Residential deposition surface area questionnaire instructions
THL 2011 Draft 0.9

Help is available on the following topics:

Questionnaire package contents:

o The questionnaire as an .xls file (if not already done so, save the file with your initials)
o These instructions as a print and a file.
o Berner BLM-50 laser meter (5 cm – 50 m)
o tape measure 2 or 3 m

For instant assistance call 040-7783 462/Riikka or 0400 673 207/Otto

NOTE: Security settings in Excel may block macros. The questionnaire uses macros to
o test whether macros are active (opening the workbook)
o copying the room template for each room you specify
o (optionally) highlighting furniture entries that have been modified by the user

When you open the questionnaire .xls file, you will automatically see this message if the macros will function:
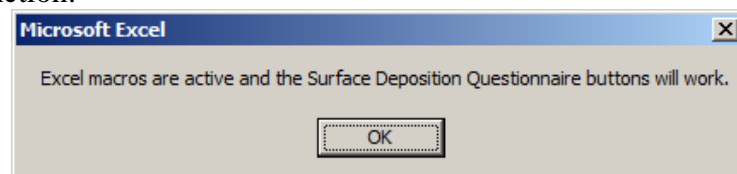
If you do not see the above message when opening the .xls file, please adjust your Excel security settings as follows

In Excel version 2003: Tools – Options – Security – Macro security the options are:

Very high & **High**: only macros signed or stored in 'trusted locations' run
Medium: User is asked whether to allow macros when opening the workbook (see example below) (recommended for running this questionnaire)
Low: all macros are allowed (not recommended)
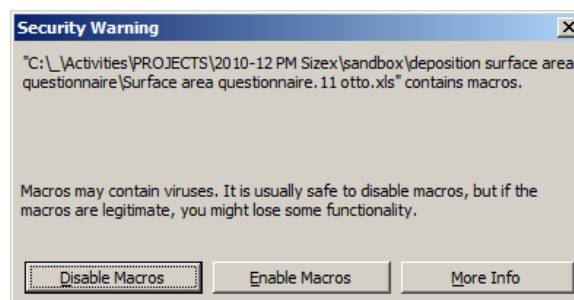
Entering room and furniture data

Please follow these two steps:

1. Enter first overall information on the whole apartment.
2. Enter detailed data for each room.

1. Enter first overall information on the whole apartment.

In this section you specify information about the rooms for which entry forms are automatically created when you are ready.

Select the Apartment –sheet, which has two sections (A and B)

First enter your contact information and data on the overall apartment in section A:

Name	Telephone	E-mail

A RESIDENCE	Value	Unit of measure	Notes
Note: This machine uses	1.23		for presenting decimal numbers (use decimal comma vs point as shown)
Number of floors		(number)	Number of living floors in the residence
Apartment type		(text)	Nominal rooms, e.g. 2h+k etc.
Official floor area		m^2	Total floor area of the residence (m^2), warm living space
Main room height		m	Main room height (m) (if variable, specify differences for rooms)
Occupants, adults		(number)	
Occupants, children		(number)	
Ventilation system		type (natural, mechanical))	
o full mechanical exhaust		1=yes, 0=no	
o full mechanical air intake		1=yes, 0=no	
o filter type		filter classification	

Enter the number of floors, rooms and total living area of the apartment (if known; please refer to the apartment or house documentation as necessary; this information is normally available in the contract etc. official documents).

Use the provided laser meter to measure the most common room height (this will be the default for all rooms; if the height in some rooms is different, you will need to specify those rooms separately later). Refer to the laser meter instructions for more details; shortly:

Power on – activate laser – aim – measure:

(i) activate the device from the red button. Put the bottom of the meter against your reference surface (e.g. here the floor).
(ii) activate the laser using the red button again. DO NOT LOOK INTO THE BEAM!
(iii) look at the laser beam (red dot) on the ceiling and make sure it is correctly pointed to the surface to which you want the distance measured
(iv) press again the red button to take the measurement.

