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Textiles — Integrated conversion table for replacing traditional yarn numbers by rounded values in the Tex System

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FOREWORD

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Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2947 was drawn up by Technical Committee ISO/TC 38, *Textiles,* and circulated to the Member Bodies in August 1972.

It has been approved by the Member Bodies of the following countries :

Australia	India	Spain
Austria	Ireland	Sweden
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No Member Body expressed disapproval of the document.

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INTERNATIONAL STANDARD

ISO 2947-1973 (E)

Textiles — Integrated conversion table for replacing traditional yarn numbers by rounded values in the Tex System

0 INTRODUCTION

To facilitate the implementation of the Tex System the conversion table which is the subject of this International Standard has been developed with the collaboration of experts from the following international organizations :

- Association Européenne de Moulinage
- Association of European Jute Industries
- Comité International de la Rayonne et des Fibres Synthétiques (CIRFS)
- Eurocoton
- Fédération Internationale de la Filterie
- International Association of Users of Man-made Fibres (AIUFFAS)
- International Bureau for the Standardization of Man-made Fibres (BISFA)
- International Federation of Cotton and Allied Textile Industries (IFCATI)
- International Wool Textile Organization (IWTO)
- Secrétariat International des Industries de la Maille

In compiling this conversion table, the principle has been to choose rounded values in the Tex System each of which would accommodate as many yarn counts as possible from the traditional systems without encroaching on spinners' tolerances. While in many cases rounding has been determined by purely numerical considerations, account has been taken of existing international practices or agreements. For example, where specific English cotton counts are related to metric counts, this is reflected in the rounded tex value. The rounded values included for denier numbers form a limited selection from the range of "Continental Rounded Decitex Values", which embraces the bulk of deniers produced and is already in use by the major man-made fibre producers.

To ensure a smooth transition to the Tex System it is necessary to maintain a degree of flexibility in regard to both the choice of unit and satisfying the reasonable requirements of spinners' customers. Adoption of the rounded values in the conversion table would, however, make a substantial contribution to rationalization since 466 traditional yarn counts would be replaced by 205 rounded tex values.

When the Tex System has been fully adopted, it is hoped that a range of tex values will ultimately evolve which will have more rational intervals between linear densities than those determined pragmatically and embodied in this International Standard.

1 SCOPE AND FIELD OF APPLICATION

This International Standard is intended to facilitate the changeover by industry and commerce from traditional yarn numbering systems to the Tex System (see ISO/R 1144).

It provides a range of recommended rounded linear densities in the Tex System to replace the yarn numbers in the six main traditional numbering systems referred to in section 6 and covers the great majority of yarns currently produced.

The rounded tex values for count systems not covered by section 6 (e.g. Dewsbury count) may be ascertained by applying the principle on which the conversion table is based, viz. by using the relevant conversion factor from ISO/R 1144 to give the exact Tex System equivalents and then choosing a range of rounded numbers which are, as far as possible, not more than 2 % different from the exact equivalents.

2 REFERENCE

ISO/R 1144, *Textiles — Universal system for designating linear density (Tex System).*

3 CHOICE OF UNIT

Although the rounded Tex System values in the conversion table have been expressed in terms of the basic unit, tex, the decitex equivalents have also been included because they can be used throughout the whole count range without employing decimal fractions.

The choice of unit is entirely a matter to be determined by individual sectors (or even between spinner and customer); the decitex unit, for example, is particularly suitable for fine yarns (whether spun or filament) and the tex unit for medium and coarse yarns.

4 SYMBOLS AND ABBREVIATIONS

The count systems referred to in the headings of columns 2 to 7 of the conversion table are given in Tables 1 and 2.

5 APPLICATION OF THE INTEGRATED CONVERSION TABLE

5.1 While covering the majority of spun and filament yarn production, the rounded values in the six traditional systems are not exhaustive. Where a customer requires a yarn of a specific linear density not included in the conversion table, production of such a yarn should be arranged between spinner and customer. This is particularly relevant to yarns used for the production of sewing threads, where it is necessary to work to especially fine tolerances.

