Use) Regulations 1986, and in India the governing rules are published by the Ministry of Road Transport and Highways.

How is a Compressor Repair and Gasket Kit replaced? Step by step

Replacing a compressor repair and gasket kit is a job with a defined sequence and safety discipline, because it is carried out on a system that contains compressed air and hot surfaces. The workflow below summarises general service practice; for application-specific sequences and values the vehicle manufacturer's service manual is decisive.

The air brake system still holds pressure in the tanks after the engine is switched off, and the compressor head stays hot for a long time. Personal protective equipment is essential: impact-rated goggles or a face shield, heat and oil resistant gloves, and workwear. Before starting, secure the vehicle, chock the wheels and drain the air tanks completely through the drain valves. A fitting, bolt or cover removed under compressed air can cause serious injury. On compressors connected to the coolant circuit, do not open the head while the system is hot; pressurised hot coolant carries a scalding risk.

1. **Secure the vehicle and depressurise the system:** Stop the engine, apply the parking brake, chock the wheels and disconnect the battery isolator or the negative terminal. Drain all air tanks through the drain valves and confirm that the gauge reads zero. On water cooled compressors, wait for the engine and the cooling circuit to cool down.
2. **Clean and mark the area:** Blow dust and oil off the area around the compressor and the connection points of the air and coolant lines. Label the lines before removal and photograph them if possible; mixing up the control line and the oil return line is a frequent assembly error.
3. **Disconnect the lines and cap the openings:** Disconnect the air delivery line, the control line, the oil feed and return lines and, where fitted, the coolant hoses. Cap the end of every disconnected line and every open port with clean plugs. A single particle of dust that enters the brake system travels from the dryer all the way to the valves and creates a new fault.

4. **Remove the compressor or take off the head:** If the scope covers only the head gasket set, the compressor can stay on the vehicle; for a wide-scope overhaul the compressor is separated from the engine. Always loosen the head bolts in a crosswise sequence and in stages; loosening from one point distorts the head.

5. **Inspect the old parts and make a diagnosis:** Look at which area of the removed gaskets shows burning, crushing or a traceable leak path. Look for pitting on the valve plate face, cracks or seating marks on the reeds, and scoring on the cylinder wall. This inspection is the most valuable data showing whether the scope of the selected kit is correct.

6. **Prepare the surfaces:** Clean old gasket residue from the head, valve plate and block faces with a plastic scraper that will not score the surface. Do not use a metal scraper or a grinding disc; the micron-level marks they leave permanently spoil the seating of the new gasket. Check surface flatness with a straight edge and feeler gauge, and do not try to cover an out-of-tolerance surface with a gasket.

7. **Verify the new kit:** Lay every gasket in the new kit over the removed one and compare the hole layout, the coolant passage openings and the outer contour. Check the O-ring sizes and the direction of the shaft seal. Even a single hole that does not match means the wrong part; never force the assembly.

8. **Fit the gaskets dry and the right way round:** Unless stated otherwise, do not apply sealant to the head and valve plate gaskets; modern gasket materials are designed to seal on their own and excess sealant can block passages. Lightly wet the O-rings with a thin film of suitable oil before fitting, and seat the shaft seal squarely in its housing with attention to lip direction.

9. **Torque in stages and in a crosswise sequence:** Seat the head bolts by hand first, then tighten them with a torque wrench from the centre outwards in a crosswise sequence in at least two stages. Going straight to the final torque in one pass crushes the gasket on one side and leaves it loose on the other. Use the vehicle or compressor manufacturer's manual for the tightening sequence and the final value.

10. **Refit the compressor and connect the lines:** Tighten the drive connection to the value in the manual and connect the lines according to their labels. Confirm that the oil feed and return lines are clear and unrestricted; a restricted oil return will soon overload the new gasket as well. Fill and bleed the coolant circuit.

11. **Start up and carry out leak and performance tests:** Start the engine, let it idle for a few minutes and check all connections with soapy water. Then repeat the build-up time test, monitor the cut-out and cut-in pressures and observe the head temperature. Carry out a cold check after the test drive: some leaks only appear after a thermal cycle.

