

PRESS DIE COMPONENTS BY DAYTON PROGRESS

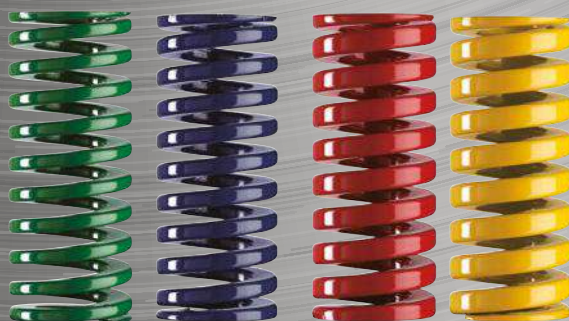


COIL SPRINGS

ISO 10243:2019



a MISUMI Group Company



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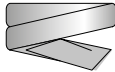
1314 Meridian St.
Portland, IN 47371 **USA**

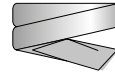
DAYTON PROGRESS Mexico, S. de R.L. de C.V.

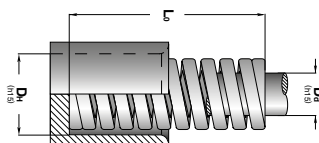
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a MISUMI Group Company

			ISWLG Extra Light	ISWG Light	ISWB Medium	ISWR Strong	ISWY Extra Strong	ISWS Ultra Strong
			Special Springs Standard	ISO 10243:2019	ISO 10243:2019	ISO 10243:2019	ISO 10243:2019	Special Springs Standard
Rectangular Wire			Max. Defl. 50% L0	Max. Defl. 40% L0	Max. Defl. 37.5% L0	Max. Defl. 30% L0	Max. Defl. 25% L0	Max. Defl. 15% L0
DH	Dd	L0	R ± 10%	R ± 10%	R ± 10%	R ± 10%	R ± 10%	R ± 10%
mm	mm	mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm
10	5	25	8.5	11.0	16.0	23.0	36.8	167.0
		32	6.5	8.5	13.0	17.5	27.9	130.0
		38	5.5	6.8	11.9	14.8	23.7	105.0
		44	4.8	6.0	10.3	13.0	19.2	86.0
		51	4.2	5.0	8.9	11.2	16.5	79.0
		64	3.3	4.1	7.5	9.2	13.2	62.0
		76	2.7	3.6	6.2	7.5	10.9	51.0
		115	-	-	-	4.8	-	-
		305	0.7	0.9	1.6	1.9	2.6	11.5
		25	16.0	21.0	30.0	42.1	58.5	288.0
12.5	6.3	32	12.2	16.4	24.8	33.2	43.9	216.0
		38	10.3	13.6	21.4	29.3	36.0	176.0
		44	8.7	12.1	18.0	24.6	30.3	149.0
		51	7.5	10.3	15.5	19.6	26.2	128.0
		64	5.8	7.6	12.1	15.0	21.2	100.0
		76	4.7	6.3	10.2	13.2	17.1	84.0
		89	4.1	5.4	8.4	11.4	14.5	71.0
		102	3.6	4.1	6.3	8.4	12.7	61.0
		305	1.3	1.6	2.4	3.2	4.3	22.0
		25	20.2	29.0	49.4	75.7	118.0	-
16	8	32	16.0	22.9	38.5	60.2	89.0	449.0
		38	12.3	19.3	33.9	50.8	72.1	363.0
		44	10.6	17.1	30.0	42.8	60.9	309.0
		51	8.9	14.0	26.4	37.1	52.3	256.0
		64	7.0	10.7	20.5	30.3	41.2	203.0
		76	5.8	9.0	17.8	25.7	34.1	166.0
		89	4.8	7.3	15.2	21.7	29.5	139.0
		102	4.1	6.8	13.5	18.9	25.6	114.0
		115	3.9	6.6	11.8	15.7	22.4	105.0
		127	-	-	-	-	-	94.0
20	10	152	-	-	-	-	-	78.0
		305	1.5	2.3	4.3	6.3	8.4	38.8
		25	29.4	55.8	98.0	216.0	293.0	-
		32	22.6	45.0	72.6	168.0	224.0	-
		38	18.6	36.0	56.0	129.0	177.0	-
		44	15.7	30.0	47.5	112.0	149.0	452.0
		51	13.7	24.5	41.7	94.0	128.0	378.0
		64	11.3	19.2	32.3	72.1	99.0	301.0
		76	9.8	16.0	25.1	59.7	81.7	247.0
		89	8.3	14.0	22.0	50.5	69.5	208.0
25	12.5	102	7.4	12.0	19.8	44.2	60.6	188.0
		115	6.4	10.9	18.1	38.4	53.0	159.0
		127	5.9	9.5	16.6	34.1	47.5	146.0
		139	5.4	8.4	15.1	31.0	43.0	-
		152	4.9	7.5	13.2	28.2	39.0	120.0
		178	-	7.1	-	-	-	-
		305	2.5	4.0	6.1	14.0	20.0	60.0
		25	53.9	105.0	157.0	375.0	459.0	-
		32	42.2	80.3	118.0	297.0	374.0	-
		38	35.8	62.0	93.0	219.0	300.0	-
25	12.5	44	31.4	52.9	80.8	187.0	244.0	1158.0
		51	27.0	44.0	68.6	156.0	208.0	933.0
		64	21.6	35.2	53.0	123.0	161.0	644.0
		76	18.1	28.0	43.2	99.0	131.0	556.0
		89	15.2	24.0	38.2	84.0	111.0	462.0
		102	13.2	21.1	33.0	73.0	96.3	390.0
		115	11.8	18.7	28.0	65.0	85.7	360.0
		127	10.6	16.7	25.9	57.7	76.3	326.0

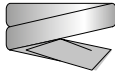
			ISWT Super Strong	ISWW Hyper Strong
			Special Springs Standard	Special Springs Standard
Rectangular Wire				
DH	Dd	L0	R ± 10%	R ± 10%
mm	mm	mm	N/mm	N/mm
10	5	20	580.0	-
		30	360.0	-
		40	260.0	-
		50	200.0	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
12.5	6.3	20	970.0	-
		30	590.0	-
		40	400.0	-
		50	320.0	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
16	8	20	1650.0	1818.0
		35	920.0	1000.0
		50	580.0	615.0
		75	410.0	400.0
		100	280.0	286.0
		-	-	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
16	6.3	25	2270.0	2400.0
		40	1160.0	1333.0
		50	830.0	1000.0
		75	500.0	600.0
		100	380.0	429.0
		-	-	-
		-	-	-
		-	-	-
		-	-	-
		-	-	-
19	10	25	4550.0	4800.0
		50	2000.0	2400.0
		60	1500.0	-
		75	1250.0	1500.0
		100	900.0	1000.0
		125	710.0	857.0
		-	-	-
		-	-	-
		-	-	-
		-	-	-
19	8	30	4550.0	4800.0
		50	2000.0	2400.0
		60	1500.0	-
		75	1250.0	1500.0
		100	900.0	1000.0
		125	710.0	857.0
		-	-	-
		-	-	-
		-	-	-
		-	-	-



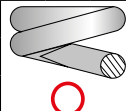
D _H	Hole diameter
D _d	Rod diameter
L ₀	Spring free length

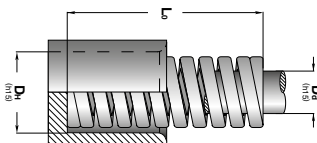
Max. Defl.	Maximum total working deflection
R	Spring rate (N) - load required for 1mm deflection

Overview

			ISWLG Extra Light	ISWG Light	ISWB Medium	ISWR Strong	ISWY Extra Strong	ISWS Ultra Strong
			Special Springs Standard	ISO 10243:2019	ISO 10243:2019	ISO 10243:2019	ISO 10243:2019	Special Springs Standard
Rectangular Wire			Max. Defl. 50% L0	Max. Defl. 40% L0	Max. Defl. 37.5% L0	Max. Defl. 30% L0	Max. Defl. 25% L0	Max. Defl. 15% L0
DH	Dd	L0	R ± 10%	R ± 10%	R ± 10%	R ± 10%	R ± 10%	R ± 10%
mm	mm	mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm
25	12.5	139	9.6	15.3	23.2	52.7	66.0	-
		152	8.8	14.0	20.8	47.8	63.5	255.0
		178	7.6	12.5	17.8	41.0	53.9	230.0
		203	6.7	10.4	15.8	35.8	47.0	202.0
		305	4.4	7.0	10.2	22.9	30.9	136.0
32	16	38	43.1	98.0	185.0	388.0	480.0	-
		44	37.3	79.5	158.0	324.0	390.0	1300.0
		51	32.4	67.0	134.0	272.0	336.0	1150.0
		64	25.5	53.0	99.0	212.0	269.0	1077.0
		76	21.6	44.0	80.5	172.0	219.0	874.0
		89	18.1	37.2	69.1	141.0	180.0	721.0
		102	15.7	32.0	58.8	122.0	155.0	620.0
		115	14.2	29.0	51.5	107.0	140.0	560.0
		127	12.7	25.0	44.8	93.0	124.0	496.0
		139	11.6	23.0	42.3	86.0	112.0	-
		152	10.6	21.5	37.8	78.0	102.0	408.0
		178	9.0	18.2	32.5	67.2	88.2	353.0
		203	7.8	15.8	28.9	59.1	76.0	304.0
		254	6.4	12.5	22.2	46.4	60.8	243.0
		305	5.3	10.3	18.3	38.0	49.0	196.0
40	20	51	48.1	92.0	182.0	350.0	628.0	-
		64	39.2	73.0	140.0	269.0	487.0	1128.0
		76	33.3	63.0	108.0	219.0	379.0	1017.0
		89	28.4	51.0	90.7	190.0	321.0	880.0
		102	24.5	45.0	81.0	163.0	281.0	762.0
		115	22.1	39.6	71.8	142.0	245.0	679.0
		127	19.6	36.0	62.7	128.0	221.0	622.0
		139	17.7	32.0	57.5	115.0	185.0	-
		152	16.2	28.0	51.6	105.0	168.0	509.0
		178	13.7	25.2	44.1	89.0	150.0	429.0
		203	12.3	21.8	36.7	77.0	132.0	374.0
		254	9.8	17.0	30.1	61.0	107.0	296.0
		305	8.3	14.8	24.6	51.0	87.8	246.0
		64	86.3	156.0	209.0	413.0	709.0	1980.0
		76	70.6	125.0	168.0	339.0	572.0	1811.0
50	25	89	59.8	109.0	140.0	288.0	475.0	1410.0
		102	52.0	94.0	119.0	245.0	405.0	1215.0
		115	46.1	81.0	106.0	215.0	352.0	1076.0
		127	42.2	71.0	97.0	192.0	316.0	968.0
		139	38.2	66.5	87.0	168.0	289.0	-
		152	34.3	60.0	80.0	154.0	255.0	806.0
		178	29.4	52.0	69.5	134.0	215.0	698.0
		203	25.5	44.0	59.8	117.0	187.0	612.0
		229	-	-	50.9	-	-	-
		254	20.6	35.0	46.0	89.0	153.0	472.0
		305	17.2	28.5	38.6	73.0	127.0	388.0
		76	57.8	189.0	320.0	618.0	952.0	1900.0
		89	51.4	158.0	260.0	515.0	819.0	1517.0
		102	44.4	131.0	221.0	438.0	700.0	1295.0
		115	38.0	116.0	187.0	370.0	620.0	1070.0
63	38	127	33.2	103.0	168.0	333.0	565.0	979.0
		152	27.4	84.3	136.0	269.0	458.0	775.0
		178	24.0	71.5	114.0	226.0	384.0	630.0
		203	21.0	61.7	100.0	198.0	337.0	546.0
		229	-	-	89.2	-	-	-
		254	16.4	47.0	78.4	155.0	263.0	423.0
		305	13.6	38.2	64.7	128.0	218.0	349.0

			ISWT		ISWW	
			Super Strong		Hyper Strong	
			Special Springs Standard		Special Springs Standard	
Rectangular Wire						
DH	Dd	L0	R ± 10%		R ± 10%	
mm	mm	mm	N/mm		N/mm	
ISWT 25	ISWT 12.5	-	-		-	
		-	-		-	
		-	-		-	
ISWW 25	ISWW 10	-	-		-	
		-	-		-	
		-	-		-	
ISWT 32	ISWT 16	35	5360.0		6667.0	
		50	3000.0		3636.0	
		75	1670.0		2222.0	
		100	1200.0		1538.0	
		125	940.0		1250.0	
		150	810.0		1053.0	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
ISWW 32	ISWW 12.5	-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
ISWT 38	ISWT 20	40	5710.0		7143.0	
		50	4000.0		5000.0	
		75	2220.0		2778.0	
		100	1540.0		1923.0	
		150	1050.0		1316.0	
		200	740.0		926.0	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
ISWW 38	ISWW 16	-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
ISWT 50	ISWT 25	60	4605.0		-	
		75	3932.0		-	
		100	2650.0		-	
		125	2000.0		-	
		150	1605.0		-	
		200	1167.0		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
ISWW 50	ISWW 12.5	-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
ISWT 63	ISWT 38	-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
ISWW 63	ISWW 15	-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	
		-	-		-	

			ISWTG	ISWTB	ISWTR	ISWTY	ISWL
			Light	Medium	Strong	Extra Strong	
			Special Springs Standard	Special Springs Standard	Special Springs Standard	Special Springs Standard	Special Springs Standard
Round Wire			Max. Defl. 40% L ₀	Max. Defl. 37.5% L ₀	Max. Defl. 30% L ₀	Max. Defl. 25% L ₀	Max. Defl. 32% L ₀
DH	Dd	L ₀	R ± 10%	R ± 10%	R ± 10%	R ± 10%	R ± 10%
mm	mm	mm	N/mm	N/mm	N/mm	N/mm	N/mm
6.3	4.4	16	1.6	4.7	12.7	33.0	Not painted springs with anti-rust lubricant. For more information see p. 30
		25	1.0	2.9	7.7	19.8	
		38	0.6	1.8	4.9	11.9	
		51	0.5	1.5	3.7	9.5	
8.3	5.9	16	2.5	5.4	12.5	30.9	
		25	1.6	3.6	6.9	23.0	
		38	1.1	2.4	5.1	13.2	
		51	0.8	1.9	4.0	9.3	
10	5	25	4.4	12.3	20.7	-	
		32	3.4	9.5	16.1	-	
		38	2.8	7.8	13.0	-	
		44	2.4	6.5	10.9	-	
		51	2.1	5.6	9.6	-	
		64	1.6	4.5	7.7	-	
		76	1.3	3.7	6.3	-	
		305	0.3	0.9	1.5	-	
12.5	6.3	25	8.5	21.7	37.5	-	
		32	6.5	16.8	28.9	-	
		38	5.3	13.8	23.5	-	
		44	4.4	11.6	19.6	-	
		51	3.8	10.0	17.3	-	
		64	2.9	7.8	13.5	-	
		76	2.5	6.4	11.2	-	
		89	2.1	5.6	9.5	-	
16	8	305	0.6	1.5	2.7	-	
		25	17.9	31.9	81.6	-	
		32	13.5	24.0	61.3	-	
		38	10.5	19.4	49.9	-	
		44	8.8	16.1	40.8	-	
		51	7.6	13.8	35.6	-	
		64	5.9	10.7	27.8	-	
		76	4.8	8.8	22.8	-	
		89	4.0	7.5	19.6	-	
		102	3.5	6.5	17.0	-	
		305	1.1	2.1	5.4	-	



D _H	Hole diameter
D _d	Rod diameter
L ₀	Spring free length

Max. Defl.	Maximum total working deflection
R	Spring rate (N) - load required for 1mm deflection

How to select springs

1

For a quick selection, you are request to define estimated life, hole diameter, total force and total working deflection including at least 5% pre-load.

2

Find the estimated life and the hole diameter DH as stated in chart at page 7.

Estimated Life (cycles)	DH - Hole diameter (mm)						
	10	12.5	16	20	25	32	40
+3.000.000 cycles	Load (N)						
	-	-	-	220	410	485	745
	70	130	185	315	560	830	1130
	110	190	330	525	845	1520	2030
	125	200	380	935	1560	2530	3270
	145	230	455	1090	1760	2800	4770
				4090	6350	7700	

3

Check the available forces as stated in chart at page 7.

Estimated Life (cycles)	DH - Hole diameter (mm)						
	10	12.5	16	20	25	32	40
+3.000.000 cycles	Load (N)						
	60	110	140	220	410	485	745
	70	130	185	315	560	830	1130
	110	190	330	525	845	1520	2030
	125	200	380	935	1560	2530	3270
	145	230	455	1090	1760	2800	4770
	390	660	1285	1880	4090	6350	7700

4

Select the requested force and the corresponding Series as stated in chart at page 7.

