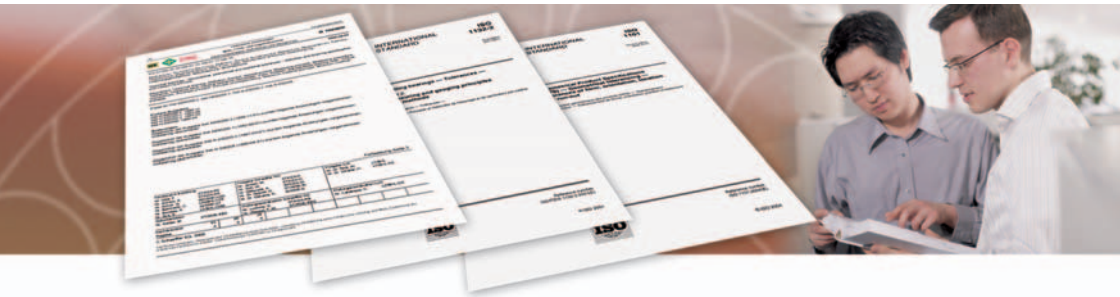
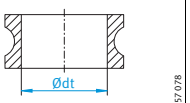
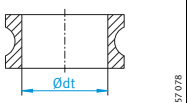
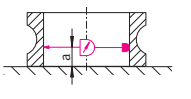
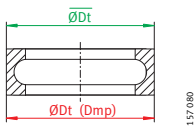
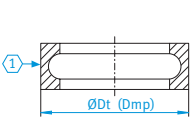
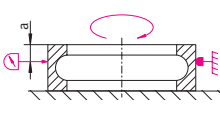
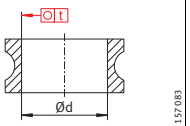
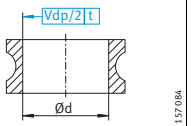
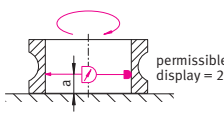
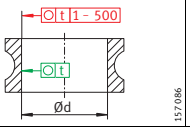
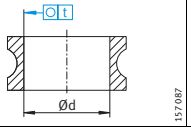
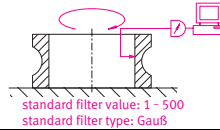
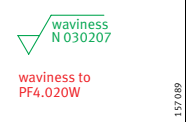
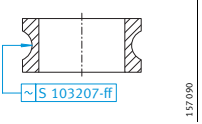
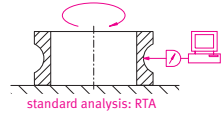
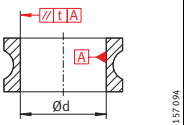
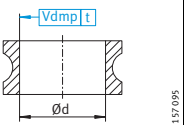
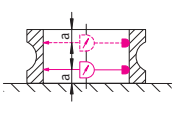
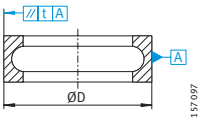
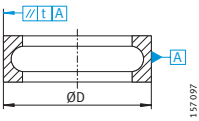
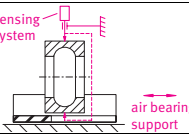
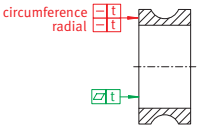
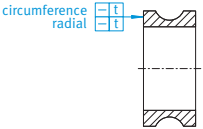
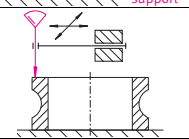
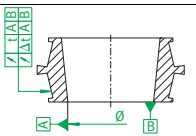
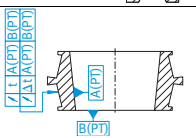
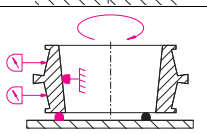


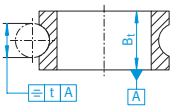
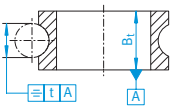
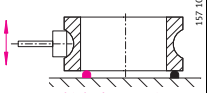
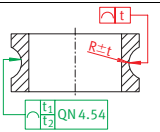
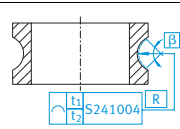
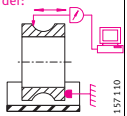
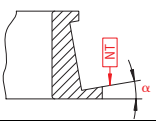
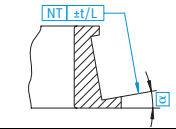
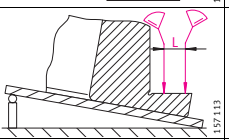
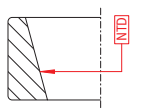
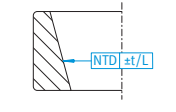
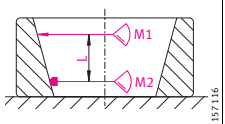
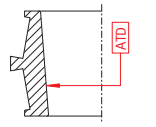
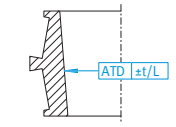
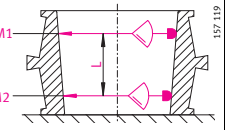
Rolling bearing tolerances

