Committee plan 2019

NC 310 327 'LNG/CNG installations and equipment'

NEN: sets the standard

COMMITTEE PLAN 2019

STANDARDISATION COMMITTEE
NC 310 327 'LNG/CNG installations and equipment'

DATE
2018-11-05

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1 General details

1.1 Committee

NC 310 327 'LNG/CNG installations and equipment'

1.2 Area of expertise

This standardisation committee is responsible for European and international standardisation activities related to installations and equipment for natural gas, both in compressed (CNG) and in liquefied (LNG) state. The standardisation activities include:

— plant and equipment used for onshore and offshore production, transportation, transfer, storage and regassification of LNG;
— design, construction, operation, inspection, safety and maintenance of fuelling stations and facilities for natural gas, both (bio-)CNG and (bio-)LNG, fuelled engines for transportation;
— operational aspects of natural gas vehicles (NGVs) during their life cycle.

1.3 Interest

1.3.1 Objective

Natural gas is considered an important fuel in the transition towards a safe, reliable and affordable low-carbon energy supply chain. Compared to other fossil fuels, like oil and coal, combustion of natural gas has relatively low SO_x and NO_x emissions (air quality) as well as CO_2 emissions (climate change). Another advantage is the high energy density of natural gas in liquefied state (i.e. LNG), making it a suitable fuel to transport over long distances in view of securing energy supply as well as fuel for road and marine transportation. Moreover, the natural gas infrastructure is suitable for renewable gases like biomethane or syngas produced from renewables. Use of renewable gases will further reduce the net CO_2 emissions.

The standardisation activities intend to support and accelerate the uptake of natural gas as 'transition fuel' by addressing interoperability, occupational health and safety, process safety, environmental aspects, and other aspects that are needed for reliable installations and equipment and market acceptance. The standardisation committee aims at contributing to these standardisation activities by taking part in working groups, commenting on draft standards and setting the agenda and priorities.

The standards that are part of the portfolio of this standardisation committee also contribute to a number of the **sustainable developments goals** of the United Nations, as shown in Figure 1.

Goal 7 – Ensure access to affordable, reliable, sustainable and modern energy for all

Goal 9 – Build resilient infrastructure, promote sustainable industrialization and foster innovation

Goal 11 – Make cities inclusive, safe, resilient and sustainable

Goal 13 – Take urgent action to combat climate change and its impacts

Figure 1 – Contribution of standardisation committee to sustainable development goals

1.3.2 Motivation

The Netherlands have a long history in and much experience with natural gas after discovery of the so-called Slochteren gas field late 1950s. Since several decades, the Netherlands has a country-wide network of CNG fuelling stations. In the recent years, several LNG fuelling stations have been constructed to create a country-wide network as well. With Gate, the Netherlands also has an LNG facility that can both regassify LNG for injection into the natural gas grid and enables LNG bunkering of ships and fuelling road vehicles. Several Dutch companies are investing in the natural gas related infrastructure including fuelling and bunkering stations as well as vehicles and ships.

With the so-called Hazardous substances publication series (in Dutch abbreviated to **PGS**), the Netherlands have developed clear guidelines for CNG fuelling stations (**PGS 25**), LNG fuelling stations (**PGS 33-1**), LNG bunkering (**PGS 33-2**), and parking and repair of NGVs (**PGS 26**). These PGS publications are on one the hand built upon European and international standards and on the other hand used as (starting) document to develop or improve these standards.

For Dutch stakeholders, it is important to be aware of European and international standards, to influence these standards in which they have an interest, and to ensure that national policy and regulations with a standardisation component remains aligned with European and global developments. Clause 5 elaborates on the drivers to take part in this standardisation committee.

1.3.3 Regulation

Most relevant regulation is the European **Directive 2014/94/EU** on the deployment of the alternative fuels infrastructure. This Directive is part of the **Clean Power for Transport** package of the European Commission, that includes the realisation of trans-European transport networks (**TEN-T**) corridors for motorways and inland waterways including corridors for natural gas. Based on Directive 2014/94/EU, the European Commission has requested the European organisations for standardisation (CEN and CENELEC) to develop the standards for the technical specifications to which reference is made in the Directive (i.e. standardisation request **M/533**). Table 1 summarises the requested standards in the field of natural gas (i.e. CNG and LNG). These standards will become binding, either in whole or partly, through delegated regulations as defined in Directive 2014/94/EU.

