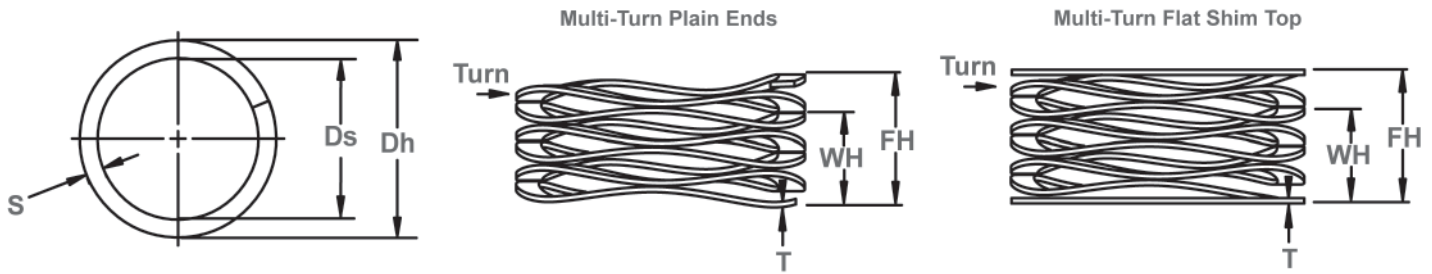


# MWL, MWM, MWR Wave Springs

## Multi Turn, Metric

Used for low to medium force applications with greater travel compared to single-turn springs. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER		SHAFT DIAMETER CLEARANCE	LOAD (N)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. N/mm
	Dh mm	Ds									
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

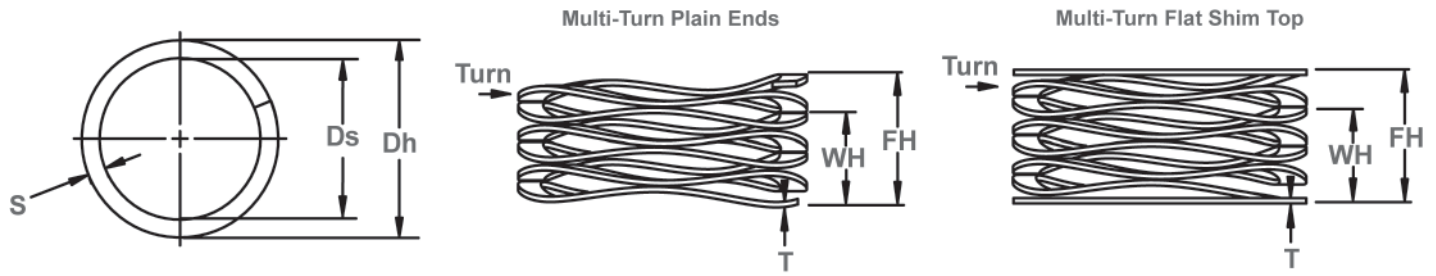
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MATERIAL CODES: ST = CARBON STEEL. SQ = 17-7 PH/C STAINLESS STEEL. SPECIAL ALLOYS AVAILABLE UPON REQUEST.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER		SHAFT DIAMETER CLEARANCE	LOAD (N)	WORK HEIGHT		FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION		SPRING RATE Ref. N/mm
	Dh mm	Ds			WH	FH					T	S	
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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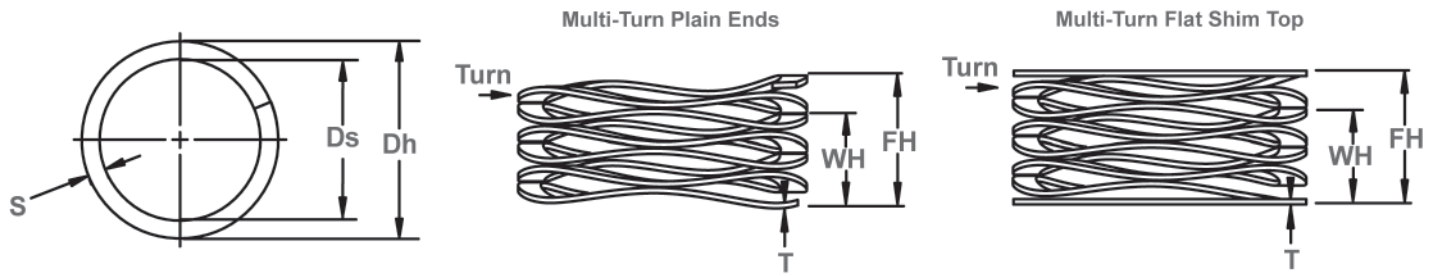
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Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER		SHAFT DIAMETER CLEARANCE	LOAD (N)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. N/mm
	Dh mm	Ds							T	S	
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	

