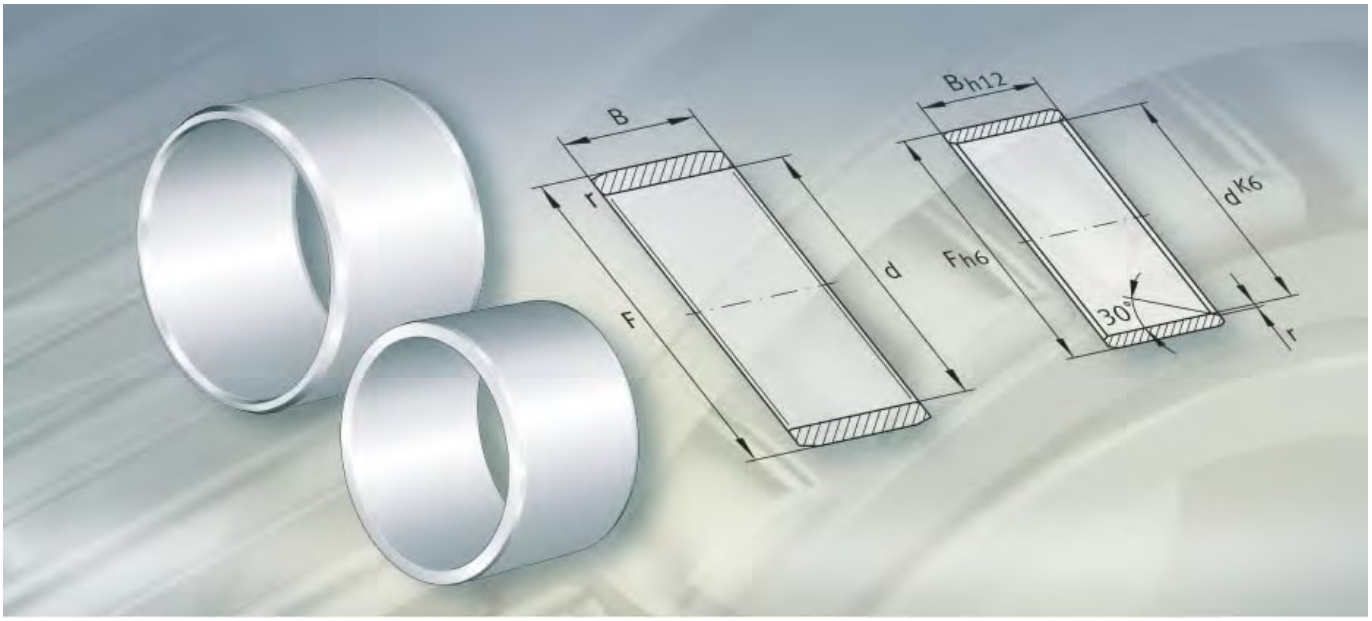


Inner rings

Inner rings

Precision machined raceway

IR

With lubrication hole

IR..-IS1

Ground raceway

LR

Inner rings

Features

Inner rings are made from hardened rolling bearing steel and have precision machined or ground raceways.

They are used where:

- the shaft cannot be used as a raceway for needle roller and cage assemblies, drawn cup needle roller bearings with open ends, drawn cup needle roller bearings with closed end and needle roller bearings
- needle roller bearings must be combined with wider inner rings in order to allow larger axial displacements of the shaft in relation to the housing
- optimum running surfaces are required for seal lips.

Precision machined raceway

Inner rings IR have a precision machined raceway.

Chamfers on the end faces allow easy insertion into the bearing and prevent damage to the seal lips of the bearing.

Inner rings are available with and without a lubrication hole. Rings with a lubrication hole have the suffix IS1.

Ground raceway

Inner rings LR have a ground raceway.
The end faces are turned and the edges are broken.

These rings have larger tolerances than the rings IR. They are thus suitable for applications that allow larger width tolerances and less demanding requirements for axial runout.

Machining allowance on raceway

Inner rings are available as a special design with a machining allowance z on the raceway (suffix VGS). The size of the allowance is dependent on the raceway diameter, see table.

