

## 2.2 Valve Cotters

Valve cotters have the task of attaching the valve spring retainer to the valve, so that the valve spring always holds the valve in the required position.

While turned cotters were used earlier, cold formed cotters are state of the art today for valve stem diameters up to 12,7 mm (1/2 in.). TRW has standardised valve cotters, to limit the number of types. The precise forming method guarantees uniform quality and ensures interchangeability.



Valve cotters are sub-divided into two groups, according to their function:

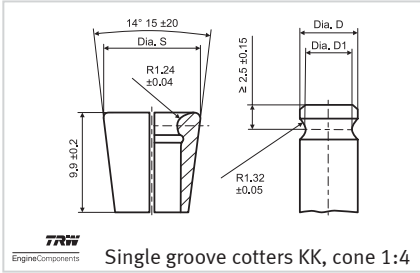
- clamping types, where the frictional connection between valve, cotter and spring retainer is obtained in any operating situation;
- the non-clamping types, which allow free rotation of valve.

**When replacing the valves, it is essential to use new cotters as well!**

### KS/TRW valve cotter programm range

Material	description	Design	„valve stem Ø“	„Case Hardened“	„Number of beads“
KK-7H	single groove cotter	clamping	7	Hardened	1
KK-8H	single groove cotter	clamping	8	Hardened	1
KK-9H	single groove cotter	clamping	9	Hardened	1
KK-10H	single groove cotter	clamping	10	Hardened	1
KK-11H	single groove cotter	clamping	11	Hardened	1
KK-12H	single groove cotter	clamping	12	Hardened	1
LK-6H	single groove cotter	clamping	6	Hardened	1
LK-7H	single groove cotter	clamping	7	Hardened	1
LK-1610	single groove cotter	clamping	12	not Hardened	1
LK-2607	single groove cotter	clamping	7	Hardened	1
LK-2615	single groove cotter	clamping	9	not Hardened	1
RK-7	single groove cotter	clamping	7	not Hardened	1
RK-7H	single groove cotter	clamping	7	Hardened	1
RK-8	single groove cotter	clamping	8	not Hardened	1
RK-8H	single groove cotter	clamping	8	Hardened	1
RK-9H	single groove cotter	clamping	9	Hardened	1
RK-10H	single groove cotter	clamping	10	Hardened	1
RK-11H	single groove cotter	clamping	11	Hardened	1
MK-5H	multi groove cotter	non clamping	5	Hardened	3
MK-5.5H	multi groove cotter	non clamping	5,5	Hardened	3
MK-6H	multi groove cotter	non clamping	6	Hardened	3
MK-7H	multi groove cotter	non clamping	7	Hardened	3
MK-7H2	multi groove cotter	non clamping	7	Hardened	2
MK-8H	multi groove cotter	non clamping	8	Hardened	3
MK-9H	multi groove cotter	non clamping	9	Hardened	3
MK-10H	multi groove cotter	non clamping	10	Hardened	4

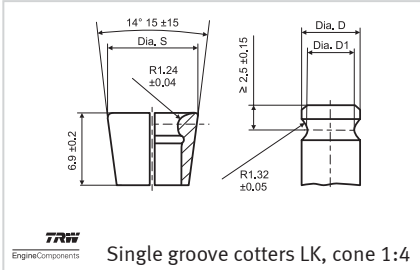
## Single groove cotters KK



Single groove cotters KK, cone 1:4

Short designation		Dia. S* ±0.06	Dimensions of valve stem end			Weight (g)
Unhardened	Casehardened		Dia. D nominal size	Preferred range dia. D from to	Dia. D1	
KK 6	KK 6H	10	6	5.99   5.89	4.85 ± 0.05	1.17
KK 7	KK 7H	11	7	6.99   6.89	5.85 ± 0.05	1.37
KK 8	KK 8H	12	8	7.99   7.89	6.83 ± 0.07	1.55
KK 9	KK 9H	13	9	8.99   8.89	7.8 ± 0.1	1.73
KK 10	KK 10H	14	10	9.99   9.89	8.8 ± 0.1	1.90
KK 11	KK 11H	15	11	10.99   10.89	9.8 ± 0.1	2.00
KK 12	KK 12H	16	12	11.99   11.89	10.8 ± 0.1	2.24

