ANNEXURE 1

(item 2.1)

Directives Given by Competent authority of Bureau and Policy to review composition

1-A The following directions have been received from the Competent Authority of the Bureau for reviewing the composition of the Sectional Committee:

i) Major Government purchasing organizations like DGS&D, RDSO, CPWD, Defence etc are to be given representation in the committees wherever applicable.

ii) Examine the justification and need for continuation of a member in an individual capacity who is continuing for more than six years in a sectional committee.

iii) New members are to be co-opted who are expected to contribute in emerging new technology.

iv) In case representative of the concerned organization is not attending the meeting regularly or not continuing even by correspondences, the organization may be informed for substituting their member.

v) Members who are represented in individual capacity, the continuation of their membership is to be considered on the basis of their past attendance and contribution.

vi) Efforts should be made to include representative of different product segments as per the scope of the committee.

vii) Increased involvement of premier institutions like IIT, CSIR labs, IISc and other R & D organizations to be worked out.

The committee may please note.

1-B As a matter of policy, composition of Sectional Committees is to be reviewed to replace the persons who are continuing for longer periods, to co-opt the members/organizations which are capable of contributing in emerging new technologies and new areas of work and strength of the manufacturers should be restricted to 1/3 of the total strength of the Technical Committees.

The committee may please note.

ANNEXURE-2

(Item 2.2)

COMPOSITION OF ELECTRIC AND HYBRID VEHICLES SECTIONAL COMMITTEE, TED 27

SCOPE – Standardization of Electric and Hybrid vehicles and their components & Liaison with Co-ordination of work with ISO/ TC 22/SC 37 and IEC/ TC 69.

Meeting No.	**Date**	**Venue**
12th Meeting	3rd March 2023	Webex
13th Meeting	16th October 2023	Webex
14th Meeting	17th May 2024	Physical (ICAT, Manesar)

Sl. No.	**Name of the Organization**	**REPRESENTED BY** *Principal member (P)* *Alternate member (A)* *Young professional (YP)*	**Attendance**			
			12th	**13th**	**14th**	**Total**
1)	International Centre for Automotive Technology, Manesar	Shri Saurabh Dalela (**Chairperson)**	-	-	Y	1/1
2)	International Centre for Automotive Technology, Manesar	Shri Vikas Sadan (P) Shri Deepak Joshi (A) Shri Sonu Kumar Sudrania (A)	Y	Y	Y	3/3
3)	Ashok Leyland Limited, Chennai	Shri Muthukumar N (A) Shri Faustino V (A) S. Parthiban (P)	Y	Y	Y	3/3
4)	Association of State Road Transport Undertakings, New Delhi	Shri R. R. K Kishore (P) Shri M Trinath Babu (P)	Y	Y	Y	3/3
5)	Automotive Component Manufactures Association of India, New Delhi	Shri Sanjay Tank (P) Shri Ankit Dhiman (A)	Y	Y	Y	3/3
6)	Automotive Research Association of India, Pune	Shri A. A. Deshpande (P) Shri M M Desai (A) Shri P G Mengaji (YP)	Y	N	Y	2/3
7)	Bajaj Auto Limited, Pune	Shri Arvind V. Kumbhar (A) Shri Milind J Pagare (P) Shri Abhay Kumar (YP)	Y	Y	Y	3/3
8)	CSIR - Indian Institute of Petroleum, Dehradun	Shri Dr. L Robindro (P) Shri Wittison Kamei (A)	N	N	Y	1/3
9)	Central Institute of Road Transport, Pune	Shri N. R. Tiwari (P) Shri S. N. Dhole (A)	N	N	N	0/3
10)	Central Pollution Control Board, New Delhi	Shri Ankush Tewani (P) Shri Gautam K Sharma (A)	N	Y	Y	2/3
11)	Centre for Development of Advanced Computing, Pune	Shri Chanrasekar V. (P) Shri Renji V. Chacko (P) Shri Udayasagar V (YP)	Y	N	N	2/3
12)	Centre for Science and Environment, New Delhi	Shri Vivek Chattopadhyaya (A)	N	Y	Y	2/3

Sl. No.	Name of the Organization	REPRESENTED BY *Principal member (P)* *Alternate member (A)* *Young professional (YP)*	Attendance			
			12th h	13th h	14th	Total
13)	Chakr Innovation Private Limited, Gurugram	Shri Mohit Singhvi (P) Shri Abhijit Datta (A)	-	-	-	
14)	Denso International India Private Limited, Gurugram	Shri Noel Alexander Peters (P)	-	-	Y	1/1
15)	Hella India Automotive Private Limited, Gurugram	Shri Dr A K Prakash (P) Shri Sujit Barhate (A) Shri Abhishek Mandhana (YP)	Y	N	N	1/3
16)	Hero Motocorp Limited, New Delhi	Shri Feroz Ali Khan (P) Shri Piyush Chowdhry (A) Shri Varun Kumar Sharma (YP)	Y	Y	Y	3/3
17)	Honda Cars India Research and Development Limited, Noida	Shri S. MUTHU KUMAR (P) Shri Gagan Manral (A) Ms. Neha Gaba (YP)	Y	Y	Y	3/3
18)	Honda Motorcycle and Scooter India Private Limited, Gurgaon	Shri Vipin Sharma (P) Shri Arpan shukla (A)	Y	Y	Y	3/3
19)	Indian Institute of Technology Delhi, New Delhi	Shri Sumit Chattopadhyay (P) Prof. Saptarshi Basak (A)	Y	N	Y	2/3
20)	Indian Institute of Technology Kanpur, Kanpur	Shri Prabodh Bajpai (P) Shri Kanwar Singh Nalwa (A) Dr. M.V. Gururaj (YP)	N	Y	Y	2/3
21)	Indian Institute of Technology Ropar, Punjab	Shri Dhiraj Kumar Mahajan (P) Shri J. Kalaiselvi (A)	N	Y	Y	2/3
22)	International Advanced Research Centre for Powder Metallurgy and New Materials, Gurugram	Dr. R. Gopalan (P) Dr. Raju Prakash (A)	Y	Y	Y	3/3
23)	International Copper Association India, Mumbai	Shri K N Hemanth Kumar (P) Shri Jyotish Pande (A)	-	Y	N	1/2
24)	KPIT Technology Limited, Pune	Shri Tejas Kshatriya (A) Shri Kirankumar Dakle (P)	Y	Y	Y	3/3
25)	Mahindra Electric Mobility Limited, Bengaluru	Shri GUDIVADA RAJESH (A) Shri Kharidu Kiran Kumar (P)	N	Y	Y	2/3
26)	Mahindra and Mahindra Limited, Mumbai	Shri S Sakthivelan (P) Shri Devinder Tangri (A) Shri R Ganesh Kumar (YP)	Y	Y	Y	3/3
27)	Maruti Suzuki India Limited, Gurugram	Shri Gururaj Ravi (P) Shri Sumit Kumar (YP) Ms. Buvaneswari M (A)	Y	Y	Y	3/3
28)	Ministry of Electronics and Information Technology, New Delhi	Shri Om Krishan Singh (P)	-	-	Y	1/1
29)	Ministry of Heavy Industries and Public Enterprises, New Delhi	Shri R K Jaiswal (P)	N	N	Y	1/3
30)	Ministry of New and Renewable Energy, New Delhi	Shri Dipesh Pherwani (P)	N	N	N	0/3
31)	Nissan Motor India Private Limited, Chennai	Shri Indhumathi Elumalai (P) Shri Pragalpha (A)	N	Y	Y	2/3

Sl. No.	Name of the Organization	REPRESENTED BY *Principal member (P)* *Alternate member (A)* *Young professional (YP)*	Attendance			
			12th	13th	14th	Total
32)	Ola Electric Technologies Private Limited, Bengaluru	Shri Subrat Kumar Shri Sanchit Khare	-	-	Y	1/1
33)	Panasonic India Private Limited, Gurugram	Shri Anil Mehta (P) Shri Chitrarth Shukla (YP)	N	N	Y	1/3
34)	Petroleum and Explosives Safety Organisation, Nagpur	Shri V K Mishra Shri S D Mishra	N	N	N	0/3
35)	Renault India Private Limited, Mumbai	Shri Rajendra Khile (P) Shri Vijay Dinakaran (A)	Y	Y	Y	3/3
36)	Skoda Auto Volkswagen India Private Limited	Shri Makarand Brahme (P) Shri Milind Jagatp (A) Ms. Saily Smarth (YP)	Y	Y	Y	3/3
37)	Society of Indian Automobile Manufacturers (SIAM), Delhi	Shri Amit Kumar (A) Shri Prashant Kumar Banerjee (P)	Y	Y	Y	3/3
38)	TVS Motor Company Limited, Hosur	Shri M S Anand Kumar (P) Shri Asish Kumar Das (A)	Y	N	Y	2/3
39)	Tata Motors Limited, Pune	Shri Senthilnathan Thangavelu (P) Shri Vaibhav Jadhav (A) Ms. Namrata Deb (YP)	Y	Y	Y	3/3
40)	The Energy and Resources Institute, New Delhi	Shri I V Rao (P) Shri Sharif Qamar (A) Shri Faiz Jamal (YP)	N	N	Y	1/3
41)	Toyota Kirloskar Motor Private Limited, Bidadi	Shri Raju. M (P) Shri Vijeth Gatty (A) Shri Kiran T N (YP)	Y	Y	Y	3/3
42)	Valeo India Private Limited, Chennai	Shri Devaraj D (P) Shri Vivek Murali (A)	Y	Y	Y	3/3
43)	Vanaz Engineers Limited, Pune	Shri S J VISPUTE (A) Shri R.K. Kanade (P)	Y	Y	Y	3/3

NOTE:
In 14th meeting- Committee noted the information given in the agenda. Committee approved the nomination of IIP and TERI. Committee requested members to provide the contact detail as follows:

- **Centre for Science** to provide contact detail of NFTDC and JBM
- **ICAT** to provide contact detail of SMEV, and Bharat Electronics,

BIS to check the contact detail of other organization.
It was decided that once details are received, contact may be established through telephone/mail to ascertain their interest and those interested would be asked to submit the nomination.

Present Status:

1. IIP and TERI nominations have been updated on portal.
2.

Bharat Electronics Limited -	Shri S. Senthil Kumar (DGM - MWT) was contacted

	over telephone and nomination proforma has been sent to provide the nomination, vide mail dt 6.12.2024
Indian Electrical and Electronic Manufacturers Association (IEEMA)	Shri Rahul Kumar, Executive Officer, was contacted over telephone and nomination proforma has been sent to confirm their interest for TED 27 committee and provide nomination, vide mail dt 6.12.2024
Vehicle Research and Development Establishment, Ahmednagar	Shri Vinod Kumar, Scientist E, was contacted over telephone and nomination proforma has been sent to confirm their interest for TED 27 committee and provide nomination, vide mail dt 6.12.2024
Reliance BP Mobility Limited	Shri Ravishankar V Desai, Advisor - Fuels and technology, was contacted over telephone and nomination proforma has been sent to confirm their interest for TED 27 committee and provide nomination, vide mail dt 6.12.2024
JBM Group	Shri Manoj Gupta (EVP & Business Head) was contacted over telephonenomination proforma has been sent to confirm their interest for TED 27 committee and provide nomination, vide mail dt 5.11.2024
Non-Ferrous Materials Technology Development Center, Hyderabad –	Contact could not be made over telephone. However an email has been sent to Dr. K. Balasubramanian, Director NFTDC, Hyderabad , for confirming their interest for TED 27 committee and provide nomination, vide mail dt 6.12.2024
Samsung SDI Co. Ltd	Contact could not be made over telephone and e-mail.
Society of Manufacturers of Electric Vehicles, New Delhi	

Committee may please deliberate.

