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# INTERNATIONAL STANDARD



# 1074

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Counterbalanced lift trucks — Stability — Basic tests

*Chariots élévateurs travaillant en porte-à-faux — Stabilité — Essais de base*

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## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

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.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 110 has reviewed ISO Recommendation R 1074 and found it technically suitable for transformation. International Standard ISO 1074 therefore replaces ISO Recommendation R 1074-1969 to which it is technically identical.

ISO Recommendation R 1074 was approved by the Member Bodies of the following countries :

Australia	India	Switzerland
Belgium	Ireland	Turkey
Bulgaria	Israel	United Kingdom
Czechoslovakia	Japan	U.S.A.
Egypt, Arab Rep. of	Netherlands	U.S.S.R.
France	Poland	Yugoslavia
Germany	South Africa, Rep. of	
Greece	Sweden	

No Member Body expressed disapproval of the Recommendation.

The Member Bodies of the following countries disapproved the transformation of ISO/R 1074 into an International Standard :

Germany  
United Kingdom

# Counterbalanced lift trucks – Stability – Basic tests

## 1 SCOPE

This International Standard specifies the basic tests for the verification of stability of counterbalanced lift trucks.

## 2 FIELD OF APPLICATION

This International Standard applies to counterbalanced fork lift trucks with tiltable or non-tiltable masts, up to and including 10 000 kg or 20 000 lb manufacturer's rated capacity.<sup>1)</sup>

It also applies to lift trucks operating under the same conditions but having ancillary attachments other than forks.

It applies neither to trucks with retractable devices (mast or fork) nor to lift trucks when adapted for use as mobile cranes.

## 3 CONDITIONS OF VALIDITY

### 3.1 Normal operating conditions

The basic tests specified in this International Standard ensure that the type of lift truck under consideration has satisfactory minimum stability under standardized operating conditions defined as follows :

- a) operating on level surfaces;
- b) travelling with the load in the lowered position;
- c) stacking with the mast vertical.

### 3.2 Other conditions

When the operating conditions differ from those stated in 3.1 (as, for example, where the use of forward tilt is required when stacking full load at maximum lift height), and until the publication of the relevant International Standards<sup>2)</sup>, it is necessary, to meet the test values agreed upon between the interested parties, to use either

- a) a truck with a higher rated capacity, or
- b) a truck having design modifications.

In both cases, the stability conditions shall be equivalent to those obtained during the four tests specified below for normal operating conditions.

### 3.3 Additional tests

If any tests other than the four tests specified below are required, and until the publication of the relevant International Standards<sup>3)</sup>, the details should be agreed upon between the interested parties.

## 4 STABILITY TESTS FOR FORK TRUCKS

### 4.1 Specification of tests

The stability of fork trucks shall be verified by four tests carried out by means of a platform which can tilt about one side.

The tests are carried out on an operational truck but without the operator.

A fork truck being tested for stability is placed on the platform which is initially horizontal, in the conditions specified in 4.2 and, successively, in each of the four positions described in clause 6, which correspond respectively to the four tests.

In each of these tests the platform is tilted to the slope indicated in the table.

The truck is considered stable if it passes all four tests without overturning.

In the case of test No. 4, it is permissible for one of the front wheels to lose contact with the platform and, in the case of three-wheeled trucks, for the outer extremity of the chassis to come into contact with the platform.

### 4.2 Conditions for carrying out the tests

#### 4.2.1 Position of the truck on the platform

For tests No. 1 and 2 the truck shall be placed on the platform in such a manner that the axes of its wheels are

1) See ISO/R 1214, *Counterbalanced fork lift trucks – Rated capacity*.

2) The tests for the verification of the stability of lift trucks when the operating conditions differ from the standardized conditions (see 3.1) are at present under consideration.

3) The additional tests which could be required are at present under consideration.

parallel to the axis of tilting XY of the platform (see figure 6).

For tests No. 3 and 4 the truck shall be placed on the platform in a turning position, and in such a manner that the line MN is parallel to the axis of tilting of the platform. Moreover, the steering wheel nearer to this axis should be parallel with it (see figures 7, 8, and 9).

