TURBOCHARGERS – RECONDITIONED, EFFICIENT, AND POWERFUL

TAKING RESPONSIBILITY IN A CHANGING WORLD

RHEINMETALL

TURBO BY INTEC
THE BRAND FOR TURBOCHARGERS

Turbochargers are used in almost all modern passenger car engines and are increasingly also found in utility vehicle engines. A lack of maintenance or other defective engine components can have a major impact on a turbocharger's durability – and may even cause it to fail. With its reconditioned turbochargers under the turbo by Intec brand, Motorservice offers high-quality replacement part solutions for any vehicle application.

The product range includes turbochargers for passenger cars, utility vehicles, and off-highway applications as well as products relating to turbochargers – a complete product range from a single source. Under the turbo by Intec brand, Motorservice initially started turbocharger reconditioning on a small scale and gradually stepped things up all the way to series production. An in-house replacement program for common turbocharger applications has been developed in order to meet market requirements even better. As a result, by replacing the turbocharger on older vehicles, repair shops can respond to the competitive pressure in the passenger car sector with high-quality solutions.

turbo by Intec complies with stringent requirements when reconditioning turbochargers. Motorservice uses machines that have been approved by turbocharger manufacturers in order to guarantee perfect quality throughout its production processes.

turbo by Intec

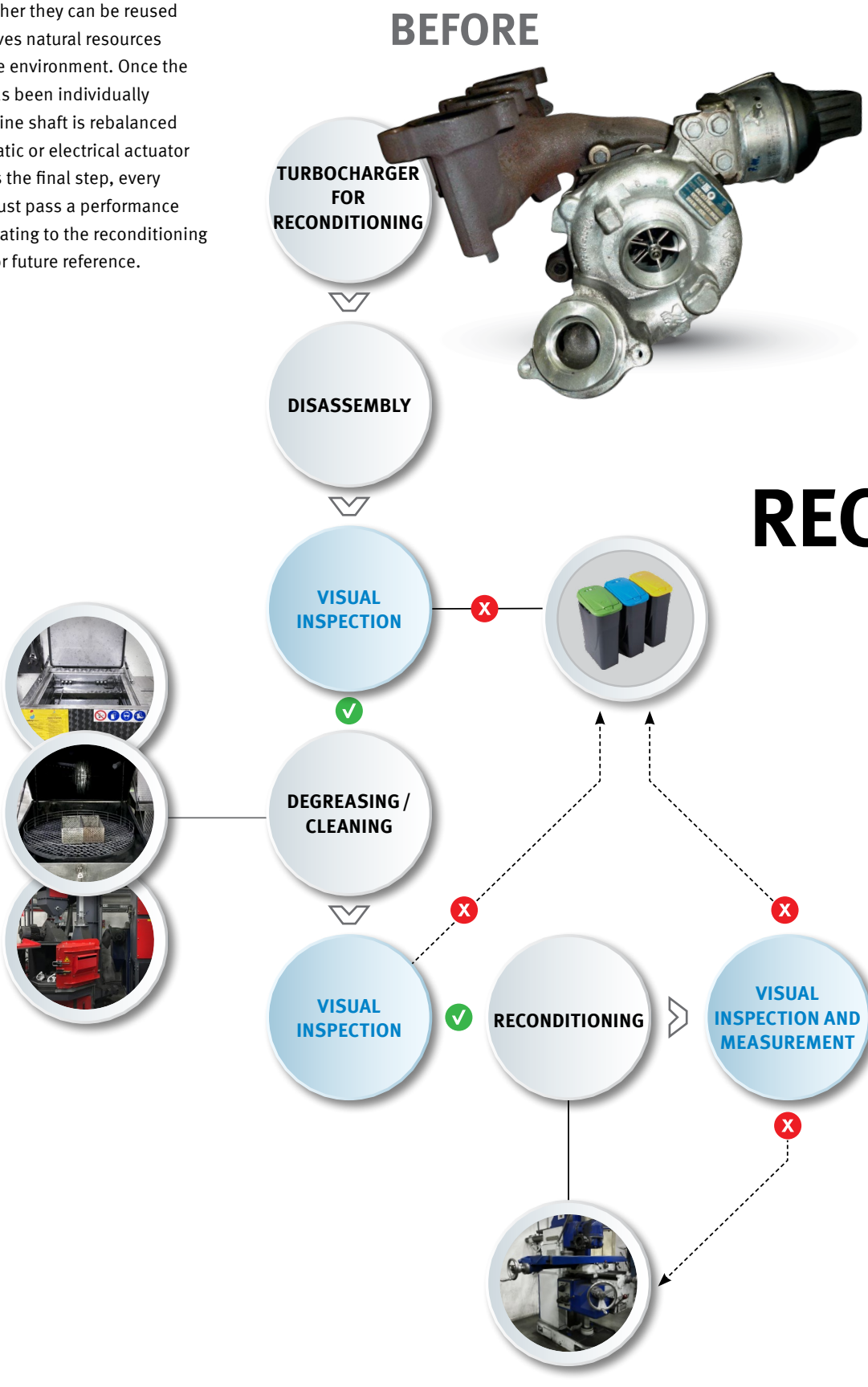
- Wide range of high-quality turbochargers for many common engine types used in passenger cars / utility vehicles and other applications
- Many years of experience in reconditioning turbochargers
- Reconditioning according to OE specifications (bearing clearance, etc.)
- Use of original spare part kits if available
- The Performance range offers special modifications for rally vehicles and race cars

