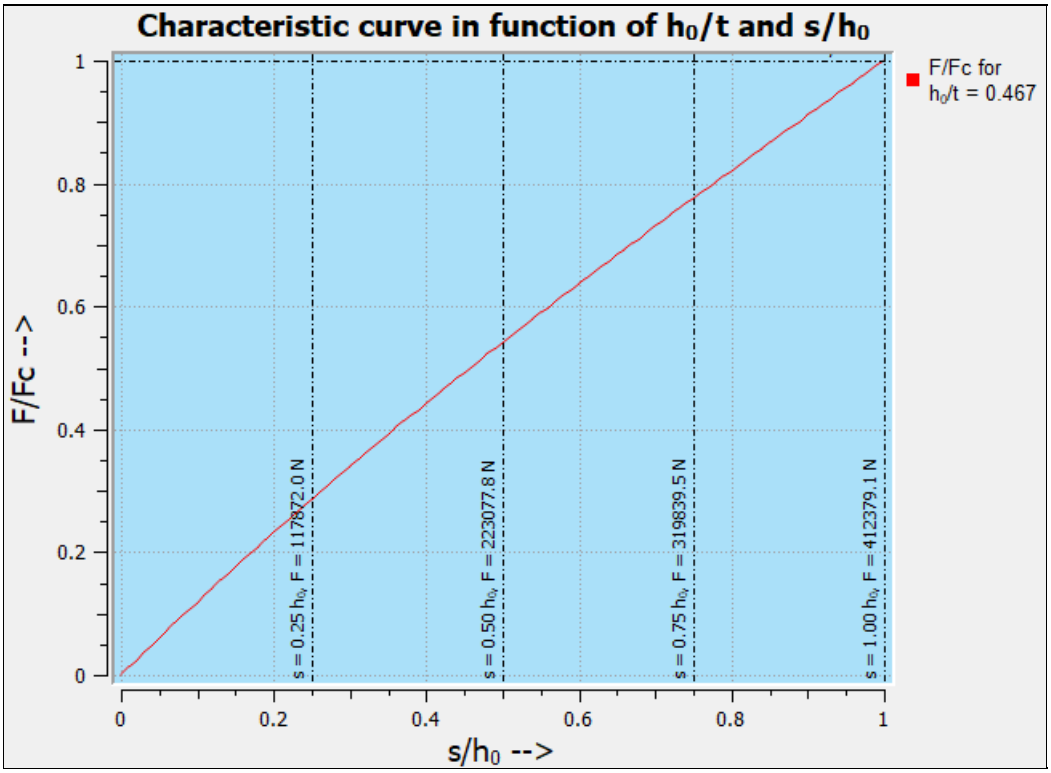
Reliable Pressings & Engineering
Disc Spring & Stack Design

Disc Spring & Stack Properties

Spring Reference:	1-B - 250x127x13.63			
Outside diameter:	250.00	mm,	9.843	in
Inside diameter:	127.00	mm,	5.000	in
Annulus width:	3.92	mm,	0.155	in
Height:	20.00	mm,	0.787	in
Original thickness:	14.50	mm,	0.571	in
Reduced thickness:	13.63	mm,	0.537	in
Free height:	6.37	mm,	0.251	in
Base angle:	7.08° ,		0.12	rad
Temperature:	45.00	°C,	113.00	°F
Material:	50CrV4/SAE9150			
Young's modulus:	204933.30	N/mm²,	29743609.30	lbs/in²
Poisson's ratio:	0.30			
Reduced thickness/thickness ratio:	0.94			
Weight:	3.8106	Kg,	8.3986	lbs
Friction:	Considered			
Coeff. of edge friction:	0.040			
Coeff. of surface friction:	0.020			
Other terms:	0.00 %			
Algorithm:	Updated Ferrari			

Single spring characteristic curve and values



25% of the free height:	1.59	mm,	0.063	in
Load:	122783.35	N,	27621.67	lbs
50% of the free height:	3.19	mm,	0.125	in
Load:	232372.74	N,	52275.19	lbs
75% of the free height:	4.78	mm,	0.188	in
Load:	333166.16	N,	74949.95	lbs
100% of the free height:	6.37	mm,	0.251	in
Load:	429561.60	N,	96635.32	lbs

It is strongly recommended that the working load deflection be designed to never exceed 75% of the full spring/stack deflection.

