

Primary characteristics

These safety valves are suitable for steam, air and other gases which do not attack the materials of the valves. The disc with special collar gives a high lift and large discharge capacity.

The safety valves:

- are available in a version with a soft-sealing disc
- have a maintenance-free stem guide, giving efficient sealing and low friction
- are designed to permit locking of the valve disc during pressure testing
- have a cap and cover that prevent unauthorized effect of the spring adjusting screw or spring

CE-marked according to Pressure Equipment Directive (PED 97/23/EG). For fluid group 2. Module H1, category IV.

Design

The valves have a spring-loaded disc and a lifting lever. Safety valves PN 16 are also available in a double version, i.e. with a common inlet section but with two independent valve discs. The valve body is of the angle pattern design and has flanges at the inlet and outlet. There is a tapped drain hole. The yoke bonnet is bolted to the valve body. DN 150 and larger have a nozzle ring. The safety valves have a protective cover and cap over the spring and spring adjusting screw. This design conforms the requirements acc. to DNV and Lloyd's to prevent those parts of the safety valves for unauthorized effects. There are two versions of the valve disc, one with a metal sealing surface only, the other with a dual seal of metal and EPDM rubber.

The set pressure is set and adjusted by the spring adjusting screw in the bonnet. Valves of DN 150 and larger are supplied with a special tool for installing the spring. During pressure testing the stem, and therefore the valve disc, is locked by a locking device secured to the bonnet with two screws. The device is not supplied with the valve. Each valve is provided with an identification plate stating NAF number, DN, PN, seat diameter, (set) pressure and working range of the spring. The valves are supplied tested and set to the required set pressure.

Information about the capacity and design acc. to Norske Veritas and Lloyd's Register of Shipping is submitted on request.

Applications

The safety valves are suitable for steam, air and other gases not corrosive to the component materials. Contact NAF for further details.

Test pressure

The inlet section of the valve is pressure tested with water at a pressure of 1.5 x PN.

Air is used for operating tests and to test the set pressure.



Connections (Table 1)

The safety valves have drilled raised face flanges conforming to the standards set out below.

Pressure Class PN	Valve flanges		Counter flanges for welding	
	Inlet	Outlet	Inlet	Outlet
16	EN1092-1 PN16	EN1092-1 PN10	DIN2633 (SS2033)	DIN2632 (SS2032)
40	EN1092-1 PN40	EN1092-1 PN16	DIN2635 (SS2035)	DIN2633 (SS2033)

Working pressure and temperature (Table 2)

Temperature Max. °C	Pressure max. bar (e)	
	PN 16	PN 25/40
200	12,4	30,2
300	10,3	25,8
350	9,6	24,0
400	9,2	23,1

Capacity

For steam, see page 6. Details for other media on request.

Ordering example

When placing the order, please specify the type designation, DN, set pressure, temperature, medium and required capacity as follows:

NAF 546640 DN 80 x 125 for set pressure = 20 bar(e), saturated steam. Capacity 35 t/h.

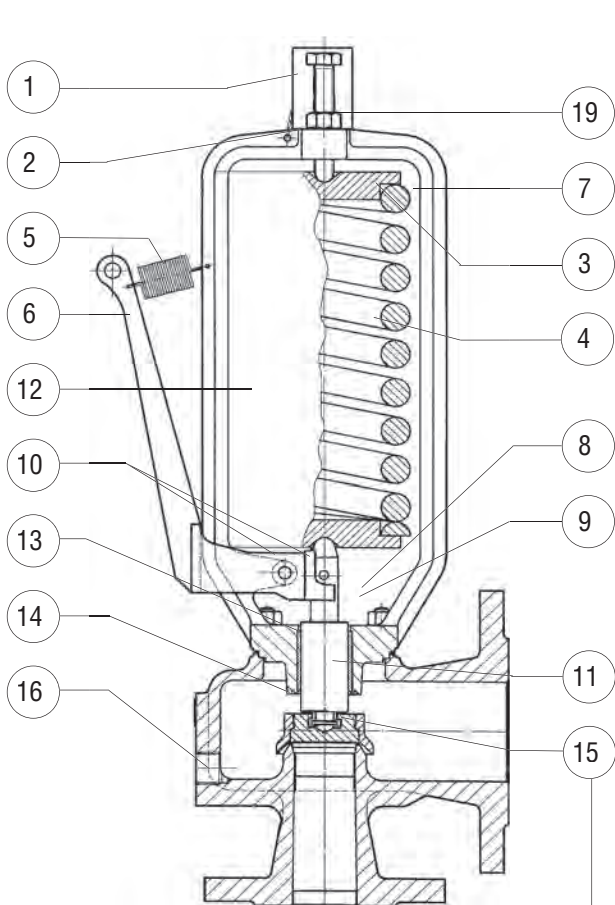
Instructions

See Fi 46.721 AGB which is supplied with the valve.