We provide a comprehensive product portfolio covering a wide range of engines –
Some examples of our turbochargers for the aftermarket are listed below:

Item no.	Manufacturer	OE ref. no. *	Engines
226120025	PSA	0375Q6	1.6L HDI 90CV
221900183	BMW	11 65 7 810 189	2.0L D 140CV
226120036	BMW	11658519476	2.0L TD 184CV
221890171	Volkswagen	04C145701C	1.0L TSI
221900049	Seat	038253056EX	VAG 1.9 TDI
221900196	Audi	03L253016T	VAG 1.6L TDI 105CV
221900152	Citroën	0375N1	PSA 1.6 HDi 112 CV
221900047	Citroën	037569	PSA 1.6 HDi 110 CV
221890016	Fiat	71784113	Opel / Fiat 1.3 JTD-CDTI
221900134	BMW	11 65 7 794 022	N47 D20 C
226120037	BMW	11657808758	2.0L TD 184CV
221890131	Audi	03L253056T	VAG 2.0L TDI 140CV
221890093	Nissan	1441100Q1G	Renault 1.5L DCI 110CV
221890020	Citroën	0375G9	PSA 206 / C1 / C2 / C3, Ford Fiesta 1.4 HDi
221900219	Ford	1819894	PSA 1.3L HDI 75CV
221890018	Fiat	71724445	Panda / Grande Punto 1.3 CDTI / JTD
221100003	Volkswagen	04E145703Q	VW GOLF VII 1.2 TSI
226120032	Citroën	9804945280	1.6L BlueHDi
221890061	Renault	7701476880	1.5 dCi 85 CV
221920001	Mercedes-Benz	646 096 01 99	Sprinter 2.1L CDI 100 / 150CV
221900263	Renault	8013745004S	1.5L dCi
221900220	Peugeot	0375P8	PSA 1.6L HDI 115CV
221920014	Volkswagen	03F145701H	1.2L TSI
221900178	Audi	028145702N	VAG 1.9L TDI 110CV
226120002	Ford	1684949	PSA / Ford 1.6 HDi 90 & 75 CV
226120013	Volkswagen	03C145701F	VAG 1.4 TFSI 125 CV
221900261	Ford	9677063780	2.0L TDCI 165CV
221900260	Peugeot	1609652780	PSA 2.0L HDI 150CV
221900062	Volkswagen	038145702J	VAG 1.9 TDI
221900258	Opel	25201063	1.4L A14 / B14 140CV
221900154	Hyundai	282012A400	1.5L CRDI 110 CV
221900309	BMW	11658570082	2.0 L B47 D20 A

* The reference numbers listed are for comparison purposes only and must not be used on invoices to the consumer.
All content including pictures and diagrams is subject to change. For assignment and replacement, refer to the current catalogs or systems based on TecAlliance.

The Reconditioning Process
Each turbocharger is completely dismantled and cleaned with great care. All individual parts are checked to determine whether they can be reused – which conserves natural resources and protects the environment. Once the turbocharger has been individually rebuilt, the turbine shaft is rebalanced and the pneumatic or electrical actuator is calibrated. As the final step, every turbocharger must pass a performance test. All data relating to the reconditioning work is saved for future reference.



