



**MACHINE CATEGORY SPECIFIC GUIDELINES FOR  
Grant of BIS Certification as per “The Machinery and Electrical Equipment Safety  
(Omnibus Technical Regulations) Order, 2024”**

**Under Scheme-X of  
Bureau of Indian Standards (Conformity Assessment) Regulations, 2018  
Guidelines For  
Semiconductor converters**

*These Machine category specific Guidelines shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-X of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products notified under “The Machinery and Electrical Equipment Safety (Omnibus Technical Regulations) Order, 2024”. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.*

Section of the Guidelines	Aspects dealt with
A.	Introduction
B.	Machine Category specific requirements to be submitted in Technical File of the Machines  <i>[This section stipulates the additional Machine category specific requirements to be submitted in Technical File of the Machines, other than those specified in the General Guidelines for grant of licence]</i>
C.	Series/Grouping guidelines for Grant of licence/Change in Scope of licence
D.	Labelling and Marking requirements
E.	Scope of Licence
F.	Scope of Certificate of Conformity (CoC)

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**CENTRAL MARKS DEPARTMENT-III**

**Subject: Machine Category Specific Guidelines for grant of BIS Certification as per “The Machinery and Electrical Equipment Safety (Omnibus Technical Regulations) Order, 2024” under Scheme-X of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 – Guidelines for Semiconductor Converters**

This document stipulates the Machine category Specific Guidelines for Grant of Licence (GoL)/change in Scope of Licence (CSoL)/Grant of Certificate of Conformity, and are to be read in conjunction with BIS Act 2016 and Rules, Regulations framed thereunder. These guidelines are also to be read in conjunction with the general guidelines for grant of BIS Certification issued vide CMD-I/ 2:17:1 (OTR) dated 14 July 2025, as modified/revised from time to time. Any situation, in general, not covered in these guidelines is to be dealt with as per the provisions of BIS Act, Rules and Regulations by the Regional Offices (ROs) and Branch Offices (BOs).

**SECTION A: Introduction**

1. This Machine Category Specific Guidelines shall be used for the purpose of grant of licence/change in scope of licence for “Semiconductor Converters” specified at Sl. No. 18 of the Third Schedule of the “The Machinery and Electrical Equipment Safety (Omnibus Technical Regulations) Order, 2024” and subsequent amendments made from time to time.
2. For the purpose of obtaining the licence/change in scope of licence from the Bureau, Manufacturer shall apply to Bureau of Indian Standards after ascertaining the scope of licence along with technical file including compliance report(s) as per the procedure defined by the Bureau of Indian Standards under the Conformity Assessment Scheme as specified in “The Machinery and Electrical Equipment Safety (Omnibus Technical Regulations) Order , 2024” and subsequent amendments made from time to time ensuring the required number of sample(s) in respect of a product series/ range or group, as stipulated further in these Guidelines.
3. For the purpose of obtaining Certificate of Conformity (CoC) in respect of a Machine which is not intended to be manufactured on a continuous basis, from the Bureau, Manufacturer shall apply to Bureau of Indian Standards ascertaining the scope of CoC and technical file including compliance report(s), as per the procedure defined by the Bureau of Indian Standards under the Conformity Assessment Scheme as specified in “The Machinery and Electrical Equipment Safety (Omnibus Technical Regulations) Order , 2024” and subsequent amendments made from time to time. CoC will be granted for same Type of Semiconductor Converters only. The scope of CoC shall be limited to the Batch Number/Serial No of the Machine only and the same shall be clearly specified in the scope of CoC granted.

## **SECTION B. Machine specific requirements to be submitted in Technical File of the Machines:**

### ***a) General***

#### **1. Compliance to the Indian standards and Essential requirements to be submitted in the Technical file of the Machine:**

