

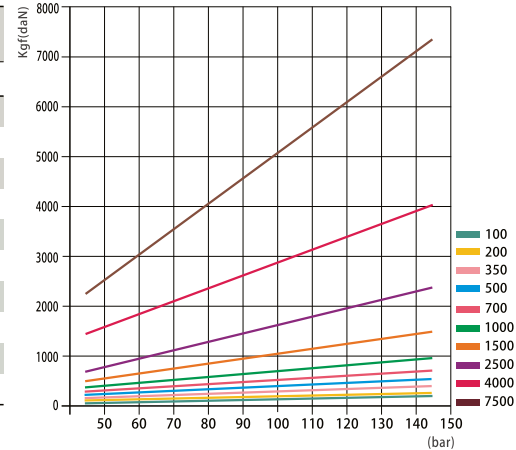


The **Best Quality** and Long Life...
More Compact and More Powerful

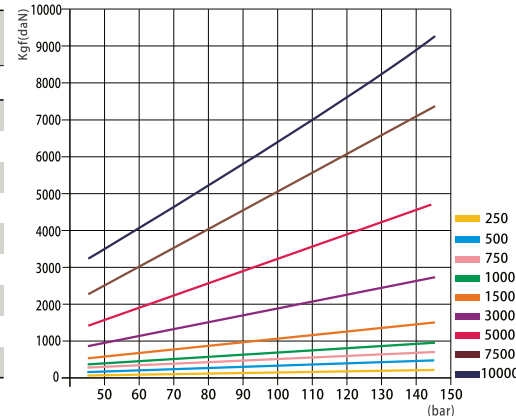
충진압력에 따른 스프링 초기하중

Initial Spring Force related to the Charging Pressure

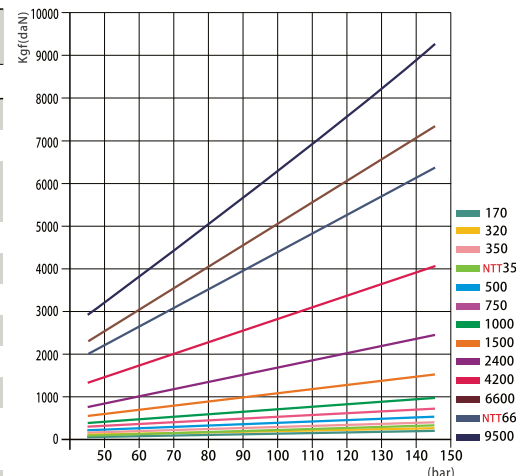
분류		N/NB/NS/NSB/NSC/NM 충진압력 Charging Pressure [Kg/cm ² (bar)]										
규격	초기하중	50	60	70	80	90	100	110	120	130	140	150
100	Kg (daN)	39	47	55	63	71	79	86	94	102	110	118
200		77	92	108	123	138	154	169	185	200	215	231
350		127	153	178	203	229	254	280	305	331	356	382
500		190	228	266	304	342	380	418	456	494	532	570
700		245	294	343	393	442	491	540	589	638	687	736
1000		353	424	495	565	636	707	777	848	918	989	1060
1500		509	610	712	814	916	1017	1119	1221	1323	1424	1526
2500		795	954	1113	1272	1431	1590	1749	1908	2067	2225	2384
4000		1413	1696	1978	2261	2543	2826	3109	3391	3674	3956	4239
7500		2512	3014	3517	4019	4522	5024	5526	6029	6531	7034	7536



분류		NC/NK 충진압력 Charging Pressure [Kg/cm ² (bar)]										
규격	초기하중	50	60	70	80	90	100	110	120	130	140	150
250	Kg (daN)	88	106	124	141	159	177	194	212	230	247	265
500		157	188	220	251	283	314	345	377	408	440	471
750		245	294	343	393	442	491	540	589	638	687	736
1000		353	424	495	565	636	707	777	848	918	989	1060
1500		509	610	712	814	916	1017	1119	1221	1323	1424	1526
3000		981	1178	1374	1570	1766	1963	2159	2355	2551	2748	2944
5000		1658	1990	2322	2653	2985	3317	3648	3980	4312	4643	4975
7500		2512	3014	3517	4019	4522	5024	5526	6029	6531	7034	7536
10000		3542	4251	4959	5668	6376	7085	7793	8502	9210	9918	10627