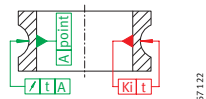
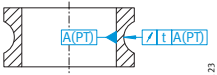
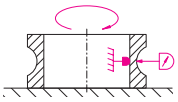
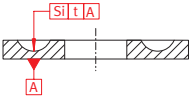
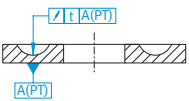
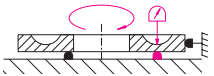
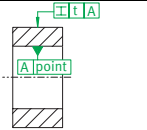
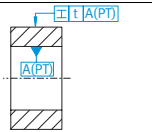
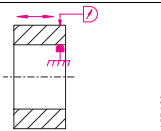
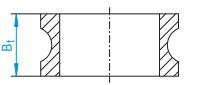
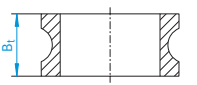
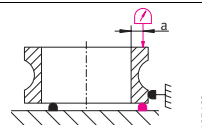
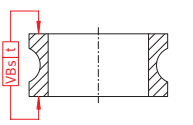
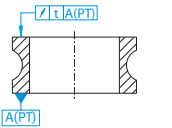
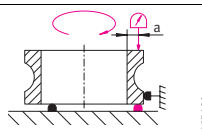
Definitions/Measurement principles

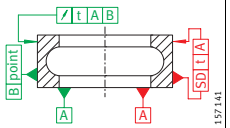
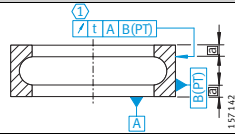
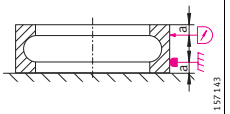
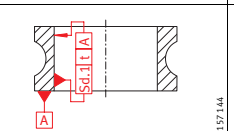
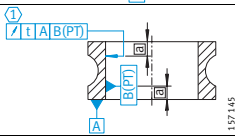
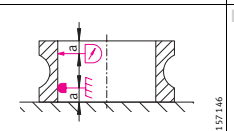
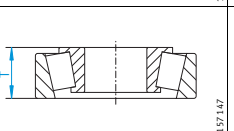
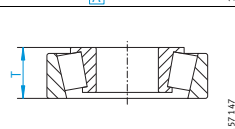
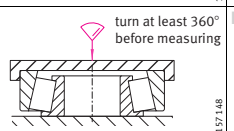
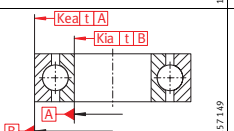
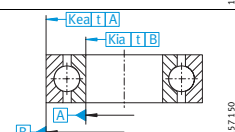
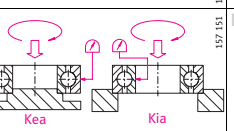
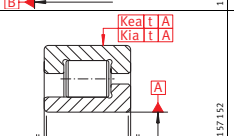
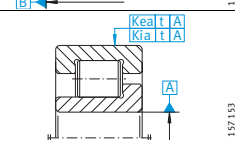
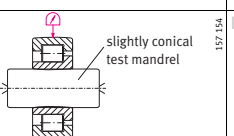
SCHAEFFLER GROUP
INDUSTRIAL