Special Invitee as per 11th meeting of TED 27:

Sl. No.	Name	Organization
1)	Shri Avinash Khot Shri Gaurav Singh	Suzuki Motorcycle India Pvt Ltd
2)	Shri Hitesh Saini, Shri Sai Kiran Wupadrasta Ms. Pooja Chetri, Shri Shridhara Shanbhogu	Honeywell India
3	Shri Mallikarjuna Sajjan	Matter Motor Works Pvt.Ltd

ANNEXURE 3

(item 2.5)

PANEL COMPOSITION

TED 27: P1 - Panel on Safety			
Sl. No.	**Organization**	**Member Name**	**Member Email**
1)	Automotive Research Association of India, Pune	Shri A. A. Deshpande **(Convener)**	deshpande.aed@araiindia.com
2)	Ashok Leyland Limited, Chennai	Shri Muthukumar N	muthukumar.n@ashokleyland.com
		Shri S. Parthiban	Parthiban.s2@ashokleyland.com
3)	Automotive Research Association of India, Pune	Shri M M Desai	desai.aed@araiindia.com
		Shri P G Mengaji	mengaji.aed@araiindia.com
4)	Bajaj Auto Limited, Pune	Shri Arvind V. Kumbhar	avkumbhar@bajajauto.co.in
		Shri Adish Aggarwal	aggarwala@bajajauto.co.in
5)	Hero Motocorp Limited, New Delhi	Shri Feroz Ali Khan	Feroz.khan@heromotocorp.com
		Shri Piyush Chowdhry	piyush.chowdhry@heromotocorp.com
		Shri Varun Kumar Sharma	varun2.sharma@heromotocorp.com
6)	Honda Motorcycle and Scooter India Private Limited, Gurgaon	Shri Vipin Sharma	vipin.sharma@honda.hmsi.in
		Shri Arpan shukla	arpan.shukla@honda2wheelersindia.com
7)	Honeywell International India Private Limited, Bengaluru	Ms. Pooja Chetri	pooja.chetri@honeywell.com
8)	Indian Institute of Technology Ropar, Punjab	Shri Dhiraj Kumar Mahajan	dhiraj.mahajan@iitrpr.ac.in
		Shri J. Kalaiselvi	kalaiselvi@iitrpr.ac.in
9)	KPIT Technology Limited, Pune	Shri Tejas Kshatriya	tejas.kshatriya@kpit.com
		Shri Kirankumar Dakle	kiran.dakle@kpit.com
10)	Mahindra and Mahindra Limited, Mumbai	Shri R Ganesh Kumar	r.ganeshkumar2@mahindra.com
		Shri Abhijit Dhotre	Dhotre.abhijit@mahindra.com
11)	Maruti Suzuki India Limited, Gurugram	Shri Gururaj Ravi	gururaj.ravi@maruti.co.in
		Shri Sumit Kumar	sumitkumar@maruti.co.in
		Ms. Buvaneswari M	m.buvaneswari@maruti.co.in
12)	Suzuki Motorcycle India Private Limited, Gurugram	Shri Avinash Khot	khot.avinash@suzukimotorcycle.in
		Shri Ramkrishna Ahire	a.ramkrishna@suzukimotorcycle.in
13)	Tata Motors Limited, Pune	Shri Senthilnathan Thangavelu	stt770131@tatamotors.com

		Shri Vaibhav Jadhav	jadhav.vaibhav@tatamotors.com
14)	Toyota Kirloskar Motor Private Limited, Bidadi	Shri Raju. M	rajum@toyota-kirloskar.co.in
		Shri M. Suchindran	suchindranm@toyota-kirloskar.co.in

TED 27: P2 - Panel on Electric Motor			
Sl. No.	**Organization**	**Member Name**	**Member Email**
1)	International Centre for Automotive Technology, Manesar	Shri Madhusudan Joshi **(Convener)**	madhusudan.joshi@icat.in
2)	Ashok Leyland Limited, Chennai	Shri Muthukumar N	muthukumar.n@ashokleyland.com
		Shri Faustino V	Faustino.v@ashokleyland.com
3)	Automotive Component Manufactures Association of India, New Delhi	Shri Sanjay Tank	sanjay.tank@acma.in
		shri Ankit Dhiman	ankit.dhiman@acma.in
4)	Automotive Research Association of India, Pune	Shri A. A. Deshpande	deshpande.aed@araiindia.com
		Shri M M Desai	desai.aed@araiindia.com
		Shri P G Mengaji	mengaji.aed@araiindia.com
5)	Bajaj Auto Limited, Pune	Shri Arvind V. Kumbhar	avkumbhar@bajajauto.co.in
		Shri Abhay Kumar	akumar15@bajajauto.co.in
6)	Hero Motocorp Limited, New Delhi	Shri Feroz Ali Khan	Feroz.khan@heromotocorp.com
		Shri Piyush Chowdhry	piyush.chowdhry@heromotocorp.com
7)	Honda Motorcycle and Scooter India Private Limited, Gurgaon	Shri Vipin Sharma	vipin.sharma@honda.hmsi.in
		Shri Arpan shukla	arpan.shukla@honda2wheelersindia.com
8)	Mahindra and Mahindra Limited, Mumbai	Shri S Sakthivelan	sakthivelan.s@mahindra.com
		Shri Devinder Tangri	tangri.devinder@mahindra.com
		Shri Abhijit Dhotre	Dhotre.abhijit@mahindra.com
9)	Maruti Suzuki India Limited, Gurugram	Shri Sumit Kumar	sumitkumar@maruti.co.in
		Ms. Buvaneswari M	m.buvaneswari@maruti.co.in
		Shri Shubhajit Kulavi	shubhajit.kulavi@maruti.co.in
10)	Matter Motor Works Private Limited, Ahmedabad	Shri Mallikaarjun	mallikarjuna.sajjan@matter.in
11)	Suzuki Motorcycle India Private Limited, Gurugram	Shri Avinash Khot	khot.avinash@suzukimotorcycle.in
		Shri Ramkrishna Ahire	a.ramkrishna@suzukimotorcycle.in
12)	Tata Motors Limited, Pune	Shri Senthilnathan Thangavelu	stt770131@tatamotors.com
		Shri Vaibhav Jadhav	jadhav.vaibhav@tatamotors.com
13)	Toyota Kirloskar Motor Private Limited, Bidadi	Shri Raju. M	rajum@toyota-kirloskar.co.in
		Shri M. Suchindran	suchindranm@toyota-kirloskar.co.in

TED 27: P2 - Panel on Electric Motor			
Sl. No.	**Organization**	**Member Name**	**Member Email**
		Shri Kiran T N	lfs_Kirantn@toyota-kirloskar.co.in
14)	international Centre for Automotive Technology, Manesar	Shri Vikas Sadan	vikas.sadan@icat.in
		Shri Sonu Kumar Sudrania	sonu.sudrania@icat.in

TED 27: P3 - Panel on RESS – Rechargeable Energy Storage System (Ultra Capacitors, Battery & Code of Practice for Battery disposal)			
Sl. No.	**Organization**	**Member Name**	**Member Email**
1)	international Centre for Automotive Technology, Manesar	Shri Madhusudan Joshi **(Convener)**	madhusudan.joshi@icat.in
2)	Ashok Leyland Limited, Chennai	Shri Muthukumar N	muthukumar.n@ashokleyland.com
		Shri Faustino V	Faustino.v@ashokleyland.com
3)	Bajaj Auto Limited, Pune	Shri Arvind V. Kumbhar	avkumbhar@bajajauto.co.in
		Shri Milind J Pagare	mjpagare@bajajauto.co.in
		Shri Abhay Kumar	akumar15@bajajauto.co.in
4)	Hero Motocorp Limited, New Delhi	Shri Feroz Ali Khan	Feroz.khan@heromotocorp.com
		Shri Piyush Chowdhry	piyush.chowdhry@heromotocorp.com
		Shri Varun Kumar Sharma	varun2.sharma@heromotocorp.com
5)	Honda Motorcycle and Scooter India Private Limited, Gurgaon	Shri Vipin Sharma	vipin.sharma@honda.hmsi.in
		Shri Arpan shukla	arpan.shukla@honda2wheelersindia.com
6)	Indian Institute of Technology Ropar, Punjab	Shri Dhiraj Kumar Mahajan	dhiraj.mahajan@iitrpr.ac.in
		Shri J. Kalaiselvi	kalaiselvi@iitrpr.ac.in
7)	International Advanced Research Centre for Powder Metallurgy and New Materials, Gurugram	Dr R. Gopalan	gopy@arci.res.in
		Dr Raju Prakash	rprakash@arci.res.in
8)	Mahindra and Mahindra Limited, Mumbai	Shri S Sakthivelan	sakthivelan.s@mahindra.com
		Shri Devinder Tangri	tangri.devinder@mahindra.com
		Shri Abhijit Dhotre	Dhotre.abhijit@mahindra.com
9)	Maruti Suzuki India Limited, Gurugram	Shri Gururaj Ravi	gururaj.ravi@maruti.co.in
		Ms. Buvaneswari M	m.buvaneswari@maruti.co.in
10)	Matter Motor Works Private Limited, Ahmedabad	Shri Mallikaarjun	mallikarjuna.sajjan@matter.in
11)	Renault India Private Limited, Mumbai	Mr. Rajendra Khile	rajendra.khile@rntbci.com
		Mr. Vijay Dinakaran	vijay.dinakaran@rntbci.com
12)	Suzuki Motorcycle India Private Limited, Gurugram	Shri Avinash Khot	khot.avinash@suzukimotorcycle.in
		Shri Ramkrishna Ahire	a.ramkrishna@suzukimotorcycle.in

TED 27: P3 - Panel on RESS – Rechargeable Energy Storage System (Ultra Capacitors, Battery & Code of Practice for Battery disposal)			
Sl. No.	**Organization**	**Member Name**	**Member Email**
13)	TVS Motor Company Limited, Hosur	Shri M S Anand Kumar	ms.anandkumar@tvsmotor.com
		Shri Asish Kumar Das	asish.das@tvsmotor.com
14)	Tata Motors Limited, Pune	Shri Senthilnathan Thangavelu	stt770131@tatamotors.com
		Shri Vaibhav Jadhav	jadhav.vaibhav@tatamotors.com
15)	Toyota Kirloskar Motor Private Limited, Bidadi	Shri Raju. M	rajum@toyota-kirloskar.co.in
		Shri Vijeth Gatty	vijeth_gatty@toyota-kirloskar.co.in
		Shri M. Suchindran	suchindranm@toyota-kirloskar.co.in
16)	International Centre for Automotive Technology, Manesar	Shri Deepak Joshi	srs@icat.in
		Shri Sonu Kumar Sudrania	sonu.sudrania@icat.in