Table 1 – Requested European standards for natural gas infrastructure per M/533

Requested standard	Reference [a]	Status (per 2019-01-01)
LNG refuelling points for maritime and inland waterway vessels	EN **ISO 20519**, Ships and marine technology – Specification for bunkering of LNG fuelled vessels	Published in February 2017
LNG connectors and receptacles	EN **ISO 12617**, Road vehicles – LNG refuelling connector – 3,1 MPa connector	Published in April 2017
LNG and L-CNG refuelling points for motor vehicles	EN **ISO 16924**, Natural gas fuelling stations – LNG stations for fuelling vehicles	Published in April 2018
CNG connectors and receptacles	EN **ISO 14469**, Road vehicles – CNG refuelling connector	Published in September 2017
CNG refuelling points for motor vehicles	EN **ISO 16923**, Natural gas fuelling stations – CNG stations for fuelling vehicles	Published in April 2018

[a] All European standards are adopted international standards (not modified), either developed in parallel or adopted after publication of the ISO document.

Other regulations relate to improving air quality, for which natural gas is an interesting fuel compared to other fossil fuels. Several open waters are of will become so-called emission controlled areas (ECA), in which ships have to comply with strict emission levels. This can be achieved by investing in scrubbers, changing to low-sulphur oil fuels or switching to LNG. More information is available at the International Maritime Organisation (**IMO**). An increasing number of cities are banning certain diesel fuelled vehicles or establish environmental zones. NGVs are an alternative that is also recognised by municipal fleet owners, public transportation companies and delivery companies, for example.

2 Structure and relations of committee

2.1 National structure

Committee	Name
NC 310 327	LNG/CNG installations and equipment

2.2 International relations

Committee	Name	Membership [a]
CEN/TC 282	Installations and equipment for LNG	
CEN/TC 326	Natural gas vehicles – Fuelling and operation	*Secretariat*
ISO/TC 67/SC 9	LNG installations and equipment	P-member

[a] CEN committees: the national committee is allowed to give advice and to vote on European developments mentioned. ISO committees: P-members (participants) are actively involved in the development of standards and are obliged to vote; O-members (observers) have access to the documents and are allowed to comment, but are not obliged to vote.

2.3 LNG/CNG playing field

Figure 2 illustrates the (inter)national relationships of technical committees related to the field of LNG/CNG standardisation divided in road vehicles, fuel quality, fuel measurements, and LNG/CG installation and equipment. Table 2 provides an explanation of the relevant committees that are involved in LNG/CNG standardisation activities as shown in Figure 2.

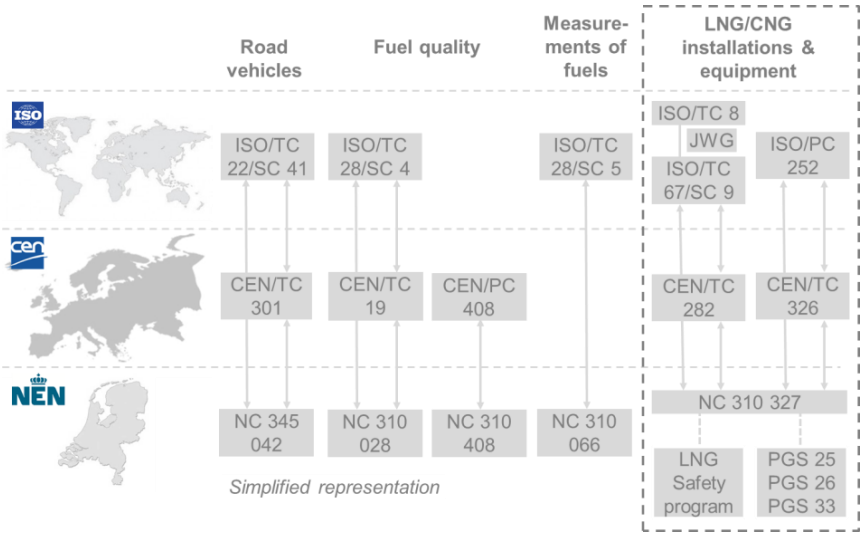

Figure 2 – Visualisation of LNG/CNG playing field related to LNG/CNG standardisation activities

Table 2 – Relevant international, European and national committees dealing with LNG/CNG related standardisation activities (see also Figure 1 for relationship)

