Multi Turn, Metric

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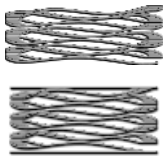
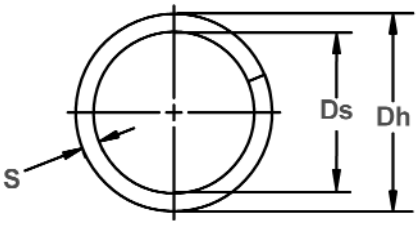
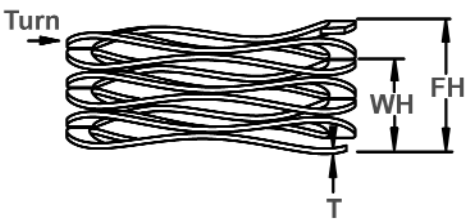
More turns equals less force. Utilizes nearly half the space as helical compression springs while producing the same force.

MWL,MWM, MWR Wave Springs

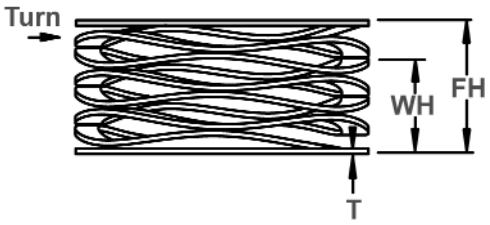




Multi-Turn Plain Ends



Multi-Turn Flat Shim Top



Wave Spring Measurements

WAVE SPRING NO.	HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWL-6 A*	6	4	6	0.61	1.52	2.5	3	0.13	0.51	6.56
MWL-6 B*	6	4	6	0.81	2.03	2.5	4	0.13	0.51	4.92
MWL-6 C*	6	4	6	1.02	2.54	2.5	5	0.13	0.51	3.94
MWL-6 D*	6	4	6	1.22	3.05	2.5	6	0.13	0.51	3.28
MWL-6 E*	6	4	6	1.42	3.56	2.5	7	0.13	0.51	2.81
MWL-6 F*	6	4	6	1.63	4.06	2.5	8	0.13	0.51	2.46
MWL-6 G*	6	4	6	1.83	4.57	2.5	9	0.13	0.51	2.19
MWL-6 H*	6	4	6	2.24	5.59	2.5	11	0.13	0.51	1.79
MWL-6 I*	6	4	6	2.64	6.60	2.5	13	0.13	0.51	1.51
MWM-6 A*	6	4	12	0.74	1.52	2.5	3	0.15	0.61	15.24
MWM-6 B*	6	4	12	0.97	2.03	2.5	4	0.15	0.61	11.25
MWM-6 C*	6	4	12	1.22	2.54	2.5	5	0.15	0.61	9.09
MWM-6 D*	6	4	12	1.47	3.05	2.5	6	0.15	0.61	7.62
MWM-6 E*	6	4	12	1.70	3.56	2.5	7	0.15	0.61	6.47
MWM-6 F*	6	4	12	1.96	4.06	2.5	8	0.15	0.61	5.69
MWM-6 G*	6	4	12	2.18	4.57	2.5	9	0.15	0.61	5.03
MWM-6 H*	6	4	12	2.69	5.59	2.5	11	0.15	0.61	4.14
MWM-6 I*	6	4	12	3.18	6.60	2.5	13	0.15	0.61	3.50
MWL-8 A	8	5	15	1.70	2.82	2.5	3	0.20	0.81	13.42
MWL-8 B	8	5	15	2.39	3.76	2.5	4	0.20	0.81	10.94
MWL-8 C	8	5	15	2.74	4.70	2.5	5	0.20	0.81	7.67
MWL-8 D	8	5	15	3.56	5.64	2.5	6	0.20	0.81	7.20
MWL-8 E	8	5	15	4.01	6.58	2.5	7	0.20	0.81	5.85
MWL-8 F	8	5	15	4.57	7.52	2.5	8	0.20	0.81	5.09
MWL-8 G	8	5	15	5.26	8.46	2.5	9	0.20	0.81	4.69
MWL-8 H	8	5	15	6.35	10.34	2.5	11	0.20	0.81	3.76
MWL-8 I	8	5	15	7.37	12.22	2.5	13	0.20	0.81	3.09
MWM-8 A	8	5	30	1.78	2.82	2.5	3	0.25	0.81	28.81
MWM-8 B	8	5	30	2.54	3.76	2.5	4	0.25	0.81	24.61
MWM-8 C	8	5	30	3.05	4.70	2.5	5	0.25	0.81	18.17
MWM-8 D	8	5	30	3.81	5.64	2.5	6	0.25	0.81	16.40
MWM-8 E	8	5	30	4.32	6.58	2.5	7	0.25	0.81	13.27
MWM-8 F	8	5	30	4.95	7.52	2.5	8	0.25	0.81	11.69
MWM-8 G	8	5	30	5.59	8.46	2.5	9	0.25	0.81	10.45
MWM-8 H	8	5	30	6.86	10.34	2.5	11	0.25	0.81	8.62
MWM-8 I	8	5	30	7.87	12.22	2.5	13	0.25	0.81	6.91

***Not available with shim ends**
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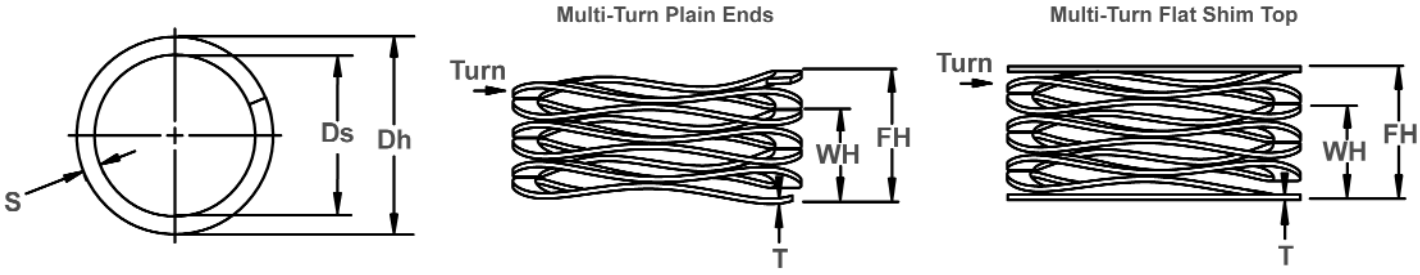

