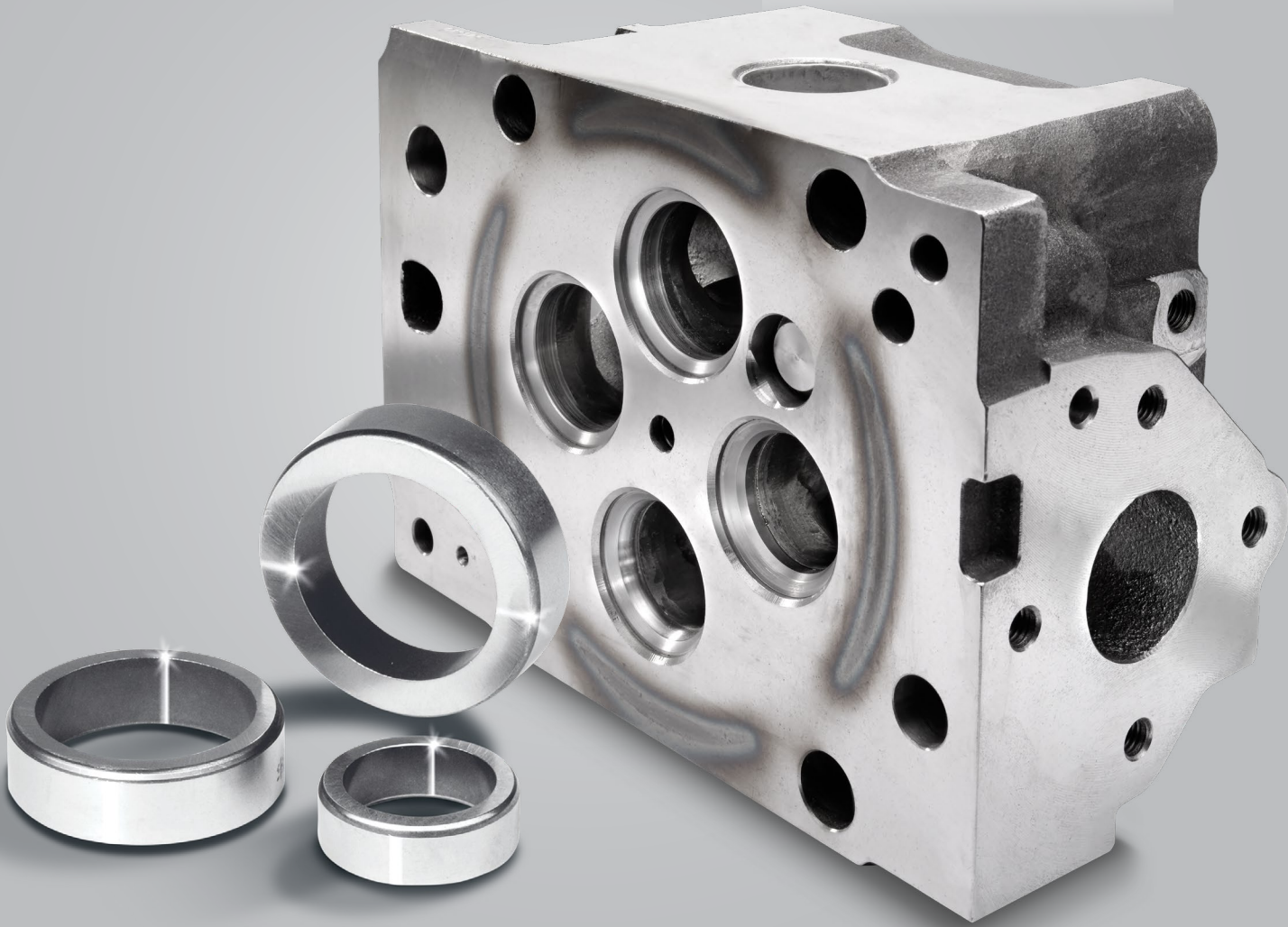




KOLBENSCHMIDT

TRW

EngineComponents



PRODUCT RANGE

VALVE SEAT INSERTS

TAKING RESPONSIBILITY IN A CHANGING WORLD



RHEINMETALL

VALVE SEAT INSERTS

Valve seat inserts have significantly gained in importance ever since the introduction of aluminium cylinder heads. Together with the valves, they seal off the combustion chamber of the cylinder head. The valve seat insert prevents the valve from knocking/burying into the cylinder head. It absorbs a proportion of the combustion heat that is applied to the valve. It gives off this heat to the cylinder head. In order to cope with the different strains, an optimum material composition has to be found for the valve seat inserts. Not only do the operating conditions in the engine have to be taken into account, but also the material's machinability for the engine reconditioner.