Committee	Name
ISO/TC 8	Ships and marine technology
ISO/TC 22/SC 41	Specific aspects for gaseous fuels [used in road vehicles]
ISO/TC 28/SC 4	Classifications and specifications [of fuels]
ISO/TC 28/SC 5	Measurement of refrigerated hydrocarbon and non-petroleum based liquefied gaseous fuels
ISO/TC 67/SC 9	Liquefied natural gas installations and equipment
ISO/PC 252	Natural gas fuelling stations for vehicles [disbanded]
CEN/TC 19	Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin
CEN/TC 282	Installations and equipment for LNG
CEN/TC 301	Road vehicles
CEN/TC 326	Natural gas vehicles – Fuelling and operation
CEN/PC 408	Natural gas and biomethane for use in transport and biomethane for injection in the natural gas grid
NC 310 028	Liquid and gaseous fuels, lubricants and related products
NC 310 066	Flow and volume measurement
NC 310 327	LNG/CNG installations and equipment
NC 310 408	Biomethane
NC 345 042	Road vehicles
PGS 25	Natural gas: compressed natural gas (CNG) delivery installations for road vehicles
PGS 26	(Compressed) natural gas: safe parking and repair of road vehicles
PGS 33-1	Natural gas: liquefied natural gas (LNG) delivery installations for road vehicles
PGS 33-2	Natural gas: liquefied natural gas (LNG) delivery installations for ships

3 Committee composition and stakeholders categories

3.1 **Composition of committee** (as per 2019-01-01) [NB. There will be some replacements]

Member	Employer	Role	Stakeholder category [a]
Wim de Boom	SBM Offshore	Member	4a
Erik Büthker	PitPoint Clean Fuels	Chairperson	1a
Tim Stoffelsma	Shell Global Solutions International	Member	1a
Linard Velgersdijk	GATE Terminal	Member	1a
Sander Verweij	Gutteling	Member	5a
Robin Wade	AkzoNobel	Member	5a

[a] See Appendix A for explanation of the stakeholders categories.

3.2 Missing categories stakeholders

Stakeholder category	Identified organisations
Requirement-specifying organisations/clients	Gasunie, Vopak,
Research and knowledge institutes	Institute for Safety (IFV), TNO
Legislative authorities	Ministry of Infrastructure and Water Management
Influencers - wider context	National LNG Platform, Port of Rotterdam

3.3 Review stakeholders

Because the standardisation committee is relatively new, the analysis of stakeholders and the engagement of potential identified stakeholders is a recurring item on the periodic meetings. In addition to the missing stakeholders categories as mentioned in 3.2, it is also recognised that more direct users, manufacturers/suppliers of main product and associated products and services, and implementing/ executing/service provider organisations would be welcomed.

4 Publications

4.1 National work

This standardisation committee has not published home grown national standards.

4.2 European work

This standardisation committee has contributed to the European standards that have been published by **CEN/TC 282** and **CEN/TC 326**. The list of publications can be obtained by selecting the technical committee concerned. All **CEN members**, including the Netherlands, have the obligation to adopt European standards (i.e. EN publications) as national standards (i.e. NEN-EN publications for the Netherlands) and withdraw conflicting national standards. In addition, several European standards are identical adoptions of international standards (i.e. EN-ISO publications, that automatically will become national standards like NEN-EN-ISO publications) through the so-called **Vienna Agreement**.

4.3 International work

This standardisation committee has contributed to the international standards that have been published by **ISO/TC 67/SC 9** and ISO/PC 252 (disbanded). The list of publications can be obtained by selecting the technical committee concerned.

5 Ambition, objectives and services – The service profile

The annual client satisfaction survey amongst members of the NEN standardisation committees revealed the need for greater clarification of NEN's added value. This need will be met with establishing the service profile that provides insight into the needs of the standardisation committee and will allow NEN to optimise its added value for the standardisation committee. Human resources and other resources can then be deployed as effectively and efficiently as possible. The service profile is an agreement at the level of the standardisation committee; individual agreements with committee members are not included.

The service profile consists of four aspects:

1) **Influence –** Influencing the content and applicability of standards and other agreements in the interest of the own organisation, the sector and / or society.
2) **Consensus building –** Creating a broad support base / building consensus for solutions that are established in standards or other agreements.
3) **Network –** Access to a Dutch, European and / or international network of people and organisations.
4) **Knowledge –** Knowledge of standards and other developments related to technology, legislation and implementation of standards.