	DH - Hole diameter (mm)						Series
	10	12.5	16	20	25	32	
	Load (N)						
	60	110	140	220	410	485	745
	70	130	185	315	560	830	1130
	110	190	330	525	845	1520	2030
	125	200	380	935	1560	2530	3270
	145	230	455	1090	1760	2800	4770
	390	660	1285	1880	4090	6350	7700
							ISWLG
							ISWG
							ISWR
							ISWS

5

Choose the requested deflection in the selected Series.

see Series pages

Catalog-No	D _H Hole	D _C Rod	L ₀ Free Length	R Spring Rate	Deflection					do not use			
					4 POINT DEFLECTION								
					A 20% L ₀	B 25% L ₀	C 27.5% L ₀	D 30% L ₀	E				
in g, h													
ISWR16-25	16	8	25	75.7 (7.7)	5	379 (38.62)	6.3	477 (48.61)	6.9	520 (52.99)	7.5	568 (57.88)	8.4
ISWR16-32	16	8	32	62.8 (6.4)	6.4	338 (34.44)	8	422 (43)	8.8	465 (47.38)	9.6	507 (51.66)	10.6
ISWR16-38	16	8	38	48.5 (4.9)	7.6	269 (27.0)	9.5	401 (40.98)	10.5	437 (44.66)	11.4	468 (47.8)	12.6
ISWR16-44	16	8	44	42.8 (4.4)	8.8	237 (23.8)	11	371 (37.99)	12.1	408 (41.78)	13.2	438 (44.8)	14.6
ISWR16-51	16	8	51	37.1 (3.8)	10.2	210 (21.1)	12.8	345 (35.4)	14	375 (38.4)	15.3	408 (41.8)	16.9
ISWR16-58	16	8	58	30.3 (3.1)	12.4	186 (18.6)	15.6	294 (30.4)	17.6	330 (34.1)	19.2	360 (37.1)	21.4
ISWR16-70	16	8	70	25.7 (2.6)	15.2	151 (15.1)	19.8	244 (25.4)	22.9	275 (28.5)	25.8	306 (31.6)	29.2
ISWR16-80	16	8	80	21.7 (2.2)	17.8	128 (12.8)	23.8	204 (21.4)	27.5	235 (24.5)	30.6	266 (27.6)	34.5
ISWR16-102	16	8	102	19.3 (1.9)	20.4	104 (10.4)	27.5	182 (18.2)	31.6	213 (21.3)	35.8	244 (25.4)	40.6
ISWR16-115	16	8	115	15.7 (1.6)	23	81 (8.1)	31.6	145 (14.5)	36.9	176 (17.6)	41.9	205 (20.5)	47.1
ISWR16-305	16	8	305	7.1 (0.7)	61	430 (44.12)	76.3	542 (55.23)	83.9	586 (59.73)	91.5	630 (64.24)	104

6

Once chosen the deflection, select the spring's code.

see Series pages

Catalog-No	D _H Hole	D _C Rod	L ₀ Free Length	R Spring Rate	Deflection				do not use	
					A 20% L ₀	B 25% L ₀	C 27.5% L ₀	D 30% L ₀		
N/mm										
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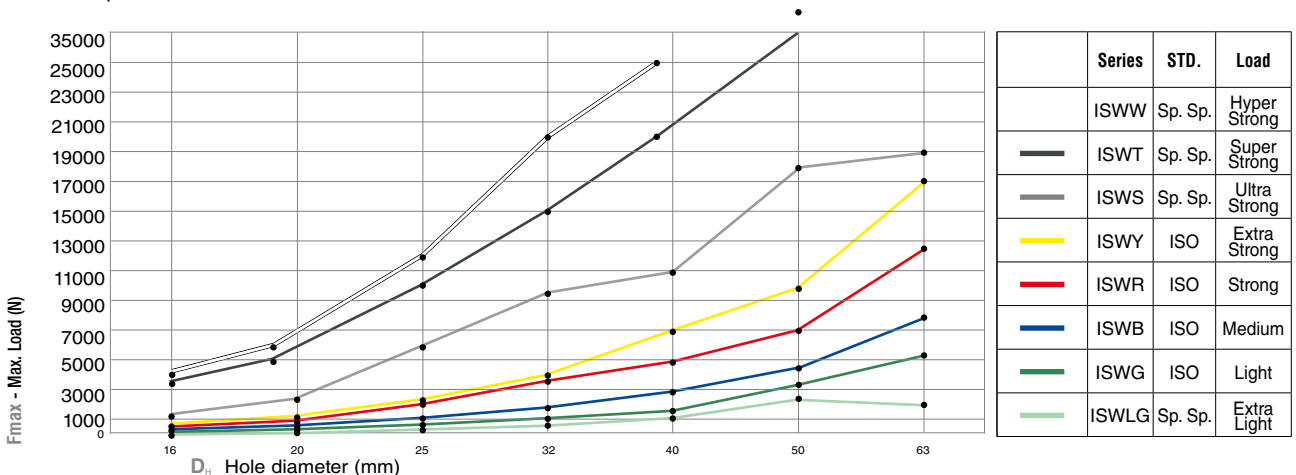
Rectangular Wire

Series	DH - Hole diameter (mm)									Estimated Life (cycles)
	10	12.5	16	20	25	32	40	50	63	
	Load (N)									
ISWLG	60	110	140	220	410	485	745	1560	1290	+ 3.000.000
	80	150	185	290	540	650	1000	2120	1700	~ 1.500.000
	90	170	205	330	610	730	1120	2380	1900	300 - 500.000
	105	190	230	365	680	810	1250	2650	2150	100 - 200.000
ISWG	70	130	185	315	560	830	1130	2320	3250	+ 3.000.000
	80	150	220	380	675	990	1360	2780	3900	~ 1.500.000
	95	180	260	440	780	1160	1590	3240	4540	300 - 500.000
	110	200	300	500	890	1320	1810	3710	5190	100 - 200.000
ISWB	110	190	330	525	845	1520	2030	3050	5310	+ 3.000.000
	130	230	400	625	1010	1830	2430	3660	6370	~ 1.500.000
	150	255	450	705	1140	2060	2730	4120	7170	300 - 500.000
	170	280	500	780	1260	2280	3040	4580	7960	100 - 200.000
ISWR	125	200	380	935	1560	2530	3270	4860	8440	+ 3.000.000
	155	250	480	1170	1950	3170	4090	6070	10560	~ 1.500.000
	170	275	525	1290	2140	3480	4490	6670	11610	300 - 500.000
	185	300	570	1400	2340	3800	4900	7280	12660	100 - 200.000
ISWY	145	230	455	1090	1760	2800	4770	6820	11890	+ 3.000.000
	170	270	535	1280	2070	3290	5610	8030	13990	~ 1.500.000
	195	305	605	1440	2320	3700	6300	9020	15740	300 - 500.000
	215	340	670	1605	2585	4120	7010	10040	17330	100 - 200.000
ISWS	390	660	1285	1880	4090	6350	7700	12280	12130	+ 3.000.000
	470	790	1540	2260	4910	7620	9240	14730	14560	~ 1.500.000
	530	890	1730	2540	5530	8570	10400	16580	16380	300 - 500.000
	590	990	1925	2825	6140	9520	11550	18420	128200	100 - 200.000

Round Wire

Series	DH - Hole diameter (mm)					Estimated Life (cycles)
	6,3	8,3	10	12.5	16	
	Load (N)					
ISWTG	5	10	25	50	100	+ 3.000.000
	7	12	30	60	115	~ 1.500.000
	8	14	35	70	135	300 - 500.000
	10	15	40	80	150	100 - 200.000
ISWTB	18	22	70	130	175	+ 3.000.000
	22	28	90	150	210	~ 1.500.000
	25	30	100	170	240	300 - 500.000
	28	35	110	190	290	100 - 200.000
ISWTR	40	40	100	175	360	+ 3.000.000
	48	48	120	220	450	~ 1.500.000
	50	52	135	240	500	300 - 500.000
	58	58	150	260	545	100 - 200.000
ISWTY	80	85	-	-	-	+ 3.000.000
	100	105	-	-	-	~ 1.500.000
	110	115	-	-	-	300 - 500.000
	120	125	-	-	-	100 - 200.000

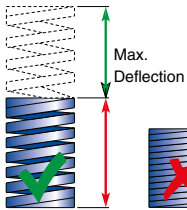
The stated service life values are obtained from in-house reliability tests and are not guaranteed due to the impossibility to consider all variables on the real working conditions of the springs. The indicated guidelines are an approximate method for selecting the springs. It is recommended to refer to the standard tabs before using the springs.
See p. 6.



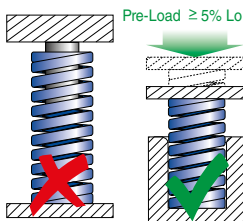
Operating Instructions



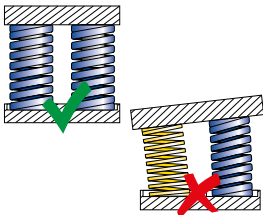
The correct use of Special Springs' springs assures higher performance than to the lifetime values indicated. Incorrect uses can reduce the lifetime significantly a may cause damages or injury.



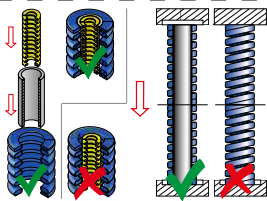
Do not exceed the maximum deflection. High risk of sudden failure and damages on the tool.



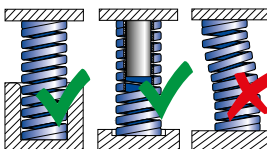
The bigger is the pre-load the longer is the lifetime of the spring for the same total deflection. Thus longer springs with same total force, will assure longer lifetime. It is recommended to always apply a minimum pre-load of 5% of the free length. Absent or insufficient pre-load causes unexpected failure to the springs.



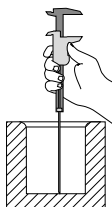
When using different types of springs simultaneously, ensure that deflections and forces guarantee a balanced load. Always ensure the best perpendicularity between surfaces, to avoid early failure of the springs.



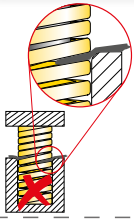
Overlapped springs only if guided. Coupled springs only if not in contact. Risk of sudden failure and damages.



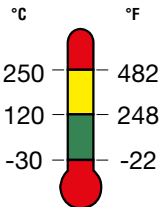
The bigger the guide the longer the lifetime. It is essential to always guide all springs with a free length /diameter ratio exceeding 3.5.



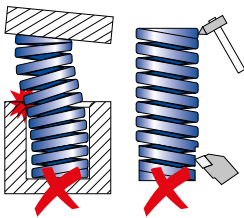
Tool maintenance can vary the original working deflection of the springs. Always check and reset the original working stroke, to avoid high risk of early failures or damages of the tool.



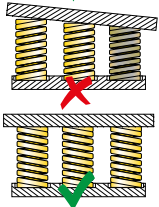
The presence of scraps or any solid piece between coils can cause a reduction of springs deflection, overloads and early failure of the springs and damage of the tool. Check and always remove possible scraps.



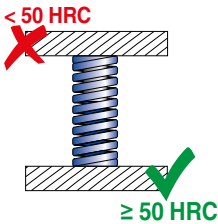
In the temperature range of 120 ÷ 250°C consider a loss between 1 to 2% of the spring rate every 40°C.



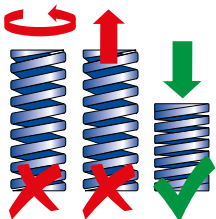
Any alteration on the surface of the springs (cutting, grinding, scratches, etc.) may significantly reduce their lifetime. Always replace the damaged springs with new ones.



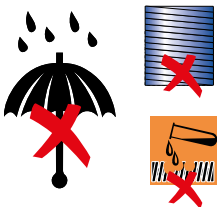
Damaged springs may cause imbalanced load, damage to the other springs and to the tool. Replace all springs. Advance planned maintenance prevents damages and saves money.



The springs are made with hardened alloy steel. Use surfaces with suitable material and hardness to prevent their wear and abrasion when in contact with the springs.



Do not apply to the springs forces other than in compression direction. Use of compression springs as traction or torsion springs is cause of deformation and sudden failure. The improper use of springs may bring to unforeseen accidents with damage and injury.



Avoid storage of springs in the fully compressed position for long periods. Protect the springs from corrosive agents to prevent oxidation and early failures. Always replace rusty springs.



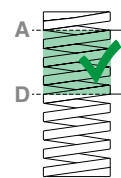
The compliance to RoHS and the material used allow to dispose springs as regular metal scrap.

How to check spring rate [R]?

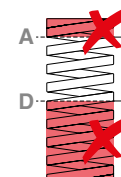
$R \pm 10\%$ Spring rate

Spring rate is the load required in N to deflect a spring by 1 mm.

Springs rate is verified considering the force values as stated in columns A and D.

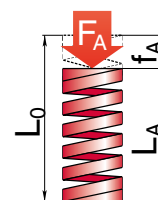


Testing the spring rate beyond the specified ranges may lead to unreliable results.

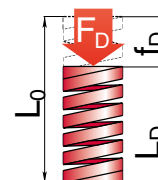


Calculation example

- 1 Deflect the spring to $f_A = 5 \text{ mm}$ (col. A) in relation to nominal length L_0 and then measure the force F_A (N)



- 2 Deflect the spring to $f_D = 7.5 \text{ mm}$ (col. D) in relation to nominal length L_0 and measure the force F_D (N)



- 3 Calculate the springs Rate R by the following formula:

$$R = (F_D - F_A) / (f_D - f_A)$$

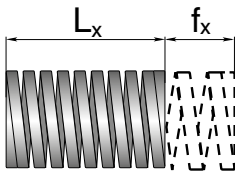
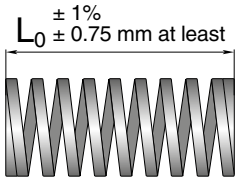
- 4 The R value as resulted at point 3 shall correspond to the one stated in the catalog

$$R = 375 \text{ N/mm} \pm 10\%$$

$$F_x = R \cdot f_x$$

Force at L_x

The springs force F_x at given deflection f_x is the result of the springs rate and the deflection value. It may be influenced by the tolerances of spring rate R and free length L_0 . Calculation is correct only when using deflection values in the range of columns A and D.



Calculation example

1

For a better understanding, the example below shows the calculation of the nominal value of force and the min and max values possible for the spring R 32-076 at a given length L_x of 55.1 mm as follows:

$$R = 172 \text{ N/mm} \pm 10\%$$

$$R_{\min} = 154.8 \text{ N/mm}$$

$$R_{\max} = 189.2 \text{ N/mm}$$

$$L_0 = 76 \text{ mm} \pm 1\%$$

$$L_{0 \min} = 75.24 \text{ mm}$$

$$L_{0 \max} = 76.76 \text{ mm}$$

2

Nominal value of force ($F_{x \text{ nom}}$) will be:

$$F_{x \text{ nom}} = R \cdot (L_0 - L_x)$$

$$F_{x \text{ nom}} = 172 \cdot (76 - 55.1)$$

$$F_{x \text{ nom}} = 3595 \text{ N}$$

3

Min value of force ($F_{x \min}$) will be:

$$F_{x \min} = R_{\min} \cdot (L_{0 \min} - L_x)$$

$$F_{x \min} = 154.8 \cdot (75.24 - 55.1)$$

$$F_{x \min} = 3117,67 \text{ N}$$

4

Max value of force ($F_{x \max}$) will be:

$$F_{x \max} = R_{\max} \cdot (L_{0 \max} - L_x)$$

$$F_{x \max} = 189.2 \cdot (76.76 - 55.1)$$

$$F_{x \max} = 4098.07 \text{ N}$$

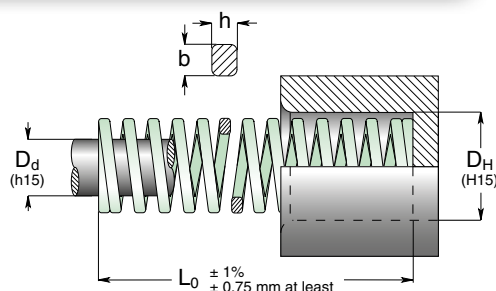
Extra-light load springs

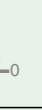
- ISWLG -

Rectangular Wire

Catalog-No.

ISWLG 10—25



Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E
	Hole Diameter	Rod Diameter	Free Length	Spring Rate	30%L ₀	40%L ₀	45%L ₀	50% L ₀	do not use					
	b x h		± 10%	+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000				
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	
ISWLG10-25	10	5	25	8.5	7.5	63.8	10.0	85.0	11.3	96.1	12.5	106.3	14.1	
ISWLG10-32			32	6.5	9.6	62.4	12.8	83.2	14.4	93.6	16.0	104.0	18.5	
ISWLG10-38			38	5.5	11.4	62.7	15.2	83.6	17.1	94.1	19.0	104.5	22.5	
ISWLG10-44			44	4.8	13.2	63.4	17.6	84.5	19.8	95.0	22.0	105.6	23.2	
ISWLG10-51			51	4.2	15.3	64.3	20.4	85.7	23.0	96.6	25.5	107.1	27.5	
ISWLG10-64			64	3.3	19.2	63.4	25.6	84.5	28.8	95.0	32.0	105.6	34.0	
ISWLG10-76	1.65 x 1.0		76	2.7	22.8	61.6	30.4	82.1	34.2	92.3	38.0	102.6	40.4	
ISWLG10-305			305	0.7	91.5	59.5	122.0	79.3	137.3	89.2	152.5	99.1	172.7	
ISWLG13-25	12.5	6.3	25	16.0	7.5	120.0	10.0	160.0	11.3	180.8	12.5	200.0	13.6	
ISWLG13-32			32	12.2	9.6	117.1	12.8	156.2	14.4	175.7	16.0	195.2	17.9	
ISWLG13-38			38	10.3	11.4	117.4	15.2	156.6	17.1	176.1	19.0	195.7	21.9	
ISWLG13-44			44	8.7	13.2	114.8	17.6	153.1	19.8	172.3	22.0	191.4	26.4	
ISWLG13-51			51	7.5	15.3	114.8	20.4	153.0	23.0	172.5	25.5	191.3	29.6	
ISWLG13-64			64	5.8	19.2	111.4	25.6	148.5	28.8	167.0	32.0	185.6	37.1	
ISWLG13-76	2.3 x 1.3	8	76	4.7	22.8	107.2	30.4	142.9	34.2	160.7	38.0	178.6	44.9	
ISWLG13-89			89	4.1	26.7	109.5	35.6	146.0	40.1	164.4	44.5	182.5	53.2	
ISWLG13-102			102	3.6	30.6	110.2	40.8	146.9	45.9	165.2	51.0	183.6	59.4	
ISWLG13-305			305	1.3	91.5	114.4	122.0	152.5	137.3	171.6	152.5	190.6	186.6	
ISWLG16-25	3.05 x 1.5	10	25	20.2	7.5	151.5	10.0	202.0	11.3	228.3	12.5	252.5	14.0	
ISWLG16-32			32	16.0	9.6	153.6	12.8	204.8	14.4	230.4	16.0	256.0	18.7	
ISWLG16-38			38	12.3	11.4	140.2	15.2	187.0	17.1	210.3	19.0	233.7	22.0	
ISWLG16-44			44	10.6	13.2	139.9	17.6	186.6	19.8	209.9	22.0	233.2	26.1	
ISWLG16-51			51	8.9	15.3	136.2	20.4	181.6	23.0	204.7	25.5	227.0	30.4	
ISWLG16-64			64	7.0	19.2	134.4	25.6	179.2	28.8	201.6	32.0	224.0	38.8	
ISWLG16-76	20	10	76	5.8	22.8	132.2	30.4	176.3	34.2	198.4	38.0	220.4	46.4	
ISWLG16-89			89	4.8	26.7	128.2	35.6	170.9	40.1	192.5	44.5	213.6	54.2	
ISWLG16-102			102	4.1	30.6	125.5	40.8	167.3	45.9	188.2	51.0	209.1	62.4	
ISWLG16-115			115	3.9	34.5	134.6	46.0	179.4	51.8	202.0	57.5	224.3	70.6	
ISWLG16-305			305	1.5	91.5	137.3	122.0	183.0	137.3	206.0	152.5	228.8	190.2	
ISWLG20-25	3.9 x 1.7	10	25	29.4	7.5	220.5	10.0	294.0	11.3	332.2	12.5	367.5	13.9	
ISWLG20-32			32	22.6	9.6	217.0	12.8	289.3	14.4	325.4	16.0	361.6	18.2	
ISWLG20-38			38	18.6	11.4	212.0	15.2	282.7	17.1	318.1	19.0	353.4	22.0	
ISWLG20-44			44	15.7	13.2	207.2	17.6	276.3	19.8	310.9	22.0	345.4	25.8	
ISWLG20-51			51	13.7	15.3	209.6	20.4	279.5	23.0	315.1	25.5	349.4	30.3	
ISWLG20-64			64	11.3	19.2	217.0	25.6	289.3	28.8	325.4	32.0	361.6	38.9	
ISWLG20-76	305	10	76	9.8	22.8	223.4	30.4	297.9	34.2	335.2	38.0	372.4	47.0	
ISWLG20-89			89	8.3	26.7	221.6	35.6	295.5	40.1	332.8	44.5	369.4	55.7	
ISWLG20-102			102	7.4	30.6	226.4	40.8	301.9	45.9	339.7	51.0	377.4	64.2	
ISWLG20-115			115	6.4	34.5	220.8	46.0	294.4	51.8	331.5	57.5	368.0	72.9	
ISWLG20-127			127	5.9	38.1	224.8	50.8	299.7	57.2	337.5	63.5	374.7	80.7	
ISWLG20-139			139	5.4	41.7	225.2	55.6	300.2	62.6	338.0	69.5	375.3	88.4	
ISWLG20-152			152	4.9	45.6	223.4	60.8	297.9	68.4	335.2	76.0	372.4	96.7	
ISWLG20-305			305	2.5	91.5	228.8	122.0	305.0	137.3	343.3	152.5	381.3	196.0	