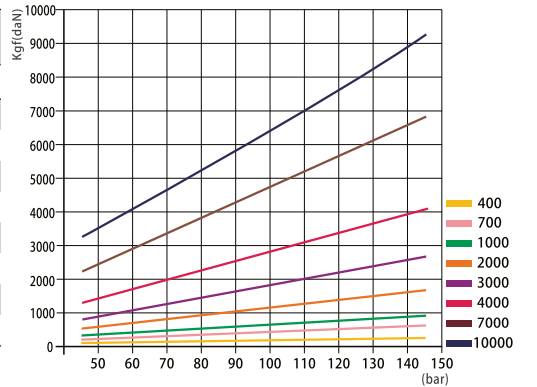
분류		NT/NTT 충진압력 Charging Pressure [Kg/cm ² (bar)]										
규격	초기하중	50	60	70	80	90	100	110	120	130	140	150
170	Kg (daN)	39	47	55	63	71	79	86	94	102	110	118
320		77	92	108	123	138	154	169	185	200	215	231
350		127	153	178	203	229	254	280	305	331	356	382
NTT350		100	121	141	161	181	201	221	241	261	281	301
500		157	188	220	251	283	314	345	377	408	440	471
750		245	294	343	393	442	491	540	589	638	687	736
1000		308	369	431	492	554	615	677	739	800	862	923
1500		509	610	712	814	916	1017	1119	1221	1323	1424	1526
2400		795	954	1113	1272	1431	1590	1749	1908	2067	2225	2384
4200		1413	1696	1978	2261	2543	2826	3109	3391	3674	3956	4239
6600	NTT	2512	3014	3517	4019	4522	5024	5526	6029	6531	7034	7536
6600		2208	2649	3091	3533	3974	4416	4857	5299	5740	6182	6623
9500		3179	3815	4451	5087	5723	6359	6994	7630	8266	8902	9538



스프링 하중 계산공식

Spring Force Calculation related to the Charging Pressure and Stroke performance

분류		NP/NPS 충진압력 Charging Pressure [Kg/cm ² (bar)]										
규격	초기하중	50	60	70	80	90	100	110	120	130	140	150
400	Kg (daN)	157	188	220	251	283	314	345	377	408	440	471
700		265	318	371	425	478	531	584	637	690	743	796
1000		330	396	462	528	594	660	726	792	858	924	990
2000		628	754	879	1005	1130	1256	1382	1507	1633	1758	1884
3000		981	1178	1374	1570	1766	1963	2159	2355	2551	2748	2944
4000		1413	1696	1978	2261	2543	2826	3109	3391	3674	3956	4239
7000		2388	2866	3343	3821	4298	4776	5254	5731	6209	6686	7164
10000		3542	4251	4959	5668	6376	7085	7793	8502	9210	9918	10627



스트로크 변위에 따른 초기하중 대비 최대하중 변환률

Force Increasing Ratio

모든 실린더의 초압 대비 종압의 증압비는 약1.6배로 일정합니다.

All the cylinders Force increasing ratio between initial and end stroke is about 1.6

1.충진압력에 따른 스프링 초기하중 계산

Initial Spring Force related to the Charging Pressure

$$\textcircled{1} F_i = \frac{\pi}{4} d^2 \times P \quad \textcircled{2} F_f = F_i \times I_f$$

F_i : 초기하중/Initial Force(Kgf,daN)

F_f : 최대하중/Final Force(Kgf,daN)

P : 충진압력/Charging pressure(bar,Kgf/cm²)

d : 로드직경/Rod diameter(cm)

I_f : 증압률/Pressure Increasing Factor(1.6배)

예) N1000-50을 100Kgf/cm²(bar)로 충진하였을 경우 스프링 초기하중 및 최대하중 계산.

F_i and F_f ,when apply to charging pressure 100bar to the N1000-50

$$F_i = \frac{3.14}{4} \times d^2 \times P = \frac{3.14}{4} \times 3^2 \times 100 = 706.5\text{kgf}(\text{daN})$$

$$F_f = F_i \times I_f = 706.5 \times 1.6 = 1130.4\text{kgf}(\text{daN})$$

2.스트로크 구간에 따른 스프링 초기하중 계산

Force Increasing related to the Stroke Performance

$$\textcircled{1} F_a = F_i + \Delta F \quad \textcircled{2} \Delta F = \frac{(F_f - F_i)}{\text{max.STROKE}} \times \text{act.STROKE}$$

F_a : 임의 스트로크에서 스프링 하중/Spring force at performed stroke(kgf,daN)

ΔF : 하중 증가분/Increased spring force at performed stroke(kgf,daN)

F_i : 초기하중/Initial Force(kgf,daN)

F_f : 최대하중/Final Force(kgf,daN)

예) N1000-50의 스트로크 25mm 진행시의 하중 계산

F_a ,stroke performed to 25mm of N1000-50

$$\Delta F = \frac{(F_f - F_i)}{\text{max.STROKE}} \times \text{act.STROKE} = \frac{(1600-1000)}{50} \times 25 = 300\text{kgf}$$

$$F_a = 1000 + 300 = 1300\text{kgf}(\text{daN})$$