TED 27: P4 - Panel on EV Electronics Components & Systems (PHS, BMS, Controllers & Sensors)			
Sl. No.	**Organization**	**Member Name**	**Member Email**
1)	IIT Ropar	Shri Dhiraj Kumar Mahajan **(Convener)**	dhiraj.mahajan@iitrpr.ac.in
2)	Automotive Component Manufactures Association of India, New Delhi	Shri Sanjay Tank	sanjay.tank@acma.in
		shri Ankit Dhiman	ankit.dhiman@acma.in
3)	Automotive Research Association of India, Pune	Shri A. A. Deshpande	deshpande.aed@araiindia.com
		Shri M M Desai	desai.aed@araiindia.com
4)	Bajaj Auto Limited, Pune	Shri Arvind V. Kumbhar	avkumbhar@bajajauto.co.in
		Shri Abhay Kumar	akumar15@bajajauto.co.in
5)	Hero Motocorp Limited, New Delhi	Shri Feroz Ali Khan	Feroz.khan@heromotocorp.com
		Shri Piyush Chowdhry	piyush.chowdhry@heromotocorp.com
6)	Honda Motorcycle and Scooter India Private Limited, Gurgaon	Shri Arpan shukla	arpan.shukla@honda2wheelersindia.com
7)	Honeywell International India Private Limited, Bengaluru	Ms. Pooja Chetri	pooja.chetri@honeywell.com
8)	Indian Institute of Technology Ropar, Punjab	Shri J. Kalaiselvi	kalaiselvi@iitrpr.ac.in
9)	KPIT Technology Limited, Pune	Shri Tejas Kshatriya	tejas.kshatriya@kpit.com
		Shri Kirankumar Dakle	kiran.dakle@kpit.com
10)	Mahindra and Mahindra Limited, Mumbai	Shri S Sakthivelan	sakthivelan.s@mahindra.com
		Shri Devinder Tangri	tangri.devinder@mahindra.com
		Shri R Ganesh Kumar	r.ganeshkumar2@mahindra.com
11)	Maruti Suzuki India Limited, Gurugram	Shri Gururaj Ravi	gururaj.ravi@maruti.co.in
		Ms. Buvaneswari M	m.buvaneswari@maruti.co.in
12)	Matter Motor Works Private Limited, Ahmedabad	Shri Mallikaarjun	mallikarjuna.sajjan@matter.in
13)	Narnix Technolabs Private Limited, New Delhi	Shri Narang N Kishore	kishor@narnix.com
14)	Suzuki Motorcycle India Private Limited, Gurugram	Shri Avinash Khot	khot.avinash@suzukimotorcycle.in
		Shri Ramkrishna Ahire	a.ramkrishna@suzukimotorcycle.in

TED 27: P4 - Panel on EV Electronics Components & Systems (PHS, BMS, Controllers & Sensors)			
Sl. No.	**Organization**	**Member Name**	**Member Email**
15)	Spark Minda Technical Centre, Minda Corporation Limited	Shri Ashutosh Telang	ashutosh.telang@mindacorporation.com

TED 27 : P7 - Panel on Testing & Performance Measurements Panel			
Sl. No.	**Organization**	**Member Name**	**Member Email**
1)	International Centre for Automotive Technology, Manesar	Shri Vikas Sadan **(Convener)**	vikas.sadan@icat.in
2)	Ashok Leyland Limited, Chennai	Shri Muthukumar N	muthukumar.n@ashokleyland.com
		Shri Faustino V	Faustino.v@ashokleyland.com
3)	Automotive Research Association of India, Pune	Shri A. A. Deshpande	deshpande.aed@araiindia.com
		Shri M M Desai	desai.aed@araiindia.com
4)	Bajaj Auto Limited, Pune	Shri Arvind V. Kumbhar	avkumbhar@bajajauto.co.in
		Shri Milind J Pagare	mjpagare@bajajauto.co.in
5)	Hero Motocorp Limited, New Delhi	Shri Feroz Ali Khan	Feroz.khan@heromotocorp.com
		Shri Piyush Chowdhry	piyush.chowdhry@heromotocorp.com
6)	Honda Motorcycle and Scooter India Private Limited, Gurgaon	Shri Vipin Sharma	vipin.sharma@honda.hmsi.in
		Shri Arpan shukla	arpan.shukla@honda2wheelersindia.com
7)	KPIT Technology Limited, Pune	Shri Tejas Kshatriya	tejas.kshatriya@kpit.com
		Shri Kirankumar Dakle	kiran.dakle@kpit.com
8)	Mahindra and Mahindra Limited, Mumbai	Shri S Sakthivelan	sakthivelan.s@mahindra.com
		Shri Devinder Tangri	tangri.devinder@mahindra.com
9)	Maruti Suzuki India Limited, Gurugram	Shri Gururaj Ravi	gururaj.ravi@maruti.co.in
		Ms. Buvaneswari M	m.buvaneswari@maruti.co.in
10)	Suzuki Motorcycle India Private Limited, Gurugram	Shri Avinash Khot	khot.avinash@suzukimotorcycle.in
		Shri Ramkrishna Ahire	a.ramkrishna@suzukimotorcycle.in
11)	Tata Motors Limited, Pune	Shri Senthilnathan Thangavelu	stt770131@tatamotors.com
		Shri Vaibhav Jadhav	jadhav.vaibhav@tatamotors.com
12)	Toyota Kirloskar Motor Private Limited, Bidadi	Shri Raju. M	rajum@toyota-kirloskar.co.in
		Shri Vijeth Gatty	vijeth_gatty@toyota-kirloskar.co.in
13)	international Centre for Automotive Technology, Manesar	Shri Deepak Joshi	srs@icat.in

TED 27: P8 - Panel on Chemistry Agnostic Standards			
Sl. No.	**Organization**	**Member Name**	**Member Email**
1)	International Centre of Automotive Technology, Manesar	Shri Saurabh Dalela **(Convener)**	Saurabh.Dalela@icat.in
2)	Automotive Research Association of India, Pune	Shri Sachin P. Pandit	pandit.aed@araiindia.com
3)	Chakr Innovation Private Limited, Gurugram	Ms. Abhilasha Meena	abhilasha@chakr.in
		Shri Abhijit Datta	datta.abhijit@chakr.in
4)	Indian Institute of Technology, Bombay	Shri Venkatasailanathan Ramadesigan	venkatr@iitb.ac.in
5)	Indian Oil Corporation Limited, New Delhi	Mr. P Mohana Sundaram	sundaramp@INDIANOIL.IN
6)	NITI Aayog, New Delhi	Mr. Manoj Kumar Upadhay	mk.upadhyay@nic.in
7)	Ola Electric Technologies Private Limited, Bengaluru	Shri Subrat Kumar Dash	subrat.dash@olaelectric.com
8)	Tata Motors Limited, Pune	Mr. Shri Kapil Baidya	kapil.baidya@tatamotors.com
		Mr. Jayesh Zadokar	jsz770003@tatamotors.com
9.	MoRTH	**Nomination awaited**	

NOTE: Organizations highlighted in yellow are not committee member. They are part of respective panels only.

ANNEXURE 4
(Sl No 1, item 3)

Minutes of Panel 3 meeting

For BIS use only

BUREAU OF INDIAN STANDARDS

MINUTES

Name of the PANEL, TED 27	Date and Time	Day	Venue
Panel 3- TED 27 RESS – Rechargeable Energy Storage System (Ultra Capacitors, Battery & Code of Practice for Battery disposal)	28.11.2024	Thursday	Virtual

Convenor: Shri Madhusudan Joshi

ITEM 0 WELCOME ADDRESS

0.1 Welcome by Member Secretary
Member Secretary welcomed the participants

0.2 Opening Remarks by Convenor
Convenor welcomed the participants and briefed the subjects under discussion. He further thanked panel members for their active contribution.

ITEM 1 COMPOSITION OF PANEL

For change in panel composition, panel recommended that suggestions may be submitted by member to BIS through mail, which would be taken up for deliberation in next committee meeting.

ITEM 2 Subjects for discussion

1. **Regarding Nail Penetration test (IS 18590 and IS 18606)**

   Decision in 14th meeting (Relevant excerpt): Ms. Mohanty briefed the comment. Committee deliberated at length and mentioned that for some battery technology, Nail penetration test is important test and therefore it should be included in the standard. Further committee added that in the present form, it cannot be included in the standard as the issue of repeatability is associated with this test.

   Further, committee mentioned that if Ms. Mohanty can check and provide the solution of repeatability issue, it can be deliberated further and after due deliberation it would be included in the standard. Committee requested Panel 3 to deliberate on input received from Centre for Science and Environment and provide its recommendation.

Present Status: Input received from Ms. Mohanty (vide mail dt 26.11.2024) is attached at **Annexure 2.**

Panel recommendation:

Shri Vijay from Renault mentioned that apart from repeatability issue (associated with Nail penetration test), there is other aspect also. The subject is under discussion in GTR 20 and there are 3 methods (Penetration, overcharging and overheating) to trigger thermal propagation and actually nail penetration as a method is there in the existing standard. Apart from these methods, many other methods (laser) are under research/development in GTR20 phase II and by these methods thermal propagation can be simulated. The ultimate aim is if thermal propagation is created then what one should do, for these documentations are given in in IS 18606/AIS 038 Penetration is one of the methods for thermal propagation. So, we don't think that safety is compromised however there is always scope of improvement in standard but that should be done based on research and global experiences. India is ahead of Europe in implementation of GTR20 by ~2.5 years as well as 15 plus additional requirements already added based on field experiences.

Shri Kharidu Kiran Kumar (from Mahindra Electric Mobility Limited, Bengaluru) mentioned that Nail penetration is more relevant at cell level rather than at pack level.He also briefed the transition of Nail pentraton test to AIS 038 from AIS 048. He further added that good amount of energy are absorbed by vehicle even before intrusion happen in battery pack and various compliance requirement given in the standard (ex-Crush test) addresses these issues directly or indirectly. Any test should be included after detailed deliberation and with having enough data for evaluations.

Shri Apurva Desai from Matter Motors highlighted the issues associated with nail penetration test for battery for L category vehicles (due to high energy density). He further mentioned that if this initiation method is used for L category, then panel should decide direction of penetration also.

Panel deliberated and requested Ms. Mohanty from CSE to present her technical findings with suggestions to address issues raised by member.

2. **Comment from Honda Car on IS 18606**

Decision in 14th meeting (Relevant excerpt): For Thermal propagation test, committee deliberated and in principle agreed. However, it requested ARAI and other stakeholders to provide their input. Based on input received, it may be deliberated in Panel/committee meeting.