Point N is the centre of the tread of the front wheel nearer to the axis of tilting XY on the platform (see figures 7, 8 and 9).

Point M is defined as follows :

- a) for trucks having a steering axle : the projection on the platform of the intersection of the axis of the truck with the axis of this axle (see figure 7);
- b) for trucks steering by means of a single swivelling wheel : the centre of the tread of the steering wheel on the platform (see figure 8);
- c) for trucks steering by means of twin swivelling wheels : the centre of the tread of the steering wheel nearer to the axis of tilting XY on the platform (see figure 9).

**4.2.2 Test load**

The test load shall be such that its action corresponds to that of a homogeneous cube the mass of which is equal to the maximum load  $Q$  and the dimensions of which are equal to twice the load centre distance  $D$ , the values of  $Q$  and  $D$  corresponding to the manufacturer's rated capacity of the truck<sup>1)</sup> (see figure 1).

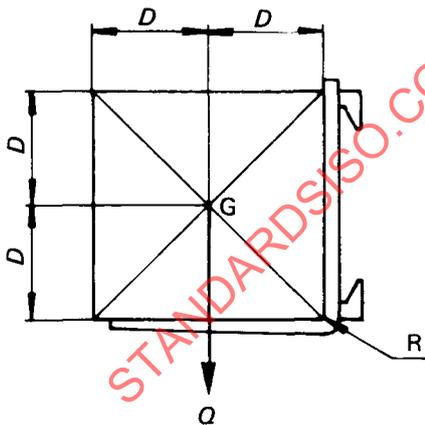


FIGURE 1

The centre of gravity G of the test load shall be located in the longitudinal plane of symmetry AB of the truck (see figures 6, 7, 8 and 9).

**4.2.3 Immobilisation of the truck**

The truck shall be immobilised only by the braking device and not by chocks between the wheels and the platform or

other external devices. If the hand-brake of a truck is not sufficient, the foot-brake may be locked in its braking position.

The coefficient of friction of the platform surface may be increased if necessary by an appropriate friction-increasing material.

**4.2.4 Verification of the vertical position of the mast**

Before proceeding with test No. 1, the vertical position of the mast shall be verified by means of a plumb-line.

The plumb-line hanging from R (inner corner of the fork, see figure 1) shall indicate the same point in the horizontal plane for two lift heights of load : the height 0,30 m (12 in) and the maximum height.

Deviations shall be corrected by varying the tilt of the mast within the limits imposed by the design of the truck.

NOTE—This sub-clause does not apply to trucks with non-tiltable mast.

**4.2.5 Safety devices**

Special precautions should be taken to prevent the overturning of the truck or the displacement of the test load during the course of the tests. If the device for preventing the total overturning of the truck consists of a lashing, this shall not be tight and shall be sufficiently supple to impose no appreciable restriction on the truck until the overturning movement commences.

For tests No. 1 and 3 (load at maximum lift height), the test load shall be either

- a) placed on the fork and held at the upper edge by a safety sling which is supple and kept slackened, or
- b) suspended near the ground from an appropriate support placed on the fork in such a manner that the seat of the hook of the support is at the point where the centre of gravity G of the test load would be located if the test load were to be placed on the fork.

**5 STABILITY TESTS FOR TRUCKS WITH OTHER ATTACHMENTS**

Lift trucks furnished with attachments other than forks shall be subjected to the same stability tests, except in cases where the attachment can bring the centre of gravity of the load out of the plane of symmetry AB of the truck.<sup>2)</sup>

For the verification of the vertical position of the mast, a reference point R shall be suitably chosen, near to the fixing point of the attachment.

The test load, however, shall be the specified load at the specified distance indicated for the attachment when used on the truck being tested.

The lift height envisaged for tests No. 2 and 4 shall be measured between the platform and the underside of the load or of the attachment. Only the smaller of these heights is to be taken into consideration.

1) See ISO/R 1214.

2) The stability tests are under further consideration for lift trucks furnished with attachments which can bring the centre of gravity of the load out of the plane of symmetry of the truck.