Various NEN services have been categorised under each aspect. Each aspect has been divided into a basic service level and additional service levels. Every standardisation committee will receive the basic service level as a minimum. It is up to the committee members to discuss the potential need for additional services.

The standardisation committee 'LNG/CNG installations and equipment' has reviewed the current activities and possibilities related to the four aspects, which are summarised below:

1) Influence
   - The committee offers participation in standardisation activities of ISO/TC 67/SC 9, CEN/TC 282 and CEN/TC 326:
     — as expert in working group (i.e. writing standards);
     — as reviewer of draft standards (i.e. providing comments);
     — as delegate in plenary meetings (i.e. taking [strategic] decisions).
   - The Netherlands provides leadership for CEN/TC 326:
     — possibility to set the agenda;
     — early and first-hand information about developments;
     — contact point for authorities (legislation, standardisation request).
   - Committee members pro-actively contribute and are committed to work programme of the relevant ISO and CEN technical committees:
     — addressing potential new work items for standardisation;
     — submitting relevant Dutch guidelines (e.g. PGS 33-1 was translated to English to use this document as starting document for developing ISO 16924; similar the revised versions of PGS 25 and PGS 26 will be translated to English in order to support standardisation in these fields of activities);
     — promoting Dutch knowhow and experience (e.g. deliverables of the **LNG Safety Program**).
   - The Netherlands is in high esteem in Europe and beyond in the field of alternative fuels and associated infrastructure, also because it is frontrunner in risk-based thinking to deploy new developments in the field of alternative fuels.

2) Consensus building
   - Potential stakeholders are informed through various channels and invited to participate.
   - NEN and committee members have regular contacts with authorities (e.g. Ministry of Infrastructure and Water Works), also in view of the PGS publications.
   - Committee members inform their rank and file, and validate whether standards meet their expectations.

3) Network
   - Committee members have access to the networks of ISO/TC 67/SC 9, CEN/TC 282 and CEN/TC 326, and can participate in working groups and / or plenary meetings of these technical committees (e.g. useful for seeking support for new work item proposals).

- NEN in cooperation with the standardisation committee organises (thematic) seminars open for all Dutch interested parties.
- NEN and committee members participate in LNG and CNG related events to present ongoing (standardisation) activities or to call attention to these activities.
- Standardisation and related activities are disseminated through own networks including **National LNG Platform**.

4) Knowledge
- Committee members have access to documents through ISOlutions (password-secured, web-based documentation system).
- Current topics are addressed at meetings which also offer the possibility to exchange best practices / lessons learned.
- NEN in cooperation with the standardisation committee organises (thematic) seminars open for all Dutch interested parties.
- Knowledge sharing and building takes place through participation in events and (indirectly) in research programmes.
- NEN and committee members share information through news articles, other types of publications, and social media.

Figure 3 shows the service profile of the standardisation committee 'LNG/CNG installations and equipment' by illustrating the importance of the four aspects as ranked by the committee members.