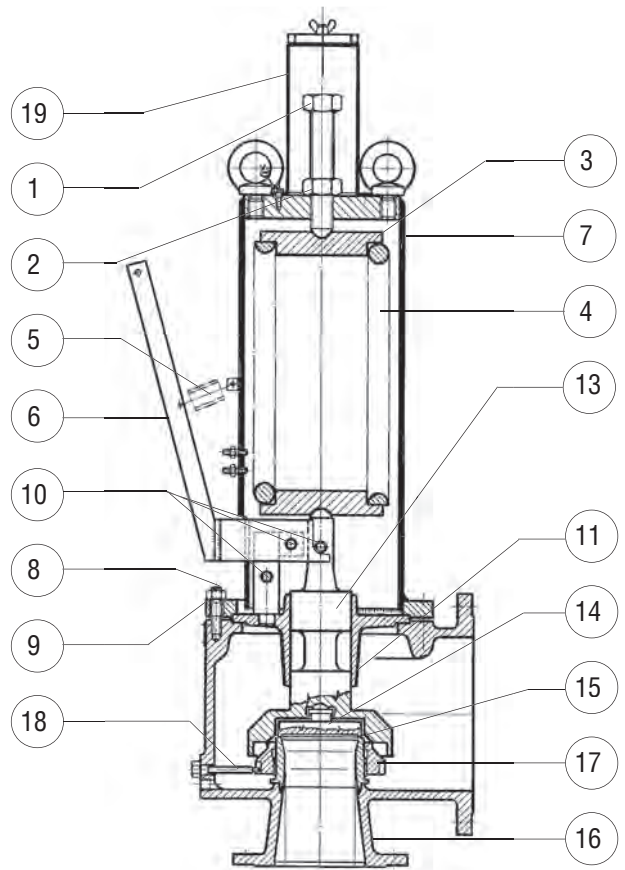
Material specification (Table 3)

Item	Description	Material
1	Adjusting screw	Steel 8.8
2	Locknut	Steel 8.8
3	Spring washer	Steel SS 2172
4	Spring	SS 1774 / St 2090
5	Spring	SS 1770
6	Lifting lever	Nodular cast iron/steel
7	Yoke bonnet/DN 25 - 100 Bonnet/cover/DN 150 - 250	Cast steel ASTM A 216-82 Grade WCC EN10028 P265 GII
8	Stud	Steel 8.8
9	Hex. nut	Steel 8.8
10	Tension pin	SS 1770
11	Stem guide DN 25 - 100 Stem bush DN 150 - 250	Self lubricating PTFE bush EN1.4436

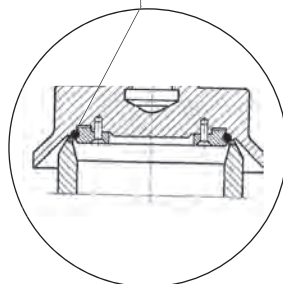
Item	Description	Material
12	Cover/DN 25-100	Surface-treated steel
13	Stem/DN 25-100 Stem/DN 150-250	EN1.4301 PTFE lined stainless steel 1.4408
14	Disc/DN 25-100 Disc/DN 150-250	EN1.4301 EN10213-2 1.4317
15	Sealing surface, disc Soft seal	Machined in the disc O-ring of EPDM
16	Body Sealing surface, disc	EN10213-2 1.0619 Stainless steel, welded
17	Nozzle ring	Stainless steel, ASTM A351 Gr CF8M
18	Set screw	EN10269, 1.4436
19	Cap	Surface-treated steel



