TECHNICAL REPORT 8281/1

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Packaging — Estimating the filled volume using the flat dimensions — Part 1: Paper sacks

Emballages — Évaluation du volume de remplissage à partir des dimensions plates — Partie 1: Sacs en papier

At its first meeting in 1975, Sub-committee 2, *Sacks*, of Technical Committee ISO/TC 122, *Packaging*, agreed to create a working group (WG 1) to study methods of relating the flat dimensions of a paper sack to its capacity and if feasible, to make a recommendation for a method. At the very beginning it was pointed out that the volume of a sack is not an exact property, nor is it unique. It is dependent upon the product, the method of filling and any treatment after filling. Nevertheless, a relation between the dimensions and volume was considered to be worth seeking, even if it were to be an arbitrary one.

It became evident very early that establishing the desired relation would be impracticable without a wide range of experiments which were then carried out in France under the direction of the convener of the group. However, difficulties in establishment of the rate of filling and the assessment of the apparent density of the filling material were considerable and so it was impossible to recommend any accurate method.

As the work carried out by the working group was extensive and in any case gave valuable information, the sub-committee decided to publish the work as a Technical Report (type 3). This part of ISO/TR 8281 comprises all the individual results of measurement for paper sacks which can be treated further; for example different kinds of nomograms could be established on the basis of these results.

0 Introduction

This part of ISO/TR 8281 deals with paper sacks. Plastics sacks (of thermoplastic flexible film) will form the subject of ISO/TR 8281/2.

1 Scope and field of application

This part of ISO/TR 8281 establishes empirical equations for relating the flat dimensions of paper sacks to their capacity. The experimental methods used are also described.

2 Reference

ISO 6591/1, *Packaging — Sacks — Description and method of measurement — Part 1: Paper sacks.* [1)]

1) At present at the stage of draft.

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3 Principle

The general sequence used throughout was

a) determination of the mass of the empty sack;

b) measurement of the flat dimensions of the sack;

c) filling and closure of the sack;

d) assessment of the filled sack for degree of filling and, when necessary, addition or removal of contents until the sack was filled with the correct quantity of contents;

e) measurement of the filled dimensions of the sack;

f) determination of the degree of flexing of the filled sack by measuring the amount of sag when the sack was held up by opposite corners;

g) determination of the mass of the filled sack;

h) calculation of the volume of the sack, V, by the equation

$$V = \frac{m}{\varrho}$$

where

m is the mass of contents (total mass minus tare of sack);

ϱ is the bulk density of the contents.

4 Filling material

Polyethylene granules were used throughout as filling material.

The bulk density and granule size varied from occasion to occasion and information on density and size analysis is given in table 1.

Table 1 — Filling materials

Type of sack	Type of filling material	Density kg/l	Particle size analysis (mesh)					
			4 mm	3,15 mm	2,5 mm	2 mm	1,6 mm	1,6 mm
Open mouth pasted valved sewn	Polyethylene cubic granules	0,542	5,7 %	93,5 %	1,35 %	0,1 %		0,1 %
Valved pasted	Polyethylene cubic granules	0,565						
Open mouth sewn	Polyethylene cylindrical granules	0,6	49 %	37,4 %	12,2 %	1,4 %	—	—

5 Test sacks

The test sacks were hand made, either two plies of 100 g/m^2 paper or three plies of 70 g/m^2 paper, their dimensions being based on sack sizes in general use and taking into account paper deckles.

6 Procedure

6.1 Filling method

Valve sacks were filled using a small hopper containing a filling spout and means of using compressed air to assist the flow of the granules.

Open mouth sacks were filled manually or by using a small gravity hopper.

NOTE — The assessment of the degree of filling was considered to be most important, as it can be the source of large errors.

The experts in the working group were invited to give opinions and make judgements based on their experience in the field.

In those instances where full agreement was not reached, a further sack of the same dimensions was filled to allow direct comparison and full agreement.

6.2 Closing method

Valve sacks did not require a closure device but self-adhesive tape was used to prevent any spillage of contents.

Open mouth pasted bottom sacks were closed with staples 50 mm from the top.

Open mouth sewn bottom sacks were closed by sewing 15 mm from the top.

With gusseted sacks, the gusset ends were included in the closure in the internal position.

6.3 Measurement of filled dimensions

In the preliminary work a large caliper device was made to measure the dimensions of the filled sacks but it was found easier and more accurate to use a tape measure in conjunction with two large blocks of wood.

7 Expression of results

The symbols used are those of ISO 6591/1.

