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BUREAU OF INDIAN STANDARDS

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भारतीय मानक मसौदा

प्राकृतिक गैस ईंधन भरने वाले स्टेशन — वाहनों में ईंधन भरने के लिए एलएनजी स्टेशन

(ISO 16924 : 2016, संशोधित)

Draft Indian Standard

NATURAL GAS FUELLING STATIONS — LNG STATIONS FOR FUELLING VEHICLES

(ISO 16924 : 2016, MOD)

ICS 75.200

Mechanical Equipment used in Refueling Stations
Petroleum and Gaseous Fuel Sectional Committee, MED 38

Last date for comments is
16 March 2025

NATIONAL FOREWORD

(Adoption clauses to be added later)

The ISO standard has been approved for publication as Indian Standard with modifications (*see National Annex E*). Additionally, certain terminology and conventions are however not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words ‘International Standard’ appear referring to this standard, they should be read as ‘Indian Standard’.
- b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as a decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
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ISO 834-1 Fire-resistance tests — Elements of building construction — Part 1: General requirements	IS/ISO 834-1 : 1999 Fire-resistance tests — Elements of building construction Part 1 General requirements	<i>Identical</i>
ISO 9809-1 Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa	IS 7285 (Part 2) : 2017 Refillable seamless steel gas cylinders — Specification Part 2 Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa (112 kgf/mm ²) (<i>fourth revision</i>)	<i>Identical</i>
ISO 11119-3 Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450L with non-load-sharing metallic or non-metallic liners	IS 16646 : 2017 Transportable refillable fully wrapped composite cylinders for liquefied petroleum gas (LPG) — Specification	<i>Identical</i>
ISO 11439 Gas cylinders — High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles	IS 15490 : 2017 Seamless steel cylinders for on-board storage of compressed natural gas as a fuel for automotive vehicles — Specification (<i>first revision</i>)	<i>Identical</i>
ISO 12100 Safety of machinery — General principles for design — Risk assessment and risk reduction	IS 16819 : 2018/ISO 12100 : 2010 Safety of machinery — General principles for design — Risk assessment and risk reduction	<i>Identical</i>
ISO 14120 Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards	IS 16811 : 2018/ISO 14120 : 2015 Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards	<i>Identical</i>
ISO 15500-2 Road vehicles — Compressed natural gas (CNG) fuel system components — Part 2: Performance and general test methods	IS 15711 : 2006/ISO 15500-2 : 2001 Road vehicles — Compressed natural gas (CNG) fuel system components — Performance and general test methods	<i>Identical</i>
ISO 15589-1 Petroleum, petrochemical and natural gas industries — Cathodic protection of pipeline systems — Part 1: On-land pipelines	IS 8062 (Part 2) : 2006 Cathodic protection of buried pipeline/structure for transportation of natural gas, oil and liquids — Code of practice (<i>first revision</i>)	<i>Identical</i>
IEC 60079-0 Electrical apparatus for explosive gas atmospheres — Part 0: General requirements	IS/IEC 60079-0 : 2017 Explosive atmospheres Part 0 Equipment —	<i>Identical</i>

	General requirements (<i>third revision</i>)	
IEC 60079-11 Explosive atmospheres — Part 11: Equipment Protection by Intrinsic Safety “i”	IS/IEC 60079-11 : 2011 Explosive atmospheres Part 11 Equipment protection by intrinsic safety “i” (<i>first revision</i>)	<i>Identical</i>
IEC 60079-14 Electrical apparatus for explosive gas atmospheres — Part 14: Electrical installations in hazardous areas (other than mines)	IS 16724 : 2018/IEC 60079-14 : 2013 Explosive atmospheres — Electrical installations design, selection and erection	<i>Identical</i>
IEC 60079-25 Explosive atmospheres — Part 25: Intrinsically safe electrical systems	IS/IEC 60079-25 : 2010 Explosive atmospheres Part 25 Intrinsically safe electrical systems (<i>first revision</i>)	<i>Identical</i>
IEC 60204-1 Safety of machinery — Electrical equipment of machines — Part 1: General requirements	IS 16504 (Part 1) : 2019/IEC 60204-1 : 2016 Safety of Machinery — Electrical equipment of machines Part 1 General requirements (<i>first revision</i>)	<i>Identical</i>
IEC 60529 Degrees of protection provided by enclosures (IP Code)	IS/IEC 60529 : 2001 Degrees of protection provided by enclosures (IP Code)	<i>Identical</i>