- i. As per the provisions of “The Machinery and Electrical Equipment Safety (Omnibus Technical Regulations) Order, 2024 (OTR)”, Each machine, or as the case may be, electrical equipment specified in the first Schedule shall conform to the corresponding Indian Standards, as applicable, as given below:
  - a) Type A standards as given below: IS 16819:2018/ISO 12100:2010 (Safety of Machinery General Principles for Design- Risk Assessment and Risk Reduction and,
  - b) Type B Standards –as per the second schedule of the Order;
  - c) Type C Standards – as per the third Schedule of the Order:Provided that if a Type C standard deviates from one or more technical provisions dealt with by Type A or Type B standard, Type C standard takes precedence.
- ii. For each model of the machine Applicant manufacturer shall identify the applicable Indian standard and essential requirements, and submit the same in the technical file of the machine along with the application for grant of BIS Certification.
- iii. For machines, of which Type C Standard are already mapped in the Third Schedule of the OTR, compliance shall necessarily include that Standard/Essential requirement.
- iv. For Machines, against which there is no Type C Standard has been mapped as of now, compliance shall necessarily include Type A Standard and Type B Standards (as identified by the manufacturer and as applicable to the machine). In such cases, Manufacturer may himself identify any one or more or Part of Type C Indian Standards available, which he thinks is/are applicable to the particular machine from the point of view of its safety. Manufacturer may submit the compliance to these standards also. In such case, compliance may be checked against these identified Standard(s) or requirements, as applicable, by BIS.
- v. Indian standards and Essential requirements, as applicable, to which the Machine conform shall be specified in the Scope of licence or CoC.

#### **2. Submission of technical file:**

- i) Technical file shall be submitted for each type of Semiconductor Converters based on type of conversion and switching separately.
- ii) However, **in case the manufacturer feels that there are number of models covered in a series, he may submit a combined technical file based on the lead model mentioning details of all models covered in the series with technical justification.** Technical file of lead model of each of the family of models shall be submitted. In the technical file of the lead model, model names/numbers, which are covered in the family shall be specified. *(Please see Section C of these Guidelines regarding family of models)*

***b) Suggestive checklists for evaluation of conformity to applicable Indian Standards and Risk Assessment Sheet and their verification, for various types of Machines/Equipment:***

1. **For Machines, of which Type C Standard are already mapped in the Third Schedule of the OTR:** In order to help manufacturers preparing the technical file for different types of machines, suggestive checklists for evaluation of conformity to applicable Indian Standards and Risk Assessment Sheet have been prepared by BIS based on the information contained in the respective Type C Standard. These checklists do not contain the exhaustive list and are for the purpose of guidance only. Any other hazards/Risks not listed in these checklists, which may be identified by the manufacturer shall also be listed and adequate safety measures shall be taken and indicated in the above check-list by the manufacturer while submitting the technical file of the Machine.

- i. **Checklist for Semiconductor Converters based on IS 16539-1-1/IEC 60146-1-1 is given at *Annexure-1***

Verification of conformity with the safety requirements and/or protective measures shall be done in accordance with IS 16539-1-1/IEC 60146-1-1, as applicable. The protective measures taken by the manufacturer shall be submitted to BIS and these measures may also be verified by BIS during factory visit.

The manufacturers while preparing the technical file for different types of Semiconductor Converters shall also submit the conformity to applicable Indian Standards and Risk Assessment Sheet for compliance to Type A and Type B Standards. The suggestive checklists have been prepared by BIS and are for the purpose of guidance only. Any other hazards/Risks not listed in these checklists, which may be identified by the manufacturer shall also be listed and adequate safety measures shall be taken and indicated in the above check-list by the manufacturer while submitting the technical file of the Machine.

**Checklist for Semiconductor Converters based on IS 16819/ISO 12100 is given at *Annexure-2*.**

**Checklist for Semiconductor Converters based on IS 16504-1/IEC 60204-1 is given at *Annexure-3*.**

***d) Compliance of the Safety related Parts of Control System (SRP/CS) for various Semiconductor Converters as specified in respective Type C Indian standard to be submitted in the Technical file of the Machine.***

**SECTION C. Series/Grouping guidelines for Grant of licence/Change in Scope of licence:**

***a) General:***

1. Manufacturer shall declare all the models of each type of the Semiconductor Converters intended to be covered in the Licence.
2. For CoC, Manufacturer shall declare Type of Semiconductor Converters intended to be covered in the scope of CoC. Further, Date/Month of manufacturing, Model

name/number and Lot No./Batch Number along with Serial No. of the Semiconductor Converters, shall also be declared for unique identification of Semiconductor Converters covered in the scope of CoC.