Relevant comment:

↑	58	Annex K-3.3.1	a) The test shall be conducted at temperature: 25 °C + 2 °C;	Change opreration temperature as below a) The test shall be conducted at temperature: between 18 °C to maximum permissible operating temperature	Thermal propagation tests are sometimes conducted in outdoor shelters for safety reasons, so we would like to see the test temperature range expanded. The proposed conditions are the contents of ISO6469-1 AMD(2022). It is expected that the next revised version of R100 will also cite this.

Present Status:
Mail was sent to ARAI and other stakeholders for input on above point. Input received from MSIL (vide mail dt 27.11.2024) is attached at **Annexure 3.**

Panel recommendation:
Panel deliberated and decided to wait till it is finalized by UNECE. Once it is finalized by UNECE, subject may be taken again for deliberation and finalization.

3. **Battery for E-Rickshaw:**

Decision in 14th meeting (Relevant excerpt): Committee deliberated at length and mentioned that presently requirement of E-Rickshaw is not covered in IS 18506 and IS 18590. for Type approval of E-Rickshaw, AIS 048 is being followed and for FAME, AIS 156 is mandatory. Committee deliberated and decided to cover E-Rickshaw battery (excluding open type battery) in the scope of IS 18590. It requested Panel 3 to deliberate in detail and formulate draft amendment document, for modification in scope. Draft amendment document shall be circulated into WC along with other agreed comments (please see item 5.4).

Present Status:
Draft document prepared for amendment in IS 18590 (incorporated only agreed comments) is attached at **Annexure-4**. Panel may deliberate for inclusion of E-Rickshaw in the scope as decided during 14th meeting.

Panel recommendation:

Shri Kharidu Kiran Kumar (from Mahindra Electric Mobility Limited, Bengaluru) briefed the subject and added that inclusion of E-Rickshaw in IS 18590 will enhance the safety battery and E-rickshaw, thus E-Rickshaw should be included in the standard (except open type battery i.e. lead acid battery).

Shri Varun Sharma from Hero Moto Corp, mentioned that E-Rickshaw and E-Cart are clubbed with L category vehicles in many standards notified under CMVR (ex. E-Rickshaw is part of AIS 009 REV 3) thus inclusion of E-rickshaw with L category should not be a problem

Shri Sanchit from OLA and Shri Abhay from BAL also agreed for inclusion of E-Rickshaw in IS

18590.

Panel deliberated and requested members to review IS 18590 and provide their additional comments, if any, within two weeks. It decided to discuss the subject again in next panel meeting.

4. **Review of ISO 18300:2016-** Electrically propelled vehicles — Test specifications for lithium-ion battery systems combined with lead acid battery or capacitor

Decision in 14th meeting (Relevant excerpt): Committee requested Panel 3 to deliberate and provide its recommendation that whether to adopt (identical/modified) ISO 18300 or it is not at all suitable for our country needs and may not be adopted at all.

Panel recommendation: Panel deliberated and requested OLA team to review IS 18300 and provide their input within 1 month. It further requested BIS to circulate the document for their input.

Annexure 1

DETAIL OF PARTICIPANTS

SL. NO.	NAME OF MEMBER	NAME OF ORGANIZATION	ATTENDEE EMAIL
1)	Shri Abhay Kumar	Bajaj Auto Limited, Pune	akumar15@bajajauto.co.in
2)	Shri Parmeshwar Mane	Bajaj Auto Limited, Pune	pjmane@bajajauto.co.in
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5)	Shri Ajay Kumar	Honda Motorcycle & Scooter India Pvt. Ltd.	ajay.kumar5@honda.hmsi.in
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11)	Shri Kharidu Kiran Kumar	Mahindra Electric Mobility Limited, Bengaluru	kumar.kharidu@mahindra.com
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18)	Ms. Sapnaa Noor Mohameds	Renault India Private Limited, Mumbai	sapnaa.noor-mohamed@rntbci.com
19)	Shri Asish Kumar Das	TVS Motor Company Limited, Hosur	asish.das@tvsmotor.com
20)	Shri Kiran T N	Toyota Kirloskar Motor Private Limited, Bidadi	lfs_kirantn@toyota-kirloskar.co.in

Annexure 2

Comments received from MSIL

Regarding Nail Penetration test (IS 18590 and IS 18606): I'd asked for inclusion of nail penetration test in the standard.

While it is understood that the nail penetration test does not provide repeatable results, it is also, one of the methods with which thermal runaway propagation within cells is usually the highest. It is also the most replicable of real-life situations that could happen to a battery. That was the thought behind the suggestion to make it compulsory. In any case, it is a requisite in many standards across the world. For eg. IEC60086-4: 2000, UL1642: 2006, SN/T1414.1-2004, SN/T1414.3-2004, QC/T743-2006, GB8897.4-2002.

If we still think it is not feasible to conduct NP tests, it may be useful to conduct a study on battery packs that do not go through an NP test and the percentage of safety events in these batteries vis-a-vis those that do

Annexure 3
Comments received from MSIL

With reference to the Proposal made by M/s Honda on IS 18606: 2024, We have gone through the same & observed following –

1. The similar discussion is in process in UN GRSP Informal working group, It was put as GRSP-75-16 in (75th GRSP, 27 – 31 May 2024) as attached. We observed that In GRSP IWG they are considering not to have Temperature requirement under Environmental conditions. However, proposal of 18 degree centigrade & above is quoted under Tested device (clause 3.2 c).

2. The subject is under consideration in GRSP and NOT yet concluded. It will be further discussed in upcoming GRSP session.
Additionally, We would like to share that Proposed Rev 3 to AIS 038 is now to be taken up as Amd to AIS038 Rev2 with suitable 6 months implemenation lead-time as per the decision in 72nd AISC dt. Aug'2024.

In view of above we opine that the We can take up the incorporation once it is finalised in GRSP and Published in UN R100. Post deliberation, It can be propagated first in AIS 038 Rev 2 as it is the current notified standard for the purpose in CMVR. Subsequently it shall be incorporated in IS 18606: 2024.

Annexure 4

BUREAU OF INDIAN STANDARDS

DRAFT FOR COMMENTS ONLY
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DRAFT AMENDMENT NO. 1
TO
IS 18590: 2024
ELECTRIC POWER TRAIN OF L CATEGORY VEHICLES — SPECIFIC REQUIREMENTS

ICS: 43.120

Automotive Tyres, Tubes and Rims Sectional Committee,TED 07	Last Date for Comments: **XXXXX**

DRAFT AMENDMENT NO. 1
TO
IS 18590: 2024
ELECTRIC POWER TRAIN OF L CATEGORY VEHICLES — SPECIFIC REQUIREMENTS

(*Page* 1, *Clause* **1.1**) Substitute the following for the existing:

(Panel to deliberate)

(*Page* 4, *Clause* **3.52**) **—** Insert the following after *clause* **3.52**.

3.53 Swappable Battery Pack — It is REESS with connector for connecting charger/electric powertrain vehicle, battery management system (BMS), electrical protection circuit, enclosure and supporting devices.

3.54 Swapping Station — Equipment facility that provides Electric Power Train Vehicles with a Swappable Battery Pack.

[*Page* 10, *Clause* **9.1.3 (f)**] **—** Substitute the following for existing:

9.1.3 Onboard/Portable charger

a) Charger shall have charge voltage cut-off to avoid over charging of REESS;
b) Charger shall have soft-start function every time REESS is connected for charging;
c) Charger shall have pre-charge function to detect deep discharge condition of REESS;
d) Charger shall have input supply variation (230 VAC +/- 10 %) protection;
e) Charger shall have earth leakage detection as per class 1 of IS 12640 Part 1; and
f) On-board/portable charger shall have communication with battery (BMS).

For swappable battery pack, swapping station intended for charging of swappable battery pack shall be used for verification of compliance to requirements of **9.1.3**. However, if vehicle manufacturer declares that every vehicle will be provided with charger, then that charger shall be used for verification of compliance to requirements of **9.1.3**.

ANNEXURE 5

(Sl No 2, item 3)

DRAFT AMENDMENT DOCUMENT FOR IS 17191 PART 1 AND PART 2

A-5.1 Draft for Amendment in IS 17191 Part 2

DRAFT AMENDMENT NO. 2
TO
IS 17191 (Part 2): 2019
ELECTRIC POWER TRAIN VEHICLES — PART 2 METHOD OF MEASURING THE RANGE

[*Page* 1, *Clause* **6.1.2**] **—** Substitute the following for the existing:

6.1.2 The driving cycle shall be Modified Indian Driving Cycles (MIDC) each made of Part 1 (four elementary urban cycles of 195 s duration each) and Part 2 (an extra-urban cycle) as given in Annex B of CMVR for vehicles of category M1, M2 (with GVW up to 3500 kg).

The driving cycle shall be, Part 1 of the Modified Indian Driving Cycle as given in Annex B of CMVR, for vehicles of category N.

The driving cycle shall be Delhi Driving Cycle as given in AIS-049 (Rev 1):2016, as amended and revised from time to time, for M2 (with GVW above 3500 kg) and M3 category of vehicles.

(*Page* 1, *Clause* **6.3.1**) **—** Substitute the following for the existing:

6.3.1 *Principle*

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

If the Electric Power Train Vehicle has multiple driving modes,

where default mode is —

a) Available, test shall be carried out in default mode.
b) Not available, then test shall be carried out in worst case mode agreed between vehicle manufacture and test agency.

[*Page* 2, *Clause* **6.5** (*see* also *Amendment no.* 1)] **—** Substitute the following for the existing:

'6.5 Application of the Cycle and Measurement of the Range

The test sequence shall be followed as per **6.1**.

For L1 category of vehicles, automatic head lamp and for L2 category of vehicles, automatic head lamp or daytime running lamps shall be ON, during the test cycle.

For vehicles of other than L1 and L2 category, if DRL is installed on vehicle, DRL may be switched ON during test cycle as per vehicle manufacture's recommendation.

The vehicle tested shall be equipped with the daytime running lamp system that has the highest electrical energy consumption among the daytime running lamp systems, which are fitted by the manufacturer to vehicles.

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 percent of the maximum speed of the driving cycle or 85 Percent of the maximum speed of the vehicle for L 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 ofnot more than 15 min 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.'

A-5.2 Draft for Amendment in IS 17191 Part 1

DRAFT AMENDMENT NO. 2
TO
IS 17191 (Part 1): 2019
ELECTRIC POWER TRAIN VEHICLES — PART 1 MEASUREMENT OF ELECTRICAL ENERGY CONSUMPTION

[*Page* 4, *Clause* **4.4, b)**] — Substitute the following for the existing:

(b) Application of 34 cycles of IDC (of 108 s duration each) as given in Annex A of CMVR for L category of vehicles.

Or

2 Modified Indian Driving Cycles (MIDC) each made of Part-I (four elementary urban cycles of 195 s duration each) and Part 2 (an extra-urban cycle) as given in Annex B of CMVR (test distance: 22 km, test duration: 40 minutes) for vehicles of category M1, M2 (with GVW up to 3500 kg).
Or

22 Cycles of Part-I of the Modified Indian Driving Cycle (MIDC) as given in Annex B of CMVR for N Category of vehicles.

Or

25 Cycles of Delhi Driving Cycle for M2 (with GVW above 3500 kg) and M3 category of vehicles (refer para 5.1.1 or 5.1.2) (see Annex C)

(*Page* 5, *Clause* **6.1.2) —** Substitute the following for the existing:

6.1.2 The driving cycle shall be Modified Indian Driving Cycles (MIDC) each made of Part 1 (four elementary urban cycles of 195 s duration each) and Part 2 (an extra-urban cycle) as given in Annex B of CMVR for vehicles of category M1, M2 (with GVW up to 3500 kg).

