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व्यापक परिचालन में मसौदा

प्रलेख प्रेषण सूचना

| Ref | Date |
|---|---|
| टीईडी **27/** टी- **10** | **08 08 2018** |

**विद्युत एवं हाइब्रिड वाहन विषय समिति, टीईडी** 27

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

ख) विद्युत एवं हाइब्रिड वाहन विषय समिति**,** टीईडी **27,** के सभी सदस्यों को

ग) अन्य सभी रूचि रखने वाले निकाय

महोदय/ महोदया**,**

निम्नलिखित प्रलेख संलग्न हैं:

| प्रलेख संख्या | विषय |
|---|---|
| **TED 27 (12996) W** | विद्युत पावरट्रेन वाहन — रेंज मापने की विधि (AIS 040:2015 का अभिन्न अभिग्रहण ) |

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 **: 08 10 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

संलग्न: उपरिलिखित

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**DRAFT IN WIDE CIRCULATION**

**DOCUMENT DESPATCH ADVICE**

| Ref | Date |
|---|---|
| **TED 27/ T-10** | **08 08 2018** |

**Electric and Hybrid Vehicles Sectional Committee, TED 27**

1) All Members of Transport Engineering Division Council, TEDC
2) All Members of Electric and Hybrid Vehicles Sectional Committee, TED 27
3) All Others Interested.

Dear Sir/ Madam,

Please find enclosed the following draft standard:

| Document No. | Title |
|---|---|
| TED 27 (12996) W | Electric Power Train Vehicles — Method of measuring the range (Identical adoption of AIS 040:2015) |

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 : **08 10 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

Encl: As above

## FORMAT FOR SENDING COMMENTS ON BIS DOCUMENTS

**(Please use A4 size sheet of paper only and type within fields indicated. Comments on each clauses/sub-clauses/table/fig. etc be started on a fresh box. Information in Column 4 should include reasons for the comments and suggestions for modified wording of the clauses when the existing text is found not acceptable. Adherence to this format facilitates Secretariat's work)**

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| Sl. No. | Clause/ Sub-clause/ para/ table/ fig. No. commented | Type of Comments (General/ Editorial/ Technical) | Justification | Proposed change |
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**Doc: TED 27 (12996) W**
**August 2018**

**For BIS Use Only**

Draft *Indian Standard*

# Electric Power Train Vehicles — Method of Measuring the Range

ICS 43.120



**Last date for receipt of comments is 08 10 2018**

**Electric and Hybrid Vehicles Sectional Committee, TED 27**

Foreword

This draft Indian Standard will be adopted by the Bureau of Indian Standards, after the draft is finalized by the Electric and Hybrid Vehicles Sectional Committee and approved by the Transport Engineering Division Council.

This standard prescribes the requirements for the measurement of range of battery operated vehicles. In the formulation of this standard considerable assistance has been drawn from:

AIS 040 (Rev 1):2015 Electric Power Train Vehicles – Method of measuring the range.

TED 27 (12990) W Electric Power Train Vehicles – Measurement of electrical energy consumption

AIS 049 : 2016 Electric Power Train Vehicles - CMVR Type Approval for Electric Power Train Vehicles

Central Motor Vehicles Rules, 1989 (as amended from time to time)

Doc No MoRTH/ TAP/ CMVR - 115/116 (Issue no 4)

The draft standard incorporates corrigendum 1 issued to AIS 040 in December 2017.

In case of any variance between the standard and Central Motor Vehicles Rules, 1989 (as amended from time to time), latter shall prevail. Following document may be referred for latest update on statutory requirements related to Battery Operated Vehicles.

*Central Motor Vehicles Rules*, 1989 (as amended from time to time)

The composition of the committee responsible for the formulation of this standard is given at annex A.

In reporting the results of a test or analysis made in accordance with this standard, is to be rounded off, it shall be done in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’.

**Electric Power Train Vehicles -**
**Method of Measuring the Range**
**(**Draft *Indian Standard***)**

## 1.0 SCOPE

This standard specifies the method for measurement of range expressed in km for L, M and N categories of Electric Power Train Vehicles.

## 2.0 REFERENCES

| | |
|---|---|
| 14272:2011 | Automotive vehicles — Types — Terminology |
| TED 27 (12990) W | Electric Power Train Vehicles – Measurement of electrical energy consumption |

## 3.0 DEFINITIONS

For the purpose of this standard the definitions given in document no TED 27 (12990) W in addition to definitions given in IS 14272 shall apply.

## 3.0 VEHICLE PREPARATION

Vehicle preparation shall be as per **4.0** of document no TED 27 (12990) W.

## 4.0 CLIMATE CONDITION

All the tests are conducted at a temperature of between 20 °C and 30 °C.

Note: If the ambient condition cannot be met at the time of the test, then based on mutual agreement between test agency and vehicle manufacturer, requirement of ambient temperature condition can be waived.