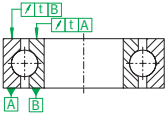
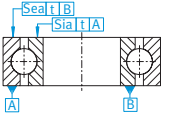
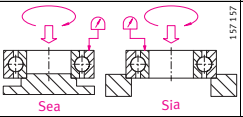
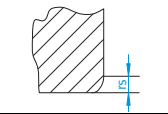
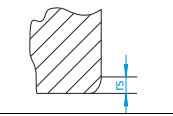
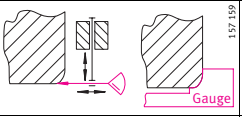
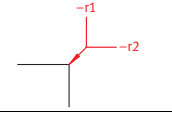
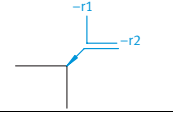
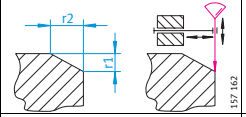
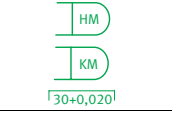
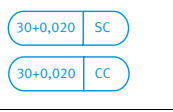
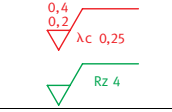
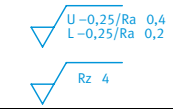
Symbol	Examples of drawing notations		Measurement principle	Characteristic
	INA/FAG (old)	Schaeffler Group (new)		
Δds (Ads) **ΔDs** (ADs)				Deviation of single diameter from nominal dimension (diameter)
Δdmp (Admp) **ΔDmp** (ADmp)				Deviation of mean diameter from nominal dimension in a single radial plane (diameter, mean) 1 = roundness or two-point roundness respectively
Vdp/2 **Vp/2** **VDp/2**				Half variation of diameter in a single radial plane (two-point roundness)
○				Roundness – to MZCI (Minimum Zone Circle) is the minimum distance between the radii of two concentric circles enclosing the roundness profile both inside and outside
~				Waviness

Symbol	Examples of drawing notations		Measurement principle	Characteristic
	INA/FAG (old)	Schaeffler Group (new)		
Vdmp **Vmp** **VDmp**	 157 094	 157 095	 157 096	Variation of the mean diameter of the various radial planes in relation to each other (two-point parallelism)
//	 157 097	 157 097	 157 098	Parallelism
—	 157 099	 157 101	 157 102	Straightness
	 157 103	 157 104	 157 105	Variation in wall thickness Differential measurement

Symbol	Examples of drawing notations		Measurement principle	Characteristic
	INA/FAG (old)	Schaeffler Group (new)		
			 measure at multiple datum points	Symmetry
			t_1: 1st and higher order: radius and form deviation t_2: 2nd and higher order: form deviation 	Line form tolerance of radii
NT				Deviation of single inclination angle to surface (inclination angle deviation)
NTD				Deviation of single inclination angle to diameter (inclination angle deviation)
ATD				Deviation of single taper angle (taper angle deviation)

Symbol	Examples of drawing notations		Measurement principle	Characteristic
	INA/FAG (old)	Schaeffler Group (new)		
Ki **Ke**				Radial variation in wall thickness (radial runout)
Si **Se**				Variation in wall thickness (axial runout)
⌶				Variation in wall thickness in cross-sectional plane
ΔBs (ABs) **ΔCs** (ACs)				Deviation of single width from nominal dimension
VBs **VCs**				Variation in width

Symbol	Examples of drawing notations		Measurement principle	Characteristic
	INA/FAG (old)	Schaeffler Group (new)		
SD	 157 141	 157 142	 157 143	Variation of inclination of outside surface to face 1 = multiple datum points
Sd.1	 157 144	 157 145	 157 146	Variation of inclination of bore to face 1 = multiple datum points
ΔTs (ATs)	 157 147	 157 147	 157 148	Deviation of actual bearing width from nominal width (section height)
Kia **Kea**	 157 149	 157 150	 157 151	Radial runout of inner ring and outer ring on assembled bearing
Kia **Kea**	 157 152	 157 153	 157 154	Radial runout of inner ring and outer ring on assembled bearing

Symbol	Examples of drawing notations		Measurement principle	Characteristic
	INA/FAG (old)	Schaeffler Group (new)		
Sia **Sea**	 157 155	 157 156	 157 157	Axial runout of inner ring and outer ring on assembled bearing
rs **rs min** **rs max**	 157 158	 157 158	 157 159	Chamfer dimension dependent on form (smallest or largest single chamfer dimension)
r1 **r2**	 157 160	 157 161	 157 162	Chamfer dimension not dependent on form
SC **CC**	 157 163	 157 164	SC = Significant Characteristic CC = Critical Characteristic 157 165	Indication of characteristic
Ra **Rz** **Rpk** **Rk** **Rvk**	 157 166	 157 167	U = upper limit L = lower limit –0,25 = transmission trait (λc) Ra, Rz = parameter 157 168	Surface notation
–	Eht = Einsatzhärtungstiefe Nht = Nitrierhärtetiefe Rht = Einhärtungstiefe nach dem Randschichthärten 157 169	CHD = Case hardening depth NHD = Nitriding hardness depth SHD = Surface hardening depth 157 170		Hardness parameters

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