



FÉDÉRATION EUROPÉENNE DE LA MANUTENTION

SECTION II

CONTINUOUS HANDLING

FEM

2 272

DESCRIPTION OF UNIT LOADS

PLASTIC BOXES

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PRELIMINARY REMARK

For each installation of continuous handling equipment for unit loads, the characteristics of the goods to be conveyed are important for its proper functioning, being part of the system. It matters therefore to provide a precise description of the product to be conveyed as early as the planning phase. The necessary indications and properties to be mentioned are contained in the International Standard ISO 3569.

Section II "Continuous Handling Equipment" of FEM (Fédération Européenne de la Manutention) presents hereunder one of a series of documents giving complementary information concerning a group of products to be conveyed and provide the user of continuous handling equipment to understand why it is necessary to supply such detailed information and what consequences can be expected in using the equipment for a unit load not foreseen, especially since the user might encounter a problem of such nature for the first time.

1 GENERAL

Usually, plastic boxes are easy to convey, even with the simplest conveyors. The advantage of such simple conveyors lies in their low price – their disadvantage in their sensitiveness in handling unit loads which deviate from the ideal. In that respect, the surface directly in contact with the conveyor is of particular importance. The solutions where even considerable deviations from this ideal product do not cause any problems are very costly.

The plastic boxes are often specially bought for use in a part of a handling system and for that reason they should be particularly well designed for this. If other boxes should be bought later it is important that these boxes don't have other properties than the original ones. It should also be noted that the fact that the boxes circulate through the handling system results in the wear of the boxes and very special attention should be devoted to this (see § 8).

A precise description of the kind of box provided in the handling system has, in principle, to make reference to the ISO 3569 Standard.

The best compromise in a particular case takes into account :

- the type of the expected deviations
- their frequency
- the type of the resulting problem
- the consequences of a malfunction
- the expense necessary to correct the malfunction
- the cost of the installation
- the operating costs,

and can only be obtained by cooperation between the manufacturer and the user with a complete exchange of information necessary.

The properties are discussed in the sequence indicated in the ISO 3569 Standard.

2 SHAPE

Normally there are two different types of plastic boxes, one has straight sides and the other has tapered sides. Box dimensions indicated as length (L), width (B) and height (H).



STRAIGHT SIDED BOX
WITHOUT FLANGE



CONICAL BOX
WITH FLANGE

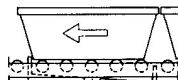
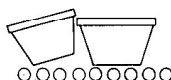
2.1 Geometrical design

2.1.1 Straight sided box

- not possible to stack one inside the other and therefore need larger storage spacing
- difficult to separate on roller conveyors
- has often no tendency to climb
- with flange some tendency to climb
- can also be hooked to each other.

2.1.2 Conical box

- has often tendency to climb
- easy to pile and need therefore less storage spacing
- easy to separate on roller conveyors.



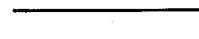
2.1.3 Protruding parts

Direction signal pins, handles, label holders, lids or over-flowing loads can cause problem at the accumulation areas or at the exchange points of the transport system.

2.2 Side construction

2.2.1 Flat sided

- easy to guide.



2.2.2 Double walled

- Equivalent to flat sided
- More rigid sides are recommended.

2.2.3 Sides designed with profile

- Not suitable if there are transverse or longitudinal edges which can get wedged to divider guide. Special attention to wheel in the divider guide.
- Rounded corners on the container are preferable.



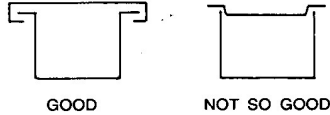
2.2.4 Other influences

Special attention should be paid to reflection caused by labels, trade names, signs, etc... which may disturb the function of the photo-electric cells.

2.3 Closing devices

2.3.1 Cover

- ought to be fixed on the box, as a cover lightly placed on the box may fly away or come off suddenly and cause problems.
- it should also be remarked that a box without cover has flat smooth sides, but when it is fitted with a cover it may have an overhanging edge.



