

Nominal Diameter d ①		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
s	max	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	min	0.75	0.75	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
d _c	Nominal Size	8.70	9.80	10.80	11.80	13.00	14.10	15.10	16.20	17.30	18.30	19.50	20.50	21.50	22.50	23.50
	max	9.06	10.16	11.16	12.16	13.36	14.46	15.46	16.56	17.66	18.72	19.92	20.92	21.92	22.92	23.92
	min	8.60	9.70	10.70	11.70	12.90	14.00	15.00	16.10	17.20	18.17	19.37	20.37	21.37	22.37	23.37
a	max	2.40	2.50	3.20	3.30	3.40	3.60	3.70	3.70	3.80	3.90	4.10	4.10	4.20	4.20	4.20
b	≈	1.10	1.30	1.40	1.50	1.70	1.80	1.90	2.00	2.00	2.10	2.20	2.20	2.30	2.40	2.50
d ₁	min	1.00	1.00	1.20	1.20	1.50	1.50	1.70	1.70	1.70	1.70	2.00	2.00	2.00	2.00	2.00
d ₂		3.00	3.70	3.30	4.10	4.90	5.40	6.20	7.20	8.00	8.80	9.40	10.40	11.20	12.20	13.20
per 1000 units ≈ kg		0.14	0.15	0.18	0.31	0.37	0.42	0.52	0.56	0.60	0.65	0.74	0.83	0.90	1.00	1.10

①, Hardness of retaining rings :

hole diameter $d \leq 48\text{mm}$, 470-580 HV or 47-54 HRC

$48\text{mm} < \text{hole diameter } d \leq 200\text{mm}$, 435-530 HV or 44-51 HRC

$200\text{mm} < \text{hole diameter } d \leq 300\text{mm}$, 390-470 HV or 40-47 HRC.

Nominal Diameter d ①		24	25	26	28	30	31	32	34	35	36	37	38	40	42	45
s	max	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.50	1.50	1.50	1.50	1.50	1.75	1.75	1.75
	min	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.44	1.44	1.44	1.44	1.44	1.69	1.69	1.69
d _c	Nominal Size	25.90	26.90	27.90	30.10	32.10	33.40	34.40	36.50	37.80	38.80	39.80	40.80	43.50	45.50	48.50
	max	26.32	27.32	28.32	30.60	32.60	33.90	34.90	37.00	38.30	39.30	40.30	41.30	44.40	46.40	49.40
	min	25.69	26.69	27.69	29.85	31.85	33.15	34.15	36.25	37.55	38.55	39.55	40.55	43.11	45.11	48.11
a	max	4.40	4.50	4.70	4.80	4.80	5.20	5.40	5.40	5.40	5.40	5.50	5.50	5.80	5.90	6.20
b	≈	2.60	2.70	2.80	2.90	3.00	3.20	3.20	3.30	3.40	3.50	3.60	3.70	3.90	4.10	4.30
d ₁	min	2.00	2.00	2.00	2.00	2.00	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
d ₂		14.80	15.50	16.10	17.90	19.90	20.00	20.60	22.60	23.60	24.60	25.40	26.40	27.80	29.60	32.00
per 1000 units ≈ kg		1.42	1.50	1.60	1.80	2.06	2.10	2.21	3.20	3.54	3.70	3.74	3.90	4.70	5.40	6.00

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Nominal Diameter d ①		47	48	50	52	55	56	58	60	62	63	65	68	70	72	75
s	max	1.75	1.75	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.50	2.50	2.50	2.50	2.50
	min	1.69	1.69	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	2.43	2.43	2.43	2.43	2.43
d _c	Nominal Size	50.50	51.50	54.20	56.20	59.20	60.20	62.20	64.20	66.20	67.20	69.20	72.50	74.50	76.50	79.50
	max	51.60	52.60	55.30	57.30	60.30	61.30	63.30	65.30	67.30	68.30	70.30	73.60	75.60	77.60	80.60
	min	50.04	51.04	53.74	55.74	58.74	59.74	61.74	63.74	65.74	66.74	68.74	72.04	74.04	76.04	79.04
a	max	6.40	6.40	6.50	6.70	6.80	6.80	6.90	7.30	7.30	7.30	7.60	7.80	7.80	7.80	7.80
b	=	4.40	4.50	4.60	4.70	5.00	5.10	5.20	5.40	5.50	5.60	5.80	6.10	6.20	6.40	6.60
d ₁	min	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	3.00	3.00	3.00	3.00	3.00
d ₂		33.50	34.50	36.30	37.90	40.70	41.70	43.50	44.70	46.70	47.70	49.00	51.60	53.60	55.60	58.60
per 1000 units ≈ kg		6.10	6.70	7.30	8.20	8.30	8.70	10.50	11.10	11.20	12.40	14.30	16.00	16.50	18.10	18.80

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$200\text{mm} < \text{hole diameter } d \leq 300\text{mm}$, 390-470 HV or 40-47 HRC.