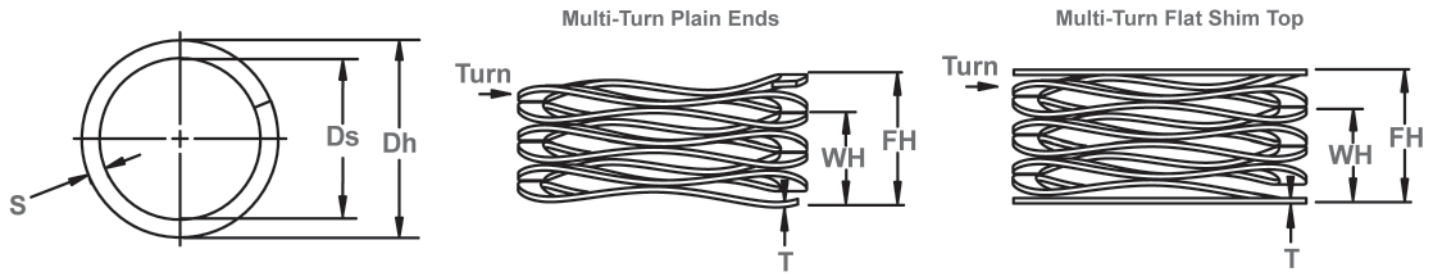
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Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER		SHAFT DIAMETER CLEARANCE	LOAD (N)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. N/mm
	Dh mm	Ds									
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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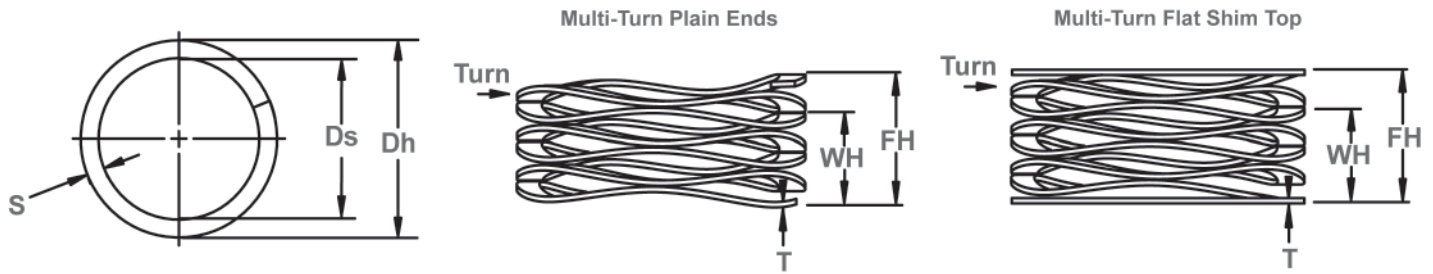
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Wave Spring Measurements

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	Dh mm			Ds	WH			FH	T	
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

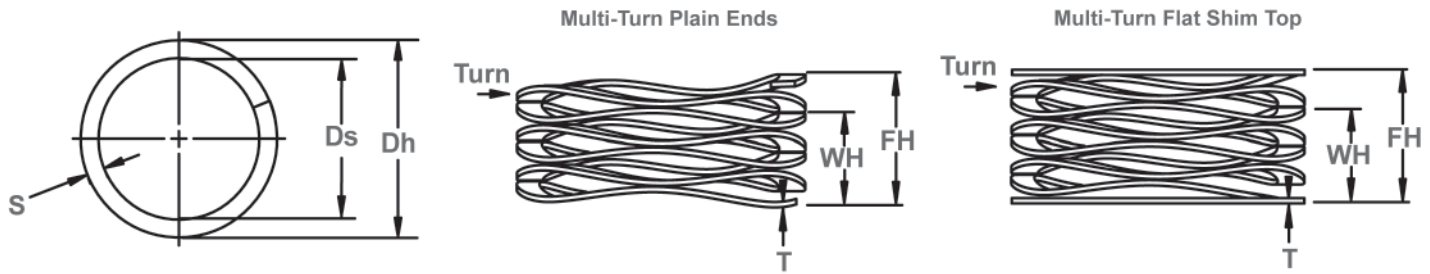
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FOR FLAT SHIM TOP WAVE SPRINGS, ADD AN 'F' TO THE END OF THE PART NUMBER (i.e. MWL-8ST AF, MWM-10ST BF, MWR-14ST CF, ETC.)

