Annex G

(normative)

Folding and loading the test load

G.1 General

This annex sets out the method for folding of the **test load** and loading it into the **test washing machine** and the **reference machine**. Experience has shown that the way that a **washing machine** is loaded can influence the results obtained, especially with respect to washing performance. To achieve reproducible results it is therefore necessary to specify both the loading sequence and the position and placement of all load items in the **test washing machine** and the **reference machine** for all performance tests.

G.2 Folding the items prior to loading the test washing machine

G.2.1 General

This clause sets out the folding of load items before they are placed into the **test washing machine** as specified in G.3.

G.2.2 Test load

G.2.2.1 Small sheet with a stain test strip attached

Small sheet with a stain test strip attached shall be folded in accordance with Figure G.1.



Fold the small sheet along the lines. Strip should be on the top in the centre of the sheet

Fold the small sheet according to picture above



Sheet is folded again in such a way that strip parts do not cover themselves



Four stains remain on the upper side of the sheet

Figure G.1 — Folding small sheet with a stain test strip attached

G.2.2.2 Small sheet

Small sheets shall be folded in accordance with Figure G.2.





Figure G.2 — Folding small sheet

G.2.2.3 Large sheets

Large sheets shall be folded into thirds to form letter "Z" in accordance with Figure G.3.



Figure G.3 — Folding large sheets

G.3 Loading Items into the test washing machine – general rules

G.3.1 Machine type

G.3.1.1 General

For the purposes of loading, all **washing machines** shall be classified as either **horizontal axis washing machine** or **vertical axis washing machines** as specified below.

G.3.1.2 Horizontal axis washing machines

In a **horizontal axis washing machine** the load is placed in a drum which rotates around an axis which is usually horizontal or close to horizontal (see definition). This is illustrated in Figure G.4. In most cases, the drum rotates around this axis for washing and spinning **operations**.



Figure G.4 — Illustration of horizontal axis washing machine

G.3.1.3 Vertical axis washing machines

In a **vertical axis washing machine** the load is placed in a drum which rotates around an axis which is usually vertical or close to vertical (see definition). This is illustrated in Figure G.5. In cases where the drum does not rotate for any **operation** (i.e. no spinning function available and no rotation during washing) then the **washing machine** is classified as a **vertical axis washing machine**.

Components, protrusions or mechanical devices of different style (e.g. agitator, impeller) inside the drum in a **vertical axis washing machine** may cause slight variations in the loading scheme described. These variations are covered in the loading sequence for **vertical axis washing machines**.



Figure G.5 — Illustration of vertical axis washing machine

G.3.2 Loading sequences

G.3.2.1 General rules

Test washing machines shall always be loaded item by item in layers from bottom to top. All items shall be placed into the drum in the orientation described below.

G.3.2.2 Items with attached strip

G.3.2.2.1 General

Load items which have stain test strips attached (e.g. small sheets) are always laid flat in the **test washing machine** with the 5 soils of the stain test strip facing upwards. Load items with stain test strips attached shall not be placed one top of each other.

G.3.2.2.2 Loading for horizontal axis washing machines

Horizontal axis washing machine shall be loaded as described in this section. The folded small sheet with the stain test strip shall be placed in the drum with the Sebum/Carbon Black/Blood/Cocoa stains facing upwards and the side of the sheet folded twice facing to the front of the **test washing machine** drum as illustrated in Figure G.6.

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Open side of small sheet towards the back of the drum

Folded side of small sheet towards the front of the drum

Figure G.6 — Horizontal axis washing machine: placement of items in the drum

G.3.2.2.3 Loading for vertical axis test washing machines

Vertical axis test washing machine shall be loaded as described in this section.

The folded small sheet shall be placed in the drum with the Sebum/Carbon Black/Blood/Cocoa stains facing upwards and the side of the sheet folded twice facing the drum wall as illustrated in Figure G.7.



Figure G.7 — Vertical axis washing machine: placement of items in the drum

G.4 Loading requirements for the test load – horizontal axis test washing machines

G.4.1 General loading directions

G.4.1.1 General

A **horizontal axis washing machine** shall be loaded in steps from bottom to top. The sequence step by step is given in G.4.2.

G.4.1.2 Amount of test load and soiled strips

The amount of **test load** (small and large sheets) as well as the number of stain test strips for a given machine size is given in Table 3 and in G.8.

G.4.2 Horizontal axis washing machine: loading step by step

G.4.2.1 General

Divide the load as defined in 6.4.6.2 or G.8 in part loads. The number of part loads shall be equal to the number of small sheets with attached stain test strips. Divide the different **test load** items (small and large sheets) as equally as possible and sort each part load according to Table G.1.

