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व्यापक परिचालन में मसौदा

प्रलेख प्रेषण सूचना

Ref	Date
टीईडी **22/** टी- 61	**02 07 2018**

परिवहन ट्रैक्टर, ट्रेलर और औद्योगिक ट्रक विषय समिति, **टीईडी 22**

क) परिवहन इंजीनियरिंग विभाग परिषद ।पंइविप। के सभी सदस्यों को

ख) परिवहन ट्रैक्टर, ट्रेलर और औद्योगिक ट्रक विषय समिति, टीईडी 22 के सभी सदस्यों को

ग) अन्य सभी रूचि रखने वाले निकाय

महोदय/ महोदया,

निम्नलिखित प्रलेख संलग्न हैं:

प्रलेख संख्या	विषय
TED 22 (12113) W	फार्कलिफ्ट ट्रकों के लिए स्वीकृति मानदंड (आईएस 10517 का पहला पुनरीक्षण)

कृप्या उपरोक्त मानक मसौदे का अवलोकन कर अपनी सम्मतियां यह बताते हुए भेजें, कि यदि अंतत: यह मानक राष्ट्रीय मानक के रूप में स्वीकृत हो जाए, तो इस पर अमल करने में आपके व्यवसाय अथवा कारोबार में क्या कठिनाइयां आ सकती है ।

सम्मति की अन्तिम तिथि : **02 09 2018**

सम्मति यदि कोई हो तो नीचे दिए गए प्रारूप में लिख कर, उपरिलिखित पते पर अधोहस्ताक्षरी को भेजें ।यदि कोई सम्मति प्राप्त नहीं होती हैं अथवा सम्मति में केवल भाषा संबधी त्रुटि हुई तो उपरोक्त प्रलेख को यथावत अंतिम रूप दिया जायेगा । यदि कोई सम्मति तकनीकी प्रकृति की हुई तो विषय समिति के अध्यक्ष के परामर्श से अथवा उनकी इच्छा पर आगे की कार्यवाही के लिए विषय समिति को भेजे जाने के बाद प्रलेख को अंतिम रूप दे दिया जाएगा ।

यह प्रलेख भारतीय मानक ब्यूरो की वैबसाइट www@bis.org.in पर भी उपलब्ध है ।

धन्यवाद

भवदीय

(आर आर सिंह)
वैज्ञानिक ई एवं प्रमुख
परिवहन इंजिनीयरिंग विभाग

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DRAFT IN WIDE CIRCULATION

DOCUMENT DESPATCH ADVICE

Ref	Date
TED 22/ T-61	**02 07 2018**

Transport Tractors, Trailers and Industrial Trucks Sectional Committee, TED 22

1) All Members of Transport Engineering Division Council, TEDC

2) All Members of Transport tractors, Trailers and Industrial Trucks Sectional Committee, TED 22

3) All Others Interested.

Dear Sir/ Madam,

Please find enclosed the following draft standard:

Document No.	Title
TED 22 (12113) W	Acceptance Criteria for Forklift Trucks *(First Revision of IS 10517)*

Kindly examine this draft standard and forward your views stating any difficulty which you are likely to experience in your business or profession, if this is finally adopted as National Standard.
Last date for comments : **02 09 2018**
Comments, if any, may please be made in the format given below and mailed to the undersigned at the above address.

In case no comments are received or comments received are of editorial nature, you will kindly permit us to presume your approval for the above document as finalized. However, in case of comments of technical in nature are received then it may be finalized either in consultation with the Chairman, Sectional Committee or referred to the sectional committee for further necessary action if so desired by the Chairman, Sectional Committee.

The document is also hosted on BIS website www.bis.org.in

Thanking you,

Yours faithfully,

(R R Singh)
Scientist 'E' & Head
Transport Engineering Department
Bureau of Indian Standards.

Encl: As above

Draft Indian Standard

ACCEPTANCE CRITERIA FOR FORKLIFT TRUCKS

(First Revision of IS 10517)

ICS 53.060

Last date for receipt of comments is 02.09.2018

FOREWORD

This draft Indian Standard (First Revision) shall be adopted by the Bureau of Indian Standards on the recommendation of the Transport Tractors, Trailers and Industrial Trucks Sectional Committee and approval of the Transport Engineering Division Council.

This Indian Standard was first adopted by the Indian Standards Institution on 30 March 1983.

This standard has been taken up for revision as there are updates in reference standards for various tests and requirements with the advent in technology.In this revision latest versions of referred IS/ISO Standards have been incorporated.
In this revision Amendment No.1 issued to this standard has been incorporated and following requirements have been added/deleted or changed :

a) Test certificates from manufacturer for battery , battery charger and AC motor has been made to be required as per AIS , IEC and EN standards
b) Test certificate requirement from manufacture for AC motor has also been included in this revision
c) The service brake performance test requirement has been changed and to be checked as per IS 9701.
d) Performance test requirement for fork testing has also been added.
e) AC motor has also been included as prime mover

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2005 ‘Rules for rounding off numerical values (fourth revision)’. The number of significant places retained in the rounded off value should be the same as that of specified value in this standard.