DN 25 - 100

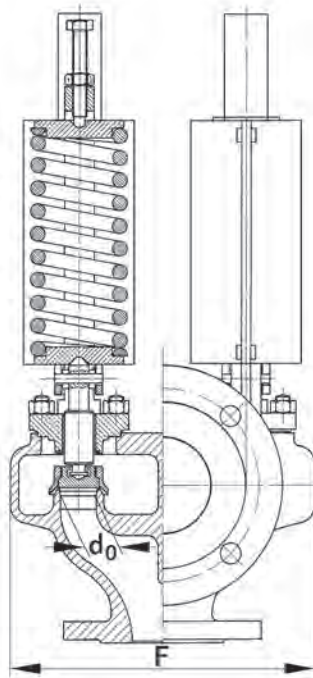


DN 150 - 250

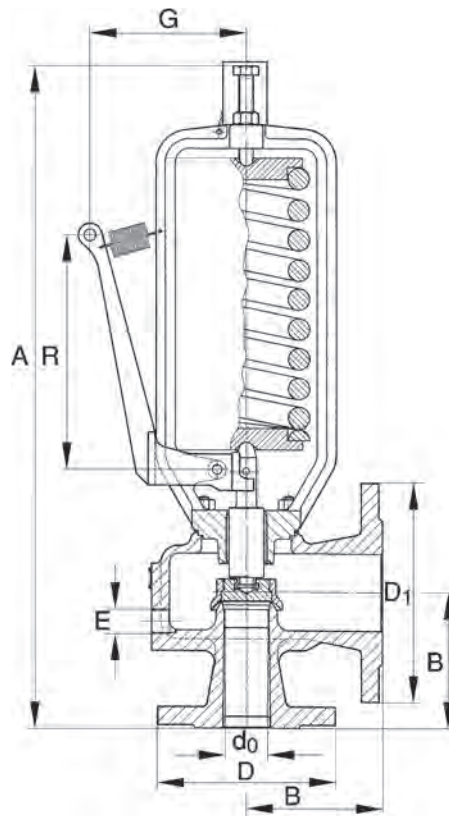


Dimensions and mass (Table 4)

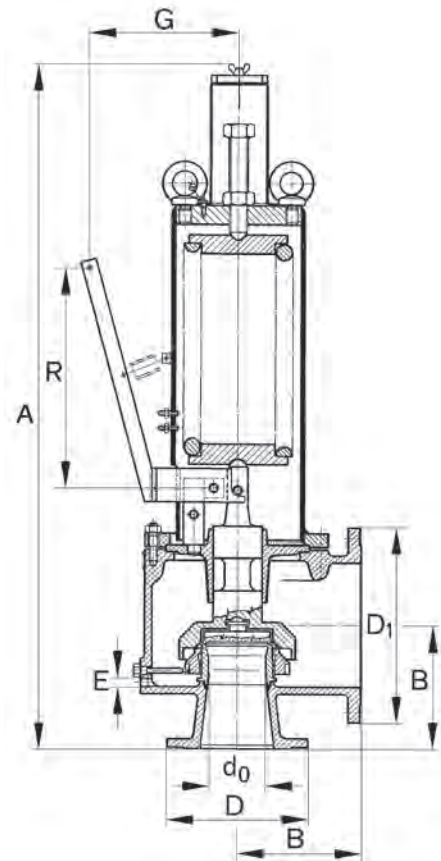
Pressure PN	NAF No.	DN In-/Outlet	d_0	D	D_1	B	A	G	R	E	F	Mass ca kg
16	546340/41	65 x 100	62	185	220	140	780	195	291	R3/4"	-	44
		80 x 125	76	200	250	160	925	246	363	R3/4"	-	90
		100 x 150	95	220	285	180	1095	282	450	R3/4"	-	140
	546350/51	150 x 250	115	285	395	250	1280*	290	439	R3/4"	-	210
		200 x 300	160	340	445	300	1675*	344	511	R3/4"	-	350
		250 x 350	204	405	505	325	1925*	359	589	R3/4"	-	520
25/40	546640/41	25 x 40	24	115	150	100	440	94	141	R3/4"	-	8,5
		32 x 50	30	140	165	110	530	114	169	R3/4"	-	13
		40 x 65	38	150	185	115	595	130	197	R3/4"	-	21
		50 x 80	47,5	165	200	120	690	152	224	R3/4"	-	29
		65 x 100	62	185	220	140	880	195	291	R3/4"	-	55
		80 x 125	76	200	250	160	1075	246	363	R3/4"	-	110
		100 x 150	95	235	285	180	1295	282	450	R3/4"	-	160
16 (Twin design)	546343	50 x 80	2 x 30	165	200	130	550	114	169	R3/4"	254	27
		65 x 100	2 x 38	185	220	140	620	130	197	R3/4"	306	43



NAF 546343



**NAF 546340/41
546640/41**



NAF 546350/51

Set pressure (Table 5)

Max permitted back pressure approx. 15% of set pressure for fully discharged quantity.