(v) Record the distance from the display

Second, enter information about each rectangular room or space in the apartment in section B (note that here some spaces like halls, storage rooms etc. are best entered as separate rooms even if not normally counted as such):

B Rooms (and rectangular spaces)	Room dimensions Length m	Width m	Number of walls 1/4	Room Height (enter if different) m	Room Area m²
#### Kitchen	2.5	3.7	4.0	2.55	9.3
Livingroom					
Bedroom 1					
Bedroom 2					
Bedroom 3					
Toilet 1					
Toilet 2					
Bathroom					
Sauna					
Utility room					
Storage room 1					
Storage room 2					
Hall					
<enter room name>					
<enter room name>					
(insert new rows or edit above as needed)					

Total room area (compare for validation):   (17%of 55m²)   **9.3**

After entering all dimensions, press >>>   [Create All Entry Forms]

Or select targe room name and press this button >>   [Create Selected Entry Form]

<end of form>

Red marks on the left show rooms for which the data is not yet entered (e.g. Kitchen). Total area of rooms highlighted in red highlights that less than 90% of the nominal area has been entered: please add all the rooms and spaces.

Use the provided laser meter (or other meters) to measure the room dimensions. Estimate whether the room height is the same for each room; enter if different.

In some rooms less than four walls exist – in such case enter your fractional estimate of the wall surface area (e.g. one whole wall missing = 3; half a wall missing = 3.5 etc.).

After entering all rooms and spaces from which the apartment consists of (i.e. the sum of the floor area of the rooms matches your total area – see the percentage calculated below the Section B; in current example the coverage is 98%), press the *Create All Entry Forms* –button. This will create a new entry sheet for each room.

If you need to add a new room or space later, position the cursor on the cell with the name of the new space and press *Create Selected Entry Form* –button.

2. Enter detailed data for each room.

After creating the entry sheets, select each one and enter all the furniture in the room according to the following procedure. Note that also cupboards that are permanently installed are entered: the objective is to estimate the complete surface area of the apartment, whether loose furniture or fixed structures.

Each room sheet contains 30 rows for furniture in the room (new rows can be added if there are more furniture). Each row combines all similar pieces of furniture: e.g. if you have six similar chairs around your dining table, you need to enter only one row specifying that there are six pieces.

Example of entries for kitchen furniture:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Q
1																
2	Kitchen															
3				1	2	3	4	5	6	7	8	9	10	11	12	
4								Additonal	Open	Open	Covered	Covered	Doors or	Load	Notes	Ok
5		Category	n	Type of furniture	Width	Depth	Height	shelves	base	top	sides	back	covered front		Enter here any additional information	
6			(how many)		m	m	m	number	0|1	0|1	0|1	0|1	0|1	%	including photos (P1, P2, ...) taken	
7																
8	1	Chairs	4	1001 Kitchen chair (0.35×0.3)	0.35	0.3	0.25		1	1		1				
9	2	Tables	1	1701 Dining table big (1.6×0.8)	1.6	1.1			1	1						
10	3	Tables	1	1705 Kitchen sink (1.2×0.6)	1.2	0.6			1	1						
11	4	Tables	1	1702 Dining table small (1.2×0.8)	0.8	0.6			1	1						
12	5	Cupboards	2	1101 Full height cuppoards (0.6×0.6)	0.6	0.6	2.2	6			1		1			
13	6	Cupboards	5	1103 Above sink/table cuppoards (0.6	0.6	0.3	1	4			1		1			
14	7	Cupboards	5	1102 Under sink/table cuppoards (0.6×	0.6	0.6	0.7	1			1		1		1 drawer (x5) included	
15	8															
16	9															
17	10															
18	11															
19	12															
20	13															
21	14															
22	15															
23	16															
24	17															
25	18															
26	19															
27	20															
28	21															
29	22															
30	23															
31	24															
32	25															
33	26															
34	27															
35	28															
36	29															
37	30															
38																
39		Highlight non-default values														
40																

o green cells on the right indicate that necessary information has been entered
o grey shaded entries are values that user has adjusted (macro button on the bottom)

Entering pieces of furniture

2.1 First select the category of your furniture (green column)
2.2 Enter the number of similar pieces (e.g. shelves and cupboards can be located in different parts of the room but can be combined here on the same row)
2.3 Select the best match to your furniture from the predefined types (yellow column)

Now the default values for the dimensions and other properties are shown in the remaining columns. If you are happy with the values your row is done. If your pieces of furniture differ from the defaults, you need to enter the correct value in each column.