Machining allowance

Raceway diameter F mm		Machining allowance z mm	Preground raceway diameter F_{VGS}
over	incl.		
–	50	0,1	$F_{VGS} = F + z$ (tolerance h7)
50	80	0,15	
80	180	0,2	
180	250	0,25	
250	315	0,3	
315	400	0,35	
400	500	0,4	

Inner rings

Suffixes

Suffixes for available designs: see table.

Available designs

Suffix	Description	Design
C3, C4	Radial internal clearance larger than normal	Special design, available by agreement
C2	Radial internal clearance smaller than normal	
EGS	Surface ground free from spiral marks for rotary shaft seals to DIN 3 760 and DIN 3 761	
IS1	With lubrication hole	
VGS	Machining allowance z on raceway[1)]	

1) See table Machining allowance, page 779.

Design and safety guidelines

Design of bearing arrangements

Axial location

In order to prevent lateral creep of the bearing rings, they must be located by means of physical locking.

The abutment shoulders (shaft, housing) should be sufficiently high and perpendicular to the bearing axis. The transition from the bearing seat to the abutment shoulder must be designed with rounding to DIN 5 418 or an undercut to DIN 509. The minimum values for the chamfer dimensions r in the dimension tables must be observed.

The overlap between the snap rings and the end faces of the bearing rings must be sufficiently large.

Maximum inner ring chamfer dimensions to DIN 620-6 must be taken into consideration.

Accuracy

Normal tolerances

The dimensional and geometrical tolerances of inner rings IR correspond to tolerance class PN to DIN 620.

Radial internal clearance

When combined with INA needle roller bearings, inner rings have an internal clearance CN to DIN 620-4.

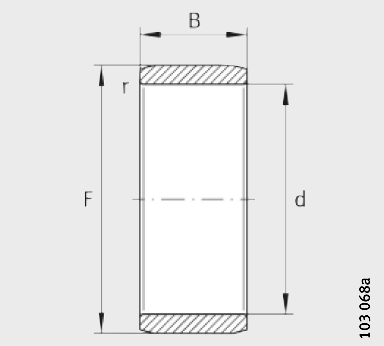
When combined with INA drawn cup needle roller bearings with open ends or closed end, inner rings have an internal clearance C2 to C3 to DIN 620-4, depending on the raceway diameter.

Radial internal clearance

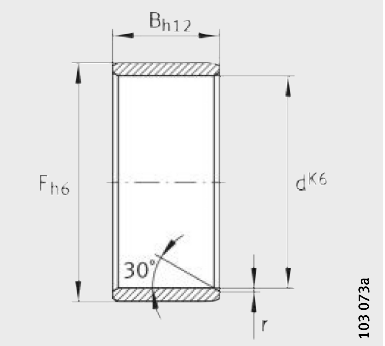
Bore d mm		Radial internal clearance							
		C2 µm		CN µm		C3 µm		C4 µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	24	0	25	20	45	35	60	50	75
24	30	0	25	20	45	35	60	50	75
30	40	5	30	25	50	45	70	60	85
40	50	5	35	30	60	50	80	70	100
50	65	10	40	40	70	60	90	80	110
65	80	10	45	40	75	65	100	90	125
80	100	15	50	50	85	75	110	105	140
100	120	15	55	50	90	85	125	125	165
120	140	15	60	60	105	100	145	145	190
140	160	20	70	70	120	115	165	165	215
160	180	25	75	75	125	120	170	170	220
180	200	35	90	90	145	140	195	195	250
200	225	45	105	105	165	160	220	220	280
225	250	45	110	110	175	170	235	235	300
250	280	55	125	125	195	190	260	260	330
280	315	55	130	130	205	200	275	275	350
315	355	65	145	145	225	225	305	305	385
355	400	100	190	190	280	280	370	370	460
400	450	110	210	210	310	310	410	410	510