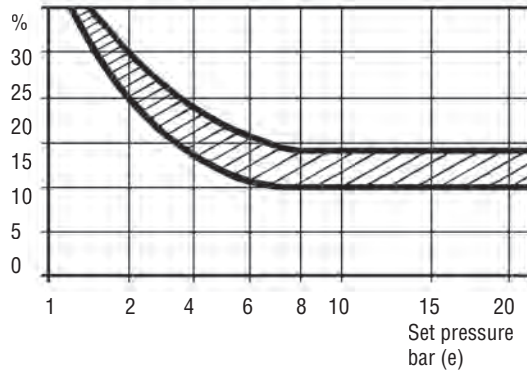
Pressure Class PN	NAF No.	DN	Bore d ₀	Temp max ¹⁾ °C	Set pressure bar e (p ₀) Max 1)		
					steam	air	min ¹⁾
Metal seat							
16 ²⁾	546340	65 x 100	62	400	15	16	1
16 ²⁾		80 x 125	76	400	15	16	1
16 ²⁾		100 x 150	95	400	15	16	1
16 ³⁾	546350	150 x 250	115	400	15	16	1
16 ³⁾		200 x 300	160	400	15	16	1
16 ³⁾		250 x 350	204	400	15	16	1
25/40	546640	25 x 40	24	400	36	40	1
25/40		32 x 50	30	400	36	40	1
25/40		40 x 65	38	400	36	40	1
25/40		50 x 80	47,5	400	36	40	1
25/40		65 x 100	62	400	36	40	10
25/40		80 x 125	76	400	36	40	10
25/40		100 x 150	95	400	36	40	10
Soft seat							
16 ²⁾	546341	65 x 100	62	200	15	16	1
16 ²⁾		80 x 125	76	200	15	16	1
16 ²⁾		100 x 150	95	200	15	16	1
16 ³⁾	546351	150 x 250	115	200	15	16	1
16 ³⁾		200 x 300	160	200	15	16	1
25/40	546641	40 x 65	38	200	15	40	1
25/40		50 x 80	47,5	200	15	40	1
Twin design							
16	546343	50 x 80	2 x 30	400	15	16	1
16		65 x 100	2 x 38	400	15	16	1

- ¹⁾ For intermediate values see page 1.
- ²⁾ For PN 16, DN 25 - 50, select PN 25/40 NAF 546640/41.
- ³⁾ For DN 150,200 and 250 are also available in PN 25 as special design.
Max. set pressure 15 bar (e)

Operation pressure difference

Recommended difference between set pressure and operation pressure = operation pressure difference.
 For set pressure ≥ 7 bar (e) the recommended set pressure differential is about 10%. The differential for set pressures ≤ 7 bar (e) varies greatly depending on the set pressure. See the graph below.

Operating pressure difference, recommended values.



Normal setting range of spring (Table 6)

Setting ranges of springs in bar (e)		
	NAF 546343 DN 50-65	
NAF 546340/41 DN 65-100	NAF 546640/41 DN 25-100	NAF 546350/51 DN 150-250
1,0 - 2,1	1,0 - 2,1	1,0 - 1,5
2,1 - 2,8	2,1 - 2,8	1,5 - 2,2
2,8 - 3,6	2,8 - 3,6	2,2 - 3,0
3,6 - 4,8	3,6 - 4,8	3,0 - 4,0
4,8 - 6,4	4,8 - 6,4	4,0 - 5,2
6,4 - 8,6	6,4 - 8,6	5,2 - 6,8
8,6 - 11,5	8,6 - 11,5	6,8 - 8,8
11,5 - 14,6	10,0 - 14,6*	8,8 - 11,5
14,6 - 16,0	11,5 - 14,6	11,5 - 15,0
	14,6 - 18,5	
	18,5 - 22,0	
	22,0 - 25,0	
	25,0 - 29,0	
	29,0 - 33,0	
	33,0 - 37,0	
	37,0 - 40,0	