5.2 With a few exceptions, fractional traditional counts have been omitted from the conversion table; the rounded Tex System values for most fractional traditional counts can usually be obtained by taking the rounded value for a count in the table having the same digits and making the necessary adjustment of the decimal sign (this is of particular significance where yarns for the carpet and tyre industries are concerned, Ne_c 0,98 and Ne_c 1,05 being quite common).

5.3 This International Standard is not intended to apply to the product designation of sewing threads, for which special systems are recognized by producers and customers.

TABLE 1 — **Indirect systems**

Symbolic abreviation	Yarn count system	Unit of length used	Unit of mass used	Unit of yarn count number
Ne_c	Cotton (English)	840 yards	1 pound	840 yd/lb
Nm	Metric	1 kilometre	1 kilogram	km/kg
Ne_w	Worsted	560 yards	1 pound	560 yd/lb
Ne_L	Linen (wet or dry spun)	300 yards	1 pound	300 yd/lb

TABLE 2 — **Direct systems**

Symbolic abbreviation	Yarn count (number) system	Unit of mass used	Unit of length used	Unit of yarn count number
Tj	Jute, hemp linen (dry spun)	1 pound	14 400 yards (spyndle unit)	lb/14 400 yd
Td	Denier	1 gram	9 kilometres	g/9 000 m
Tt	Tex	1 gram	1 kilometre	g/km

6 INTEGRATED CONVERSION TABLE

Columns A and B are for information only.

1	2	3	4	5	6	7	8	A	B
Rounded value	Traditional counts or numbers						Rounded value	Exact equivalent	Deviation
	Cotton (English)	Metric	Worsted	Linen	Jute	Denier			
tex	Ne_c	Nm	Ne_w	Ne_L	Tj	Td	dtex	dtex	%
1						9	10	10,00	0,0
1,1						10	11	11,11	− 1,0
1,2						11	12	12,22	− 1,8
1,3						12	13	13,33	− 2,5
1,6						14	16	15,56	+ 2,8
1,7						15	17	16,67	+ 2,0
2						18	20	20,00	0,0
2,2						20	22	22,22	− 1,0
2,6						23	26	25,56	+ 1,7
2,8						25	28	27,78	+ 0,8
3						27	30	30,00	0,0
3,1						28	31	31,11	− 0,4
3,3						30	33	33,33	− 1,0
3,5						32	35	35,56	− 1,6
4						35	40	38,89	+ 2,9
4,4						40	44	44,44	− 1,0
4,8						43	48	47,78	+ 0,5
5	120 118	200				45	50	49,21 50,00 50,04	+ 1,6 0,0 − 0,1
5,1	116 115						51	50,91 51,35	+ 0,2 − 0,7
5,2	114					47	52	51,80 52,22	+ 0,4 − 0,4
5,3	112 110	190					53	52,63 52,72 53,68	+ 0,7 + 0,5 − 1,3
5,5	108						55	54,68	+ 0,6

1	2	3	4	5	6	7	8	A	B
Rounded value	Traditional counts or numbers						Rounded value	Exact equivalent	Deviation
	Cotton (English)	Metric	Worsted	Linen	Jute	Denier			
tex	Ne_c	Nm	Ne_w	Ne_L	Tj	Td	dtex	dtex	%
5,6	106 105	180				50	56	55,56 55,71 56,24	+ 0,8 + 0,5 − 0,4
5,7	104						57	56,78	+ 0,4
5,8	102					52	58	57,78 57,89	+ 0,4 + 0,2
5,9	100	170					59	58,82 59,05	+ 0,3 − 0,1
6	98						60	60,26	− 0,4
6,2	96 95					56	62	61,51 62,16 62,22	+ 0,8 − 0,3 − 0,4
6,3	94	160					63	62,50 62,82	+ 0,8 + 0,3
6,4	92						64	64,18	− 0,3
6,6	90	150					66	65,61 66,67	+ 0,6 − 1,0
6,7	88						67	67,10	− 0,1
6,9	86	145					69	68,66 68,97	+0,5 0,0
7	85 84						70	69,47 70,30	+ 0,8 − 0,4
7,1	82	140					71	71,43 72,01	− 0,6 − 1,4
7,2						65	72	72,22	− 0,3
7,4	80	135					74	73,81 74,07	+ 0,3 − 0,1
7,5	79						75	74,75	+ 0,3
7,6	78						76	75,71	+ 0,4
7,7	77	130					77	76,69 76,92	+ 0,4 + 0,1
7,8	76					70	78	77,70 77,78	+ 0,4 + 0,3
7,9	75						79	78,73	+ 0,3
8	74	125					80	79,80 80,00	+ 0,3 0,0
8,1	73						81	80,89	+ 0,1