Inner rings

Without lubrication hole



IR



LR

Dimension table · Dimensions in mm

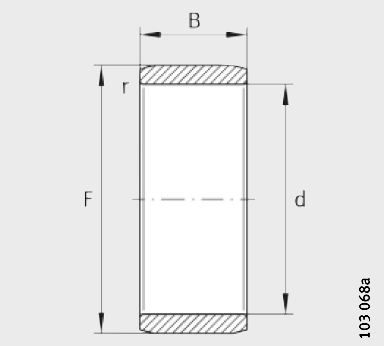
Designation	Mass	Dimensions				Tolerance of raceway F µm	
	m	d	F	B	r		
	≈g				min.	upper	lower
IR5X8X12	2,8	**5**	8	12	0,3	–7	–23
IR5X8X16	3,7	**5**	8	16	0,3	–7	–23
IR6X9X12	3	**6**	9	12	0,3	–7	–23
IR6X9X16	4,3	**6**	9	16	0,3	–7	–23
IR7X10X10,5	3,1	**7**	10	10,5	0,3	–7	–23
LR7X10X10,5	3,1	**7**	10	10,5	0,3	–	–
IR7X10X12	3,6	**7**	10	12	0,3	–7	–23
IR7X10X16	4,9	**7**	10	16	0,3	–7	–23
IR8X12X10,5	5	**8**	12	10,5	0,3	–4	–18
LR8X12X10,5	5	**8**	12	10,5	0,3	–	–
IR8X12X12,5	5,9	**8**	12	12,5	0,3	–4	–18
LR8X12X12,5	5	**8**	12	12,5	0,3	–	–
IR9X12X12	4,4	**9**	12	12	0,3	–4	–18
IR9X12X16	6	**9**	12	16	0,3	–4	–18
IR10X13X12,5	5,2	**10**	13	12,5	0,3	–4	–18
LR10X13X12,5	5,2	**10**	13	12,5	0,3	–	–
IR10X14X13	7,4	**10**	14	13	0,3	–4	–18
IR10X14X16	9,2	**10**	14	16	0,3	–4	–18
IR10X14X20	11,5	**10**	14	20	0,3	–4	–18
IR12X15X12	5,7	**12**	15	12	0,3	–4	–18
IR12X15X12,5	6,1	**12**	15	12,5	0,3	–4	–18
LR12X15X12,5	6,1	**12**	15	12,5	0,3	–	–
IR12X15X16	7,6	**12**	15	16	0,3	–4	–18
IR12X15X16,5	8,1	**12**	15	16,5	0,3	–4	–18
LR12X15X16,5	8,1	**12**	15	16,5	0,3	–	–
IR12X15X22,5	10,9	**12**	15	22,5	0,3	–4	–18
LR12X15X22,5	10,9	**12**	15	22,5	0,3	–	–
IR12X16X13	8,5	**12**	16	13	0,3	–4	–18
IR12X16X16	10,7	**12**	16	16	0,3	–4	–18
IR12X16X20	13,5	**12**	16	20	0,3	–4	–18
IR12X16X22	14,9	**12**	16	22	0,3	–4	–18
IR14X17X17	9,5	**14**	17	17	0,3	–4	–18

Dimension table (continued) · Dimensions in mm

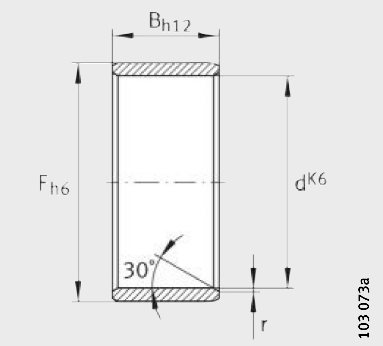
Designation	Mass	Dimensions				Tolerance of raceway F µm	
	m	d	F	B	r		
	≈g				min.	upper	lower
LR15X18X12,5	7,2	**15**	18	12,5	0,3	–	–
IR15X18X16	9,4	**15**	18	16	0,3	–4	–18
IR15X18X16,5	9,8	**15**	18	16,5	0,3	–4	–18
LR15X18X16,5	9,8	**15**	18	16,5	0,3	–	–
IR15X19X16	12,9	**15**	19	16	0,3	0	–12
IR15X19X20	16,3	**15**	19	20	0,3	0	–12
IR15X20X13	13,5	**15**	20	13	0,3	0	–12
IR15X20X23	24,4	**15**	20	23	0,3	0	–12
IR17X20X16	10,6	**17**	20	16	0,3	0	–12
IR17X20X16,5	11,1	**17**	20	16,5	0,3	0	–12
LR17X20X16,5	11,1	**17**	20	16,5	0,3	–	–
IR17X20X20	13,5	**17**	20	20	0,3	0	–12
IR17X20X20,5	13,8	**17**	20	20,5	0,3	0	–12
LR17X20X20,5	13,8	**17**	20	20,5	0,3	–	–
IR17X20X30,5	20,6	**17**	20	30,5	0,3	0	–12
LR17x20X30,5	20,6	**17**	20	30,5	0,3	–	–
IR17X21X16	15	**17**	21	16	0,3	0	–12
IR17X21X20	18	**17**	21	20	0,3	0	–12
IR17X22X13	14,9	**17**	22	13	0,3	0	–12
IR17X22X16	18,4	**17**	22	16	0,3	0	–12
IR17X22X23	27,1	**17**	22	23	0,3	0	–12
IR17X24X20	33,8	**17**	24	20	0,6	0	–12