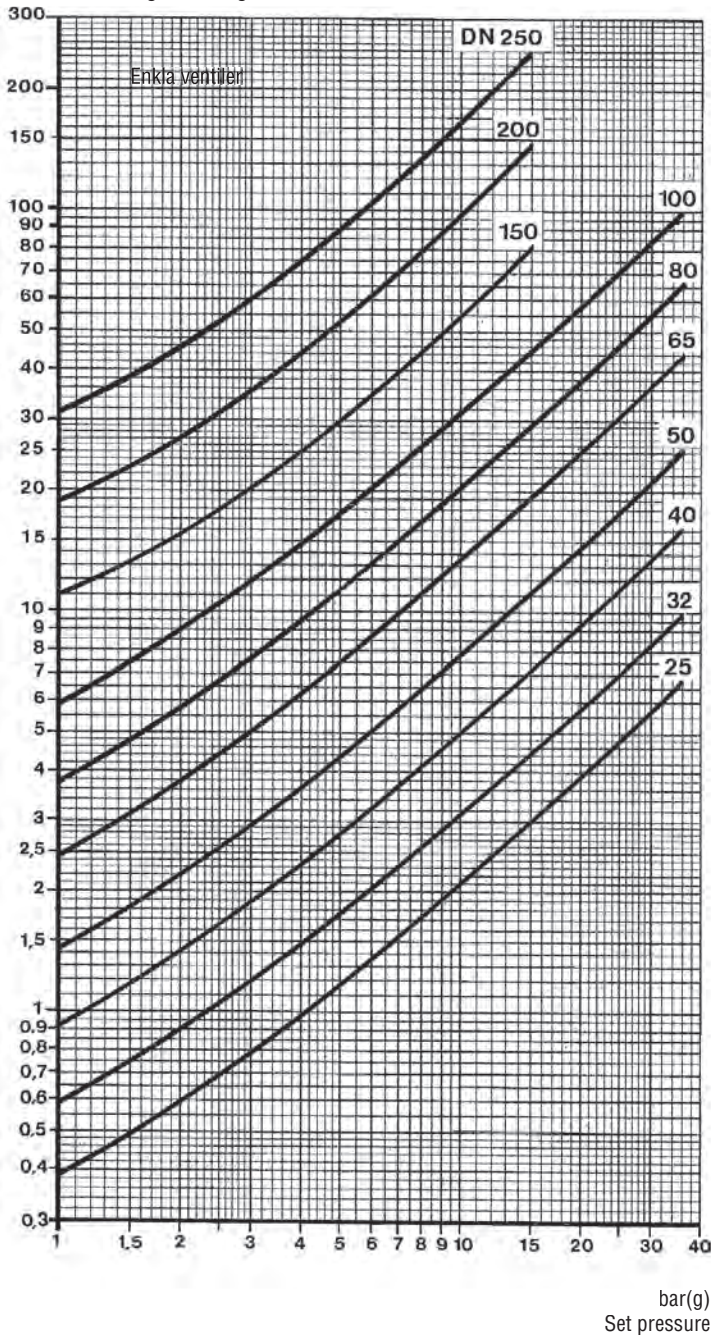
*Only for NAF 546640/41, DN 65, 80 and 100

Capacity for steam

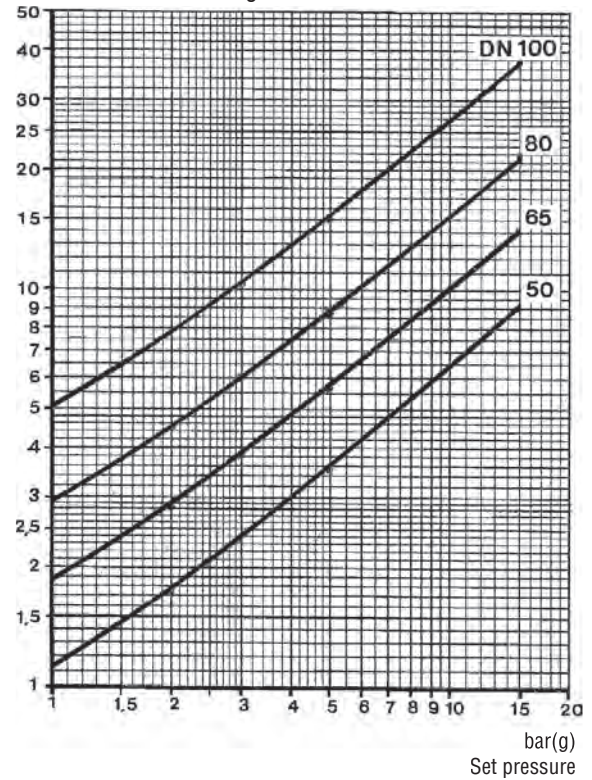
The capacities in the graph are for saturated steam and the values are guaranteed by NAF including 10% overpressure.

The graphs state max and min set pressure for each DN. The relationship between DN and NAF number, and therefore set pressure range for each type of valve, is shown on the table on page 4.

