

# *Cuscinetti a rulli conici*



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## Cuscinetti a rulli conici

### Definizione ed attitudini

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#### → Definizione

Montati sempre in opposizione ad un altro cuscinetto analogo, i cuscinetti a rulli conici ad una corona di corpi volventi permettono una notevole rigidità di montaggio, soprattutto quando sono precaricati.

#### ■ Gabbie

I cuscinetti a rulli conici sono generalmente dotati di una gabbia in lamiera imbutita o, in alcuni casi, di una gabbia in materiale sintetico.

#### ■ Angolo di contatto

Gli anelli di questo cuscinetto sono separabili: l'anello esterno (coppa) non è legato al resto del cuscinetto che è composto dall'anello interno (cono) e dai rulli mantenuti sul cono dalla gabbia. Il cuscinetto a rulli conici può accettare carichi assiali solo in un unico senso. Deve essere montato in opposizione con un cuscinetto dello stesso tipo.

La Norma ISO 355 definisce diverse serie di cuscinetti a rulli conici, con angoli di contatto compresi tra 10 e 30°. Per un determinato carico radiale, il carico assiale che può sopportare il cuscinetto, sarà tanto maggiore quanto più l'angolo della coppa sarà grande. SNR ha adottato una simbologia definita secondo questa norma per le nuove serie dette "intermedie", ed ha conservato la vecchia simbologia d'uso corrente per le altre serie.

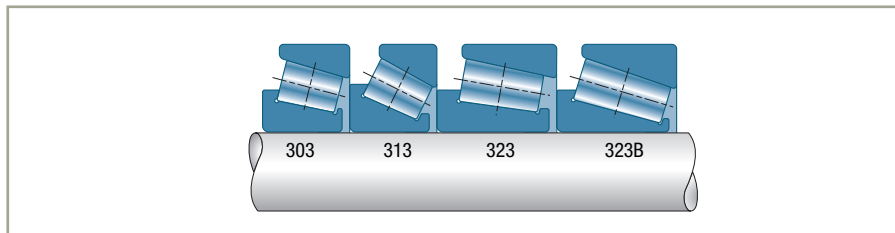
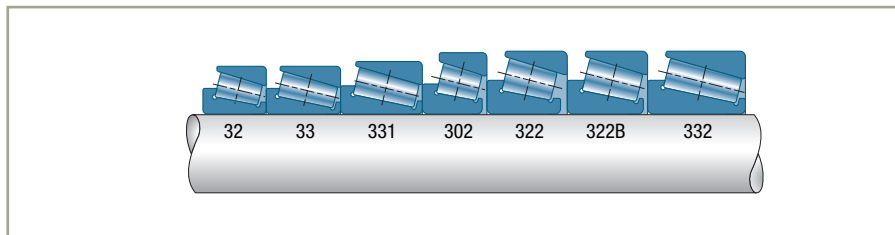
#### → Attitudini

#### ■ Carichi e velocità

Il cuscinetto a rulli conici è un cuscinetto a contatto angolare, in grado di sopportare carichi radiali ed assiali importanti.

#### ■ Difetti d'allineamento

La correzione dei profili delle generatrici in contatto consente difetti d'allineamento dell'ordine di 0,06°.



## Varianti

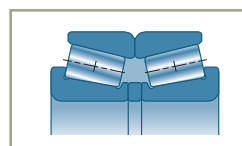
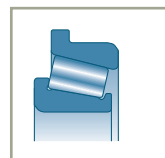
### ■ Raccordi speciali

Raccordi speciali sulla superficie laterale maggiore del cono per adattarlo ai grandi raccordi degli spallamenti d'albero come quelli dei mozzi ruota.

### ■ Flangia sulla coppa

### ■ Cuscinetti accoppiati

Sono costituiti da due cuscinetti generalmente separati da un distanziale calibrato, preregistrati, in modo da formare un solo supporto. Gli elementi di uno stesso insieme accoppiato, non possono essere sostituiti con elementi di un altro insieme.



## Cuscinetti a rulli conici (seguito)

### Tolleranze e giochi

#### → Tolleranze

Questi cuscinetti sono forniti in precisione standard, con tolleranze conformi alla norma ISO 492. Possono essere forniti su richiesta con tolleranze particolari su una o più dimensioni o caratteristiche.

#### → Giochi

##### ■ Gioco assiale

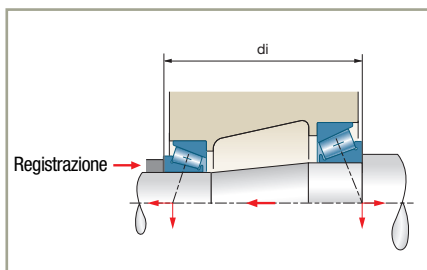
Poiché questi cuscinetti sono sempre montati in opposizione, il gioco assiale è determinato dalla registrazione dei cuscinetti in fase di montaggio, vale a dire dalla determinazione della posizione relativa iniziale dei coni rispetto alle coppe. La registrazione determina un gioco meccanico (gioco positivo) o un precarico (gioco negativo).

##### ■ Tipi di montaggio

##### Montaggio a O

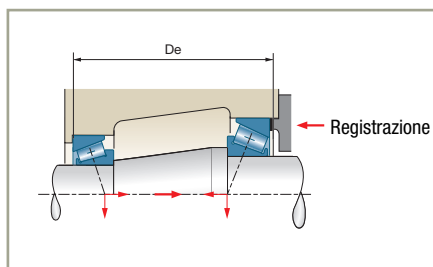
Da utilizzare nei casi di variazioni di temperatura o qualora si debbano allontanare il più possibile i punti d'applicazione delle reazioni dei due cuscinetti. Permette in particolare di realizzare montaggi compatti, sia precaricati sia con gioco.

La registrazione avviene sulla distanza  $d_i$  dei coni dei due cuscinetti, determinata attraverso una lunghezza di distanziale o attraverso un serraggio con ghiera.



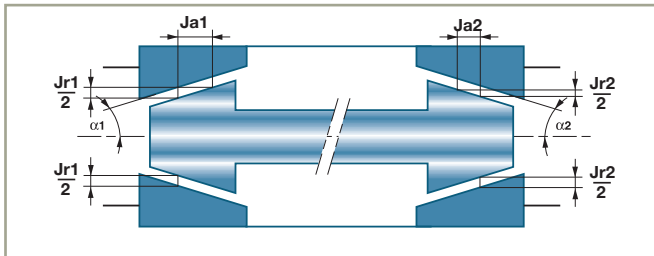
##### Montaggio a X

La registrazione avviene sulla distanza  $D_e$  delle coppe dei due cuscinetti, determinata da spessori o ghiera di regolazione.



## ■ Relazione tra il gioco assiale $J_a$ e il gioco radiale $J_r$ di un cuscinetto

$$J_a = 1,25 Y \cdot J_r$$



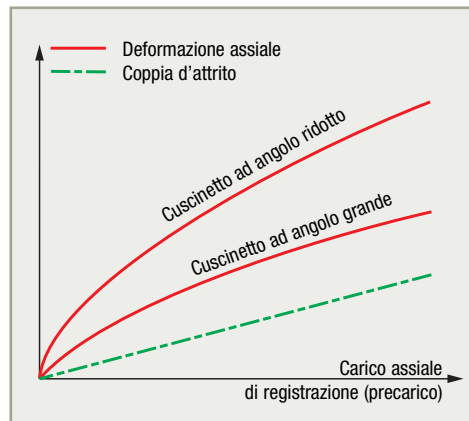
### ■ Precarico

I cuscinetti a rulli conici sono precaricati ogni volta che si desidera garantire la rigidità assiale del montaggio (cuscinetti di pignone conico, cuscinetti di mandrino di macchina utensile, ecc.) La determinazione del valore nominale del precarico avviene in modo preciso per ogni applicazione, in funzione delle condizioni di carico e delle caratteristiche dei cuscinetti scelti.

Per stabilire un dossier di precarico dei cuscinetti, consultare SNR.

Per ogni simbolo di cuscinetto, SNR stabilisce due curve caratteristiche:

- la curva di deformazione assiale, che caratterizza la rigidità del cuscinetto, la quale dipende dall'angolo di contatto, dal numero di rulli e dalla loro lunghezza effettiva;
- la curva della coppia di attrito, che permette di valutare l'ordine di grandezza di tale coppia per verificare la correttezza del precarico.



