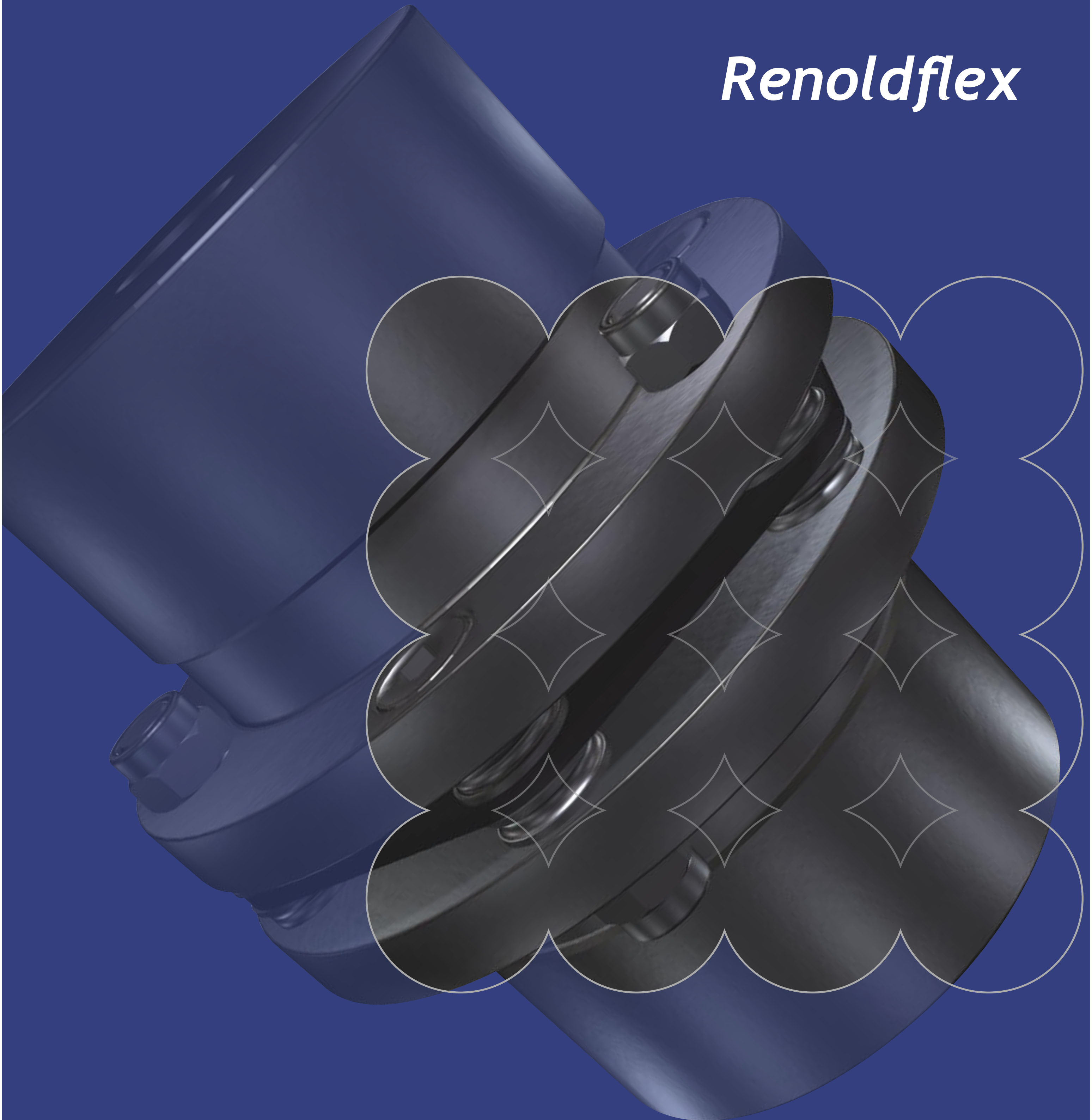
Renoldflex



RENOLD

Superior Coupling Technology

Renoldflex Type A

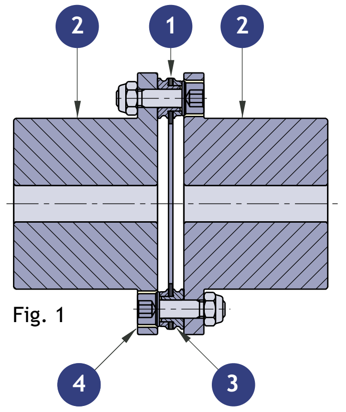


Fig. 1

Renoldflex Type B

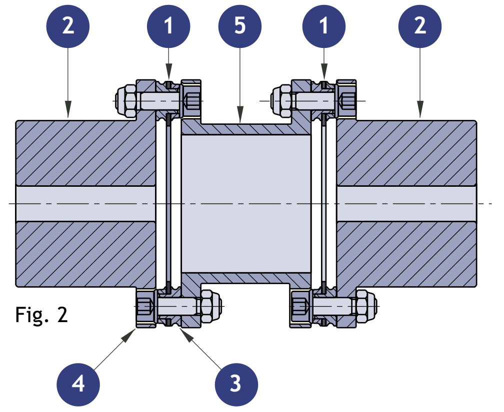


Fig. 2

7 Disc pack

2 Hub

3 Precision bushings

4 High tensile steel screws

5 Spac

Renoldflex - torsionally rigid steel coupling

Renoldflex is a new range of couplings that utilizes a stainless spring steel disc pack to provide a positive 'backlash free' drive.

The coupling consists of two carbon steel hubs that are connected to the disc packs with a system of micrometric precision bushings and high tensile steel screws. This construction provides a backlash free and torsionally rigid drive with the additional benefit of a 100% steel construction.

The Renoldflex range of couplings is based upon a modular component assembly; therefore it can be easily adapted to suit a wide variety of applications and design situations:

The Renoldflex type A (fig. 1) uses a single disc pack and two hubs. It permits both axial and angular misalignments. This arrangement guarantees the highest torsional stiffness for this range of couplings. A special vertical support can be produced to allow for vertical or inclined mounting of the type A arrangement.

The Renoldflex type B (fig. 2) uses two disc packs, two hubs and a spacer. It permits axial, angular and radial misalignments. The spacer component can be supplied in several lengths to allow for different axial dimensions

Renoldflex - the advantages of the system

Zero backlash: Ideal for use on synchronous machines or for machines with frequent starts, stops and reverses. Provides precision position control for applications where operational accuracy needs to be guaranteed.