Q t/h sat. steam including 10% overpressure
Single-acting valves



Q t/h sat. steam including 10% overpressure
Double-acting valves



Blowdown

The value is less than 10% for compressible media. By set pressure ≤ 3 bar max 0,3 bar.

Conversion factor

The capacity of NAF safety valves is for saturated steam. To convert these steam quantities to superheated steam, the value on the graph must be divided by the factor given in the table below for the superheated steam. Obviously the converse also applies, i.e. the quantity of superheated steam multiplied by the corresponding factor gives saturated steam.

(Table 7)

Bar	Sat. temp °C	Total temperature - Superheated steam °C																	
		175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600
0,5	111	1,04	1,07	1,10	1,13	1,15	1,18	1,21	1,23	1,25	1,28	1,30	1,33	1,35	1,37	1,39	1,41	1,43	1,45
1,5	127	1,03	1,05	1,08	1,10	1,13	1,16	1,19	1,21	1,23	1,26	1,28	1,30	1,33	1,35	1,37	1,39	1,41	1,43
3	143	1,01	1,03	1,06	1,09	1,11	1,14	1,17	1,19	1,21	1,24	1,26	1,28	1,31	1,33	1,35	1,37	1,39	1,41
5	158	1,01	1,01	1,04	1,07	1,10	1,12	1,15	1,17	1,20	1,22	1,24	1,27	1,29	1,31	1,33	1,35	1,37	1,39
10	183		1,01	1,02	1,05	1,07	1,10	1,13	1,15	1,17	1,20	1,22	1,24	1,27	1,29	1,31	1,33	1,35	1,37
15	200		1,00	1,01	1,02	1,05	1,08	1,11	1,13	1,16	1,18	1,21	1,23	1,25	1,27	1,29	1,32	1,34	1,36
20	214			1,01	1,01	1,04	1,07	1,10	1,13	1,15	1,18	1,20	1,22	1,25	1,27	1,29	1,31	1,33	1,35
25	225			1,00	1,01	1,03	1,06	1,09	1,12	1,14	1,17	1,19	1,22	1,24	1,26	1,28	1,31	1,33	1,35
30	235				1,00	1,03	1,05	1,08	1,11	1,14	1,17	1,19	1,22	1,24	1,26	1,28	1,31	1,33	1,35
40	251				1,00	1,02	1,04	1,07	1,11	1,13	1,16	1,19	1,21	1,24	1,26	1,28	1,31	1,33	1,35
50	264					1,01	1,03	1,06	1,09	1,12	1,15	1,18	1,21	1,23	1,26	1,28	1,31	1,33	1,35
60	275					1,00	1,01	1,05	1,09	1,12	1,15	1,18	1,21	1,24	1,26	1,29	1,31	1,33	1,36
70	285						1,00	1,04	1,09	1,12	1,16	1,19	1,21	1,24	1,27	1,29	1,32	1,34	1,37
80	295						1,00	1,04	1,08	1,12	1,16	1,19	1,22	1,25	1,28	1,30	1,33	1,35	1,38
90	303							1,04	1,08	1,12	1,16	1,19	1,22	1,25	1,28	1,31	1,33	1,36	1,39
100	310							1,04	1,07	1,12	1,16	1,20	1,23	1,26	1,29	1,32	1,35	1,37	1,40
110	317							1,03	1,07	1,11	1,17	1,20	1,24	1,27	1,30	1,33	1,36	1,38	1,41
120	324							1,00	1,06	1,11	1,17	1,21	1,25	1,28	1,31	1,34	1,37	1,39	1,42
130	330								1,05	1,11	1,17	1,21	1,26	1,29	1,33	1,36	1,39	1,41	1,44
140	336								1,04	1,11	1,18	1,22	1,27	1,30	1,34	1,37	1,40	1,43	1,46
150	341								1,03	1,10	1,18	1,23	1,28	1,32	1,35	1,38	1,42	1,45	1,48
160	346								1,02	1,10	1,18	1,24	1,29	1,33	1,37	1,41	1,44	1,47	1,50
170	351								1,00	1,10	1,19	1,25	1,31	1,35	1,39	1,43	1,46	1,50	1,53
180	356									1,10	1,20	1,27	1,33	1,38	1,42	1,46	1,49	1,53	1,56
190	360									1,10	1,21	1,29	1,36	1,41	1,45	1,50	1,53	1,57	1,60
200	364									1,09	1,23	1,31	1,39	1,44	1,49	1,54	1,58	1,62	1,65



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