Wave Spring Measurements

WAVE SPRING NO.	HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWL-10 A	10	7	18	1.91	3.96	2.5	3	0.20	0.81	8.75
MWL-10 B	10	7	18	2.54	5.28	2.5	4	0.20	0.81	6.56
MWL-10 C	10	7	18	3.15	6.60	2.5	5	0.20	0.81	5.21
MWL-10 D	10	7	18	3.78	7.92	2.5	6	0.20	0.81	4.35
MWL-10 E	10	7	18	4.42	9.25	2.5	7	0.20	0.81	3.73
MWL-10 F	10	7	18	5.05	10.57	2.5	8	0.20	0.81	3.27
MWL-10 G	10	7	18	5.69	11.89	2.5	9	0.20	0.81	2.90
MWL-10 H	10	7	18	6.32	13.21	2.5	10	0.20	0.81	2.61
MWL-10 I	10	7	18	6.96	14.53	2.5	11	0.20	0.81	2.38
MWM-10 A	10	7	35	2.03	3.96	2.5	3	0.28	0.81	18.13
MWM-10 B	10	7	35	2.79	5.28	2.5	4	0.28	0.81	14.06
MWM-10 C	10	7	35	3.56	6.60	2.5	5	0.28	0.81	11.48
MWM-10 D	10	7	35	4.32	7.92	2.5	6	0.28	0.81	9.70
MWM-10 E	10	7	35	5.08	9.25	2.5	7	0.28	0.81	8.40
MWM-10 F	10	7	35	5.84	10.57	2.5	8	0.28	0.81	7.41
MWM-10 G	10	7	35	6.60	11.89	2.5	9	0.28	0.81	6.62
MWM-10 H	10	7	35	7.37	13.21	2.5	10	0.28	0.81	5.99
MWM-10 I	10	7	35	8.13	14.53	2.5	11	0.28	0.81	5.47
MWL-12 A	12	9	20	1.47	4.34	2.5	3	0.20	1.02	6.97
MWL-12 B	12	9	20	1.98	5.79	2.5	4	0.20	1.02	5.25
MWL-12 C	12	9	20	2.46	7.24	2.5	5	0.20	1.02	4.19
MWL-12 D	12	9	20	2.95	8.69	2.5	6	0.20	1.02	3.48
MWL-12 E	12	9	20	3.45	10.13	2.5	7	0.20	1.02	2.99
MWL-12 F	12	9	20	3.94	11.58	2.5	8	0.20	1.02	2.62
MWL-12 G	12	9	20	4.45	13.03	2.5	9	0.20	1.02	2.33
MWL-12 H	12	9	20	4.93	14.48	2.5	10	0.20	1.02	2.09
MWL-12 I	12	9	20	5.44	15.93	2.5	11	0.20	1.02	1.91
MWM-12 A	12	8.5	40	2.36	4.34	2.5	3	0.28	1.17	20.19
MWM-12 B	12	8.5	40	3.18	5.79	2.5	4	0.28	1.17	15.29
MWM-12 C	12	8.5	40	3.96	7.24	2.5	5	0.28	1.17	12.21
MWM-12 D	12	8.5	40	4.75	8.69	2.5	6	0.28	1.17	10.16
MWM-12 E	12	8.5	40	5.54	10.13	2.5	7	0.28	1.17	8.70
MWM-12 F	12	8.5	40	6.32	11.58	2.5	8	0.28	1.17	7.61
MWM-12 G	12	8.5	40	7.11	13.03	2.5	9	0.28	1.17	6.76
MWM-12 H	12	8.5	40	7.92	14.48	2.5	10	0.28	1.17	6.10
MWM-12 I	12	8.5	40	8.71	15.93	2.5	11	0.28	1.17	5.55

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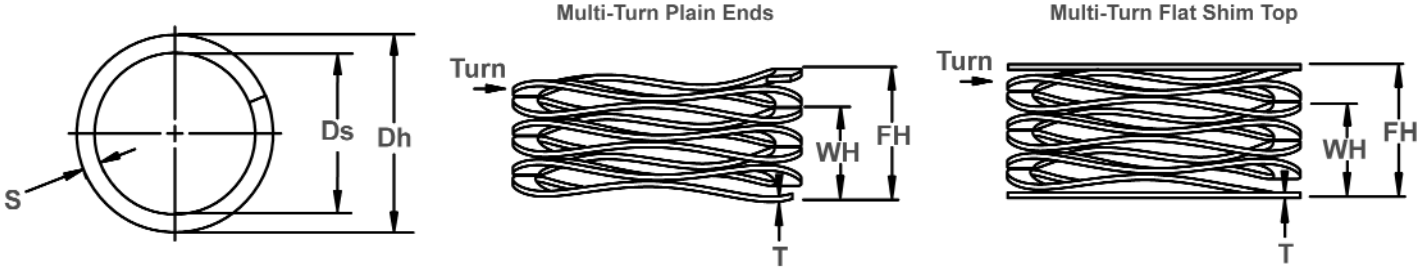

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WAVE SPRING NO.	HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWR-12 A	12	8.5	60	1.98	4.34	2.5	3	0.30	1.14	25.40
MWR-12 B	12	8.5	60	2.64	5.79	2.5	4	0.30	1.14	19.05
MWR-12 C	12	8.5	60	3.30	7.24	2.5	5	0.30	1.14	15.24
MWR-12 D	12	8.5	60	3.99	8.69	2.5	6	0.30	1.14	12.77
MWR-12 E	12	8.5	60	4.65	10.13	2.5	7	0.30	1.14	10.94
MWR-12 F	12	8.5	60	5.31	11.58	2.5	8	0.30	1.14	9.56
MWR-12 G	12	8.5	60	5.97	13.03	2.5	9	0.30	1.14	8.50
MWR-12 H	12	8.5	60	6.63	14.48	2.5	10	0.30	1.14	7.64
MWR-12 I	12	8.5	60	7.29	15.93	2.5	11	0.30	1.14	6.95
MWL-14 A	14	10	22	2.18	4.95	2.5	3	0.23	1.47	7.95
MWL-14 B	14	10	22	2.95	6.60	2.5	4	0.23	1.47	6.01
MWL-14 C	14	10	22	3.71	8.26	2.5	5	0.23	1.47	4.84
MWL-14 D	14	10	22	4.52	9.91	2.5	6	0.23	1.47	4.09
MWL-14 E	14	10	22	5.33	11.56	2.5	7	0.23	1.47	3.54
MWL-14 F	14	10	22	6.17	13.21	2.5	8	0.23	1.47	3.13
MWL-14 G	14	10	22	7.01	14.86	2.5	9	0.23	1.47	2.80
MWL-14 H	14	10	22	7.85	16.51	2.5	10	0.23	1.47	2.54
MWL-14 I	14	10	22	8.71	18.16	2.5	11	0.23	1.47	2.33
MWM-14 A	14	10	50	2.18	4.95	2.5	3	0.30	1.52	18.06
MWM-14 B	14	10	50	2.95	6.60	2.5	4	0.30	1.52	13.67
MWM-14 C	14	10	50	3.71	8.26	2.5	5	0.30	1.52	11.00
MWM-14 D	14	10	50	4.52	9.91	2.5	6	0.30	1.52	9.29
MWM-14 E	14	10	50	5.33	11.56	2.5	7	0.30	1.52	8.03
MWM-14 F	14	10	50	6.17	13.21	2.5	8	0.30	1.52	7.11
MWM-14 G	14	10	50	7.01	14.86	2.5	9	0.30	1.52	6.37
MWM-14 H	14	10	50	7.85	16.51	2.5	10	0.30	1.52	5.77
MWM-14 I	14	10	50	8.71	18.16	2.5	11	0.30	1.52	5.29
MWR-14 A	14	9	80	3.15	4.95	2.5	3	0.38	1.52	44.36
MWR-14 B	14	9	80	4.19	6.60	2.5	4	0.38	1.52	33.15
MWR-14 C	14	9	80	5.26	8.26	2.5	5	0.38	1.52	26.69
MWR-14 D	14	9	80	6.30	9.91	2.5	6	0.38	1.52	22.18
MWR-14 E	14	9	80	7.34	11.56	2.5	7	0.38	1.52	18.97
MWR-14 F	14	9	80	8.41	13.21	2.5	8	0.38	1.52	16.66
MWR-14 G	14	9	80	9.45	14.86	2.5	9	0.38	1.52	14.79
MWR-14 H	14	9	80	10.49	16.51	2.5	10	0.38	1.52	13.29
MWR-14 I	14	9	80	11.56	18.16	2.5	11	0.38	1.52	12.11