Torsional stiffness: The precision design of the spring steel disc pack guarantees a high torsional stiffness. This is an integral characteristic for applications on packaging machines, printing presses, machine tools and other precision machines.

High operating temperatures: Renoldflex's 100% steel construction makes it suitable for use in a multitude of harsh and difficult operating environments including temperatures up to 240°C. Ideal for use in applications involving boiler feeds or high temperature liquid pumps.

High operating speeds: Each Renoldflex component is machined to within very tight manufacturing tolerances for both concentricity and perpendicularity. This makes the couplings intrinsically suitable for operating on high-speed applications, including in the presence of irregular or peak torques. This also allows for an accurate transmission of angular velocity.

Long life: The precision design and manufacture of the disc elements creates a perfect force distribution, which, in conjunction with the tight manufacturing tolerances, eliminates all backlash. This ensures the Renoldflex coupling range has a long life with little to no wear.

Maintenance free: Renoldflex is designed to be 100% maintenance free making it an ideal coupling for harsh, dangerous or remote operating environments. The all steel construction combined with the precision-machined components removes the need for lubrication and the necessity for regular cleaning.

Misalignment diagram

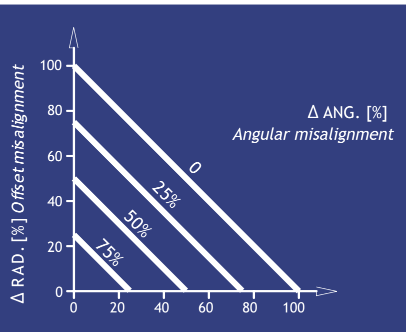
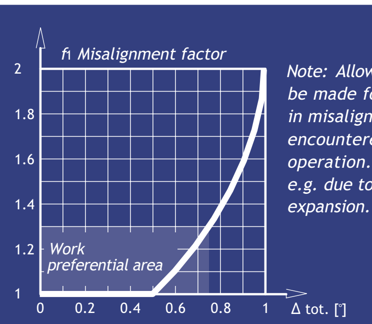


Fig. 4 Δ AX. [%] *Axial misalignment*

Misalignment factor f1



Note: Allowance should be made for change in misalignment encountered during operation. e.g. due to thermal expansion.