### ■ Gioco assiale in fase di montaggio per due cuscinetti separati

Poiché questi cuscinetti sono sempre montati in opposizione, il loro gioco interno è determinato dalla registrazione effettuata al momento del montaggio che determina il gioco assiale dell'albero.

A titolo indicativo, la relazione tra il gioco assiale e il gioco radiale corrispondente è data dalla formula:

$$J_r = 0,8 / Y \cdot J_a \quad (Y = 0,4 \cotg\alpha)$$

Questi cuscinetti possono essere montati precaricati, quando si desidera garantire la rigidità assiale di un montaggio. Il limite di velocità è allora ridotto e dipende dal valore del precarico. Consultare SNR.

## Cuscinetti a rulli conici (seguito)

### Elementi di calcolo

#### ■ Durata di vita

#### ■ Albero montato su due cuscinetti semplici

##### Carico dinamico equivalente

L'equilibrio assiale dell'albero dipende non solo dagli sforzi esterni applicati a quest'ultimo, ma anche dalle forze indotte dai carichi radiali applicati su ogni cuscinetto.

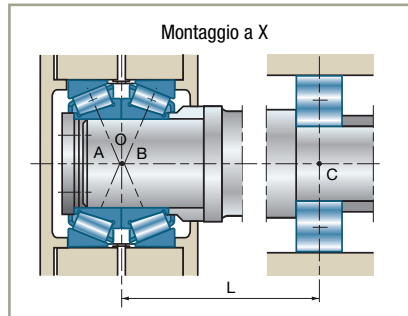
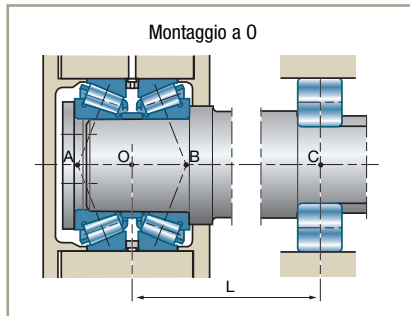
##### Carico statico equivalente

Il suo valore  $P_0$  corrisponde al valore maggiore tra i due valori ottenuti a partire dalle seguenti formule:

$$P_0 = F_r$$

$$P_0 = 0,5 F_r + Y_0 \cdot F_a$$

#### ■ Albero di cui uno dei due supporti è costituito da due cuscinetti accoppiati non precaricati montati a $\circ$ oppure a $\times$



Si ritiene che questo supporto sia costituito da un unico cuscinetto a doppia corona di rulli, il cui centro O corrisponde al centro della distanza AB dei punti d'applicazione delle reazioni. Il montaggio di un albero con questo tipo di supporto è iperstatico (3 punti d'appoggio A, B, C) e può essere assimilato approssimativamente ad un montaggio su due supporti, solo se la distanza AB è inferiore a  $L/5$  e se la rigidità dell'insieme è corretta (difetto di allineamento  $< 0,06^\circ$ ). In tutti gli altri casi, consultare SNR.

**Carico dinamico equivalente del supporto doppio**  
(Norma ISO 281 )

$$P = F_r + 1,1 Y \cdot F_a \quad \text{se } F_a / F_r \leq e$$

$$P = 0,67 F_r + 1,68 Y \cdot F_a \quad \text{se } F_a / F_r > e$$

**Capacità dinamica di base del supporto doppio**

La capacità dinamica di base di un insieme di due cuscinetti identici è:

$$C_e = 1,715 C$$

**Carico statico equivalente del supporto doppio**

$$P_0 = F_r + 1,1 Y \cdot F_a$$

**Capacità statica di base del supporto doppio**

La capacità statica dell'insieme di due cuscinetti identici è pari al doppio di quella di un unico cuscinetto.

$$C_{0e} = 2 C_0$$

#### ■ Calcolo dei cuscinetti precaricati

Le forze indotte che intervengono nell'equilibrio assiale di due cuscinetti hanno dei valori che dipendono dal precarico applicato e dalle caratteristiche di rigidità dei cuscinetti. Il calcolo del carico equivalente su ogni cuscinetto è pertanto complesso e deve essere effettuato dai Servizi tecnici SNR.



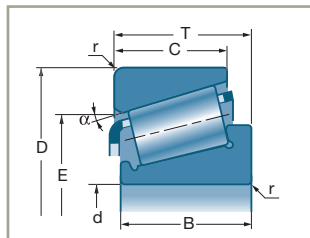
## Cuscinetti a rulli conici (seguito)

### Elementi di montaggio

#### ■ Intercambiabilità degli elementi di uno stesso simbolo

Poiché i coni e le coppe dei cuscinetti a rulli conici sono separabili, la Norma ISO, oltre alle dimensioni e tolleranze degli ingombri esterni, stabilisce:

- le dimensioni nominali del diametro inferiore della pista della coppa (E)
- l'angolo di contatto ( $\alpha$ )



#### Intercambiabilità tra elementi di fabbricazione SNR

I coni e le coppe di uno stesso simbolo sono totalmente intercambiabili tra di loro, poiché la larghezza totale del cuscinetto (quota T) rimane conforme alla tolleranza normalizzata (ISO 492).

#### Intercambiabilità tra un elemento SNR e un elemento di un'altra marca

Questa intercambiabilità è possibile a condizione che gli elementi non SNR siano conformi alla Norma ISO 355, in particolare le quote  $\alpha$  ed E. Tuttavia, poiché le tolleranze di queste quote, le correzioni dei profili delle piste, la qualità dell'acciaio e gli stati superficiali sono tipici di ciascun costruttore, le prestazioni di questi assemblaggi rischiano di essere sensibilmente ridotte. Devono pertanto essere evitate.

Alcuni simboli SNR di vecchia progettazione non permettono l'intercambiabilità con altre marche. Sono evidenziati nell'elenco dei Cuscinetti Standard.

#### ■ Parametri di registrazione

Il montaggio dei cuscinetti standard richiede sempre una registrazione perché i loro elementi sono separabili. Questa registrazione dipende dalle quote caratteristiche d'assemblaggio e dalle loro tolleranze, ovvero:

##### Le quote funzionali del cuscinetto

- Alesaggio d
- Diametro esterno D
- La distanza tra le facce cono e coppa di uno stesso cuscinetto: quota T

##### Le quote funzionali dell'insieme

- La distanza degli spallamenti delle coppe ( $D_e$ )
- La distanza degli spallamenti dei coni ( $d_i$ )
- I diametri delle sedi dell'albero e dell'alloggiamento

La tolleranza generalmente ammessa per un gioco determinato (positivo o negativo) costringe a ripetere l'operazione di registrazione per ogni assemblaggio, a fronte dell'ampiezza delle tolleranze dei cuscinetti standard e delle quote di montaggio.

Si agisce allora ogni volta su una delle distanze di spallamento ( $D_e$ ) o ( $d_i$ ) per compensare le variazioni delle altre quote caratteristiche di assemblaggio.

La registrazione è un'operazione ripetitiva relativamente lunga, che richiede una mano d'opera specializzata in grado di garantirne la precisione e l'affidabilità.



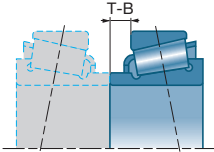
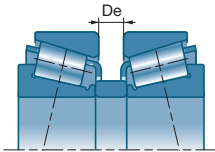
## ■ Installazione senza registrazione

In molti montaggi di serie, le tolleranze delle quote hanno una dispersione gaussiana ridotta. Utilizzando cuscinetti con tolleranze ridotte, si ottiene senza alcuna registrazione, con una probabilità del 99,73%, un gioco adatto a numerose applicazioni.

Applicazioni principali: ruote di veicoli, scatole del cambio.

I cuscinetti sono generalmente montati ad O e poco distanti l'uno dall'altro.