Order of loading	Sorting layer	Type of test load per layer
1	1	All small sheets without any attachment
2	2	First row of large sheets (if any)
3	3	All small sheets with stain test strips
4	4	Second row of large sheets (if any)

Table G.1 — Orientation of test load items within a part load

G.4.2.2 Sorting rules

For large sheets the first row of sheets shall be filled in all part loads before any large sheets are placed in the second row.

If the number of items cannot be divided equally between the part loads the items shall be divided as equal as possible starting with part load number 1.

G.4.2.3 Example showing how a 15 kg load shall be divided into part loads and then loaded into a horizontal axis washing machine

Example showing the division of the **test load** into part loads and the order they are loaded into the machine. The example shows the procedure for a 15 kg machine.

Reference to Table 3 shows that the **test load** for the 15 kg machine shall consist of 10 small sheets with a stain test strip attached, 22 additional small sheets without any stain test strip attached, and 13 large sheets.

Table G.1 shows how the **test load** shall be sorted within a **part load**. The number of part loads for a 15 kg machine is 10 (equal the number of stain test stripes. (G.4.2))

The test load will then be sorted as follows:

Small sheets (22 units): The 22 small sheets shall be sorted in layer number 1 of each part load. The 22 sheets will be divided according to G.4.2.2 giving 3 sheets in part load 1 and 2 and 2 sheets per layer in part load 3 to 10.

Large sheets (13 units): 10 large sheets shall be placed in layer number 2 in part load 1–10. The remaining 3 large sheets are placed in layer number 4 and in part load 1–3. Small sheets with attached stain test strip (10 units) shall be placed in layer number 3 in part loads 1-10.

Thus the part load sorting will be according to the attached table.

Sorting	Sorting Load items (15 kg load)		Number of test load items in each part load											
layer		Part load number												
		1	2	3	4	5	6	7	8	9	10			
1	All small sheets without any attachment	3	3	2	2	2	2	2	2	2	2			
2	First row of large sheets (if any)	1	1	1	1	1	1	1	1	1	1			
3	The small sheets with stain test strips	1	1	1	1	1	1	1	1	1	1			
4	Second row of large sheets (if any)	1	1	1										

Table G.2 — Part load items for a 15 kg test load

The items shall be folded according to the scheme in G.2.2.1 - G.2.2.3.

The test load items shall be loaded according to G.4.3.

G.4.2.4 Example of part load compositions

Examples of part load compositions for some test load masses can be found in Table G.3. to G.6.

Table G.3 — Part load items for a 5 kg test load

Order of	Sorting		Number of test load items in each part load									
loading	layer	Load items (5 kg load)	Part load number									
			1	2	3	4	5					
1	1	All small sheets	3	3	2	2	2					
2	2	First row of large sheets (if any)	1	1	1	0	0					
3	3	The small sheets with stain test strips	1	1	1	1	1					
4	4	Second row of large sheets (if any)	0	0	0	0	0					

Table	G 4 —	Part load	items	for a	10	ka	test	load
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Order of Sorting			Number of test load items in each part load										
		Load items (10 kg load)	Part load number										
J	,		1	2	3	4	5	6	7	8	9	10	
1	1	All small sheets	3	3	3	3	2	2	2	2	2	2	
2	2	First row of large sheets (if any)	1	1	1	1	1	1	0	0	0	0	
3	3	The small sheets with stain test strips	1	1	1	1	1	1	1	1	1	1	
4	4	Second row of large sheets (if any)	0	0	0	0	0	0	0	0	0	0	

			Number of test load items in each part load											
Order of loading	Sorting laver	Load items (20 kg load)	Part load number											
g	,		1	2	3	4	5	6	7	8	9	10		
1	1	All small sheets	3	2	2	2	2	2	2	2	2	2		
2	2	First row of large sheets (if any)	1	1	1	1	1	1	1	1	1	1		
3	3	The small sheets with stain test strips	1	1	1	1	1	1	1	1	1	1		
4	4	Second row of large sheets (if any)	1	1	1	1	1	1	1	1	1	1		

Table G.5 — Part load items for a 20 kg test load

Table G.6 — Part load items for a 100 kg test load

Order of Sorting			Number of test load items in each part load										
		Load items (100 kg load)		Part load number									
			1	2	3	4	5	6	7	8	9	10	
1	1	All small sheets	3	3	3	3	2	2	2	2	2	2	
2	2	First row of large sheets (if any)	7	7	7	7	7	7	6	6	6	6	
3	3	The small sheets with stain test strips	1	1	1	1	1	1	1	1	1	1	
4	4	Second row of large sheets (if any)	6	6	6	6	6	6	6	6	6	6	

G.4.2.5 Part load items for loads sizes not shown in Table G.2 to G.6

For **test load** sizes not shown in Table G.2 to G.6 select the correct number of **test load** items from Table 3 or calculate the correct number from formula in G.8. Sort the part loads according to Table G.1 and sorting rules in G.4.2.2.