Fig. 5

Temperature factor f3

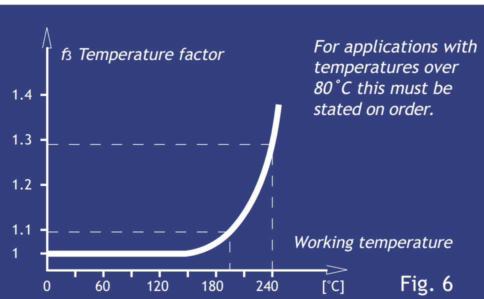
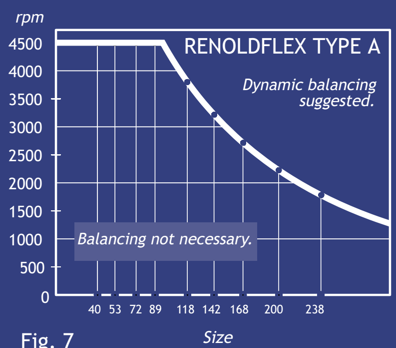


Fig. 6

Balancing



Balancing; Renoldflex standard elements are balanced to grade G6.3 - BS ISO 1940-1:2003. Additional balancing is recommended for applications over the speed curves in figures 7 and 8.

Fig. 7

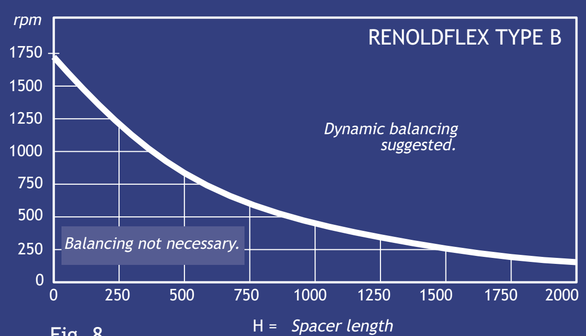


Fig. 8

Renoldflex coupling size selection

In order to select the most suitable sized coupling, a number of service factors must be taken into consideration. These service factors make adjustments to the design torque (**T**) of an application to take into account factors such as misalignment, load classification, driver classification as well as high ambient temperatures to produce a selection torque ($\mathbf{T_S}$, where $\mathbf{T_S}$ = **T** x $\mathbf{f_S}$). The most suitable coupling is then selected by comparing the selection torque ($\mathbf{T_S}$) and the couplings nominal torque ($\mathbf{T_N}$). Please note – it is important to ensure that the coupling selected will accept the required shaft diameters. Should shaft diameter exceed the maximum permissible then a larger coupling should be selected.

The total service factor $\mathbf{f_S} = \mathbf{f_1} \times \mathbf{f_2} \times \mathbf{f_3}$; where $\mathbf{f_1}$ is the misalignment factor, $\mathbf{f_2}$ is the load classification factor and $\mathbf{f_3}$ is the temperature factor. Note; the load classification factor is weighted depending upon the prime mover classification. These service factors are defined below:

Misalignment factor f_1

The maximum misalignments quoted within the technical data for the Renoldflex coupling range cannot be present at the same time. Therefore, the presence of any axial misalignment Δ_{ax} reduces the possibility for offset misalignment Δ_{rad} and angular misalignment Δ_{ang}, which can be seen in figure 4. The combined total angular misalignment Δ_{TOT} is a function of the angular misalignment Δ_{ang} and offset misalignment Δ_{rad} of the shafts, according to the following formula:

$$\Delta_{TOT}\ [^\circ] = \frac{\Delta_{ang}}{\mathbf{2}} + \arctan \frac{\Delta_{rad}}{\mathbf{(H-B)}}$$

The values **H** and **B** [mm] are given in the overall dimensions table. The misalignment factor $\mathbf{f_1}$ is a function of Δ_{TOT} as shown in figure 5.

Load factor f_2

The following load factors apply for machines operated by electric or hydraulic motors as well as steam or gas turbines.

OPERATING MACHINE	load factor f_2
Blowers: low inertia	1.1
Blowers: high inertia, cooling towers	2.0
Centrifugal pumps: low inertia and light liquids	1.1
Centrifugal pumps: high inertia or semi-liquid materials	1.75
Conveyors	1.5
Elevators and cranes	2.0
Gear pumps	1.5
Machine tools: auxiliary drives	1.1
Machine tools: main drives	1.75
Mills	2.5
Paper machines and textile machines	2.0
Presses	3.0
Reciprocating pumps	2.5
Woodworking machines	1.5