The technical committee has reviewed the provisions of the following International Standard referred in this adopted standard and has decided that it is acceptable for use in conjunction with this standard:

<i>International Standard</i>	<i>Title</i>
ISO 7-1	Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation
ISO 4126-1	Safety devices for protection against excessive pressure — Part 1: Safety valves
ISO 8580	Rubber and plastics hoses — Determination of ultra-violet resistance under static conditions
ISO 9809-2	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa
ISO 11119-1	Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l
ISO 11119-2	Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners

ISO 11925-3	Reaction to fire tests — Ignitability of building products subjected to direct impingement of flame — Part 3: Multi-source test
ISO 13847	Petroleum and natural gas industries — Pipeline transportation systems — Welding of pipelines
ISO 15500-17	Road vehicles — Compressed natural gas (CNG) fuel system components — Part 17: Flexible fuel line
ISO 15649	Petroleum and natural gas industries — Piping
IEC 31010	Risk management — Risk assessment techniques
IEC 60079-10-1	Explosive atmospheres — Part 10-1: Classification of areas — Explosive gas atmospheres

This standard also makes a reference of technical deviation to the ISO standard. The deviations are given in **National Annex E**.

NOTE — The technical content of the document has not been enclosed as these are identical with the corresponding ISO standard. For details, please refer the corresponding **ISO 16924 : 2016** or kindly contact:

Head
Mechanical Engineering Department
Bureau of Indian Standard
9 Bahadur Shah Zafar Marg
New Delhi 110002
Email: med@bis.gov.in
Telefax: 011-23232509

NATIONAL ANNEX E
(National Foreword)

LISTS OF TECHNICAL DEVIATIONS

M-1 The text of the International Standard ISO 16924 : 2016 has been approved for publication as Indian Standard with agreed modifications as indicated below.

<i>Sl No.</i>	<i>Clause/Subclause</i>	<i>Modification</i>
i)	1, para 3	Substitute the following for the existing: ‘This document is applicable to fuelling stations receiving LNG/LCNG and other liquefied methane-rich gases that comply with local applicable gas composition regulation or with the gas quality requirements of ISO 13686.’
ii)	1, para 4	Substitute the following for the existing: ‘This document includes all equipment from the LNG/LCNG storage tank filling connection up to the fueling nozzle on the vehicle. The LNG storage tank filling connection itself and the vehicle fueling nozzle are not covered in this document.’
iii)	1, para 5	Substitute the following for the existing: ‘This document includes fuelling stations having the following characteristics: a) private access; b) public access (assisted); c) metered dispensing; d) fuelling stations with fixed LNG storage; e) fuelling stations with mobile LNG storage; f) movable fuelling stations; g) mobile fuelling stations; and h) multi-fuel stations.’
iv)	5.1.1, para 1, line 3	Substitute the following for the existing: ‘The principles and guidelines of ISO 12100, ISO 31000 and IEC 31010 or equivalent shall be followed in developing a risk management policy and a risk management framework.’
v)	5.1.1, para 1, line 5	Substitute the following for the existing:

		<p>‘One or more of the risk assessment techniques described in IEC 31010 or equivalent shall be used to conduct risk assessments.’</p>
vi)	6.1.2.8	<p>Substitute the following for the existing:</p> <p>‘If a fire wall is constructed for the purpose of reducing the separation distances, it shall be of at least one hour fire-resistant construction. The fire wall shall not restrict the access of fire fighters and their equipment. With the fire wall, the tanker unloading connection and LNG/LCNG dispensers can be as close as possible to the firewall.’</p>
vii)	7.3.1	<p>Substitute the following for the existing:</p> <p>‘The filling receptacle or standard filling connections like flanges, connectors etc shall be placed so that it is easily accessible by the driver of the LNG tanker or other competent person for connection of the offloading hose without entering the containment.’</p>
viii)	7.3.2	<p>Substitute the following for the existing:</p> <p>‘The type of filling receptacle or standard filling connections like flanges, connectors etc shall be compatible with the filling nozzle/flanges/connectors of the offloading hose of the LNG tanker. Similar rules shall be applied in those cases where an offloading arm is used.’</p>
ix)	7.4.1.1	<p>Substitute the following for the existing:</p> <p>‘At least one trained person along with a trained tanker driver shall be in continuous attendance and shall have an unobstructed view of the LNG transfer point while offloading is in progress. This person shall be able to monitor the level and pressure of the LNG storage tank and control the offloading process.</p>
x)	7.4.1.2	<p>Substitute the following for the existing:</p> <p>‘The trained person shall sanction the filling process either continuously or intermittently at periods not exceeding five minutes.’</p>
xi)	7.8.2.1	<p>Substitute the following for the existing:</p> <p>‘Anti-drive equipment helps to mitigate risk in the event that an LNG tanker moves (or attempts to move) away from the LNG fueling station during the product transfer operation and can be required by some national standards or regulations. Primarily, it is intended to prevent movement of the vehicle in relation to the LNG fueling station; the</p>

