

3. Single Row Deep Groove Ball Bearings

IBC single row deep groove ball bearings have deep, uninterrupted raceways and a high degree of conformity between balls and raceways. This enables them to carry axial loads in both direction in addition to radial loads even at high speeds. Single row deep groove ball bearings are suitable for a wide variety of applications and are therefore produced in a large number of sizes and designs.

Dimensions

The boundary dimensions of IBC single row deep groove ball bearings are conform to ISO 15-1981 and are also conform to DIN 625.

Precision grade

IBC single row deep groove ball bearings are produced with normal precision grades with ISO 6 (P6), ISO 5 (P5) and ISO 4/ABEC 7 (P4A) as standard. Preferred availability is P63, P5, P53, P4A2H.

Internal clearance

IBC single row deep groove ball bearings are produced with normal radial internal clearance, with reduced C2 clearance as well as with enlarged C3 clearance as standard. In combination with higher precision grades, the precision grade and the internal radial clearance have a combined writing such as:

- P6 + C3 = P63
- P5 + C3 = P53
- P4A + C2H = P4A2H

Misalignment

IBC single row deep groove ball bearings have very limited ability to accommodate errors of alignment. The permissible angular misalignment between inner and outer rings, which will not produce inadmissibly high additional stress in the bearing, depends on the radial internal clearance of the bearing during operation, the bearing size, its internal design and the forces and moments acting on it. Because of the complex relationship between these factors, exact values for permissible misalignment cannot be given, but under normal application conditions, it is usually between 2 and 10 minutes of arc. Because of noise generation the misalignment should be no more than 2 minutes of arc.

Cages

IBC single row deep groove ball bearings are produced with a pressed steel cage as standard. For applications with high speed, vibration etc. special cages are developed by IBC. Bearings with high precision grades are mainly produced with phenolic cages. The riveted type TB or for smaller sizes THB has a snap cage. The temperature should be no more than 100 °C. Brass cages and aluminium cages are also available according to customer requirements and IBC design.

Shielded and sealed bearing

The most popular sizes of single row deep groove bearings are also produced by IBC as standard with shields and seals at one or both sides.

Bearings with shields or seals at both sides are supplied as standard filled with a grease which has good rust inhibiting properties and which is suitable for operating temperatures between -30 and +120 °C. The bearings are lubricated for life and maintenance-free. Additional to the standard grease IBC provides a larger availability of applicant conformed grease or for special customer requirements. Also, smaller quantities can be provided. This service gives a great advantage to the customer because he has not to open the bearing to wash out the grease for new regreasing.

Paired deep groove ball bearings

For applications where the load carrying capacity of a single bearing is inadequate or where the shaft has to be axially located in both directions with a given play, IBC can supply matched pairs of single row deep groove ball bearings on request. The bearings are matched in production so that when they are mounted directly adjacent to each other, an even distribution of load will be obtained without having to use shims or similar devices. Depending on requirements the pair can be supplied in the three alternative arrangements.

Minimum load

In order to assure the satisfactory operation of all ball bearings they must always be subjected to a given minimum load. This is also true for IBC single row deep groove ball bearings, particularly if they run at high speeds where the inertia forces of the balls and cage, and the friction in the lubricant can have a detrimental influence on the rolling conditions in the bearing and may cause damaging sliding movement to occur between the balls and the raceways. The required minimum radial load to be applied in such cases can be estimated from:

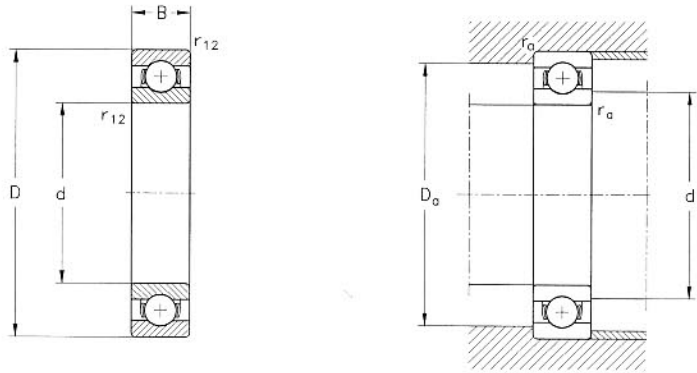
$$Fr_{\min} = K \cdot (\nu \cdot n)^{2/3} \cdot d_m^2 \cdot 10^{-6} \quad [\text{N}] \quad [9.1]$$