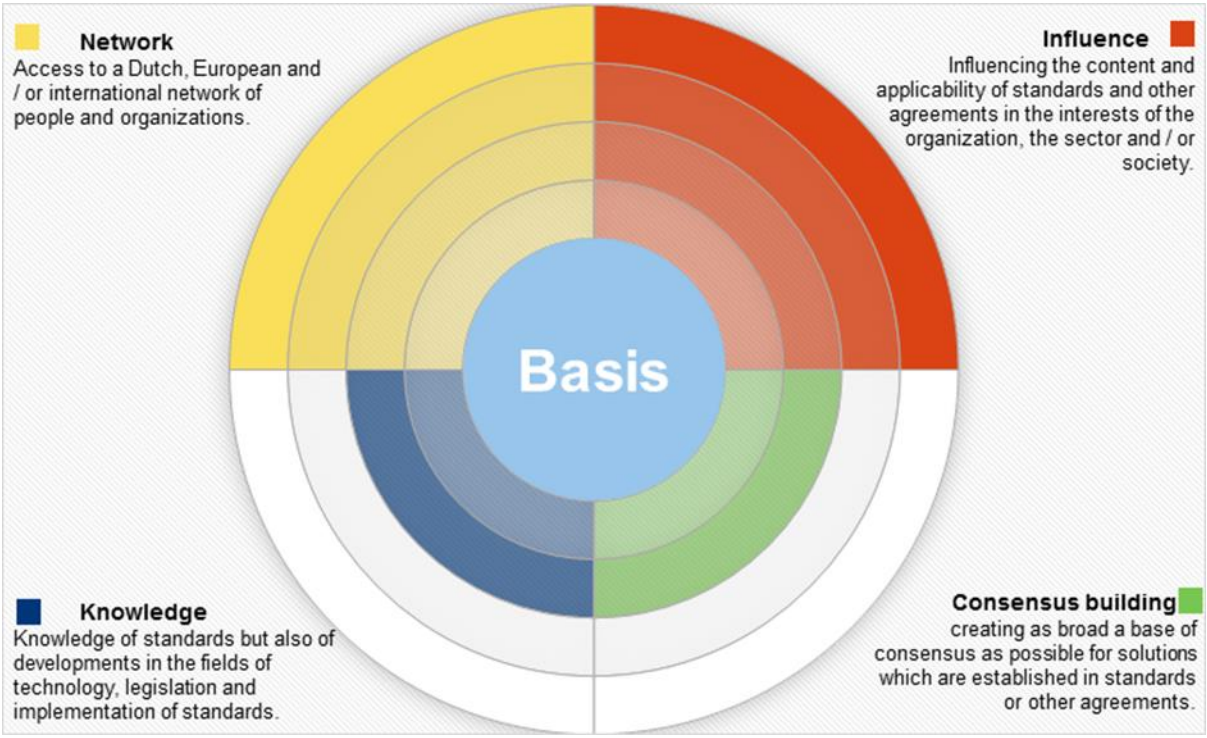

Figure 3 – Service profile standardisation committee 'LNG/CNG installations and equipment'

6 Work programme, objectives and planned activities

6.1 National work

This standardisation committee has defined the following activities:

— Determining the Dutch position (vote) and Dutch comments for documents that have been issued by the CEN or ISO technical committee concerned (see also 6.2 and 6.3) for feedback and/or vote. This includes the assessment of documents for suitability to be implemented in the Netherlands by reviewing the content on possible conflicts with Dutch and / or European laws and regulations.

— Supporting Dutch convenors, experts and members in CEN and ISO technical committees and working groups.

— Setting the agenda for future developments (strategy) and securing the Dutch interests in European and international standardisation activities. This includes bringing forward relevant Dutch guidelines and related deliverables to the CEN and ISO technical committees concerned.

— (Co-)organising events to promote the standards and standardisation activities related to LNG/CNG installations and equipment, including:
  - a technical session on cryogenic spillage resistance related to the future NEN-EN-ISO 20088 series;
  - a joint working session on cryogenic hoses by combining the meetings of this standardisation committee and the standardisation committee on hoses;
  - a launching event for the new editions of PGS 25, PGS 26 and PGS 33-1 (and possibly other PGS publications related to alternative fuels).

— Promoting the standardisation committee and its activities among the Dutch market (including government, research world and societal society), for example at network events, exhibitions and conferences, seminars and through news articles.

— Engaging stakeholders identified in the stakeholders analysis (see also Clause 3) and other stakeholders responding on future needs and developments (e.g. shipyards constructing and maintain LNG fuelled ships, large-scale offshore and onshore developments.

— Serving as informal sounding board for the revisions of PGS 33-2 and the PGS related publication on multi-fuelling stations.

This standardisation committee has currently no home grown national standards on its work programme.

6.2 European work

6.2.1 CEN/TC 282

Scope

The scope of CEN/TC 282 is standardisation in the field of onshore or offshore facilities, procedures and equipment used for production, transportation, transfer, storage and regasification of LNG, from the inlet to the outlet of natural gas/LNG facilities by drafting standards specific to LNG when such standards are not included in the programme of work of another technical committee. In addition, CEN/TC 282 coordinates questions concerning LNG in the technical work of the technical committee dealing with cryogenic equipment.

Structure
CEN/TC 282 has two active working groups (as per 2019-01-01):
- WG 1 'EN 1474-2 update with the recent European technology'
- WG 5 'Design of onshore installations'

These working groups are responsible for developing or revising standards currently on the work programme or registered as preliminary work item.

