



PRODUCT KNOWLEDGE

VALVES –
PERFECTION IN EVERY DETAIL

THE ORIGINAL. TRW ENGINE COMPONENTS SETS STANDARDS.



TRW Engine Components sets the standards for design guidelines and production tolerance specifications and is the benchmark for valve producers all over the world.

The requirements ...

... placed on valve steels are constantly increasing. Valves are becoming ever smaller and lighter (multi-valves / skirt Ø 5 mm) and the introduction of the emissions limit values for exhaust gases is forcing engine manufacturers to make combustible mixtures leaner. This leads to a rise in combustion temperatures and the exhaust valves are subjected to an increasingly oxidizing atmosphere.

TRW Engine Components valves are tested in extensive engine tests and developed further to meet the increasing requirements!

Maximum material strengths

TRW Engine Components achieves higher hardness and strength values with austenitic steel (A / RA – non-magnetic) via solution annealing with subsequent precipitation hardening.

Wear resistance

Today, high-quality exhaust valves are almost exclusively seat-faced. The seat facing helps to reduce wear and protects against oxidation for a better sealing effect over the entire operating time of the engine. TRW Engine Components uses four different facing materials in this process for a wide range of conditions. Sealing problems can quickly result in valve failure and significant repair costs!

UP AND DOWN. 2,000 TIMES A MINUTE.

Stresses on the valve

The intake valves that are not as heavily subjected to thermal stress are cooled by circulating fresh gases.

Exhaust valves, on the other hand, are subjected to extremely high thermal loads during the thrust cycle, along with additional chemical corrosion. The burnt gasses flow around the exhaust valves, with gas temperatures reaching up to 1,000 °C.

Upstrokes and downstrokes (load change) and the pressing of the valve against the valve seat insert take place at an engine speed of 4,000 rotations per minute. The valves experience around 200 million load changes over an operating time of 200,000 km.

Valves from TRW Engine Components are designed based on modern calculation methods (FEA) and are subjected to extensive tests before series release. This takes place as part of durability tests and in engine test runs. Great importance is placed on direct cooperation with the engine manufacturers.



PRECISION IN DETAIL

Reduced thermal load

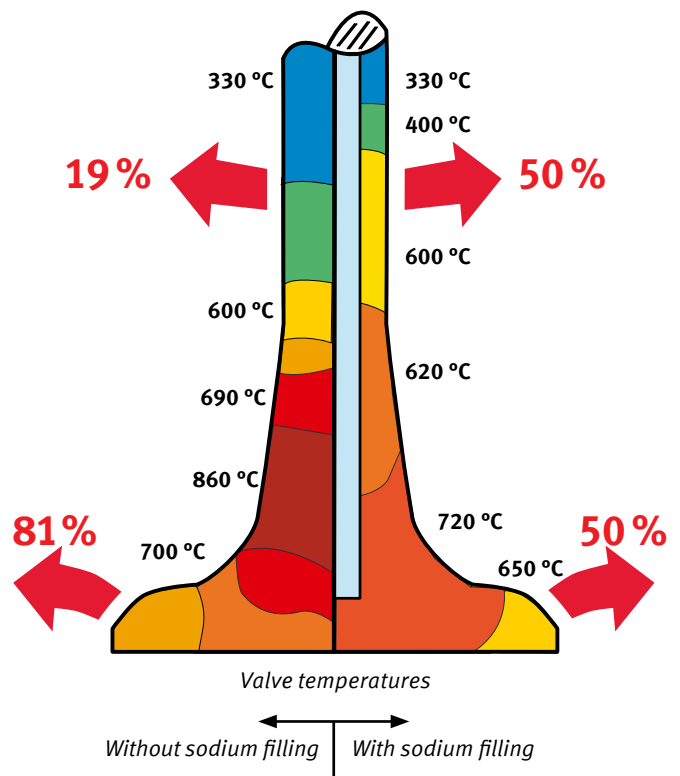
On the exhaust valve in particular, the thermal loads are huge. For the most extreme temperature stress, TRW Engine Components valves are hollow bored and filled with sodium. The sodium moving in the skirt conveys the heat from the valve head towards the valve guide, achieving a significant temperature reduction of up to 150 °C. This means that the valve materials can be operated beyond the normal permissible temperature limit.

Material combination

In order to fulfil a wide range of requirements, TRW Engine Components combines two different valve materials to create a bimetallic valve via friction welding. The friction welding process used here works without material additives. This method enables highly heat-resistant materials to be combined with induction-curable steels.

Something for all applications

TRW Engine Components offers six different types of steel to achieve the optimal configuration for the stress during engine operation. Information on the materials is available in the current product catalogue.



221	106							
OM 926 Euro 3		933, 944	D (LA)	6	7201 cm ³	3V	225 kW	(306 PS)
OM 926 Euro 4/5		969	D (LA)	6	7201 cm ³	3V	225-240 kW	(306-326 PS)
OM 926 Euro 5		946, 990, 996, 999	D (LA)	6	7201 cm ³	3V	195-240 kW	(265-326 PS) 17:1
40 078 6..., 40 270 6..., 41 003 6...								
	IN/EX [4]	13,03 x 8 x 60,0	G2				A 906 053 01 29	81-16105
	IN/EX [4]	14,03 x 8 x 60,0	G2				A 906 053 01 30	81-16107
							A 906 053 05 29	
	IN [1]	35,08 x 28 x 7,6	G1				A 906 053 01 31	92-16165 NEW
	IN [1]	35,37 x 28 x 7,7	G1				A 906 053 02 31	92-16159
	EX [2]	40,38 x 31 x 8,5	G1 45°				A 906 053 02 32	92-16160
							A 906 053 14 32	
	EX [1]	40,08 x 31 x 8,0	G1				A 906 053 16 32	92-16167 NEW
	EX [1]	40,08 x 31.2 x 8,0	G1				A 906 053 01 32	92-16166 NEW

Extract from the catalog

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