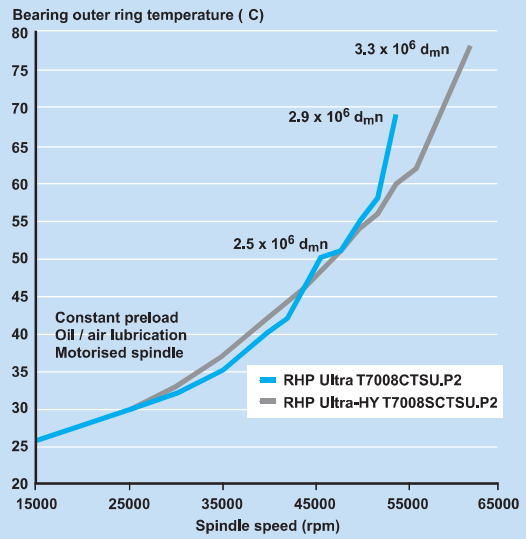
RHP Ultra and RHP Ultra-HY High Speed Angular Contact Ball Bearings

High Speed Optimisation

Through extensive analysis and rigorous testing, the optimum inner and outer ring raceway curvatures and number and size of rolling elements have been determined for each size of RHP Ultra in order to minimise heat generation. This has enabled reliable operation at speeds up to and beyond 2.5 x 10^6 d_mn with oil/air lubrication.

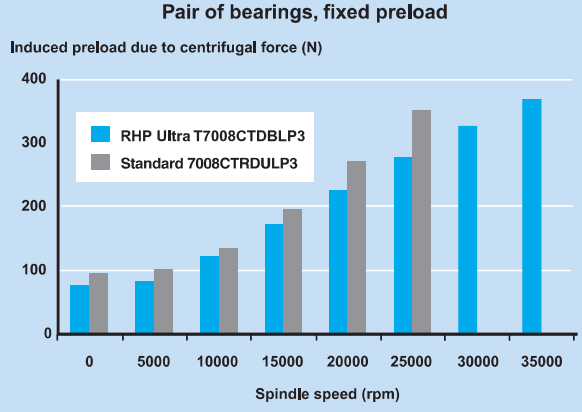
Effect of Speed on Operating Temperature
Fig. 2.2



Low Induced Preload

When arranged in sets, the design of the RHP Ultra bearing is such that the effects of differential expansions of the inner and outer rings are reduced. Compared with a standard Super Precision bearing, this means that the induced preload due to centrifugal force is lower, ball-raceway contact heat generation is lower and so the speed capability of the set is increased.

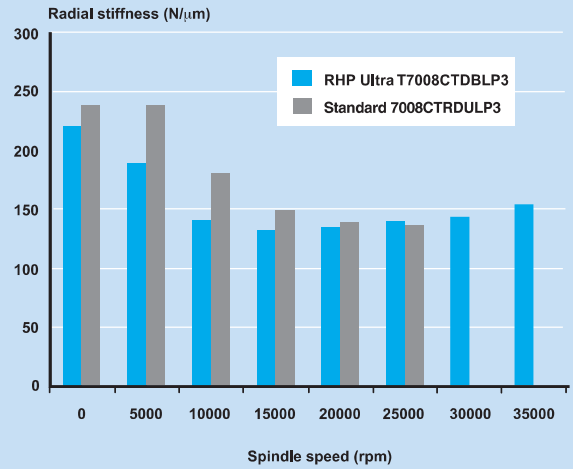
Effect of Speed on Preload
Fig. 2.3



High Rigidity

In optimising for very high speed, some reduction in axial stiffness has to be expected compared with standard Super Precision bearings. However, in very high speed applications, radial stiffness is usually of greater importance than axial stiffness. At high speed the radial stiffness of an RHP Ultra bearing is actually similar to or greater than that of a standard Super Precision bearing. Therefore the precision, accuracy and high surface finish of machined parts is maintained. The ceramic ball version, RHP Ultra-HY, will give even greater rigidity.

Effect of Speed on Radial Stiffness
Fig. 2.4



Universal Face Control

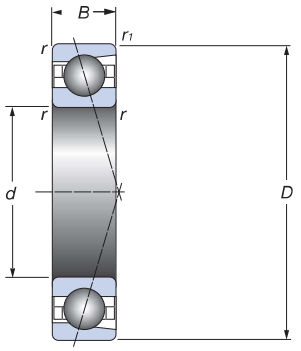
As with all other Super Precision angular contact ball bearings, RHP Ultra series bearings are universally faced.

Limiting Speeds

For full details on limiting speeds please refer to the bearing tables pages 35 and 36, and to the section ‘Limiting speeds’ on page 52.