## ■ Le due possibilità di montaggio senza registrazione sono:

Tipo di montaggio	Cuscinetti preregolati	Insieme accoppiato
<b>Schema del principio di registrazione</b>		
<b>Caratteristiche del cuscinetto</b>	<ul style="list-style-type: none"> <li>▶ Tolleranza ridotta sulla posizione del cono rispetto alla superficie laterale maggiore della coppa (quota T-B)</li> <li>▶ Cono e coppa intercambiabili.</li> <li>▶ Cono generalmente allungato per evitare un distanziale.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Insieme di due cuscinetti preregolati con una tolleranza ridotta sulla distanza delle due coppe (0,03 mm circa).</li> <li>▶ Elementi non intercambiabili con quelli di un altro insieme.</li> </ul>
<b>Caratteristiche del montaggio</b>	<ul style="list-style-type: none"> <li>▶ Montaggi ad O di grande serie.</li> <li>▶ Tolleranza sulla distanza (De) degli spallamenti delle coppe dell'ordine di 0,05 mm max.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Montaggi di grande o media serie.</li> <li>▶ Tolleranza sulla distanza (De) degli spallamenti delle coppe dell'ordine di 0,05 mm max.</li> </ul>
<b>Tolleranze sul gioco assiale</b>	<ul style="list-style-type: none"> <li>▶ Tolleranza dell'ordine di 0,15 / 0,20 mm con una probabilità del 99,7%. I giochi, al di fuori di questa probabilità (0,3%), sono compresi in una fascia teorica da 0,4 a 0,6 mm circa.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Tolleranza dell'ordine di 0,10 / 0,15 mm con una probabilità del 99,7%. I giochi, al di fuori di questa probabilità (0,3%), sono compresi in una fascia teorica da 0,25 a 0,4 mm circa.</li> </ul>

## Prefissi e suffissi

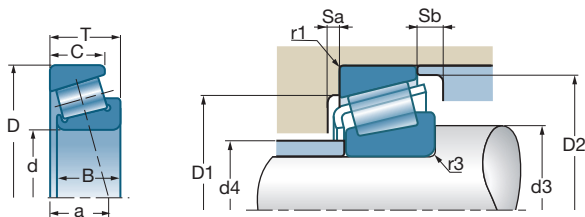
### ■ Prefissi





<b>R</b>	Raccordi speciali sulla superficie laterale maggiore dell'anello interno (cono)
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### ■ Suffissi

<b>B</b>	Suffisso per le serie 322 e 323 ad angolo maggiorato
<b>A, C</b>	Indici di progettazione interna
<b>T</b>	Flangia su anello esterno (coppa)
<b>P6X</b>	Cuscinetto la cui tolleranza sulla quota T soddisfa i requisiti della classe di precisione 6X

## Cuscinetti a rulli conici (seguito)

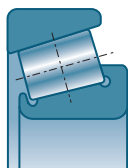




d		D	B	C	T	a			e	Y	Yo		
												10 <sup>3</sup> N	10 <sup>4</sup> N
mm	Rif.	mm	mm	mm	mm	mm							
15	30202A	35	11	10,0	11,75	8,40	15,80	14,50	0,32	1,88	1,03	10000	15000
17	30203A	40	12	11,0	13,25	9,90	21,2	21,3	0,35	1,74	0,96	9500	13000
	32203A	40	16	14,0	17,25	11,25	31,0	31,0	0,31	1,92	1,06	9200	12000
	30303A	47	14	12,0	15,25	10,40	29,7	27,2	0,29	2,11	1,16	8400	11000
20	30204A	47	14	12,0	15,25	11,20	28,2	30,6	0,35	1,74	0,96	8000	11000
	30304A	52	15	13,0	16,25	11,20	34,7	33,2	0,30	2,00	1,10	7500	10000
	32304A	52	21	18,0	22,25	13,60	44,6	46,3	0,30	2,00	1,10	7700	10000
25	32005V	47	15	11,5	15,00	11,50	28,5	31,5	0,43	1,39	0,77	7600	10000
	30205A	52	15	13,0	16,25	12,60	35,4	39,4	0,37	1,60	0,88	7100	10000
	32205B	52	18	15,0	19,25	16,75	41,5	49,0	0,58	1,03	0,57	7200	9500
	33205A	52	22	18,0	22,00	14,00	52,5	57,5	0,35	1,71	0,94	7300	9800
	30305A	62	17	15,0	18,25	13,00	49,2	48,1	0,30	2,00	1,10	6200	8600
	32305A	62	24	20,0	25,25	15,90	64,6	68,8	0,30	2,00	1,10	6300	8200
30	32006C	55	17	13,0	17,00	13,50	38,5	45,0	0,43	1,39	0,77	6400	8000
	30206A	62	16	14,0	17,25	13,80	45,4	50,5	0,37	1,60	0,88	5900	8400
	32206C	62	20	17,0	21,25	14,75	50,0	55,0	0,37	1,60	0,88	5800	8100
	33206A	62	25	19,5	25,00	16,00	71,9	77,0	0,34	1,76	0,97	6300	8400
	30306A	72	19	16,0	20,75	15,30	61,7	63,1	0,31	1,90	1,05	5300	7400
	31306A	72	19	14,0	20,75	23,10	52,5	60,3	0,83	0,73	0,40	5100	7000
	32306A	72	27	23,0	28,75	18,90	85,5	96,4	0,32	1,90	1,05	5400	7000
35	32007C	62	18	14,0	18,00	15,00	46,5	56,0	0,45	1,32	0,73	5600	7900
	30207A	72	17	15,0	18,25	15,25	58,0	62,0	0,37	1,60	0,88	5100	7200
	32207C	72	23	19,0	24,25	18,25	70,0	80,0	0,37	1,60	0,88	4900	6900
	32207B	72	23	19,0	24,25	21,75	66,0	81,0	0,58	1,03	0,57	5200	6900
	33207A	72	28	22,0	28,00	18,50	96,8	109,0	0,35	1,70	0,94	5500	7400
	30307A	80	21	18,0	22,75	16,90	78,8	82,6	0,31	1,90	1,05	4700	6600
	31307A	80	21	15,0	22,75	25,80	68,5	76,3	0,83	0,73	0,40	4500	6200
	32307A	80	31	25,0	32,75	20,50	103,6	118,3	0,31	1,90	1,05	4800	6300
	32307B	80	31	25,0	32,75	25,25	95,0	112,0	0,55	1,10	0,60	4600	6300
40	32008C	68	19	14,5	19,00	15,00	53,0	65,0	0,38	1,58	0,87	5000	7000
	33108A	75	26	20,5	26,00	18,00	84,8	110,3	0,35	1,69	0,93	4600	6400
	30208A	80	18	16,0	19,25	16,90	63,0	74,0	0,37	1,60	0,88	4500	6500
	32208C	80	23	19,0	24,75	19,75	78,0	88,0	0,37	1,60	0,88	4300	6100
	33208A	80	32	25,0	32,00	21,00	113,9	132,0	0,36	1,68	0,92	4900	6600
	30308A	90	23	20,0	25,25	19,50	95,2	107,5	0,35	1,74	0,96	4100	5800
	31308A	90	23	17,0	25,25	29,10	84,9	95,8	0,83	0,73	0,40	3900	5500
	32308A	90	33	27,0	35,25	23,40	120,8	147,1	0,35	1,74	0,96	4200	5500

\* Si tratta di velocità limite secondo la definizione SNR (vedi da pagina 85 a 87).