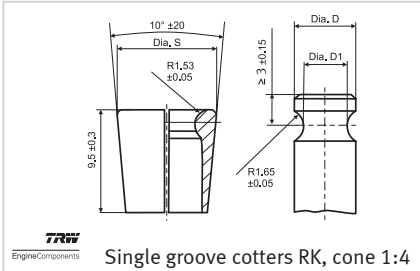
## Single groove cotters LK



Single groove cotters LK, cone 1:4

Short designation		Dia. S* ±0.06	Dimensions of valve stem end			Weight (g)
Unhardened	Casehardened		Dia. D nominal size	Preferred range dia. D from to	Dia. D1	
LK 5.5	LK 5.5H	8.5	5.5	5.49   5.39	4.35 ± 0.05	0.58
LK 6	LK 6H	9	6	5.99   5.89	4.85 ± 0.05	0.64
LK 6.5	LK 6.5H	9.5	6.5	6.49   6.39	5.35 ± 0.05	0.69
LK 7	LK 7H	10	7	6.99   6.89	5.85 ± 0.05	0.73

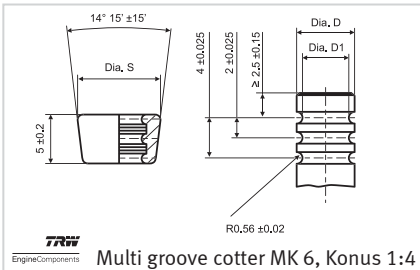
## Single groove cotters RK



Single groove cotters RK, cone 1:4

Short designation		Dia. S* ±0.06	Dimensions of valve stem end			Weight (g)
Unhardened	Casehardened		Dia. D nominal size	Preferred range dia. D from to	Dia. D1	
RK 6	RK 6H	8.79	6	5.99   5.89	4.15 ± 0.05	0.77
RK 7	RK 7H	9.79	7	6.99   6.89	5.15 ± 0.05	0.91
RK 8	RK 8H	10.79	8	7.99   7.89	6.13 ± 0.07	1.09
RK 9	RK 9H	11.79	9	8.99   8.89	7.1 ± 0.1	1.19
RK 10	RK 10H	12.79	10	9.99   9.89	8.1 ± 0.1	1.30
RK 11	RK 11H	13.79	11	10.99   10.89	9.1 ± 0.1	1.46
RK 12	RK 12H	14.79	12	11.99   11.89	10.1 ± 0.1	1.58

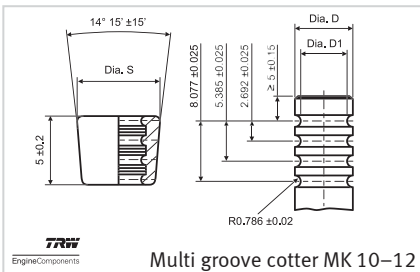
## Multi groove cotters MK 5-9



Multi groove cotter MK 6, Konus 1:4

Type	Number of beads	Dia. D ± 0.02	Dia. D1	Dia. D ± 0.05	Weight (g)
MK 5	3	4.92	3.91 ± 0.05	7.0	0.30
MK 5.5	3	5.42	4.41 ± 0.05	7.5	0.35
MK 6	3	5.92	4.59 ± 0.05	8.5	0.49
MK 7	3	6.92	5.25 ± 0.05	10.5	1.12
MK 8	3	7.92	6.23 ± 0.07	11.5	1.27
MK 9	3	8.92	7.20 ± 0.1	12.5	1.40

## Multi groove cotters MK 10-12



Multi groove cotter MK 10-12

Type	Number of beads	Dia. D ± 0.02	Dia. D1	Dia. D ± 0.05	Weight (g)
MK 10	4	9.92	8.20 ± 0.1	13.8	2.04
MK 11	4	10.92	9.20 ± 0.1	14.8	2.19
MK 12	4	11.92	10.20 ± 0.1	15.8	2.82

## 2.3 Valve Guides

The purpose of the valve guides is to support the side forces operating on the valve stem.

The guide also centres the valve on the valve seat and conducts a part of the heat from the valve head via the valve stem to the cylinder head.

Due to these extreme loads, the correct choice of material with appropriate characteristics is of critical importance for the product quality.