d_m	[mm]	Mean bearing diameter
ν	[mm ² /s]	Viscosity
n	[min ⁻¹]	Speed

Series	Constant K
618	15
619, 160	20
60, 62	25
63	30

3.2 Single Row Deep Groove Ball Bearings

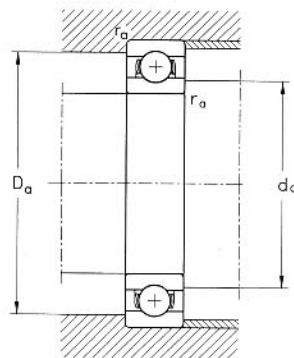
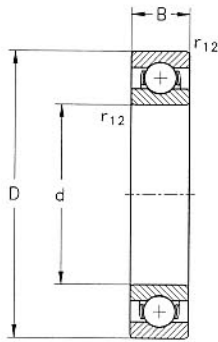
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Primary dimensions			Basic bearing number	Dimensions			Basic load ratings		Limiting speeds		Weight kg
d	D	B		d _a	D _a	r ₁₂	C	C ₀	n _{bGrease}	n _{bOil}	
mm						N		min ⁻¹			
10	15	3	61700	11,0	14,0	0,1	870	440	36000	43000	0,002
10	19	5	61800	12,0	17,0	0,3	1750	850	37000	43000	0,005
10	22	6	61900	12,0	20,0	0,3	1950	750	34000	41000	0,010
10	26	8	6000	12,0	24,0	0,3	4600	2000	31000	36500	0,020
10	30	9	6200	14,0	26,0	0,6	5100	2400	26000	32000	0,032
10	35	11	6300	14,0	31,0	0,6	8100	3500	21000	27000	0,055
12	18	4	61701	13,5	17,0	0,2	940	540	31000	37000	0,005
12	21	5	61801	14,0	19,0	0,3	1800	950	33000	39000	0,006
12	24	6	61901	14,0	22,0	0,3	2900	1450	31000	36000	0,011
12	28	8	6001	14,0	26,0	0,3	5100	2400	26500	33000	0,022
12	32	10	6201	16,0	28,0	0,6	6900	3100	23000	29000	0,037
12	37	12	6301	17,0	32,0	1,0	9700	4200	19000	25000	0,060
15	21	4	61702	16,5	20,0	0,2	960	590	27000	32000	0,006
15	24	5	61802	17,0	22,0	0,3	2000	1250	28000	33000	0,007
15	28	7	61902	17,0	26,0	0,3	4100	2100	26000	30000	0,017
15	32	9	6002	17,0	30,0	0,3	5600	2900	22500	30000	0,030
15	35	11	6202	19,0	31,0	0,6	7800	3800	20000	24000	0,045
15	42	13	6302	20,0	37,0	1,0	11400	5400	17500	21000	0,080
17	23	4	61703	18,5	21,5	0,2	1020	670	25000	30000	0,006
17	26	5	61803	19,0	24,0	0,3	2200	1400	26000	32000	0,009
17	30	7	61903	19,0	28,0	0,3	4350	2350	24000	28000	0,018
17	35	10	6003	19,0	33,0	0,3	6100	3300	20000	26000	0,042
17	40	12	6203	21,0	36,0	0,6	9600	4800	18000	21000	0,070
17	47	14	6303	22,0	42,0	1,0	13500	6600	17000	20000	0,120
20	27	4	61704	22,0	25,5	0,2	1060	740	21000	25000	0,008
20	32	7	61804	22,0	30,0	0,3	3450	2250	20000	26000	0,020
20	37	9	61904	22,0	35,0	0,3	6550	3650	19000	23000	0,040
20	42	12	6004	24,0	38,0	0,6	9500	5200	17500	21000	0,070
20	47	14	6204	25,0	42,0	1,0	12800	6700	15000	19000	0,110
20	52	15	6304	26,5	45,5	1,1	15900	7800	14000	17000	0,140
25	32	4	61705	27,0	30,5	0,2	1110	860	19000	23000	0,010
25	37	7	61805	27,0	35,0	0,3	4360	2600	18000	25000	0,022
25	42	9	61905	27,0	40,0	0,3	6650	4100	16000	19000	0,041
25	47	12	6005	29,0	43,0	0,6	11500	6800	15500	19000	0,080
25	52	15	6205	30,0	47,0	1,0	14000	7900	13000	16000	0,130
25	62	17	6305	31,5	55,5	1,1	22500	11600	12000	14000	0,250