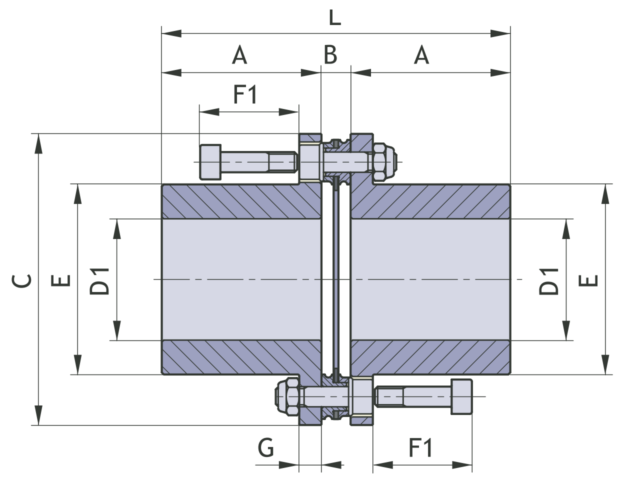
For machines operated by alternative prime movers the load factor f_2 must be adjusted as follows:

- f_2+1 for machines operated by IC engines with 4 or 5 pistons.
- f_2+0.5 for machines operated by IC engines with 6 pistons, hydraulic turbines or with a start torque >2.
- The following must be taken into account with regard to repetitive high peak torque applications:
  - For non reversing duty: T> Peak torque
  - For reversing duty: T> 1.5 Peak torque.

Temperature factor f_3

Renoldflex couplings are unaffected by temperatures up to 160°C. For applications with higher temperatures, the temperature factor f_3 seen in figure 6 must be taken into consideration.

RENOLDFLEX TYPE A

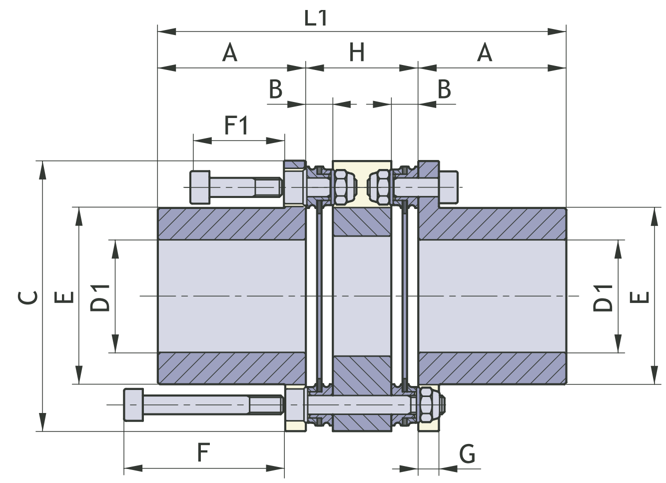


Renoldflex - overall dimensions

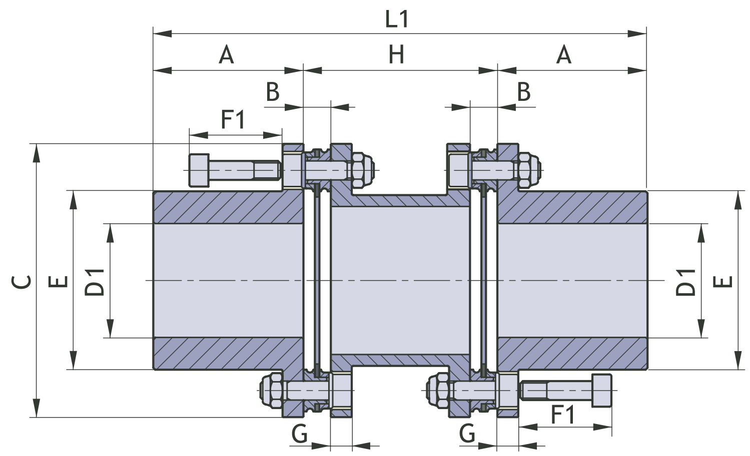
Size	A mm	B mm	C mm	Pilot bore D mm	Max bore D_1* mm	E mm	F_1 mm	G mm	Spacer length H mm		L mm	L_1 mm	Coupling weights Hub (pilot bore) kg	Disk packs kg	Spacer kg
53	24.5	6.9	53	6	22	32.5	25	5	30 39	Available up to 3000 mm upon request	55.9	79 88	0.2 0.2	0.6 0.7	0.2 0.2
70	39.5	7.5	70.5	10	35	47	25	5	31.2 60 100 140		86.5	110.2 139 179 219	0.6 0.6 0.6 0.6	0.1 0.1 0.1 0.1	0.3 0.3 0.5 0.6
88	45	8.8	88.3	14	45	62.5	32	8	37.6 70 80 100 140		98.8	127.6 160 170 190 230	1.2 1.2 1.2 1.2 1.2	0.1 0.2 0.2 0.2 0.2	0.6 0.7 0.7 0.8 1.1
116	55	10.4	116.5	15	60	82	40	10	46.3 100 140 180		120.4	156.3 210 250 290	2.4 2.5 2.5 2.5	0.3 0.2 0.2 0.2	1.3 1.4 1.7 2.0
140	60	12	140.5	19	75	98	47	11	55 100 140 180		132	175 220 260 300	3.7 3.9 3.9 3.9	0.4 0.4 0.4 0.4	2.3 2.1 2.6 3.0
166	75	13	166.5	25	90	118	56	12	62.6 100 140 180		163	216.6 250 290 330	7.0 7.0 7.0	0.9 0.9 0.9	3.2 3.8 4.5
198	90	15	198.5	30	100	141	64	14	71.8 140 180		195	251.8 320 360	11.8 11.8	1.4 1.4	5.2 6.0
238	125	20.8	238	39	120	169	81	16	140 180		270.8	392.4 432.4	23.3 23.23	2.2 2.2	10.0 11.8