Width and **depth** are the horizontal dimensions. Use the laser meter or standard tape meter to measure. Aim at better than 10% accuracy (but allow rounding i.e. use a close match, if available, without corrections).

Height is the vertical dimension.

Number of **shelves** are listed for shelves, cupboards and some tables.

Open base: If the floor below the furniture is open, enter 1. The base of some cupboards, chairs, tables, sofas and beds can be completely closed; in these cases enter 0. Note that there may be a small space allowing air to mix into the base; in such case the base is not closed (=1).

Open top: in similar way, the space above the furniture has an additional surface, e.g. like between some cupboards and the ceiling there may be an additional shelf, enter 1 in such case; in all other cases where there is no additional horizontal surface, enter 0. Note: the total number of horizontal levels of an object is calculated as

horizontal levels of an object = nr of shelves + open top!

Covered sides: cupboards have normally closed sides. Some shelves however may have open sides and an open back. Indicate whether the surface area of the side or the back exists, accordingly.

Doors/covered front: shelves may have doors; cupboards often do. Beds may have vertical front surface, too. Indicate accordingly (1=yes, 0=no).

Load: the amount of books and other stuff on the shelves as well as the amount of clothes on cloth racks is estimated here; please refer to the shelves and cloth rack sections below for example pictures.

Ok: Check-field: Make sure to enter all necessary details; the ok-field on your entry sheet turns green when all necessary data have been entered for each row.

Highlight non-default values –button highlights the cells for which you have entered adjusted values instead of the defaults.

Furniture types

The following sections show some typical types of furniture pointing out the main features to pay attention to.

Type images © IKEA

The horizontal and vertical surfaces of each piece of furniture are calculated using 10 simple variables. Three of the variables are dimensions (in meters), one is a count (nr of additional shelves), five are yes/no variables that are coded by 1 or 0, respectively, and one is a percentage (the load of items on shelves).

Entry parameters:

Width x **depth** defines the horizontal dimensions of the object
Height defines the height of vertical surfaces (when applicable as defined by closed back, sides and front (the doors are interpreted as front facing surface for chairs

Shelves indicate additional horizontal levels besides the top of the object.

Whether the object is covering the floor or the ceiling is handled by these variables:

Each object that is not covering the floor from air flow has an **open base** (enter 1).
Each object that is not filling the space up to the ceiling has an **open top** (enter 1)

Whether the object has vertical surfaces

An object that has vertical surface (width x height) in the back has **covered back**
An object that has vertical surface (width x height) in the front has **doors**/**covered front**
An object that has vertical surface (depth x height) on the sides has **covered sides**