2.3.2 Strapping

- The band is outside the box (compare with cardboard where it collapses) and therefore gives irregularity in the transport surface.

2.3.3 Clips

- May get caught to each other.
- May fall off the box.

2.3.4 Steel wire seal

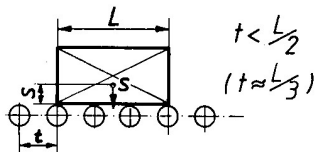
- May get caught in other boxes or in the conveyor.

3 ALIGNMENT

If the square is ideal, only the width of the handling equipment and the number of units that can be placed on a particular handling equipment will be influenced. The effects of deviations according to paragraphs 2.1.3 and 2.2.3 is obvious, but in case of an alternate alignment, it can vary.

4 POSITION OF THE CENTRE OF GRAVITY

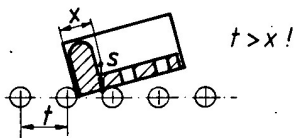
The necessary indications pertaining to the position of the centre of gravity are contained in ISO 3569, § 4.2.



4.1 Eccentric position of the centre of gravity

What will happen if the centre of gravity is offset?

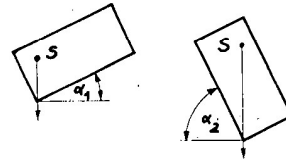
- 4.1.1 A smaller pitch will be required for roller conveyors, wheel conveyors, and transfer points.



- 4.1.2 The triggering of intermediate rollers or similar equipment is no longer reliable, since the load bearing at the end is not sufficient.

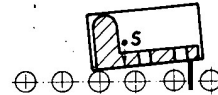


- 4.1.3 The tipping angle differs between elevating and lowering.

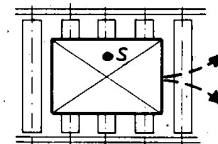


- 4.1.4 If the centre of gravity is displaced mainly toward the front, the conveyed loads have a tendency to rotate (especially when getting in contact with distribution arms or at transfer points including changes of direction).

- 4.1.5 If the centre of gravity is towards the rear, then it is easy to jump over stops.

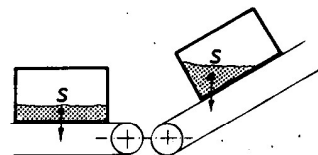


- 4.1.6 If the centre of gravity is displaced to the side, the load tends to turn uncontrollably.



4.2 Unstable centre of gravity

If the loose contents of the container can move out of place (e. g. loose sand, liquids, loose parts etc.) the behaviour described under § 4.1 will be modified depending on the slope of the conveyor; if the contents are not easy to move and if, for instance the product is brought to a different position by shocks or vibration, the centre of gravity will move after an indefinable period.



5 MATERIAL

5.1 General

A precise knowledge of the material in contact with the conveyor is extremely important. Its strength, its friction coefficient (which in some case may vary according to the load), its resistance to abrasion, its resistance to the conditions of the environment such as dampness and the modifications of its properties due to the influence of the environment, are so important that it is not enough to speak merely of "a plastic box".

5.2 The physical and chemical qualities of different plastics

There are many varieties of plastics and those mentioned on this table are just the most current ones.

MATERIAL	QUALITY					
	Temp. max. °C	Temp. min. °C	Impact resist.	Chem. resist.	Density	Electrostatic sensit.
Polythene	95	- 40	good	good	0,91 0,96	yes
Polypropylene	95-100	- 5	not so good	not so good	0,90- 0,91	yes
Polystyrene	60-80	- 5	bad	bad	1,04- 1,06	yes
Polyester glass fibre reinforced	100-110	- 20	average	good	1,5 2,5	less sensitive

The values are given just as an indication. Precise values should be given by the plastic manufacturer.