Extra-light load springs

- ISWLG -

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		30%L ₀		40%L ₀		45%L ₀		50% L ₀		
	b x h			± 10%	+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000		do not use	
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	
ISWLG25-25	25	12.5	25	53.9	7.5	404.3	10.0	539.0	11.3	609.1	12.5	673.8	12.9	
ISWLG25-32			32	42.2	9.6	405.1	12.8	540.2	14.4	607.7	16.0	675.2	17.2	
ISWLG25-38			38	35.8	11.4	408.1	15.2	544.2	17.1	612.2	19.0	680.2	20.7	
ISWLG25-44			44	31.4	13.2	414.5	17.6	552.6	19.8	621.7	22.0	690.8	24.4	
ISWLG25-51			51	27.0	15.3	413.1	20.4	550.8	23.0	621.0	25.5	688.5	28.5	
ISWLG25-64			64	21.6	19.2	414.7	25.6	553.0	28.8	622.1	32.0	691.2	36.5	
ISWLG25-76			76	18.1	22.8	412.7	30.4	550.2	34.2	619.0	38.0	687.8	43.9	
ISWLG25-89			89	15.2	26.7	405.8	35.6	541.1	40.1	609.5	44.5	676.4	51.4	
ISWLG25-102			102	13.2	30.6	403.9	40.8	538.6	45.9	605.9	51.0	673.2	59.3	
ISWLG25-115			115	11.8	34.5	407.1	46.0	542.8	51.8	611.2	57.5	678.5	67.2	
ISWLG25-127			127	10.6	38.1	403.9	50.8	538.5	57.2	606.3	63.5	673.1	74.4	
ISWLG25-139			139	9.6	41.7	400.3	55.6	533.8	62.6	601.0	69.5	667.2	81.6	
ISWLG25-152	5.4 x 2.2	16	152	8.8	45.6	401.3	60.8	535.0	68.4	601.9	76.0	668.8	89.5	
ISWLG25-178			178	7.6	53.4	405.8	71.2	541.1	80.1	608.8	89.0	676.4	105.0	
ISWLG25-203			203	6.7	60.9	408.0	81.2	544.0	91.4	612.4	101.5	680.1	121.0	
ISWLG25-305			305	4.4	91.5	402.6	122.0	536.8	137.3	604.1	152.5	671.0	182.0	
ISWLG32-38			38	43.1	11.4	491.3	15.2	655.1	17.1	737.0	19.0	818.9	19.9	
ISWLG32-44			44	37.3	13.2	492.4	17.6	656.5	19.8	738.5	22.0	820.6	23.5	
ISWLG32-51			51	32.4	15.3	495.7	20.4	661.0	23.0	745.2	25.5	826.2	27.6	
ISWLG32-64			64	25.5	19.2	489.6	25.6	652.8	28.8	734.4	32.0	816.0	35.2	
ISWLG32-76			76	21.6	22.8	492.5	30.4	656.6	34.2	738.7	38.0	820.8	42.4	
ISWLG32-89			89	18.1	26.7	483.3	35.6	644.4	40.1	725.8	44.5	805.5	50.0	
ISWLG32-102			102	15.7	30.6	480.4	40.8	640.6	45.9	720.6	51.0	800.7	57.6	
ISWLG32-115	32	20	115	14.2	34.5	489.9	46.0	653.2	51.8	735.6	57.5	816.5	65.5	
ISWLG32-127			127	12.7	38.1	483.9	50.8	645.2	57.2	726.4	63.5	806.5	72.5	
ISWLG32-139			139	11.6	41.7	483.7	55.6	645.0	62.6	726.2	69.5	806.2	79.4	
ISWLG32-152			152	10.6	45.6	483.4	60.8	644.5	68.4	725.0	76.0	805.6	87.3	
ISWLG32-178			178	9.0	53.4	480.6	71.2	640.8	80.1	720.9	89.0	801.0	103.0	
ISWLG32-203			203	7.8	60.9	475.0	81.2	633.4	91.4	712.9	101.5	791.7	118.0	
ISWLG32-254			254	6.4	76.2	487.7	101.6	650.2	114.3	731.5	127.0	812.8	148.0	
ISWLG32-305			305	5.3	91.5	485.0	122.0	646.6	137.3	727.7	152.5	808.3	178.0	
ISWLG40-51	6.5 x 2.6	25	51	48.1	15.3	736	20.4	981	23.0	1106	25.5	1227	28.0	
ISWLG40-64			64	39.2	19.2	753	25.6	1004	28.8	1129	32.0	1254	36.2	
ISWLG40-76			76	33.3	22.8	759	30.4	1012	34.2	1139	38.0	1265	43.7	
ISWLG40-89			89	28.4	26.7	758	35.6	1011	40.1	1139	44.5	1264	51.7	
ISWLG40-102			102	24.5	30.6	750	40.8	1000	45.9	1125	51.0	1250	59.8	
ISWLG40-115			115	22.1	34.5	762	46.0	1017	51.8	1145	57.5	1271	67.9	
ISWLG40-127			127	19.6	38.1	747	50.8	996	57.2	1121	63.5	1245	75.2	
ISWLG40-139			139	17.7	41.7	738	55.6	984	62.6	1108	69.5	1230	82.4	
ISWLG40-152			152	16.2	45.6	739	60.8	985	68.4	1108	76.0	1231	90.6	
ISWLG40-178			178	13.7	53.4	732	71.2	975	80.1	1097	89.0	1219	106.0	
ISWLG40-203			203	12.3	60.9	749	81.2	999	91.4	1124	101.5	1248	122.0	
ISWLG40-254	8.0 x 3.4	38	254	9.8	76.2	747	101.6	996	114.3	1120	127.0	1245	154.0	
ISWLG40-305			305	8.3	91.5	759	122.0	1013	137.3	1140	152.5	1266	185.0	
ISWLG50-64			64	86.3	19.2	1657	25.6	2209	28.8	2485	32.0	2762	35.1	
ISWLG50-76			76	70.6	22.8	1610	30.4	2146	34.2	2415	38.0	2683	42.2	
ISWLG50-89			89	59.8	26.7	1597	35.6	2129	40.1	2398	44.5	2661	50.3	
ISWLG50-102			102	52.0	30.6	1591	40.8	2122	45.9	2387	51.0	2652	58.4	
ISWLG50-115			115	46.1	34.5	1590	46.0	2121	51.8	2388	57.5	2651	66.1	
ISWLG50-127			127	42.2	38.1	1608	50.8	2144	57.2	2414	63.5	2680	73.8	
ISWLG50-139			139	38.2	41.7	1593	55.6	2124	62.6	2391	69.5	2655	80.9	
ISWLG50-152			152	34.3	45.6	1564	60.8	2085	68.4	2346	76.0	2607	89.0	
ISWLG50-178			178	29.4	53.4	1570	71.2	2093	80.1	2355	89.0	2617	105.0	
ISWLG50-203	10.5 x 4.1	50	203	25.5	60.9	1553	81.2	2071	91.4	2331	101.5	2588	121.0	
ISWLG50-254			254	20.6	76.2	1570	101.6	2093	114.3	2355	127.0	2616	152.0	
ISWLG50-305			305	17.2	91.5	1574	122.0	2098	137.3	2362	152.5	2623	184.0	
ISWLG63-76			76	57.8	22.8	1318	30.4	1757	34.2	1977	38.0	2196	47.3	
ISWLG63-89			89	51.4	26.7	1372	35.6	1830	40.1	2061	44.5	2287	54.9	
ISWLG63-102			102	44.4	30.6	1359	40.8	1812	45.9	2038	51.0	2264	64.1	
ISWLG63-115			115	38.0	34.5	1311	46.0	1748	51.8	1968	57.5	2185	75.6	
ISWLG63-127			127	33.2	38.1	1265	50.8	1687	57.2	1899	63.5	2108	82.6	
ISWLG63-152			152	27.4	45.6	1249	60.8	1666	68.4	1874	76.0	2082	99.8	
ISWLG63-178			178	24.0	53.4	1282	71.2	1709	80.1	1922	89.0	2136	118.4	
ISWLG63-203	63	38	203	21.0	60.9	1279	81.2	1705	91.4	1919	101.5	2132	135.9	
ISWLG63-254			254	16.4	76.2	1250	101.6	1666	114.3	1875	127.0	2083	172.8	
ISWLG63-305			305	13.6	91.5	1244	122.0	1659	137.3	1867	152.5	2074	208.6	
	11 x 4.9													

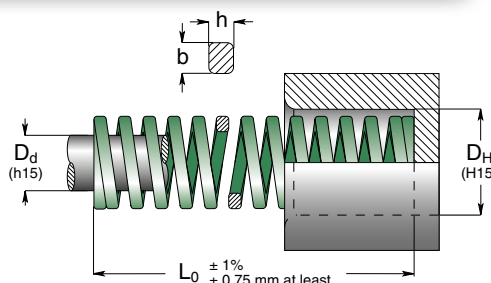
Light load springs

- ISWG -

Rectangular Wire according to ISO 10243

Catalog-No.

ISWG 10—25



Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		25%L ₀		30%L ₀		35%L ₀		40% L ₀		
	b x h			± 10%	+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000		do not use	
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	
ISWG10-25	10	5	25	11.0	6.3	69.3	7.5	82.5	8.8	96.8	10.0	110.0	13.5	
ISWG10-32			32	8.5	8.0	68.0	9.6	81.6	11.2	95.2	12.8	108.8	17.5	
ISWG10-38			38	6.8	9.5	64.6	11.4	77.5	13.3	90.4	15.2	103.4	20.8	
ISWG10-44			44	6.0	11.0	66.0	13.2	79.2	15.4	92.4	17.6	105.6	23.9	
ISWG10-51			51	5.0	12.8	64.0	15.3	76.5	17.9	89.5	20.4	102.0	28.9	
ISWG10-64			64	4.1	16.0	65.6	19.2	78.7	22.4	91.8	25.6	105.0	36.1	
ISWG10-76			76	3.6	19.0	68.4	22.8	82.1	26.6	95.8	30.4	109.4	43.2	
ISWG10-305			1.7 x 1.1		305	0.9	76.3	68.7	91.5	82.4	106.8	96.1	122.0	109.8
ISWG12.5-25	12.5	6.3	25	21.0	6.3	132.3	7.5	157.5	8.8	184.8	10.0	210.0	13.2	
ISWG12.5-32			32	16.4	8.0	131.2	9.6	157.4	11.2	183.7	12.8	209.9	18.0	
ISWG12.5-38			38	13.6	9.5	129.2	11.4	155.0	13.3	180.9	15.2	206.7	21.0	
ISWG12.5-44			44	12.1	11.0	133.1	13.2	159.7	15.4	186.3	17.6	213.0	24.0	
ISWG12.5-51			51	10.3	12.8	131.8	15.3	157.6	17.9	184.4	20.4	210.1	28.7	
ISWG12.5-64			64	7.6	16.0	121.6	19.2	145.9	22.4	170.2	25.6	194.6	35.8	
ISWG12.5-76			76	6.3	19.0	119.7	22.8	143.6	26.6	167.6	30.4	191.5	42.7	
ISWG12.5-89			89	5.4	22.3	120.4	26.7	144.2	31.2	168.5	35.6	192.2	50.4	
ISWG12.5-102	2.4 x 1.4		102	4.1	25.5	104.6	30.6	125.5	35.7	146.4	40.8	167.3	58.4	
ISWG12.5-305			305	1.6	76.3	122.1	91.5	146.4	106.8	170.9	122.0	195.2	172.0	
ISWG16-25	16	8	25	29.0	6.3	182.7	7.5	217.5	8.8	255.2	10.0	290.0	12.6	
ISWG16-32			32	22.9	8.0	183.2	9.6	219.8	11.2	256.5	12.8	293.1	16.4	
ISWG16-38			38	19.3	9.5	183.4	11.4	220.0	13.3	256.7	15.2	293.4	19.7	
ISWG16-44			44	17.1	11.0	188.1	13.2	225.7	15.4	263.3	17.6	301.0	22.5	
ISWG16-51			51	14.0	12.8	179.2	15.3	214.2	17.9	250.6	20.4	285.6	26.3	
ISWG16-64			64	10.7	16.0	171.2	19.2	205.4	22.4	239.7	25.6	273.9	33.3	
ISWG16-76			76	9.0	19.0	171.0	22.8	205.2	26.6	239.4	30.4	273.6	40.2	
ISWG16-89			89	7.3	22.3	162.8	26.7	194.9	31.2	227.8	35.6	259.9	47.6	
ISWG16-102			102	6.8	25.5	173.4	30.6	208.1	35.7	242.8	40.8	277.4	55.4	
ISWG16-115	3.2 x 1.5		115	6.6	28.8	190.1	34.5	227.7	40.3	266.0	46.0	303.6	60.8	
ISWG16-305			305	2.3	76.3	175.5	91.5	210.5	106.8	245.6	122.0	280.6	165.0	
ISWG20-25	20	10	25	55.8	6.3	351.5	7.5	418.5	8.8	491.0	10.0	558.0	12.1	
ISWG20-32			32	45.0	8.0	360.0	9.6	432.0	11.2	504.0	12.8	576.0	15.3	
ISWG20-38			38	36.0	9.5	342.0	11.4	410.4	13.3	478.8	15.2	547.2	18.9	
ISWG20-44			44	30.0	11.0	330.0	13.2	396.0	15.4	462.0	17.6	528.0	21.5	
ISWG20-51			51	24.5	12.8	313.6	15.3	374.9	17.9	438.6	20.4	499.8	25.0	
ISWG20-64			64	19.2	16.0	307.2	19.2	368.6	22.4	430.1	25.6	491.5	31.1	
ISWG20-76			76	16.0	19.0	304.0	22.8	364.8	26.6	425.6	30.4	486.4	37.3	
ISWG20-89			89	14.0	22.3	312.2	26.7	373.8	31.2	436.8	35.6	498.4	44.5	
ISWG20-102			102	12.0	25.5	306.0	30.6	367.2	35.7	428.4	40.8	489.6	51.1	
ISWG20-115			115	10.9	28.8	313.9	34.5	376.1	40.3	439.3	46.0	501.4	58.2	
ISWG20-127			127	9.5	31.8	302.1	38.1	362.0	44.5	422.8	50.8	482.6	64.9	
ISWG20-139			139	8.4	34.8	292.3	41.7	350.3	48.7	409.1	55.6	467.0	71.5	
ISWG20-152			152	7.5	38.0	285.0	45.6	342.0	53.2	399.0	60.8	456.0	78.8	
ISWG20-178	4.0 x 2.1		178	7.1	44.5	316.0	53.4	379.1	62.3	442.3	71.2	505.5	89.0	
ISWG20-305			305	4.0	76.3	305.2	91.5	366.0	106.8	427.2	122.0	488.0	157.0	