*Use maximum bore D_1 only for uniform load. For heavy duty class, maximum bore: $D_1 = \frac{E}{1.45}$

RENOLDFLEX TYPE B H-MIN.



RENOLDFLEX TYPE B



* Renoldflex allows 1.75 times the nominal torque for short periods of time.

** See fig 7 & 8.

*** The torsional stiffness of a single pack complete coupling can be approximated to the torsional stiffness of 1 disc pack C_k

The torsional angle of a single pack coupling

$$[^\circ] = \frac{180}{\pi} \frac{T}{C_k}$$

The torsional stiffness of a complete double pack coupling can be approximated to:

$$C_{TOT} = \frac{1}{\frac{2}{C_K} + \frac{H-2B}{C_H}}$$ H,B - see catalogue overall dims

The torsional angle of a double pack coupling

$$[^\circ] = \frac{180}{\pi} \frac{T}{C_k}$$

T (Nm) - Transmitted torque

Renoldflex - technical data

			RENOLDFLEX TYPE A *Single disc pack*				RENOLDFLEX TYPE B *Double disc pack*						TORSIONAL STIFFNESS***		
Size	Nominal Torque T* Nm	Max Speed V** rpm	Misalignment Δ radial mm	Misalignment Δ axial ±mm	Misalignment Δ angular [˚]	Inertia J kg m²	Spacer Length H mm		Misalignment Δ radial mm	Misalignment Δ axial ±mm	Misalignment Δ angular [˚]	Inertia J kg m²	1 Disc pack C_K Nm/rad	Spacer C_H 10^6 Nm mm/rad	C_{TOT} Nm/rad
53	75	10000	0	0.4	0.75	0.00011	30 39	Available up to 3000 mm upon request	0.3 0.4	0.8	1.5	0.00016 0.00019	113406	4.1	56703 41988.45
70	170	8400	0	0.5	0.75	0.00049	31.2 60 100 140		0.3 0.7 1.2 1.4	1.1	1.5	0.00071 0.00076 0.00081 0.00087	142464	11.8	71232 56065.02 47142.56 40670.11
88	320	6800	0	0.6	0.75	0.00164	37.6 70 80 100 140		0.4 0.8 0.9 1.2 1.7	1.2	1.5	0.00218 0.00252 0.00256 0.00265 0.00282	200260	51.6	100130 90889.35 89316.32 86328.13 80913.99
116	750	5400	0	0.8	0.75	0.00991	46.3 100 140 180		0.5 1.2 1.7 2.2	1.6	1.5	0.00795 0.00928 0.00986 0.01047	341665	130.4	170832.5 154769.46 147752.84 141344.84
140	1350	4600	0	1	0.75	0.01359	55 100 140 180		0.7 1.1 1.7 2.2	2.1	1.5	0.01824 0.02093 0.02179 0.02264	503858	236	233020.5 224165.39 215958.66
166	2400	3800	0	1.2	0.75	0.0345	62.6 100 140 180		0.7 1.1 1.7 2.2	2.5	1.5	0.05175 0.05379 0.05584	938363	576.1	442511.2 429319.64 416891.81
198	4000	3400	0	1.4	0.75	0.08368	71.8 140 180		0.7 1.6 2.2	2.8	1.5	0.12413 0.12736	1258733	959.8	587023.07 573004.37
238	6500	3000	0	1.7	0.75	0.22773	140 180		1.6 2.1	3.4	1.5	0.33419 0.34564	2268097	1807	1068089.47 1043419.61

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