Spring stack characteristic values

25% of the free height:	25.48	mm,	1.003	in
Load:	250791.53	N,	56418.73	lbs
50% of the free height:	50.96	mm,	2.006	in
Load:	474633.69	N,	106774.86	lbs
75% of the free height:	76.44	mm,	3.009	in
Load:	680509.61	N,	153089.26	lbs
100% of the free height:	101.92	mm,	4.013	in
Load:	877402.41	N,	197382.79	lbs

For deflection values greater than the 75% of the free height the load value will increase differently from the calculated value.

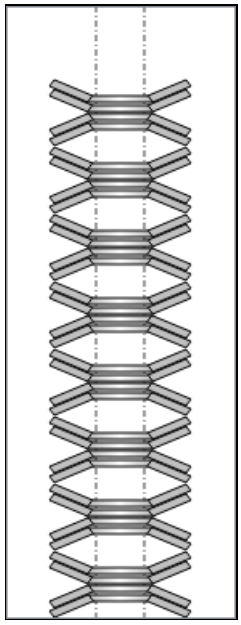
Loads and deflections

Single spring

Load:	412379.13	N,	92769.91	lbs
Deflection:	6.370	mm,	0.251	in
Post peak deflection:	N/A	mm,	N/A	in

Spring stack

Load:	518144.98	N,	116563.28	lbs
Stack deflection:	56.200	mm,	2.213	in
Post peak stack deflection:	N/A	mm,	N/A	in