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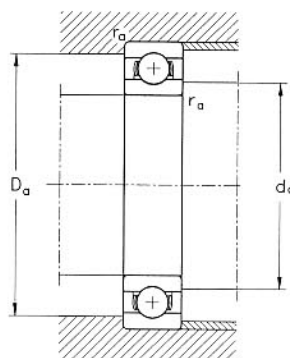
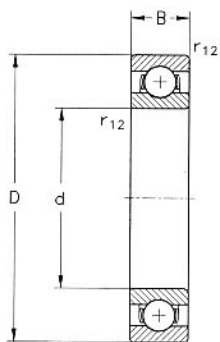
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Primary dimensions			Basic bearing number	Dimensions			Basic load ratings		Limiting speeds		Weight kg
d	D mm	B		d_a	D_a mm	r_{12}	C N	C_0	$n_{bGrease}$	n_{bOil}	
30	42	7	61806	32,0	40,0	0,3	4500	2900	15000	18000	0,027
30	47	9	61906	32,0	45,0	0,3	7800	4700	14000	17000	0,045
30	55	13	6006	35,0	50,0	1,0	13500	8300	13000	16000	0,130
30	62	16	6206	35,0	57,0	1,0	19500	11300	11000	13000	0,190
30	72	19	6306	36,5	65,5	1,1	28100	16000	9500	12000	0,350
35	47	7	61807	37,0	45,0	0,3	4800	3300	13000	16000	0,031
35	55	10	61907	39,0	51,0	0,6	9600	6200	12000	14000	0,073
35	62	14	6007	40,0	57,0	1,0	16000	10300	11000	13500	0,160
35	72	17	6207	41,5	65,5	1,0	25500	15300	9500	11500	0,300
35	80	21	6307	43,0	72,0	1,5	33500	18500	8500	10000	0,460
40	52	7	61808	42,0	50,0	0,3	4900	4000	11000	14000	0,034
40	62	12	61908	44,0	58,0	0,6	14500	10200	11000	13000	0,110
40	68	15	6008	45,0	63,0	1,0	17000	11700	10000	12500	0,190
40	80	18	6208	46,5	73,5	1,0	30700	19000	9000	11000	0,360
40	90	23	6308	48,0	82,0	1,5	41000	24000	7500	9000	0,630
45	58	7	61809	47,0	56,0	0,3	6400	5600	9500	12000	0,040
45	68	12	61909	49,0	64,0	0,6	14000	9800	9700	11000	0,120
45	75	16	6009	50,0	70,0	1,0	21000	15000	9400	11000	0,250
45	85	19	6209	51,5	78,5	1,0	33200	21600	7500	9500	0,410
45	100	25	6309	53,0	92,0	1,5	52700	31500	6800	8200	0,850
50	65	7	61810	52,0	63,0	0,3	6800	6300	9000	12000	0,057
50	72	12	61910	54,0	68,0	0,6	14600	10400	9000	10500	0,130
50	80	16	6010	55,0	75,0	1,0	21800	16300	8600	10500	0,280
50	90	20	6210	56,5	83,5	1,1	35100	23200	7000	8500	0,450
50	110	27	6310	59,0	101,0	2,0	61800	38000	6400	7700	1,050
55	72	9	61811	57,0	70,0	0,3	9000	8500	8500	10000	0,083
55	80	13	61911	60,0	75,0	1,0	15900	11400	8000	9500	0,190
55	90	18	6011	61,5	83,5	1,1	28300	21300	7800	9300	0,380
55	100	21	6211	63,0	92,0	1,5	43600	29000	6300	7600	0,610
55	120	29	6311	64,0	111,0	2,0	71500	45000	5300	6300	1,350
60	78	10	61812	62,0	76,0	0,3	8700	6700	8000	9500	0,120
60	85	13	61912	65,0	80,0	1,0	16500	12000	7500	9000	0,200
60	95	18	6012	66,5	88,5	1,1	30000	23500	6800	8100	0,420
60	110	22	6212	68,0	102,0	1,5	52400	36000	6100	7000	0,780
60	130	31	6312	71,0	119,0	2,1	81900	52000	5000	6000	1,700