## 5.0 TEST PROCEDURE

### 5.1 Test Sequence

**5.1.1** The driving cycle shall be the Indian Driving Cycle (IDC) as given in annex B of document no TED 27 (12990) W for all L category vehicles.

**5.1.2** The driving cycle shall be Part-I of the modified Indian driving cycle as given in annex C of document no TED 27 (12990) W for M1, M2 (with GVW upto 3500 kg) and N category of vehicles.

The driving cycle shall be Delhi Driving Cycle as given in annex D of document no TED 27 (12990) W for M2 (with GVW above 3500 kg) and M3 category of vehicles.

**5.1.3** In cases where the vehicle does not reach the required acceleration during driving, the accelerator/speed control shall remain fully activated until the reference curve has been reached again

## 5.2 Power setting of the chassis dynamometer

The procedure prescribed in the document MoRTH/ TAP/ CMVR-115/116 (issue no 4) as amended from time to time shall be adopted.

## 5.3 Test Method

### 5.3.1 Principle

The test method described hereafter permits to measure the range of the Electric Power Train Vehicles expressed in km.

### 5.3.2

| Parameters, Units and Accuracy of Measurements Parameter | **Unit** | **Accuracy** | **Resolution** |
|---|---|---|---|
| Time | s | ± 0.1 s | 0.1 s |
| Distance | m | ± 0.1 percent | 1 m |
| Temperature | C | ± 1 degree C | 1 degree C |
| Speed | Km/ h | ± 1 percent | 0.2 km/h |
| Mass | Kg | ± 0.5 percent | 1 kg |
| Electricity balance | Ah | ± 0.5 percent | 0.3 percent |
| Where accuracy is specified in percent, it is the percent off the measured value. | | | |

## 5.4 Operation Modes

The test method includes the following steps:

a) Initial charge of the Rechargeable Energy Storage System (REESS)

b) Application of the cycle and measurement of the range.

Between the steps, if the vehicle has to be moved, it is pushed to the following test area (without regenerative recharging).

**5.4.1** Initial charge of the Rechargeable Energy Storage System (REESS)

Charging the REESS consists of the following procedures:

**Note:** "Initial charge of the REESS" applies to the first charge of the REESS, at the reception of the vehicle. In case of several combined tests or measurements, carried out consecutively, the First charge carried out shall be an "initial charge of the REESS" and the following may be done in accordance with the "normal overnight charge" procedure

**5.4.1.1** Discharge of the Rechargeable Energy Storage System (REESS)

**5.4.1.1.1** The procedure starts with the discharge of the REESS of the vehicle while driving (on the test track, on a chassis dynamometer, etc.) at a steady speed of 70 per cent +/-5 percent from the maximum thirty minutes speed of the vehicle.

**5.4.1.1.2** Stopping the discharge occurs:

(a) When the vehicle is not able to run at 65 per cent of the maximum thirty minutes speed; or
(b) when an indication to stop the vehicle is given to the driver by the standard onboard instrumentation; or
(c) After covering the distance of 100 km.

**5.4.1.2** Application of a normal overnight charge

The Rechargeable Energy Storage System (REESS) shall be charged according to the following procedure.

**5.4.1.2.1** Normal overnight charge procedure

The charging is carried out:

(a) With the on board charger if fitted; or
(b) With an external charger recommended by the manufacturer using the charging pattern prescribed for normal charging;
(c) In an ambient temperature comprised between 20 °C and 30 °C.

**Note:** If the ambient condition cannot be met at the time of the test, then based on mutual agreement between test agency and vehicle manufacturer, requirement of ambient temperature condition can be waived.

This procedure excludes all types of special charges that could be automatically or manually initiated like, for instance, the equalisation charges or the servicing charges. The manufacturer shall declare that during the test, a special charge procedure has not occurred.

**5.4.1.2.2** End of charge criteria

The end of charge criteria corresponds to a charging time not exceeding twelve hours, except if a clear indication is given to the driver by the standard instrumentation that the REESS is not yet fully charged.

In this case,

$$\text{The maximum time is} = \frac{3 \times \text{claimed battery capacity (Wh)}}{\text{mains power supply (W)}}$$

## 5.5 Application of the Cycle and Measurement of the Range

The test sequence shall be followed as per 5.1 above.

The end of test criteria shall be when the vehicle is not able to meet the target curve up to 50 km/h , ( or 85% of the maximum speed of the driving cycle or 85% of the maximum speed of the vehicle for

L1 category of vehicles only) or when an indicator from the standard on-board instrumentation is given to the driver to stop the vehicle.

Then the vehicle shall be slowed down to 5 km/h by deactivating the accelerator control, without touching the brake control and then stopped by braking.

When the vehicle does not reach the required acceleration or speed of the test cycle, the accelerator control shall remain fully activated until the reference curve has been reached again.

To respect human needs, up to three interruptions shall be permitted between test sequences of not more than 15 minutes in total.

At the end, measure D of the covered distance in km is the electric range of the electric vehicle. It shall be rounded to nearest whole number.