Draft Indian Standard

ACCEPTANCE CRITERIA FOR FORKLIFT TRUCKS
(First Revision)

1 SCOPE

1.1 This standard specifies the guidelines on the basis of which forklift truck should be tested.

2 REFERENCES

The standards/documents listed below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid . All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards/documents listed below.

IS	*Title*
1271 : 2012	Electrical Insulation-thermal Evaluation and Designation
4357 : 2017	Industrial Trucks ─ Counterbalanced Trucks with Mast ─ Verification of Stability (Third Revision)
5154 (Part 1) : 2013	Lead - Acid Traction Batteries Part 1 General Requirements and Methods of Test
5154 (Part 2) : 2013	Lead - Acid Traction Batteries Part 2 Dimensions of Cell and Terminals and Marking of Polarity on Cells
6876*	Fork-lift trucks ─ Fork arms ─ Technical Characteristics and Testing
7621**	Industrial Trucks ─ Overhead Guards ─ Specification and Testing
7553 : 2003	Control Symbols for Powered Industrial Trucks
9701 : 2001	Powered Industrial Trucks and Tractors ─ Brake performance and Components Strength
10000 (Part 12) : 1980	Methods of Tests for Internal Combustion Engines - Part XII : Specimen Test Certificates
BS 1727 : 1987	Specification for Motors for battery operated Vehicles

*[under revision vide Doc.No. TED 22(11511) W]

**[under revision vide Doc. no.TED 22 (1007)F]

EN 12895 : 2015	Industrial Trucks – Electromagnetic Compability
EN 60034 -14 : 2007	Rotating Electrical Machines – Part 14 : Mechanical Vibration of Certain Machines with shaft heights 56 mmm and higher – Measurement, Evaluation and Limits of Vibration Severity
EN 60204-1 : 2016	Safety of Machinery, Electrical Equipment of Machines- Part 1: General Requirements
IEC 61851 -21-1 : 2017	Electric vehicle conductive charging system - Part 21-1 Electric vehicle on-board charger EMC requirements
AIS 048 – 2009	Battery- operated Vehicles – Safety Requirements of Traction Batteries
AIS 138 – Part 1 – 2017	Electric Vehicles Conductive AC Charging System
AIS 138 – Part 2 – 2017	Electric Vehicles Conductive DC Charging System

DOC.NO.: MoRTH/CMVR/TAP-115-116 Issue No. 4

3 TESTING

3.1 Visual Examination

3.1.1 Each forklift shall be checked for its general workmanship.

3.1.2 It shall be seen that operator's seat isadjustable forward and backward to ensure ease of operation of various controls.

3.1.3 It shall be checked that the control symbols are properly shown in accordance with IS 7553

3.1.4 It shall be checked that the capacity chart is displayed in such a way that it is visible to the operator.

3.2 Dimensional Checks — The following dimensions shall be checked as specified by the manufacturer:

a) Fork length,
b) Maximum forks spread,
c) Overall length,
d) Overall width,
e) Overall height raised
f) Collapsed height,
g) Free lift,
h) Maximum fork height,
j) Minimum clearance from ground,
k) Wheel base,
m) Tyre size,
n) Mass of the truck, and
p) Mast tilt forward and backward

3.3 Test Certificate – The following shall be accepted on test certificate:

a) *IC Engine* – As per manufacturer's test certificate in accordance with IS: 10000 (Part XII) Or MoRTH/CMVR/TAP-115/116 Issue No.4

b) *DC Motor* – As per manufacturer's test certificate in accordance with the tests given in Annex A.

c) *Battery* – As per manufacturer's test certificate in accordance with IS: 5154 (Part 1 and Part 2) or AIS-048.

d) *Battery Charger* – As per manufacturer's test certificate in accordance with AIS 138 (Part 1) and AIS-138 (Part 2) as applicable or IEC 61851-21-1

e) *AC Motor* – As per manufacturer's test certificate in accordance with the EN 60204 (Parts 1 to 9), EN 60034-14 and EN 12895

3.4 Performance Test of Forklift Truck — Each truck shall be tested as follows to ensure satisfactory performance:

a) *Capacity Test* — The truck shall be driven with rated pay load at the speed specified by the manufacturer.

b) *Speed Test* — The truck shall be run with/without load at the corresponding speed specified by the manufacturer.The admissible variation in speed shall be within 10 percent

c) *Turning Radius* —The truck shall be checked for turning radius. Turning circle radius on both directions shall be checked and it shall be within 5 percent.