Light load springs

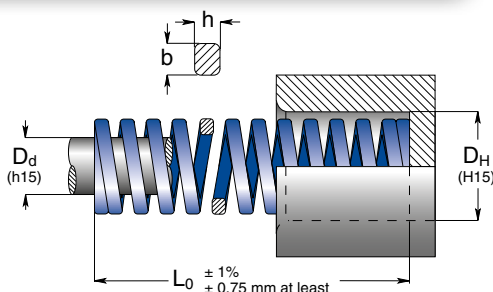
- ISWG -

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		25%L ₀		30%L ₀		35%L ₀		40% L ₀		
	b x h			± 10%	+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000		do not use	
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	
ISWG25-25	25	12.5	25	105.0	6.3	661.5	7.5	787.5	8.8	924.0	10.0	1050.0	11.9	
ISWG25-32			32	80.3	8.0	642.4	9.6	770.9	11.2	899.4	12.8	1027.8	16.0	
ISWG25-38			38	62.0	9.5	589.0	11.4	706.8	13.3	824.6	15.2	942.4	18.3	
ISWG25-44			44	52.9	11.0	581.9	13.2	698.3	15.4	814.7	17.6	931.0	21.4	
ISWG25-51			51	44.0	12.8	563.2	15.3	673.2	17.9	787.6	20.4	897.6	24.9	
ISWG25-64			64	35.2	16.0	563.2	19.2	675.8	22.4	788.5	25.6	901.1	31.4	
ISWG25-76			76	28.0	19.0	532.0	22.8	638.4	26.6	744.8	30.4	851.2	37.5	
ISWG25-89			89	24.0	22.3	535.2	26.7	640.8	31.2	748.8	35.6	854.4	43.5	
ISWG25-102			102	21.1	25.5	538.1	30.6	645.7	35.7	753.3	40.8	860.9	51.1	
ISWG25-115			115	18.7	28.8	538.6	34.5	645.2	40.3	753.6	46.0	860.2	58.1	
ISWG25-127			127	16.7	31.8	531.1	38.1	636.3	44.5	743.2	50.8	848.4	64.1	
ISWG25-139			139	15.3	34.8	532.4	41.7	638.0	48.7	745.1	55.6	850.7	70.4	
ISWG25-152			152	14.0	38.0	532.0	45.6	638.4	53.2	744.8	60.8	851.2	77.1	
ISWG25-178			178	12.5	44.5	556.3	53.4	667.5	62.3	778.8	71.2	890.0	93.1	
ISWG25-203			203	10.4	50.8	528.3	60.9	633.4	71.1	739.4	81.2	844.5	103.0	
ISWG25-305	5.4 x 2.7		305	7.0	76.3	534.1	91.5	640.5	106.8	747.6	122.0	854.0	156.0	
ISWG32-38	32	16	38	98.0	9.5	931	11.4	1117	13.3	1303	15.2	1490	18.3	
ISWG32-44			44	79.5	11.0	875	13.2	1049	15.4	1224	17.6	1399	21.5	
ISWG32-51			51	67.0	12.8	858	15.3	1025	17.9	1199	20.4	1367	25.5	
ISWG32-64			64	53.0	16.0	848	19.2	1018	22.4	1187	25.6	1357	31.9	
ISWG32-76			76	44.0	19.0	836	22.8	1003	26.6	1170	30.4	1338	38.6	
ISWG32-89			89	37.2	22.3	830	26.7	993	31.2	1161	35.6	1324	46.5	
ISWG32-102			102	32.0	25.5	816	30.6	979	35.7	1142	40.8	1306	53.2	
ISWG32-115			115	29.0	28.8	835	34.5	1001	40.3	1169	46.0	1334	60.0	
ISWG32-127			127	25.0	31.8	795	38.1	953	44.5	1113	50.8	1270	66.7	
ISWG32-139			139	23.0	34.8	800	41.7	959	48.7	1120	55.6	1279	71.8	
ISWG32-152			152	21.5	38.0	817	45.6	980	53.2	1144	60.8	1307	78.5	
ISWG32-178			178	18.2	44.5	810	53.4	972	62.3	1134	71.2	1296	94.4	
ISWG32-203			203	15.8	50.8	803	60.9	962	71.1	1123	81.2	1283	107.0	
ISWG32-254			254	12.5	63.5	794	76.2	953	88.9	1111	102.0	1275	136.0	
ISWG32-305	6.8 x 3.3		305	10.3	76.3	786	91.5	942	106.8	1100	122.0	1257	163.0	
ISWG40-51	40	20	51	92.0	12.8	1178	15.3	1408	17.9	1647	20.4	1877	25.5	
ISWG40-64			64	73.0	16.0	1168	19.2	1402	22.4	1635	25.6	1869	31.4	
ISWG40-76			76	63.0	19.0	1197	22.8	1436	26.6	1676	30.4	1915	37.8	
ISWG40-89			89	51.0	22.3	1137	26.7	1362	31.2	1591	35.6	1816	44.3	
ISWG40-102			102	45.0	25.5	1148	30.6	1377	35.7	1607	40.8	1836	50.7	
ISWG40-115			115	39.6	28.8	1140	34.5	1366	40.3	1596	46.0	1822	58.1	
ISWG40-127			127	36.0	31.8	1145	38.1	1372	44.5	1602	50.8	1829	64.6	
ISWG40-139			139	32.0	34.8	1114	41.7	1334	48.7	1558	55.6	1779	70.1	
ISWG40-152			152	28.0	38.0	1064	45.6	1277	53.2	1490	60.8	1702	76.6	
ISWG40-178			178	25.2	44.5	1121	53.4	1346	62.3	1570	71.2	1794	90.4	
ISWG40-203			203	21.8	50.8	1107	60.9	1328	71.1	1550	81.2	1770	102.0	
ISWG40-254			254	17.0	63.5	1080	76.2	1295	88.9	1511	102.0	1734	129.0	
ISWG40-305	8.1 x 4.0		305	14.8	76.3	1129	91.5	1354	106.8	1581	122.0	1806	156.0	
ISWG50-64	50	25	64	156.0	16.0	2496	19.2	2995	22.4	3494	25.6	3994	31.0	
ISWG50-76			76	125.0	19.0	2375	22.8	2850	26.6	3325	30.4	3800	37.2	
ISWG50-89			89	109.0	22.3	2431	26.7	2910	31.2	3401	35.6	3880	43.6	
ISWG50-102			102	94.0	25.5	2397	30.6	2876	35.7	3356	40.8	3835	50.3	
ISWG50-115			115	81.0	28.8	2333	34.5	2795	40.3	3264	46.0	3726	58.1	
ISWG50-127			127	71.0	31.8	2258	38.1	2705	44.5	3160	50.8	3607	63.7	
ISWG50-139			139	66.5	34.8	2314	41.7	2773	48.7	3239	55.6	3697	69.5	
ISWG50-152			152	60.0	38.0	2280	45.6	2736	53.2	3192	60.8	3648	76.5	
ISWG50-178			178	52.0	44.5	2314	53.4	2777	62.3	3240	71.2	3702	91.9	
ISWG50-203			203	44.0	50.8	2235	60.9	2680	71.1	3128	81.2	3573	105.0	
ISWG50-254			254	35.0	63.5	2223	76.2	2667	88.9	3112	102.0	3570	131.0	
ISWG50-305	10.9 x 5.3		305	28.5	76.3	2175	91.5	2608	106.8	3044	122.0	3477	155.0	
ISWG63-76	63	38	76	189.0	19.0	3591	22.8	4309	26.6	5027	30.4	5746	36.5	
ISWG63-89			89	158.0	22.3	3523	26.7	4219	31.2	4930	35.6	5625	43.4	
ISWG63-102			102	131.0	25.5	3341	30.6	4009	35.7	4677	40.8	5345	49.7	
ISWG63-115			115	116.0	28.8	3341	34.5	4002	40.3	4675	46.0	5336	55.6	
ISWG63-127			127	103.0	31.8	3275	38.1	3924	44.5	4584	50.8	5232	62.7	
ISWG63-152			152	84.3	38.0	3203	45.6	3844	53.2	4485	60.8	5125	77.1	
ISWG63-178			178	71.5	44.5	3182	53.4	3818	62.3	4454	71.2	5091	92.2	
ISWG63-203			203	61.7	50.8	3134	60.9	3758	71.1	4387	81.2	5010	103.0	
ISWG63-254			254	47.0	63.5	2985	76.2	3581	88.9	4178	102.0	4794	130.0	
ISWG63-305	11.0 x 7.8		305	38.2	76.3	2915	91.5	3495	106.8	4080	122.0	4660	157.0	

Medium load springs

- ISWB -

Rectangular Wire according to ISO 10243



Catalog-No.

ISWB 10-25

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E	
	Hole Diameter	Rod Diameter		Spring Rate	25%L ₀	30%L ₀	33.75%L ₀	37.5% L ₀							
	b x h		± 10%	+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000		do not use			
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm		
ISWB10-25	10	5	25	16.0	6.3	100.8	7.5	120.0	8.4	134.4	9.4	150.4	10.2		
ISWB10-32			32	13.0	8.0	104.0	9.6	124.8	10.8	140.4	12.0	156.0	14.2		
ISWB10-38			38	11.9	9.5	113.1	11.4	135.7	12.8	152.3	14.2	169.0	16.8		
ISWB10-44			44	10.3	11.0	113.3	13.2	136.0	14.9	153.5	16.5	170.0	19.4		
ISWB10-51			51	8.9	12.8	113.9	15.3	136.2	17.2	153.1	19.1	170.0	23.4		
ISWB10-64			64	7.5	16.0	120.0	19.2	144.0	21.6	162.0	24.0	180.0	28.2		
ISWB10-76			76	6.2	19.0	117.8	22.8	141.4	25.7	159.3	28.5	176.7	34.2		
ISWB10-305			1.9 x 1.3		305	1.6	76.3	122.1	91.5	146.4	102.9	164.6	114.0	182.4	134.0
ISWB12.5-25	12.5	6.3	25	30.0	6.3	189.0	7.5	225.0	8.4	252.0	9.4	282.0	11.9		
ISWB12.5-32			32	24.8	8.0	198.4	9.6	238.1	10.8	267.8	12.0	297.6	16.2		
ISWB12.5-38			38	21.4	9.5	203.3	11.4	244.0	12.8	273.9	14.2	303.9	18.7		
ISWB12.5-44			44	18.0	11.0	198.0	13.2	237.6	14.9	268.2	16.5	297.0	21.3		
ISWB12.5-51			51	15.5	12.8	198.4	15.3	237.2	17.2	266.6	19.1	296.1	25.6		
ISWB12.5-64			64	12.1	16.0	193.6	19.2	232.3	21.6	261.4	24.0	290.4	32.4		
ISWB12.5-76			76	10.2	19.0	193.8	22.8	232.6	25.7	262.1	28.5	290.7	39.0		
ISWB12.5-89			89	8.4	22.3	187.3	26.7	224.3	30.0	252.0	33.3	279.7	45.9		
ISWB12.5-102	2.5 x 1.5		102	6.3	25.5	160.7	30.6	192.8	34.4	216.7	38.3	241.0	52.3		
ISWB12.5-305			305	2.4	76.3	183.1	91.5	219.6	102.9	247.0	114.0	273.6	153.0		
ISWB16-25	16	8	25	49.4	6.3	311.2	7.5	370.5	8.4	415.0	9.4	464.4	10.5		
ISWB16-32			32	38.5	8.0	308.0	9.6	369.6	10.8	415.8	12.0	462.0	13.2		
ISWB16-38			38	33.9	9.5	322.1	11.4	386.5	12.8	433.9	14.2	481.4	17.2		
ISWB16-44			44	30.0	11.0	330.0	13.2	396.0	14.9	447.0	16.5	495.0	19.4		
ISWB16-51			51	26.4	12.8	337.9	15.3	403.9	17.2	454.1	19.1	504.2	24.2		
ISWB16-64			64	20.5	16.0	328.0	19.2	393.6	21.6	442.8	24.0	492.0	29.2		
ISWB16-76			76	17.8	19.0	338.2	22.8	405.8	25.7	457.5	28.5	507.3	36.3		
ISWB16-89			89	15.2	22.3	339.0	26.7	405.8	30.0	456.0	33.3	506.2	41.7		
ISWB16-102	3.2 x 2.0		102	13.5	25.5	344.3	30.6	413.1	34.4	464.4	38.2	515.7	48.9		
ISWB16-115			115	11.8	28.8	339.8	34.5	407.1	38.8	457.8	43.1	508.6	53.1		
ISWB16-305			305	4.3	76.3	328.1	91.5	393.5	102.9	442.5	114.0	490.2	142.0		
ISWB20-25			20	10	25	98.0	6.3	617.4	7.5	735.0	8.4	823.2	9.4	921.2	10.5
ISWB20-32					32	72.6	8.0	580.8	9.6	697.0	10.8	784.1	12.0	871.2	13.9
ISWB20-38	38	56.0			9.5	532.0	11.4	638.4	12.8	716.8	14.2	795.2	16.6		
ISWB20-44	44	47.5			11.0	522.5	13.2	627.0	14.9	707.8	16.5	783.8	18.8		
ISWB20-51	51	41.7			12.8	533.8	15.3	638.0	17.2	717.2	19.1	796.5	23.1		
ISWB20-64	64	32.3			16.0	516.8	19.2	620.2	21.6	697.7	24.0	775.2	27.5		
ISWB20-76	76	25.1			19.0	476.9	22.8	572.3	25.7	645.1	28.5	715.4	33.8		
ISWB20-89	89	22.0			22.3	490.6	26.7	587.4	30.0	660.0	33.3	732.6	39.7		
ISWB20-102	4.1 x 2.4		102	19.8	25.5	504.9	30.6	605.9	34.4	681.1	38.2	756.4	47.3		
ISWB20-115			115	18.1	28.8	521.3	34.5	624.5	38.8	702.3	43.1	780.1	52.5		
ISWB20-127			127	16.6	31.8	527.9	38.1	632.5	42.9	712.1	47.6	790.2	56.9		
ISWB20-139			139	15.1	34.8	525.5	41.7	629.7	46.9	708.2	52.1	786.7	62.1		
ISWB20-152			152	13.2	38.0	501.6	45.6	601.9	51.3	677.2	57.0	752.4	67.6		
ISWB20-305	4.1 x 2.4		305	6.1	76.3	465.4	91.5	558.2	102.9	627.7	114.0	695.4	143.0		

Medium load springs

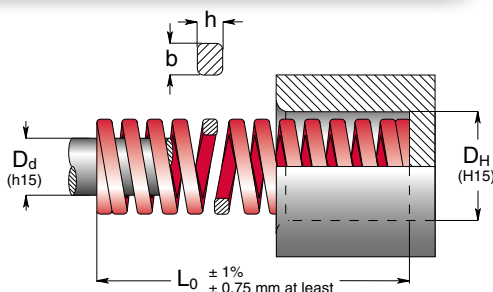
- ISWB -

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		25%L ₀		30%L ₀		33.75%L ₀		37.5% L ₀		
	b x h			± 10%	+ 3.000.000	N	~ 1.500.000	N	300 - 500.000	N	100 - 200.000	N	do not use	
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	
ISWB25-25	25	12.5	25	1570	6.3	989	7.5	1178	8.4	1319	9.4	1476	10.2	
ISWB25-32			32	118.0	8.0	944	9.6	1133	10.8	1274	12.0	1416	13.7	
ISWB25-38			38	93.0	9.5	884	11.4	1060	12.8	1190	14.2	1321	15.7	
ISWB25-44			44	80.8	11.0	889	13.2	1067	14.9	1204	16.5	1333	18.2	
ISWB25-51			51	68.6	12.8	878	15.3	1050	17.2	1180	19.1	1310	21.7	
ISWB25-64			64	53.0	16.0	848	19.2	1018	21.6	1145	24.0	1272	26.0	
ISWB25-76			76	43.2	19.0	821	22.8	985	25.7	1110	28.5	1231	32.3	
ISWB25-89			89	38.2	22.3	852	26.7	1020	30.0	1146	33.3	1272	38.0	
ISWB25-102			102	33.0	25.5	842	30.6	1010	34.4	1135	38.2	1261	43.0	
ISWB25-115			115	28.0	28.8	806	34.5	966	38.8	1086	43.1	1207	48.6	
ISWB25-127			127	25.9	31.8	824	38.1	987	42.9	1111	47.6	1233	53.7	
ISWB25-139			139	23.2	34.8	807	41.7	967	46.9	1088	52.1	1209	59.4	
ISWB25-152			152	20.8	38.0	790	45.6	948	51.3	1067	57.0	1186	63.8	
ISWB25-178			178	17.8	44.5	792	53.4	951	60.1	1070	66.7	1187	76.6	
ISWB25-203			203	15.8	50.8	803	60.9	962	68.5	1082	76.1	1202	88.4	
ISWB25-305	5.4 x 3.3		305	10.2	76.3	778	91.5	933	102.9	1050	114.0	1163	135.0	
ISWB32-38	32	16	38	185.0	9.5	1758	11.4	2109	12.8	2368	14.2	2627	16.3	
ISWB32-44			44	158.0	11.0	1738	13.2	2086	14.9	2354	16.5	2607	18.9	
ISWB32-51			51	134.0	12.8	1715	15.3	2050	17.2	2305	19.1	2559	23.1	
ISWB32-64			64	99.0	16.0	1584	19.2	1901	21.6	2138	24.0	2376	28.5	
ISWB32-76			76	80.5	19.0	1530	22.8	1835	25.7	2069	28.5	2294	34.2	
ISWB32-89			89	69.1	22.3	1541	26.7	1845	30.0	2073	33.3	2301	40.4	
ISWB32-102			102	58.8	25.5	1499	30.6	1799	34.4	2023	38.2	2246	48.0	
ISWB32-115			115	51.5	28.8	1483	34.5	1777	38.8	1998	43.1	2220	54.3	
ISWB32-127			127	44.8	31.8	1425	38.1	1707	42.9	1922	47.6	2132	59.2	
ISWB32-139			139	42.3	34.8	1472	41.7	1764	46.9	1984	52.1	2204	65.3	
ISWB32-152			152	37.8	38.0	1436	45.6	1724	51.3	1939	57.0	2155	73.0	
ISWB32-178			178	32.5	44.5	1446	53.4	1736	60.1	1953	66.7	2168	84.5	
ISWB32-203			203	28.9	50.8	1468	60.9	1760	68.5	1980	76.1	2199	96.9	
ISWB32-254			254	22.2	63.5	1410	76.2	1692	85.7	1903	95.2	2113	121.0	
ISWB32-305	6.8 x 4.0		305	18.3	76.3	1396	91.5	1674	102.9	1883	114.0	2086	147.0	
ISWB40-51	40	20	51	182.0	12.8	2330	15.3	2785	17.2	3130	19.1	3476	21.4	
ISWB40-64			64	140.0	16.0	2240	19.2	2688	21.6	3024	24.0	3360	26.8	
ISWB40-76			76	108.0	19.0	2052	22.8	2462	25.7	2776	28.5	3078	32.7	
ISWB40-89			89	90.7	22.3	2023	26.7	2422	30.0	2721	33.3	3020	39.0	
ISWB40-102			102	81.0	25.5	2066	30.6	2479	34.4	2786	38.2	3094	44.1	
ISWB40-115			115	71.8	28.8	2068	34.5	2477	38.8	2786	43.1	3095	50.6	
ISWB40-127			127	62.7	31.8	1994	38.1	2389	42.9	2690	47.6	2985	55.9	
ISWB40-139			139	57.5	34.8	2001	41.7	2398	46.9	2697	52.1	2996	61.8	
ISWB40-152			152	51.6	38.0	1961	45.6	2353	51.3	2647	57.0	2941	67.5	
ISWB40-178			178	44.1	44.5	1962	53.4	2355	60.1	2650	66.7	2941	77.2	
ISWB40-203			203	36.7	50.8	1864	60.9	2235	68.5	2514	76.1	2793	91.8	
ISWB40-254			254	30.1	63.5	1911	76.2	2294	85.7	2580	95.2	2866	113.0	
ISWB40-305	8.2 x 4.7		305	24.6	76.3	1877	91.5	2251	102.9	2531	114.0	2804	138.0	
ISWB50-64	50	25	64	209.0	16.0	3344	19.2	4013	21.6	4514	24.0	5016	28.2	
ISWB50-76			76	168.0	19.0	3192	22.8	3830	25.7	4318	28.5	4788	34.9	
ISWB50-89			89	140.0	22.3	3122	26.7	3738	30.0	4200	33.3	4662	39.2	
ISWB50-102			102	119.0	25.5	3035	30.6	3641	34.4	4094	38.2	4546	47.3	
ISWB50-115			115	106.0	28.8	3053	34.5	3657	38.8	4113	43.1	4569	52.6	
ISWB50-127			127	97.0	31.8	3085	38.1	3696	42.9	4161	47.6	4617	59.8	
ISWB50-139			139	87.0	34.8	3028	41.7	3628	46.9	4080	52.1	4533	65.1	
ISWB50-152			152	80.0	38.0	3040	45.6	3648	51.3	4104	57.0	4560	70.8	
ISWB50-178			178	69.5	44.5	3093	53.4	3711	60.1	4177	66.7	4636	84.2	
ISWB50-203			203	59.8	50.8	3038	60.9	3642	68.5	4096	76.1	4551	96.5	
ISWB50-229			229	50.9	57.3	2917	68.7	3497	77.3	3935	85.8	4367	108.0	
ISWB50-254			254	46.0	63.5	2921	76.2	3505	85.7	3942	95.2	4379	122.0	
ISWB50-305	11.1 x 5.8		305	38.6	76.3	2945	91.5	3532	102.9	3972	114.0	4400	147.0	
ISWB63-76	63	38	76	320.0	19.0	6080	22.8	7296	25.7	8224	28.5	9120	30.7	
ISWB63-89			89	260.0	22.3	5798	26.7	6942	30.0	7800	33.3	8658	36.5	
ISWB63-102			102	221.0	25.5	5636	30.6	6763	34.4	7602	38.2	8442	43.6	
ISWB63-115			115	187.0	28.8	5386	34.5	6452	38.8	7256	43.1	8060	48.9	
ISWB63-127			127	168.0	31.8	5342	38.1	6401	42.9	7207	47.6	7997	54.2	
ISWB63-152			152	136.0	38.0	5168	45.6	6202	51.3	6977	57.0	7752	65.7	
ISWB63-178			178	114.0	44.5	5073	53.4	6088	60.1	6851	66.7	7604	76.5	
ISWB63-203			203	100.0	50.8	5080	60.9	6090	68.5	6850	76.1	7610	88.0	
ISWB63-229			229	89.2	57.3	5111	68.7	6128	77.3	6895	85.8	7653	104.0	
ISWB63-254			254	78.4	63.5	4978	76.2	5974	85.7	6719	95.2	7464	112.0	
ISWB63-305	11.5 x 9.1		305	64.7	76.3	4937	91.5	5920	102.9	6658	114.0	7376	134.0	

Strong load springs

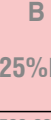
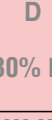
- ISWR -

Rectangular Wire according to ISO 10243



Catalog-No.

