Approval of Ex (Electrical) Apparatus for use / installation in the Hazardous Areas

Requirement under Rule 102 of the Petroleum Rules, 2002 lays down that no electrical wiring shall be installed and no electrical apparatus shall be used in petroleum refinery, storage installation, storage shed, service station or any other place where petroleum is refined, blended, stored, loaded / filled or unloaded unless it is approved by the Chief Controller of Explosives.

As per Rule 22 of the Gas Cylinders Rules, 2016 and Rule 31 of the Static and Mobile Pressure Vessels (Unfired) Rules, 2016 the premises for filling & storing flammable gas(es) in cylinders or storing flammable gases in pressure vessel, the Ex Electrical Apparatus installed shall be of the type approved by the Chief Controller of Explosives.

The Composite CNG dispensing unit & CNG dispenser shall be of the type approved by the Chief Controller of Explosives as per Condition 1(b) and 8 of the license FORM G issued under the Gas Cylinders Rules, 2016. Auto LPG and Auto LNG dispenser shall be of the type approved by the Chief Controller of Explosives as per Rule 29 of the Static and Mobile Pressure Vessels (Unfired) Rules, 2016.

In this context for the above, electrical apparatus which has to be used in an hazardous area covered under Petroleum Rules, 2002 or Gas Cylinders Rules, 2016 or Static and Mobile Pressure Vessels (Unfired) Rules, 2016 shall require approval from the Chief Controller of Explosives.

For the purpose of installation of electrical equipments, the areas have been divided into 3 categories of hazardous areas namely:

i. Zone "0" area where inflammable gas and vapours are expected to be continuously present eg., inside the tank.
ii. Zone "1" area where inflammable gas and vapours are expected to be present under normal operating conditions e.g., on the mouth of the vent pipe or near fill point, unloading point etc., during the operation.
iii. Zone "2" area where inflammable gas and vapours are expected to be present under abnormal operating condition e.g., during the failure or rupture of the equipment.

The extent of the hazardous area for petroleum refinery / processing plant storage installation, storage shed and service station shall be determined as laid down in Fourth Schedule of the Petroleum Rules, 2002.

Various types of protection techniques have been developed to make these electrical equipments safe for use in hazardous areas, viz –

I. Flameproof protection: - In this type of protection the enclosure which houses the electrical equipment is designed in a manner that the explosion inside the enclosure due to ingress of explosive/flammable gas or vapour will not be transmitted / communicated to outside hazardous atmosphere.

II. Intrinsically safe :- In this type of protection the equipment is designed in such a manner that the electrical energy which can enter explosive environment is so low or restricted in a manner that it cannot ignite a explosive gas air mixture.

III. Pressurised protection: - In this type of protection the pressure inside the enclosure housing the electrical equipment is maintained at a positive pressure (higher than atmospheric

pressure outside enclosure) so as not to allow ingress of inflammable/explosive gas air mixture thus avoiding possibility of explosion.

IV. Encapsulated protection: - The principle of this type of the protection is that the apparatus to be protected is submerged / potted in a suitable substance in liquid state which is then allowed to cool and form a solid block. This prevents direct contact between the electrical apparatus and the explosive atmosphere.

V. Increased safety type of protection: - This type of protection is achieved by adopting measures in the design and manufacture of electrical apparatus to ensure security against occurrence of arcs, sparks and excessive temperature. In addition to the type of protection provided the nature of explosive gas which will occur in the atmosphere around the equipment as also to be borne in mind.

VI Type 'n' or non sparking type: - For achieving this type of protection, it is to be ensured that the equipment is so constructed and maintained that no incendive spark is formed in normal operation and no fault is likely to occur in equipment which can lead to ignition of explosives gas mixture

VII. Oil Immersion: - When an electrical equipment capable of igniting explosive gas mixture is protected by immersion in mineral oil or other suitable protective liquid so that explosive gas mixture cannot come in contact with electrical equipment i.e. oil/liquid acts as a barrier between them .

VIII. Powder Filling: - A low energy spark producing equipment, if covered with a layer of appropriate thickness made of granulated material, such as quartz or solid glass particles (electrical non-conducting inorganic materials) of particle size 0.5 mm to 1 mm will prevent propagation of flame from interior of the layer to explosive atmosphere present above the surface of filling material. Such protection can even prevent flame propagation of Hydrogen-air mixture (having lowest experimental safe gap valve MESG = 0.29 mm) if granule size smaller than 1 mm & a layer thickness of 10 mm is used as filling material.