The sets of results obtained are listed in table 2. The results are listed in the annex.

Table 2 — Number of results

Type of sack	No. of results
Valve pasted	120
Valve sewn	17
Open mouth sewn	120
Open mouth pasted	94

Each set was processed by computer to give a regression analysis, based on the following models:

$$V = b^2 (\alpha a + \beta b + \gamma c)$$

for valve and open mouth pasted bottom sacks, and

$$V = (b + e)^2 [\alpha a + \beta(b + e) + \gamma e + \Delta]$$

where

V is the volume, in litres;

a is the flat length, in millimetres;

b is the flat width, in millimetres;

c is the bottom width, in millimetres;

e is the gusset width, in millimetres;

α, β, γ are regression coefficients;

Δ is a regression constant.

For each type of sack, the following equations were obtained:

a) volume of sack from the flat dimensions;

b) filled dimensions from the flat dimensions;

c) flat dimensions from the filled dimensions.

The results of the regression analysis for the various types of sack are given in 7.1 to 7.4.

The results of the study may also be presented graphically or nomographically.

Some examples of such nomographs are given in figures 1 to 3.

7.1 Open mouth sewn flat and gusseted sack

7.1.1 Volume of sack from the flat dimensions

$$V = (b + e)^2 [0{,}307\,9\,a - 0{,}021\,5\,e - 0{,}150\,8\,(b + e) - 15{,}9] \times 10^{-6}$$

V is given in litres for a, b, e in millimetres.

7.1.2 Filled dimensions from the flat dimensions

$$A = 0{,}955\,a - 0{,}05\,(b + e) - 0{,}000\,5\,e^2 - 50$$

$$B = 0{,}82\,(b + e) - 0{,}000\,35\,e^2$$

$$C = 0{,}115\,a + 0{,}128\,(b + e) - 0{,}000\,25\,e^2 - 5$$

A, B, C are given in millimetres for a, b, e in millimetres.

7.1.3 Flat dimensions from the filled dimensions

$$a = \frac{1}{0{,}955}\,(A + 0{,}05\,B + 0{,}000\,5\,C^2 + 50)$$

$$b = \frac{1}{0{,}82}\,(B + 0{,}000\,35\,C^2)$$

$$e = \frac{1}{0{,}000\,25}\,(0{,}1\,C - 0{,}011\,5\,A - 0{,}012\,8\,B + 0{,}5)^{1/2}$$

a, b, e are given in millimetres for A, B, C in millimetres.

7.2 Open mouth pasted flat hexagonal sack

7.2.1 Volume of sack from the flat dimensions

$$V = b^2\,(0{,}304\,6\,a + 0{,}057\,c - 0{,}148\,b) \times 10^{-6}$$

V is given in litres for a, b, c in millimetres.

7.2.2 Filled dimensions from the flat dimensions

$$A = 0{,}955\,a - 0{,}105\,b - 0{,}000\,5\,e^2 - 10$$

$$B = 0{,}800\,b - 0{,}000\,25\,c^2$$

$$C = 0{,}245\,b + 0{,}000\,25\,c^2 + 5{,}9$$

A, B, C are given in millimetres for a, b, c in millimetres.

7.2.3 Flat dimensions from the filled dimensions

$$a = \frac{1}{0{,}955}\,(A + 0{,}105\,B + 0{,}000\,5\,C^2 + 10)$$

$$b = \frac{1}{0{,}800}\,(B + 0{,}000\,25\,C^2)$$

$$c = \frac{1}{0{,}000\,25}\,(0{,}1\,C - 0{,}024\,5\,B - 5{,}9)^{1/2}$$

a, b, c are given in millimetres for A, B, C in millimetres.

7.3 Valved sewn flat and gusseted sack

7.3.1 Volume of sack from the flat dimensions

$$V = (b + e)^2\,[0{,}235\,5\,a + 0{,}052\,e - 0{,}088\,0\,(b + e)] \times 10^{-6}$$

V is given in litres for a, b, e in millimetres.

7.3.2 Filled dimensions from the flat dimensions

$$A = 0{,}973\,a - 0{,}001\,6\,e^2 - 67{,}6$$

$$B = 0{,}913\,(b + e) - 0{,}000\,94\,e^2 - 28{,}2$$

$$C = 0{,}147\,(b + e) + 0{,}000\,86\,e^2 + 0{,}064\,a + 10{,}8$$

A, B, C are given in millimetres for a, b, e in millimetres.