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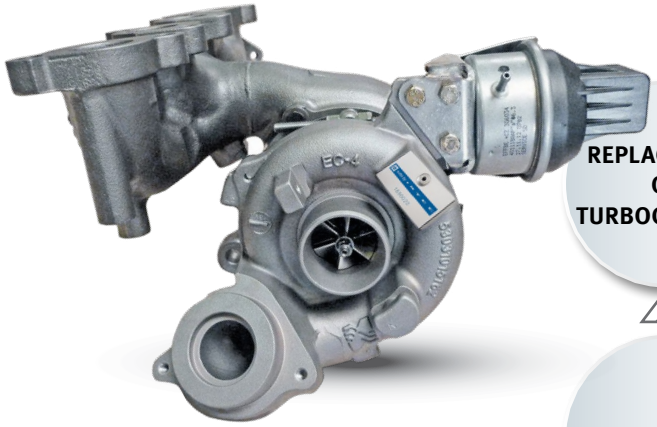


RBOCHARGER
ITIONING PROCESS

turbo by Intec –
sional reconditioning process

REPLACEMENT OF TURBOCHARGER

PACKAGING

LABELING

FINAL INSPECTION

CONTROL

BALANCING

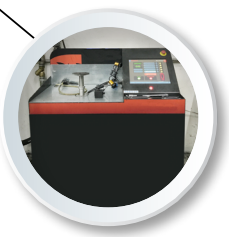
FLOWBENCH TEST

FINAL ASSEMBLY

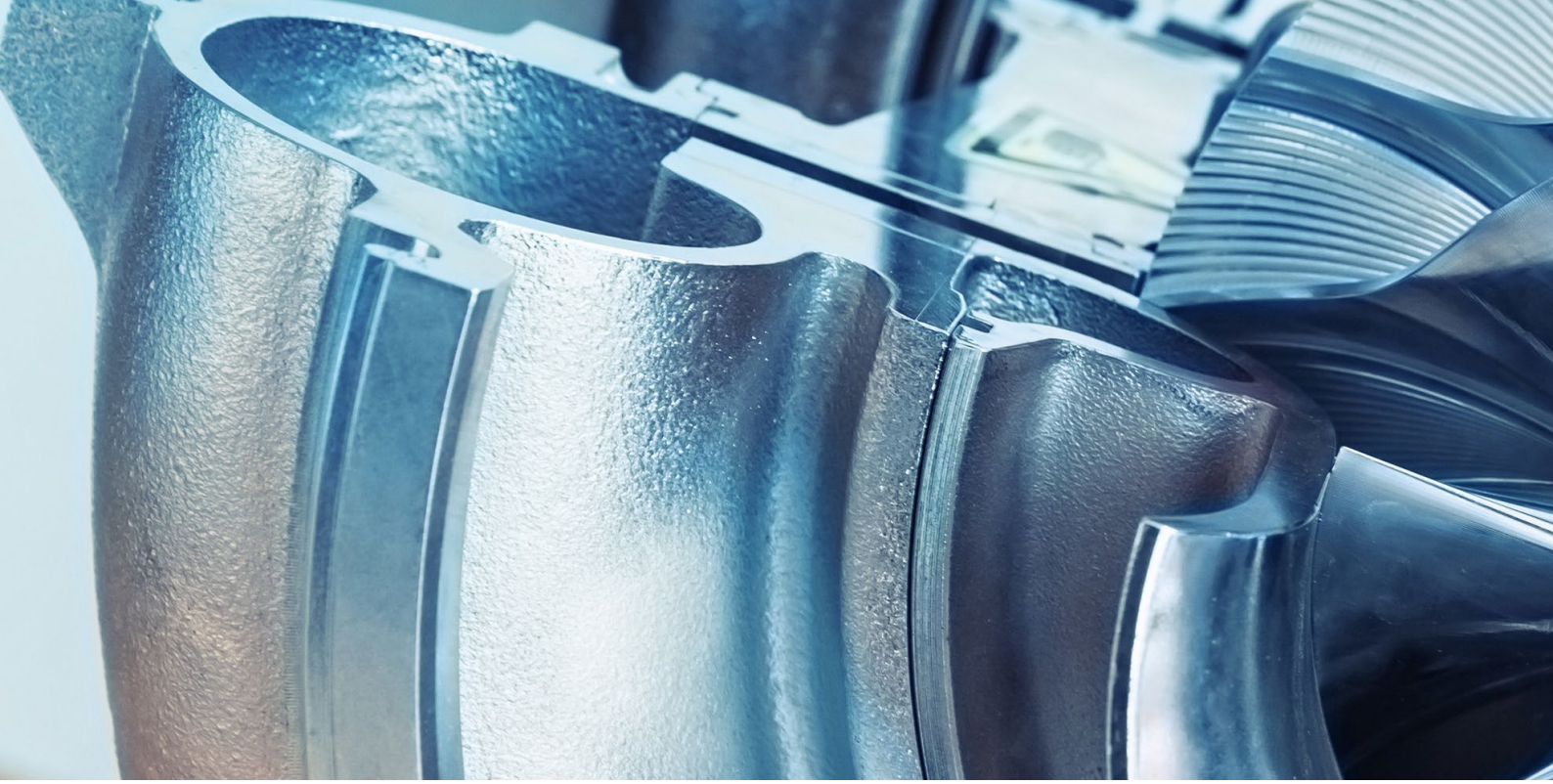
VSR TEST

CHRA ASSEMBLY

NT



NEW COMPONENTS

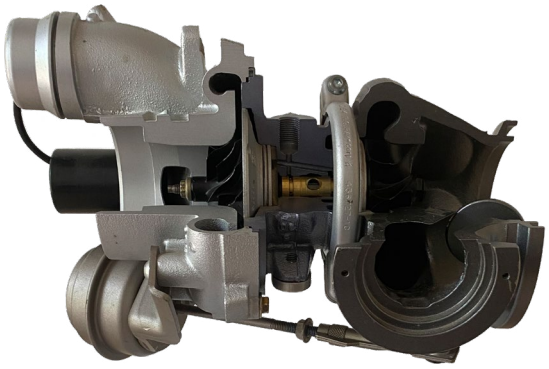


TURBOCHARGER DIAGNOSTICS MATRIX

	Possible Causes of Failure														
Symptoms	Lack of oil supply to the turbocharger	Unsuitable engine oil / lack of oil maintenance	Foreign particles in engine oil	Foreign bodies in compressor housing or turbine housing	Air filter blocked / suction or pressure lines leaking	Crankcase ventilation or oil return line blocked / faulty	Valve guides, piston rings, engine, or cylinder liners are worn / increased blow-by	Fuel system / injection system faulty or incorrectly configured	Boost pressure regulating throttle / valve does not open or close	VTG restricted in its movement	Actuator of regulating throttle / valve / VTG unit faulty	Electrical / electronic control unit of turbocharger faulty	Exhaust system has excessive flow resistance	Exhaust gas leak upstream or downstream of turbine housing	Turbocharger has excessive speed
Compressor impeller / turbine impeller faulty				■											