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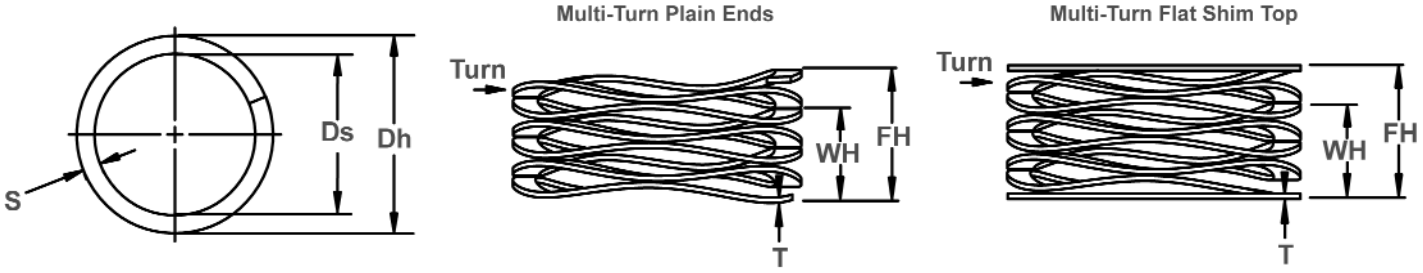

Wave Spring Measurements

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MWL-15 A	15	11	25	2.57	5.18	2.5	3	0.25	1.47	9.56
MWL-15 B	15	11	25	3.43	6.91	2.5	4	0.25	1.47	7.18
MWL-15 C	15	11	25	4.27	8.64	2.5	5	0.25	1.47	5.72
MWL-15 D	15	11	25	5.13	10.36	2.5	6	0.25	1.47	4.78
MWL-15 E	15	11	25	5.99	12.09	2.5	7	0.25	1.47	4.10
MWL-15 F	15	11	25	6.83	13.82	2.5	8	0.25	1.47	3.58
MWL-15 G	15	11	25	7.70	15.54	2.5	9	0.25	1.47	3.19
MWL-15 H	15	11	25	8.53	17.27	2.5	10	0.25	1.47	2.86
MWL-15 I	15	11	25	9.40	19.00	2.5	11	0.25	1.47	2.60
MWM-15 A	15	10	50	3.43	5.18	3.5	3	0.23	1.47	28.53
MWM-15 B	15	10	50	4.57	6.91	3.5	4	0.23	1.47	21.40
MWM-15 C	15	10	50	5.72	8.64	3.5	5	0.23	1.47	17.12
MWM-15 D	15	10	50	6.86	10.36	3.5	6	0.23	1.47	14.26
MWM-15 E	15	10	50	8.00	12.09	3.5	7	0.23	1.47	12.23
MWM-15 F	15	10	50	9.14	13.82	3.5	8	0.23	1.47	10.70
MWM-15 G	15	10	50	10.29	15.54	3.5	9	0.23	1.47	9.51
MWM-15 H	15	10	50	11.43	17.27	3.5	10	0.23	1.47	8.56
MWM-15 I	15	10	50	12.57	19.00	3.5	11	0.23	1.47	7.78
MWR-15 A	15	10	80	3.20	5.18	3.5	3	0.25	1.47	40.38
MWR-15 B	15	10	80	4.19	6.91	3.5	4	0.25	1.47	29.44
MWR-15 C	15	10	80	5.23	8.64	3.5	5	0.25	1.47	23.50
MWR-15 D	15	10	80	6.27	10.36	3.5	6	0.25	1.47	19.56
MWR-15 E	15	10	80	7.32	12.09	3.5	7	0.25	1.47	16.75
MWR-15 F	15	10	80	8.36	13.82	3.5	8	0.25	1.47	14.65
MWR-15 G	15	10	80	9.40	15.54	3.5	9	0.25	1.47	13.01
MWR-15 H	15	10	80	10.46	17.27	3.5	10	0.25	1.47	11.75
MWR-15 I	15	10	80	11.51	19.00	3.5	11	0.25	1.47	10.68
MWL-16 A	16	11	25	2.11	5.41	2.5	3	0.25	1.47	7.57
MWL-16 B	16	11	25	2.79	7.21	2.5	4	0.25	1.47	5.66
MWL-16 C	16	11	25	3.51	9.02	2.5	5	0.25	1.47	4.54
MWL-16 D	16	11	25	4.19	10.82	2.5	6	0.25	1.47	3.77
MWL-16 E	16	11	25	4.90	12.62	2.5	7	0.25	1.47	3.24
MWL-16 F	16	11	25	6.30	16.23	2.5	9	0.25	1.47	2.52
MWL-16 G	16	11	25	7.70	19.84	2.5	11	0.25	1.47	2.06
MWL-16 H	16	11	25	9.09	23.44	2.5	13	0.25	1.47	1.74

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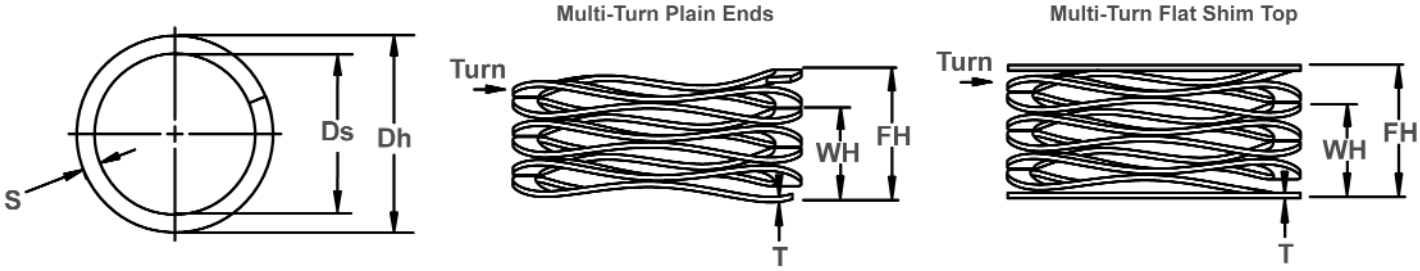