As per the Indian standards the explosive gases are classified under two broad categories viz.,

i. Group I – Methane

ii. Group II is subdivided into three types, viz. IIA, IIB, IIC
IIA represents Propane
IIB represents Ethylene
IIC represents Acetylene
IIB+H2 represents Ethylene + Hydrogen

Since areas coming under the Petroleum Rules, 2002 will have presence of hydrocarbons consisting of Carbon chain of C_2 and above, the equipment to be used should be appropriate to IIA & IIB classification. However, if the equipment is to find application in petroleum refineries where presence of hydrogen cannot be ruled out, approval under Group IIC would be required in such case.

PROCESS OF APPROVAL FOR ELECTRICAL FITTINGS FOR USE IN HAZARDOUS AREAS

Most Important:- Only those electrical Apparatus / Instruments / Fittings (generally denoted by "Ex Equipments") finding application / use in hazardous areas of petroleum refineries / Installations / Terminals and other licensed premises covered under Petroleum Rules, 2002 , Gas Cylinders Rules, 2016 and SMPV(U) Rules 2016 are only be considered for approval by Chief Controller of Explosives, Nagpur.

It is also mandatory to install CCE approved electrical equipments in the licensed premises where storage, filling and dispensing of flammable gases like LPG, LNG, CNG, CBG, Hydrogen, Acetylene and other hazardous gases and chemicals are used, as mandated in respective statutory Rules.

Requirement of documents for approval of "Ex Electrical Apparatus" is based on type i.e. whether the equipment is manufactured **indigenously** in India or **imported** in India.

[A] Documents for approval of indigenously manufactured Ex Electrical Apparatus

1. Online application form indicating name of the firm, correspondence address, manufacturing address and details of the Ex Electrical Apparatus duly signed (*name, designation of the signatory along with seal of firm*).

2. Profile of the manufacturer including documentary evidence of the company such as:
   a. Certificate of Incorporation issued by Registrar of Companies or
   b. FORM G issued by Registrar of Firms and Registered Partnership deed or
   c. Declaration on non judicial stamp paper stating that the firm is a proprietorship firm duly notarized along with PAN, TAN and GST Certificate

3. A comprehensive report accompanied by all necessary drawings, calculations giving references to recognized code or codes followed, full details of design and construction and necessary test certificates from the recognized testing laboratory / IECEx Certifying Body in respect of the apparatus and the components together with details of technical persons employed for manufacturing, after sales service, manufacturing and quality control equipments or instruments available.

4. Test report issued by Indian test laboratory recognized by the Chief Controller of Explosives and valid copy of BIS license (*only for Ex Electrical Apparatus having flameproof type protection*) or

   IECEx Certificate of Conformity, valid copy of IECEx Quality Assessment Report (*summary*) and IECEx Test Report.

5. Technical details of the electrical components, Zone and Gas Group for which approval is sought, temperature class of Ex Electrical Apparatus.

6. List of technically trained personnel for after sales service

7. User Performance Report of the product for revalidation of approval.

8. Scrutiny fee of Rs 2000 per type / model of the apparatus. Maximum 5 nos of equipments with different test certificate is only being allowed in one online application.

9. Declaration that equipment has not been installed in hazardous premises as per standard format (Standard format is available on PESO's online application portal).

10. Acceptable standards for approval: (*With effect from 01/04/2024*)

Sr No	BIS Standards ***	IEC Standards	Description
1	IS/IEC 60079-0:2017	IEC 60079-0: 2017	Equipment — General Requirements
2	IS/IEC 60079-1:2014	IEC 60079-1: 2014	Equipment Protection by Flameproof Enclosures "d"
3	IS/IEC 60079-2:2014	IEC 60079-2: 2014	Equipment protection by pressurized enclosure "p"
4	IS/IEC 60079-5:2015	IEC 60079-5: 2015	Equipment protection by powder filling "q"
5	IS/IEC 60079-6:2016	IEC 60079-6: 2015	Equipment protection by liquid immersion "o"
6	IS/IEC 60079-7:2017	IEC 60079-7: 2015	Equipment protection by increased safety "e"
7	IS/IEC 60079-11:2011	IEC 60079-11: 2023	Equipment Protection by Intrinsic Safety "i"
8	IS/IEC 60079 -15:2017	IEC 60079-15: 2017	Equipment Protection by Non Sparking "n"
9	IS/IEC 60079 -18:2014	IEC 60079-18: 2014	Equipment protection by encapsulation "m"
10	IS/IEC 60079 -25:2020	IEC 60079-25: 2020	Intrinsically safe electrical systems
11	IS/IEC 60079 -26:2021	IEC 60079-26: 2021	Equipment with Equipment Protection Level (EPL) Ga
12	IS/IEC 60079 -28:2015	IEC 60079-28: 2015	Protection of equipment and transmission systems using optical radiation
13	IS/IEC 60079-29: Sec 1:2016	IEC 60079-29-1:2016	Gas detectors Section 1 Performance Requirements of Detectors for Flammable Gases
14	IS/IEC 60079-29: Sec 4:2009	IEC 60079-29-4:2009	Gas detectors: Sec 4 performance requirements of open path detectors for flammable gases
15	IS/IEC/IEEE 60079-30 : Sec 1:2015	IEC/IEEE 60079-30-1: 2015	Electrical Resistance Trace Heating Section 1 General and testing requirements