7.3.3 Flat dimensions from the filled dimensions

$$a = \frac{1}{0{,}973}\,(A + 0{,}001\,6\,C^2 + 67{,}6)$$

$$b + e = \frac{1}{0{,}913}\,(B + 0{,}000\,94\,C^2 + 28{,}2)$$

$$e = \frac{1}{0{,}000\,86}\,(0{,}1\,C - 0{,}014\,7\,B - 0{,}006\,4\,A - 1{,}8)^{1/2}$$

a, b, e are given in millimetres for A, B, C in millimetres.

7.4 Valved pasted flat hexagonal ends sack

7.4.1 Volume of sack from the flat dimensions

$$V = b^2\,(0{,}266\,8\,a + 0{,}404\,7\,c - 0{,}139\,9\,b) \times 10^{-6}$$

V is given in litres for a, b, c in millimetres.

7.4.2 Filled dimensions from the flat dimensions

$$A = 1{,}025\,a + 1{,}02\,c - 0{,}002\,8\,c^2 - 80$$

$$B = 0{,}920\,b - 0{,}001\,5\,c^2 - 35$$

$$C = 0{,}095\,b + 0{,}002\,5\,c^2 + 58$$

A, B, C are given in millimetres for a, b, c in millimetres.

7.4.3 Flat dimensions from the filled dimensions

$$a = \frac{1}{1{,}025}\,(A - 1{,}02\,C + 0{,}002\,8\,C^2 + 80)$$

$$b = \frac{1}{0{,}920}\,(B + 0{,}001\,5\,C^2 + 35)$$

$$c = \frac{1}{0{,}002\,5}\,(0{,}1\,C - 0{,}009\,5\,B - 5{,}8)^{1/2}$$

a, b, c are given in millimetres for A, B, C in millimetres.

8 Notes on procedure

The information and equations given in this part of ISO/TR 8281 have application in many areas, but users should be aware of limitations and restrictions that can occur. These are summarized in 8.1 to 8.4.

8.1 Influence of type of closing machine

Certain types of sewn closure machine require a definite space above the contents (ullage) to make a satisfactory closure.

Some automatic closing machines will trim away part of the top of the sack before sewing. The equations given may not be satisfactory in these instances.

8.2 Influence of contents

Highly fluidized aerated powders will require sacks of greater volume than given by the equations, in order to let sufficient contents be packed during filling.

8.3 Accuracy

The equations are only accurate to ± 5 %.

The equations are more accurate for sacks of average size.

Application to sacks with dimensions outside the following limits is not recommended:

- width: 350 to 650 mm
- length: 500 to 1200 mm
- bottom width: 100 to 200 mm

8.4 Other types of sack

Certain types of sack were not included in this study, namely

- open mouth pasted gusseted rectangular bottom sack (SOS);
- open mouth pasted flat turn over bottom sack (pinch bottom);
- valved pasted sewn flat sack with one hexagonal end.

Application of the equations to such sacks may give doubtful results.

Bibliography

Similar and related studies have been undertaken by a number of experts, for example

[1] French Standard H 13-042, *Sac papier grande contenance — Spécifications dimensionnelles.*

[2] In German, *Merkblatt 6.*

[3] Oy Wilh. Schauman Ab, Finland.

Annex

Results of filling trials

Table 3 — Valved pasted sack (ϱ = 0,565 kg/l)