Chairs

Open back

Closed back

with armrests
open base

armrests and
a closed base

Stools, footrests

	D	E	F	G	H	I	J	K	L	M
2		Length/			Additonal	Open	Open	Covered	Covered	Doors or
3	**Standard furniture**	Width	Depth	Height	shelves	base	top	sides	back	covered front
4		m	m	m	number	0|1	0|1	0|1	0|1	0|1
	D	E	F	G	H	I	J	K	L	M
6	1001 Kitchen chair (0.35×0.3×0.25)	0.35	0.30	0.25	0	1	1	0	1	0
7	1002 Kitchen chair w. back (0.35×0.3×0.5)	0.35	0.30	0.50	0	1	1	0	1	0
8	1003 Armchair (0.6×0.5×0.7)	0.60	0.50	0.70	0	1	1	1	1	0
9	1004 Sauna bench (2×0.8×0)	2.00	0.80	0	1	1	1	0	0	0
10	1005 Kitchen stool (0.35×0.3×0)	0.35	0.30	0	0	1	1	0	0	0
11	1006 Staircase stool (0.35×0.3×0)	0.35	0.30	0	1	1	1	0	0	0
12	1007 Foot rest (0.4×0.3×0)	0.40	0.30	0	0	1	1	0	0	0
13	1009 Custom chair (<enter>x<enter>x<enter>)	<enter>	<enter>	<enter>	0	1	1	0	0	0

Cupboards

Cupboards are closed structures with three sides covered by walls and with doors assumed to be fixed to the walls. In case of open structure or stand loose cupboard, enter a shelf (with doors as appropriate).

For cupboards account for the following details
- enter number of shelves (but if doors, ignore items on the shelves)
- check if the space below the lowest shelf and above the highest shelf are open or closed

Open base	Open bases partly open	double	Triple, closed base

	D	E	F	G	H	I	J	K	L	M
2		Length/			Additonal	Open	Open	Covered	Covered	Doors or
3	**Standard furniture**	Width	Depth	Height	shelves	base	top	sides	back	covered front
4		m	m	m	number	0|1	0|1	0|1	0|1	0|1
	D	E	F	G	H	I	J	K	L	M
14	1101 Full height cuppoards (0.6×0.6×2.2)	0.60	0.60	2.20	6	0	0	1	0	1
15	1102 Under sink/table cuppoards (0.6×0.6×0.7	0.60	0.60	0.70	1	0	0	1	0	1
16	1103 Above sink/table cuppoards (0.6×0.3×1)	0.60	0.30	1.00	4	0	0	1	0	1
17	1109 Custom cupboard (<enter>x<enter>x<en	<enter>	<enter>	<enter>	<enter>	<enter>	<enter>	1	0	<enter>

Equipment

All household equipment and electronics belong to this category. The deposition surface areas are not very large, but some of the equipment with plastic covers may cause electrostatic collection of particles. List your equipment and rely mostly on the default dimensions. <mark><in the early phase please comment></mark>

Please refer to the standard equipment in the drop down menu for selection of equipment ot enter. Please ignore shavers, mp3-players, toasters, irons and other small things.

|	D	E	F	G	H	I	J	K	L	M
2		Length/			Additonal	Open	Open	Covered	Covered	Doors or
3	**Standard furniture**	Width	Depth	Height	shelves	base	top	sides	back	covered front
4		m	m	m	number	0|1	0|1	0|1	0|1	0|1
	D	E	F	G	H	I	J	K	L	M
22	1301 Dishwasher (0.6×0.6×0.7)	0.60	0.60	0.70	0	1	1	0	0	0
23	1302 Owen/stove (0.6×0.6×0.7)	0.60	0.60	0.70	0	1	1	0	0	0
24	1303 Microwave owen (0.4×0.3×0.3)	0.40	0.30	0.30	0	1	1	0	0	0
25	1304 Refridgerator (0.6×0.6×1)	0.60	0.60	1.00	0	1	1	1	1	1
26	1305 Washing machine (0.6×0.6×0.7)	0.60	0.60	0.70	0	1	1	0	0	0
27	1306 Laundry dryer (0.6×0.6×0.7)	0.60	0.60	0.70	0	1	1	0	0	0
28	1307 Desktop computer (0.25×0.6×0.45)	0.25	0.60	0.45	0	0	1	0	0	0
29	1308 Other (<enter>x<enter>x<enter>)	<enter>	<enter>	<enter>	<enter>	1	1	1	1	1

Shelves

Shelves can be open from all sides, have closed back and sides but be open from the front, or can have also doors. The base (space below the lowest shelf) can be open or closed.