MATERIAL CODES: ST = CARBON STEEL. SQ = 17-7 PH/C STAINLESS STEEL. SPECIAL ALLOYS AVAILABLE UPON REQUEST.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER		SHAFT DIAMETER CLEARANCE	LOAD (N)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. N/mm
	Dh mm	Ds			WH	FH			T	S	
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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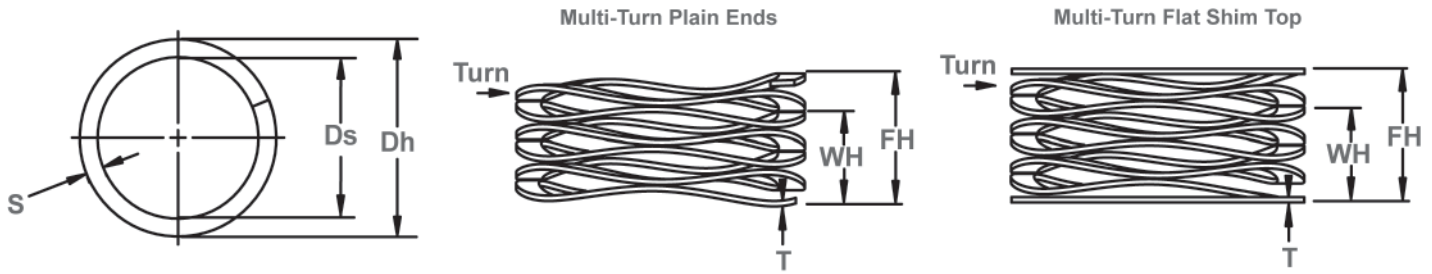
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# MWL, MWM, MWR Wave Springs

## Multi Turn, Metric

Used for low to medium force applications with greater travel compared to single-turn springs. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER		SHAFT DIAMETER CLEARANCE	LOAD (N)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. N/mm
	Dh mm	Ds									
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	

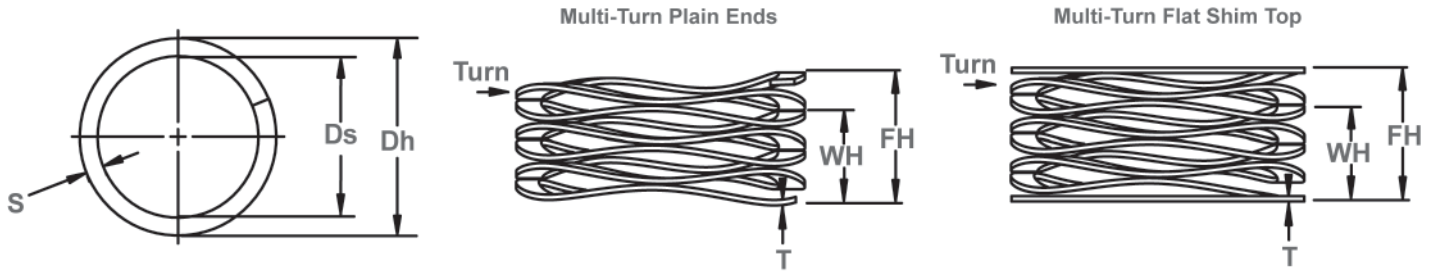
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Wave Spring Measurements

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

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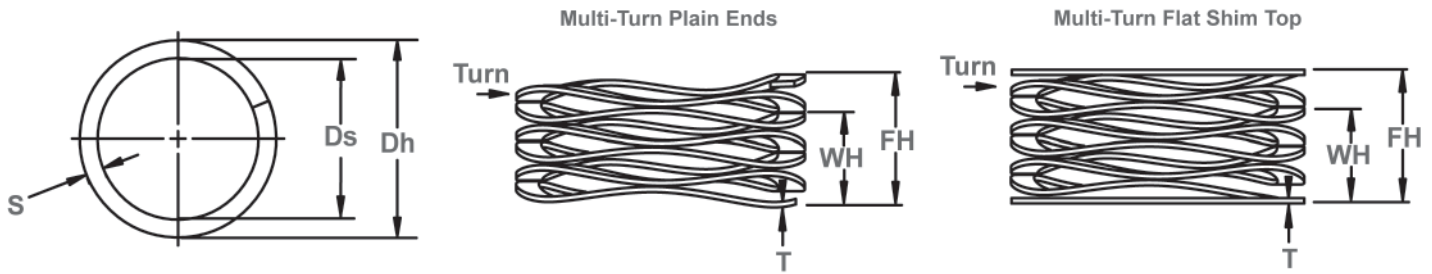
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# MWL, MWM, MWR Wave Springs

## Multi Turn, Metric

Used for low to medium force applications with greater travel compared to single-turn springs. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER	SHAFT DIAMETER CLEARANCE	LOAD (N)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. N/mm
	Dh mm			Ds	WH			FH	T	
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