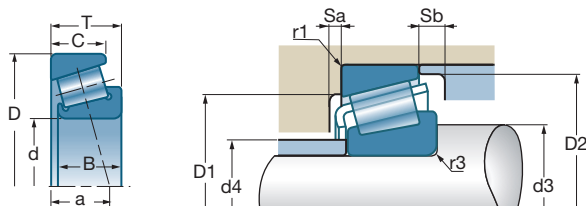
## Caratteristiche

### ■ Cuscinetti ad una corona di rulli conici (metrici)



	D1 min	D1 max	D2 min	d3 min	d4 max	Sa min	Sb min	r1 max	r3 max		ISO
Rif.	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	
30202A	29,0	29,0	32,0	19,0	20,0	2,0	1,8	1,0	1,0	0,053	
30203A	34,0	34,0	37,0	23,0	23,0	2,0	2,3	1,0	1,0	0,076	2DB
32203A	33,6	34,2	37,9	23,8	22,1	3,1	0,5	1,0	1,0	0,103	2DD
30303A	40,0	41,0	42,0	23,0	25,0	2,0	3,2	1,0	1,0	0,121	2FB
30204A	40,0	41,0	43,0	26,0	27,0	2,0	3,3	1,0	1,0	0,125	2DB
30304A	44,0	45,0	47,0	27,0	28,0	2,0	3,2	1,5	1,5	0,179	2FB
32304A	43,0	45,0	47,0	27,0	27,0	3,0	4,0	1,5	1,5	0,238	2FD
32005V	40,0	42,0	44,0	30,0	30,0	3,0	3,5	0,6	0,6	0,110	4CC
30205A	44,0	46,0	48,0	31,0	31,0	2,0	3,3	1,0	1,0	0,154	3CC
32205B	41,0	46,0	49,0	31,0	30,0	3,2	4,0	1,0	1,0	0,192	5CD
33205A	43,0	46,0	49,0	31,0	30,0	4,0	4,0	1,0	1,0	0,222	2DE
30305A	54,0	55,0	57,0	32,0	34,0	2,0	3,2	1,5	1,5	0,265	2FB
32305A	53,0	55,0	57,0	32,0	33,0	3,0	5,0	1,5	1,5	0,378	2FD
32006C	48,0	49,0	52,0	36,0	35,0	3,7	4,0	1,0	1,0	0,165	4CC
30206A	53,0	56,0	57,0	36,0	37,0	2,0	3,2	1,0	1,0	0,238	3DB
32206C	52,0	56,0	59,0	36,0	37,0	3,2	4,0	1,0	1,0	0,282	3DC
33206A	53,0	56,0	59,0	36,0	36,0	5,0	5,5	1,0	1,0	0,353	2DE
30306A	62,0	65,0	66,0	37,0	40,0	3,0	4,5	1,5	1,5	0,400	2FB
31306A	55,0	65,0	68,0	37,0	40,0	3,0	6,5	1,5	1,5	0,395	7FB
32306A	59,0	65,0	66,0	37,0	39,0	4,0	5,5	1,5	1,5	0,579	2FD
32007C	54,0	56,0	59,0	41,0	40,0	4,0	4,0	1,0	1,0	0,219	4CC
30207A	62,0	65,0	67,0	42,0	44,0	3,0	3,0	1,5	1,5	0,328	3DB
32207C	61,0	65,0	67,0	42,0	43,0	3,6	5,5	1,5	1,5	0,430	3DC
32207B	56,0	65,0	68,0	42,0	42,0	3,0	5,0	1,5	1,5	0,436	5DC
33207A	61,0	65,0	68,0	42,0	42,0	5,0	6,0	1,5	1,5	0,542	2DE
30307A	70,0	71,0	74,0	44,0	45,0	3,0	4,5	1,5	2,0	0,550	2FB
31307A	62,0	71,0	76,0	44,0	44,0	4,0	7,5	1,5	2,0	0,526	7FB
32307A	66,0	71,0	74,0	44,0	44,0	4,0	7,5	1,5	2,0	0,827	2FE
32307B	61,0	71,0	76,0	44,0	42,0	5,3	7,5	1,5	2,0	0,741	5FE
32008C	60,0	62,0	65,0	46,0	46,0	4,7	4,5	1,0	1,0	0,265	3CD
33108A	65,0	68,0	71,0	47,0	47,0	4,0	5,5	1,5	1,5	0,505	2CE
30208A	69,0	73,0	74,0	47,0	49,0	3,0	3,8	1,5	1,5	0,422	3DB
32208C	68,0	73,0	75,0	47,0	48,0	5,1	5,5	1,5	1,5	0,508	3DC
33208A	67,0	73,0	76,0	47,0	47,0	5,0	7,0	1,5	1,5	0,733	2DE
30308A	77,0	81,0	82,0	49,0	52,0	3,0	5,0	1,5	2,0	0,759	2FB
31308A	71,0	81,0	86,0	49,0	51,0	4,0	8,0	1,5	2,0	0,747	7FB
32308A	73,0	81,0	82,0	49,0	50,0	4,0	8,0	1,5	2,0	1,040	2FD

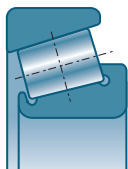
## Cuscinetti a rulli conici (seguito)





d		D	B	C	T	a			e	Y	Yo			
												10°N	10°N	giri/min*
mm	Rif.	mm	mm	mm	mm	mm								
45	32009V	75	20	15,5	20,00	16,50	59,0	73,0	0,39	1,53	0,84	4500	6300	
	33109A	80	26	20,5	26,00	19,10	87,0	117,0	0,38	1,57	0,86	4200	5900	
	30209C	85	19	16,0	20,75	17,75	67,0	74,0	0,40	1,48	0,81	4200	6000	
	32209A	85	23	19,0	24,75	20,10	84,1	103,0	0,40	1,48	0,81	4000	5600	
	32209B	85	23	19,0	24,75	23,75	87,0	104,0	0,59	1,01	0,56	4300	5700	
	33209A	85	32	25,0	32,00	22,00	118,4	141,0	0,39	1,56	0,86	4400	5900	
	30309A	100	25	22,0	27,25	21,30	114,1	129,8	0,35	1,74	0,96	3700	5200	
	31309A	100	25	18,0	27,25	32,50	106,2	109,0	0,83	0,73	0,40	3500	4600	
	32309A	100	36	30,0	38,25	25,60	152,2	189,3	0,35	1,74	0,96	3700	4900	
	32309B	100	36	30,0	38,25	29,75	152,0	187,0	0,55	1,10	0,60	3700	5100	
50	32010A	80	20	15,5	20,00	18,00	69,0	95,0	0,42	1,42	0,78	4100	5800	
	33110A	85	26	20,0	26,00	20,50	87,0	125,0	0,41	1,46	0,80	3900	5400	
	30210C	90	20	17,0	21,75	19,25	76,0	89,0	0,42	1,43	0,79	3100	4500	
	32210A	90	23	19,0	24,75	21,00	96,8	109,0	0,42	1,43	0,79	4000	5300	
	33210A	90	32	24,5	32,00	23,50	127,2	158,0	0,41	1,45	0,80	4000	5300	
	30310A	110	27	23,0	29,25	23,00	147,1	152,0	0,35	1,74	0,96	3600	4800	
	31310A	110	27	19,0	29,25	35,00	125,0	130,0	0,83	0,73	0,40	3200	4200	
	32310A	110	40	33,0	42,25	28,20	177,5	236,1	0,35	1,73	0,95	3400	4500	
	55	32011A	90	23	17,5	23,00	19,80	79,7	115,6	0,41	1,48	0,81	3600	5100
		33011A	90	27	21,0	27,00	19,50	101,2	138,0	0,31	1,92	1,06	4000	5400
33111A		95	30	23,0	30,00	22,00	122,8	155,0	0,37	1,60	0,88	3900	5200	
30211A		100	21	18,0	22,75	21,00	94,6	112,8	0,40	1,48	0,81	3500	5000	
32211A		100	25	21,0	26,75	22,80	112,7	141,5	0,40	1,48	0,81	3400	4700	
33211A		100	35	27,0	35,00	25,50	152,7	188,0	0,40	1,50	0,83	3600	4900	
30311A		120	29	25,0	31,50	24,50	155,0	179,0	0,35	1,74	0,96	3300	4400	
31311A		120	29	21,0	31,50	38,00	146,0	154,0	0,83	0,73	0,40	2900	3800	
32311A		120	43	35,0	45,50	30,40	212,7	271,3	0,35	1,74	0,96	3100	4100	
32311B		120	43	35,0	45,50	36,00	206,0	275,0	0,55	1,10	0,60	3000	4200	
60	32012A	95	23	17,5	23,00	20,80	83,8	121,5	0,83	0,73	0,40	3400	4900	
	33012A	95	27	21,0	27,00	20,50	103,4	145,0	0,33	1,83	1,00	3700	4900	
	33112A	100	30	23,0	30,00	23,50	113,0	164,0	0,40	1,51	0,83	3600	4700	
	30212A	110	22	19,0	23,75	22,30	103,3	130,0	0,40	1,48	0,81	3200	4600	
	32212A	110	28	24,0	29,75	25,00	138,7	178,8	0,40	1,48	0,81	3100	4400	
	33212A	110	38	29,0	38,00	27,50	161,0	223,0	0,40	1,48	0,81	3400	4500	
	30312A	130	31	26,0	33,50	26,50	180,0	210,0	0,35	1,74	0,96	3000	4000	
	31312A	130	31	22,0	33,50	40,50	165,9	176,0	0,83	0,73	0,40	2700	3600	
	32312A	130	46	37,0	48,50	32,00	244,0	315,0	0,35	1,74	0,96	3000	4000	

\* Si tratta di velocità limite secondo la definizione SNR (vedi da pagina 85 a 87).