Number of shelves: do not count top twice (count either as a shelf or as open top)

PLEASE INDICATE HOW MANY % OF THE SHELVES ARE FULL

| Open | Covered back with closed base | Double (enter 1x2) | Wide | Glass doors open base |
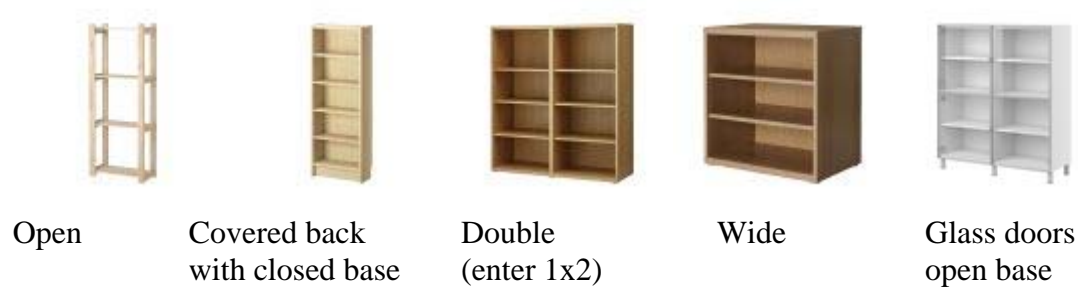
Shelf loads are needed to estimate the additional surface of the items stored on the shelves. Reference loads are books that have their sides (vertical) and tops (horizontal) exposed to air. Please use the following photographs to calibrate your estimates:

Empty   Full

0%   20%   50%   75%   90%

When you enter multiple shelves on the same line, the load estimate is the overall average over all shelves!

In fine-tuning your load estimates take into account that the surface area of your objects over all the shelves grouped onto the same row is targeted. If your shelves are half full, but the load is airy (e.g. books not in row), weigh the load upwards. In case of decorative items, estimate the surface area in comparison with a full load of books.

	D	E	F	G	H	I	J	K	L	M	N
2		Length/			Additonal	Open	Open	Covered	Covered	Doors or	Load
3	**Standard furniture**	Width	Depth	Height	shelves	base	top	sides	back	covered front	
4		m	m	m	number	0|1	0|1	0|1	0|1	0|1	%
	D	E	F	G	H	I	J	K	L	M	N
30	1401 Full height shelf 30 cm (0.8×0.3×1.6)	0.80	0.30	1.60	6	1	1	0	0	0	<enter>
31	1402 Full height shelf 40 cm (0.8×0.4×1.6)	0.80	0.40	1.60	6	1	1	0	0	0	<enter>
32	1403 Full height shelf narrow (0.6×0.3×1.6)	0.60	0.30	1.60	6	1	1	0	0	0	<enter>
33	1404 Medium height shelf 1 (0.8×0.3×1.2)	0.80	0.30	1.20	4	1	1	0	0	0	<enter>
34	1405 Medium height shelf 2 (0.8×0.4×1.2)	0.80	0.40	1.20	4	1	1	0	0	0	<enter>
35	1406 Single shelf (0.8×0.3×)	0.80	0.30		0	1	1	0	0	0	<enter>
36	1409 Custom shelf (<enter>x<enter>x<enter>)	<enter>	<enter>	<enter>	<enter>	1	1	0	0	0	<enter>

Sofas

Sofa types are separated by the number of persons accommodated; rely on the default dimensions as far as possible. The base of the sofa can be closed sometimes, please pay attention!