Nominal Diameter d ①		78	80	82	85	88	90	92	95	98	100	102	105	108	110	112
s	max	2.50	2.50	2.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	4.00	4.00
	min	2.43	2.43	2.43	2.92	2.92	2.92	2.92	2.92	2.92	2.92	3.90	3.90	3.90	3.90	3.90
d _c	Nominal Size	82.50	85.50	87.50	90.50	93.50	95.50	97.50	100.50	103.50	105.50	108.00	112.00	115.00	117.00	119.00
	max	83.80	86.80	88.80	91.80	94.80	96.80	98.80	101.80	104.80	106.80	109.30	113.30	116.30	118.30	120.30
	min	81.96	84.96	86.96	89.96	92.96	94.96	96.96	99.96	102.96	104.96	107.46	111.46	114.46	116.46	118.46
a	max	8.50	8.50	8.50	8.60	8.60	8.60	8.70	8.80	9.00	9.20	9.50	9.50	9.50	10.40	10.50
b	≈	6.80	7.00	7.00	7.20	7.40	7.60	7.80	8.10	8.30	8.40	8.50	8.70	8.90	9.00	9.10
d ₁	min	3.00	3.00	3.00	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
d ₂		60.10	62.10	64.10	66.90	69.90	71.90	73.70	76.50	79.00	80.60	82.00	85.00	88.00	88.20	90.00
per 1000 units ≈ kg		20.40	22.00	24.00	25.30	28.00	31.00	32.00	35.00	37.00	38.00	55.00	56.00	60.00	64.50	72.00

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$48\text{mm} < \text{hole diameter } d \leq 200\text{mm}$, 435-530 HV or 44-51 HRC

$200\text{mm} < \text{hole diameter } d \leq 300\text{mm}$, 390-470 HV or 40-47 HRC.

Nominal Diameter d ①		115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
s	max	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	min	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
d _c	Nominal Size	122.00	127.00	132.00	137.00	142.00	147.00	152.00	158.00	164.00	169.00	174.50	179.50	184.50	189.50	194.50
	max	123.50	128.50	133.50	138.50	143.50	148.50	153.50	159.50	165.50	170.50	176.00	181.00	186.20	191.20	196.20
	min	121.37	126.37	131.37	136.37	141.37	146.37	151.37	157.37	163.37	168.37	173.87	178.87	183.78	188.78	193.78
a	max	10.50	11.00	11.00	11.00	11.20	11.20	11.40	12.00	12.00	13.00	13.00	13.50	13.50	14.20	14.20
b	≈	9.30	9.70	10.00	10.20	10.50	10.70	10.90	11.20	11.40	11.60	11.80	12.20	12.70	13.20	13.70
d ₁	min	3.50	3.50	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
d ₂		93.00	96.90	101.90	106.90	111.50	116.50	121.00	124.80	129.80	132.70	137.70	141.60	146.60	150.20	155.20
per 1000 units ≈ kg		74.50	77.00	79.00	82.00	84.00	87.50	93.00	105.00	107.00	110.00	125.00	140.00	150.00	165.00	170.00

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$200\text{mm} < \text{hole diameter } d \leq 300\text{mm}$, 390-470 HV or 40-47 HRC.

Nominal Diameter d ①		190	195	200	210	220	230	240	250	260	270	280	290	300
s	max	4.00	4.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
	min	3.90	3.90	3.90	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88
d _c	Nominal Size	199.50	204.50	209.50	222.00	232.00	242.00	252.00	262.00	275.00	285.00	295.00	305.00	315.00
	max	201.20	206.20	211.20	223.70	233.70	243.70	254.00	264.00	277.00	287.00	297.00	307.00	317.00
	min	198.78	203.78	208.78	221.28	231.28	241.28	251.19	261.19	274.19	284.19	294.19	304.19	314.19
a	max	14.20	14.20	14.20	14.20	14.20	14.20	14.20	14.20	16.20	16.20	16.20	16.20	16.20
b	≈	13.80	13.80	14.00	14.00	14.00	14.00	14.00	14.00	16.00	16.00	16.00	16.00	16.00
d ₁	min	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	5.00	5.00	5.00	5.00	5.00
d ₂		160.20	165.20	170.20	180.20	190.20	200.20	210.20	220.20	226.00	236.00	246.00	256.00	266.00
per 1000 units ≈ kg		175.00	183.00	195.00	270.00	315.00	330.00	345.00	360.00	375.00	388.00	400.00	415.00	435.00

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$200\text{mm} < \text{hole diameter } d \leq 300\text{mm}$, 390-470 HV or 40-47 HRC.