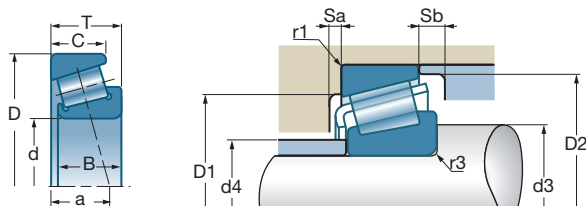
■ Cuscinetti ad una corona di rulli conici (metrici) (seguito)



	D1 min	D1 max	D2 min	d3 min	d4 max	Sa min	Sb min	r1 max	r3 max		ISO
Rif.	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	
32009V	67,0	69,0	72,0	49,0	51,0	4,0	4,5	1,0	1,0	0,320	3CC
33109A	69,0	73,0	77,0	52,0	52,0	4,0	5,5	1,5	1,5	0,551	3CE
30209C	74,0	78,0	80,0	52,0	54,0	3,2	4,5	1,5	1,5	0,463	3DB
32209A	73,0	78,0	80,0	52,0	53,0	3,0	5,5	1,5	1,5	0,641	3DC
32209B	70,0	78,0	82,0	52,0	53,0	4,0	5,5	1,5	1,5	0,576	5DC
33209A	72,0	78,0	81,0	52,0	52,0	5,0	7,0	1,5	1,5	0,803	3DE
30309A	86,0	91,0	92,0	54,0	59,0	3,0	5,0	1,5	2,0	1,030	2FB
31309A	79,0	91,0	95,0	54,0	56,0	4,0	9,0	1,5	2,0	0,951	7FB
32309A	82,0	91,0	93,0	54,0	56,0	4,0	8,0	1,5	2,0	1,400	2FD
32309B	76,0	91,0	94,0	54,0	55,0	5,0	8,0	1,5	2,0	1,400	5FD
32010A	72,0	74,0	77,0	56,0	56,0	4,0	4,5	1,0	1,0	0,360	3CC
33110A	74,0	78,0	82,0	57,0	56,0	4,0	6,0	1,5	1,5	0,574	3CE
30210C	79,0	83,0	85,0	57,0	58,0	3,3	4,5	1,5	1,5	0,527	3DB
32210A	78,0	83,0	85,0	57,0	58,0	3,0	5,5	1,5	1,5	0,667	3DC
33210A	77,0	83,0	87,0	57,0	57,0	5,0	7,5	1,5	1,5	0,875	3DE
30310A	95,0	100,0	102,0	60,0	65,0	4,0	6,0	2,0	2,5	1,290	2FB
31310A	87,0	100,0	104,0	60,0	62,0	4,0	10,0	2,0	2,5	1,240	7FB
32310A	90,0	100,0	102,0	60,0	62,0	5,0	9,0	2,0	2,5	1,860	2FD
32011A	81,0	83,0	86,0	62,0	63,0	4,0	5,5	1,5	1,5	0,592	3CC
33011A	81,0	83,0	86,0	62,0	63,0	5,0	6,0	1,5	1,5	0,667	2CE
33111A	83,0	88,0	91,0	62,0	62,0	5,0	7,0	1,5	1,5	0,863	3CE
30211A	88,0	91,0	94,0	64,0	64,0	4,0	4,5	1,5	2,0	0,732	3DB
32211A	87,0	91,0	95,0	64,0	63,0	4,0	5,5	1,5	2,0	0,915	3DC
33211A	85,0	91,0	96,0	64,0	62,0	6,0	8,0	1,5	2,0	1,160	3DE
30311A	104,0	110,0	111,0	65,0	71,0	4,0	6,5	2,0	2,5	1,610	2FB
31311A	94,0	110,0	113,0	65,0	68,0	4,0	10,5	2,0	2,5	1,580	7FB
32311A	99,0	110,0	111,0	65,0	68,0	5,0	10,5	2,0	2,5	2,350	2FD
32311B	91,0	110,0	112,0	65,0	65,0	5,0	10,5	2,0	2,5	2,320	5FD
32012A	85,0	88,0	91,0	67,0	67,0	4,0	5,5	1,5	1,5	0,632	4CC
33012A	85,0	88,0	90,0	67,0	67,0	5,0	6,0	1,5	1,5	0,715	2CE
33112A	88,0	93,0	96,0	67,0	67,0	5,0	7,0	1,5	1,5	0,917	3CE
30212A	96,0	101,0	103,0	69,0	70,0	4,0	4,5	1,5	2,0	0,967	3EB
32212A	95,0	101,0	104,0	69,0	69,0	4,0	5,5	1,5	2,0	1,170	3EC
33212A	93,0	101,0	105,0	69,0	69,0	6,0	9,0	1,5	2,0	1,540	3EE
30312A	112,0	118,0	120,0	72,0	77,0	5,0	7,5	2,5	3,0	2,030	2FB
31312A	103,0	118,0	123,0	72,0	73,0	5,0	11,5	2,5	3,0	2,000	7FB
32312A	107,0	118,0	120,0	72,0	74,0	6,0	11,5	2,5	2,0	2,924	2FB



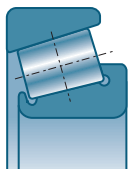
## Cuscinetti a rulli conici (seguito)





d		D	B	C	T	a			e	Y	Yo			
												10 <sup>3</sup> N	10 <sup>3</sup> N	giri/min*
mm	Rif.	mm	mm	mm	mm	mm								
65	32013A	100	23	17,5	23,00	22,50	83,0	128,0	0,46	1,31	0,72	3400	4600	
	33013A	100	27	21,0	27,00	21,50	107,9	156,0	0,35	1,72	0,95	3400	4600	
	33113A	110	34	26,5	34,00	26,00	159,3	211,0	0,39	1,55	0,85	3300	4400	
	30213A	120	23	20,0	24,75	23,80	126,3	152,7	0,40	1,48	0,81	2900	4100	
	32213A	120	31	27,0	32,75	27,30	168,7	221,8	0,40	1,48	0,82	2800	3900	
	33213A	120	41	32,0	41,00	29,50	202,0	280,0	0,39	1,54	0,85	2800	4000	
	30313A	140	33	28,0	36,00	28,50	203,0	238,0	0,35	1,74	0,96	2800	3700	
	31313A	140	33	23,0	36,00	44,00	191,4	204,0	0,83	0,73	0,40	2500	3300	
	32313A	140	48	39,0	51,00	34,50	273,0	350,0	0,35	1,74	0,96	2800	3700	
	32313B	140	48	39,0	51,00	41,50	275,0	375,0	0,55	1,10	0,60	2600	3500	
	70	32014A	110	25	19,0	25,00	24,00	105,0	160,0	0,43	1,38	0,76	3200	4200
		33014A	110	31	25,5	31,00	22,50	127,0	204,0	0,28	2,11	1,16	3200	4200
30214A		125	24	21,0	26,25	25,90	138,3	173,7	0,42	1,43	0,79	2800	4000	
32214A		125	31	27,0	33,25	28,90	173,1	237,1	0,42	1,43	0,79	2700	3800	
33214A		125	41	32,0	41,00	31,00	201,0	282,0	0,41	1,47	0,81	2900	3900	
30314A		150	35	30,0	38,00	30,00	230,0	272,0	0,35	1,74	0,96	2600	3500	
31314A		150	35	25,0	38,00	47,00	213,5	229,0	0,83	0,73	0,40	2300	3000	
32314A		150	51	42,0	54,00	36,50	310,0	405,0	0,35	1,74	0,96	2600	3500	
32314B		150	51	42,0	54,00	44,00	305,0	405,0	0,55	1,10	0,60	2400	3300	
75		32015A	115	25	19,0	25,00	25,50	106,0	167,0	0,46	1,31	0,72	3000	4000
		33015A	115	31	25,5	31,00	23,00	111,0	186,0	0,30	2,01	1,11	3000	4000
		33115A	125	37	29,0	37,00	29,00	188,1	252,0	0,40	1,51	0,83	2800	3700
	30215A	130	25	22,0	27,25	27,00	153,8	175,0	0,44	1,38	0,76	2700	3600	
	32215A	130	31	27,0	33,25	30,00	168,0	224,0	0,44	1,38	0,76	2700	3600	
	33215A	130	41	31,0	41,00	32,00	208,0	298,0	0,43	1,40	0,77	2700	3600	
	30315A	160	37	31,0	40,00	32,00	255,0	305,0	0,35	1,74	0,96	2400	3200	
	32315A	160	55	45,0	58,00	39,00	355,0	470,0	0,35	1,74	0,96	2400	3200	
	32315B	160	55	45,0	58,00	46,50	325,0	415,0	0,55	1,10	0,60	2300	3100	
	80	32016A	125	29	22,0	29,00	27,00	139,0	216,0	0,42	1,42	0,78	2800	3700
		33016A	125	36	29,5	36,00	25,00	173,0	284,0	0,28	2,16	1,19	2800	3700
		33116A	130	37	29,0	37,00	30,50	179,0	276,0	0,42	1,44	0,79	2600	3500
30216A		140	26	22,0	28,25	27,50	160,0	200,0	0,42	1,43	0,79	2500	3400	
32216A		140	33	28,0	35,25	31,00	199,0	265,0	0,42	1,43	0,79	2500	3400	
33216A		140	46	35,0	46,00	35,00	250,0	365,0	0,43	1,41	0,78	2500	3400	
30316A		170	39	33,0	42,50	34,00	291,0	350,0	0,35	1,74	0,96	2300	3000	
85		32017A	130	29	22,0	29,00	28,50	142,0	224,0	0,44	1,36	0,75	2600	3500
	33017A	130	36	29,5	36,00	26,00	176,0	296,0	0,29	2,06	1,13	2600	3500	
	33117A	140	41	32,0	41,00	33,00	211,0	330,0	0,41	1,48	0,81	2400	3300	
	30217A	150	28	24,0	30,50	30,00	202,4	232,0	0,42	1,43	0,79	2400	3200	