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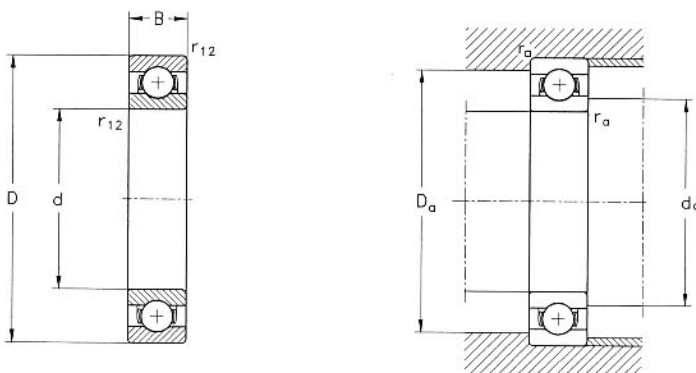
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Primary dimensions			Basic bearing number	Dimensions			Basic load ratings		Limiting speeds		Weight kg
d	D mm	B		d_a	D_a mm	r_{12}	C N	C_o	$n_{bGrease}$ min^{-1}	n_{bOil} min^{-1}	
65	85	10	61813	69,0	81,0	0,6	12200	12000	7000	8500	0,130
65	90	13	61913	70,0	85,0	1,0	17400	13400	6700	8000	0,220
65	100	18	6013	71,5	93,5	1,1	31000	25500	6400	7500	0,440
65	120	23	6213	73,0	112,0	1,5	55900	40500	5500	6500	0,990
65	140	33	6313	76,0	129,0	2,1	92300	60000	4800	5600	2,100
70	90	10	61814	74,0	86,0	0,6	12500	10000	6700	8000	0,160
70	100	16	61914	75,0	95,0	1,0	24000	18300	6300	7500	0,350
70	110	20	6014	76,5	103,5	1,1	38500	31600	6100	7200	0,600
70	125	24	6214	78,0	117,0	1,5	67400	49300	5000	6000	1,100
70	150	35	6314	81,0	139,0	2,1	104000	69000	4500	5400	2,400
75	95	10	61815	79,0	91,0	0,6	12800	12100	6300	7500	0,160
75	105	16	61915	80,0	100,0	1,0	24200	19300	6000	7000	0,370
75	115	20	6015	81,5	108,5	1,1	40000	33800	5700	6800	0,640
75	130	25	6215	83,0	122,0	1,5	66300	49000	4800	5600	1,200
75	160	37	6315	86,0	149,0	2,1	114000	76500	4400	5100	3,000
80	100	10	61816	84,0	96,0	0,6	12900	13700	6000	7000	0,170
80	110	16	61916	85,0	105,0	1,0	25100	20500	5600	6700	0,380
80	125	22	6016	86,5	118,5	1,1	47500	40000	5300	6400	0,850
80	140	26	6216	89,0	131,0	2,0	72700	53000	4600	5400	1,400
80	170	39	6316	91,0	159,0	2,1	124000	87000	3900	4600	3,600
85	110	13	61817	90,0	105,0	1,0	19300	20000	5300	6300	0,290
85	120	18	61917	91,5	113,5	1,1	32000	30000	5300	6300	0,550
85	130	22	6017	91,5	123,5	1,1	50000	43500	5100	6000	0,890
90	115	13	61818	95,0	110,0	1,0	19600	20400	5300	6300	0,300
90	125	18	61918	96,5	118,5	1,1	33200	31500	5000	6000	0,590
90	140	24	6018	98,0	132,0	1,5	59000	51000	4800	5700	1,150
95	120	13	61819	100,0	115,0	1,0	19900	17600	5000	6000	0,310
95	130	18	61919	101,5	123,5	1,1	35000	34000	4800	5600	0,610
95	145	24	6019	103,0	137,0	1,5	60600	54200	4500	5400	1,200
100	125	13	61820	105,0	120,0	1,0	19900	21200	4800	5600	0,310
100	140	20	61920	106,5	133,5	1,1	43000	42000	4500	5300	0,830
100	150	24	6020	108,0	142,0	1,5	61000	54000	4300	5100	1,300
105	130	13	61821	110,0	125,0	1,0	20800	19600	4500	5300	0,350
105	145	20	61921	111,5	138,5	1,1	45000	44000	4300	5000	0,880
105	160	26	6021	114,0	151,0	2,0	73000	69000	4000	4800	1,600