What are the most common mistakes when replacing a Compressor Repair and Gasket Kit?

Compressor repair and gasket kit jobs that end with a repeat failure usually fail not because of part quality but because of a handful of classic mistakes in fitting discipline. The points below are problems encountered again and again in the field.

Fitting a gasket kit to a worn housing does not solve the fault, it only postpones it. A compressor with visible scoring or ovality in the cylinder wall, or with crankshaft and connecting rod clearance, will start passing oil again within a short time even with the best gasket kit. A "blown gasket" verdict given without measurement is the most expensive shortcut there is, because it means bringing the vehicle back into the workshop a second time.
Do not apply sealant indiscriminately to the head and valve plate gaskets. Excess sealant spreads during tightening and can narrow an air or coolant passage; particles that break away travel under a valve reed and directly create a new fault. Sealant is used only at the points and of the type explicitly stated by the manufacturer.

- **Cleaning the surface with a metal scraper:** The scratches left behind permanently spoil the seating of the new gasket; use a plastic scraper and a suitable cleaner.
- **Not checking surface flatness:** A head distorted by thermal stress will leak even with a new gasket. A flatness check with a feeler gauge and straight edge takes only a few minutes.
- **Using "feel" instead of a torque wrench:** Head bolts have tight tolerances; under-tightening leaks, over-tightening crushes the gasket and damages the threads.
- **Skipping the crosswise sequence and the stages:** A head tightened corner to corner in a single pass crushes the gasket asymmetrically and starts leaking on the first thermal cycle.
- **Reusing single-use washers and O-rings:** A sealing element that has already been compressed once will not deliver the same performance at the second assembly.
- **Not checking the oil return line:** A restricted or blocked return line raises crankcase pressure and overloads the new seal as well.
- **Neglecting the air dryer:** If the cartridge is not renewed after a compressor that has been passing oil, the contaminated dryer keeps polluting the system.
- **Mixing up the control and oil lines:** A wrongly connected control line means the compressor never unloads at all.
- **Letting dirt into the system:** Lines left open during removal carry particles as far as the brake valves.
- **Changing only the gasket without inspecting the valve group:** A fatigued valve reed means low efficiency even in a compressor with brand new gaskets.

Compressor Repair and Gasket Kit technical values and check points

The values used when working with a compressor repair and gasket kit vary with compressor type, the number of cylinders and the vehicle manufacturer's specification. The ranges below are

general references frequently encountered on heavy commercial vehicle air brake systems; they are not binding.

Compressor Repair and Gasket Kit technical values (general reference; units bar, psi, °C and mm)

Parameter	Typical range (general reference)	Note
System cut-out pressure	8.0-12.5 bar (116-181 psi)	Defined by the pressure regulator; vehicle specific
Cut-in (reload) pressure	Approximately 0.6-1.5 bar below cut-out pressure	If the gap narrows, the compressor cuts in frequently
Compressor head (delivery side) temperature	Typically in the 150-200 °C band in continuous operation	Above the upper limit, gasket and valve life drops rapidly
Air dryer inlet temperature	Generally 60-90 °C is targeted	High temperature reduces drying efficiency
Compressor swept volume (heavy commercial)	Approximately 200-800 cm³	Selected according to vehicle air consumption
Build-up time from empty tanks to cut-out pressure	A few minutes on a healthy system	The exact time is taken from the service manual
Head / valve plate surface out-of-flatness	Typical acceptance limit in the order of 0.05-0.10 mm	If exceeded, the surface is machined or the part renewed
Oil quantity coming from the dryer	Only a thin film is acceptable	A constant dark oil flow points to the compressor side
Gasket kit renewal interval	Typically the 250,000-400,000 km band	Duty profile and maintenance discipline are decisive

Typical torque bands for compressor assembly (general reference, Nm; exact values are taken from the OE service manual)