3. **Manufacturer shall ensure that each model of the Semiconductor Converters conforms to the Indian standard or Essential requirements, as applicable.** However, for the purpose of demonstration of the compliance to applicable Indian Standards or the essential requirements, manufacturer may submit the Risk assessment and compliance reports of the representative model (Lead model) only as described below at sub-para (b):

***b) Family of models and Lead model in a family:***

1. The manufacturer shall declare all the models (by name/ number/ code, as uniquely defined by the manufacturer) of the Semiconductor Converters.
2. The manufacturer shall identify and declare **Family of models** and the **lead model** in each family of models. **Lead model** represents a family of models declared by manufacturer. **While declaring a family of models, similarity of risks including Type of Hazards which are associated with the members of the family of Semiconductor Converters shall be considered. Model posing highest risk and hence employing the maximum safety features shall be declared as the lead model of the family.**
3. For the purpose of demonstration of the compliance to applicable Indian Standards or the essential requirements, manufacturer shall submit compliance of the lead model. Technical file containing Risk assessment and compliance of this lead model shall be submitted along with application.
4. Based on the justification submitted by the manufacturer and subsequent desk-assessment and factory assessment, BIS may agree/modify/not agree to such groupings.
5. Coverage of varieties of Semiconductor Converters in the scope of licence shall be determined accordingly by BIS.
6. During operation of the licence if any new model is intended to be covered within the existing scope of licence and which are considered to be in the same family already covered, application for inclusion of all such new models (Change in scope of licence) in scope of licence along with necessary fee and technical file shall be submitted by licensee to BIS. Based on the assessment made, new models may be included in the scope of licence after review of technical file and/or factory visit. Provision of family of models and submission of technical file of the lead model, as above, may be applicable for such inclusions.


**SECTION D. Labelling and Marking requirements:**

- a) Each Semiconductor Converters or equipment, shall conform to the labeling and marking requirements as specified in the Scheme X of the BIS (Conformity Assessment) Regulations, 2018 and also to be complied with the safety instructions or symbols, if any required to be labeled or marked on the machinery or electrical equipment, as the case may be.

- b) Each Semiconductor Converters or equipment, shall also conform to the labeling and marking requirements including information for use, as specified in the respective Indian Standards i.e. to IS 16539-1-1/IEC 60146-1-1.
- c) **Information as above shall be given in English language also.**
- d) The BIS Standard Mark, as given in the Schedule of the licence, shall be marked on each machine, provided always that the product thus marked conforms to the corresponding Indian standard or Essential requirements, as applicable.

**SECTION E. SCOPE OF LICENCE:**

Licence is granted to use Standard Mark with following scope:

Product	Scope of licence	Standard Mark
Semiconductor Converters	Please see Annexure attached	IS 16819:2018/ISO 12100:2010  CM/L- XXXXXXXXXXXX

Annexure to the scope of licence Number.....

Type of Semiconductor Converters	Models covered		Conforming to Indian Standard(s) or Essential requirements
	Model number/name as uniquely identified, of the lead model in the family	Model number/name as uniquely identified, of the machines covered in the family	

Illustrative example 1 of Annexure to scope of licence (applicable for scope covering Semiconductor Converters):

Type of Machine/Equipment  (Semiconductor Converters)	Models covered		Conforming to Indian Standard(s) or Essential requirements
	Model number/name as uniquely identified, of the lead model in the family	Model number/name as uniquely identified, of the machines covered in the family	
SC-1	LM-SC-1	SC-1-A	IS 16819/ISO 12100 IS 16539-1-1/IEC 60146-1-1
		SC-1-B	
		SC-1-C	



**SECTION F. SCOPE OF CERTIFICATE OF CONFORMITY (CoC):**

Certificate of Conformity is granted with following scope:

Product	Scope of licence
Semiconductor Converters	Please see Annexure attached

Annexure to the scope of Certificate of Conformity number .....

Type of Semiconductor Converters	Models covered		Conforming to Indian Standard(s) or Essential requirements	Lot No./ Batch no. with serial numbers of the Machine (from...to...)	Date/month of manufacturing of the Machine
	Model number/name as uniquely identified, of the lead model in the family	Model number/name as uniquely identified, of the machines covered in the family			

Illustrative example 1 for CoC:

Type of Machine/Equipment <i>(Either Milling Machine or Electro-Discharge Machine or Turning Machine or Presses etc.)</i>	Models covered		Conforming to Indian Standard(s) or Essential requirements	Lot No./ Batch no. with serial numbers of the Machine (from...to...)	Date/month of manufacturing of the Machine
	Model number/name as uniquely identified, of the lead model in the family	Model number/name as uniquely identified, of the machines covered in the family			
SC-1	LM-SC-1	SC-1-A	IS 16819/ISO 12100 IS 16539-1-1/IEC 60146-1-1	Batch no.- SC-1-A Serial No. 001 to 200	January 2025 to March 2025

## Annexure-1

### Suggestive checklist for evaluation of conformity to Type C Standard IS 16539-1-1:2017/IEC 60146-1-1:2009 for Power Semiconductor Converter (For guidance)