\* Si tratta di velocità limite secondo la definizione SNR (vedi da pagina 85 a 87).

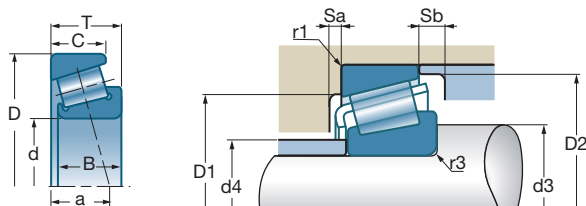
■ Cuscinetti ad una corona di rulli conici (metrici) (seguito)







	D1 min	D1 max	D2 min	d3 min	d4 max	Sa min	Sb min	r1 max	r3 max		ISO
Rif.	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	
32013A	90,0	93,0	97,0	72,0	72,0	4,0	5,5	1,5	1,5	0,675	4CC
33013A	89,0	93,0	96,0	72,0	72,0	5,0	6,0	1,5	1,5	0,757	2CE
33113A	96,0	103,0	106,0	72,0	73,0	6,0	7,5	1,5	1,5	1,300	3DE
30213A	106,0	111,0	113,0	74,0	77,0	4,0	4,5	1,5	2,0	1,160	3EB
32213A	104,0	111,0	115,0	74,0	76,0	4,0	5,5	1,5	2,0	1,550	3EC
33213A	102,0	111,0	115,0	74,0	74,0	6,0	9,0	1,5	2,0	2,020	3EE
30313A	122,0	128,0	130,0	77,0	83,0	5,0	8,0	2,5	3,0	2,520	2GB
31313A	111,0	128,0	132,0	77,0	79,0	5,0	13,0	2,5	3,0	2,500	7GB
32313A	117,0	128,0	130,0	77,0	80,0	6,0	12,0	2,5	3,0	3,400	2GD
32313B	109,0	128,0	77,0	133,0	77,0	6,0	12,0	2,5	3,0	3,460	5GD
32014A	98,0	103,0	105,0	77,0	78,0	5,0	6,0	1,5	1,5	0,867	4CC
33014A	99,0	103,0	105,0	77,0	78,0	5,0	5,5	1,5	1,5	1,080	2CE
30214A	110,0	116,0	118,0	79,0	81,0	4,0	5,0	1,5	2,0	1,300	3EB
32214A	108,0	116,0	119,0	79,0	80,0	4,0	6,0	1,5	2,0	1,730	3EC
33214A	107,0	116,0	120,0	79,0	79,0	7,0	9,0	1,5	2,0	2,120	3EE
30314A	130,0	138,0	140,0	82,0	89,0	5,0	8,0	2,5	3,0	3,050	2GB
31314A	118,0	138,0	141,0	82,0	84,0	5,0	13,0	2,5	3,0	2,950	7GB
32314A	125,0	138,0	140,0	82,0	86,0	6,0	12,0	2,5	3,0	4,400	2GD
32314B	117,0	138,0	143,0	82,0	83,0	7,0	12,0	2,5	3,0	4,250	5GD
32015A	103,0	108,0	110,0	82,0	83,0	5,0	6,0	1,5	1,5	0,858	4CC
33015A	104,0	108,0	110,0	82,0	83,0	6,0	5,5	1,5	1,5	1,150	2CE
33115A	109,0	116,0	120,0	84,0	84,0	6,0	8,0	1,5	2,0	1,810	3DE
30215A	115,0	121,0	124,0	84,0	86,0	4,0	5,0	1,5	2,0	1,390	4DB
32215A	115,0	121,0	124,0	84,0	85,0	4,0	6,0	1,5	2,0	1,760	4DC
33215A	111,0	121,0	125,0	84,0	83,0	7,0	10,0	1,5	2,0	2,230	3EE
30315A	139,0	148,0	149,0	87,0	95,0	5,0	9,0	2,5	3,0	3,700	2GB
32315A	133,0	148,0	149,0	87,0	91,0	7,0	13,0	2,5	3,0	5,370	2GD
32315B	124,0	148,0	151,0	87,0	90,0	7,0	14,0	2,5	3,0	5,200	5GD
32016A	112,0	117,0	120,0	87,0	89,0	6,0	7,0	1,5	1,5	1,300	3CC
33016A	112,0	117,0	119,0	87,0	90,0	6,0	6,5	1,5	1,5	1,630	2CE
33116A	114,0	121,0	126,0	89,0	89,0	6,0	8,0	1,5	2,0	1,930	3DE
30216A	124,0	130,0	132,0	90,0	91,0	4,0	6,0	2,0	2,5	1,690	3EB
32216A	122,0	130,0	134,0	90,0	90,0	5,0	7,0	2,0	2,5	2,150	3EC
33216A	119,0	130,0	135,0	90,0	89,0	7,0	11,0	2,0	2,5	2,940	3EE
30316A	148,0	158,0	159,0	92,0	102,0	5,0	9,5	2,5	3,0	4,360	2GB
32017A	117,0	122,0	125,0	92,0	94,0	6,0	7,0	1,5	1,5	1,410	4CC
33017A	118,0	122,0	125,0	92,0	94,0	6,0	6,5	1,5	1,5	1,700	3CE
33117A	122,0	130,0	135,0	95,0	95,0	7,0	9,0	2,0	2,5	2,440	3DE
30217A	132,0	140,0	141,0	95,0	97,0	5,0	6,5	2,0	2,5	2,160	3EB