The driving cycle shall be, Part 1 of the modified Indian Driving Cycle as given in Annex A of CMVR, for vehicles of category N.

The driving cycle shall be Delhi Driving Cycle as given in AIS-049 (Rev 1):2016, as amended and revised from time to time, for M2 (with GVW above 3500 kg) and M3 category of vehicles.

(*Page* 5, *Clause* **6.3.1**) — Substitute the following for the existing:

6.3.1 *Principle*

The test method described hereafter permits to measure the electric energy consumption expressed in Wh/km, to be measured:

If the Electric Power Train Vehicle has multiple driving modes,

where default mode is –

a) Available, test shall be carried out in default mode.
b) Not available, then test shall be carried out in worst case mode agreed between vehicle manufacture and test agency.

[*Page* 5, *Clause* **6.4.2**(*see* also *Amendment no.* 1)**]** — Substitute the following for the existing:

6.4.2 The chassis dynamometer shall be set as per the settings given in **6.2**. Starting within 4 h from to, 34 cycles of IDC (of 108 s duration each) or 22 cycles of Part 1 of MIDC (of 195 s duration each) or 2 MIDC cycles each made of Part 1 (four elementary urban cycles of 195 s duration each) and Part 2 (an extra-urban cycle) or 25 cycle of Delhi Driving Cycle as applicable (refer para **6.1.1** or **6.1.2** above) are run. At the end, the covered distance (D) in km is recorded.

For L1 category of vehicles, automatic head lamp and for L2 category of vehicles, automatic head lamp or daytime running lamps shall be ON, during the test cycle.

For vehicles of other than L1 and L2 category, if DRL is installed on vehicle, DRL may be switched ON during test cycle as per vehicle manufacture's recommendation.

The vehicle tested shall be equipped with the daytime running lamp system that has the highest electrical energy consumption among the daytime running lamp systems, which are fitted by the manufacturer to vehicles.

(*Page* 5, *Clause* **6.5.4**) — Substitute the following for the existing:

6.5.4 *Test Results*

The result of the electric energy consumption shall be expressed in Watt - hour per kilometer (Wh/km) rounded off to the nearest whole number.

ANNEXURE 6

(Sl No 3 of item 3)

Minutes of Sub-Panel meeting (on Traction Motor)

Minutes not received, Sub-Panel to brief the status/recommendation

ANNEXURE 7

(Sl No 7 of item 3)

Creation of Panel 8 and its meeting

A-7.1 Mail for Chemistry Agnostic

Regarding Chemistry Agnostic Standard

ME Me <ted@bis.gov.in>
Mon, 22 Jul 2024 9:22:52 AM +0530

To "muthukumar.n" <muthukumar.n@ashokleyland.com>, "Faustino.v" <Faustino.v@ashokleyland.com>, "Parthiban.s2" <Parthiban.s2@ashokleyland.com>, "dt.asrtu" <dt.asrtu@gmail.com>, "sritrinath" <sritrinath@gmail.com>, "sanjay.tank" <sanjay.tank@acma.in>, "ankit.dhiman" <ankit.dhiman@acma.in>, "deshpande.aed" <deshpande.aed@araiindia.com>, "desai.aed" <desai.aed@araiindia.com>, "mengaji.aed" <mengaji.aed@araiindia.com>, "avkumbhar" <avkumbhar@bajajauto.co.in>, "mjpagare" <mjpagare@bajajauto.co.in>, "akumar15" <akumar15@bajajauto.co.in>, "Robindro Lairenlakpam" <robindro@iip.res.in>, "Wittison Kamei" <kamei.wittison@iip.res.in>, "ntiwari" <ntiwari@cirtindia.com>, "sndhole" <sndhole@cirtindia.com>, "Ankush Tewani" <ankush.cpcb@nic.in>, "Gautam Kumar Sharma" <gautam.cpcb@gov.in>, "vvcsekar" <vvcsekar@cdac.in>, "renji" <renji@cdac.in>, "udayasagar" <udayasagar@cdac.in>, "vivek" <vivek@cseindia.org>, "Anumita" <Anumita@cseindia.org>, "Moushumi.mohanty" <Moushumi.mohanty@cseindia.org>, "peters.noel" <peters.noel@suzukimotorcycle.in>, "ak.prakash" <ak.prakash@hella.com>, "sujit.barhate" <sujit.barhate@hella.com>, "abhishek.mandhana" <abhishek.mandhana@hella.com>, "Feroz.khan" <Feroz.khan@heromotocorp.com>, "piyush.chowdhry" <piyush.chowdhry@heromotocorp.com>, "varun2.sharma" <varun2.sharma@heromotocorp.com>, "muthu_kumar" <muthu_kumar@n.t.rd.honda.co.jp>, "Gagan_Manral" <Gagan_Manral@n.t.rd.honda.co.jp>, "ngaba" <ngaba@hondacarindia.com>, "vipin.sharma" <vipin.sharma@honda.hmsi.in>, "arpan.shukla" <arpan.shukla@honda2wheelersindia.com>

Cc "saurabh dalela" <saurabh.dalela@icat.in>

Dear Madam/Sir,

This is in reference to the item 5.2 of the 14th meeting of TED 27(attached).

We have received the detailed report from NITI Ayog and it has been shared with Committee Members vide mail dated 28.6.2024.

In consultation with TED 27 Chairman (Shri Saurabh Dalela-Director ICAT), it has been decided to take-up the subject on **TOP Priority.** A preliminary meeting was held at Manak Bhawan BIS HQ New Delhi under Guidance of DDG- Standardization (BIS) and TED 27 Chairman. During the meeting, the road map for expeditious development of this priority subject was deliberated upon and it was decided to constitute a seperate panel (P-8) of experts having domain knowledge on the subject. Present composition of Panel 8, is as follows:

Convenor	Sh Saurabh Dalela (Director ICAT and Charman TED 27)
Experts from:	***Nomination Received/Awaited***
ARAI	Mr. Sachin Pandit
OLA	Mr Subrat Dash
TATA	Mr. Kapil Vaidya Mr. Jayesh Zadokar
IIT Bombay	Prof. Venkatasailanathan Ramadesigan
Chakra Innovation	Mr. Abhijit Datta Ms. Abhilasha Meena
NITI AYOG	Sh. Manoj Kumar Upadhyay
IOCL	Mr. P Mohana Sundaram
MoRTH	Nomination awaited

It was further decided that since the subject will now be dealt by the special Panel (P-8) as above, the same subject now stands withdrawn from other panel within TED 27 in order to avoid duplicity of the work.

Committee Members are requested to share their comments/inputs if any on the subject.

Next meeting of Panel 8 will be convened shortly in consultation with the Panel Convenor.

Regards
August Dubey
Scientist C| Deputy Director
Transport Engg Department (TED)
Bureau of Indian Standards
Ministry of Consumer Affairs, Food & Public Distribution, GOI

1 Attachment(s) • Download as Zip

Approved mINUTES-TED 27.pdf
342.6 KB •

A-7.2 Minutes of Panel 8 meeting (1st meeting)

Minutes
(For BIS internal use only)

Name of the Panel	Date and Time	Day	Venue
Panel 8	**2 August 2024 11AM onward**	**Friday**	**Hybrid (ICAT+Virtual)**

Convenor: Shri Saurabh Dalela
Member Secretary: August Dubey Sc. C, TED

The Member Secretary welcomed the participants. The Chairperson also welcomed everyone and emphasized that we should not be seen as restricting innovation and technology. Given that battery technology is still evolving and not yet mature, the government's aggressive push for electric vehicles (EVs) aims for 30% penetration by 2030, the Chairperson stressed that the panel's work should support this target and not hinder technological advancements. Further the Chairman stressed that the final standard must not therefore appear for a specific technology(s) but as much as possible should be technology / chemistry independent.

List of Participants attached at Annexure-1.

The Member Secretary then gave a presentation, summarizing the actions taken so far, with the details provided in Annexure-2.

Mr. Manoj from NITI Aayog provided background information, explaining that the report was prepared based on communication from the Prime Minister's Office (PMO). He mentioned that the report concluded that chemistry-agnostic parameters can be developed for niche battery chemistries that are still in laboratory testing or early market trials. This is not intended to replace or modify the existing testing systems or practices, but rather to facilitate the development of standards for new battery chemistries. This is an attempt to facilitate new battery chemistry which are not covered under existing standards by developing a standard(s) which would cover known/expected requirements to run them as pilot project, and once they have successful trial with learning of that, remaining/additional requirement could be added

Panel mentioned that existing AIS standards (and corresponding Indian Standards) for EVs are chemistry-agnostic and primarily focus on the safety of Rechargeable Energy Storage Systems (REESS). Panel agreed that when defining terminology, as far as possible, references of international standards and documents should be taken into account.

The panel also discussed whether to address the subject through amendments to existing standards or by formulating new Indian Standards. After deliberation, it was decided not to modify the existing standards, but instead to create new Indian Standards (to avoid any issues/conflict in ongoing practices of certification and approval).

Panel deliberated and recommended that the new standards (that would be developed) should address safety (including thermal safety), certain aspects of performance, and environmental considerations.

Mr. P. Mohan from IOCL mentioned that certain batteries differ based on their applications. For example, lead-acid batteries face challenges with fast charging, whereas Li-ion batteries have an advantage in this aspect. Comparing these for a three-wheeler application, both may be suitable, but their fast-charging capabilities differ. Similarly, Li-ion batteries perform poorly at low temperatures compared to lead-acid batteries. The panel acknowledged these technical intricacies and decided to discuss them in the next meeting.

The panel deliberated on a co-option request from MSIL and decided not to approve it. Further, it agreed to incorporate NFTDC (Director-Mr. Bala, or some other expert from NFTDC) into Panel 8. The panel also requested members to suggest details of stakeholders involved in the manufacturing or development of new battery chemistries.