Clause of IS 16539 (Part 1/Sec 1) : 2025 IEC 60146-1-1 : 2024	Specified requirements	Whether requirement is applicable to the Machine or not applicable	Conformity (Yes/No)	Technical documentation submitted as evidence of conformity (Design document/Risk assessment/Safety function diagrams/safety validation reports/Test report/supplier test certificate etc.)
<b>7.2</b>	<b>Insulation Test</b>			
<b>7.3</b>	<b>Functional Test</b>			
7.3.1	Light load and functional test			
7.3.2	Rated current test			
7.3.3	Over-current capability test			
7.3.4	Measurement of the inherent voltage regulation			
7.3.5	Measurement of ripple voltage and current			
7.3.6	Measurement of harmonic currents			
<b>7.4</b>	<b>Losses, temperature and power factor</b>			
7.4.1	Power loss determination for assemblies and equipment			
7.4.2	Temperature rise test			
7.4.3	Power factor measurement			
<b>7.5</b>	<b>Auxiliary device and control equipment</b>			
7.5.1	Checking of auxiliary devices			
7.5.2	Checking the properties of the control equipment			
7.5.3	Checking the protective devices			
<b>7.6</b>	<b>EMC test</b>			
7.6 a)	Immunity test			
7.6 b)	Radio frequency radiated and conducted disturbances			
<b>7.7</b>	Measurement of audible noise and Additional tests			

Note: This is not an exhaustive list, any other requirements not listed above from IEC 60204-1 or any other Type B Standard, which may be identified by the manufacturer shall also be listed and adequate safety measures shall be taken and indicated in the above check-list by the manufacturer while submitting the technical file of the Machine

[illegible]

[illegible]

[illegible]

8	<b>Ergonomic Hazards:</b>	<input type="checkbox"/> access; <input type="checkbox"/> design or location of indicators and visual displays units; <input type="checkbox"/> design, location or identification of control devices; <input type="checkbox"/> effort; <input type="checkbox"/> flicker, dazzling, shadow, stroboscopic effect; <input type="checkbox"/> local lighting; <input type="checkbox"/> mental overload/underload; <input type="checkbox"/> posture; <input type="checkbox"/> repetitive activity; <input type="checkbox"/> visibility.	<input type="checkbox"/> discomfort; <input type="checkbox"/> fatigue; <input type="checkbox"/> musculoskeletal disorder; <input type="checkbox"/> stress; <input type="checkbox"/> any other (for example, mechanical, electrical) as a consequence of a human error.											
9	<b>Hazards associated with the environment in which the machine is used:</b>	<input type="checkbox"/> dust and fog; <input type="checkbox"/> electromagnetic disturbance; <input type="checkbox"/> lightning; <input type="checkbox"/> moisture; <input type="checkbox"/> pollution; <input type="checkbox"/> snow; <input type="checkbox"/> temperature; <input type="checkbox"/> water; <input type="checkbox"/> wind; <input type="checkbox"/> lack of oxygen.	<input type="checkbox"/> burn; <input type="checkbox"/> slight disease; <input type="checkbox"/> slipping, falling; <input type="checkbox"/> suffocation; <input type="checkbox"/> any other as a consequence of the effect caused by the sources of the hazards on the machine or parts of the machine.											
10	<b>Combination of Hazards:</b>	<input type="checkbox"/> for example, repetitive activity + effort + high environmental temperature	<input type="checkbox"/> for example, dehydration, loss of awareness, heat stroke											
<p><b>Note:</b> This is not an exhaustive list, any other hazards not listed above, which may be identified by the manufacturer shall also be listed and adequate safety measures shall be taken and indicated in the above check-list by the manufacturer while submitting the technical file of the Machine.</p> <p>a. Origin: A</p> <p>single origin of a hazard can have several potential consequences.</p> <p>b. Potential consequences: For each type of hazard or group of hazards, some potential consequences can be related to several origins of hazard</p>														

**Annexure- 3**

**Suggestive Check list for evaluation of conformity to Type B Standard - IS 16504-1/IEC 60204-1 for General requirements (For guidance )**