Single Row Deep Groove Ball Bearings

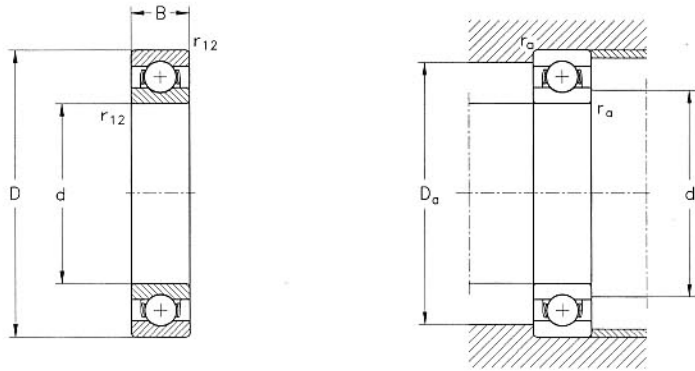
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Primary dimensions			Basic bearing number	Dimensions			Basic load ratings		Limiting speeds		Weight kg
d	D	B		da	Da	r ₁₂	C	C ₀	n _{bGrease}	n _{bOil}	
mm			mm			N		min ⁻¹			
110	140	16	61822	115,0	135,0	1,0	28100	29000	4300	5000	0,600
110	150	20	61922	116,5	143,5	1,1	44000	45000	4000	4800	0,900
110	170	28	6022	119,0	161,0	2,0	82000	73600	3800	4600	1,950
120	150	16	61824	125,0	145,0	1,0	29100	32500	3800	4500	0,650
120	165	22	61924	126,5	148,5	1,1	56000	57000	3600	2040	1,200
120	180	28	6024	129,0	171,0	2,0	85300	80500	3600	4200	2,050
130	165	18	61826	136,5	158,5	1,1	38000	43000	3600	4300	0,930
130	180	24	61926	138,0	172,0	1,5	65000	67000	3400	4000	1,600
130	200	33	6026	139,0	191,0	2,0	108000	100000	3300	3900	3,150
140	175	18	61828	146,5	168,5	1,1	39000	46500	3400	4000	1,000
140	190	24	61928	148,0	182,0	1,5	67000	73000	3200	3800	1,900
140	210	33	6028	149,0	201,0	2,0	112000	101000	3100	3600	3,350
150	190	20	61830	156,5	183,5	1,1	48800	61000	3000	3600	1,040
150	210	28	61930	159,0	201,0	2,0	88500	93000	2800	3400	3,050
150	225	35	6030	161,0	214,0	2,1	127000	126000	2600	3300	4,800
160	200	20	61832	167,0	193,0	1,0	49500	65000	2900	3500	1,460
160	220	28	61932	169,0	211,0	2,0	92500	99000	2600	3300	3,300
160	240	38	6032	171,0	229,0	2,1	145000	145000	2400	3000	5,900
170	215	22	61834	177,0	208,0	1,0	62000	79800	2600	3200	1,900
170	230	28	61934	179,0	220,0	2,0	94000	107000	2400	3000	3,500
170	260	42	6034	181,0	249,0	2,1	170000	175000	2200	2800	7,900
180	225	22	61836	187,0	218,0	1,0	62500	82000			
180	250	33	61936	189,0	241,0	2,0	120000	136000	2200	2800	5,100
180	280	46	6036	191,0	269,0	2,1	200000	205000	2100	2700	10,400
190	240	24	61838	199,0	231,0	1,5	76000	97000	2200	2800	2,700
190	260	33	61938	200,0	250,0	2,0	118000	135000	2100	2700	5,300
190	290	46	6038	201,0	279,0	2,1	208000	220000	2000	2600	11,000
200	250	24	61840	209,0	242,0	1,5	77000	104000	2100	2700	2,800
200	280	38	61940	212,0	268,0	2,0	150000	170000	2000	2600	7,400
200	310	51	6040	211,0	299,0	2,1	220000	248000	1900	2400	14,400
220	270	28	61844	220,0	313,0	1,5	79000	111000	2000	2500	3,000
220	300	38	61944	231,0	288,0	2,0	152000	180000	1900	2400	8,000
220	340	56	6044	233,0	327,0	3,0	249000	297000	1800	2200	18,500