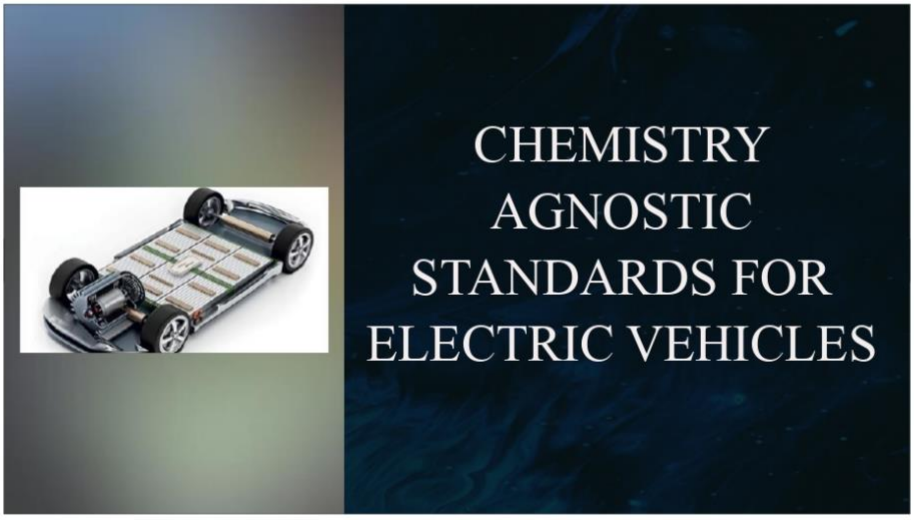
Panel agreed that a webinar should be conducted by Chakra Innovation and all relevant stake holders engaged in specific battery chemistry, in association with BIS to gather stakeholders' perspectives on the challenges they face with new technologies for EV, and to take their input on the subject. The input from the webinar will be reviewed in the next panel meeting.

The panel decided that the following speakers will present a presentation at the webinar (preferably on 13.8.2024 from 11:00 AM onwards):
1. Professor from IIT Bombay
2. Representatives from Chakra Innovation
3. Representatives from Ola Electric

Panel requested Chakra innovation to prepare the draft document for formulation of New Indian Standards, based on above discussion and submit to the panel for deliberation in next meeting. It further decided to hold the next meeting on 23.8.2024 from 2:00 PM to 4:00 PM.

There being no other business, meeting ended with vote of thanks to the Chair and participants.

Annexure -1



Development So For

- **Minutes of meeting from NITI Ayog dt. 30.1.2024**

NITI Ayog has constituted an Expert Committee for developing Chemistry Agnostic Standards for Energy Storage Technology. The Expert Committee mentioned that BIS need to modify the existing application standards AIS 038, AIS 040, AIS 041, AIS 048, AIS 049 and AIS 156 etc. to support the available and upcoming battery energy storage. Further modification and clarification may be appended as annexures with existing standards as discussed in the above para.

- **Modification in AIS standards are not under the purview of BIS. However TED 27 has formulated Indian Standards based on AIS 038, AIS 156 and other AIS standard for E-Mobility, Committee deliberated and decided as follows:**

14th meeting TED 27-

- Committee deliberated and mentioned that separate standards may be formulated based on inputs received from committee constituted by NITI Ayog.
- It advised BIS to request Chakra Innovation to brief about Aluminium Air Battery in Panel 3 meeting. It requested panel 3 to deliberate further and provide its recommendation.

Development So For

- Final Report of the Expert Committee for Developing Chemistry agnostic standards for energy storage technologies: received on 20.6.2024
- It was Circulated with TED 27members
- Meeting at BIS HQ- Under Guidance of Chair TED 27 and DDG-Standardization on 2/7/2024
- It was decided to Constitute a new panel and take up the project expeditiously

PANEL 8
CHEMISTRY AGNOSTIC STANDARD

Convenor	Sh. Saurabh Dalela (Director ICAT and Charman TED 27)
Experts from:	**Nomination Received/Awaited**
ARAI	Sh. Sachin Pandit
OLA Electric	Sh. Subrat Dash
TATA Motors	Sh. Kapil Vaidya Sh. Jayesh Zadokar
IIT Bombay	Prof. Venkatasailanathan Ramadesigan
Chakra Innovation	Sh. Abhijit Datta Ms. Abhilasha Meena
NITI AYOG	Sh. Manoj Kumar Upadhyay
IOCL	Sh. P Mohana Sundaram
MoRTH	Nomination Awaited

NOTE:
1 MSIL has requested to be part of the Panel 8 vide mail dated 22.7.2024

2. Ms Mohanty (CSE) input : Dr Bala was super helpful when we worked on the Tropical EV Batteries whitepaper in collaboration with the Department of Science and Technology last year. It was released by the Minister on National Science Day in February this year. The paper focused on low and high TRL level battery chemistries for development and production in India.

Application of Chemistry Agnostic Standards

- CHEMISTRY AGNOSTIC STANDARDS CAN BE USED IN TWO APPLICATION
  - Stationary Purpose- To be addressed by ETD
  - Mobility Purpose (For EV)- To be addressed by TED

Annexure -2

List of Participants

SL NO.	NAME OF ORGANIZATION	NAME OF MEMBER
1)	Automotive Research Association of India (ARAI)	Shri Sachin Pandit
2)	Chakr Innovation Private Limited, Gurugram	Shri Raman kukreja
3)	Chakr Innovation Private Limited, Gurugram	Shri Mohit
4)	Chakr Innovation Private Limited, Gurugram	Shri Abhijit Datta
5)	Chakr Innovation Private Limited, Gurugram	Ms Abhilasha
6)	International Centre for Automotive Technology (ICAT)	Shri Deepak Joshi
7)	International Centre for Automotive Technology (ICAT)	Dr Madhusudan Joshi
8)	Indian Oil Corporation Ltd	Shri P Mohana Sundaram
9)	Indian Institute of Technology Bombay,	Prof. Venkatasailanathan Ramadesigan
10)	NITI Aayog	Shri Manoj Kumar Upadhyay
11)	Ola Electric Technologies Private Limited	Shri Subrat Dash
12)	Tata Motors Limited, Pune	Shri Jayesh Zadokar
13)	Tata Motors Limited, Pune	Shri Kapil Baidya
14)	Tata Motors Limited, Pune	Ms Sayali kale

ANNEXURE 8

(Sl No 3 of item 3)

Comments on IS 18606: 2024

Basic Details	**Clause/Subclause No.& Attachment**	**Paragraph No./Figure No./Table No.**	**Type of Comment**	**Comments/Suggestions along with Justification for the Proposed Change**	**Proposed Change/Modified Wordings**
Name: Shubhajit Kulavi Organisation: MSIL Email: shubhajit.kulavi@maruti.co.in Comment ID #: TED_2024-11-159607	NA cmt_1731667190_673724f672124.png	NA	Editorial	(~~**Page 26**~~, Clause G-2.1, key, Sl No. 7) — Substitute the following for the existing: 7 Spray nozzle - brass with 121 holes, Φ 0.5: 1 hole in centre, 2 inner circle of 12 holes at 30° pitch, and 4 outer circle of 24 holes at 15° pitch.	(**Page 29,** Clause G-2.1, key, Sl No. 7) — Substitute the following for the existing: 7 Spray nozzle - brass with 121 holes, Φ 0.5: 1 hole in centre, 2 inner circle of 12 holes at 30° pitch, and 4 outer circle of 24 holes at 15° pitch.

ANNEXURE 9

(Sl No 12 of item 3)

MINUTES OF PANEL 4 MEETING

9.1 Minutes Panel 4 (dt 11.9.2024)

Minutes of Panel 4 meeting

Name of the Panel	Date and Time	Day	Venue
Panel 4-TED 27 EV Electronics Components & Systems(PHS, BMS, Controllers & Sensors)	**11 September 2024** (11AM onwards)	**Wednesday**	**Virtual**

Convenor: Dr. Dhiraj Mahajan (Associate Professor, IIT Ropar)
Member Secretary- August Dubey

The Member Secretary welcomed the participants and requested for brief introductions. After introduction, Convenor also welcomed the members and outlined the agenda of panel meeting.

Shri Selvaraj from Roots Industry presented the presentation and highlighted the need of standard for DC to DC converter (presentation attached at Annex-1). Shri Selvaraj proposed adopting ISO 21782 Part 4 with proposed modifications, to include the requirements of DC to DC converter for Voltage Class A equipment.

Some of the panel members suggested to adopt ISO 21782 Part 4, identically and to develop a separate standard for requirement of DC to DC converter for voltage CLASS A equipment. Panel deliberated and decided that further study of the ISO standards (ISO 21782-4 and ISO 21782-7) and the proposed modifications was necessary before reaching a conclusion that whether to formulate a single standard or two separate standards. It constituted a sub-group to undertake this study, consisting of Shri Selvaraj (Roots), Shri Manoj Desai (ARAI), and Shri Sumit (MSIL), with Shri Selvaraj as the group leader.

The panel also addressed other topics and assigned responsibilities as follows:

Standards	**Assigned to Experts**(from)
ISO 21782-1: General test conditions and definitions	HMSI
ISO 21782-2: Performance testing of the motor system	MAHINDRA
ISO 21782-5: Operating load testing of the motor system	
ISO 21782-3: Performance testing of the motor and the inverter	HMC
ISO 21782-6: Operating load testing of the motor and the inverter	
ISO 21498 Part 1: Electrically propelled road vehicles — Electrical specifications and tests for voltage class B systems and components Part 1: Voltage sub-classes and characteristics	IIT Ropar
ISO 21498 Part 2: Electrically propelled road vehicles — Electrical specifications and tests for voltage class B systems and components Part 2: Electrical tests for components	

Participants requested BIS to share the aforementioned ISO standards for review. Panel requested members to complete their studies and submit their findings to the Convenor and BIS, which would be circulated and discussed in the next panel meeting. It decided to hold the next meeting of Panel 4 on 15 October 2024 (3:00 PM Onwards)

The list of participants is attached as Annex -2.

There being no other business, meeting ended with vote of thanks to Convenor and Participants.

Annex 1
Presentation from Roots Industries

STANDARD PROPOSAL

DC DC Converters

DC-DC Converter is a power electronics unit that provides electrical power to 12V, 24V, or 48V (or higher) systems on an electrified vehicle system.

The DCDC Converter is a switching power supply system that receives an input from a high voltage and converts (reduces or bucks) the voltage to a lower voltage of the same type (i.e., higher dc voltage to a lower dc voltage). It can also convert a lower input voltage and increase (boost) to a higher output voltage.