Inner rings

Without lubrication hole



IR



LR

Dimension table (continued) · Dimensions in mm

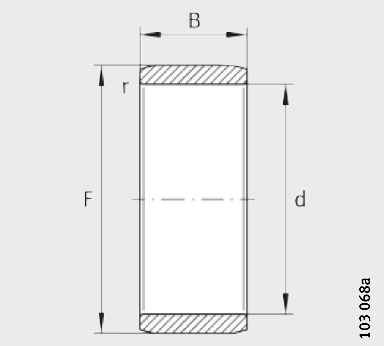
Designation	Mass	Dimensions				Tolerance of raceway F µm	
	m	d	F	B	r		
	≈g				min.	upper	lower
IR20X24X16	15	**20**	24	16	0,3	0	–12
IR20X24X20	21,3	**20**	24	20	0,3	0	–12
LR20X25X12,5	16,3	**20**	25	12,5	0,3	–	–
LR20X25X16,5	21,7	**20**	25	16,5	0,3	–	–
IR20X25X17	25	**20**	25	17	0,3	0	–12
IR20X25X20	27,5	**20**	25	20	0,3	0	–12
IR20X25X20,5	27,4	**20**	25	20,5	0,3	0	–12
LR20X25X20,5	27,4	**20**	25	20,5	0,3	–	–
IR20X25X26,5	38	**20**	25	26,5	0,3	0	–12
LR20X25X26,5	38	**20**	25	26,5	0,3	–	–
IR20X25X30	40,4	**20**	25	30	0,3	0	–12
IR20X25X38,5	52,5	**20**	25	38,5	0,3	0	–12
LR20X25X38,5	52,5	**20**	25	38,5	0,3	–	–
IR20X28X20	45,2	**20**	28	20	0,6	0	–12
IR22X26X16	18,2	**22**	26	16	0,3	0	–12
IR22X26X20	23	**22**	26	20	0,3	0	–12
IR22X28X17	29,5	**22**	28	17	0,3	0	–12
IR22X28X20	35	**22**	28	20	0,3	0	–12
IR22X28X20,5	36	**22**	28	20,5	0,3	0	–12
LR22X28X20,5	36	**22**	28	20,5	0,3	–	–
IR22X28X30	54,4	**22**	28	30	0,3	0	–12