Connection point	Typical torque band (general reference)	Application note
Cylinder head bolts	25-50 Nm	Tightened crosswise, in at least two stages
Valve plate / intermediate plate bolts	15-35 Nm	Staged tightening is essential to prevent plate distortion
Compressor housing mounting bolts	30-60 Nm	Varies with the mounting type and bolt class
Air delivery line fitting	20-40 Nm	Together with a new sealing washer
Oil feed / return line banjo bolt	10-25 Nm	The washer is renewed at every removal
Coolant hose clamp	3-6 Nm	Over-tightening cuts the hose

The torque values are given only as a guiding range. Even within the same compressor family, bolt diameter, material class and gasket type may require different values; some manufacturers define separate values for first assembly and for overhaul assembly. What counts in practice is the current OE service manual specific to the engine or chassis code of the vehicle, and a calibrated torque wrench must always be used during assembly.

- Are the head and valve plate faces clean, free of scoring and within the flatness tolerance?
- Are there cracks, seating marks or permanent deformation on the valve reeds?
- Does the hole layout of the gasket in the new kit match the old gasket exactly?
- Are the O-ring sizes and the shaft seal lip direction correct?
- Are the oil feed and return lines open, unrestricted and clean?
- Is the replacement history of the air dryer cartridge known?
- Are the cut-out and cut-in pressures within the band given in the manual?
- Has the build-up time improved noticeably compared with before the job?
- Does the compressor really unload after cut-out pressure?

How is a Compressor Repair and Gasket Kit maintained and its service life extended?

What determines the service life of a compressor repair and gasket kit is not the kit itself but the conditions in which the compressor operates. In a compressor that receives adequate oil supply, whose cooling works, whose unloading system functions properly and which draws clean air, the gaskets do their job for years without trouble. In a compressor that is permanently under load, draws dirty air or has a restricted oil return, on the other hand, even the best kit will tire earlier than expected.

- **Air filter discipline:** The compressor takes its intake air either from the engine air filter or from its own filter. Dirty intake wears the cylinder wall and accelerates oil carry-over.
- **Replacing the air dryer cartridge on schedule:** A tired cartridge carries moisture into the system; moisture wears valves and lines from the inside.
- **Draining the tanks regularly:** Emptying the accumulated water and oil mixture through the drain valves reduces the load on both the dryer and the compressor.
- **Fixing external air leaks immediately:** If there is a leak in the system the compressor stays permanently in load; temperature rises and gasket life shortens. According to field observation, this state of continuous load is the single factor that shortens compressor life most.
- **Keeping to the oil and oil filter intervals:** The compressor takes its oil from the engine; degraded oil directly affects the compressor bearings and the shaft seal.
- **Checking the cooling circuit:** On water cooled compressors, a blocked coolant passage raises head temperature rapidly.
- **Verifying that the unloading system works:** If the pressure regulator and the control line are not healthy, the compressor never gets any rest.
- **Periodic visual inspection:** At every service, check the area around the compressor, the lines and the connection faces for traces of oil and carbon.
- **Monitoring after an overhaul:** After any work that involves the compressor, repeat the leak and build-up time checks within the first few hundred kilometres.

In fleet operations the most efficient approach is to plan a compressor overhaul not as the replacement of a single gasket but as a service package. When the compressor is opened, renewing the head and plate gaskets, the O-rings, the shaft seal and, where necessary, the valve group together is far more economical than bringing the same vehicle back into the workshop a few months later. Reviewing the air dryer cartridge during the same service noticeably increases the durability of the work.

Related technical guides: Compressor Piston-Ring & Connecting Rod: Repair Guide · Truck Air Compressor Overhaul Kit: Head, Valve Plate, Gasket · Compressor Crankshaft & Drive Assembly: Failure & Replacement Guide · Compressor Valve & Unloader: Fault, Replacement & Care Guide · Compressor Cooling Plate & Water Cooling: Faults, Repair & Care

Application and compatibility: Vehicle compatibility catalogue · Engine compatibility catalogue

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