| 1 closed base | 2 closed | 3 closed | 4 closed | 5 open base |

	D	E	F	G	H	I	J	K	L	M
2		Length/			Additonal	Open	Open	Covered	Covered	Doors or
3	**Standard furniture**	Width	Depth	Height	shelves	base	top	sides	back	covered front
4		m	m	m	number	0|1	0|1	0|1	0|1	0|1
	D	E	F	G	H	I	J	K	L	M
37	1501 Sofa for 1 (0.8×0.6×0.6)	0.80	0.60	0.60	0	1	1	1	1	0
38	1502 Sofa for 2 (1.2×0.6×0.6)	1.20	0.60	0.60	0	1	1	1	1	0
39	1503 Sofa for 3 (1.8×0.6×0.6)	1.80	0.60	0.60	0	1	1	1	1	0
40	1504 Sofa for 4 (2.4×0.6×0.6)	2.40	0.60	0.60	0	1	1	1	1	0
41	1505 Sofa for 5 (3×0.6×0.6)	3.00	0.60	0.60	0	1	1	1	1	0
42	1506 Sofa for 6 (3.6×0.6×0.6)	3.60	0.60	0.60	0	1	1	1	1	0
43	1509 Custom sofa (<enter>x<enter>x<enter>)	<enter>	<enter>	<enter>	0	1	1	1	1	0

Tables

Some tables contain also shelves. A drawer or shelf under a table may not have an open top.

	D	E	F	G	H	I	J	K	L	M
2		Length/			Additonal	Open	Open	Covered	Covered	Doors or
3	**Standard furniture**	Width	Depth	Height	shelves	base	top	sides	back	covered front
4		m	m	m	number	0|1	0|1	0|1	0|1	0|1
	D	E	F	G	H	I	J	K	L	M
44	1601 Dining table big (1.6×0.8×)	1.60	0.80		0	1	1	0	0	0
45	1602 Dining table small (1.2×0.8×)	1.20	0.80		0	1	1	0	0	0
46	1603 TV table (0.8×0.8×0.4)	0.80	0.80	0.40	1	1	1	0	0	0
47	1604 Night table (0.4×0.4×0.4)	0.40	0.40	0.40	1	1	1	0	0	0
48	1605 Kitchen sink (1.2×0.6×0)	1.20	0.60	0	0	1	1	0	0	0
49	1609 Custom table (<enter>x<enter>x<enter>)	<enter>	<enter>	<enter>	<enter>	1	1	0	0	0

Other

Two standard pieces of furniture are in this category: beds and coat racks.

Standard bed is 210 x 80 cm; enter double bed as 2 pieces and king size bed as 1.5 pieces (adjust the ratio as appropriate). Enter the height of the solid part of the frame, i.e. excluding legs. Indicate whether the bed has an open base.

For children's beds enter a fractional number (e.g. 0.75 beds) or enter the correct measurements.

For coat racks please indicate the length of the rack as well as whether the rack has separate covered sides.

PLEASE INDICATE HOW MANY % OF THE RACK IS FULL in comparison with a rack completely stuffed with jackets.

	D	E	F	G	H	I	J	K	L	M
2		Length/			Additonal	Open	Open	Covered	Covered	Doors or
3	Standard furniture	Width	Depth	Height	shelves	base	top	sides	back	covered front
4		m	m	m	number	0|1	0|1	0|1	0|1	0|1
	D	E	F	G	H	I	J	K	L	M
50	1701 Bed (2.1×0.8×0.25)	2.10	0.80	0.25	0	1	1	1	1	0
51	1702 WC seat (0.4×0.6×0.5)	0.40	0.60	0.5	0	0	1	1	1	1
52	1703 Washbasin (0.4×0.35×0.2)	0.40	0.35	0.2	0	1	1	1	1	1
53	1704 Bath tub (1.6×0.8×0.5)	1.60	0.80	0.5	0	1	1	1	1	1
54	1705 Coat rack (1×0.4×0)	1.00	0.40	0	1	1	1	0	0	0
55	1706 Shoe rack (0.8×0.3×0)	0.80	0.30	0	2	1	1	0	0	0
56	1709 Custom furniture (<enter>x<enter>x<ent	<enter>	<enter>	<enter>	0	1	1	0	0	0

Notes on using the default furniture

The default entries are available from the dropdown lists for various furniture types. The data is read from the Lookup-sheet. Please maximize the use of standard items to minimize the additional work in entering detailed measurements:

o if the difference between your piece of furniture and a standard item is <10%, its ok
o many items can be 'scaled' using the number of pieces column; e.g.
    a king size bed (width 120 cm instead of standard 80 cm), enter 1.5 beds
    multiple book shelves of same dimensions, enter one and indicate the number

Make sure to enter all necessary details; the ok-field on your entry sheet turns green when all necessary data have been entered for each row.