Dimension table (continued) · Dimensions in mm

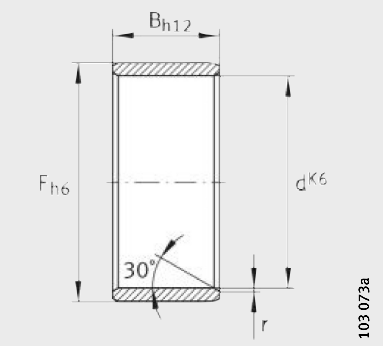
Designation	Mass	Dimensions				Tolerance of raceway F µm	
	m	d	F	B	r		
	≈g				min.	upper	lower
IR25X29X20	25,9	**25**	29	20	0,3	0	–12
IR25X29X30	39,3	**25**	29	30	0,3	0	–12
LR25X30X12,5	20	**25**	30	12,5	0,3	–	–
LR25X30X16,5	26,7	**25**	30	16,5	0,3	–	–
IR25x30X17	27,4	**25**	30	17	0,3	0	–12
IR25X30X20	32,8	**25**	30	20	0,3	0	–12
IR25X30X20,5	33,4	**25**	30	20,5	0,3	0	–12
LR25X30X20,5	33,4	**25**	30	20,5	0,3	–	–
IR25X30X26,5	46	**25**	30	26,5	0,3	0	–12
LR25X30X26,5	46	**25**	30	26,5	0,3	–	–
IR25X30X30	53	**25**	30	30	0,3	0	–12
IR25X30X32	56	**25**	30	32	0,3	0	–12
IR25X30X38,5	64,5	**25**	30	38,5	0,3	0	–12
LR25X30X38,5	64,5	**25**	30	38,5	0,3	–	–
IR25X32X22	52,5	**25**	32	22	0,6	+5	–4
IR28X32X17	24,5	**28**	32	17	0,3	+5	–4
IR28X32X20	28,5	**28**	32	20	0,3	+5	–4
IR28X32X30	43,5	**28**	32	30	0,3	+5	–4
LR30x35X12,5	23,3	**30**	35	12,5	0,3	–	–
IR30X35X13	25	**30**	35	13	0,3	+5	–4
IR30X35X16	34	**30**	35	16	0,3	+5	–4
LR30X35X16,5	31,4	**30**	35	16,5	0,3	–	–
IR30X35X17	36	**30**	35	17	0,3	+5	–4
IR30X35X20	39	**30**	35	20	0,3	+5	–4
IR30X35X20,5	39,7	**30**	35	20,5	0,3	+5	–4
LR30X35X20,5	39,7	**30**	35	20,5	0,3	–	–
IR30X35X26	50,4	**30**	35	26	0,3	+5	–4
IR30X35X30	58,5	**30**	35	30	0,3	+5	–4
IR30X37X18	50	**30**	37	18	0,6	+5	–4
IR30X37X22	61,6	**30**	37	22	0,6	+5	–4
IR32X37X20	42	**32**	37	20	0,3	0	–9
IR32x37X30	62	**32**	37	30	0,3	0	–9
IR32X40X20	68	**32**	40	20	0,6	0	–9
IR32X40X36	124	**32**	40	36	0,6	0	–9
IR33X37X13	21,9	**33**	37	13	0,3	0	–9

Inner rings

Without lubrication hole



IR



LR

Dimension table (continued) · Dimensions in mm

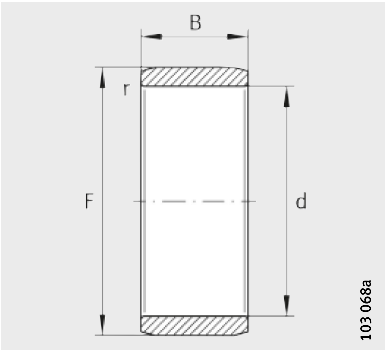
Designation	Mass	Dimensions				Tolerance of raceway F µm	
	m	d	F	B	r		
	≈g				min.	upper	lower
LR35X40X12,5	27,2	**35**	40	12,5	0,3	–	–
LR35X40X16,5	37,4	**35**	40	16,5	0,3	–	–
IR35X40X17	37,8	**35**	40	17	0,3	0	−9
IR35X40X20	44,2	**35**	40	20	0,3	0	−9
IR35X40X20,5	46,1	**35**	40	20,5	0,3	0	−9
LR35X40X20,5	46,1	**35**	40	20,5	0,3	–	–
IR35X40X30	67,1	**35**	40	30	0,3	0	−9
IR35X42X36	117	**35**	42	36	0,6	0	−9
IR35X43X22	82	**35**	43	22	0,6	0	−9
IR38X43X20	48,1	**38**	43	20	0,3	0	−9
IR38X43X30	73,6	**38**	43	30	0,3	0	−9
LR40X45X16,5	41,4	**40**	45	16,5	0,3	–	–
IR40X45X17	42,5	**40**	45	17	0,3	0	−9
IR40X45X20	50,8	**40**	45	20	0,3	0	−9
IR40X45X20,5	51,8	**40**	45	20,5	0,3	0	−9
LR40X45X20,5	51,8	**40**	45	20,5	0,3	–	–
IR40X45X30	84	**40**	45	30	0,3	0	−9
IR40X48X22	91,6	**40**	48	22	0,6	0	−9
IR40X48X40	170	**40**	48	40	0,6	0	−9
IR40X50X22	118	**40**	50	22	1	0	−9
IR42X47X20	52,8	**42**	47	20	0,3	−5	−19
IR42X47X30	81	**42**	47	30	0,3	−5	−19
LR45X50X20,5	58,8	**45**	50	20,5	0,3	–	–
IR45X50X25	70,8	**45**	50	25	0,6	−5	−19
IR45X50X25,5	75,1	**45**	50	25,5	0,3	−5	−19
LR45X50X25,5	75,1	**45**	50	25,5	0,3	–	–
IR45X50X35	101	**45**	50	35	0,6	−5	−19
IR45X52X22	89	**45**	52	22	0,6	0	−11
IR45X52X40	164	**45**	52	40	0,6	0	−11
IR45X55X22	129	**45**	55	22	1	0	−11
LR50X55X20,5	64,1	**50**	55	20,5	0,6	–	–
IR50X55X25	78	**50**	55	25	0,6	0	−11
IR50X55X35	112	**50**	55	35	0,6	0	−11