Wave Spring Measurements

WAVE SPRING NO.	HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWM-16 A	16	11	55	3.63	5.41	3.5	3	0.25	1.47	30.93
MWM-16 B	16	11	55	4.83	7.21	3.5	4	0.25	1.47	23.04
MWM-16 C	16	11	55	6.05	9.02	3.5	5	0.25	1.47	18.51
MWM-16 D	16	11	55	7.24	10.82	3.5	6	0.25	1.47	15.36
MWM-16 E	16	11	55	8.46	12.62	3.5	7	0.25	1.47	13.20
MWM-16 F	16	11	55	10.87	16.23	3.5	9	0.25	1.47	10.26
MWM-16 G	16	11	55	13.28	19.84	3.5	11	0.25	1.47	8.39
MWM-16 H	16	11	55	15.70	23.44	3.5	13	0.25	1.47	7.10
MWR-16 A	16	11	90	3.30	5.41	3.5	3	0.30	1.52	42.69
MWR-16 B	16	11	90	4.57	7.21	3.5	4	0.30	1.52	34.07
MWR-16 C	16	11	90	5.59	9.02	3.5	5	0.30	1.52	26.25
MWR-16 D	16	11	90	6.86	10.82	3.5	6	0.30	1.52	22.71
MWR-16 E	16	11	90	7.87	12.62	3.5	7	0.30	1.52	18.95
MWR-16 F	16	11	90	10.16	16.23	3.5	9	0.30	1.52	14.83
MWR-16 G	16	11	90	12.45	19.84	3.5	11	0.30	1.52	12.18
MWR-16 H	16	11	90	14.73	23.44	3.5	13	0.30	1.52	10.33
MWL-18 A	18	13	30	3.63	5.72	3.5	3	0.20	1.80	14.40
MWL-18 B	18	13	30	4.75	7.62	3.5	4	0.20	1.80	10.45
MWL-18 C	18	13	30	5.94	9.53	3.5	5	0.20	1.80	8.38
MWL-18 D	18	13	30	7.14	11.43	3.5	6	0.20	1.80	6.99
MWL-18 E	18	13	30	8.31	13.34	3.5	7	0.20	1.80	5.97
MWL-18 F	18	13	30	10.69	17.15	3.5	9	0.20	1.80	4.65
MWL-18 G	18	13	30	14.25	22.86	3.5	12	0.20	1.80	3.48
MWM-18 A	18	13	55	3.68	5.72	3.5	3	0.25	1.83	27.07
MWM-18 B	18	13	55	4.98	7.62	3.5	4	0.25	1.83	20.82
MWM-18 C	18	13	55	6.22	9.53	3.5	5	0.25	1.83	16.66
MWM-18 D	18	13	55	7.47	11.43	3.5	6	0.25	1.83	13.88
MWM-18 E	18	13	55	8.74	13.34	3.5	7	0.25	1.83	11.96
MWM-18 F	18	13	55	11.23	17.15	3.5	9	0.25	1.83	9.29
MWM-18 G	18	13	55	14.96	22.86	3.5	12	0.25	1.83	6.96
MWR-18 A	18	13	90	3.84	5.72	3.5	3	0.30	1.83	47.88
MWR-18 B	18	13	90	5.13	7.62	3.5	4	0.30	1.83	36.16
MWR-18 C	18	13	90	6.40	9.53	3.5	5	0.30	1.83	28.81
MWR-18 D	18	13	90	7.70	11.43	3.5	6	0.30	1.83	24.10
MWR-18 E	18	13	90	8.97	13.34	3.5	7	0.30	1.83	20.60
MWR-18 F	18	13	90	11.53	17.15	3.5	9	0.30	1.83	16.03
MWR-18 G	18	13	90	15.37	22.86	3.5	12	0.30	1.83	12.01

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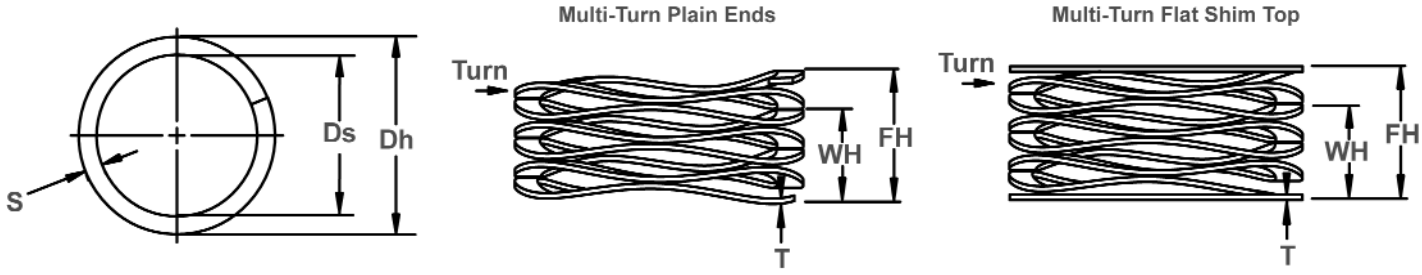
MWL,MWM, MWR Wave Springs

Multi Turn, Metric

Used for low force applications with large deflections: More turns equals less force. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWL-20 A	20	15	35	2.72	6.32	3.5	3	0.20	1.80	9.70
MWL-20 B	20	15	35	3.61	8.43	3.5	4	0.20	1.80	7.25
MWL-20 C	20	15	35	4.52	10.54	3.5	5	0.20	1.80	5.81
MWL-20 D	20	15	35	5.41	12.65	3.5	6	0.20	1.80	4.83
MWL-20 E	20	15	35	6.32	14.76	3.5	7	0.20	1.80	4.15
MWL-20 F	20	15	35	8.13	18.97	3.5	9	0.20	1.80	3.23
MWL-20 G	20	15	35	10.82	25.30	3.5	12	0.20	1.80	2.42
MWM-20 A	20	14	70	3.05	6.32	3.5	3	0.25	1.98	21.36
MWM-20 B	20	14	70	4.06	8.43	3.5	4	0.25	1.98	16.02
MWM-20 C	20	14	70	5.08	10.54	3.5	5	0.25	1.98	12.82
MWM-20 D	20	14	70	6.27	12.65	3.5	6	0.25	1.98	10.98
MWM-20 E	20	14	70	7.32	14.76	3.5	7	0.25	1.98	9.41
MWM-20 F	20	14	70	9.17	18.97	3.5	9	0.25	1.98	7.14
MWM-20 G	20	14	70	12.22	25.30	3.5	12	0.25	1.98	5.35
MWR-20 A	20	14	100	4.24	6.32	3.5	3	0.33	2.01	48.01
MWR-20 B	20	14	100	5.66	8.43	3.5	4	0.33	2.01	36.12
MWR-20 C	20	14	100	7.06	10.54	3.5	5	0.33	2.01	28.74
MWR-20 D	20	14	100	8.48	12.65	3.5	6	0.33	2.01	24.01
MWR-20 E	20	14	100	9.91	14.76	3.5	7	0.33	2.01	20.61
MWR-20 F	20	14	100	12.73	18.97	3.5	9	0.33	2.01	16.00
MWR-20 G	20	14	100	16.97	25.30	3.5	12	0.33	2.01	12.00
MWL-25 A	25	19	50	2.06	6.63	3.5	3	0.25	2.18	10.94
MWL-25 B	25	19	50	2.74	8.84	3.5	4	0.25	2.18	8.20
MWL-25 C	25	19	50	3.43	11.05	3.5	5	0.25	2.18	6.56
MWL-25 D	25	19	50	4.11	13.26	3.5	6	0.25	2.18	5.47
MWL-25 E	25	19	50	4.80	15.47	3.5	7	0.25	2.18	4.69
MWL-25 F	25	19	50	6.20	19.89	3.5	9	0.25	2.18	3.65
MWL-25 G	25	19	50	8.26	26.52	3.5	12	0.25	2.18	2.74
MWM-25 A	25	19	80	2.95	6.63	3.5	3	0.30	2.39	21.72
MWM-25 B	25	19	80	3.94	8.84	3.5	4	0.30	2.39	16.32
MWM-25 C	25	19	80	4.90	11.05	3.5	5	0.30	2.39	13.01
MWM-25 D	25	19	80	5.89	13.26	3.5	6	0.30	2.39	10.86
MWM-25 E	25	19	80	6.88	15.47	3.5	7	0.30	2.39	9.32
MWM-25 F	25	19	80	8.84	19.89	3.5	9	0.30	2.39	7.24
MWM-25 G	25	19	80	11.79	26.52	3.5	12	0.30	2.39	5.43