1	2	3	4	5	6	7	8
Rounded value	Traditional counts or numbers						Rounded value
	Cotton (English)	Metric	Worsted	Linen	Jute	Denier	
tex	Ne_c	Nm	Ne_W	Ne_L	Tj	Td	dtex
8,2	72						82
8,4	71 70	120				75	84
8,5	69						85
8,7	68	115					87
8,8	67						88
9	66					80	90
9,1	65	110					91
9,2	64						92
9,4	63						94
9,5	62	105					95
9,7	61						97
10	60 59	100 99				90	100
10,2	58	98 97					102
10,5	57 56	96 95 94					105
10,8	55	93 92					108
11	54	91 90	80			100	110
11,2	53	89	79				112
11,5	52	88 87	78 77				115

A	B
Exact equivalent	Deviation
dtex	%
82,01	0,0
83,17	+ 1,0
83,33	+ 0,8
84,36	− 0,4
85,58	− 0,7
86,84	+ 0,2
86,96	0,0
88,13	− 0,1
88,89	+ 1,2
89,47	+ 0,6
90,85	+ 0,2
90,91	+ 0,1
92,27	− 0,3
93,73	+ 0,3
95,24	− 0,3
96,80	+ 0,2
98,42	+ 1,6
100,0	0,0
100,1	− 0,1
101,0	− 1,0
101,8	+ 0,2
102,0	0,0
103,1	− 1,1
103,6	+ 1,4
104,2	+ 0,8
105,3	− 0,3
105,4	− 0,4
106,4	− 1,3
107,4	+ 0,6
107,5	+ 0,5
108,9	− 0,8
109,4	+ 0,5
109,9	+ 0,1
110,7	− 0,6
111,1	− 1,0
111,4	+ 0,5
112,1	− 0,1
112,4	− 0,4
113,6	+ 1,2
114,9	+ 0,1
115,0	0,0

1	2	3	4	5	6	7	8	A	B
Rounded value	Traditional counts or numbers						Rounded value	Exact equivalent	Deviation
	Cotton (English)	Metric	Worsted	Linen	Jute	Denier			
tex	Ne_c	Nm	Ne_W	Ne_L	Tj	Td	dtex	dtex	%
11,7	51	86	76				117	115,8 116,3 116,6	+ 1,0 + 0,6 + 0,3
12	50 49	85 84 83	75 74	140			120	117,6 118,1 119,0 119,7 120,5	+ 2,0 + 1,6 + 0,8 + 0,3 − 0,4
12,2		82	73				122	121,3 122,0	+ 0,6 0,0
12,5	48 47	81 80 79	72 71 70	130		112	125	123,0 123,5 124,4 124,8 125,0 125,6 126,5 126,6 127,2	+ 1,6 + 1,2 + 0,5 + 0,2 0,0 − 0,5 − 1,2 − 1,3 − 1,7
13	46 45	78 77 76	69 68 67				130	128,2 128,4 129,9 130,3 131,2 131,6 132,2	+ 1,4 + 1,2 + 0,1 − 0,2 − 0,9 − 1,2 − 1,7
13,5	44 43	75 74 73	66 65				135	133,3 134,2 135,1 136,3 137,0 137,3	+ 1,3 + 0,6 − 0,1 − 1,0 − 1,5 − 1,7
14	42	72 71	64 63	120		125	140	137,8 138,4 138,9 140,6 140,8	+ 1,6 + 1,2 + 0,8 − 0,4 − 0,6
14,5	41 40	70 69 68	62 61 60				145	142,9 144,0 144,9 145,2 147,1 147,6	+ 1,5 + 0,7 + 0,1 − 0,1 − 1,4 − 1,8
15	39	67 66	59	110		135	150	149,3 150,0 150,1 150,3 151,4 151,5	+ 0,5 0,0 − 0,1 − 0,2 − 0,9 − 1,0