Fitting instructions

Kolbenschmidt and TRW Engine Components valve seat inserts are finished on the outside diameter. The dimension for the locating hole in the cylinder head can be determined using the following pressfit table. For all valve seat inserts, the valve seat angle must be checked after insertion and finished if necessary.

Inserting the sintered metal valve seat inserts

Make sure that the seat insert to be used is always fitted with the radius side facing downwards. Due to the radius and the spring effect of the sintered material, the Kolbenschmidt sintered metal valve seat insert does not require any liquid nitrogen for cooling the seat inserts and or warming of the cylinder head to press the valve seat inserts into the cylinder head. The seat inserts are pressed in at room temperature using a suitable tool.

Materials

Valve seat inserts made of sintered materials (powder metallurgical process) are used in the latest engine generations from well-known engine manufacturers. Materials made using conventional casting processes struggle to cope with the increasingly high thermal and mechanical strains on the seat insert in the combustion chamber.

For this reason, Motorservice offers sintered valve seat inserts made of three different material combinations, covering the entire range of applications in existing and future engines.



NOTE

Replacement of valve seat inserts and valves as part of a gas conversion always involves changing the original engine specifications. Whether the new material combinations will work harmoniously and achieve the required results under the changed conditions can only be estimated in advance. Extreme operating conditions and the specific engine loads must be taken into consideration. These are the sole responsibility of the engine reconditioner.

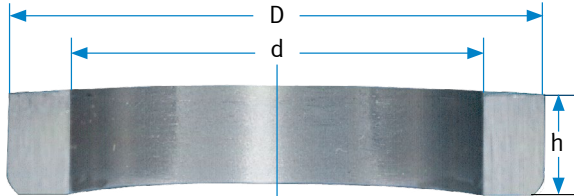


ATTENTION

Pay attention to the valve specifications when performing conversion work.

Kolbenschmidt and TRW Engine Components recommend the following pressfits / press fittings

Seat insert outside diameter		Cast iron cylinder head		Aluminium cylinder head	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
20 – 30	0.7874 – 1.1811	0.06	0.0024	0.08	0.0031
30 – 40	1.1811 – 1.5748	0.08	0.0031	0.10	0.0040
40 – 50	1.5748 – 1.9685	0.10	0.0040	0.12	0.0047
50 – 60	1.9685 – 2.3622	0.12	0.0047	0.14	0.0055
60 – 70	2.3622 – 2.7559	0.14	0.0055	0.16	0.0063



Main dimensions of a valve seat insert

D = Outside diameter, d = Inside diameter, h = Height



ATTENTION

Extreme operating conditions and high engine stresses must be taken into consideration and remain the responsibility of the engine reconditioner.

The engine reconditioner must carefully check the selected specification of engine components.