ISWR 10-25

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		20%L ₀		25%L ₀		27.5%L ₀		30% L ₀		
	b x h			± 10%	+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000		do not use	
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	mm
ISWR10-25	10	5	25	23.0	5.0	115.0	6.3	144.9	6.9	158.7	7.5	172.5	9.2	
ISWR10-32			32	17.5	6.4	112.0	8.0	140.0	8.8	154.0	9.6	168.0	12.1	
ISWR10-38			38	14.8	7.6	112.5	9.5	140.6	10.5	155.4	11.4	168.7	13.2	
ISWR10-44			44	13.0	8.8	114.4	11.0	143.0	12.1	157.3	13.2	171.6	15.1	
ISWR10-51			51	11.2	10.2	114.2	12.8	143.4	14.0	156.8	15.3	171.4	19.5	
ISWR10-64			64	9.2	12.8	117.8	16.0	147.2	17.6	161.9	19.2	176.6	21.8	
ISWR10-76			76	7.5	15.2	114.0	19.0	142.5	20.9	156.8	22.8	171.0	27.9	
ISWR10-115			115	4.8	23.0	110.4	29.0	139.2	32.0	153.6	34.5	165.6	56.0	
ISWR10-305			1.9 x 1.5		305	1.9	61.0	115.9	76.3	145.0	83.9	159.4	91.5	173.9
ISWR12.5-25	12.5	6.3	25	42.1	5.0	210.5	6.3	265.2	6.9	290.5	7.5	315.8	9.8	
ISWR12.5-32			32	33.2	6.4	212.5	8.0	265.6	8.8	292.2	9.6	318.7	13.6	
ISWR12.5-38			38	29.3	7.6	222.7	9.5	278.4	10.5	307.7	11.4	334.0	14.6	
ISWR12.5-44			44	24.6	8.8	216.5	11.0	270.6	12.1	297.7	13.2	324.7	18.1	
ISWR12.5-51			51	19.6	10.2	199.9	12.8	250.9	14.0	274.4	15.3	299.9	22.3	
ISWR12.5-64			64	15.0	12.8	192.0	16.0	240.0	17.6	264.0	19.2	288.0	27.3	
ISWR12.5-76			76	13.2	15.2	200.6	19.0	250.8	20.9	275.9	22.8	301.0	33.1	
ISWR12.5-89			89	11.4	17.8	202.9	22.3	254.2	24.5	279.3	26.7	304.4	38.9	
ISWR12.5-102			102	8.4	20.4	171.4	25.5	214.2	28.1	236.0	30.6	257.0	43.8	
ISWR12.5-305	2.4 x 1.9		305	3.2	61.0	195.2	76.3	244.2	83.9	268.5	91.5	292.8	140.0	
ISWR16-25	16	8	25	75.7	5.0	378.5	6.3	476.9	6.9	522.3	7.5	567.8	8.4	
ISWR16-32			32	60.2	6.4	385.3	8.0	481.6	8.8	529.8	9.6	577.9	10.5	
ISWR16-38			38	50.8	7.6	386.1	9.5	482.6	10.5	533.4	11.4	579.1	13.6	
ISWR16-44			44	42.8	8.8	376.6	11.0	470.8	12.1	517.9	13.2	565.0	15.9	
ISWR16-51			51	37.1	10.2	378.4	12.8	474.9	14.0	519.4	15.3	567.6	18.9	
ISWR16-64			64	30.3	12.8	387.8	16.0	484.8	17.6	533.3	19.2	581.8	24.9	
ISWR16-76			76	25.7	15.2	390.6	19.0	488.3	20.9	537.1	22.8	586.0	29.2	
ISWR16-89			89	21.7	17.8	386.3	22.3	483.9	24.5	531.7	26.7	579.4	34.5	
ISWR16-102			102	18.9	20.4	385.6	25.5	482.0	28.1	531.1	30.6	578.3	39.1	
ISWR16-115	3.1 x 2.5		115	15.7	23.0	361.1	28.8	452.2	31.6	496.1	34.5	541.7	44.0	
ISWR16-305			305	6.3	61.0	384.3	76.3	480.7	83.9	528.6	91.5	576.5	104.0	
ISWR20-25	20	10	25	216.0	5.0	1080	6.3	1361	6.9	1490	7.5	1620	8.3	
ISWR20-32			32	168.0	6.4	1075	8.0	1344	8.8	1478	9.6	1613	10.9	
ISWR20-38			38	129.0	7.6	980	9.5	1226	10.5	1355	11.4	1471	12.5	
ISWR20-44			44	112.0	8.8	986	11.0	1232	12.1	1355	13.2	1478	15.0	
ISWR20-51			51	94.0	10.2	959	12.8	1203	14.0	1316	15.3	1438	17.6	
ISWR20-64			64	72.1	12.8	923	16.0	1154	17.6	1269	19.2	1384	22.6	
ISWR20-76			76	59.7	15.2	907	19.0	1134	20.9	1248	22.8	1361	27.5	
ISWR20-89			89	50.5	17.8	899	22.3	1126	24.5	1237	26.7	1348	31.7	
ISWR20-102			102	44.2	20.4	902	25.5	1127	28.1	1242	30.6	1353	37.5	
ISWR20-115			115	38.4	23.0	883	28.8	1106	31.6	1213	34.5	1325	42.6	
ISWR20-127			127	34.1	25.4	866	31.8	1084	34.9	1190	38.1	1299	45.5	
ISWR20-139			139	31.0	27.8	862	34.8	1079	38.2	1184	41.7	1293	50.1	
ISWR20-152					152	28.2	30.4	857	38.0	1072	41.8	1179	45.6	1286
ISWR20-305	4.0 x 3.3		305	14.0	61.0	854	76.3	1068	83.9	1175	91.5	1281	114.0	

Strong load springs

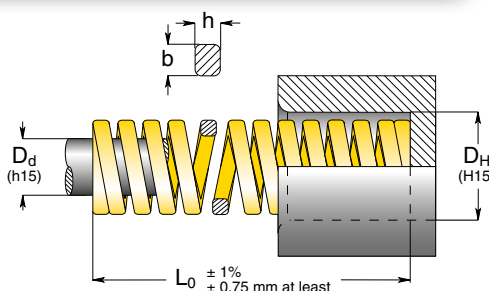
- ISWR -

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E		
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		20%L ₀		25%L ₀		27.5%L ₀		30% L ₀				
	b x h			± 10%		+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000		do not use		
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	mm		
ISWR25-25	25	12.5	25	375.0	5.0	1875	6.3	2363	6.9	2588	7.5	2813	8.5			
ISWR25-32			32	297.0	6.4	1901	8.0	2376	8.8	2614	9.6	2851	11.0			
ISWR25-38			38	219.0	7.6	1664	9.5	2081	10.5	2300	11.4	2497	12.6			
ISWR25-44			44	187.0	8.8	1646	11.0	2057	12.1	2263	13.2	2468	14.8			
ISWR25-51			51	156.0	10.2	1591	12.8	1997	14.0	2184	15.3	2387	17.9			
ISWR25-64			64	123.0	12.8	1574	16.0	1968	17.6	2165	19.2	2362	23.1			
ISWR25-76			76	99.0	15.2	1505	19.0	1881	20.9	2069	22.8	2257	26.3			
ISWR25-89			89	84.0	17.8	1495	22.3	1873	24.5	2058	26.7	2243	30.5			
ISWR25-102			102	73.0	20.4	1489	25.5	1862	28.1	2051	30.6	2234	37.3			
ISWR25-115			115	65.0	23.0	1495	28.8	1872	31.6	2054	34.5	2243	41.9			
ISWR25-127			127	57.7	25.4	1466	31.8	1835	34.9	2014	38.1	2198	46.2			
ISWR25-139			139	52.7	27.8	1465	34.8	1834	38.2	2013	41.7	2198	49.3			
ISWR25-152			152	47.8	30.4	1453	38.0	1816	41.8	1998	45.6	2180	55.7			
ISWR25-178			178	41.0	35.6	1460	44.5	1825	49.0	2009	53.4	2189	65.1			
ISWR25-203			203	35.8	40.6	1453	50.8	1819	55.8	1998	60.9	2180	74.5			
ISWR25-305			5.5 x 4.2	305	22.9	61.0	1397	76.3	1747	83.9	1921	91.5	2095	110.0		
ISWR32-38	32	16	38	388.0	7.6	2949	9.5	3686	10.5	4074	11.4	4423	12.5			
ISWR32-44			44	324.0	8.8	2851	11.0	3564	12.1	3920	13.2	4277	14.9			
ISWR32-51			51	272.0	10.2	2774	12.8	3482	14.0	3808	15.3	4162	17.8			
ISWR32-64			64	212.0	12.8	2714	16.0	3392	17.6	3731	19.2	4070	22.4			
ISWR32-76			76	172.0	15.2	2614	19.0	3268	20.9	3595	22.8	3922	26.1			
ISWR32-89			89	141.0	17.8	2510	22.3	3144	24.5	3455	26.7	3765	30.8			
ISWR32-102			102	122.0	20.4	2489	25.5	3111	28.1	3428	30.6	3733	36.8			
ISWR32-115			115	107.0	23.0	2461	28.8	3082	31.6	3381	34.5	3692	41.4			
ISWR32-127			127	93.0	25.4	2362	31.8	2957	34.9	3246	38.1	3543	44.4			
ISWR32-139			139	86.0	27.8	2391	34.8	2993	38.2	3285	41.7	3586	48.5			
ISWR32-152			152	78.0	30.4	2371	38.0	2964	41.8	3260	45.6	3557	54.8			
ISWR32-178			178	67.2	35.6	2392	44.5	2990	49.0	3293	53.4	3588	63.6			
ISWR32-203			203	59.1	40.6	2399	50.8	3002	55.8	3298	60.9	3599	72.5			
ISWR32-254			254	46.4	50.8	2357	63.5	2946	69.9	3243	76.2	3536	92.8			
ISWR32-305			7.1 x 5.4	305	38.0	61.0	2318	76.3	2899	83.9	3188	91.5	3477	112.0		
ISWR40-51			40	20	51	350.0	10.2	3570	12.8	4480	14.0	4900	15.3	5355	17.0	
ISWR40-64	64	269.0			12.8	3443	16.0	4304	17.6	4734	19.2	5165	21.9			
ISWR40-76	76	219.0			15.2	3329	19.0	4161	20.9	4577	22.8	4993	26.7			
ISWR40-89	89	190.0			17.8	3382	22.3	4237	24.5	4655	26.7	5073	31.3			
ISWR40-102	102	163.0			20.4	3325	25.5	4157	28.1	4580	30.6	4988	37.1			
ISWR40-115	115	142.0			23.0	3266	28.8	4090	31.6	4487	34.5	4899	41.0			
ISWR40-127	127	128.0			25.4	3251	31.8	4070	34.9	4467	38.1	4877	46.5			
ISWR40-139	139	115.0			27.8	3197	34.8	4002	38.2	4393	41.7	4796	53.1			
ISWR40-152	152	105.0			30.4	3192	38.0	3990	41.8	4389	45.6	4788	56.1			
ISWR40-178	178	89.0			35.6	3168	44.5	3961	49.0	4361	53.4	4753	67.4			
ISWR40-203	203	77.0			40.6	3126	50.8	3912	55.8	4297	60.9	4689	76.2			
ISWR40-254	254	61.0			50.8	3099	63.5	3874	69.9	4264	76.2	4648	96.2			
ISWR40-305	8.4 x 6.2	305			51.0	61.0	3111	76.3	3891	83.9	4279	91.5	4667	115.0		
ISWR50-64	50	25			64	413.0	12.8	5286	16.0	6608	17.6	7269	19.2	7930	22.4	
ISWR50-76					76	339.0	15.2	5153	19.0	6441	20.9	7085	22.8	7729	26.5	
ISWR50-89					89	288.0	17.8	5126	22.3	6422	24.5	7056	26.7	7690	31.5	
ISWR50-102			102	245.0	20.4	4998	25.5	6248	28.1	6885	30.6	7497	37.6			
ISWR50-115			115	215.0	23.0	4945	28.8	6192	31.6	6794	34.5	7418	42.7			
ISWR50-127			127	192.0	25.4	4877	31.8	6106	34.9	6701	38.1	7315	47.5			
ISWR50-139			139	168.0	27.8	4670	34.8	5846	38.2	6418	41.7	7006	51.8			
ISWR50-152			152	154.0	30.4	4682	38.0	5852	41.8	6437	45.6	7022	57.8			
ISWR50-178			178	134.0	35.6	4770	44.5	5963	49.0	6566	53.4	7156	68.5			
ISWR50-203			203	117.0	40.6	4750	50.8	5944	55.8	6529	60.9	7125	77.6			
ISWR50-254			254	89.0	50.8	4521	63.5	5652	69.9	6221	76.2	6782	97.9			
ISWR50-305			11.1 x 7.6	305	73.0	61.0	4453	76.3	5570	83.9	6125	91.5	6680	121.0		
ISWR63-76			63	38	76	618.0	15.2	9394	19.0	11742	20.9	12916	22.8	14090	24.7	
ISWR63-89					89	515.0	17.8	9167	22.3	11485	24.5	12618	26.7	13751	30.0	
ISWR63-102					102	438.0	20.4	8935	25.5	11169	28.1	12308	30.6	13403	35.1	
ISWR63-115					115	370.0	23.0	8510	28.8	10656	31.6	11692	34.5	12765	37.5	
ISWR63-127	127	333.0			25.4	8458	31.8	10589	34.9	11622	38.1	12687	45.9			
ISWR63-152	152	269.0			30.4	8178	38.0	10222	41.8	11244	45.6	12266	56.5			
ISWR63-178	178	226.0			35.6	8046	44.5	10057	49.0	11074	53.4	12068	66.8			
ISWR63-203	203	198.0			40.6	8039	50.8	10058	55.8	11048	60.9	12058	78.8			
ISWR63-254	254	155.0			50.8	7874	63.5	9843	69.9	10835	76.2	11811	102.0			
ISWR63-305	11.6 x 12.3	305			128.0	61.0	7808	76.3	9766	83.9	10739	91.5	11712	122.0		

Extra-strong load springs

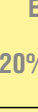
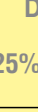
- ISWY -

Rectangular Wire according to ISO 10243



Catalog-No.

ISWY 10—25

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D	 E
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		17%L ₀		20%L ₀		22.5%L ₀		25% L ₀	
	b x h			± 10%	+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000		do not use
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm
ISWY10-25	10	5	25	36.8	4.3	158.2	5.0	184.0	5.6	206.1	6.2	228.2	7.7
ISWY10-32			32	27.9	5.4	150.7	6.4	178.6	7.2	200.9	8.0	223.2	10.6
ISWY10-38			38	23.7	6.5	154.1	7.6	180.1	8.6	203.8	9.5	225.2	12.6
ISWY10-44			44	19.2	7.5	144.0	8.8	169.0	9.9	190.1	11.0	211.2	13.8
ISWY10-51			51	16.5	8.7	143.6	10.2	168.3	11.5	189.8	12.7	209.6	16.2
ISWY10-64			64	13.2	10.9	143.9	12.8	169.0	14.4	190.1	16.0	211.2	20.4
ISWY10-76			76	10.9	12.9	140.6	15.2	165.7	17.1	186.4	19.0	207.1	25.2
ISWY10-305			1.9 x 1.6		305	2.6	51.9	134.9	61.0	158.6	68.6	178.4	76.3
ISWY12.5-25	12.5	6.3	25	58.5	4.3	251.6	5.0	292.5	5.6	327.6	6.2	362.7	8.1
ISWY12.5-32			32	43.9	5.4	237.1	6.4	281.0	7.2	316.1	8.0	351.2	9.9
ISWY12.5-38			38	36.0	6.5	234.0	7.6	273.6	8.6	309.6	9.5	342.0	12.9
ISWY12.5-44			44	30.3	7.5	227.3	8.8	266.6	9.9	300.0	11.0	333.3	14.1
ISWY12.5-51			51	26.2	8.7	227.9	10.2	267.2	11.5	301.3	12.7	332.7	17.4
ISWY12.5-64			64	21.2	10.9	231.1	12.8	271.4	14.4	305.3	16.0	339.2	21.0
ISWY12.5-76			76	17.1	12.9	220.6	15.2	259.9	17.1	292.4	19.0	324.9	26.4
ISWY12.5-89			89	14.5	15.1	219.0	17.8	258.1	20.0	290.0	22.2	321.9	31.5
ISWY12.5-102	2.6 x 2.0		102	12.7	17.3	219.7	20.4	259.1	23.0	292.1	25.5	323.9	36.0
ISWY12.5-305			305	4.3	51.9	223.2	61.0	262.3	68.6	295.0	76.3	328.1	111.0
ISWY16-25			25	118.0	4.3	507.4	5.0	590.0	5.6	660.8	6.2	731.6	8.5
ISWY16-32	16	8	32	89.0	5.4	480.6	6.4	569.6	7.2	640.8	8.0	712.0	11.0
ISWY16-38			38	72.1	6.5	468.7	7.6	548.0	8.6	620.1	9.5	685.0	13.2
ISWY16-44			44	60.9	7.5	456.8	8.8	535.9	9.9	602.9	11.0	669.9	14.7
ISWY16-51			51	52.3	8.7	455.0	10.2	533.5	11.5	601.5	12.7	664.2	17.7
ISWY16-64			64	41.2	10.9	449.1	12.8	527.4	14.4	593.3	16.0	659.2	21.9
ISWY16-76			76	34.1	12.9	439.9	15.2	518.3	17.1	583.1	19.0	647.9	27.8
ISWY16-89			89	29.5	15.1	445.5	17.8	525.1	20.0	590.0	22.2	654.9	31.2
ISWY16-102			102	25.6	17.3	442.9	20.4	522.2	23.0	588.8	25.5	652.8	37.9
ISWY16-115	3.2 x 2.9		115	22.4	19.6	439.0	23.0	515.2	25.9	580.2	28.7	642.9	44.5
ISWY16-305			305	8.4	51.9	436.0	61.0	512.4	68.6	576.2	76.3	640.9	113.0
ISWY20-25			25	293.0	4.3	1260	5.0	1465	5.6	1641	6.2	1817	6.9
ISWY20-32	20	10	32	224.0	5.4	1210	6.4	1434	7.2	1613	8.0	1792	9.4
ISWY20-38			38	177.0	6.5	1151	7.6	1345	8.6	1522	9.5	1682	12.0
ISWY20-44			44	149.0	7.5	1118	8.8	1311	9.9	1475	11.0	1639	13.5
ISWY20-51			51	128.0	8.7	1114	10.2	1306	11.5	1472	12.7	1626	16.2
ISWY20-64			64	99.0	10.9	1079	12.8	1267	14.4	1426	16.0	1584	21.2
ISWY20-76			76	81.7	12.9	1054	15.2	1242	17.1	1397	19.0	1552	24.7
ISWY20-89			89	69.5	15.1	1049	17.8	1237	20.0	1390	22.2	1543	28.8
ISWY20-102			102	60.6	17.3	1048	20.4	1236	23.0	1394	25.5	1545	34.8
ISWY20-115	4.1 x 3.8		115	53.0	19.6	1039	23.0	1219	25.9	1373	28.7	1521	39.0
ISWY20-127			127	47.5	21.6	1026	25.4	1207	28.6	1359	31.7	1506	43.0
ISWY20-139			139	43.0	23.6	1015	27.8	1195	31.3	1346	34.7	1492	45.3
ISWY20-152			152	39.0	25.8	1006	30.4	1186	34.2	1334	38.0	1482	50.4
ISWY20-305			305	20.0	51.9	1038	61.0	1220	68.6	1372	76.3	1526	103.0