Flat dimensions						Net mass (kg)	Filled volume (l)	Filling degree (mm)			Filled dimensions (mm)		
Nominal (mm)			Measured (mm)										
Length	Width	Bottom width	Length	Width	Bottom width			Diagonal	Diameter	Ullage	Length	Width	Thickness
400	300	100	399	297	100	5,17	9,2	10	183	114	410	235	104
800	300	100	798	296	102	10,52	18,6	42	170	155	806	234	111
1 200	300	100	1 200	295	101	16,3	28,8	150	173	170	1 219	228	123
400	350	100	395	347	101	6,5	11,5	5	205	133	413	280	114
600	350	100	594	345	100	10,4	18,3	8	195	140	604	270	126
800	350	100	795	346	100	14	24,7	28	205	158	804	268	126
1 000	350	100	993	346	100	17,8	31,5	62	210	176	1 008	267	126
1 200	350	100	1 194	349	100	22,2	39,4	100	215	175	1 202	266	136
400	400	100	390	397	100	7,7	13,6	10	254	155	404	328	118
600	400	100	592	396	100	12,8	22,6	10	235	165	614	325	126
800	400	100	792	396	100	17 6	31,1	22	220	189	811	320	129
1 000	400	100	998	397	100	22,9	40,5	58	225	190	1 016	319	135
1 200	400	100	1 195	396	100	26,8	47,4	119	245	242	1 204	316	139
400	450	100	395	445	100	9,7	17,1	8	255	148	416	375	120
600	450	100	592	446	100	15,6	27,7	10	280	180	610	350	141
800	450	100	795	446	100	21,8	38,6	25	260	190	803	362	147
1 000	450	100	992	446	100	28,1	49,7	75	285	208	997	355	158
1 200	450	100	1 193	444	100	32,9	58,3	132	263	260	1 200	357	155
400	500	100	397	496	102	11,6	20,5	15	183	152	406	417	135
600	500	100	592	496	100	18,2	32,3	20	310	190	600	405	142
800	500	100	790	496	100	25,8	45,7	30	300	205	786	394	158
1 000	500	100	992	496	100	32,7	57,9	58	315	250	998	398	166
1 200	500	100	1 197	496	100	40,4	71,5	135	300	293	1 197	392	175
400	550	100	395	546	100	12,8	22,8	15	365	175	402	472	131
600	550	100	593	546	100	20,8	36,8	5	325	205	597	457	147
800	550	100	795	546	100	30,1	53,3	23	340	205	792	438	175
1 000	550	100	994	545	100	38,8	68,6	35	325	210	986	435	178
1 200	550	100	1 195	547	100	48	84,9	75	350	255	1 170	423	200
400	600	100	394	594	100	14,4	25,4	15	375	170	396	516	140
600	600	100	598	595	100	24	42,5	20	370	210	596	495	161
800	600	100	795	595	100	33,8	59,7	28	380	260	787	492	180
1 000	600	100	992	595	100	43,8	77,6	34	382	290	970	487	195
1 200	600	100	1 192	596	100	55,6	98,4	100	370	276	1 188	489	199
400	650	100	394	645	100	15,8	27,9	18	405	190	402	560	138
600	650	100	594	645	100	26,5	46,8	18	425	224	596	553	167
800	650	100	792	645	100	39,1	69,2	5	415	235	798	530	188
1 000	650	100	992	645	100	49,9	88,4	23	420	282	985	546	193
1 200	650	100	1 195	646	100	66,3	117,3	40			1 170	524	223
1 200	650	100	1 195	646	100	61,1	108,0		425	300	1 171	522	202
400	350	130	394	345	132	7,2	13,7	10	215	129	406	249	136
600	350	130	594	345	130	9,9	17,6	10	210	153	610	260	138
800	350	130	795	345	131	14,8	26,3	31	218	163	801	255	141
1 000	350	130	997	346	130	19,3	34,2	48	203	158	1 008	251	153
1 200	350	130	1 195	345	131	23,2	41,1	80	205	166	1 198	254	154
400	400	130	394	397	132	8,9	15,8	15	250	135	416	298	142
600	400	130	595	395	131	14	24,8	10	238	153	616	300	151
800	400	130	794	396	132	19	33,7	18	255	170	807	296	158
1 000	400	130	999	397	131	24,9	44,2[1)]	60	260	164	1 016	297	152
1 200	400	130	1 192	397	132	29,2	51,7	90	255	161	1 205	296	162

1) Too full.