Existing ISO Standard for DC DC Converters

- **ISO 21782-1:2023(E)**
  General test conditions and definitions

- **ISO 21782-4:2021(E)**
  Performance testing of the DC/DC converter

- **ISO 21782-7:2021(E)**
  Operating load testing of the DC/DC converter

- **Developing BIS standard and Definitions of product requirements, supports to enhance Quality and Reliability controls over these products, as it's an emerging product and used in EV's & other applications**

- **ISO 21782-4 to be adopted for voltage class B systems (60 VDC and 1500 VDC).**

- **Along with this adoption,**
  - **Request to add voltage class A systems (</= 60VDC)**
  - **In addition to this, proposed to include Electrical requirements such as**
  - **Sleep current**
  - **Ripple voltage**
  - **Over load capacity & protection**
  - **Short circuit protection**
  - **Insulation resistance**
  - **Line & Load regulations**
  - **Storage / operating temperature**
  - **Life test**

- **Request to include EMI/EMC (AIS 004 Part 3) requirements**

THANK YOU

Annex 2
Detail of participants

NAME OF ORGANIZATION	NAME OF PARTICIPANT	EMAIL
Automotive Component Manufactures Association of India, New Delhi	Shri Sanjay Tank	sanjay.tank@acma.in
Automotive Research Association of India, Pune	Shri Manoj Desai	desai.aed@araiindia.com
Denso International India Private Limited, Gurugram	Shri Rohit Yadav	rohit.yadav.a6y@ap.denso.com
Hero MotoCorp Limited, New Delhi	Shri Yash Yadav	yash.yadav@heromotocorp.com
Hero MotoCorp Limited, New Delhi	Ms. Apoorva Tripathi	apoorva.tripathi@heromotocorp.com
Honda Motorcycle & Scooter India Pvt. Ltd.	Shri Ajay Kumar	ajay.kumar5@honda.hmsi.in
Indian Institute of Technology Ropar, Punjab	Dr Kalaiselvi J	kalaiselvi@iitrpr.ac.in
Maruti Suzuki India Limited, Gurugram	Shri Sumit Kumar	sumitkumar@maruti.co.in
Maruti Suzuki India Limited, Gurugram	Shri Shubhajit Kulavi	shubhajit.kulavi@maruti.co.in
Mahindra and Mahindra Limited, Mumbai	Shri Rajkumar Koilraj	koilraj.rajkumar@mahindra.com
Mahindra and Mahindra Limited, Mumbai	Shri Akshay Ap	ap.akshay@mahindra.com
Minda Corporation Ltd.	Shri Gouri Sankar Pattanaik	gourisankar.pattanaik@mindacorporation.com
Minda Corporation Ltd.	Shri Dhanashri Abhane	dhanashri.abhane@mindacorporation.com
Roots Industries India Limited, Coimbatore	Shri Selvaraj R	rselvaraj@roots.co.in

A-9.2 Minutes of Panel 4 meeting (dt. 12.11.2024)

Minutes of Panel 4 meeting

Name of the Panel	Date and Time	Day	Venue
2nd meeting of Panel 4/TED 27 EV Electronics Components & Systems(PHS, BMS, Controllers & Sensors)	**12.11.2024**	**Tuesday**	**Virtual**

Convenor: Dr. Dhiraj Mahajan (Associate Professor, IIT Ropar)
Member Secretary- August Dubey
The Member Secretary welcomed the participants and requested for brief introductions. After introduction, Convenor also welcomed the members and outlined the agenda of panel meeting.
List of Participants attached at **Annexure 1.**
Panel deliberated and recommended as follows:

Standards	Assigned to **Experts**/(from)	Panel recommendation
ISO 21782 -4 Electrically propelled road vehicles — Test specification for electric propulsion components Part 4: Performance testing of the DC/DC converter ISO 21782 - 7: ISO 21782-7:2021 Electrically propelled road vehicles — Test specification for electric propulsion components Part 7: Operating load testing of the DC/DC converter	Working Group on DC/DC Converter (**WG1/P4**): • Shri Selvaraj (Roots)- Convenor • Shri Manoj Desai (ARAI), • and Shri Sumit (MSIL),	Shri Selvaraj from Roots briefed the ppt (attached **Annexure- 2).** He further added that input from ARAI is awaited for points related to testing. Panel deliberated and requested ARAI to provide input at earliest. It further requested **WG1/P4** to finalize its recommendation at earliest
ISO 21782-1: General test conditions and definitions	HMSI	Shri Arpan Shukla mentioned that standard is general in nature and it will be useful If other parts are considered for adoption. Panel deliberated and decided to take decision after deliberation on other standards.
ISO 21782-2: Performance testing of the motor system ISO 21782-5: Operating load testing of the motor system	MAHINDRA	Shri Akshay and Shri Karuppasamy from M&M briefed the presentation attached at **Annexure- 3.** Panel deliberated and mentioned that subject Motor System is addressed sufficiently in existing standards. Thus adoption of ISO 21782 Part 2 and 5 are not required for time being.
ISO 21782-3: Performance testing of the motor and the inverter ISO 21782-6: Operating load testing of the motor and the inverter	HMC	Shri Varun Sharma from HMC briefed the presentation attached at **Annexure- 4.** Panel deliberated and constituted a working group-**WG2/P4** (Motor and Inverter) consisting of experts from BAL, HMSI and HMC (Shri Varun Sharma - Convenor), ACMA, ICAT and ARAI to deliberate and provide the recommendation: 1: Need of standard for class A system 2. If needed then how to address class A system (through modified adoption of ISO standard or through development of separate standard for class A system)

		Panel further requested other experts (from 4 wheeler segment, testing agency and ACMA) to provide recommendation on necessity of standard on the subject and suggestions for modification required in the standard, if any.
ISO 21498 Part 1: Electrically propelled road vehicles — Electrical specifications and tests for voltage class B systems and components Part 1: Voltage sub-classes and characteristics	IIT Ropar	Dr Dhiraj Mahajan briefed the ISO 21498 Part 1 and Part 2. Panel deliberated and requested other members to go through the standard and provide their input that whether the subject is covered in existing IS/AIS standard or not.
ISO 21498 Part 2: Electrically propelled road vehicles — Electrical specifications and tests for voltage class B systems and components Part 2: Electrical tests for components		

Panel mentioned that as all above standards are component standards thus active participation of experts from ACMA members is needed. It further requested ACMA to nominate suitable experts for each above subject. It further requested BIS to share all the standards with all panel members for their review.
There being no other points, meeting ended with vote of thanks to Convenor and Participants.

Annexure 1
List of Participants

SL. NO.	NAME OF MEMBER	NAME OF ORGANIZATION
1)	Shri Abhay Kumar	Bajaj Auto Ltd
2)	Shri Arpan Shukla	Honda Motorcycle & Scooter India Pvt. Ltd.
3)	Ms. Apoorva Tripathi	Hero MotoCorp Limited, New Delhi
4)	Shri Varun Sharma	Hero MotoCorp Ltd.
5)	Shri Yash Yadav	Hero MotoCorp Ltd.
6)	Dr. Dhiraj K. Mahajan	Indian Institute of Technology Ropar, Punjab
7)	Shri Kalaiselvi J	Indian Institute of Technology Ropar, Punjab
8)	Shri Akshay AP	Mahindra and Mahindra Limited, Mumbai
9)	Shri Karuppasamy Thangaraj	Mahindra and Mahindra Limited, Mumbai
10)	Shri Shubhajit Kulavi	Maruti Suzuki India Limited, Gurugram
11)	Shri Sumit Kumar	Maruti Suzuki India Limited, Gurugram
12)	Shri Arun Kumar	Maruti Suzuki India Limited, Gurugram
13)	Shri Dhanashri Abhane	Minda Corporation Ltd.
14)	Shri Selvaraj R	Roots Industries India Limited, Coimbatore
15)	Shri Ramkrishna Ahire	Suzuki Motorcycle India Private Limited, Gurugram

Annexure 2
Presentation from Shri Selvaraj

DC DC Converter – Standard Proposal

- **Reference : Panel 4, TED 27 meeting dt 11.Sep.2024**

Scope of Work : Study of ISO standards - ISO 21782-4 and ISO 21782-7 and preparation of proposed modifications

Sub Group Members :
- Shri Manoj Desai (ARAI)
- Shri Sumit (MSIL)
- Shri Selvaraj (Roots)

Proposal :

- Adoption of ISO standards – ISO 21782-1, ISO 21782-4 and ISO 21782-7
- During adoption, we wish to propose following changes for additional inclusion
- These additional Electrical load tests and EMC tests could enhance the Quality and Reliability on DC DC Converters

1) ISO 21782-1:2023(E)

Electrically propelled road vehicles — Test specification for electric propulsion components —
Part 1: **General test conditions and definitions**

Scope
This document specifies the test procedures for performance and operating load for voltage class B electric propulsion components (motor, inverter, DC/DC converter) and their combinations (motor system) of electrically propelled road vehicles.
This document specifies the terms and definitions used in the ISO 21782 series and general test conditions.

Proposal 1 : Along with this adoption, voltage class A systems (</= 60VDC) to be included in the scope

Voltage class A classification of an electric component or circuit with a maximum working voltage (3.5) of ≤ 30 V AC (rms) or ≤ 60 V DC respectively
Voltage class B classification of an electric component or circuit with a maximum working voltage (3.5) of (> 30 and ≤ 1 000) V AC (rms) or (> 60 and ≤ 1 500) V DC respectively

2) ISO 21782-4:2021(E)

Electrically propelled road vehicles — Test specification for electric propulsion components —

Part 4: Performance testing of the DC/DC converter

Scope
This document specifies performance tests and each evaluation for the DC/DC converter in the voltage class B electric propulsion system of electrically propelled road vehicles.

Proposal 1 : Along with this adoption, voltage class A systems (</= 60VDC) to be included in the scope

Test conditions	Value	Remark
DC/DC converter input voltage	— Maximum voltage for unlimited operating capability as specified in ISO 21498-1 — Minimum voltage for unlimited operating capability as specified in ISO 21498-1 — Rated voltage as defined in ISO 21782-1:2019, 3.22	For DC/DC converter input voltage tolerance, see ISO 21782-1:2019, 5.3.
Operating points	Test points as defined in Figure B.1 — "p_1" to "p_{18}"	
Ambient conditions	Room temperature (RT) and humidity as defined in ISO 21782-1:2019, 5.4	

Proposal 2 : Referred documents revision level and clause nos to be removed. Only standard nos to be mentioned.

Following voltage characteristics can be considered to include in ISO 21782-4

Electrically propelled road vehicles — Electrical specifications and tests for voltage class B systems and components — Part 1: Voltage sub-classes and characteristics - ISO 21498-1:2021(E)

1. Voltage operating ranges
2. Under voltages
3. Over voltages
4. Voltage transients
5. Ripple voltage

Ripple : Set of unwanted periodic deviations with respect to the average value of the measured or supplied quantity, occurring at frequencies which can be related to that of components within a system

Transient : Phenomenon or quantity which varies between two consecutive steady states during a short time interval compared to the timescale of interest

Proposal 3 : As referred in ISO 21498-1, the above voltage characteristics to be included as an enhanced controls over DC DC Converter .

Following Electrical load characteristics can be considered to include in ISO 21782-4

ISO 16750-2:2023 Road vehicles — Environmental conditions and testing for electrical and electronic equipment - Part 2: Electrical loads

- Superimposed alternating voltage
- Slow decrease and increase of supply voltage. Discontinuities in supply voltage
- Reversed voltage
- Short circuit protection
- Insulation resistance

ISO 21780 Road vehicles — Supply voltage of 48 V — Electrical requirements and tests

- Quiescent current

Proposal 4 : As referred in ISO 16750-2 and ISO 21780, the above electrical load tests to be included as an enhanced controls over DC DC Converter .

- **Regulatory requirements - EMI/EMC Certification –AIS 004 Part 3**

Proposal 5 : The above Regulatory requirement to be included as an EMC controls for DC DC Converter .

3) ISO 21782-7:2021(E)

Electrically propelled road vehicles — Test specification for electric propulsion components — Part 7:Operating load testing of the DC/DC converter

Scope

This document specifies the operating load test and test criteria for the DC/DC converter designed as a voltage class B electric propulsion system of electrically propelled road vehicles.

Proposal 1 : Along with this adoption, voltage class A systems (</= 60VDC) to be included in the scope

Summary of proposed changes :

Proposal 1 : Along with this adoption, voltage class A systems (</= 60VDC) to be included in the scope

Proposal 2 : Referred documents revision level and clause nos to be removed (e.g. ISO 21782-1:2019, 5.4). Only standard nos to be mentioned.