Extra-strong load springs

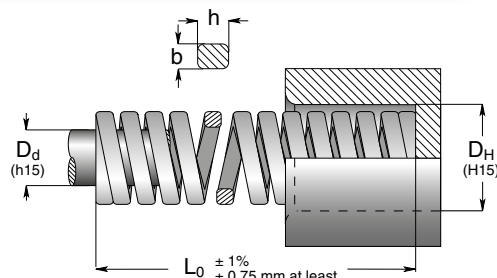
- ISWY -

Catalog-No.	D _H	D _d	L ₀	R	A		B		C		D		E
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		17%L ₀		20%L ₀		22.5%L ₀		25% L ₀	
	b x h			± 10%	+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000		do not use
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm
ISWY25-25	25	12.5	25	459.0	4.3	1974	5.0	2295	5.6	2570	6.3	2892	6.7
ISWY25-32			32	374.0	5.4	2020	6.4	2394	7.2	2693	8.0	2992	10.7
ISWY25-38			38	300.0	6.5	1950	7.6	2280	8.6	2580	9.5	2850	12.0
ISWY25-44			44	244.0	7.5	1830	8.8	2147	9.9	2416	11.0	2684	14.4
ISWY25-51			51	208.0	8.7	1810	10.2	2122	11.5	2392	12.8	2662	17.4
ISWY25-64			64	161.0	10.9	1755	12.8	2061	14.4	2318	16.0	2576	21.4
ISWY25-76			76	131.0	12.9	1690	15.2	1991	17.1	2240	19.0	2489	26.9
ISWY25-89			89	111.0	15.1	1676	17.8	1976	20.0	2220	22.3	2475	30.9
ISWY25-102			102	96.3	17.3	1666	20.4	1965	23.0	2210	25.5	2456	36.7
ISWY25-115			115	85.7	19.6	1680	23.0	1971	25.9	2217	28.8	2468	40.3
ISWY25-127			127	76.3	21.6	1648	25.4	1938	28.6	2180	31.8	2426	45.1
ISWY25-139			139	66.0	23.6	1558	27.8	1835	31.3	2066	34.8	2297	47.6
ISWY25-152			152	63.5	25.8	1638	30.4	1930	34.2	2172	38.0	2413	53.5
ISWY25-178			178	53.9	30.3	1633	35.6	1919	40.1	2159	44.5	2399	63.9
ISWY25-203			203	47.0	34.5	1622	40.6	1908	45.7	2147	50.8	2388	70.2
ISWY25-305			305	30.9	51.9	1604	61.0	1885	68.6	2121	76.3	2358	110
ISWY32-38	32	16	38	480.0	6.5	3120	7.6	3648	8.6	4128	9.5	4560	11.4
ISWY32-44			44	390.0	7.5	2925	8.8	3432	9.9	3861	11.0	4290	13.7
ISWY32-51			51	336.0	8.7	2923	10.2	3427	11.5	3864	12.7	4267	15.6
ISWY32-64			64	269.0	10.9	2932	12.8	3443	14.4	3874	16.0	4304	20.0
ISWY32-76			76	219.0	12.9	2825	15.2	3329	17.1	3745	19.0	4161	24.4
ISWY32-89			89	180.0	15.1	2718	17.8	3204	20.0	3600	22.2	3996	29.7
ISWY32-102			102	155.0	17.3	2682	20.4	3162	23.0	3565	25.5	3953	35.1
ISWY32-115			115	140.0	19.6	2744	23.0	3220	25.9	3626	28.7	4018	39.0
ISWY32-127			127	124.0	21.6	2678	25.4	3150	28.6	3546	31.7	3931	42.8
ISWY32-139			139	112.0	23.6	2643	27.8	3114	31.3	3506	34.7	3886	48.0
ISWY32-152			152	102.0	25.8	2632	30.4	3101	34.2	3488	38.0	3876	52.4
ISWY32-178			178	88.2	30.3	2672	35.6	3140	40.1	3537	44.5	3925	60.9
ISWY32-203			203	76.0	34.5	2622	40.6	3086	45.7	3473	50.7	3853	69.2
ISWY32-254			254	60.8	43.2	2627	50.8	3089	57.2	3478	64.0	3861	88.1
ISWY32-305			305	49.0	51.9	2543	61.0	2989	68.6	3361	76.3	3739	104.0
ISWY40-51	40	20	51	628.0	8.7	5464	10.2	6406	11.5	7222	12.7	7976	15.0
ISWY40-64			64	487.0	10.9	5308	12.8	6234	14.4	7013	16.0	7792	19.5
ISWY40-76			76	379.0	12.9	4889	15.2	5761	17.1	6481	19.0	7201	23.3
ISWY40-89			89	321.0	15.1	4847	17.8	5714	20.0	6420	22.2	7126	26.7
ISWY40-102			102	281.0	17.3	4861	20.4	5732	23.0	6463	25.5	7165	33.8
ISWY40-115			115	245.0	19.6	4802	23.0	5635	25.9	6346	28.7	7032	36.2
ISWY40-127			127	221.0	21.6	4774	25.4	5613	28.6	6321	31.7	7006	40.7
ISWY40-139			139	185.0	23.6	4366	27.8	5143	31.3	5791	34.7	6420	42.0
ISWY40-152			152	168.0	25.8	4334	30.4	5107	34.2	5746	38.0	6384	49.6
ISWY40-178			178	150.0	30.3	4545	35.6	5340	40.1	6015	44.5	6675	56.5
ISWY40-203			203	132.0	34.5	4554	40.6	5359	45.7	6032	50.7	6692	67.1
ISWY40-254			254	107.0	43.2	4622	50.8	5436	57.2	6120	64.0	6848	86.3
ISWY40-305			305	87.8	51.9	4557	61.0	5356	68.6	6023	76.3	6699	104.0
ISWY50-64	50	25	64	709.0	10.9	7728	12.8	9075	14.4	10210	16.0	11344	19.3
ISWY50-76			76	572.0	12.9	7379	15.2	8694	17.1	9781	19.0	10868	24.2
ISWY50-89			89	475.0	15.1	7173	17.8	8455	20.0	9500	22.2	10545	28.0
ISWY50-102			102	405.0	17.3	7007	20.4	8262	23.0	9315	25.5	10328	33.5
ISWY50-115			115	352.0	19.6	6899	23.0	8096	25.9	9117	28.7	10102	38.6
ISWY50-127			127	316.0	21.6	6826	25.4	8026	28.6	9038	31.7	10017	41.4
ISWY50-139			139	289.0	23.6	6820	27.8	8034	31.3	9046	34.7	10028	47.3
ISWY50-152			152	255.0	25.8	6579	30.4	7752	34.2	8721	38.0	9690	50.2
ISWY50-178			178	215.0	30.3	6515	35.6	7654	40.1	8622	44.5	9568	61.1
ISWY50-203			203	187.0	34.5	6452	40.6	7592	45.7	8546	50.7	9481	67.7
ISWY50-254			254	153.0	43.2	6610	50.8	7772	57.2	8752	64.0	9792	87.0
ISWY50-305			305	127.0	51.9	6591	61.0	7747	68.6	8712	76.3	9690	104.0
ISWY63-76	63	38	76	952.0	12.9	12281	15.2	14470	-	-	-	-	15.5
ISWY63-89			89	819.0	15.1	12367	17.8	14578	-	-	-	-	20.0
ISWY63-102			102	700.0	17.3	12110	20.4	14280	23.0	16100	25.5	17850	30.7
ISWY63-115			115	620.0	19.6	12152	23.0	14260	25.9	16058	28.7	17860	34.9
ISWY63-127			127	565.0	21.6	12204	25.4	14351	28.6	16159	31.7	17967	38.0
ISWY63-152			152	458.0	25.8	11816	30.4	13923	34.2	15664	38.0	17404	47.2
ISWY63-178			178	384.0	30.3	11635	35.6	13670	40.1	15398	44.5	17088	55.8
ISWY63-203			203	337.0	34.5	11627	40.6	13682	45.7	15401	50.7	17120	64.8
ISWY63-254			254	263.0	43.2	11362	50.8	13360	57.2	15044	63.5	16701	86.7
ISWY63-305			305	218.0	51.9	11314	61.0	13298	68.6	14955	76.3	16633	106.0

Ultra-strong load springs

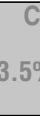
- ISWS -

Rectangular Wire



Catalog-No.

ISWS 13—25

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E	
	Hole Diameter	Rod Diameter		Spring Rate	10%L ₀	12%L ₀	13.5%L ₀	15% L ₀							
	b x h		± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	do not use							
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm		
ISWS10-25	10	5	25	167.0	2.5	417.5	3.0	501.0	3.4	567.8	3.8	634.6	5.9		
ISWS10-32			32	130.0	3.2	416.0	3.8	494.0	4.3	559.0	4.8	624.0	7.5		
ISWS10-38			38	105.0	3.8	399.0	4.6	483.0	5.1	535.5	5.7	598.5	8.2		
ISWS10-44			44	86.0	4.4	378.4	5.3	455.8	5.9	507.4	6.6	567.6	11.0		
ISWS10-51			51	79.0	5.1	402.9	6.1	481.9	6.9	545.1	7.7	608.3	12.5		
ISWS10-64			64	62.0	6.4	396.8	7.7	477.4	8.6	533.2	9.6	595.2	15.8		
ISWS10-76			76	51.0	7.6	387.6	9.1	464.1	10.3	525.3	11.4	581.4	19.0		
ISWS10-305			2.0 x 2.8		305	11.5	30.5	350.8	36.6	420.9	41.2	473.8	45.8	526.7	89.0
ISWS13-25	12.5	6.3	25	288.0	2.5	720	3.0	864	3.4	979	3.8	1094	5.6		
ISWS13-32			32	216.0	3.2	691	3.8	821	4.3	929	4.8	1037	7.3		
ISWS13-38			38	176.0	3.8	669	4.6	810	5.1	898	5.7	1003	9.2		
ISWS13-44			44	149.0	4.4	656	5.3	790	5.9	879	6.6	983	11.1		
ISWS13-51			51	128.0	5.1	653	6.1	781	6.9	883	7.7	986	12.6		
ISWS13-64			64	100.0	6.4	640	7.7	770	8.6	860	9.6	960	16.1		
ISWS13-76			76	84.0	7.6	638	9.1	764	10.3	865	11.4	958	19.3		
ISWS13-89			89	71.0	8.9	632	10.7	760	12.0	852	13.4	951	23.3		
ISWS13-102	12.5	6.3	102	61.0	10.2	622	12.2	744	13.8	842	15.3	933	26.9		
ISWS13-305			2.75 x 3.4		305	22.0	30.5	671	36.6	805	41.2	906	45.8	1008	94.0
ISWS16-32			16	8	32	449.0	3.2	1437	3.8	1706	4.3	1931	4.8	2155	6.6
ISWS16-38					38	363.0	3.8	1379	4.6	1670	5.1	1851	5.7	2069	8.1
ISWS16-44	44	309.0			4.4	1360	5.3	1638	5.9	1823	6.6	2039	10.1		
ISWS16-51	51	256.0			5.1	1306	6.1	1562	6.9	1766	7.7	1971	11.3		
ISWS16-64	64	203.0			6.4	1299	7.7	1563	8.6	1746	9.6	1949	14.3		
ISWS16-76	76	166.0			7.6	1262	9.1	1511	10.3	1710	11.4	1892	18.0		
ISWS16-89	89	139.0			8.9	1237	10.7	1487	12.0	1668	13.4	1863	20.5		
ISWS16-102	102	114.0			10.2	1163	12.2	1391	13.8	1573	15.3	1744	24.3		
ISWS16-115	16	8	115	105.0	11.5	1208	13.8	1449	15.5	1628	17.3	1817	27.0		
ISWS16-127			127	94.0	12.7	1194	15.2	1429	17.1	1607	19.1	1795	31.5		
ISWS16-152			152	78.0	15.2	1186	18.2	1420	20.5	1599	22.8	1778	38.0		
ISWS16-305			3.5 x 4.75		305	38.8	30.5	1183	36.6	1420	41.2	1599	45.8	1777	77.2
ISWS20-44	20	10	44	452.0	4.4	1989	5.3	2396	5.9	2667	6.6	2983	8.9		
ISWS20-51			51	378.0	5.1	1928	6.1	2306	6.9	2608	7.7	2911	10.6		
ISWS20-64			64	301.0	6.4	1926	7.7	2318	8.6	2589	9.6	2890	13.8		
ISWS20-76			76	247.0	7.6	1877	9.1	2248	10.3	2544	11.4	2816	16.2		
ISWS20-89			89	208.0	8.9	1851	10.7	2226	12.0	2496	13.4	2787	20.1		
ISWS20-102			102	188.0	10.2	1918	12.2	2294	13.8	2594	15.3	2876	22.3		
ISWS20-115			115	159.0	11.5	1829	13.8	2194	15.5	2465	17.3	2751	25.5		
ISWS20-127			127	146.0	12.7	1854	15.2	2219	17.1	2497	19.1	2789	27.9		
ISWS20-152	20	10	152	120.0	15.2	1824	18.2	2184	20.5	2460	22.8	2736	34.1		
ISWS20-305			4.0 x 6.0		305	60.0	30.5	1830	36.6	2196	41.2	2472	45.8	2748	68.8

Ultra-strong load springs

- ISWS -

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D	 E		
	Hole Diameter	Rod Diameter	Free Length	Spring Rate	10%L ₀	12%L ₀	13.5%L ₀	15% L ₀	do not use						
	b x h		± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000								
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm		
ISWS25-44	25	12.5	44	1158.0	4.4	5095	5.3	6137	5.9	6832	6.6	7643	9.8		
ISWS25-51			51	933.0	5.1	4758	6.1	5691	6.9	6438	7.7	7184	11.0		
ISWS25-64			64	644.0	6.4	4122	7.7	4959	8.6	5538	9.6	6182	13.0		
ISWS25-76			76	556.0	7.6	4226	9.1	5060	10.3	5727	11.4	6338	16.0		
ISWS25-89			89	462.0	8.9	4112	10.7	4943	12.0	5544	13.4	6191	20.0		
ISWS25-102			102	390.0	10.2	3978	12.2	4758	13.8	5382	15.3	5967	23.0		
ISWS25-115			115	360.0	11.5	4140	13.8	4968	15.5	5580	17.3	6228	26.0		
ISWS25-127			127	326.0	12.7	4140	15.2	4955	17.1	5575	19.1	6227	28.0		
ISWS25-152			152	255.0	15.2	3876	18.2	4641	20.5	5228	22.8	5814	34.0		
ISWS25-178			178	230.0	17.8	4094	21.4	4922	24.0	5520	26.7	6141	39.0		
ISWS25-203	5.6 x 7.5		203	202.0	20.3	4101	24.4	4929	27.4	5535	30.5	6161	45.0		
ISWS25-305			305	136.0	30.5	4148	36.6	4978	41.2	5603	45.8	6229	63.0		
ISWS32-44	32	16	44	1300.0	4.4	5720	5.3	6890	5.9	7670	6.6	8580	9.3		
ISWS32-51			51	1150.0	5.1	5865	6.1	7015	6.9	7935	7.7	8855	10.4		
ISWS32-64			64	1077.0	6.4	6893	7.7	8293	8.6	9262	9.6	10339	13.0		
ISWS32-76			76	874.0	7.6	6642	9.1	7953	10.3	9002	11.4	9964	16.0		
ISWS32-89			89	721.0	8.9	6417	10.7	7715	12.0	8652	13.4	9661	20.0		
ISWS32-102			102	620.0	10.2	6324	12.2	7564	13.8	8556	15.3	9486	23.0		
ISWS32-115			115	560.0	11.5	6440	13.8	7728	15.5	8680	17.3	9688	26.0		
ISWS32-127			127	496.0	12.7	6299	15.2	7539	17.1	8482	19.1	9474	28.0		
ISWS32-152			152	408.0	15.2	6202	18.2	7426	20.5	8364	22.8	9302	34.0		
ISWS32-178			178	353.0	17.8	6283	21.4	7554	24.0	8472	26.7	9425	39.0		
ISWS32-203	7.5 x 9.2		203	304.0	20.3	6171	24.4	7418	27.4	8330	30.5	9272	45.0		
ISWS32-254			254	243.0	25.4	6172	30.5	7412	34.3	8335	38.1	9258	62.0		
ISWS32-305			305	196.0	30.5	5978	36.6	7174	41.2	8075	45.8	8977	75.0		
ISWS40-64	40	20	64	1128.0	6.4	7219	7.7	8686	8.6	9701	9.6	10829	12.0		
ISWS40-76			76	1017.0	7.6	7729	9.1	9255	10.3	10475	11.4	11594	14.5		
ISWS40-89			89	880.0	8.9	7832	10.7	9416	12.0	10560	13.4	11792	20.0		
ISWS40-102			102	762.0	10.2	7772	12.2	9296	13.8	10516	15.3	11659	23.0		
ISWS40-115			115	679.0	11.5	7809	13.8	9370	15.5	10525	17.3	11747	26.0		
ISWS40-127			127	622.0	12.7	7899	15.2	9454	17.1	10636	19.1	11880	28.0		
ISWS40-152			152	509.0	15.2	7737	18.2	9264	20.5	10435	22.8	11605	36.0		
ISWS40-178			178	429.0	17.8	7636	21.4	9181	24.0	10296	26.7	11454	43.0		
ISWS40-203			203	374.0	20.3	7592	24.4	9126	27.4	10248	30.5	11407	49.0		
ISWS40-254			8.5 x 11.0		254	296.0	25.4	7518	30.5	9028	34.3	10153	38.1	11278	62.0
ISWS40-305			305	246.0	30.5	7503	36.6	9004	41.2	10135	45.8	11267	75.0		
ISWS50-64	50	25	64	1980.0	6.4	12672	7.7	15246	8.6	17028	9.6	19008	13.4		
ISWS50-76			76	1811.0	7.6	13764	9.1	16480	10.3	18653	11.4	20645	16.3		
ISWS50-89			89	1410.0	8.9	12549	10.7	15087	12.0	16920	13.4	18894	19.0		
ISWS50-102			102	1215.0	10.2	12393	12.2	14823	13.8	16767	15.3	18590	22.0		
ISWS50-115			115	1076.0	11.5	12374	13.8	14849	15.5	16678	17.3	18615	25.0		
ISWS50-127			127	968.0	12.7	12294	15.2	14714	17.1	16553	19.1	18489	28.0		
ISWS50-152			152	806.0	15.2	12251	18.2	14669	20.5	16523	22.8	18377	34.0		
ISWS50-178			178	698.0	17.8	12424	21.4	14937	24.0	16752	26.7	18637	40.0		
ISWS50-203			203	612.0	20.3	12424	24.4	14933	27.4	16769	30.5	18666	45.0		
ISWS50-254			11.8 x 13.5		254	472.0	25.4	11989	30.5	14396	34.3	16190	38.1	17983	58.0
ISWS50-305			305	388.0	30.5	11834	36.6	14201	41.2	15986	45.8	17770	70.0		
ISWS63-76	63	38	76	1900.0	7.6	14440	9.1	17290	10.3	19570	11.4	21660	13.0		
ISWS63-89			89	1517.0	8.9	13501	10.7	16232	12.0	18204	13.4	20328	20.0		
ISWS63-102			102	1295.0	10.2	13209	12.2	15799	13.8	17871	15.3	19814	23.0		
ISWS63-115			115	1070.0	11.5	12305	13.8	14766	15.5	16585	17.3	18511	27.0		
ISWS63-127			127	979.0	12.7	12433	15.2	14881	17.1	16741	19.1	18699	30.0		
ISWS63-152			152	775.0	15.2	11780	18.2	14105	20.5	15888	22.8	17670	35.0		
ISWS63-178			178	630.0	17.8	11214	21.4	13482	24.0	15120	26.7	16821	44.0		
ISWS63-203			203	546.0	20.3	11084	24.4	13322	27.4	14960	30.5	16653	48.0		
ISWS63-254			11.8 x 17.8		254	423.0	25.4	10744	30.5	12902	34.3	14509	38.1	16116	62.0
ISWS63-305					305	349.0	30.5	10645	36.6	12773	41.2	14379	45.8	15984	77.0

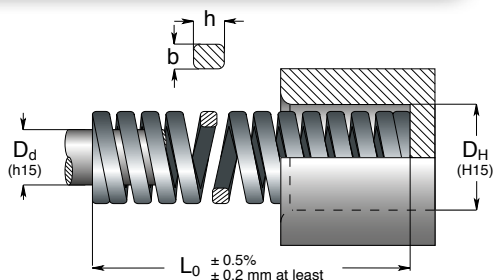
Super-strong load springs

- ISWT -

Rectangular Wire

Catalog-No.