Clause of IEC 60204-1	Specified requirements	Whether requirement is applicable to the Machine or not applicable	Conformity (Yes/No)	Technical documentation submitted as evidence of conformity (Design document/Risk assessment/ Safety function diagrams/safety validation reports/Test report/supplier test certificate etc.)
4	General Requirements			
4.1	Whether information as per Annexure B of IEC 60204-1 : 2016 is provided by the manufacturer?			
4.2	Selection of equipment			
4.2.1	Components and devices			
4.2.2	Switchgear: Compliance to IEC 61439			
4.3	Electrical supply: Whether equipment designed as per prescribed Electrical supply conditions?			
4.3.2	AC Supply			
4.3.3	DC Supply			
4.3.4	Whether can be categorized as special supply system?			
4.4	Physical Environment and Operating Conditions			
5	Incoming supply conductor terminations and devices for disconnecting and switching off			
5.1	Incoming supply conductor terminations			
	Identification of terminals for incoming supply connection			
5.2	Terminal for connection of the external protective conductor			
5.3	Whether supply disconnecting (isolating) device provided?			
	Whether provided for each incoming supply?			
	Whether provided for each on-board power supply?			
5.3.2	Type of supply disconnecting device			
5.3.3	Requirements			
5.3.4	Operating means of the supply disconnecting device			
5.3.5	Excepted circuits			
5.4	Devices for removal of power for prevention of unexpected start-up			
5.5	Devices for isolating electrical equipment			
5.6	Protection against unauthorized, inadvertent and/or mistaken connection			
6	Protection against electric shock			
6.2.2	Whether protection by enclosure?			
6.2.3	Whether protection by insulation?			
6.2.4	Whether protection against residual voltage required?			
6.2.5	Protection by barrier			
6.2.6	Protection by placing out of reach or protection by obstacles			
6.3	Fault protection			
6.3.2	Whether by prevention of occurrence of touch voltage?			



6.3.3	Whether protection by automatic disconnection of supply?			
6.4	Protection by the use of PELV			
7	Protection of equipment			
7.2	Overcurrent protection			
7.3	Protection of motors against overheating			
7.4	Protection against abnormal temperature			
7.5	Protection against the effects of supply interruption or voltage reduction and subsequent restoration			
7.6	Motor overspeed protection			
7.7	Additional earth fault/residual current protection			
7.8	Phase sequence protection			
7.9	Protection against overvoltages due to lightning and to switching surges			
7.10	Short-circuit current rating			
8	Equipotential bonding			
8.2	Protective Bonding Circuit			
8.3	Measures to restrict the effects of high leakage current			
8.4	Functional bonding			
9	Control circuits and control functions			
9.1	Control circuits			
9.1.2	Control circuit voltages			
9.1.3	Protection			
9.2	Control functions			
9.2.2	Categories of stop functions			
9.2.3	Operations			
9.2.3.4	Emergency operations (emergency stop, emergency switching off			
9.2.4	Cableless control system (CCS)			
9.3	Protective interlocks			
9.4	Control functions in the event of failure			
10	Operator interface and machine-mounted control devices			
10.1.2	Location and mounting			
10.1.3	Protection			
10.1.4	Position sensors			
10.1.5	Portable and pendant control stations			
10.2	Actuators			
10.3	Indicator lights and displays			
10.4	Illuminated push-buttons			
10.5	Rotary control devices			
10.6	Start devices			
10.7	Emergency stop devices			
10.8	Emergency switching off devices			
10.9	Enabling control device			
11	Controlgear: location, mounting, and enclosures			
11.2	Location and mounting			
11.3	Degrees of protection			
11.4	Enclosures, doors and openings			

11.5	Access to electrical equipment			
12	Conductors and cables			
12.2	Conductors			
12.3	Insulation			
12.4	Current-carrying capacity in normal service			
12.5	Conductor and cable voltage drop			
12.6	Flexible cable			
12.7	Conductor wires, conductor bars and slip-ring assemblies			
13	Wiring practices			
13.1	Connections and routing			
13.2	Identification of conductors			
13.3	Wiring inside enclosures			
13.4	Wiring outside enclosures			
13.5	Ducts, connection boxes and other boxes			
14	Electric motors and associated equipment			
15	Socket-outlets and lighting			
15.1	Socket-outlets for accessories			
15.2	Local lighting of the machine and of the equipment			
16	Marking, warning signs and reference designations			
17	Technical documentation			
18	Verification			
Annex - B	Enquiry form for the electrical equipment of machines			
Annex - C	Examples of machines covered by this part of IEC 60204			
Annex - F	Guide for the use of this part of IEC 60204			
	Note: This is not an exhaustive list, any other requirements not listed above from IEC 60204-1 or any other Type B Standard, which may be identified by the manufacturer shall also be listed and adequate safety measures shall be taken and indicated in the above check-list by the manufacturer while submitting the technical file of the Machine			