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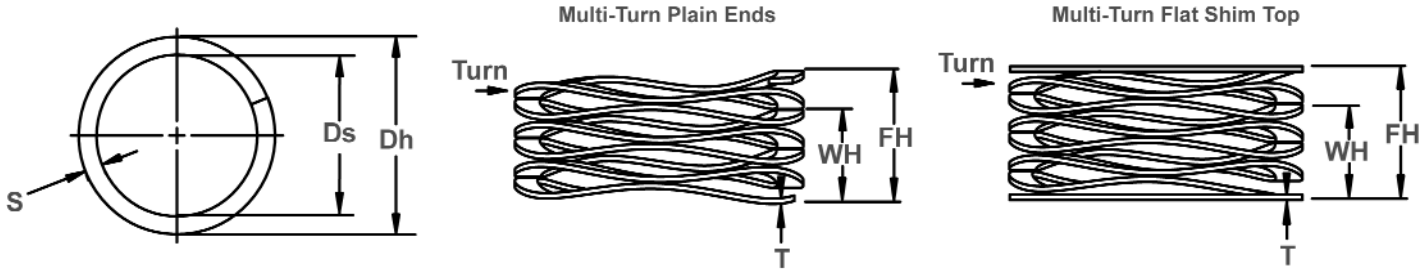

Wave Spring Measurements

WAVE SPRING NO.	HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWR-25 A	25	19	110	4.04	6.63	3.5	3	0.38	2.39	42.46
MWR-25 B	25	19	110	5.38	8.84	3.5	4	0.38	2.39	31.84
MWR-25 C	25	19	110	6.73	11.05	3.5	5	0.38	2.39	25.47
MWR-25 D	25	19	110	8.08	13.26	3.5	6	0.38	2.39	21.23
MWR-25 E	25	19	110	9.40	15.47	3.5	7	0.38	2.39	18.12
MWR-25 F	25	19	110	12.12	19.89	3.5	9	0.38	2.39	14.15
MWR-25 G	25	19	110	16.15	26.52	3.5	12	0.38	2.39	10.61
MWL-28 A	28	22	50	3.76	7.24	3.5	3	0.30	2.39	14.37
MWL-28 B	28	22	50	5.00	9.65	3.5	4	0.30	2.39	10.76
MWL-28 C	28	22	50	6.27	12.07	3.5	5	0.30	2.39	8.63
MWL-28 D	28	22	50	7.52	14.48	3.5	6	0.30	2.39	7.18
MWL-28 E	28	22	50	8.79	16.89	3.5	7	0.30	2.39	6.17
MWL-28 F	28	22	50	10.03	19.30	3.5	8	0.30	2.39	5.39
MWL-28 G	28	22	50	11.28	21.72	3.5	9	0.30	2.39	4.79
MWL-28 H	28	22	50	13.79	26.54	3.5	11	0.30	2.39	3.92
MWL-28 I	28	22	50	16.31	31.37	3.5	13	0.30	2.39	3.32
MWM-28 A	28	22	80	4.39	7.24	3.5	3	0.38	2.39	28.12
MWM-28 B	28	22	80	5.84	9.65	3.5	4	0.38	2.39	21.00
MWM-28 C	28	22	80	7.32	12.07	3.5	5	0.38	2.39	16.84
MWM-28 D	28	22	80	8.79	14.48	3.5	6	0.38	2.39	14.06
MWM-28 E	28	22	80	10.24	16.89	3.5	7	0.38	2.39	12.02
MWM-28 F	28	22	80	11.71	19.30	3.5	8	0.38	2.39	10.53
MWM-28 G	28	22	80	13.18	21.72	3.5	9	0.38	2.39	9.37
MWM-28 H	28	22	80	16.10	26.54	3.5	11	0.38	2.39	7.66
MWM-28 I	28	22	80	19.02	31.37	3.5	13	0.38	2.39	6.48
MWR-28 A	28	22	130	4.57	7.24	3.5	3	0.46	2.39	48.74
MWR-28 B	28	22	130	6.07	9.65	3.5	4	0.46	2.39	36.30
MWR-28 C	28	22	130	7.59	12.07	3.5	5	0.46	2.39	29.08
MWR-28 D	28	22	130	9.12	14.48	3.5	6	0.46	2.39	24.26
MWR-28 E	28	22	130	10.64	16.89	3.5	7	0.46	2.39	20.81
MWR-28 F	28	22	130	12.17	19.30	3.5	8	0.46	2.39	18.21
MWR-28 G	28	22	130	13.69	21.72	3.5	9	0.46	2.39	16.20
MWR-28 H	28	22	130	16.71	26.54	3.5	11	0.46	2.39	13.23
MWR-28 I	28	22	130	19.76	31.37	3.5	13	0.46	2.39	11.20

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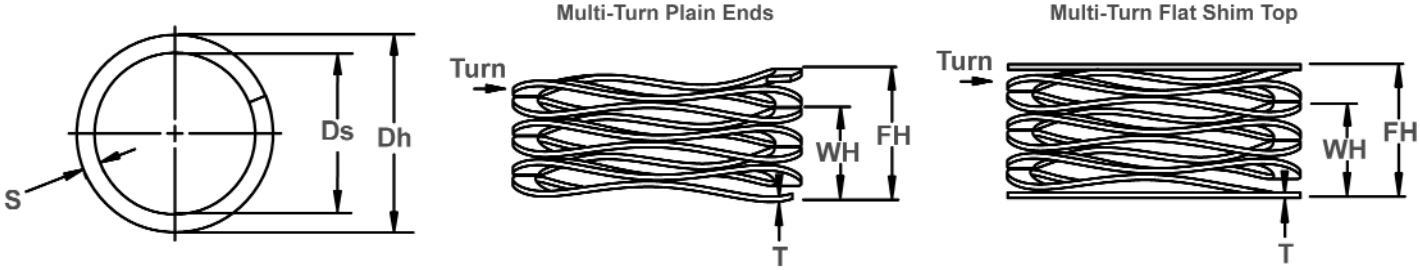

Wave Spring Measurements

WAVE SPRING NO.	HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWL-30 A	30	24	50	3.18	7.62	3.5	3	0.30	2.39	11.25
MWL-30 B	30	24	50	4.22	10.16	3.5	4	0.30	2.39	8.41
MWL-30 C	30	24	50	5.28	12.70	3.5	5	0.30	2.39	6.74
MWL-30 D	30	24	50	6.32	15.24	3.5	6	0.30	2.39	5.61
MWL-30 E	30	24	50	7.39	17.78	3.5	7	0.30	2.39	4.81
MWL-30 F	30	24	50	8.43	20.32	3.5	8	0.30	2.39	4.21
MWL-30 G	30	24	50	9.50	22.86	3.5	9	0.30	2.39	3.74
MWL-30 H	30	24	50	11.61	27.94	3.5	11	0.30	2.39	3.06
MWL-30 I	30	24	50	13.72	33.02	3.5	13	0.30	2.39	2.59
MWM-30 A	30	24	90	3.51	7.62	3.5	3	0.38	2.39	21.87
MWM-30 B	30	24	90	4.70	10.16	3.5	4	0.38	2.39	16.48
MWM-30 C	30	24	90	5.87	12.70	3.5	5	0.38	2.39	13.17
MWM-30 D	30	24	90	7.04	15.24	3.5	6	0.38	2.39	10.97
MWM-30 E	30	24	90	8.20	17.78	3.5	7	0.38	2.39	9.40
MWM-30 F	30	24	90	9.37	20.32	3.5	8	0.38	2.39	8.22
MWM-30 G	30	24	90	10.54	22.86	3.5	9	0.38	2.39	7.31
MWM-30 H	30	24	90	12.90	27.94	3.5	11	0.38	2.39	5.99
MWM-30 I	30	24	90	15.24	33.02	3.5	13	0.38	2.39	5.06
MWR-30 A	30	24	130	4.19	7.62	3.5	3	0.46	2.39	37.91
MWR-30 B	30	24	130	5.59	10.16	3.5	4	0.46	2.39	28.43
MWR-30 C	30	24	130	6.99	12.70	3.5	5	0.46	2.39	22.75
MWR-30 D	30	24	130	8.38	15.24	3.5	6	0.46	2.39	18.96
MWR-30 E	30	24	130	9.78	17.78	3.5	7	0.46	2.39	16.25
MWR-30 F	30	24	130	11.18	20.32	3.5	8	0.46	2.39	14.22
MWR-30 G	30	24	130	12.57	22.86	3.5	9	0.46	2.39	12.64
MWR-30 H	30	24	130	15.37	27.94	3.5	11	0.46	2.39	10.34
MWR-30 I	30	24	130	18.16	33.02	3.5	13	0.46	2.39	8.75
MWL-35 A	35	27	70	3.94	8.38	3.5	3	0.36	3.18	15.75
MWL-35 B	35	27	70	5.23	11.18	3.5	4	0.36	3.18	11.78
MWL-35 C	35	27	70	6.55	13.97	3.5	5	0.36	3.18	9.44
MWL-35 D	35	27	70	7.87	16.76	3.5	6	0.36	3.18	7.87
MWL-35 E	35	27	70	9.17	19.56	3.5	7	0.36	3.18	6.74
MWL-35 F	35	27	70	10.49	22.35	3.5	8	0.36	3.18	5.90
MWL-35 G	35	27	70	11.81	25.15	3.5	9	0.36	3.18	5.25
MWL-35 H	35	27	70	14.43	30.73	3.5	11	0.36	3.18	4.29
MWL-35 I	35	27	70	17.04	36.32	3.5	13	0.36	3.18	3.63