		opening of the LNG tanker valve cabinet door typically triggers a pneumatic valve which activates the brakes of the vehicle. Wheel chocks shall be applied to both sides of the rear wheels which will prevent the tanker from movement.’
xii)	7.8.3.2	Substitute the following for the existing: ‘During LNG transfer, the engine shall not be permitted to be started and used during the liquid transfer operations.’
xiii)	7.8.4	Substitute the following for the existing: ‘Before connecting the transfer hose to the fill connector, the LNG tanker shall be grounded to the LNG fuelling station grounding system. Indication of proper earthing system shall be provided. Optional interlocking to pump with the earthing system may be provided as such the pump will not start if earthing is not proper.’
xiv)	8.1.1.2, (d)	Delete it.
xv)	8.1.1.2, (e)	Substitute the following for the existing: ‘d) maximum filling level/net capacity;’
xvi)	8.1.1.2, (f)	Substitute the following for the existing: ‘e) minimum design temperature.’
xvii)	8.1.1.8, para 1, line 2	Substitute the following for the existing: ‘Extended stem valves shall normally be used on cryogenic liquid lines.’
xviii)	8.1.2.1.4.1, (c)	Substitute the following for the existing: ‘c) other sources of gas or heat, in combination or alternatively to the aforementioned items a) to b). Or any suitable code for sizing the safety valve may be used like ISO-21013, CGA- S1.3.’
xix)	8.1.2.1.6, para 1, line 3	Substitute the following for the existing: ‘The discharge area of the pressure relief device shall not be less than 0.34 mm ² /l capacity of the inner vessel and in any case need not exceed 2 000 mm ² .’
xx)	8.1.3.3.1, para 1	Substitute the following for the existing: ‘The mobile LNG storage tank shall be designed to meet the requirements of applicable codes and standards for the carriage of

		cryogenic and dangerous goods, such as ISO 20421-1, EN 13530-2, ASME SEC VIII Div I, and SMPV.’
xxi)	10.1.2.1, para 1	Add the following: ‘The disconnection force (the axial force in the fueling hose) of the breakaway device shall be arranged to separate using a force not less than 102 kgf and not greater than 185 kgf where applied in any direction that the vehicle would move.’
xxii)	10.1.2.2	Delete it.
xxiii)	10.1.3.2.1	Substitute the following for the existing: ‘The fuelling hose shall comply with ISO 21012. The fuelling hose shall be: a) suitable for LNG and designed to reduce and/or avoid the risk of cryogenic frostbite; b) suitable for the pressure duty, burst pressure criteria shall be as per ISO 21012 or as defined by local regulation; c) resistant to corrosion and mechanical damage, protected by stainless steel wire-braiding or an equivalent design; and d) adequately supported or coated to prevent kinking and abrasion, if thermoplastic/composite hoses are used.’
xxiv)	14.2.5.1.2	Substitute the following for the existing: ‘The materials used shall be such that the resistance between the fuelling nozzle and earth is less than 1 MOhms (MΩ). If this cannot be achieved, additional grounding is required. Auto indication of green/red light shall confirm the correctness of grounding. Optional interlocks are recommended to provide such that the pump will not start if grounding is not proper.’
xxv)	16.3, para 1	Substitute the following for the existing: ‘The ESD system shall be activated by the following: a) The gas detectors, the typical value of the set point for high methane concentration is detected at 25 percent of the LEL; b) The flame detectors; c) The low temperature sensors provided at the foundation of the LNG storage tank, the typical value of the set point is – 75 °C; d) Failure of the main power, instrument power or air/nitrogen supplies; e) Manual activation of any ESD push button; and f) Earthquake sensors, if installed, earthquake sensors should be

		considered for LNG fuelling stations having an LNG storage capacity exceeding 5 tonnes and located in an area with an increased risk of seismic activity.’
xxvi)	19.5.3	Delete it.