Dimension table (continued) · Dimensions in mm

Designation	Mass	Dimensions				Tolerance of raceway F µm	
	m	d	F	B	r		
	≈g				min.	upper	lower
IR50X58X22	115	**50**	58	22	0,6	0	−11
IR50X58X40	208	**50**	58	40	0,6	0	−11
IR50X60X25	162	**50**	60	25	1	0	−11
IR50X60X28	181	**50**	60	28	1,1	0	−11
IR55X60X25	85,5	**55**	60	25	0,6	−10	−21
IR55X60X35	121	**55**	60	35	0,6	−10	−21
IR55X63X25	141	**55**	63	25	1	−10	−21
IR55X63X45	256	**55**	63	45	1	−10	−21
IR55X65X28	198	**55**	65	28	1,1	−10	−21
IR60X68X25	152	**60**	68	25	1	−10	−21
IR60X68X35	213	**60**	68	35	0,6	−10	−21
IR60X68X45	276	**60**	68	45	1	−10	−21
IR60X70X25	195	**60**	70	25	1	−10	−21
IR60X70X28	215	**60**	70	28	1,1	−10	−21
IR65X72X25	141	**65**	72	25	1	−10	−21
IR65X72X45	259	**65**	72	45	1	−10	−21
IR65X73X25	164	**65**	73	25	1	−10	−21
IR65X73X35	231	**65**	73	35	1	−10	−21
IR65X75X28	229	**65**	75	28	1,1	−10	−21
IR70X80x25	221	**70**	80	25	1	−10	−26
IR70X80X30	267	**70**	80	30	1	−10	−26
IR70X80X35	312	**70**	80	35	1	−10	−26
IR70X80X54	488	**70**	80	54	1	−10	−26
IR75X85X25	238	**75**	85	25	1	−4	−17
IR75X85X30	287	**75**	85	30	1	−4	−17
IR75X85X35	336	**75**	85	35	1	−4	−17
IR75X85X54	520	**75**	85	54	1	−4	−17
IR80X90X25	253	**80**	90	25	1	−4	−17
IR80X90X30	304	**80**	90	30	1	−4	−17
IR80X90X35	355	**80**	90	35	1	−4	−17
IR80X90X54	556	**80**	90	54	1	−4	−17
IR85X95X26	277	**85**	95	26	1	−14	−27
IR85X95X36	388	**85**	95	36	1	−14	−27
IR85X100X35	582	**85**	100	35	1,1	−14	−27
IR85X100X63	1 054	**85**	100	63	1,1	−14	−27