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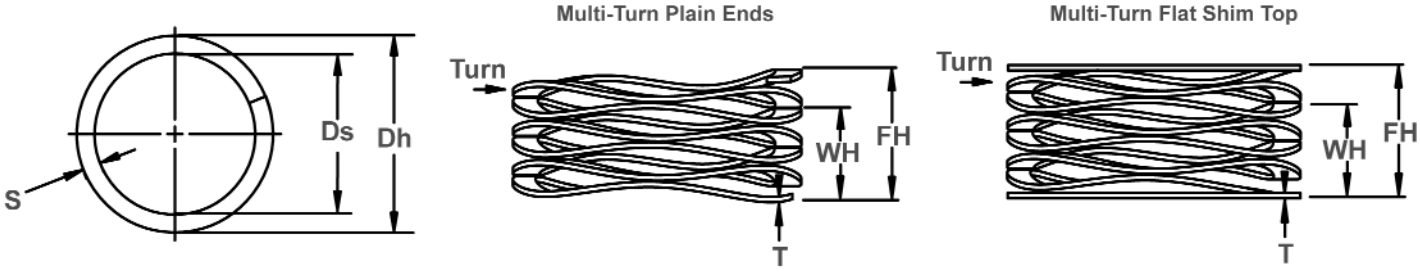

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MWM-35 A	35	27	110	4.14	8.38	3.5	3	0.41	3.38	25.93
MWM-35 B	35	27	110	5.51	11.18	3.5	4	0.41	3.38	19.42
MWM-35 C	35	27	110	6.88	13.97	3.5	5	0.41	3.38	15.52
MWM-35 D	35	27	110	8.26	16.76	3.5	6	0.41	3.38	12.93
MWM-35 E	35	27	110	9.63	19.56	3.5	7	0.41	3.38	11.08
MWM-35 F	35	27	110	11.02	22.35	3.5	8	0.41	3.38	9.71
MWM-35 G	35	27	110	12.40	25.15	3.5	9	0.41	3.38	8.63
MWM-35 H	35	27	110	15.14	30.73	3.5	11	0.41	3.38	7.05
MWM-35 I	35	27	110	17.91	36.32	3.5	13	0.41	3.38	5.97
MWR-35 A	35	27	160	4.04	8.38	3.5	3	0.46	3.38	36.84
MWR-35 B	35	27	160	5.38	11.18	3.5	4	0.46	3.38	27.63
MWR-35 C	35	27	160	6.73	13.97	3.5	5	0.46	3.38	22.10
MWR-35 D	35	27	160	8.08	16.76	3.5	6	0.46	3.38	18.42
MWR-35 E	35	27	160	9.42	19.56	3.5	7	0.46	3.38	15.79
MWR-35 F	35	27	160	10.77	22.35	3.5	8	0.46	3.38	13.81
MWR-35 G	35	27	160	12.12	25.15	3.5	9	0.46	3.38	12.28
MWR-35 H	35	27	160	14.81	30.73	3.5	11	0.46	3.38	10.05
MWR-35 I	35	27	160	17.50	36.32	3.5	13	0.46	3.38	8.50
MWL-40 A	40	30	100	2.90	9.14	3.5	3	0.41	3.38	16.00
MWL-40 B	40	30	100	3.86	12.19	3.5	4	0.41	3.38	12.00
MWL-40 C	40	30	100	4.80	15.24	3.5	5	0.41	3.38	9.58
MWL-40 D	40	30	100	5.77	18.29	3.5	6	0.41	3.38	7.99
MWL-40 E	40	30	100	6.73	21.34	3.5	7	0.41	3.38	6.85
MWL-40 F	40	30	100	7.70	24.38	3.5	8	0.41	3.38	5.99
MWL-40 G	40	30	100	8.66	27.43	3.5	9	0.41	3.38	5.33
MWL-40 H	40	30	100	10.59	33.53	3.5	11	0.41	3.38	4.36
MWL-40 I	40	30	100	12.52	39.62	3.5	13	0.41	3.38	3.69
MWM-40 A	40	30	150	5.44	9.14	3.5	3	0.53	3.63	40.45
MWM-40 B	40	30	150	7.24	12.19	3.5	4	0.53	3.63	30.28
MWM-40 C	40	30	150	9.04	15.24	3.5	5	0.53	3.63	24.20
MWM-40 D	40	30	150	10.85	18.29	3.5	6	0.53	3.63	20.16
MWM-40 E	40	30	150	12.65	21.34	3.5	7	0.53	3.63	17.27
MWM-40 F	40	30	150	14.48	24.38	3.5	8	0.53	3.63	15.14
MWM-40 G	40	30	150	16.28	27.43	3.5	9	0.53	3.63	13.45
MWM-40 H	40	30	150	19.89	33.53	3.5	11	0.53	3.63	11.00
MWM-40 I	40	30	150	23.50	39.62	3.5	13	0.53	3.63	9.30

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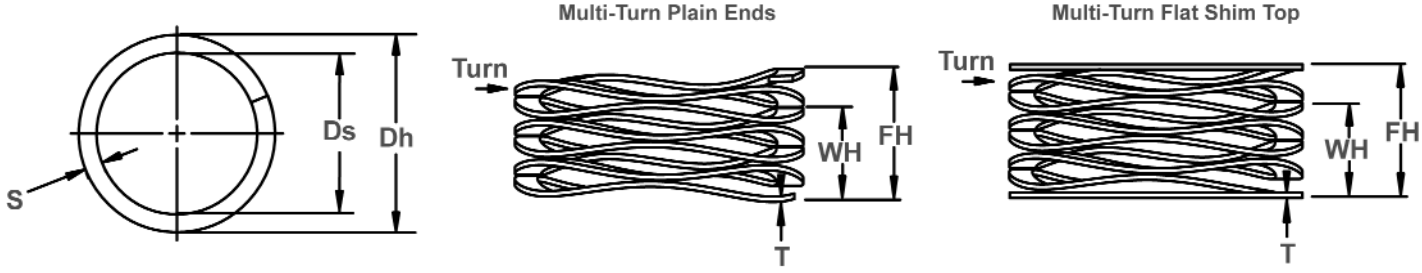
MWL,MWM, MWR Wave Springs