Overview

Material	Characteristic	Type of fuel / Combustion	Cylinder head materials	Engines
Sintered metal matrix				
HM	High machinability	Petrol (unleaded), diesel	Aluminium, grey cast iron	Low power petrol and diesel engines with low to normal strain
HT	Good machinability, high temperature resistance	Petrol (unleaded), diesel	Aluminium, grey cast iron	Powerful, highly charged, highly strained petrol and diesel engines
HT⁺	Very high temperature and wear resistance	CNG, LPG, Flex Fuel, propane gas	Aluminium, grey cast iron	Gas engines such as LPG, CNG, propane gas, Flex Fuel
Cobalt matrix				
HCR	Very high temperature and wear resistance, high corrosion resistance	CNG, LPG, Flex Fuel, propane gas	Aluminium, grey cast iron	Gas engines such as LPG, CNG, propane gas, Flex Fuel
G7	High wear and corrosion resistance	Petrol (unleaded), diesel, CNG, LPG, Flex Fuel	Aluminium, grey cast iron	Highly strained engines, high performance engines, gas applications such as LPG, CNG, Flex Fuel
HWR	Improved temperature and wear resistance, reduced friction	CNG, LPG, Flex Fuel, propane gas	Aluminium, grey cast iron	Gas engines such as LPG, CNG, propane gas, Flex Fuel
Grey cast iron				
G1	High temperature resistance	Petrol (unleaded), diesel	Aluminium, grey cast iron	Naturally aspirated engines, turbocharged engines
G2	High wear resistance	Petrol (unleaded), diesel, CNG, LPG, Flex Fuel	Aluminium, grey cast iron	Highly strained engines, high performance engines, gas applications such as LPG, CNG, Flex Fuel
G3	High temperature and wear resistance	Petrol (unleaded), diesel, CNG, LPG, Flex Fuel	Aluminium, grey cast iron	Highly strained engines, high performance engines, gas applications such as LPG, CNG, Flex Fuel
G4	High temperature and wear resistance, high oxidation resistance	Petrol (unleaded), diesel, CNG, LPG, Flex Fuel	Aluminium, grey cast iron	Highly strained engines, high performance engines, gas applications such as LPG, CNG, Flex Fuel
G5	High temperature and wear resistance, high deformation resistance	Petrol (unleaded), diesel, CNG, LPG, Flex Fuel	Aluminium, grey cast iron	Highly strained engines, high performance engines, gas applications such as LPG, CNG, Flex Fuel
G6	High temperature and wear resistance, high relaxation resistance	Petrol (unleaded), diesel, CNG, LPG, Flex Fuel	Aluminium, grey cast iron	Highly strained engines, high performance engines, gas applications such as LPG, CNG, Flex Fuel

HEADQUARTERS:

MS Motorservice International GmbH

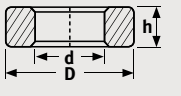
Wilhelm-Maybach-Straße 14–18

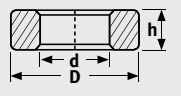
74196 Neuenstadt, Germany

www.ms-motorservice.com

www.rheinmetall.com

© MS Motorservice International GmbH – FL 1688-02 – EN – 12/20 (062024)