Inner rings

Without lubrication hole



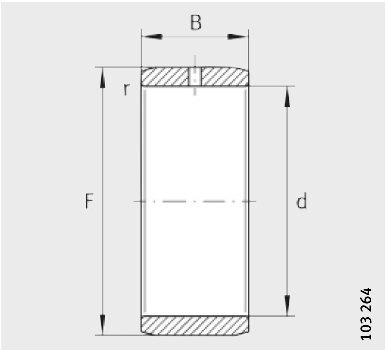
IR

Dimension table (continued) · Dimensions in mm

Designation	Mass	Dimensions				Tolerance of raceway F	
	m	d	F	B	r	µm	
	≈g				min.	upper	lower
IR90X100X26	294	**90**	100	26	1	−14	−27
IR90X100X30	340	**90**	100	30	1	−14	−27
IR90X100X36	406	**90**	100	36	1	−14	−27
IR90X105X35	610	**90**	105	35	1,1	−14	−27
IR90X105X63	1 110	**90**	105	63	1,1	−14	−27
IR95X105X26	313	**95**	105	26	1	−14	−27
IR95X105X36	431	**95**	105	36	1	−14	−27
IR95X110X35	657	**95**	110	35	1,1	−14	−27
IR95X110X63	1 170	**95**	110	63	1,1	−14	−27
IR100X110X30	350	**100**	110	30	1,1	−14	−27
IR100X110X40	505	**100**	110	40	1,1	−14	−27
IR100X115X40	797	**100**	115	40	1,1	−14	−27
IR110X120X30	409	**110**	120	30	1	−14	−32
IR110X125X40	840	**110**	125	40	1,1	−7	−22
IR120X130X30	442	**120**	130	30	1	−7	−22
IR120X135X45	1 044	**120**	135	45	1,1	−7	−22
IR130X145X35	855	**130**	145	35	1,1	−17	−37
IR130X150X50	1 690	**130**	150	50	1,5	−17	−37
IR140X155X35	917	**140**	155	35	1,1	−17	−37
IR140X160X50	1 800	**140**	160	50	1,5	−17	−37
IR150X165X40	1 122	**150**	165	40	1,1	−27	−52
IR160X175X40	1 200	**160**	175	40	1,1	−27	−52
IR170X185X45	1 441	**170**	185	45	1,1	−25	−46
IR180X195X45	1 510	**180**	195	45	1,1	−25	−46
IR190X210X50	2 410	**190**	210	50	1,5	−40	−66
IR200X220X50	2 518	**200**	220	50	1,5	−40	−66
IR220X240X50	2 753	**220**	240	50	1,5	−55	−86
IR240X265X60	4 600	**240**	265	60	2	−55	−86
IR260X285X60	4 980	**260**	285	60	2	−69	−107
IR280X305X69	6 100	**280**	305	69	2	−69	−107
IR300X330X80	9 200	**300**	330	80	2,1	−69	−107
IR320X350X80	9 800	**320**	350	80	2,1	−83	−127
IR340X370X80	10 200	**340**	370	80	2,1	−83	−127
IR360X390X80	10 900	**360**	390	80	2,1	−128	−182
IR380X415X100	16 700	**380**	415	100	2,1	−122	−172

Inner rings

With lubrication hole



IR..-IS1

Dimension table · Dimensions in mm

Designation	Mass	Dimensions				Tolerance of raceway F	
	m	d	F	B	r	µm	
	≈g				min.	upper	lower
IR6X10X10-IS1	3,7	**6**	10	10	0,3	–7	–23
IR8X12X10-IS1	4,8	**8**	12	10	0,3	–4	–18
IR10X14X12-IS1	7,3	**10**	14	12	0,3	–4	–18
IR12X16X12-IS1	7,9	**12**	16	12	0,3	–4	–18
IR15X20X12-IS1	12,2	**15**	20	12	0,3	0	–12
IR20X25X16-IS1	24	**20**	25	16	0,3	0	–12
IR25X30X16-IS1	25,7	**25**	30	16	0,3	0	–12
IR30X38X20-IS1	77	**30**	38	20	0,6	+5	–4
IR35X42X20-IS1	63,9	**35**	42	20	0,6	0	–9
IR40X50X20-IS1	106	**40**	50	20	1	0	–9
IR45X55X20-IS1	117	**45**	55	20	1	0	–11
IR50X55X20-IS1	62,5	**50**	55	20	0,6	0	–11
IR50X60X20-IS1	128	**50**	60	20	1	0	–11