Multi Turn, Metric

Used for low force applications with large deflections: More turns equals less force. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWR-40 A	40	30	300	5.66	9.14	4.5	3	0.46	3.38	86.21
MWR-40 B	40	30	300	7.54	12.19	4.5	4	0.46	3.38	64.54
MWR-40 C	40	30	300	9.42	15.24	4.5	5	0.46	3.38	51.58
MWR-40 D	40	30	300	11.33	18.29	4.5	6	0.46	3.38	43.11
MWR-40 E	40	30	300	13.21	21.34	4.5	7	0.46	3.38	36.91
MWR-40 F	40	30	300	15.09	24.38	4.5	8	0.46	3.38	32.27
MWR-40 G	40	30	300	16.97	27.43	4.5	9	0.46	3.38	28.67
MWR-40 H	40	30	300	20.75	33.53	4.5	11	0.46	3.38	23.48
MWR-40 I	40	30	300	24.54	39.62	4.5	13	0.46	3.38	19.88
MWL-45 A	45	35	110	3.38	9.91	3.5	3	0.46	3.63	16.85
MWL-45 B	45	35	110	4.52	13.21	3.5	4	0.46	3.63	12.66
MWL-45 C	45	35	110	5.64	16.51	3.5	5	0.46	3.63	10.12
MWL-45 D	45	35	110	6.76	19.81	3.5	6	0.46	3.63	8.43
MWL-45 E	45	35	110	7.90	23.11	3.5	7	0.46	3.63	7.23
MWL-45 F	45	35	110	9.02	26.42	3.5	8	0.46	3.63	6.32
MWL-45 G	45	35	110	10.16	29.72	3.5	9	0.46	3.63	5.62
MWL-45 H	45	35	110	12.40	36.32	3.5	11	0.46	3.63	4.60
MWL-45 I	45	35	110	14.66	42.93	3.5	13	0.46	3.63	3.89
MWM-45 A	45	35	225	5.33	9.91	4.5	3	0.46	3.63	49.21
MWM-45 B	45	35	225	6.99	13.21	4.5	4	0.46	3.63	36.16
MWM-45 C	45	35	225	9.14	16.51	4.5	5	0.46	3.63	30.55
MWM-45 D	45	35	225	10.80	19.81	4.5	6	0.46	3.63	24.95
MWM-45 E	45	35	225	12.70	23.11	4.5	7	0.46	3.63	21.61
MWM-45 F	45	35	225	14.48	26.42	4.5	8	0.46	3.63	18.85
MWM-45 G	45	35	225	16.26	29.72	4.5	9	0.46	3.63	16.71
MWM-45 H	45	35	225	19.81	36.32	4.5	11	0.46	3.63	13.63
MWM-45 I	45	35	225	23.37	42.93	4.5	13	0.46	3.63	11.50
MWR-45 A	45	35	400	6.43	9.91	4.5	3	0.61	3.76	114.95
MWR-45 B	45	35	400	8.38	13.21	4.5	4	0.61	3.76	82.88
MWR-45 C	45	35	400	11.20	16.51	4.5	5	0.61	3.76	75.35
MWR-45 D	45	35	400	12.95	19.81	4.5	6	0.61	3.76	58.33
MWR-45 E	45	35	400	15.37	23.11	4.5	7	0.61	3.76	51.63
MWR-45 F	45	35	400	17.27	26.42	4.5	8	0.61	3.76	43.74
MWR-45 G	45	35	400	19.68	29.72	4.5	9	0.61	3.76	39.87
MWR-45 H	45	35	400	24.26	36.32	4.5	11	0.61	3.76	33.15
MWR-45 I	45	35	400	28.45	42.93	4.5	13	0.61	3.76	27.63

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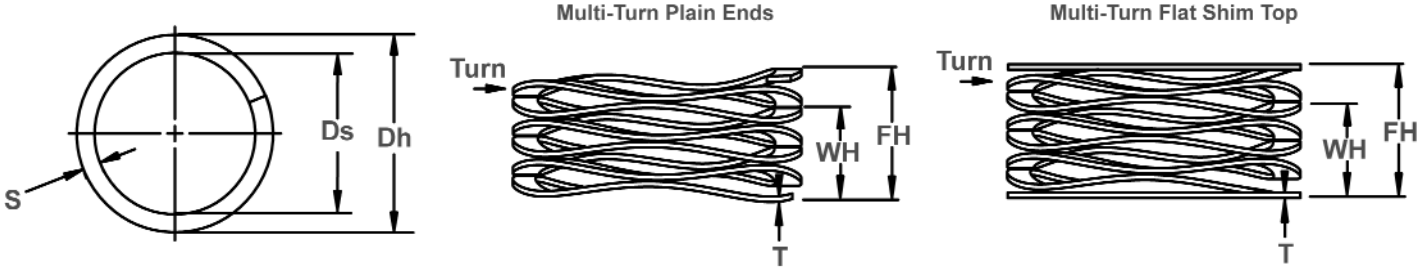

Wave Spring Measurements

WAVE SPRING NO.	HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWL-50 A	50	40	110	4.83	10.29	3.5	3	0.53	3.63	20.14
MWL-50 B	50	40	110	6.10	13.72	3.5	4	0.53	3.63	14.44
MWL-50 C	50	40	110	7.87	17.15	3.5	5	0.53	3.63	11.86
MWL-50 D	50	40	110	9.40	20.57	3.5	6	0.53	3.63	9.84
MWL-50 E	50	40	110	11.30	24.00	3.5	7	0.53	3.63	8.66
MWL-50 F	50	40	110	12.70	27.43	3.5	8	0.53	3.63	7.47
MWL-50 G	50	40	110	14.99	30.86	3.5	9	0.53	3.63	6.93
MWL-50 H	50	40	110	18.16	37.72	3.5	11	0.53	3.63	5.62
MWL-50 I	50	40	110	21.34	44.58	3.5	13	0.53	3.63	4.73
MWL-50 J	50	40	110	24.64	51.44	3.5	15	0.53	3.63	4.10
MWM-50 A	50	40	225	4.62	10.29	4.5	3	0.46	3.63	39.72
MWM-50 B	50	40	225	6.35	13.72	4.5	4	0.46	3.63	30.55
MWM-50 C	50	40	225	7.49	17.15	4.5	5	0.46	3.63	23.31
MWM-50 D	50	40	225	8.89	20.57	4.5	6	0.46	3.63	19.26
MWM-50 E	50	40	225	10.54	24.00	4.5	7	0.46	3.63	16.71
MWM-50 F	50	40	225	11.89	27.43	4.5	8	0.46	3.63	14.47
MWM-50 G	50	40	225	13.59	30.86	4.5	9	0.46	3.63	13.03
MWM-50 H	50	40	225	16.71	37.72	4.5	11	0.46	3.63	10.71
MWM-50 I	50	40	225	19.61	44.58	4.5	13	0.46	3.63	9.01
MWM-50 J	50	40	225	22.48	51.44	4.5	15	0.46	3.63	7.77
MWR-50 A	50	40	400	5.92	10.29	4.5	3	0.61	3.76	91.56
MWR-50 B	50	40	400	7.80	13.72	4.5	4	0.61	3.76	67.59
MWR-50 C	50	40	400	10.16	17.15	4.5	5	0.61	3.76	57.27
MWR-50 D	50	40	400	11.79	20.57	4.5	6	0.61	3.76	45.51
MWR-50 E	50	40	400	14.15	24.00	4.5	7	0.61	3.76	40.59
MWR-50 F	50	40	400	15.62	27.43	4.5	8	0.61	3.76	33.87
MWR-50 G	50	40	400	17.91	30.86	4.5	9	0.61	3.76	30.88
MWR-50 H	50	40	400	21.54	37.72	4.5	11	0.61	3.76	24.72
MWR-50 I	50	40	400	25.65	44.58	4.5	13	0.61	3.76	21.14
MWR-50 J	50	40	400	29.21	51.44	4.5	15	0.61	3.76	18.00
MWL-55 A	55	45	125	5.59	11.05	3.5	3	0.61	3.76	22.89
MWL-55 B	55	45	125	7.72	14.73	3.5	4	0.61	3.76	17.83
MWL-55 C	55	45	125	9.68	18.41	3.5	5	0.61	3.76	14.31
MWL-55 D	55	45	125	11.48	22.1	3.5	6	0.61	3.76	11.77
MWL-55 E	55	45	125	13.92	25.78	3.5	7	0.61	3.76	10.54
MWL-55 F	55	45	125	15.52	29.46	3.5	8	0.61	3.76	8.96
MWL-55 G	55	45	125	18.41	33.15	3.5	9	0.61	3.76	8.48
MWL-55 H	55	45	125	21.67	40.51	3.5	11	0.61	3.76	6.63
MWL-55 I	55	45	125	25.65	47.88	3.5	13	0.61	3.76	5.62
MWL-55 J	55	45	125	29.77	55.25	3.5	15	0.61	3.76	4.91
MWM-55 A	55	45	250	3.1	11.05	4.5	3	0.46	3.63	31.45
MWM-55 B	55	45	250	4.11	14.73	4.5	4	0.46	3.63	23.55
MWM-55 C	55	45	250	5.16	18.41	4.5	5	0.46	3.63	18.86
MWM-55 D	55	45	250	6.2	22.1	4.5	6	0.46	3.63	15.72
MWM-55 E	55	45	250	7.21	25.78	4.5	7	0.46	3.63	13.46