G.4.3 Loading the horizontal axis machines

Load the sorted part loads into the machine starting with part load number 1. Within a part load the items shall be loaded starting with layer number 1.

All items shall be folded according to G.2.2.1 to G.2.2.3.

Place each layer of a part load horizontally in the drum. If a part load not is filling the drum horizontally continue with the first layer of next part load before placing the **test load** items on top of each other. For large machines be sure to keep the load within the drum horizontal and if necessary place two layers beside each other in order to fill the drum depth. Figure G.8 shows in a schematic way how the different part loads can be placed within a large **washing machine** drum.



Figure G.8 — Schematic view of part loads within a large drum

G.5 Loading requirements for vertical axis washing machines

G.5.1 General loading directions

Vertical axis washing machines shall be loaded in layers from bottom to top in the same way as horizontal axis machines.

G.5.2 Vertical axis washing machine: loading step by step

The loading of vertical axis machines shall be done in the same way as for horizontal axis machines. Loading shall start with items from part load number 1 and layer number 1. Place the load items folded according to G.2.2.1 to G.2.2.3 horizontally in the drum. Start from the bottom of the drum and go clockwise round and distribute the load items evenly into the drum.

G.6 Loading of multi compartment machines

G.6.1 General loading information

Washing machines with multiple of wash compartments like **Pullman** and **Y-pocket machines** shall be loaded in the same way as for single compartment machines.

G.6.2 Loading procedure

Calculate the number of **test load** items in the same way as for horizontal axis machines according to Table 2 and 3 and sub-clauses G.2.2.1 to G.2.2.3 and divide the part loads as equal as possible between the wash compartments.

G.7 Performance testing with loads other than a full load — General information

This European Standard also permits performance testing with loads other than **rated capacity test loads**. The **test load** items shall be selected from Tables 2 and 3 or from calculations shown in G.8 using the reduced load as the base for the number of **test load** items. (Example: 40 kg machine: Load to be tested 3/4 of **rated capacity**. Select or calculate the number of **test load** item at $3/4 \times 40 \text{ kg} = 30 \text{ kg}$.)

G.8 Calculation of the composition of test load items for load sizes above not shown in the Table 3

G.8.1 General

If a **test series** shall be performed with a **test load mass** not in the 0,5 kg intervals (between 2 and 10 kg or in the 1 kg interval (10 kg and up) select the **test load** items according to the nearest of the 0,5 kg loads (interval 2 to 10 kg) or 1 kg loads (10 kg and up) and add or subtract small sheets until the desired **test load** is achieved.

If the composition of the **test load** cannot be found in Table 3 the composition of the number of small and large sheets can be calculated according to the formula shown in G.8.2.

G.8.2 Calculation of the load composition is done according to following formula:

Calculations of number of small sheets with attached soil test strip:

For test loads from 2 kg up to 10 kg:

Number of small sheets with attached stain test strip $(X_{S+ST}) = Integer(M_T + 0.5)$

For test loads 10 kg and above:

Number of small sheets with attached stain test strip $(X_{S+ST}) = 10$

Calculation of fixed number of small sheets (without attached stain test strip):

Fixed number of small sheets $(X_{SF}) = Integer(1, 5 \cdot X_{S+ST})$

Calculation of number of large sheets:

Number of large sheets
$$(X_L) = Integer\left(\frac{M_T - M_{S+ST} \cdot X_{S+ST} - M_S \cdot X_{SF} - M_L}{M_L}\right)$$

Calculation of additional number of small sheets (without attached stain test strip): *Number of additional small sheets*

$$(X_A) = Integer\left(\frac{M_T + \mathbf{0}, \mathbf{5} \cdot M_S - M_{S+ST} \cdot X_{S+ST} - M_S \cdot X_{SF} - M_L \cdot X_L}{M_S}\right)$$

Calculation of total number to small sheets

Number of small sheets $(X_S) = X_{SF} + X_A$

where:

M_T	is the total test load mass (kg);
M_S	is the mass of a small sheet (kg);
M_{ST}	is the mass of a stain test strip (kg);
M_{S+ST}	is the mass of a small sheet with a stain test strip attached (kg);
M_L	is the mass of a large sheet (kg);
X _S	is number of small sheets;
X_{S+ST}	is number of small sheets with stain test strips attached;
X_{SF}	is fixed number of small sheets;

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