*** The above applicable standards under BIS on or before the year 2008 will not be considered with immediate effect.

[B] Documents for Import of Ex Electrical Apparatus in India

1. Online application form indicating name of the firm, correspondence address, manufacturing address and details of the Ex Electrical Apparatus duly signed (*name, designation of the signatory along with seal of firm*).

2. Profile of the Indian distributor / service provider including documentary evidence of the company such as:
   a. Certificate of Incorporation issued by Registrar of Companies or
   b. FORM G issued by Registrar of Firms and Registered Partnership deed or
   c. Declaration on non judicial stamp paper stating that the firm is a proprietorship firm duly notarized along with PAN, TAN and GST Certificate

3. A comprehensive report accompanied by all necessary drawings, calculations giving references to recognized code or codes followed, full details of design and construction and necessary test certificates from the recognized testing laboratory / IECEx Certifying Body in respect of the apparatus and the components together with details of technical persons employed for manufacturing, after sales service, manufacturing and quality control equipments or instruments available.

4. Following Test report will be considered for approval:
   a. Test report issued by Indian test laboratory recognized by the Chief Controller of Explosives and valid copy of BIS license (*only for Ex Electrical Apparatus having flameproof type protection*) or
   b. IECEx Certificate of Conformity, valid copy of IECEx Quality Assessment Report (*summary*) and IECEx Test Report or
   c. EU Type Examination Certificate, Production Quality Assurance Notification and Declaration of Conformity (*Applicable for manufacturers having manufacturing location in the countries covered under the European Union only*)

5. Details of customers in petroleum, petrochemical field to whom the equipment has already been supplied abroad.

6. Name of the Indian subsidiary or service provider in India with documents in support of the same like agreement between manufacturer and Indian subsidiary cum service provider. The covering letter / application addressed to Chief Controller shall be from the original equipment manufacturer / principal manufacturer only.

7. A bi-party service agreement between the original equipment manufacturer / principal manufacturer and Indian distributor / service provider indicating set up of the Indian distributor / service provider in India, qualified and trained technical service team assigned with responsibilities of initial installation / commissioning of the apparatus as well as post sales, technical back-up, repair, maintenance & supply of original spares etc. List of technical persons specially trained by principal company/manufacturer shall be separately attached. (*Note: The Indian distributor / service provider shall have his own service team and service set up in the country and the same shall not be outsourced to any other entity*). The bi-party service agreement shall be signed by authorized representatives of principal manufacturer as well as Indian distributor. The authorized representatives shall specify the name and designation below the signature along with the seal affixed . The Service agreement shall be valid for minimum five years.

8. A letter of authorization by original equipment manufacturer / principal manufacturer addressed to the Chief Controller of Explosives, authorizing the Indian distributor / service provider to apply and obtain approval on their behalf. The authorized representatives shall specify the name and designation below the signature along with the seal affixed.

9. Technical brochure and details of the equipment including its name, description of the equipment, its different models / variants, electrical parameters, working principle & operating mechanism (*in case of special type of apparatus*), brief operation manual, its zone for which approval is sought, gas group(s), temperature class, etc.

10. Declaration that equipment has not been installed in hazardous premises as per standard format (Standard format is available on PESO's online application portal). The authorized representatives shall specify the name and designation below the signature along with the seal affixed.

11. Scrutiny fee of Rs 2000 per type / model of the apparatus. Maximum 5 nos of equipments with different test certificate is only being allowed in one online application.

12. **Additional document required for assembly of components-**

A separate sheet reflecting the following details shall also be uploaded (a) Sr No (b) Name of the manufacturer (c) Name of the component (d) Safety Marking (e) Name of Certificate issuing body (f) Certificate No and date (g) Valid copy of PESO approval for the individual electrical component as mentioned in Sr No (b) and (c) shall also be provided.
Again (h) valid COC and QAR or EU type examination certificate and PQAN or Test certificate and BIS license for flameproof shall also be uploaded whichever is applicable for all the components , entries of the above shall also be made in the above sheet.