## Cuscinetti a rulli conici (seguito)

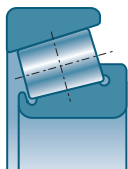




d		D	B	C	T	a			e	Y	Yo		
												10 <sup>3</sup> N	10 <sup>6</sup> N
mm	Rif.	mm	mm	mm	mm	mm							
85	32217A	150	36	30,0	38,50	33,50	224,0	300,0	0,42	1,43	0,79	2400	3200
	33217A	150	49	37,0	49,00	37,50	284,0	420,0	0,42	1,43	0,79	2400	3200
	32317A	180	60	49,0	63,50	43,00	405,0	525,0	0,35	1,74	0,96	2100	2900
90	32018A	140	32	24,0	32,00	30,00	168,0	270,0	0,41	1,42	0,78	2500	3300
	33018A	140	39	32,5	39,00	28,00	215,0	360,0	0,27	2,23	1,23	2500	3300
	33118A	150	45	35,0	45,00	35,50	253,0	400,0	0,40	1,51	0,83	2300	3100
	30218A	160	30	26,0	32,50	32,00	208,0	267,0	0,42	1,43	0,79	2200	3000
	32218A	160	40	34,0	42,50	36,00	262,0	360,0	0,42	1,43	0,79	2200	3000
	32318A	190	64	53,0	67,50	45,50	450,0	595,0	0,35	1,74	0,96	2000	2700
95	32019A	145	32	24,0	32,00	31,50	171,0	280,0	0,44	1,36	0,75	2300	3100
	33019A	145	39	32,5	39,00	28,50	242,3	375,0	0,28	2,16	1,19	2300	3100
	32019A	170	32	27,0	34,50	34,00	226,0	290,0	0,42	1,43	0,79	2100	2800
	32219A	170	43	37,0	45,50	39,00	299,0	415,0	0,42	1,43	0,79	2100	2800
100	32020A	150	32	24,0	32,00	32,50	170,0	281,0	0,46	1,31	0,72	2200	3000
	33020A	150	39	32,5	39,00	29,50	224,0	390,0	0,29	2,09	1,15	2200	3000
	30220A	180	34	29,0	37,00	36,00	258,0	335,0	0,42	1,43	0,79	2000	2700
	32220A	180	46	39,0	49,00	41,50	330,0	465,0	0,42	1,43	0,79	2000	2700
105	32021A	160	35	26,0	35,00	34,50	201,0	335,0	0,44	1,35	0,74	2100	2800
	33021A	160	43	34,0	43,00	31,00	245,0	420,0	0,28	2,12	1,17	2100	2800
	30221A	190	36	30,0	39,00	38,00	287,0	380,0	0,42	1,43	0,79	1900	2500
	32221A	190	50	43,0	53,00	44,00	380,0	540,0	0,42	1,43	0,79	1900	2500
110	32022A	170	38	29,0	38,00	36,50	236,0	390,0	0,43	1,39	0,77	2000	2700
	33022A	170	47	37,0	47,00	33,50	288,0	500,0	0,29	2,09	1,15	2000	2700
	30222A	200	38	32,0	41,00	40,00	325,0	435,0	0,42	1,43	0,79	1800	2400
	32222A	200	53	46,0	56,00	47,00	420,0	605,0	0,42	1,43	0,79	1800	2400
120	T4CB120	170	25	19,5	27,00	34,00	150,0	235,0	0,47	1,27	0,70	1900	2600
	32024A	180	38	29,0	38,00	39,00	245,0	420,0	0,46	1,31	0,72	1800	2500
	33024A	180	48	38,0	48,00	36,00	293,0	520,0	0,31	1,97	1,08	1800	2400
	30224A	215	40	34,0	43,50	44,00	345,0	470,0	0,44	1,38	0,76	1700	2200
	32224A	215	58	50,0	61,50	51,50	460,0	680,0	0,44	1,38	0,76	1700	2200
130	T4CB130	185	27	21,0	29,00	38,00	180,0	280,0	0,47	1,27	0,70	1700	2400
	32026A	200	45	34,0	45,00	43,50	320,0	545,0	0,43	1,38	0,76	1700	2200
	30226A	230	40	34,0	43,75	45,50	375,0	505,0	0,44	1,38	0,76	1500	2000
	32226A	230	64	54,0	67,75	57,00	530,0	815,0	0,44	1,38	0,76	1500	2000

\* Si tratta di velocità limite secondo la definizione SNR (vedi da pagina 85 a 87).

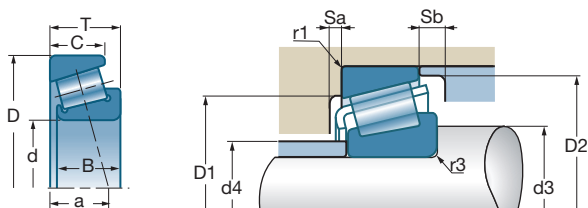







■ Cuscinetti ad una corona di rulli conici (metrici) (seguito)



	D1 min	D1 max	D2 min	d3 min	d4 max	Sa min	Sb min	r1 max	r3 max		ISO
Rif.	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	
32217A	130,0	140,0	142,0	95,0	96,0	5,0	8,5	2,0	2,5	2,750	3EC
33217A	128,0	140,0	144,0	95,0	95,0	7,0	12,0	2,0	2,5	3,620	3EE
32317A	150,0	166,0	167,0	99,0	103,0	8,0	14,5	3,0	4,0	7,450	2GD
32018A	125,0	131,0	134,0	99,0	100,0	6,0	8,0	1,5	2,0	1,691	3CC
33018A	127,0	131,0	135,0	99,0	100,0	7,0	6,5	1,5	2,0	2,200	2CE
33118A	130,0	140,0	144,0	100,0	100,0	7,0	10,0	2,0	2,5	3,220	3DE
30218A	140,0	150,0	150,0	100,0	103,0	5,0	6,5	2,0	2,5	2,700	3FB
32218A	138,0	150,0	152,0	100,0	102,0	5,0	8,5	2,0	2,5	3,500	3FC
32318A	157,0	176,0	177,0	104,0	108,0	8,0	14,5	3,0	4,0	8,780	2GD
32019A	130,0	136,0	140,0	104,0	105,0	6,0	8,0	1,5	2,0	1,784	4CC
33019A	131,0	136,0	139,0	104,0	104,0	7,0	6,5	1,5	2,0	2,300	2CE
30219A	149,0	158,0	159,0	107,0	110,0	5,0	7,5	2,5	3,0	3,160	3FB
32219A	145,0	158,0	161,0	107,0	108,0	5,0	8,5	2,5	3,0	4,200	3FC
32020A	134,0	141,0	144,0	109,0	109,0	6,0	8,0	1,5	2,0	1,880	4CC
33020A	135,0	141,0	143,0	109,0	108,0	7,0	6,5	1,5	2,0	2,310	2CE
30220A	157,0	168,0	168,0	112,0	116,0	5,0	8,0	2,5	3,0	3,700	3FB
32220A	154,0	168,0	171,0	112,0	114,0	5,0	10,0	2,5	3,0	5,200	3FC
32021A	143,0	150,0	154,0	115,0	116,0	6,0	9,0	2,0	2,5	2,500	4DC
33021A	145,0	150,0	153,0	115,0	116,0	7,0	9,0	2,0	2,5	3,060	2DE
30221A	165,0	178,0	177,0	117,0	122,0	6,0	9,0	2,5	3,0	4,500	3FB
32221A	161,0	178,0	180,0	117,0	120,0	5,0	10,0	2,5	3,0	6,250	3FC
32022A	152,0	160,0	163,0	120,0	122,0	7,0	9,0	2,0	2,5	3,100	4DC
33022A	152,0	160,0	161,0	120,0	123,0	7,0	10,0	2,0	2,5	3,800	2DE
30222A	174,0	188,0	187,0	122,0	129,0	6,0	9,0	2,5	3,0	5,230	3FB
32222A	170,0	188,0	190,0	122,0	126,0	6,0	10,0	2,5	3,0	7,352	3FC
T4CB120	154,0	157,0	164,0	132,0	130,0	4,3	7,5	3,0	3,0	1,540	4CB
32024A	161,0	170,0	173,0	130,0	131,0	7,0	9,0	2,0	2,5	3,183	4DC
33024A	160,0	170,0	171,0	130,0	132,0	6,0	10,0	2,0	2,5	4,140	2DE
30224A	187,0	203,0	201,0	132,0	140,0	6,0	9,5	2,5	3,0	6,270	4FB
32224A	181,0	203,0	204,0	132,0	136,0	7,0	11,5	2,5	3,0	9,270	4FD
T4CB130	171,0	171,0	179,0	144,0	141,0	6,2	8,0	3,0	3,0	2,300	4CB
32026A	178,0	190,0	192,0	140,0	144,0	8,0	11,0	2,0	2,5	5,060	4EC
30226A	203,0	216,0	217,0	144,0	152,0	7,0	9,5	3,0	4,0	7,070	4FB
32226A	193,0	216,0	219,0	144,0	146,0	7,0	13,5	3,0	4,0	11,500	4FD