ISWT 13—50

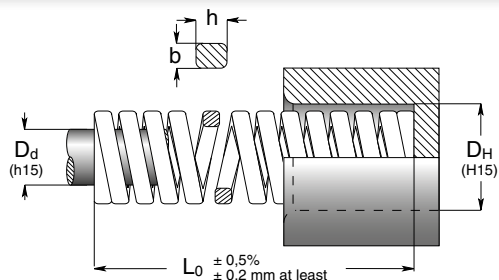


Catalog-No.	D _H	D _d	L ₀	R	F max.	
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		
	b x h			± 10%		
	mm	mm	mm	N/mm	mm	N
ISWT10-20	10	5	20	580.0	2.2	1250
ISWT10-30			30	360.0	3.5	
ISWT10-40			40	260.0	4.8	
ISWT10-50	2.1 x 4		50	200.0	6.0	
ISWT13-20	12.5	6.3	20	970.0	2.4	2000
ISWT13-30			30	590.0	3.3	
ISWT13-40			40	400.0	5.0	
ISWT13-50	2.65 x 5.35		50	320.0	6.0	
ISWT16-20	16	8	20	1650.0	2.1	3500
ISWT16-35			35	920.0	3.8	
ISWT16-50			50	580.0	6.0	
ISWT16-75	3.4 x 6.9		75	410.0	8.5	
ISWT16-100			100	280.0	12.5	
ISWT19-25	19	10	25	2270.0	2.2	5000
ISWT19-40			40	1160.0	4.3	
ISWT19-50			50	830.0	6.0	
ISWT19-75	4.1 x 8.3		75	500.0	10.0	
ISWT19-100			100	380.0	14.0	
ISWT25-30	25	12.5	30	4550.0	2.2	10000
ISWT25-50			50	2000.0	5.0	
ISWT25-60			60	1500.0	6.5	
ISWT25-75	6 x 11		75	1250.0	8.0	
ISWT25-100			100	900.0	11.1	
ISWT25-125			125	710.0	14.0	
ISWT32-35	32	16	35	5360.0	2.8	15000
ISWT32-50			50	3000.0	5.0	
ISWT32-75			75	1670.0	9.0	
ISWT32-100	7.4 x 13		100	1200.0	12.5	
ISWT32-125			125	940.0	16.0	
ISWT32-150	7.4 x 13		150	810.0	18.5	
ISWT38-40	38	20	40	5710.0	3.5	20000
ISWT38-50			50	4000.0	5.0	
ISWT38-75			75	2220.0	9.0	
ISWT38-100	8.25 x 16		100	1540.0	13.0	
ISWT38-150			150	1050.0	19.0	
ISWT38-200	8.25 x 16		200	740.0	27.0	
ISWT50-60	50	25	60	4605.0	7.6	35000
ISWT50-75			75	3932.0	8.9	
ISWT50-100			100	2650.0	13.2	
ISWT50-125	11.8 x 17.8		125	2000.0	17.5	
ISWT50-150			150	1605.0	21.8	
ISWT50-200			200	1167.0	30.0	

Rectangular Wire

Catalog-No.

ISWW 32—50

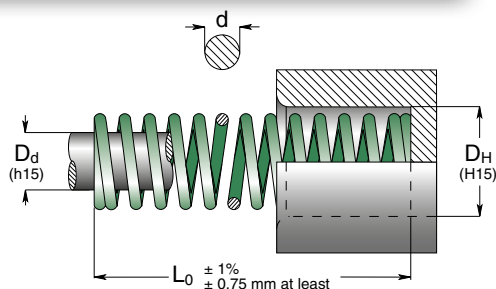


Catalog-No.	D _H	D _d	L ₀	R	F max.	
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		
	b x h			± 10%		
	mm	mm	mm	N/mm	mm	N
ISWW16-20	16	6.3	20	1818.0	2.2	4000
ISWW16-35			35	1000.0	4.0	
ISWW16-50			50	615.0	6.5	
ISWW16-75			75	400.0	10.0	
ISWW16-100	4.6 x 5.0		100	286.0	14.0	
ISWW19-25	19	8	25	2400.0	2.5	6000
ISWW19-40			40	1333.0	4.5	
ISWW19-50			50	1000.0	6.0	
ISWW19-75			75	600.0	10.0	
ISWW19-100	5.1 x 6.5		100	429.0	14.0	
ISWW25-30	25	10	30	4800.0	2.5	12000
ISWW25-50			50	2400.0	5.0	
ISWW25-75			75	1500.0	8.0	
ISWW25-100			100	1000.0	12.0	
ISWW25-125	6.9 x 9.1		125	857.0	14.0	
ISWW32-35	32	12.5	35	6667.0	3.0	20000
ISWW32-50			50	3636.0	5.5	
ISWW32-75			75	2222.0	9.0	
ISWW32-100			100	1538.0	13.0	
ISWW32-125	9.25 x 10.8		125	1250.0	16.0	
ISWW32-150	38	16	150	1053.0	19.0	25000
ISWW38-40			40	7143.0	3.5	
ISWW38-50			50	5000.0	5.0	
ISWW38-75			75	2778.0	9.0	
ISWW38-100	10.5 x 12.6		100	1923.0	13.0	
ISWW38-150			150	1316.0	19.0	
ISWW38-200			200	926.0	27.0	

Light load springs

- ISWTG -

Round Wire

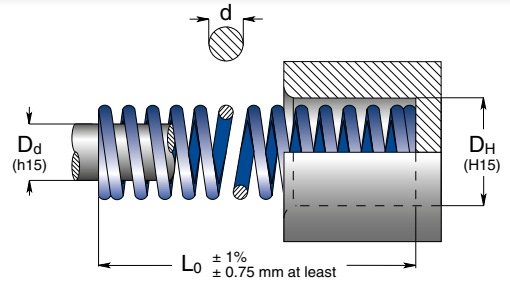


Catalog-No.

ISWTG 13—51

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E
	Hole Diameter	Rod Diameter		Spring Rate	25%L ₀	30%L ₀	35%L ₀	40% L ₀						
	d		± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	do not use						
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	
ISWTG6-16	6.3	4.4	16	1.6	4.0	6.2	4.8	7.4	5.6	8.7	6.4	9.9	5.6	
ISWTG6-25			25	1.0	6.3	6.1	7.5	7.3	8.8	8.5	10.0	9.7	8.2	
ISWTG6-38			38	0.6	9.5	5.9	11.4	7.1	13.3	8.2	15.2	9.4	11.9	
ISWTG6-51	0.6		51	0.5	12.8	6.4	15.3	7.7	17.9	8.9	20.4	10.2	16.0	
ISWTG8-16	8.3	5.9	16	2.5	4.0	9.8	4.8	11.8	5.6	13.8	6.4	15.7	5.2	
ISWTG8-25			25	1.6	6.3	9.8	7.5	11.7	8.8	13.7	10.0	15.6	7.7	
ISWTG8-38			38	1.1	9.5	10.4	11.4	12.4	13.3	14.5	15.2	16.6	10.9	
ISWTG8-51	0.8		51	0.8	12.8	9.9	15.3	11.9	17.9	13.9	20.4	15.9	14.1	
ISWTG10-25	10	5	25	4.4	6.3	27.7	7.5	33.0	8.8	38.7	10.0	44.0	13.2	
ISWTG10-32			32	3.4	8.0	27.2	9.6	32.6	11.2	38.1	12.8	43.5	16.5	
ISWTG10-38			38	2.8	9.5	26.6	11.4	31.9	13.3	37.2	15.2	42.6	19.8	
ISWTG10-44			44	2.4	11.0	26.4	13.2	31.7	15.4	37.0	17.6	42.2	23.1	
ISWTG10-51			51	2.1	12.8	26.9	15.3	32.1	17.9	37.6	20.4	42.8	26.9	
ISWTG10-64			64	1.6	16.0	25.6	19.2	30.7	22.4	35.8	25.6	41.0	33.3	
ISWTG10-76	1.1		76	1.3	19.0	24.7	22.8	29.6	26.6	34.6	30.4	39.5	39.6	
ISWTG10-305			305	0.3	76.3	22.9	91.5	27.5	106.8	32.0	122.0	36.6	157.0	
ISWTG13-25	12.5	6.3	25	8.5	6.3	53.6	7.5	63.8	8.8	74.8	10.0	85.0	13.5	
ISWTG13-32			32	6.5	8.0	52.0	9.6	62.4	11.2	72.8	12.8	83.2	16.8	
ISWTG13-38			38	5.3	9.5	50.4	11.4	60.4	13.3	70.5	15.2	80.6	20.3	
ISWTG13-44			44	4.4	11.0	48.4	13.2	58.1	15.4	67.8	17.6	77.4	23.9	
ISWTG13-51			51	3.8	12.8	48.6	15.3	58.1	17.9	68.0	20.4	77.5	26.9	
ISWTG13-64			64	2.9	16.0	46.4	19.2	55.7	22.4	65.0	25.6	74.2	33.3	
ISWTG13-76			76	2.5	19.0	47.5	22.8	57.0	26.6	66.5	30.4	76.0	41.1	
ISWTG13-89			89	2.1	22.3	46.8	26.7	56.1	31.2	65.5	35.6	74.8	48.3	
ISWTG13-305	1.5		305	0.6	76.3	45.8	91.5	54.9	106.8	64.1	122.0	73.2	163.0	
ISWTG16-25	16	8	25	17.9	6.3	112.8	7.5	134.3	8.8	157.5	10.0	179.0	14.7	
ISWTG16-32			32	13.5	8.0	108.0	9.6	129.6	11.2	151.2	12.8	172.8	18.5	
ISWTG16-38			38	10.5	9.5	99.8	11.4	119.7	13.3	139.7	15.2	159.6	22.4	
ISWTG16-44			44	8.8	11.0	96.8	13.2	116.2	15.4	135.5	17.6	154.9	25.9	
ISWTG16-51			51	7.6	12.8	97.3	15.3	116.3	17.9	136.0	20.4	155.0	30.0	
ISWTG16-64			64	5.9	16.0	94.4	19.2	113.3	22.4	132.2	25.6	151.0	37.8	
ISWTG16-76			76	4.8	19.0	91.2	22.8	109.4	26.6	127.7	30.4	145.9	45.2	
ISWTG16-89			89	4.0	22.3	89.2	26.7	106.8	31.2	124.8	35.6	142.4	52.8	
ISWTG16-102			102	3.5	25.5	89.3	30.6	107.1	35.7	125.0	40.8	142.8	60.7	
ISWTG16-305	2		305	1.1	76.3	83.9	91.5	100.7	106.8	117.5	122.0	134.2	184.0	

Round Wire



Catalog-No.

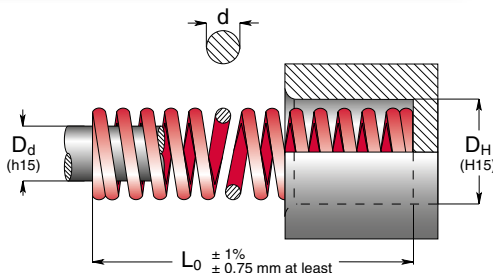
ISWTB 13—76

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		25%L ₀		30%L ₀		33.75%L ₀		37.5% L ₀		
	d			± 10%	+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000		do not use	
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	mm
ISWTB6-16	6.3	3.9	16	4.7	4.0	18.8	4.8	22.6	5.4	25.4	6.0	28.2	6.7	
ISWTB6-25			25	2.9	6.3	17.8	7.5	21.4	8.4	24.0	9.4	26.7	10.1	
ISWTB6-38			38	1.8	9.5	17.5	11.4	21.0	12.8	23.6	14.3	26.2	14.4	
ISWTB6-51	0.8		51	1.5	12.8	18.7	15.3	22.5	17.2	25.3	19.1	28.1	18.7	
ISWTB8-16	8.3	5.5	16	5.4	4.0	21.5	4.8	25.8	5.4	29.1	6.0	32.3	6.9	
ISWTB8-25			25	3.6	6.3	22.8	7.5	27.3	8.4	30.7	9.4	34.1	9.5	
ISWTB8-38			38	2.4	9.5	22.9	11.4	27.5	12.8	30.9	14.3	34.3	13.9	
ISWTB8-51	1.0		51	1.9	12.8	24.4	15.3	29.2	17.2	32.9	19.1	36.5	18.4	
ISWTB10-25	10	5	25	12.3	6.3	77.5	7.5	92.3	8.4	103.3	9.4	115.6	10.4	
ISWTB10-32			32	9.5	8.0	76.0	9.6	91.2	10.8	102.6	12.0	114.0	13.2	
ISWTB10-38			38	7.8	9.5	74.1	11.4	88.9	12.8	99.8	14.2	110.8	16.0	
ISWTB10-44			44	6.5	11.0	71.5	13.2	85.8	14.9	96.9	16.5	107.3	18.5	
ISWTB10-51			51	5.6	12.8	71.7	15.3	85.7	17.2	96.3	19.1	107.0	21.1	
ISWTB10-64			64	4.5	16.0	72.0	19.2	86.4	21.6	97.2	24.0	108.0	26.4	
ISWTB10-76	1.5		76	3.7	19.0	70.3	22.8	84.4	25.7	95.1	28.5	105.5	31.8	
ISWTB10-305	12.5	6.3	305	0.9	76.3	68.7	91.5	82.4	102.9	92.6	114.0	102.6	129.0	
ISWTB13-25			25	21.7	6.3	136.7	7.5	162.8	8.4	182.3	9.4	204.0	11.2	
ISWTB13-32			32	16.8	8.0	134.4	9.6	161.3	10.8	181.4	12.0	201.6	14.0	
ISWTB13-38			38	13.8	9.5	131.1	11.4	157.3	12.8	176.6	14.2	196.0	17.3	
ISWTB13-44			44	11.6	11.0	127.6	13.2	153.1	14.9	172.8	16.5	191.4	19.8	
ISWTB13-51			51	10.0	12.8	128.0	15.3	153.0	17.2	172.0	19.1	191.0	22.9	
ISWTB13-64			64	7.8	16.0	124.8	19.2	149.8	21.6	168.5	24.0	187.2	28.4	
ISWTB13-76			76	6.4	19.0	121.6	22.8	145.9	25.7	164.5	28.5	182.4	34.3	
ISWTB13-89	1.8		89	5.6	22.3	124.9	26.7	149.5	30.0	168.0	33.3	186.5	41.4	
ISWTB13-305	16	8	305	1.5	76.3	114.5	91.5	137.3	102.9	154.4	114.0	171.0	139.0	
ISWTB16-25			25	31.9	6.3	201.0	7.5	239.3	8.4	268.0	9.4	299.9	10.9	
ISWTB16-32			32	24.0	8.0	192.0	9.6	230.4	10.8	259.2	12.0	288.0	13.7	
ISWTB16-38			38	19.4	9.5	184.3	11.4	221.2	12.8	248.3	14.2	275.5	16.5	
ISWTB16-44			44	16.1	11.0	177.1	13.2	212.5	14.9	239.9	16.5	265.7	19.3	
ISWTB16-51			51	13.8	12.8	176.6	15.3	211.1	17.2	237.4	19.1	263.6	22.1	
ISWTB16-64			64	10.7	16.0	171.2	19.2	205.4	21.6	231.1	24.0	256.8	27.4	
ISWTB16-76			76	8.8	19.0	167.2	22.8	200.6	25.7	226.2	28.5	250.8	33.0	
ISWTB16-89			89	7.5	22.3	167.3	26.7	200.3	30.0	225.0	33.3	249.8	38.6	
ISWTB16-102			102	6.5	25.5	165.8	30.6	198.9	34.4	223.6	38.2	248.3	44.5	
ISWTB16-305	2.2		305	2.1	76.3	160.2	91.5	192.2	102.9	216.1	114.0	239.4	134.0	

Strong load springs

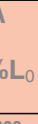
- ISWTR -

Round Wire

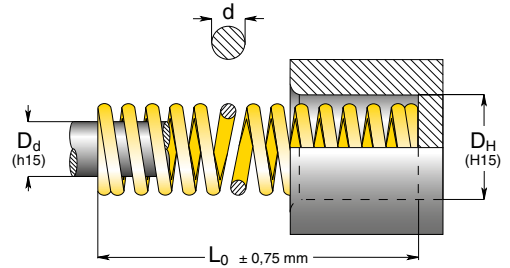


Catalog-No.