Table 3 — Valved pasted sack (ϱ = 0,565 kg/l) *(continued)*

Flat dimensions						Net mass (kg)	Filled volume (l)	Filling degree (mm)			Filled dimensions (mm)		
Nominal (mm)			Measured (mm)										
Length	Width	Bottom width	Length	Width	Bottom width			Diagonal	Diameter	Ullage	Length	Width	Thickness
400	450	130	394	445	131	10,9	19,3	15	276	143	404	351	134
600	450	130	596	446	132	17,8	31,6[1]	15	280	140	612	345	163
800	450	130	795	445	131	13,7	41,9	18	290	168	819	347	164
1 000	450	130	995	446	131	30,5	53,6	42	270	181	1 001	331	175
1 200	450	130	1 197	447	132	36,7	64,9	70	285	175	1 203	335	190
400	500	130	400	496	133	13,1	23,2	15	258	137	418	394	150
600	500	130	597	495	133	20,4	36,1	20	310	175	615	391	162
800	500	130	798	495	133	27,6	48,9	20	305	200	814	391	168
1 000	500	130	998	498	133	35,3	62,6	50	305	223	1 010	386	180
1 200	500	130	1 200	495	132	43,7	77,4	80	300	210	1 201	376	191
400	550	130	397	546	131	14,4	25,4	24	355	150	424	446	144
600	550	130	598	546	132	22,9	40,5	14	340	178	614	440	163
800	550	130	796	547	131	32,6	57,6	25	360	205	809	429	186
1 000	550	130	997	548	131	40,1	71,1	37	335	235	1 005	433	190
1 200	550	130	1 198	546	132	49,8	88,2	100	345	260	1 194	420	197
400	600	130	396	595	131	16,8	29,8[1]	20	390	150	421	490	146
600	600	130	597	596	131	26,8	47,5	25	390	190	616	479	176
800	600	130	790	595	131	36,0	63,8	25	395	235	812	479	183
1 000	600	130	995	596	131	46,2	81,8	26	390	225	1 005	477	195
1 200	600	130	1 195	597	132	57,3	101,4	75	390	270	1 193	477	206
400	650	130	394	647	132	18,1	32[1]	20	440	160	417	542	148
600	650	130	594	645	130	28,5	50,4	18	420	210	612	535	170
800	650	130	790	646	130	40,2	71,2	18	400	240	807	538	180
1 000	650	130	991	645	130	54,7	96,9	22	410	258	1 003	523	215
1 200	650	130	1 190	647	130	64,4	113,9	40	410	255	1 197	524	216
400	400	160	398	396	160	9,6	17	15	242	142	411	277	160
600	400	160	597	396	160	14,5	25,6	22	245	148	618	282	163
800	400	160	797	396	160	18,8	33,3	25	225	174	810	293	161
1 000	400	160	995	396	160	24,3	43,1	61	237	170	1 017	285	160
1 200	400	160	1 196	397	160	30,1	53,2	95	240	203	1 220	277	174
400	450	160	395	446	160	11,2	19,8	18	280	148	410	318	160
600	450	160	595	446	162	17,7	31,3	22	270	175	615	340	162
800	450	160	797	446	162	24	42,5	37	285	170	820	335	170
1 000	450	160	991	446	160	30,2	53,5	50	271	196	1 015	335	180
1 200	450	160	1 195	446	161	36,3	64,3	135	282	245	1 213	336	181
400	500	160	397	495	162	13,5	23,9	18	322	157	440	380	157
600	500	160	597	497	162	20,8	36,8[2]	10	310	184	628	377	176
800	500	160	798	497	162	28,9	51,1	35	305	190	835	379	185
1 000	500	160	995	497	162	36,2	64,1	67	300	195	1 030	380	177
1 200	500	160	1 190	496	162	43,5	76,9	122	310	212	1 212	371	202
400	550	160	395	546	162	16	28,3	20	360	170	440	420	166
600	550	160	595	547	162	24,6	43,6	15	345	183	638	432	178
800	550	160	795	547	162	34,4	60,9	10	345	188	822	422	197
1 000	550	160	995	547	162	43,3	76,6	23	340	212	1 022	418	204
400	600	160	395	597	160	17,9	31,6	15	405	180	425	469	166
600	600	160	598	597	160	28	49,5	22	393	190	635	478	183
800	600	160	794	597	160	38,9	68,9	22	395	215	832	478	202
1 000	600	160	995	597	160	50,6	89,5[1]	25	390	218	1 011	464	213
400	650	160	397	647	162	19,9	35,2	20	405	175	441	523	170
600	650	160	595	647	161	31,2	55,3	25	400	220	632	522	170
800	650	160	795	645	160	40,8	72,3	30	405	245	838	525	188
1 000	650	160	997	647	162	55,1	97,6	30	405	260	1 026	523	208

1) Too full.

2) Too slack.

Table 3 — Valved pasted sack (ϱ = 0,565 kg/l) (*concluded*)

Flat dimensions						Net mass (kg)	Filled volume (l)	Filling degree (mm)			Filled dimensions (mm)		
Nominal (mm)			Measured (mm)										
Length	Width	Bottom width	Length	Width	Bottom width			Diagonal	Diameter	Ullage	Length	Width	Thickness
600	500	190	594	497	190	21,8	38,6	20	300	177	618	369	187
800	500	190	794	497	190	29,5	52,2	34	310	190	820	365	192
1 000	500	190	995	497	190	38,5	66	70	310	190	1 025	366	195
600	550	190	594	544	192	26,1	46,2	25	345	185	647	423	186
800	550	190	795	545	192	35,8	63,4	15	355	199	836	402	203
1 000	550	190	995	545	192	45,7	80,9	37	330	180	1 023	408	222
600	600	190	594	596	192	29,8	52,8	18	370	192	642	451	207
800	600	190	794	596	192	40,4	71,5	32	380	235	835	462	212
1 000	600	190	994	595	192	52,9	93,6	28	375	200	1 018	447	230
600	650	190	595	645	192	33,7	59,7	14	430	200	643	508	208
800	650	190	794	645	192	46,4	82,2	20	410	220	835	503	226
1 000	650	190	995	645	192	59,6	105,4	35	415	180	1 050	496	233