Work programme
CEN/TC 282 has the following active work items on its work programme (as per 2019-01-01):
- EN 1473, *Installation and equipment for liquefied natural gas – Design of onshore installations* [revision]
- EN 1474-2, *Installation and equipment for liquefied natural gas – Design and testing of marine transfer systems – Part 2: Design and testing of transfer hoses* [revision]
- EN ISO 20257-1, *Installation and equipment for liquefied natural gas – Design of offshore installations – Part 1: General requirements for floating LNG installations* [new]
- EN ISO 20088-2, *Determination of the resistance to cryogenic spillage of insulation materials - Part 2: Vapor phase* [new]
- EN ISO 20088-3, *Determination of the resistance to cryogenic spillage of insulation materials - Part 3 Jet release* [new]
- EN ISO 21593, *Marine LNG fuel bunkering quick connect/disconnect coupling standard* [new]

In addition, CEN/TC 282 has ideas to develop or revise the following European standards or adopt the following international standards (as per 2019-01-01):
- Deliverable on harmonised guidelines for LNG fuelling by truck drivers
- Deliverable on LNG pipelines

The overview of current active work items of CEN/TC 282 and their status in the development process can be reviewed in the **online work programme**.

6.2.2 CEN/TC 326

Scope
The scope of CEN/TC 326 covers the design, construction, operation, inspection, safety and maintenance of fuelling stations and facilities for natural gas vehicles (NGVs). It includes natural gas and biomethane in compressed (CNG) or liquefied (LNG) form and covers the operational aspects of NGVs during their life cycle. The resulting standards will address the minimal safety requirements.

Structure
CEN/TC 326 has five active working groups (as per 2019-01-01):
- WG 1 'CNG filling stations'
- WG 3 'CNG vehicle use and operation'
- WG 4 'LNG fuelling stations'
- WG 5 'LNG vehicle use and operation'
- WG 6 'NGV refuelling appliances'

Work programme
CEN/TC 326 has the following active work items on its work programme (as per 2019-01-01):
- EN 13423, *Compressed natural gas vehicle operations* [revision]
- EN 17278, *Natural gas vehicles – Vehicle fuelling appliances* [new]

In addition, CEN/TC 326 has ideas to develop the following European standards (as per 2018-01-01):
- Deliverable on LNG vehicle use and operation
- Technical report on guidance about implementing EN ISO 16923 and EN ISO 16924

The overview of current active work items of CEN/TC 326 and their status in the development process can be reviewed in the **online work programme**.

6.3 International work

6.3.1 ISO/TC 67/SC 9

Scope
The scope of ISO/TC 67/SC 9 covers plant and equipment used for production, transportation, transfer, storage and regassification of LNG as well as LNG data and equipment particularly those regarding the LNG quality and quantity and their measurements as far as not covered by other technical committees (in those cases liaisons will be established).

Structure
ISO/TC 67/SC 9 has four active working groups (as per 2018-01-01):
- WG 1 'Equipment and procedures for LNG when used as fuel for marine, road and rail activities'
- JWG 3 'Joint ISO/TC 67/SC 9 - ISO/TC 8/SC 8 WG: Resistance to cryogenic spillage'
- WG 5 'Onshore LNG storages'
- WG 7 'Offshore installations for LNG production or regasification'

Work programme
ISO/TC 67/SC 9 has the following active work items on its work programme (as per 2018-01-01):
- ISO/TR 18624, *Guidance for conception, design and testing of LNG storage tanks* [new]
- ISO/TS 18683, *Guidelines for systems and installations for supply of LNG as fuel to ships* [revision]
- ISO 20088-2, *Determination of the resistance to cryogenic spillage of insulation materials – Part 2: Vapor phase* [new]
- ISO 20088-3, *Determination of the resistance to cryogenic spillage of insulation materials – Part 3: Jet release* [new]
- ISO 20257-1, *Installation and equipment for liquefied natural gas – Design of offshore installations – Part 1: General requirements for floating LNG installations* [new]
- ISO 20257-2, *Installation and equipment for liquefied natural gas – Design of offshore installations – Part 2: Specific requirements for FSRU* [new]

In addition, ISO/TC 67/SC 9 has ideas to develop the following international standards (as per 2019-01-01):
- ISO 20257-3, *Installation and equipment for liquefied natural gas – Design of offshore installations – Part 3: Specific requirements for FLNG*
- Deliverable on high pressure gas transfer systems (rigid or hose) for floating storage regasification unit (FSRU) applications
- Deliverable on the connector for loading/unloading of LNG road tankers

The overview of current active work items of ISO/TC 67/SC 9 and their status in the development process can be reviewed in the **online work programme**.