ISWTR 13—51

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E
	Hole Diameter	Rod Diameter		Spring Rate	20%L ₀	25%L ₀	27.5%L ₀	30% L ₀						
	d			± 10%	+ 3.000.000	~ 1.500.000	300 - 500.000	100 - 200.000	do not use					
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	
ISWTR6-16	6.3	3.6	16	12.7	3.2	40.8	4.0	51.0	4.4	56.1	4.8	61.2	7.9	
ISWTR6-25			25	7.7	5.0	38.7	6.3	48.4	6.9	53.2	7.5	58.1	12.1	
ISWTR6-38			38	4.9	7.6	37.3	9.5	46.6	10.5	51.3	11.4	56.0	17.4	
ISWTR6-51	1.0		51	3.7	10.2	37.4	12.8	46.8	14.0	51.5	15.3	56.2	23.1	
ISWTR8-16	8.3	5.2	16	12.5	4.0	50.0	4.0	50.0	4.4	55.0	4.8	60.0	8.2	
ISWTR8-25			25	6.9	5.0	34.5	6.3	43.1	6.9	47.4	7.5	51.8	12.4	
ISWTR8-38			38	5.1	7.6	38.4	9.5	48.0	10.5	52.8	11.4	57.6	16.9	
ISWTR8-51	1.2		51	4.0	10.2	40.8	12.8	51.0	14.0	56.1	15.3	61.2	23.2	
ISWTR10-25	10	5	25	20.7	5.0	103.5	6.3	130.4	6.9	142.8	7.5	155.3	8.6	
ISWTR10-32			32	16.1	6.4	103.0	8.0	128.8	8.8	141.7	9.6	154.6	10.9	
ISWTR10-38			38	13.0	7.6	98.8	9.5	123.5	10.5	136.5	11.4	148.2	13.2	
ISWTR10-44			44	10.9	8.8	95.9	11.0	119.9	12.1	131.9	13.2	143.9	14.7	
ISWTR10-51			51	9.6	10.2	97.9	12.8	122.9	14.0	134.4	15.3	146.9	17.8	
ISWTR10-64			64	7.7	12.8	98.6	16.0	123.2	17.6	135.5	19.2	147.8	22.9	
ISWTR10-76	1.6		76	6.3	15.2	95.8	19.0	119.7	20.9	131.7	22.8	143.6	26.9	
ISWTR10-305			305	1.5	61.0	91.5	76.3	114.5	83.9	125.9	91.5	137.3	110.0	
ISWTR13-25	12.5	6.3	25	37.5	5.0	187.5	6.3	236.3	6.9	258.8	7.5	281.3	8.9	
ISWTR13-32			32	28.9	6.4	185.0	8.0	231.2	8.8	254.3	9.6	277.4	11.2	
ISWTR13-38			38	23.5	7.6	178.6	9.5	223.3	10.5	246.8	11.4	267.9	13.7	
ISWTR13-44			44	19.6	8.8	172.5	11.0	215.6	12.1	237.2	13.2	258.7	15.7	
ISWTR13-51			51	17.3	10.2	176.5	12.8	221.4	14.0	242.2	15.3	264.7	18.8	
ISWTR13-64			64	13.5	12.8	172.8	16.0	216.0	17.6	237.6	19.2	259.2	23.6	
ISWTR13-76			76	11.2	15.2	170.2	19.0	212.8	20.9	234.1	22.8	255.4	28.4	
ISWTR13-89			89	9.5	17.8	169.1	22.3	211.9	24.5	232.8	26.7	253.7	33.0	
ISWTR13-305	2.2		305	2.7	61.0	164.7	76.3	206.0	83.9	226.5	91.5	247.1	114.0	
ISWTR16-25	16	8	25	81.6	5.0	408.0	6.3	514.1	6.9	563.0	7.5	612.0	9.1	
ISWTR16-32			32	61.3	6.4	392.3	8.0	490.4	8.8	539.4	9.6	588.5	11.4	
ISWTR16-38			38	49.9	7.6	379.2	9.5	474.1	10.5	524.0	11.4	568.9	14.2	
ISWTR16-44			44	40.8	8.8	359.0	11.0	448.8	12.1	493.7	13.2	538.6	16.3	
ISWTR16-51			51	35.6	10.2	363.1	12.8	455.7	14.0	498.4	15.3	544.7	18.8	
ISWTR16-64			64	27.8	12.8	355.8	16.0	444.8	17.6	489.3	19.2	533.8	23.9	
ISWTR16-76			76	22.8	15.2	346.6	19.0	433.2	20.9	476.5	22.8	519.8	29.0	
ISWTR16-89			89	19.6	17.8	348.9	22.3	437.1	24.5	480.2	26.7	523.3	34.3	
ISWTR16-102			102	17.0	20.4	346.8	25.5	433.5	28.1	477.7	30.6	520.2	39.4	
ISWTR16-305	2.8		305	5.4	61.0	329.4	76.3	412.0	83.9	453.1	91.5	494.1	119.0	

Round Wire



Catalog-No.

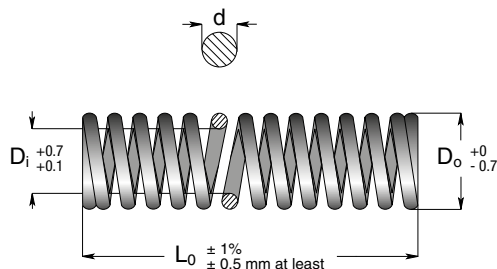
ISWTY 13—51

Catalog-No.	D _H	D _d	L ₀	R		A		B		C		D		E
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		17%L ₀		20%L ₀		22.5%L ₀		25% L ₀		
	d			± 10%		+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000	do not use	
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N	mm	
ISWTY6-16	6.3	3.2	16	33.0	2.7	89.8	3.2	105.6	3.6	118.8	4.0	132.0	9.2	
ISWTY6-25			25	19.8	4.3	84.2	5.0	99.1	5.6	111.4	6.3	123.8	14.4	
ISWTY6-38			38	11.9	6.5	77.0	7.6	90.6	8.6	101.9	9.5	113.2	21.6	
ISWTY6-51	8.3	4.5	51	9.5	8.7	82.5	10.2	97.0	11.5	109.1	12.8	121.3	27.8	
ISWTY8-16			16	30.9	2.7	83.9	3.2	98.7	3.6	111.1	4.0	123.4	9.3	
ISWTY8-25			25	23.0	4.3	97.8	5.0	115.0	5.6	129.4	6.3	143.8	13.8	
ISWTY8-38	1.5		38	13.2	6.5	85.5	7.6	100.5	8.6	113.1	9.5	125.7	22.9	
ISWTY8-51			51	9.3	8.7	80.3	10.2	94.5	11.5	106.3	12.8	118.1	29.3	

Not painted springs with anti-rust lubricant

- ISWL -

Round Wire



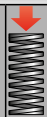
Catalog-No.

ISWL 13—76

Catalog-No.	D_o	D_i	L_0	R		A		B		C		D
	Hole Diameter	Rod Diameter	Free Length	Spring Rate		$16\%L_0$		$24\%L_0$		$28\%L_0$		$32\%L_0$
	d	d		$\pm 10\%$		$+3.000.000$		$\sim 1.500.000$		$300 - 500.000$		$100 - 200.000$
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N
ISWL3-10	3	2	10	2.94	1.6	4.4	2.4	6.62	2.8	6.9	3.2	8.8
ISWL3-15			15	1.96	2.4		3.6		4.2		4.8	
ISWL3-20			20	0.98	3.2		4.8		5.6		6.4	
ISWL3-25			25	0.98	4.0		6.0		7.0		8.0	
ISWL4-10	4	2.6	10	4.9	1.6	7.8	2.4	11.6	2.8	14.5	3.2	15.7
ISWL4-15			15	2.94	2.4		3.6		4.2		4.8	
ISWL4-20			20	2.94	3.2		4.8		5.6		6.4	
ISWL4-25			25	1.96	4.0		6.0		7.0		8.0	
ISWL4-30	6	4	30	1.96	4.8	17.7	7.2	26.5	8.4	32.4	9.6	35.5
ISWL6-15			15	7.85	2.4		3.6		4.2		4.8	
ISWL6-20			20	5.88	3.2		4.8		5.6		6.4	
ISWL6-25			25	4.90	4.0		6.0		7.0		8.0	
ISWL6-30	6	4	30	3.92	4.8	17.7	7.2	26.5	8.4	32.4	9.6	35.5
ISWL6-35			35	2.94	5.6		8.4		9.8		11.2	
ISWL8-15			15	12.75	2.4	31.4	3.6	47.1	4.2	55.6	4.8	62.8
ISWL8-20			20	9.81	3.2		4.8		5.6		6.4	
ISWL8-25	8	5.4	25	7.85	4.0		6.0		7.0		8.0	
ISWL8-30			30	6.86	4.8		7.2		8.4		9.6	
ISWL8-35			35	5.88	5.6		8.4		9.8		11.2	
ISWL8-40			40	4.90	6.4		9.6		11.2		12.8	
ISWL10-25	10	6.5	25	12.75	4.0	49	6.0	73.6	7.0	85.8	8.0	98
ISWL10-30			30	9.81	4.8		7.2		8.4		9.6	
ISWL10-35			35	8.83	5.6		8.4		9.8		11.2	
ISWL10-40			40	7.85	6.4		9.6		11.2		12.8	
ISWL10-45	10	6.5	45	6.86	7.2	49	10.8	73.6	12.6	85.8	14.4	98
ISWL10-50			50	5.88	8.0		12.0		14.0		16.0	
ISWL12-25			25	17.65	4.0	70.6	6.0	106.9	7.0	124.1	8.0	141.2
ISWL12-30			30	14.71	4.8		7.2		8.4		9.6	
ISWL12-35	12	8	35	12.75	5.6		8.4		9.8		11.2	
ISWL12-40			40	10.79	6.4		9.6		11.2		12.8	
ISWL12-45			45	9.81	7.2		10.8		12.6		14.4	
ISWL12-50	12	8	50	8.83	8.0		12.0		14.0		16.0	
ISWL12-55			55	7.85	8.8		13.2		15.4		17.6	
ISWL12-60			60	7.85	9.6		14.4		16.8		19.2	
ISWL14-25	14	9.3	25	24.52	4.0	96.1	6.0	144.2	7.0	167.7	8.0	192.2
ISWL14-30			30	19.61	4.8		7.2		8.4		9.4	
ISWL14-35			35	17.65	5.6		8.4		9.8		11.2	
ISWL14-40			40	14.71	6.4		9.6		11.2		12.8	
ISWL14-45	14	9.3	45	13.73	7.2	96.1	10.8	144.2	12.6	167.7	14.4	192.2
ISWL14-50			50	11.77	8.0		12.0		14.0		16.0	
ISWL14-55			55	10.79	8.8		13.2		15.4		17.6	
ISWL14-60			60	9.81	9.6		14.4		16.8		19.2	
ISWL14-65	14	9.3	65	8.83	10.4	96.1	15.6	144.2	18.2	167.7	20.8	192.2
ISWL14-70			70	8.83	11.2		16.8		19.6		22.4	
ISWL16-25			25	31.38	4.0	125.5	6.0	188.3	7.0	219.8	8.0	251.1
ISWL16-30			30	26.48	4.8		7.2		8.4		9.4	
ISWL16-35	16	10.7	35	22.56	5.6		8.4		9.8		11.2	
ISWL16-40			40	19.61	6.4		9.6		11.2		12.8	
ISWL16-45			45	17.65	7.2		10.8		12.6		14.4	
ISWL16-50			50	15.69	8.0		12.0		14.0		16.0	
ISWL16-55	16	10.7	55	14.71	8.8	125.5	13.2	188.3	15.4	219.8	17.6	251.1
ISWL16-60			60	12.75	9.6		14.4		16.8		19.2	
ISWL16-65			65	11.77	10.4		15.6		18.2		20.8	
ISWL16-70			70	10.79	11.2		16.8		19.6		22.4	
ISWL16-75	16	10.7	75	10.79	12.0	125.5	18.0	188.3	21.0	219.8	24.0	251.1
ISWL16-80			80	9.81	12.8		19.2		22.4		25.6	

Not painted springs with anti-rust lubricant

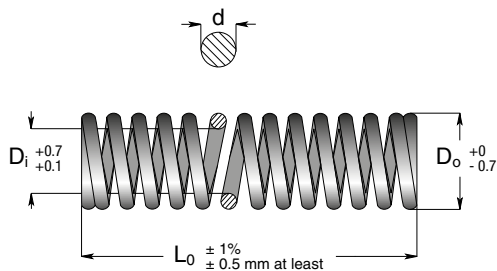
- ISWL -

Catalog-No.	D _o Hole Diameter	D _i Rod Diameter	L ₀ Free Length	R Spring Rate		A 16%L ₀		B 24%L ₀		C 28%L ₀		D 32% L ₀
	d			± 10%		+ 3.000.000		~ 1.500.000		300 - 500.000		100 - 200.000
	mm	mm	mm	N/mm	mm	N	mm	N	mm	N	mm	N
ISWL18-25	18	12	25	40.21	4.0	158.9	6.0	238.3	7.0	280.4	8.0	317.7
ISWL18-30			30	33.34	4.8		7.2		8.4		9.4	
ISWL18-35			35	28.44	5.6		8.4		9.8		11.2	
ISWL18-40			40	24.52	6.4		9.6		11.2		12.8	
ISWL18-45			45	22.56	7.2		10.8		12.6		14.4	
ISWL18-50			50	19.61	8.0		12.0		14.0		16.0	
ISWL18-55			55	17.65	8.8		13.2		15.4		17.6	
ISWL18-60			60	16.67	9.6		14.4		16.8		19.2	
ISWL18-65			65	15.69	10.4		15.6		18.2		20.8	
ISWL18-70			70	14.71	11.2		16.8		19.6		22.4	
ISWL18-75			75	13.73	12.0		18.0		21.0		24.0	
ISWL18-80			80	12.75	12.8		19.2		22.4		25.6	
ISWL18-90			90	10.79	14.4		21.6		25.2		28.8	
ISWL20-25	20	13.5	25	49.03	4.0	196.1	6.0	294.2	7.0	346.3	8.0	392.3
ISWL20-30			30	41.19	4.8		7.2		8.4		9.4	
ISWL20-35			35	35.3	5.6		8.4		9.8		11.2	
ISWL20-40			40	30.4	6.4		9.6		11.2		12.8	
ISWL20-45			45	27.46	7.2		10.8		12.6		14.4	
ISWL20-50			50	24.52	8.0		12.0		14.0		16.0	
ISWL20-55			55	22.56	8.8		13.2		15.4		17.6	
ISWL20-60			60	20.59	9.6		14.4		16.8		19.2	
ISWL20-65			65	18.63	10.4		15.6		18.2		20.8	
ISWL20-70			70	17.65	11.2		16.8		19.6		22.4	
ISWL20-75			75	16.67	12.0		18.0		21.0		24.0	
ISWL20-80			80	15.69	12.8		19.2		22.4		25.6	
ISWL20-90			90	13.73	14.4		21.6		25.2		28.8	
ISWL20-100			100	12.75	16.0		24.0		28.0		32.0	
ISWL22-25	22	14.7	25	59.82	4.0	237.3	6.0	356	7.0	415.9	8.0	474.6
ISWL22-30			30	49.03	4.8		7.2		8.4		9.4	
ISWL22-35			35	42.17	5.6		8.4		9.8		11.2	
ISWL22-40			40	37.27	6.4		9.6		11.2		12.8	
ISWL22-45			45	33.34	7.2		10.8		12.6		14.4	
ISWL22-50			50	29.42	8.0		12.0		14.0		16.0	
ISWL22-55			55	27.46	8.8		13.2		15.4		17.6	
ISWL22-60			60	24.52	9.6		14.4		16.8		19.2	
ISWL22-65			65	22.56	10.4		15.6		18.2		20.8	
ISWL22-70			70	21.57	11.2		16.8		19.6		22.4	
ISWL22-75			75	19.61	12.0		18.0		21.0		24.0	
ISWL22-80			80	18.63	12.8		19.2		22.4		25.6	
ISWL22-90			90	16.67	14.4		21.6		25.2		28.8	
ISWL22-100			100	14.71	16.0		24.0		28.0		32.0	
ISWL25-25	25	17	25	76.49	4.0	307	6.0	459.9	7.0	537.9	8.0	613.9
ISWL25-30			30	63.74	4.8		7.2		8.4		9.6	
ISWL25-35			35	54.92	5.6		8.4		9.8		11.2	
ISWL25-40			40	48.05	6.4		9.6		11.2		12.8	
ISWL25-45			45	42.17	7.2		10.8		12.6		14.4	
ISWL25-50			50	38.25	8.0		12.0		14.0		16.0	
ISWL25-55			55	35.30	8.8		13.2		15.4		17.6	
ISWL25-60			60	32.36	9.6		14.4		16.8		19.2	
ISWL25-65			65	29.42	10.4		15.6		18.2		20.8	
ISWL25-70			70	27.46	11.2		16.8		19.6		22.4	
ISWL25-75			75	25.50	12.0		18.0		21.0		24.0	
ISWL25-80			80	23.54	12.8		19.2		22.4		25.6	
ISWL25-90			90	21.57	14.4		21.6		25.2		28.8	
ISWL25-100			100	19.61	16.0		24.0		28.0		32.0	
ISWL30-50	30	20	50	51.94	8.0	414	12.0	621	14.0	724.1	16.0	828
ISWL30-60			60	44.10	9.6		14.4		16.8		19.2	
ISWL30-70			70	37.24	11.2		16.8		19.6		22.4	
ISWL30-80			80	32.34	12.8		19.2		22.4		25.6	
ISWL30-90			90	28.42	14.4		21.6		25.2		28.8	
ISWL30-100			100	25.48	16.0		24.0		28.0		32.0	
ISWL30-125			125	20.58	20.0		30.0		35.0		40.0	

Long size open ends

- ISWL -

Round Wire

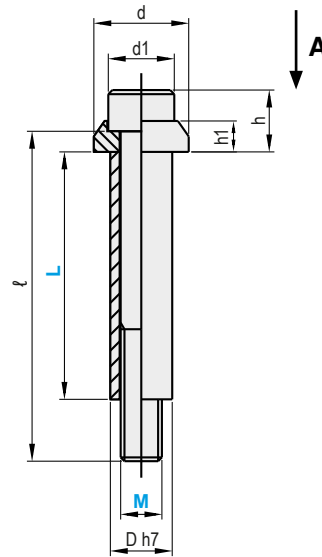


Catalog-No.

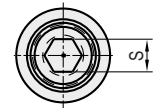
ISWL 22—300

Catalog-No.	D_o Hole Diameter	D_i Rod Diameter	d Wire Diameter	L₀ Free Length	P Pitch
	mm	mm	mm	mm	mm
ISWL03-300	3	2.0	0.4	300	1.04
ISWL04-300	4	2.6	0.6	300	1.50
ISWL06-300	6	4.0	0.9	300	2.00
ISWL08-300	8	5.4	1.2	300	2.80
ISWL10-300	10	6.5	1.5	300	3.50
ISWL12-300	12	8.0	1.8	300	4.30
ISWL14-300	14	9.3	2.2	300	4.80
ISWL16-300	16	10.7	2.4	300	5.50
ISWL18-300	18	12.0	2.8	300	5.30
ISWL20-300	20	13.5	3.0	300	6.80
ISWL22-300	22	14.7	3.4	300	6.70
ISWL25-300	25	17.0	3.8	300	8.20

Spacer / Spring unit



View A



Spacer Sleeve:

M Tempering Steel
H 1200 - 1400 N/mm²

Cup Washer:

M Tempering Steel
H 1000 N/mm²

Socket-Head Cap

Screw:
DIN 912 / ISO 4762
M 12.9

Please note the screw tightening torque!
See Table below.

d	d1	h	h1	ℓ	S	D	Catalog-No.		L
							Type	M	
15	10	10	5,5	35	5	10	SVC	M6	20
				40					25
				45					30
				50					35
				55					40
				60					45
				65					50
				70					55
				80					60
				90					70
				100					80
				110					90
				120					100
19	13	13	6,5	45	6	12,5	SVC	M8	30
				50					35
				55					40
				60					45
				65					50
				70					55
				80					60
				90					70
				100					80
				110					90
				120					100
				130					110
23	16	15	7,5	50	8	15	SVC	M10	30
				55					35
				60					40
				65					45
				70					50
				75					55
				80					60
				90					70
				100					80
				110					90
				120					100
				140					120

d	d1	h	h1	ℓ	S	D	Catalog-No.		L
							Type	M	
27	18	18	9	60	10	17,5	SVC	M12	40
				65					45
				70					50
				80					55
				90					60
				100					70
				110					80
				120					90
				130					100
				140					110
				150					120
				170					140
34	24	24	11	80	14	23	SVC	M16	50
				90					60
				100					70
				110					80
				120					90
				130					100
				140					110
				150					120
				180					140
				180					150
				200					160

Catalog-No.	-	L	Screw Tightening Torque for Steel 12.9 / [Nm]				
SVC M10	-	80	M6	M8	M10	M12	M16
SVC M16	-	150	13	32	65	120	290

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