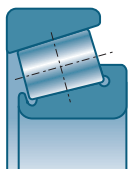
## Cuscinetti a rulli conici (seguito)





d		D	B	C	T	a			e	Y	Yo		
mm	Rif.	mm	mm	mm	mm	mm	10 <sup>3</sup> N	10 <sup>3</sup> N				giri/min*	giri/min*
<b>140</b>	T4CB140	195	27	21,0	29,00	40,00	204,0	340,0	0,50	1,19	0,66	1700	2300
	32028A	210	45	34,0	45,00	46,00	330,0	580,0	0,46	1,31	0,72	1600	2100
	30228A	250	42	36,0	45,75	47,00	440,0	580,0	0,44	1,38	0,76	1400	2000
	32228A	250	68	58,0	71,75	61,00	610,0	920,0	0,44	1,38	0,76	1400	1900
<b>150</b>	32030A	225	48	36,0	48,00	49,00	370,0	640,0	0,46	1,31	0,72	1400	2000
	30230A	270	45	38,0	49,00	51,50	450,0	605,0	0,44	1,38	0,76	1300	1700
	32230A	270	73	60,0	77,00	64,50	700,0	1070,0	0,44	1,38	0,76	1300	1700
<b>160</b>	T4DB160	220	30	23,0	32,00	44,80	237,0	390,0	0,49	1,23	0,68	1500	2000
	32032A	240	51	38,0	51,00	52,50	435,0	790,0	0,46	1,31	0,72	1400	1800
	32232A	290	80	67,0	84,00	70,00	890,0	1420,0	0,44	1,38	0,76	1200	1600
<b>170</b>	32034A	260	57	43,0	57,00	56,00	500,0	895,0	0,44	1,35	0,74	1300	1700
	32234A	310	86	71,0	91,00	75,00	1000,0	1600,0	0,44	1,38	0,76	1100	1500
<b>180</b>	32036A	280	64	48,0	64,00	59,50	713,5	1170,0	0,42	1,42	0,78	1200	1600
	32236A	320	86	71,0	91,00	77,50	1030,0	1690,0	0,45	1,33	0,73	1100	1400
<b>190</b>	32038A	290	64	48,0	64,00	62,50	655,0	1210,0	0,44	1,36	0,75	1100	1500
<b>200</b>	32940A	280	51	39,0	51,00	54,00	525,0	960,0	0,39	1,52	0,84	1100	1600
	32040A	310	70	53,0	70,00	67,00	750,0	1350,0	0,43	1,39	0,77	1000	1400
<b>240</b>	32048A	360	76	57,0	76,00	78,00	1028,8	1760,0	0,46	1,31	0,72	870	1200
<b>280</b>	32056A	420	87	65,0	87,00	90,50	1250,0	2350,0	0,46	1,31	0,72	700	1000
<b>320</b>	32064A	480	100	74,0	100,00	104,00	1520,0	2940,0	0,46	1,31	0,72	630	840

\* Si tratta di velocità limite secondo la definizione SNR (vedi da pagina 85 a 87).

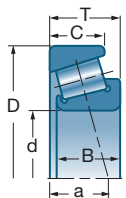
■ Cuscinetti ad una corona di rulli conici (metrici) (seguito)









	D1 min	D1 max	D2 min	d3 min	d4 max	Sa min	Sb min	r1 max	r3 max		ISO
Rif.	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	
T4CB140	180,0	181,0	189,0	152,0	151,0	5,0	8,0	3,0	3,0	2,400	4CB
32028A	187,0	200,0	202,0	150,0	153,0	8,0	11,0	2,0	2,5	5,200	4DC
30228A	219,0	236,0	234,0	154,0	163,0	9,0	9,5	3,0	4,0	9,000	4FB
32228A	210,0	236,0	238,0	154,0	159,0	8,0	13,5	3,0	4,0	14,200	4FD
32030A	200,0	213,0	216,0	162,0	164,0	8,0	12,0	2,5	3,0	6,310	4EC
30230A	234,0	256,0	250,0	164,0	175,0	9,0	11,0	3,0	4,0	11,100	4GB
32230A	226,0	256,0	254,0	164,0	171,0	8,0	17,0	3,0	4,0	18,500	4GD
T4DB160	204,0	206,0	213,0	172,0	172,0	6,0	9,0	3,0	3,0	3,200	4DB
32032A	213,0	228,0	231,0	172,0	175,0	8,0	13,0	2,5	3,0	7,700	4EC
32232A	242,0	276,0	274,0	174,0	183,0	10,0	17,0	3,0	4,0	22,500	4GD
32034A	230,0	248,0	249,0	182,0	187,0	10,0	14,0	2,5	3,0	10,300	4EC
32234A	259,0	292,0	294,0	188,0	196,0	10,0	20,0	4,0	5,0	29,300	4GD
32036A	247,0	268,0	267,0	192,0	199,0	10,0	16,0	2,5	3,0	14,200	3FD
32236A	267,0	302,0	303,0	198,0	204,0	10,0	20,0	4,0	5,0	30,700	4GD
32038A	257,0	278,0	279,0	202,0	209,0	10,0	16,0	2,5	3,0	14,800	4FD
32940A	257,0	268,0	271,0	212,0	216,0	9,0	12,0	2,5	3,0	9,380	
32040A	273,0	298,0	297,0	212,0	221,0	11,0	17,0	2,5	3,0	19,100	4FD
32048A	318,0	346,0	346,0	254,0	261,0	12,0	19,0	3,0	4,0	26,000	4FD
32056A	370,0	402,0	402,0	298,0	305,0	14,0	22,0	4,0	5,0	39,500	4FC
32064A	424,0	462,0	461,0	338,0	350,0	15,0	26,0	4,0	5,0	59,100	4GD



## Cuscinetti a rulli conici (seguito)



### ■ Cuscinetti ad una corona di rulli conici (pollici)

d		D	B	C	T	a					
pollici	Rif.	mm	mm	mm	mm	mm	10°N	10°N	giri/min*	giri/min*	kg
<b>75,987</b>	HM215249/210	131,975	39,000	32,000	39,00	29,00	205,0	285,0	2500	3500	2,190
<b>89,974</b>	HM218248/210	146,975	40,000	32,500	40,00	31,40	251,1	340,0	2400	3200	2,550
<b>88,900</b>	HM518445/410	152,400	39,688	30,163	39,688	33,70	278,8	365,0	2300	3100	2,900
<b>100,000</b>	JHM720249/210	160,000	40,000	32,000	41,00	38,60	260,0	370,0	2200	2900	3,050
<b>50,000</b>	JLM104945N910Z	82,000	27,700	17,000	21,50	22,20	72,0	95,0	4000	5700	0,444
<b>38,000</b>	JL69349/310A	63,000	17,000	13,500	17,00	14,00	41,5	56,0	5300	7500	0,200
<b>80,000</b>	JM515649/610	130,000	34,000	28,500	35,00	30,10	183,6	249,0	2700	3600	1,730
<b>17,462</b>	LM11749/710	39,878	14,605	10,668	13,843	8,80	22,3	22,8	9800	13000	0,085
<b>19,050</b>	LM11949/910	45,237	16,637	12,065	15,494	9,90	29,0	30,3	8400	11000	0,121
<b>21,986</b>	LM12749/710	45,237	16,637	12,065	15,494	10,20	27,8	33,4	8200	10000	0,117
<b>21,986</b>	LM12749/711	45,974	16,637	12,065	15,494	10,20	27,8	33,4	8200	10000	0,122
<b>38,100</b>	LM29749/710	65,088	18,288	13,970	18,034	13,70	43,3	56,8	5200	7300	0,231
<b>34,925</b>	LM48548/510	65,088	18,288	13,970	18,034	13,70	45,7	58,0	5400	7600	0,251
<b>41,275</b>	LM501349/310	73,431	19,812	14,732	19,558	16,30	56,1	69,5	4700	6600	0,328
<b>45,987</b>	LM503349/310	74,976	18,000	14,000	18,00	15,80	53,1	74,8	4400	6200	0,297
<b>45,987</b>	LM503349A/310	74,976	18,000	14,000	18,00	15,80	53,1	74,8	4400	6200	0,297
<b>45,242</b>	LM603049/011	77,788	19,842	15,08	19,842	17,60	57,5	73,5	4400	6100	0,355
<b>31,750</b>	LM67048/010	59,131	16,764	11,811	15,875	12,80	35,3	42,5	5900	8400	0,177
<b>26,988</b>	L44649/610	50,292	14,732	10,668	14,224	10,90	26,7	32,5	6900	9800	0,119
<b>29,000</b>	L45449/410	50,292	14,732	10,668	14,224	10,90	30,0	37,8	7100	9600	0,109
<b>196,850</b>	L540049/010	254,00	27,783	21,433	28,275	42,60	198,0	413,0	1200	1600	3,500
<b>34,988</b>	L68149/110	59,131	16,764	11,938	15,875	13,30	33,3	44,4	5900	7800	0,167

\* Si tratta di velocità limite secondo la definizione SNR (vedi da pagina 85 a 87).