Boost pressure too low				■	■			■	■	■	■	■	■	■	
Boost pressure too high								■	■	■	■	■			■
Turbocharger is making noises	■	■	■	■	■								■	■	
Black smoke					■			■	■	■	■	■			
Blue smoke	■	■	■	■	■	■	■							■	
High oil consumption	■	■	■	■	■	■	■							■	
Oil leak in compressor housing	■	■	■	■	■	■	■								
Oil leak in turbine housing	■	■	■	■	■	■	■							■	
Turbocharger overheated	■	■				■	■	■					■		■
Increased axial / radial shaft play	■	■	■										■		
Error message in engine management				■	■			■	■	■	■	■	■	■	■
Central nut loose / missing	■	■	■	■											

Operating Principle of Turbochargers

The exhaust gases produced during combustion drive a turbine, which is connected to the compressor impeller by a shaft. The compressor impeller on the latest and smallest turbochargers rotates at speeds of up to 400,000 revolutions per minute. It compresses the intake air and thus increases the air mass provided to the engine. This enables CO_2 emissions and fuel consumption to be minimized while also increasing performance.



turbo by Intec

When used parts can be successfully reused, everyone involved in the process benefits. By recycling raw materials and conserving resources during the reconditioning work, we can also help to protect the environment.

You can find further information here:

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