d) *Lifting and Lowering Speed* — Lifting and lowering speed with/without rated load on the trucks shall be checked against the values specified by the manufacturer and shall be within 12 percent.

e) *Gradient Test* — The gradeability of the truck shall be such that it can stop and start on specified gradient.

f) Brake *test* — The service brake performance shall be checked in accordance with IS 9701 and the parking brake shall be checked in accordance with 4 of IS 9701

g) *Fork Testing* — The fork testing shall be carried out in accordance with IS: 6876 [under revision vide Doc.No. TED 22(11511) W]

3.5 Stability and Overhead Guard Test

3.5.1 One truck out of twenty trucks supplied by the firm against various orders shall be tested subject to no change in design. The stability tests no.1, 2, 3 and 4 of IS 4357 shall be carried out in accordance with conditions laid down in IS 4357

3.5.2 Whenever the overhead guard is introduced or a design change is carried out in the existing overhead guard, the manufacturer shall test the overhead guard as per IS 7621 [under revision vide Doc. no.TED 22 (1007)F]

3.6 Name Plate Details

a) *Forklift Truck* — The name plate shall be checked to see that it is fitted at suitable place on the truck showing the following details:

i) Manufacturer's name and registered trade-mark, if any;

ii) Model;
iii) Serial number;
iv) Nomenclature;
v) Load capacity;
vi) Year of manufacture;
vii) Maximum capacity with attachments, if any; and
viii) Maximum fork height.

b) *Prime Mover*—Details of the prime mover shall be shown as specified below:

In Case of Engine	*In Case of DC/AC Motor*
Manufacturer's name	Manufacturer's name
	Type : AC/DC
Model	Model
Serial number	Serial number
Kilo Watt	kilo Watt
RPM	RPM
	Volt

c) *Instruction plate* – A suitable instruction plate, indicating precautions during operation and special important procedures to be observed in operating the truck shall be provided in a prominent place on the truck

ANNEX- A

[*Clause* 2.3 (b)]

TESTING OF DC MOTOR

A-0 The following tests shall be carried out on a DC motor, alternatively DC motors can be tested as per EN 1175 or ISO 2138 or BS 1727.

A-1 TYPE TESTS

a) Rated Output Test - The machine shall be tested at all the rated quantities assigned to it by the manufacturer and the results shall comply with the following requirements:

1) When operating under rated quantity conditions on test the temperature rise above the cooling air temperature of parts of machines shall not exceed the values given in Table 1.

TABLE 1 TEMPERATURE RISE

(*Clauses* A-1.1, A-1.4 *and* 2)

Part	Method of Measurement	Temperature rise, °C			
		Nominal Class E Insulation	Nominal Class B Insulation	Nominal Class F Insulation	Nominal Class H Insulation
(1)	(2)	(3)	(4)	(5)	(6)
Armature Winding	Resistance	105	120	140	160
Field Winding	Resistance	115	130	155	180
Commutator	Electric thermometer	105	115	115	115

NOTE ─ The Classes B, E, F and H insulation shall be as prescribed in IS 1271 : 2012. Classification of insulating materials for electrical machinery and apparatus in relation to their thermal stability in service.

2) If the actual air temperature during a test lies between 10°C and 40°C no correction is required to the value of temperature rise. If the temperature of the cooling air lies outside these limits special arrangements may be agreed to between the purchaser and the manufacture.

3) Tests shall be carried out with the motor arranged as in service but not necessarily fitted with gears, and without any cooling corresponding to that produced by the motion of the vehicle. For separately cooled motors each test shall be carried out with the flow of air (in cubic metres per minute) on which the particular rating is based.

4) In the case of self-cooled motors in which the air is drawn through ducting, filters or other parts which may restrict the flow of air in service, tests shall be made, where possible, with such parts in place. Alternatively, for the test, an artificial restriction may be provided at the motor inlet to produce an additional resistance to the flow of air, equivalent to the resistance of such parts when in place. Where air is to be drawn from the interior of the vehicle, no account shall be taken of the possible restriction of the entry of air into the vehicle.

5) In the case of machine operating for long periods at altitudes of over 1000 metres, it is necessary to take account of the less efficient cooling compared with that at sea level.

6) The effect of the lower density of air at high altitude depends on the design and construction of the particular machine concerned, but for machines of normal proportions and cooling methods it can be considered that the temperature rise at a given rating will increase by 1 percent for each - 100 metres above sea level. Account is not taken of this increase in the case of machines operating at altitudes of under l 000 metres.

b) Characteristic Curves and Efficiency Tests - These shall be carried out with the machine windings as near to the appropriate standard temperature of reference as is practicable. Reading shall be taken at a sufficient number of current values to enable the characteristic curves to be verified over the whole range of operation of the machine. For reversible machines, tests shall be carried out in both directions of rotation. The results shall be in accordance with the following:

1) The speed of a motor running in the stated direction of rotation or in either direction of rotation if reversible, shall not deviate from that shown on the characteristic curves by more than the tolerance specified in col 2 of Table 2 .