Distance measurement with laser

The Berner BLM 50 laser measuring tool is provided for easy measurement of room dimensions. The device is very easy to use for a basic measurement, eventhough the flexible device contains many features.

Quick instructions are provided below. Please refer to the full manual (available from here: Berner BLM50 User's manual.pdf)

Safety instructions:

A. Avoid dropping the device, the laser is sensitive to shocks. Use the wrist wrap!

B. Do not point the laser on anybody. DO NOT LOOK INTO THE LASER OR FRONT OF THE DEVICE WHEN ACTIVATING THE LASER!

With these in mind you are ready to go:

1. Press the lower red button to turn on power

2. Use upper right button to select the starting point of the measurement (symbol e in the Figure below: device top, bottom of LCD panel, bottom of device or extension pin). Easiest is to use the bottom of device, which is also the default.

3. Put the bottom of the device (or the selected reference level) on the wall (or other start surface level)

4. Press upper red button to turn on the laser. Make sure that the laser points to the opposite surface and the path is perpendicular

5. Press the upper red button again to take the reading (hold device steady!). Distance in mm appears on screen. Record the reading on the computer (or on paper)
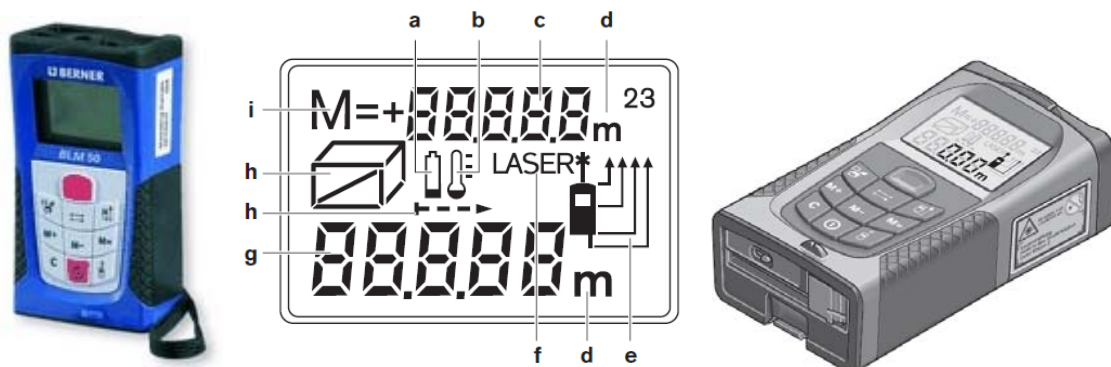
Left: upper red button: 1 power on/off, 2 activate laser, 3 take measurement
Display: symbol e shows the current reference point of the measurement.
Right: the pin for extended reference point is released from the bottom.

Calculation of surface area

This section is the documentation of how the various deposition surface area components are calculated. While the respondent is not requested to use these equations in the data entry, in tricky situations it is possible to look at the equations to solve how to enter the item dimensions for correct estimation of the deposition areas.

Equations are presented for (ctrl-click to jump):

All dimensions are in meters.

Walls of the rooms

$$A_{wall} = (2 \times lh + 2 * wh) \times \frac{n_{walls}}{4}, \text{ where}$$

A_{wall} is the total vertical wall surface area of the room,
l is the room length
w is the room width
n_{walls} is the number of (complete) walls in the room (note that doors are equivalent with the walls, but if a door opening exists without a door or curtain, it should be subtracted from the fractional number of walls

FURNITURE

Furniture surfaces are divided into upward facing horizontal, downward facing horizontal, and vertical surfaces, and each of these categories further into external and internal components. Internal surfaces refer to cupboards and shelves with doors limiting the ventilation of the space and thus the deposition efficiency of the corresponding surfaces.