												
D [mm]	d [mm]	h [mm]	HM semifinished	HT semifinished	HT* semifinished	HCR	HWR	G1 – G7 finished*	Valve seat angle	Other		
22	19	8		50009624								
24	18	8		50009610	50009650							
24.1	18	6.5		50009603								
25	19	8	50009523	50009611	50009651							
25.12	20	6	50004700									
26	20	8	50009524	50009612	50009534							
26.7	20	5.7	50004701	50004900	50009696							
27	20	8	50009525	50009530	50009693							
27	21	10	50009526	50009613	50009535							
27.13	22.1	6.4	50004702	50009531	50009536							
27.15	20.1	6.6	50004703									
28	22	10	50004811	50004932	50009652							
28.5	22	10	50004812	50004933	50009653							
28.7	22.1	4.9	50004704									
28.75	21	7.2	50004705									
28.8	24	8.6		50009615								
29	18	10	50009527	50009614	50009697							
29	23	10	50004813	50004934	50009654							
29.5	23	10	50004814	50004935	50009655							
30	20	10	50004816	50004937	50009657							
30	23	10	50004815	50004936	50009656							
30.02	23.5	6.2	50004706									
30.15	25	6.3		50004901								
30.19	24.1	8.1		50004920	50009658							
30.31	22.1	6.4	50004709									
30.5	23	10	50004817	50004938	50009659							
30.5	25	6.5	50004711									
31	18	7.5			50009623							
31	21	10	50004819	50004940	50009661							
31	24	10	50004818	50004939	50009660							
31.5	24	10	50004820	50004941	50009662							
31.83	27.4	8.5		50004921	50009698							
31.88	25.4	6.4	50004713									
31.88	26.8	6.4	50004712									
31.9	23.7	6.4	50004714									
31.9	25.3	6.4	50004715									
31.93	23.1	7.2	50004716									
32	22	10	50004822	50004943	50009665							
32	24	9	50009528	50004928	50009663							
32	25	10	50004821	50004942	50009664							
32.33	27.4	8.5		50009600								
32.5	25	10	50004823	50004944	50009666							
32.65	25.5	8	50004717									
32.65	26	8.5	50004718									
32.8	28.5	8.8		50009616								
32.83	27.4	8.5		50009601								
33	23	10	50004825	50004946	50009668							
33	26	10	50004824	50004945	50009667							
33.47	25.4	6.4	50004720									
33.48	25.3	6.4	50004721									
33.48	26.9	6.4	50004722									
33.5	24.8	7.1	50004724									
33.5	26	10	50004826	50004947	50009669							
33.7	27	8	50004725	50004902	50009699							
33.7	28.6	6.4	50004726									
34	24	10	50004827	50004949	50009671							
34	26	8.5	50004727									
34	27	10	50004801	50004948	50009670							
34.25	27	8	50004728									
34.5	27	10	50004828	50004950	50009672							
34.7	28.3	7.5	50004729									
34.76	32.1	7.8						92-22016	G1			
34.91	29.5	5.8						92-17001	G1	20.0 deg		
34.91	29.6	5.8						92-17000	G1	20.0 deg		
35	25	10	50004830	50004952	50009674							
35	28	10	50004829	50004951	50009673							
35	28.5	7.9	50004730									
35.05	27	6.4	50004731									
35.07	26.9	6.4	50004732									
35.075	28	7.65						92-16165	G1			
35.25	28	8	50004736									
35.37	28	7.7						92-16159	G1			
35.5	28	10	50004831	50004953	50009500							
35.6	29	8	50004737									
35.9	29.7	7.9						92-22015	G1	30.0 deg		
36	26	10	50004833	50004955	50009676							
36	29	10	50004832	50004954	50009675							
36.073	28.5	6.45						92-25027	G2	45.0 deg		
36.5	29	10	50004834	50004956	50009677							
36.59	30.1	7.9	50004739									
36.64	28.6	6.4	50004740									
36.64	28.6	8	50004741									
36.66	26.9	6.4	50004742									
36.8	28.4	7.5						92-22020	G1			
37	28	9	50004744									
37	30	10	50004835	50004957	50009678							
37	30	8	50004745	50004904								
37	31	10	50004803									
37.01	30.15	7.55						92-22008	G1	45.0 deg		
37.07	28.6	7.2						92-22011	G1	45.0 deg		
37.08	30.56	7						92-16124	G1	30.0 deg		
37.2	30	7	50004747	50004905								
37.5	30	10	50004836	50004958	50009501							
37.5	31	8.5	50004748									
37.5	31.2	6.95		50009617								
37.59	30.5	7.3						92-16125	G1			
38	28	10	50004837	50004960	50009680							
38	30	7	50004749									
38	31	10	50004804	50004959	50009679							