Spring properties under the applied load

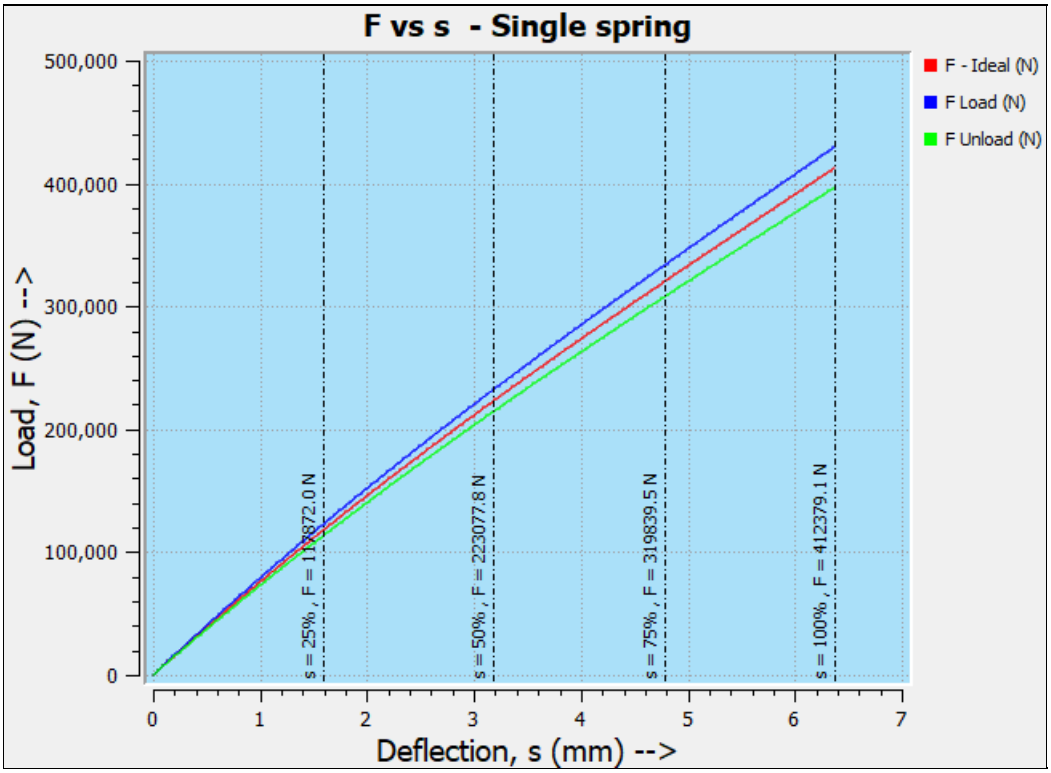
Single spring

Outside diameter:	250.41	mm,	9.859	in
Inside diameter:	126.70	mm,	4.988	in
Height:	13.63	mm,	0.537	in
Free height:	0.00	mm,	0.000	in
Actual free height:	N/A	mm,	N/A	in
Base angle:	-0.00°			

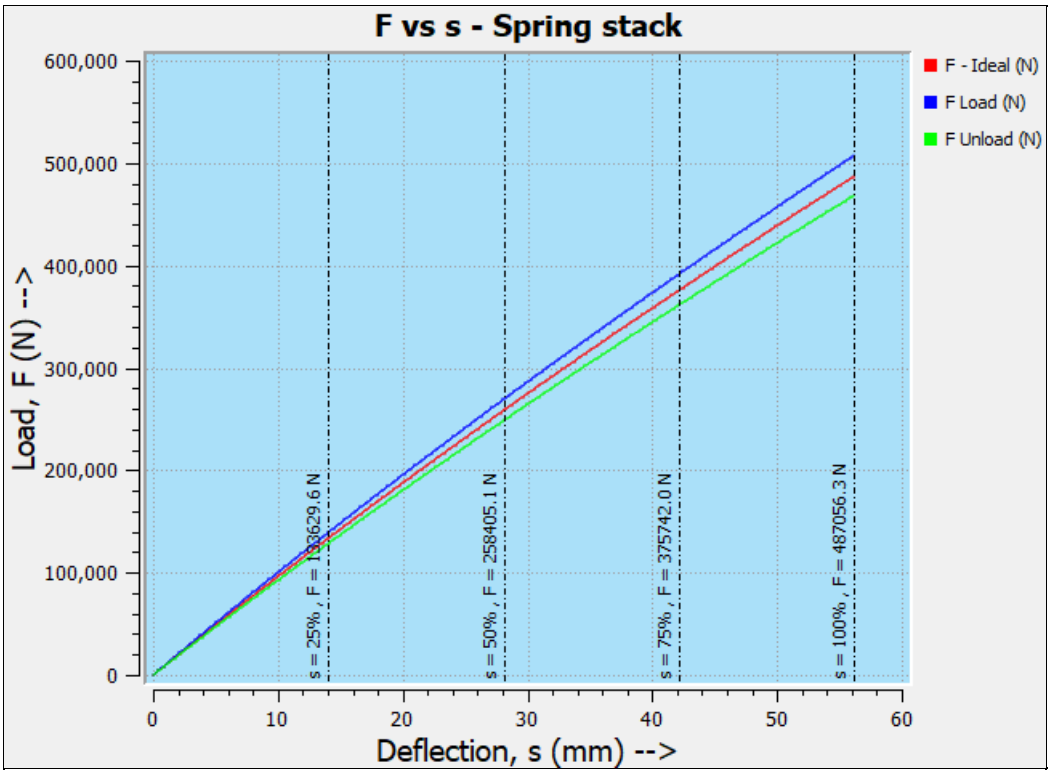
Spring stack

Height:	482.63	mm	19.001	in
Free height:	45.72	mm	1.800	in
Actual free height:	N/A	mm	N/A	in

Single spring load curve



Spring stack load curve



Spring rate and work

Single spring

Spring rate:	60070.6	N/mm
Spring work:	1442860.81	N*mm

Spring stack

Spring rate:	8064.56	N/mm
Spring work:	14837156.90	N*mm