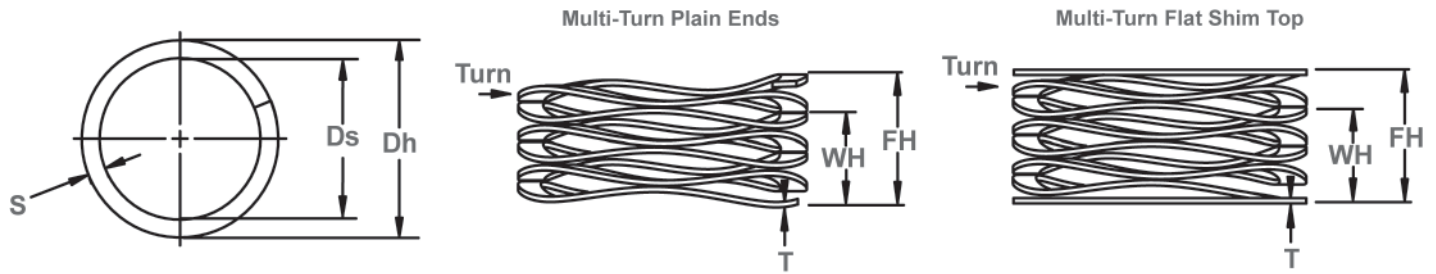
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MATERIAL CODES: ST = CARBON STEEL. SQ = 17-7 PH/C STAINLESS STEEL. SPECIAL ALLOYS AVAILABLE UPON REQUEST.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER		SHAFT DIAMETER CLEARANCE	LOAD (N)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. N/mm
	Dh mm	Ds									
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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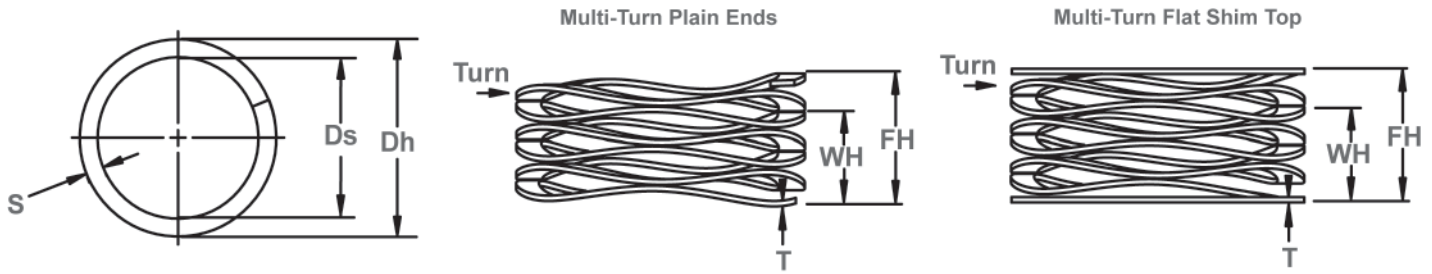
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# MWL, MWM, MWR Wave Springs

## Multi Turn, Metric

Used for low to medium force applications with greater travel compared to single-turn springs. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER		SHAFT DIAMETER CLEARANCE	LOAD (N)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. N/mm
	Dh mm	Ds							T	S	
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	

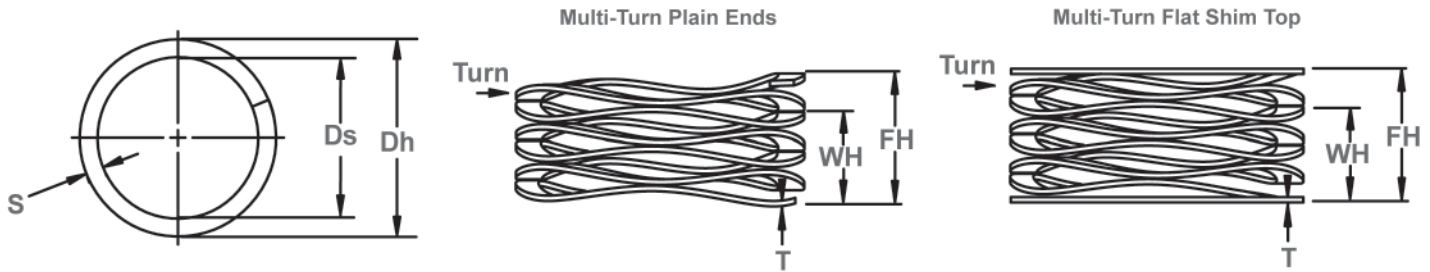
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Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER		SHAFT DIAMETER CLEARANCE	LOAD (N)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. N/mm
	Dh mm	Ds							T	S	
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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