												
D [mm]	d [mm]	h [mm]	HM semifinished	HT semifinished	HT* semifinished	HCR	HWR	G1 – G7 finished*	Valve seat angle	Other		
38.07	30	7.9						92-16154	G1	45.0 deg		
38.07	30	8.5						92-16109	G1	45.0 deg		
38.1	30.2	6.4	50004797									
38.21	28.6	6.4	50004750									
38.23	28.6	6.4	50004753									
38.23	31	8	50004755	50004907	50009503							
38.23	31.8	9.5	50004754									
38.25	30.1	6.4	50004751									
38.28	27.9	8	50004756									
38.38	30	8.5						92-16131	G1	45.0 deg		
38.5	31	10	50004838	50004961	50009504							
38.95	31	8.5	50004757									
39	29	10	50004840	50004963								
39	32	10	50004839	50004962	50009681							
39.3	31.2	7.5						92-22019	G1			
39.3	32	8	50004758									
39.5	32	10	50004841	50004964								
39.5	33	8.5	50004759									
39.7	31.8	6.4	50004798									
39.77	30.1	9.5	50004760									
39.81	31.8	6.4	50004761									
39.83	30.1	6.4	50004763									
39.85	30	7.7	50004765									
39.85	33	6.5	50004766									
39.98	30.1	7.4						92-22014	G1	45.0 deg		
40	29	10	50004843	50004966	50009682							
40	31.2	6.4						92-47031	G3	30.0 deg		
40	32	10	50004842	50004965	50009506							
40	33	8						92-25016	G2			
40	33.5	9	50004808									
40.04	30.95	7.6						92-23002	G6	30.0 deg		
40.043	31	7.3						92-59003	G2	45.0 deg		
40.043	31.2	6.4						92-59001	G1	30.0 deg		
40.05	31	7.4						92-47023	G1	30.0 deg		
40.073	30.3	8.15						92-25026	G1	30.0 deg		
40.075	31	8						92-16167	G1			
40.075	31.2	8.05						92-16166	G1			
40.09	33.5	7						92-16120	G1	45.0 deg		
40.1	31	7.5						92-16110	G1	45.0 deg		
40.1	31	7.5						92-16118	G1			
40.14	33	8			50009694							
40.16	31	9.75						92-22003	G1	45.0 deg		
40.19	30	10.5	50004767									
40.2	34	7.5	50004768									
40.26	31	9.75						92-22004	G1	45.0 deg		
40.375	31	8.5						92-16160	G1	45.0 deg		
40.46	31	7.5						92-16143	G1	45.0 deg		
40.5	32	10	50004844	50004967	50009507							
40.585	33.5	7.3						92-16121	G1			
41	30	10	50004846	50004969	50009508							
41	33	10	50004845	50004968	50009683							
41.05	30.5	6.15			92-12005					30.0 deg		
41.05	31	7.4						92-47024	G1	30.0 deg		
41.05	32	7.4						92-17005	G7	45.0 deg		
41.28	33.4	6.4	50004799									
41.4	31.8	6.4	50004770									
41.4	31.8	9.5	50004771	50009532	50009537							
41.5	33	10	50004847	50004970	50009684							
41.62	34	8	50004772	50004912								
42	31	10	50004849	50004972	50009510							
42	32.4	8						92-25015	G1	30.0 deg		
42	33	7.3						92-47030	G3	30.0 deg		
42	34	10	50004848	50004971	50009511							
42.043	33	7.35						92-59000	G1	30.0 deg		
42.05	32.7	8.64						92-47022	G1	45.0 deg		
42.05	33	7.05						92-17004	G7	30.0 deg		
42.14	33	8			50009695							
42.2	33.5	10.5	50004773									
42.5	34	10	50004850	50004973								
42.67	34.18	7.3						92-22012	G1	45.0 deg		
42.78	33.7	6.85						92-22007	G1	30.0 deg		
42.82	36.4	9.2						92-61001	G3	45.0 deg		
43	32	10	50004852	50004975	50009512							
43	35	10	50004851	50004974	50009513							
43.03	30.5	6.15						92-12001	G1	45.0 deg		
43.03	33	9.1	50004776									
43.03	34.7	6.2						92-12000	G1	20.0 deg		
43.05	32	7.25						92-47032	G1	30.0 deg		
43.05	33	7.5						92-47029	G1	30.0 deg		
43.05	34.5	7.6						92-17003	G7	45.0 deg		
43.05	34.7	6.2						92-12004	G2	20.0 deg		
43.08	31.9	8.5						92-47026	G1	30.0 deg		
43.08	32.9	8						92-47020	G1	45.0 deg		
43.08	32.9	8.01						92-47027	G1	45.0 deg		
43.1	32	7.25						92-47019	G1	30.0 deg		
43.1	32.9	8						92-47033	G1	45.0 deg		
43.1	33	7.5						92-47035	G1	30.0 deg		
43.1	34	8						92-16158	G1	45.0 deg		
43.1	34.4	7.75						92-16170	G1	36.0 deg		
43.25	36	8	50004777	50004913								
43.33	35.2	9	50004778	50004914								
43.5	35	10	50004853	50004976								
43.6	35	7.9						92-22006	G1	45.0 deg		
43.72	34.7	6.67						92-62001	G3	45.0 deg		
43.87	34.5	7.4						92-16155	G1			
43.87	34.5	7.8						92-16153	G1	30.0 deg		
44	33	10	50004855	50004978	50009685							
44	36	10	50004854									
44.01	35	8.5						92-34003	G1	45.0 deg		