Proposal 3 : As referred in ISO 21498-1, basic voltage characteristics tests to be included as an enhanced controls over DC DC Converter .

Proposal 4 : As referred in ISO 16750-2 and ISO 21780, basic electrical load tests to be included as an enhanced controls over DC DC Converter .

Proposal 5 : Regulatory requirement AIS 004 Part 3 to be included as an EMI/EMC control over DC DC Converters.

THANK YOU

Annexure 3
Presentation from M&M

ISO to IS Conversion
(M&M Study & Inputs)

ISO 21782-2: Performance testing of the motor system

ISO 21782-5: Operating load testing of the motor system

Brief of the ISO standards

ISO 21782 Part 2

Scope: performance tests for motor system designed as a voltage class B electric propulsion system for electrically propelled road vehicles.

Tests and requirements:

- **Measurement of Total Loss and Total Efficiency**: To evaluate the energy efficiency of the motor and inverter by measuring the total energy losses across various operating conditions.
- **Temperature Rise Test**: To measure the increase in temperature of the motor and inverter during operation, ensuring that the components stay within safe temperature limits.
- **Torque Characteristic Test**: To assess the torque output of the motor across a range of speeds and operating conditions to verify performance specifications.
- **Torque Ripple Test**: To measure fluctuations in the motor's torque output (torque ripple), which can affect smoothness and performance.

Brief of the ISO standards

ISO 21782 Part 5

Scope: operating load tests and test criteria for motor system designed as a voltage class B electric propulsion system for electrically propelled road vehicles.

Tests and requirements:

- **Endurance Test**: To assess the long-term durability of the motor and inverter under sustained operating conditions, ensuring that they maintain performance over time.
- **Surge Voltage Measurement Test**: To check the motor and inverter's ability to withstand transient overvoltage or spikes, ensuring that the system remains stable and protected during such events.
- **Over Speed Test**: To evaluates the motor's performance when it operates beyond its rated speed to ensure it can handle potential over-speed conditions without failure or excessive wear.

M&M Inputs on IS conversion

- The combination of IS 15999 (Part-1): 2021, IS 18073: 2023, IS 17191 Part-3: 2019 and IS 18606: 2024, standards comprehensively covers the key aspects of electric propulsion systems in vehicles, including performance testing of motors, inverters, and converters. Given that the current standards already ensure safety, reliability, and efficiency for electric vehicle components, there is no immediate need for equivalent IS standard for ISO 21782 Part 2 & 5.

- Globally, Many companies continue to rely on established standards like IEC 60034-1, ISO 6469, ISO 12405-4, and SAE standards. Adopting an equivalent IS standard prematurely in India would add an additional layer of complexity that may not be required at this stage.

Annexure 4
Presentation from HMC

Panel-4 under TED 27 – EV Electronics Components & Systems(PHS, BMS, Controllers & Sensors)

Review of ISO 21782-3 & ISO 21782-6

Presented By: Hero MotoCorp Ltd.

Context Setting

- During 1st meeting of Panel-4 under TED 27 held on 11th September 2024, following topics & responsibilities were assigned to members:

Standards	Assigned to Experts(from)
ISO 21782-1: General test conditions and definitions	HMSI
ISO 21782-2: Performance testing of the motor system	MAHINDRA
ISO 21782-5: Operating load testing of the motor system	
ISO 21782-3: Performance testing of the motor and the inverter	HMC
ISO 21782-6: Operating load testing of the motor and the inverter	
ISO 21498 Part 1: Electrically propelled road vehicles — Electrical specifications and tests for voltage class B systems and components Part 1: Voltage sub-classes and characteristics	IIT Ropar
ISO 21498 Part 2: Electrically propelled road vehicles — Electrical specifications and tests for voltage class B systems and components Part 2: Electrical tests for components	

2 ISO Standards were assigned to Hero MotoCorp Ltd.

Review of ISO 21782-3 - Performance testing of the motor and the inverter

S. N.	ISO Standard	Equivalent IS/AIS Standard	Hero MotoCorp Ltd. Understanding & Observations	Recommendations
1.	**ISO 21782-3:2019(E)** Electrically propelled road vehicles - Test specification for electric propulsion components - **Part 3: Performance testing of the motor and the inverter**	No equivalent IS/AIS standard	• It specifies performance tests of the motor and the inverter designed as a **voltage class B** electric propulsion system for electrically propelled road vehicles • This ISO standard focuses on the performance testing of the motor and Inverter as a system • IS 18073 exists which primarily focuses on environmental, mechanical, and performance testing of the **motor alone**.	• We suggest to adopt this ISO standard with technical modifications as per country's needs • We suggest to evaluate feasibility to include Class A voltage in this standard for low-voltage systems wherein test requirements can be adopted as per the original standard. • However, we suggest to have industry views (OEMs, Testing Agency & ACMA) on these standards for further adoption
2.	**ISO 21782-6:2019(E)** Electrically propelled road vehicles - Test specification for electric propulsion components - **Part 6: Operating load testing of motor and inverter**			

Hero

Thank You

ANNEXURE 10

(Sl No 12 of item 3)

Comments on Document TED 27/26886

Comments on TED 27 (26886) WC Acoustic Vehicle Alert System req.

ASHOK LEYLAND
Koi Manzil Door Nahin

Sl. No.	Existing TED 27 (26886) WC AVAS req.	AL proposal	Justifications
1.	**Clause No. 2.0** **References** ISO 10844: 2021 Acoustics — Specification of Test Tracks for Measuring Sound Emitted by Road Vehicles and Their Tyres	**Clause No. 2.0** **References** ISO 10844: **2014 or** 2021 Acoustics — Specification of Test Tracks for Measuring Sound Emitted by Road Vehicles and Their Tyres	ISO 10844: 2021 standard for Test track approval will be mandatory in Europe only from 23rd September 2028. Hence, we suggest inclusion of compliance to either 2014 or 2021 version. For deliberation
2.	**Clause No. B-2.3.1** **Measurement Criteria for A-Weighted Sound Pressure Level** As an aid for measurement and reporting of background noises [see flowchart in Fig. 4.	**Clause No. B-2.3.1** **Measurement Criteria for A-Weighted Sound Pressure Level** As an aid for measurement and reporting of background noises [see flowchart in Fig. 4.]	Editorial correction Either Open bracket removed or Close bracket added for the text "see flowchart in Fig.4"
3.	**Clause No. B-2.3.2** **Vehicle A-Weighted Sound Pressure Level Measurement Correction Criteria**	**Clause No. B-2.3.2** **Vehicle A-Weighted Sound Pressure Level Measurement Correction Criteria** Blank table in Pg. 17 shall be deleted	Editorial correction

(Note: New inclusions shown in blue & deletions strikedthrough in red)

ANNEXURE 11

(item 6.9)

GUIDELINE RECEVIED FROM PNC DEPARTMENT) FOR ADOPTION OF ISO/IEC STANDARDS AND DESIGNATION OF EXPERTS FOR ISO/IEC PROJECTS

(Reference: PNC09/20/2024-PNC-BIS)

Guidelines for strengthening the Standardisation Ecosystem in the country:

ADOPTION OF ISO/IEC STANDARDS

1. Excessive focus on adoption of ISO/IEC standards has two negative implications

a) It hinders the creation of original work and the development of new indigenous standards.
b) Fosters the tendency to take rather than make a standard

2. Therefore, unless a Wide Circulation Draft has already been issued and a revision or amendment is required due to changes in the ISO/IEC standard, no ISO/IEC standards or standards from other Standards Development Organizations shall be adopted without prior approval from the DG henceforth.

3. The proposal for taking up the adoption of a standard must elaborate the advantages and relevance of the adoption in the Indian context.

DESIGNATION OF EXPERTS FOR ISO/IEC PROJECTS

1. Focus will now be on participating in the making of ISO/IEC standards on the basis of the Level of Interest established in respect of a NWIP or draft standard.

2. The Member Secretary, in consultation with the Chair of the Sectional Committee and the Head of Department, and if necessary, with the entire Sectional Committee, shall determine and specify the Level of Interest for each NWIP or draft standard received from ISO/IEC in the IRD Portal.

3. The next step is to designate one or two members of the Sectional Committee to represent BIS for standards categorized as Level H (High) and M (Medium). These designated experts will act as face and voice of BIS for the project at the ISO/IEC level.

4. Experts assigned to H-level projects shall be entitled to attend TC/WG meetings with the approval of the Head of the Standardisation Department, and there shall not be the need to take the matter to the Screening Committee.

5. The designated expert shall be responsible for providing detailed feedback on drafts and documents from ISO/IEC, assisting the Sectional Committee in developing the rationale for proposing NWIPs, finalizing proposals for leadership positions and secretariats and briefing the Sectional Committee on discussions at the ISO/IEC level.

6. Representation of BIS at meetings for M-level projects shall be decided by the Screening Committee.

ANNEXURE 12
(item 6.9)

Presentation by Dr Om Krishan (Meity)

High Voltage 3 in 1 Power Box for EVs

What is HV 3 in1 Power Box

The High Voltage 3 in 1 Power Box combines the functionality of an Onboard Charger (OBC), a DC/DC converter and a PDU (Power Distribution Unit).

1. The OBC is the interface between the car and the public grid. It converts the energy from the network grid AC (Alternative Current) source to DC (Direct Current) voltage of the car high voltage battery in respect with the public grid and the regulations
2. The DC/DC converter stage manages the energy flow between the high voltage network (HV – typically between 200V and 900V) and the low voltage network (e.g. lights, infotainment, power steering, 12V battery, etc.).
3. The PDU enables the connections with all HV units (loads, supply) in a single location in the vehicle. The outlets can be fused in-line with the vehicle safety analysis. An HV or LV interlock can be also incorporated to monitor the connector integrity.

Popular 3 in 1 Available in India

Manufacturer	Voltage Range	On Board Charger (OBC) Rating	DC-DC Converter Rating	Power Distribution Unit (PDU) Configuration
Valeo	200 V to 450V	6.6 kW	2.5 kW	4 ports (Battery, MCU, BCS and Optional)
Amphenol	200V to 500V	6.6 kW	2.5 kW	4 ports (Battery, MCU, BCS and Optional)
Minda	250V to 450V	6.6 kW	2.0 kW	5 ports (Battery, MCU, BCS, Pre-Charge and Optional)
Shinry	240V to 430V	6.5 kW	2 kW	4 ports (Battery, MCU, BCS and Optional)
Jaya Automotive	230V to 450V	6.6 kW	2 kW	4 ports (Battery, MCU, BCS and Optional)
Jaya Automotive	230V to 450V	3.3 kW	2 kW	3 ports (Battery, BCS and Optional)

Way Forward

- Three basic parts, 1. OBC, 2. DC-DC and 3. PDU.
- All these three are matured products with global standards.
- OBC of 3.3kW and 6.6kW being used here is a Type-2 charger which is as per IEC standard, so also the DC-DC converter and PDU.
- Only additional thing is all three are put in one box, standards as whole ?.