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MWL,MWM, MWR Wave Springs

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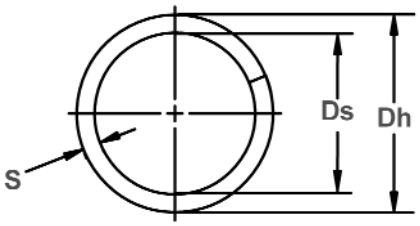
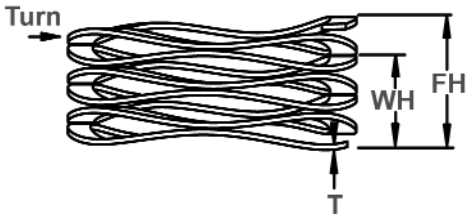
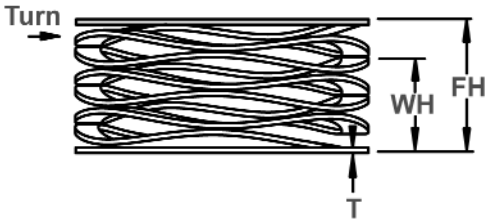


Multi-Turn Plain Ends



Multi-Turn Flat Shim Top



Wave Spring Measurements

WAVE SPRING NO.	HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWM-55 F	55	45	250	8.26	29.46	4.5	8	0.46	3.63	11.79
MWM-55 G	55	45	250	9.27	33.15	4.5	9	0.46	3.63	10.47
MWM-55 H	55	45	250	11.33	40.51	4.5	11	0.46	3.63	8.57
MWM-55 I	55	45	250	13.41	47.88	4.5	13	0.46	3.63	7.25
MWM-55 J	55	45	250	15.47	55.25	4.5	15	0.46	3.63	6.29
MWR-55 A	55	45	400	5.31	11.05	4.5	3	0.61	3.76	69.68
MWR-55 B	55	45	400	7.24	14.73	4.5	4	0.61	3.76	53.38
MWR-55 C	55	45	400	9.09	18.41	4.5	5	0.61	3.76	42.91
MWR-55 D	55	45	400	10.64	22.1	4.5	6	0.61	3.76	34.92
MWR-55 E	55	45	400	12.24	25.78	4.5	7	0.61	3.76	29.55
MWR-55 F	55	45	400	14.1	29.46	4.5	8	0.61	3.76	26.03
MWR-55 G	55	45	400	15.82	33.15	4.5	9	0.61	3.76	23.09
MWR-55 H	55	45	400	19.3	40.51	4.5	11	0.61	3.76	18.86
MWR-55 I	55	45	400	23.11	47.88	4.5	13	0.61	3.76	16.15
MWR-55 J	55	45	400	26.54	55.25	4.5	15	0.61	3.76	13.94
MWL-60 A	60	50	135	5.59	11.43	4.5	3	0.46	3.63	23.11
MWL-60 B	60	50	135	7.47	15.24	4.5	4	0.46	3.63	17.37
MWL-60 C	60	50	135	9.32	19.05	4.5	5	0.46	3.63	13.88
MWL-60 D	60	50	135	11.2	22.86	4.5	6	0.46	3.63	11.58
MWL-60 E	60	50	135	13.06	26.67	4.5	7	0.46	3.63	9.92
MWL-60 F	60	50	135	14.94	30.48	4.5	8	0.46	3.63	8.68
MWL-60 G	60	50	135	16.79	34.29	4.5	9	0.46	3.63	7.71
MWL-60 H	60	50	135	20.52	41.91	4.5	11	0.46	3.63	6.31
MWL-60 I	60	50	135	24.26	49.53	4.5	13	0.46	3.63	5.34
MWL-60 J	60	50	135	27.99	57.15	4.5	15	0.46	3.63	4.63
MWM-60 A	60	50	275	6.65	11.43	4.5	3	0.61	3.76	57.59
MWM-60 B	60	50	275	8.86	15.24	4.5	4	0.61	3.76	43.13
MWM-60 C	60	50	275	11.07	19.05	4.5	5	0.61	3.76	34.48
MWM-60 D	60	50	275	13.28	22.86	4.5	6	0.61	3.76	28.72
MWM-60 E	60	50	275	15.49	26.67	4.5	7	0.61	3.76	24.61
MWM-60 F	60	50	275	17.7	30.48	4.5	8	0.61	3.76	21.52
MWM-60 G	60	50	275	19.94	34.29	4.5	9	0.61	3.76	19.16
MWM-60 H	60	50	275	24.36	41.91	4.5	11	0.61	3.76	15.67
MWM-60 I	60	50	275	28.78	49.53	4.5	13	0.61	3.76	13.25
MWM-60 J	60	50	275	33.22	57.15	4.5	15	0.61	3.76	11.49
MWR-60 A	60	50	450	7.75	11.43	4.5	3	0.76	4.01	122.18
MWR-60 B	60	50	450	10.31	15.24	4.5	4	0.76	4.01	91.32
MWR-60 C	60	50	450	12.9	19.05	4.5	5	0.76	4.01	73.21
MWR-60 D	60	50	450	15.47	22.86	4.5	6	0.76	4.01	60.88
MWR-60 E	60	50	450	18.06	26.67	4.5	7	0.76	4.01	52.26
MWR-60 F	60	50	450	20.62	30.48	4.5	8	0.76	4.01	45.66
MWR-60 G	60	50	450	23.22	34.29	4.5	9	0.76	4.01	40.63
MWR-60 H	60	50	450	28.37	41.91	4.5	11	0.76	4.01	33.24
MWR-60 I	60	50	450	33.53	49.53	4.5	13	0.76	4.01	28.12
MWR-60 J	60	50	450	38.68	57.15	4.5	15	0.76	4.01	24.37

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