Table 4 — Open mouth pasted sack (ϱ = 0,542 kg/l)

Flat dimensions						Net mass (kg)	Filled volume (l)	Filling degree (mm)		Filled dimensions (mm)		
Nominal (mm)			Measured (mm)									
Length	Width	Bottom width	Length	Width	Bottom width			Diameter	Ullage	Length	Width	Thickness
330	300	100	330	300	100	2,9	5,4	198	125	245	230	—
730	300	100	730	300	100	9	16,6	200	120	645	223	133
930	300	100	930	300	100		21,4					
1 130	300	100	1 130	300	100	14,8	27,2	188	160	1 028	224	141
330	350	100	330	350	100	3,7	6,8	231	142	243	285	110
730	350	100	725	347	100	11,5	21,2	224	155	626	277	144
930	350	100					28,1					
1 130	350	100	1 120	349	100	19,7	36,3	221	166	1 010	266	153
330	400	100	323	398	99	4,5	8,2	—	—	235	331	110
730	400	100	725	398	135	14,7	27,2	255	180	620	300	164
930	400	100										
1 130	400	100	1 122	398	100	25	46,1	254	175	1 000	293	181
330	450	100	323	447	100	4,5	8,3	—	—	242	386	91
730	450	100	725	448	100	17,4	32,2	—	—	625	356	171
930	450	100					45,2					
1 130	450	100	1 126	447	100	30,9	57,1	292	175	1 015	354	192
330	500	100	323	497	99	5,5	10,1	328	148	248	440	110
730	500	100	725	497	100	20,7	38,1	318	185	624	408	170
930	500	100					52,3					
1 130	500	100	1 125	498	100	37,5	69,2	315	190	1 010	400	202
330	550	100	324	546	100	6,2	11,4	355	155	240	480	109
730	550	100	728	547	100	22,9	42,3	355	220	632	460	179
930	550	100					61,9					
1 130	550	100	1 127	546	100	44,1	81,3	358	210	997	433	218
330	600	100	327	596	100	6,9	12,7	363	150	236	538	104
730	600	100	722	598	100	27,3	50,3	350	228	608	506	195
930	600	100					71,1					
1 130	600	100	1 128	597	100	52	96	393	218	990	458	235
330	650	100	323	643	100	7,6	14	400	175	245	573	112
730	650	100	722	648	99	29,1	52,3	408	240	619	510	180
930	650	100					82,5					
1 130	650	100	1 129	646	99	58,6	97	418	255	980	510	249
315	350	130	310	346	130	3,5	6,5	223	135	225	275	108
715	350	130	708	348	130	11,4	21	215	153	625	273	139
915	350	130					28,9					
1 115	350	130	1 108	346	130	19,7	36,3	206	149	999	253	159
315	400	130	310	397	130	4,1	7,5	263	160	228	323	100
715	400	130	712	397	130	14,1	26	250	169	598	298	155
915	400	130					35,4					
1 115	400	130	1 105	398	130	24,6	45,5	250	180	1 010	295	174
315	450	130	315	446	130	5,1	9,5	293	155	242	361	114
715	450	130	710	447	128	17,0	31,5	290	175	616	340	167
915	450	130					45,3					
1 115	450	130	1 105	446	130	30,6	58,8	275	168	1 004	336	199
315	500	130	310	497	130	5,6	10,3	330	155	252	430	111
715	500	130	710	497	130	20,1	37,1	329	210	618	412	171
915	500	130					54,6					
1 115	500	130	1 110	498	130	37,6	69,4	330	190	1 010	390	205
315	550	130	310	545	130	6,1	11,2	370	155	245	481	111
715	550	130	710	547	130	23	42,5	356	215	610	460	176
915	550	130					60,3					
1 115	550	130	1 110	547	130	43,4	80	345	230	1 000	435	214
315	600	130										
715	600	130	709	598	130	25,5	47	388	260	621	511	173
915	600	130					69,7					
1 115	600	130	1 112	596	130	51,1	94,3	373	228	985	464	241