TABLE 2 TOLERANCE ON SPEED

OUTPUT IN kW PER 1000 REV/MIN AT THE RATED CURRENT	**TOLERANCE (PERCENT)**	
(1)	(2)	(3)
Below 3	±10	±7.5
Not less than 3, but below 10	±7.5	±5
10 and above	±6	±4.5

2) The tolerances given in col 2 shall not apply to a speed higher than that corresponding

to the current at half the declared output or to a speed lower than that corresponding to the current at twice the declared output. Notwithstanding the above, the tolerance permitted at the declared rated current shall not exceed that shown in col 3 of Table 2.

3) If more than one motor is used, then the speed tolerances given in Table 2 may not ensure satisfactory load sharing, in which case closer tolerances shall be agreed to between the purchaser and the manufacturer.

4) The tolerance on the declared efficiency curve at any point between one half and twice the one hour rated current shall not exceed 1/8 (100-y), where y is the declared efficiency expressed as a percentage.

c) Commutation Tests - These should be carried out at currents corresponding to a number of points selected to cover the full range of operation of the machine, including regenerative and resistive braking conditions where applicable. The result shall be in accordance with the following:

1) Commutation tests shall be made following the temperature tests when the machine is hot and shall be maintained for 30 seconds.

2) A reversible motor shall operate in each direction of rotation with a fixed brush setting throughout the declared range. It shall work without injurious sparking and without injury to the surface of the commutator or to the brushes at any point on the characteristic between the maximum service speed and the maximum current or the current corresponding to the maximum torque in service, if this is specified by the purchaser.

3) For a unidirectional motor, the standard of commutation in the declared direction shall be as for a reversible motor. In the reverse direction of rotation a lower standard of commutation is permissible but no permanent injury to either commutator or brushes shall be caused by running at half rated voltage at any current between the limiting values used for the normal rotation test.

4) Unidirectional machines, which in service cannot operate in the reverse direction shall be tested with normal rotation only.

d) **Overloads Test —** Where specified, motors used for propelling the vehicle shall, immediately after completion of the rated output test, be capable of sustaining a 200 percent increase of torque over its rated kilo-watt output for a period of 5 minutes. The temperature rise of the motor at the end of the overload test shall not exceed that permitted by the insulation class of the motor in accordance with Table 1.

e) Over speed Test — Every motor shall withstand for 2 minutes when hot a rotational speed equal to 1·2 times the maximum service speed.

NOTE — Maximum service speed of a motor is the rotational speed corresponding to the maximum speed met in service which is specified by the purchaser.

f) Insulation Tests — Insulation tests shall be carried out on all motors at the conclusion of the other tests, including the overspeed test, whilst the machines are still hot. They shall consist of the application of 1000 Vrms for 1 minute between all windings and the frame or core and also between field winding sections when these are separately insulated. The voltage shall be of approximately sinusoidal wave form of any convenient frequency between 25Hz and 100 Hz and shall be measured on the output side of the testing transformer.

g) The insulation resistance to earth of any combination of components or circuits within the

motor should exceed 2 Megaohms when tested with a 500 V insulation tester at the conclusion of all other tests.

A-2. ROUTINE TESTS

a) Soundness and Characteristic - Motors shall be run for sufficient time to attain the temperatures specified in A-2-a)-1) to demonstrate electrical and mechanical soundness. The speed characteristics of motors shall be checked when hot and within the limits given in col 2 of Table 2.

1) The standard temperature of the windings used for plotting declared characteristic curves shall be 75°C when Class E insulation is employed and shall be 110°C for Classes B, F or H insulation.

2) The characteristic curves shall be plotted at the effective voltage with the value of armature current plotted on the horizontal axis and with the motor speed (rev/min), the output (kW), the motor torque (Nm) and the motor efficiency plotted on the vertical axis.

NOTE — No efficiency measurements are required for routine tests.

b) Commutation - Each machine shall be tested with minimum field strength at the maximum speed shown on the characteristics at the one hour rated current and the maximum current shown on the characteristic for the drive motor. The pump motor shall be tested at the rated current and the maximum current shown on the characteristic for a short term duration as specified by the manufacturer. The result shall be in accordance with A-1.3.

c) Overspeed and Insulation - These shall be carried out in accordance with A-1-(e) and A-1-(f)

FORMAT FOR SENDING COMMENTS ON
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[Please use A4 size paper only and type within fields indicated. Comments on each clause/sub-clause be started on a fresh paper. Information in column 3 should include reasons for the comments and suggestions for modified wording of the clause when the existing text is found not acceptable. Adherence to this format facilitates Secretariat's work]

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