Horisontal external upward facing surface of the furniture

$$A_{he} = wd \times (ob + ot - 1), \text{ where}$$

A_{he} is the external horizontal surface area
w is the width
d is the depth
ob = {0|1} indicating whether the floor is open to air below the object (open base)
ot = {0|1} indicating whether the ceiling is open to air below the object (open top)
-1 = the covered floor area

tables, chairs, etc.: ob=1, ot=1, A_{he}=wd

Horisontal internal upward facing surface of the furniture

$A_{hi} = wd \times n_s$, where
A_{hi} is the external horizontal surface area
w is the width
d is the depth
n_s is the number of (internal) shelves

for tables etc. furniture without shelves set the ns =0 and open top = 1

Horisontal downward facing surface of the furniture

Downward facing surface is assumed identical to the upward facing surface for both internal and external components.

Vertical external surface of the furniture

For shelves etc. (excluding cupboards):

$A_{ve} = (cb + d)w \times h + 2cs \times d \times h$,where
Ave = vertical external surface
d = doors (yes/no) {0|1}
cb = covered back {0|1}
cs = covered sides {0|1}
w = width
h = height
d = depth

Here the category of cupboards will assumed to consist of fixed installation where the furniture is covering the wall, i.e. net external vertical surface is set to zero; thus in case of stand-alone cupboards please enter as shelves.

Vertical internal surface of the furniture

Vertical internal surface is calculated with identical formula as the external one but will be evaluated for cupboards too.

$A_{ve} = (cb + d)w \times h + 2cs \times d \times h$,where
Ave = vertical external surface
d = doors (yes/no) {0|1}
cb = covered back {0|1}

cs = covered sides {0|1}
w = width
h = height
d = depth

Vertical surface of the furniture load

Load is assumed not to affect horizontal surface area (in some cases like office lockers this may not be exactly correct, but the overall impact is assumed to be small. Loads are estimated only for shelves; for cupboards it is assumed that the lower friction velocity will void the additional effect of the items in the cupboard.

Vertical load surface is calibrated against a book shelf. Full load corresponds to a row of books with back height or 25 cm, or against full coat rack of height 60 cm

$$A_{vl} = load \times w \times 0.25 \times 2 \text{ for shelves}$$
or
$$A_{vl} = load \times w \times 0.6 \times 2 \text{ for coat racks}$$

where
Avl = the vertical surface of the load
load = the fractional load (1=100%)
w = width of the shelf or cloth rack

Worksheet macros

The worksheet can be used with macros disabled. Default settings in many Microsoft Excel installations disable macros to improve security. The recommended setting for running this questionnaire is "Medium security", which asks the user whether to allow macros to run. This section shortly documents the functionality of the macros included in the questionnaire and explains how to manually replace the macros, if necessary.

1. Opening the workbook

If macros run, a dialog box is presented to the user indicating that this is the case. This opening macro also replaces the text in cell A2 on sheet "Apartment" stating:

Excel macros are not working! Please refer to the instructions document for solving the problem!

If user selects OK from the dialogue, this text is deleted. Thus, if the red text is visible, it indicates that macros are disabled (or cancel-button was pressed).

2. Creating entry forms

Two macros are available for copying the Template-sheet into a new sheet for each room entered on the Apartment –sheet. Both macros are assigned onto macro buttons on the Apartment –sheet.

The first macro creates sheets for all rooms entered at once. The second one creates the sheet for the room selected by cursor.

Both macros add also few typical entries by default for kitchen, toilet and bedroom.

If macros are not active, the user can copy the sheets manually:
o right-click Template –sheet tab
o select Copy
o edit the name to match each room

3. Highlighting edited values

A macro button is on each room sheet. Pressing this button will check the dimensions entered for each piece of furniture and will format the cells with values edited manually to grey background.