1	2	3	4	5	6	7	8	A	B
Rounded value	Traditional counts or numbers						Rounded value	Exact equivalent	Deviation
	Cotton (English)	Metric	Worsted	Linen	Jute	Denier			
tex	Ne_c	Nm	Ne_w	Ne_L	Tj	Td	dtex	dtex	%
15,5	38	65 64	58 57				155	152,7 153,9 155,4 156,3	+ 1,5 + 0,7 − 0,3 − 0,8
16	37	63 62	56 55			145	160	158,2 158,7 159,6 161,1 161,3	+ 1,1 + 0,8 + 0,3 − 0,7 − 0,8
16,5	36	61 60	54	100			165	163,9 164,0 165,4 166,7	+ 0,7 + 0,6 − 0,2 − 1,0
16,7			53			150	167	166,7 167,1	+ 0,2 − 0,1
17	35	59 58	52				170	168,7 169,5 170,3 172,4	+ 0,8 + 0,3 − 0,2 − 1,4
17,5	34	57	51 50				175	173,7 175,4 177,2	+ 0,7 − 0,2 − 1,3
18	33	56 55	49	90			180	178,6 178,9 180,8 181,8 183,7	+ 0,8 + 0,6 − 0,4 − 1,0 − 2,0
18,5	32	54	48				185	184,5 185,2	+ 0,3 − 0,1
19	31	53 52	47 46			170	190	188,5 188,7 188,9 190,5 192,3 192,6	+ 0,8 + 0,7 + 0,6 − 0,3 − 1,2 − 1,4
19,5		51					195	196,1	− 0,6
20	30	50	45 44			180	200	196,8 200,0 201,3	+ 1,6 0,0 − 0,6
20,5	29	49	43				205	203,6 204,1 206,0	+ 0,7 + 0,4 − 0,5
21	28	48	42	80			210	206,7 208,3 210,9	+ 1,6 + 0,8 − 0,4

1	2	3	4	5	6	7	8	A	B
Rounded value	Traditional counts or numbers						Rounded value	Exact equivalent	Deviation
	Cotton (English)	Metric	Worsted	Linen	Jute	Denier			
tex	Ne_c	Nm	Ne_w	Ne_L	Tj	Td	dtex	dtex	%
21,5		47 46	41				215	212,8 216,0 217,4	+ 1,0 − 0,5 − 1,1
22	27	45	40			200	220	218,7 221,5 222,2	+ 0,6 − 0,7 − 1,0
22,5	26	44	39				225	227,1 227,3	− 0,9 − 1,0
23,5	25	43	38			210	235	232,6 233,1 233,3 236,2	+ 1,0 + 0,8 + 0,7 − 0,5
24		42 41	37	70			240	236,3 238,1 239,4 243,9	+ 1,6 + 0,8 + 0,3 − 1,6
25	24	40	36 35			225	250	246,0 246,1 250,0 253,1	+ 1,6 + 1,6 0,0 − 1,2
26	23	39	34				260	256,4 256,7 260,5	+ 1,4 + 1,3 − 0,2
26,5		38					265	263,2	+ 0,7
27	22	37	33				270	268,4 270,3	+ 0,6 − 0,1
28	21	36 35	32 31	60		250	280	275,6 276,8 277,8 281,2 285,7	+ 1,6 + 1,2 + 0,8 − 0,4 − 2,0
29,5		34*					295	294,1	+ 0,3
30	20	34* 33	30				300	294,1 295,3 303,0	+ 2,0 + 1,6 − 1,0
31	19	32	29				310	305,4 310,8 312,5	+ 1,5 − 0,3 − 0,8
32		31	28			290	320	316,4 322,2 322,6	+ 1,1 − 0,7 − 0,8

* 34 metric = 295 decitex for worsted spun yarns
34 metric = 300 decitex for all other yarns