3.2 Single Row Deep Groove Ball Bearings

618..
619..
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Primary dimensions			Basic bearing number	Dimensions			Basic load ratings		Limiting speeds		Weight kg
d	D mm	B		da	Da mm	r ₁₂	C N	C ₀	n _{BGrease} min ⁻¹	n _{Boil} min ⁻¹	
240	300	28	61848	250,0	292,0	2,0	110000	150000	1900	2300	4,500
240	320	38	61948	252,0	308,0	2,0	160000	200000	1800	2200	8,500
240	360	56	6048	253,0	347,0	3,0	261000	319000	1700	2000	20,000
260	320	28	61852	270,0	310,0	2,0	112000	164000	1700	2000	4,800
260	360	46	61952	272,0	348,0	2,0	215000	272000	1600	1900	14,500
260	400	65	6052	276,0	384,0	4,0	295000	378000	1600	1800	29,500
280	350	33	61856	289,0	341,0	2,0	140000	200000	1600	1900	7,400
280	380	46	61956	292,0	368,0	2,0	220000	290000	1500	1800	15,000
280	420	65	6056	296,0	404,0	4,0	305000	410000	1400	1700	31,000
300	380	38	61860	312,0	368,0	2,0	175000	245000	1400	1700	10,500
300	420	56	61960	314,0	406,0	2,5	270000	380000	1300	1600	24,500
300	460	74	6060	317,0	444,0	3,0	360000	500000	1200	1500	44,000
320	400	38	61864	332,0	388,0	2,0	173000	258000	1300	1600	11,000
320	440	56	61964	333,0	426,0	2,5	278000	400000	1200	1500	26,000
320	480	74	6064	337,0	464,0	3,0	372000	540000	1100	1400	46,000
340	420	38	61868	352,0	408,0	2,0	178000	275000	1200	1500	11,500
340	460	56	61968	354,0	446,0	2,5	282000	425000	1100	1400	27,000
360	440	38	61872	371,0	429,0	2,0	182000	286000	1200	1500	12,000
360	480	56	61972	373,0	466,0	2,5	292000	450000	1100	1400	28,000
380	480	46	61876	392,0	489,0	2,0	242000	390000	1100	1400	20,000
380	520	65	61976	396,0	503,0	3,0	340000	540000	1000	1300	40,000
400	500	46	61880	412,0	488,0	2,0	250000	410000	1100	1300	15,500
400	540	65	61980	416,0	524,0	3,0	350000	570000	1000	1200	41,500
420	520	46	61884	431,0	509,0	2,0	252000	425000	975	1200	22,000
420	560	65	61984	436,0	544,0	3,0	352000	600000	950	1100	43,000
440	540	46	61888	451,0	529,0	2,0	255000	440000	950	1100	22,000
440	600	74	61988	457,0	583,0	3,0	410000	720000	900	1100	61,000
460	580	56	61892	473,0	567,0	2,5	320000	570000	925	1100	35,000
460	620	74	61992	477,0	603,0	3,0	425000	750000	875	1000	62,500
480	600	58	61896	494,0	586,0	2,5	325000	600000	875	1000	37,000
480	650	78	61996	500,0	630,0	4,0	450000	815000	850	975	74,000
500	620	56	618/500	514,0	606,0	2,5	335000	620000	825	975	37,500
500	670	78	619/500	520,0	650,0	4,0	465000	870000	800	925	77,000