6.3.2 ISO/PC 252 (disbanded)

Scope
The scope of ISO/PC 252 covered design, construction and operation of stations for fuelling CNG/LNG to vehicles, including equipment, safety devices and maintenance.

Work programme
Due to an inactive work programme, this project committee has been disbanded in 2018. NEN, holding the secretariat of this project committee, will remain responsible for the maintenance of the international standards developed and published by this committee, i.e. ISO 16923 and ISO 16924.

7 Memberships in working groups

7.1 Memberships in European working groups

WG number	WG name	Name of expert
CEN/TC 282/WG 1	EN 1474-2 update with recent European technology	Sander Verweij
CEN/TC 282/WG 5	Design of onshore installations	Menno Heida, Linard Velgersdijk
CEN/TC 326/WG 1	CNG filling stations	Erik Büthker
CEN/TC 326/WG 4	LNG fuelling stations	Erik Büthker (convenor)

7.2 Memberships in international working groups

WG number	WG name	Name of expert
ISO/TC 67/SC 9/JWG 3	Resistance to cryogenic spillage	Robin Wade
ISO/TC 67/SC 9/WG 7	Offshore installations for LNG production or regasification	Wim de Boom

8 Evaluation and progress report

The standardisation committee has organised two national meetings: at NEN in Delft on 23 April 2018 and at PitPoint in Nieuwegein on 23 October 2018. During these meetings the developments of the relevant CEN and ISO technical committees were discussed and the national positions for the ballots were determined.

The Netherlands was represented at the following CEN and ISO technical committee meetings, for which the national position was determined at the standardisation committee meetings where possible:
- 24 May 2018: CEN/TC 282 meeting (London [GB]);
- 30 and 31 May 2018: CEN/TC 326 meeting (Istanbul [TR]);
- 7 and November 2018: CENT/TC 326 meeting (Brussels [BE]).

In addition, the additional stakeholders have been identified. It was acknowledged that the standardisation committee would require more critical mass to have a more balanced representation of stakeholders groups. Given the future role of natural gas in the energy transition and clean mobility package, and the Dutch knowhow on this topic, standardisation should be utilised as a tool to accelerate these developments and to export the Dutch knowhow. Actions have been formulated for 2018 and onwards to continue engaging more interested parties.

APPENDIX A — EXPLANATION OF STAKEHOLDERS CATEGORIES

Clause 3 describes the committee composition and the stakeholders categories by using a number. This appendix provides an explanation of the eleven stakeholders categories that are distinguished for taking part in standardisation activities.

	Stakeholders	**Description**
1a	Direct users	End user of the service, process or product.
1b	Trade organisations of direct users	As a group, in the form of interest groups.
2a	Requirement-specifying organisations/clients	Organisations that determine the requirements which the product or service must meet. For example, clients. Legal requirements are determined by legislative authorities (see 9).
2b	Trade organisations of requirement-specifying parties	
3a	Consulting organisations	Organisations able to advise other stakeholders on specialist matters (e.g. engineering firms, advice agencies, consultancy firms).
3b	Trade organisations of consulting parties	
4a	Implementing/executing/service-provider organisations	Product standardisation: organisations that use/apply the product as part of their service to the end user (e.g. contractor, installer). Service standardisation: organisations that deliver a process or service to the end user (e.g. debt relief agency).
4b	Trade organisations of implementing/ executing /service-provider parties	
5a	Manufacturers/suppliers of main product	In product standardisation, this is the main producer/main supplier. In service standardisation, this category does not apply. The role of 'manufacturer/supplier' is fulfilled by the implementing, service-provider organisation.
5b	Trade organisations of manufacturers/ suppliers of main product	
6a	Manufacturers/suppliers of associated products and services	In product standardisation, this concerns manufacturers/suppliers of products such as raw materials, semi-finished goods or residual/waste products along the product chain. In service standardisation, this concerns providers of additional services.
6b	Trade organisations of manufacturers/ suppliers of associated products and services	

	Stakeholders	Description
7	Research and knowledge institutes	Institutions that carry out research independently of direct commercial interest. E.g. educational institutions, laboratories, research bodies.
8	Monitoring authorities	E.g. inspectorates, certification bodies.
9	Legislative authorities	Governments.
10	Existing/new instigators	Parties that undertake alternative initiatives comparable to NEN (standards, certification schemes, guidelines, etc.).
11	Influencers - wider context	Organisations (e.g. foundations, platforms) that are involved at a generic level.