1	2	3	4	5	6	7	8	A	B
Rounded value	Traditional counts or numbers						Rounded value	Exact equivalent	Deviation
	Cotton (English)	Metric	Worsted	Linen	Jute	Denier			
tex	Ne_c	Nm	Ne_w	Ne_L	Tj	Td	dtex	dtex	%
33	18	30	27	50			330	328,1 330,7 333,3	+ 0,6 − 0,2 − 1,0
34			26				340	340,7	− 0,2
35	17	29	25				350	344,8 347,4 354,3	+ 1,5 + 0,7 − 1,2
36		28					360	357,1	+ 0,8
37	16	27	24				370	369,1 370,4	+ 0,2 − 0,1
38,5		26	23				385	384,6 385,1	+ 0,1 0,0
40	15	25	22			360	400	393,7 400,0 402,6	+ 1,6 0,0 − 0,6
42	14	24	21	40			420	413,4 416,7 421,8	+ 1,6 + 0,8 − 0,4
44		23	20			400	440	434,8 442,9 444,4	+ 1,2 − 0,7 − 1,0
45	13	22					450	454,2 454,5	− 0,9 − 1,0
47			19			420	470	466,2 466,7	+ 0,8 + 0,7
48		21		35			480	472,4 476,2	+ 1,6 + 0,8
50	12	20	18			450	500	492,1 500,0	+ 1,6 0,0
52			17			470	520	521,1 522,2	− 0,2 − 0,4
53	11	19					530	526,3 536,8	+ 0,7 − 1,3
56		18	16	30			560	551,2 553,6 555,6	+ 1,6 + 1,2 + 0,8
58						520	580	577,8	+ 0,4
59	10	17	15				590	588,2 590,5	+ 0,3 − 0,1

1	2	3	4	5	6	7	8	A	B
Rounded value	Traditional counts or numbers						Rounded value	Exact equivalent	Deviation
	Cotton (English)	Metric	Worsted	Linen	Jute	Denier			
tex	Ne_c	Nm	Ne_w	Ne_L	Tj	Td	dtex	dtex	%
63		16	14				630	625,0 632,7	+ 0,8 − 0,4
64						580	640	644,4	− 0,7
66	9	15		25			660	656,1 661,4 666,7	+ 0,6 − 0,2 − 1,0
68			13		2		680	681,4 689,0	− 0,2 − 1,3
71		14					710	714,3	− 0,6
72						650	720	722,2	− 0,3
74	8		12				740	738,1 738,2	+ 0,2 + 0,2
76				22			760	751,6	+ 1,1
77		13					770	769,2	+ 0,1
80			11			720	800	800,0 805,3	0,0 − 0,7
84	7	12		20			840	826,8 833,3 843,6	+ 1,6 + 0,8 − 0,4
86					2,5		860	861,2	− 0,1
89			10			800	890	885,8 888,9	+ 0,5 + 0,1
91		11					910	909,1	+ 0,1
92				18			920	918,6	+ 0,2
94						840	940	933,3	+ 0,7
100	6	10	9				1 000	984,2 1 000	+ 1,6 0,0
105				16	3		1 050	1 033	+ 1,6
110		9	8			1 000	1 100	1 107 1 111	− 0,6 − 1,0
120	5			14	3,5	1 080	1 200	1 181 1 200 1 206	+ 1,6 0,0 − 0,5
125		8	7				1 250	1 250 1 265	0,0 − 1,2
140				12	4	1 260	1 400	1 378 1 400	+ 1,6 0,0

1	2	3	4	5	6	7	8	A	B
Rounded value	Traditional counts or numbers						Rounded value	Exact equivalent	Deviation
	Cotton (English)	Metric	Worsted	Linen	Jute	Denier			
tex	Ne_c	Nm	Ne_w	Ne_L	Tj	Td	dtex	dtex	%
145	4	7	6				1 450	1 429 1 476	+ 1,5 − 1,8
155					4,5		1 550	1 550	0,0
165		6*		10			1 650	1 654 1 667	− 0,2 − 1,0
170		6*			5		1 700	1 722	− 1,3
175			5				1 750	1 772	− 1,2
184						1 650	1 840	1 833	+ 0,4
190					5,5		1 900	1 895	+ 0,3
200	3	5					2 000	1 968 2 000	+ 1,6 0,0
210				8	6		2 100	2 067	+ 1,6
220			4		6,5	2 000	2 200	2 215 2 222 2 239	− 0,7 − 1,0 − 1,7
240				7	7		2 400	2 362 2 411	+ 1,6 − 0,5
250		4				2 250	2 500	2 500	0,0
260					7,5		2 600	2 584	+ 0,6
280				6	8	2 500	2 800	2 756 2 778	+ 1,6 + 0,8
300	2		3		8,5	2 700	3 000	2 928 2 953 3 000	+ 2,4 + 1,6 0,0
310					9		3 100	3 100	0,0
330		3		5	9,5	3 000	3 300	3 273 3 307 3 333	+ 0,8 − 0,2 − 1,0
340					10		3 400	3 445	− 1,3
350						3 120	3 500	3 467	+ 1,0
360					10,5		3 600	3 617	− 0,5
370						3 300	3 700	3 667	+ 0,9
380					11		3 800	3 789	+ 0,3
400					11,5	3 600	4 000	3 962 4 000	+ 1,0 0,0