13. Acceptable standards for approval: (*With effect from 01/04/2024*)

Sr No	BIS Standard	IEC Standards	EN Standards	Description
1	IS/IEC 60079-0:2017	IEC 60079-0: 2017	EN IEC 60079-0:2018	Equipment — General Requirements
2	IS/IEC 60079-1:2014	IEC 60079-1: 2014	EN 60079-1:2014	Equipment Protection by Flameproof Enclosures "d"
3	IS/IEC 60079-2:2014	IEC 60079-2: 2014	EN 60079-2:2014, EN 60079-2:2014/AC:2015	Equipment protection by pressurized enclosure "p"
4	IS/IEC 60079-5:2015	IEC 60079-5: 2015	EN 60079-5:2015	Equipment protection by powder filling "q"
5	IS/IEC 60079-6:2016	IEC 60079-6: 2015	EN 60079-6:2015	Equipment protection by liquid immersion "o"
6	IS/IEC 60079-7:2017	IEC 60079-7: 2015	EN 60079-7:2015 EN IEC 60079-7:2015/A1:2018	Equipment protection by increased safety "e"
7	IS/IEC 60079-11:2011	IEC 60079-11: 2023	EN 60079-11:2012	Equipment Protection by Intrinsic Safety "i"

8	IS/IEC 60079 - 15:2017	IEC 60079-15: 2017	EN 60079-15:2010	Equipment Protection by Non Sparking “n”
9	IS/IEC 60079 - 18:2014	IEC 60079-18: 2014	EN 60079-18:2015 EN 60079-18:2015, EN 60079-18:2015/A1:2017	Equipment protection by encapsulation "m"
10	IS/IEC 60079 - 25:2020	IEC 60079-25: 2020	EN 60079-25:2010, EN 60079-25:2010/AC:2013	Intrinsically safe electrical systems
11	IS/IEC 60079 - 26:2014	IEC 60079-26: 2021	EN 60079-26:2015	Equipment with Equipment Protection Level (EPL) Ga
12	IS/IEC 60079 - 28:2015	IEC 60079-28: 2015	EN 60079-28:2015	Protection of equipment and transmission systems using optical radiation
13	IS/IEC 60079-29:Sec 1:2016	IEC 60079-29-1:2016	EN 60079-29-1:2016	Gas detectors Section 1 Performance Requirements of Detectors for Flammable Gases
14	IS/IEC 60079-29:Sec 4:2009	IEC 60079-29-4:2009	EN 60079-29-4:2010	Gas detectors: Sec 4 performance requirements of open path detectors for flammable gases
15	IS/IEC/IEEE 60079-30 : Sec 1:2015	IEC/IEEE 60079-30-1: 2015	EN 60079-30-1:2017	Electrical Resistance Trace Heating Section 1 General and testing requirements

Assembly of Ex Electrical Components:

In case approval is sought for system / packaged apparatus where number of electrical components are used documents as per category i.e *indigenously manufactured or imported in India* shall be submitted. In addition to above documents, following additional documents shall be submitted:

- Valid copy of PESO approval or
- IECEx Certificate of Conformity conforming to above standards & valid copy of IECEx Quality Assessment Report or
- EU Type Examination Certificate conforming to above standards & valid copy of Production Quality Assurance Notification.
- Test report issued by Indian test laboratory recognized by the Chief Controller of Explosives and valid copy of BIS license (*only for Ex Electrical Apparatus having flameproof type protection*) for the components of Indian Origin.

In case approval is sought for dispensers following additional documents to be submitted

* EU Type Examination Certificate conforming the fuel dispenser to EN 13617-1: 2012 or EN 13617-1: 2021 along with list of approved Ex Electrical Components duly endorsed by the notified body issuing EU Type Examination Certificate and valid copy of Production Quality Assurance Notification.

* Third Party Audit Report issued by PESO approved Ex electrical testing Laboratory or NABL accredited test Laboratory authorized for testing Ex Electrical Apparatus or a reputed testing laboratory authorized for testing Ex electrical apparatus providing clause wise compliance of: .

    a. EN 14678-1:2013 & relevant provisions of the Static & Mobile Pressure Vessels (Unfired) Rules, 2016 in case of Auto LPG dispenser.
    b. Clause 11 of ISO 16923: 2016 in case of CNG dispenser.
    c. Clause 10 of EN ISO 16924: 2018 in case of LNG dispenser.
    d. Clause 8 of ISO 19880-1: 2020 in case of Hydrogen dispenser.

Scrutiny fees of Rs 2000 per component and additional Rs 2000 for entire assembly

Application submission:

- All the documents and drawings to be submitted online only as a legible, readable and searchable PDF documents.

- All the applications and compliance to the discrepancies to be submitted through National Single Window Portal.

- The link to access the portal is https://www.nsws.gov.in/

- In case of any difficult or doubt regarding online application submission, please contact on following:
    a. https://www.nsws.gov.in/contact-us or
    b. support.ol@explosives.gov.in or
    c. 1800-233-9011.

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