ULTRA High Speed Angular Contact Bearing

RHP ULTRA
T70**
ISO SERIES 10 (Steel Ball)

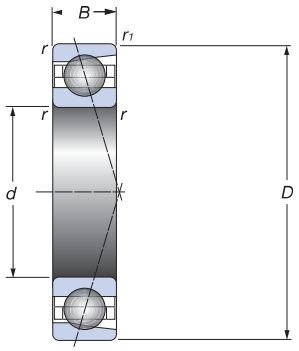


Single Row Angular Contact Ball Bearings

Basic bearing	Primary dimensions (mm)					Load ratings (N)		Limiting speeds (min⁻¹)	
	d	D	B	r	r_1	Dynamic Cr N	Static Cor	oil/air	Grease
T7004CTSU	20	42	12	0.6	0.3	7490	3520	80500	51500
T7005CTSU	25	47	12	0.6	0.3	8330	4340	69000	44000
T7006CTSU	30	55	13	1.0	0.6	10300	5550	58500	37500
T7007CTSU	35	62	14	1.0	0.6	13000	7400	51500	32500
T7008CTSU	40	68	15	1.0	0.6	14100	8650	46000	29500
T7009CTSU	45	75	16	1.0	0.6	16700	10500	41500	26500
T7010CTSU	50	80	16	1.0	0.6	17200	11300	38500	24500
T7011CTSU	55	90	18	1.0	1.0	20800	14300	33000	21000
T7012CTSU	60	95	18	1.0	1.0	21400	15200	30500	19000
T7013CTSU	65	100	18	1.0	1.0	24800	17700	29000	18000
T7014CTSU	70	110	20	1.0	1.0	32200	23400	26500	16500
T7015CTSU	75	115	20	1.0	1.0	32000	23700	25000	15000
T7016CTSU	80	125	22	1.0	1.0	35900	27100	23000	13500
T7017CTSU	85	130	22	1.0	1.0	36900	28700	22000	13000
T7018CTSU	90	140	24	1.5	1.5	42400	34000	20500	12000

ULTRA High Speed Angular Contact Bearing

HYBRID RHP ULTRA
T70**S
ISO SERIES 10 (Ceramic Ball)



Single Row Angular Contact Ball Bearings

Basic bearing	Primary dimensions (mm)					Load ratings (N)		Limiting speeds (min⁻¹)	
	d	D	B	r	r_1	Dynamic Cr N	Static Cor	oil/air	Grease
T7004SCTSU	20	42	12	0,6	0.3	7490	3520	92500	56500
T7005SCTSU	25	47	12	0.6	0.3	8330	4340	79500	48500
T7006SCTSU	30	55	13	1.0	0.6	10300	5550	67500	41000
T7007SCTSU	35	62	14	1.0	0.6	13000	7400	59000	36000
T7008SCTSU	40	68	15	1.0	0.6	14100	8650	53000	32500
T7009SCTSU	45	75	16	1.0	0.6	16700	10500	47500	29000
T7010SCTSU	50	80	16	1.0	0.6	17200	11300	44000	27000
T7011SCTSU	55	90	18	1.0	1.0	20800	14300	37500	23500
T7012SCTSU	60	95	18	1.0	1.0	21400	15200	35500	21000
T7013SCTSU	65	100	18	1.0	1.0	24800	17700	33000	20000
T7014SCTSU	70	110	20	1.0	1.0	32200	23400	30500	18000
T7015SCTSU	75	115	20	1.0	1.0	32000	23700	29000	16500
T7016SCTSU	80	125	22	1.0	1.0	35900	27100	26500	15000
T7017SCTSU	85	130	22	1.0	1.0	36900	28700	25500	14000
T7018SCTSU	90	140	24	1.5	1.5	42400	34000	24000	13000

ULTRA Preload and Stiffness

Axial Preload and Stiffness Values for Paired Angular Contact Ball Bearings with Steel Balls and Ceramic Balls

Bore code reference	Contact angle	Ball bearings with steel balls		Ball bearings with ceramic balls	
		Preload	Stiffness	Preload	Stiffness
		T70** Series L (N)	T70** Series L (N/µm)	T70**S Series L (N)	T70**S Series L (N/µm)
04	C	39	21	40	24
05	C	46	24	50	28
06	C	54	27	57	31
07	C	64	30	66	35
08	C	72	35	77	40
09	C	83	37	88	43
10	C	93	40	101	47
11	C	109	45	116	52
12	C	122	49	119	54
13	C	137	52	135	58
14	C	154	56	156	64
15	C	169	58	173	66
16	C	180	61	191	70
17	C	198	65	194	72
18	C	221	70	220	79

T70** = RHP Ultra