* 6 metric = 170 tex for the jute industry
6 metric = 165 tex for all other yarns.

1	2	3	4	5	6	7	8	A	B
Rounded value	Traditional counts or numbers						Rounded value	Exact equivalent	Deviation
	Cotton (English)	Metric	Worsted	Linen	Jute	Denier			
tex	Ne_c	Nm	Ne_w	Ne_L	Tj	Td	dtex	dtex	%
420				4	12		4 200	4 134	+ 1,6
430					12,5		4 300	4 306	− 0,1
440			2		13	4 000	4 400	4 429 4 444 4 478	− 0,7 − 1,0 − 1,7
460					13,5		4 600	4 650	− 1,1
480					14		4 800	4 823	− 0,5
500		2			14,5		5 000	4 995 5 000	+ 0,1 0,0
520					15 15,5		5 200	5 167 5 339	+ 0,6 − 2,6
560				3	16	5 000	5 600	5 512 5 556	+ 1,6 + 0,8
590	1				17		5 900	5 856 5 905	+ 0,8 − 0,1
620					18		6 200	6 201	0,0
660					19		6 600	6 546	+ 0,8
680					20		6 800	6 890	− 1,3
720					21		7 200	7 234	− 0,5
760					22		7 600	7 579	+ 0,3
780						7 000	7 800	7 778	+ 0,3
800					23		8 000	7 923	+ 1,0
840				2	24		8 400	8 268	+ 1,6
880			1				8 800	8 858	− 0,7
900					26	8 000	9 000	8 889 8 956	+ 1,2 + 0,5
960					28		9 600	9 645	− 0,5
1 000		1				9 000	10 000	10 000	0,0
1 050					30		10 500	10 334	+ 1,6
1 100				1,5	32	10 000	11 000	11 024 11 027 11 111	− 0,2 − 0,3 − 1,0
1 150					34		11 500	11 712	− 1,8
1 250					36		12 500	12 401	+ 0,8

1	2	3	4	5	6	7	8	A	B
Rounded value	Traditional counts or numbers						Rounded value	Exact equivalent	Deviation
	Cotton (English)	Metric	Worsted	Linen	Jute	Denier			
tex	Ne_c	Nm	Ne_w	Ne_L	Tj	Td	dtex	dtex	%
1 400					40	12 500	14 000	13 779 13 889	+ 1,6 + 0,8
1 550					45		15 500	15 502	0,0
1 650				1	48		16 500	16 535	− 0,2
1 850					54		18 500	18 602	− 0,6
2 000						18 000	20 000	20 000	0,0
2 100					60		21 000	20 669	+ 1,6
2 200					64	20 000	22 000	22 047 22 222	− 0,2 − 1,0
2 500					72		25 000	24 803	+ 0,8
2 800					80	25 000	28 000	27 558 27 778	+ 1,6 + 0,8
3 300				0,5	96	30 000	33 000	33 072 33 080 33 333	− 0,2 − 0,3 − 1,0
3 400					100		34 000	34 448	− 1,3
4 200					120		42 000	41 338	+ 1,6
5 000					144		50 000	49 605	+ 0,8
5 200					150		52 000	51 677	+ 0,6
5 600						50 000	56 000	55 556	+ 0,8
6 200					180		62 000	62 006	0,0
6 600					192		66 000	66 140	− 0,2
6 800					200		68 000	68 896	− 1,3