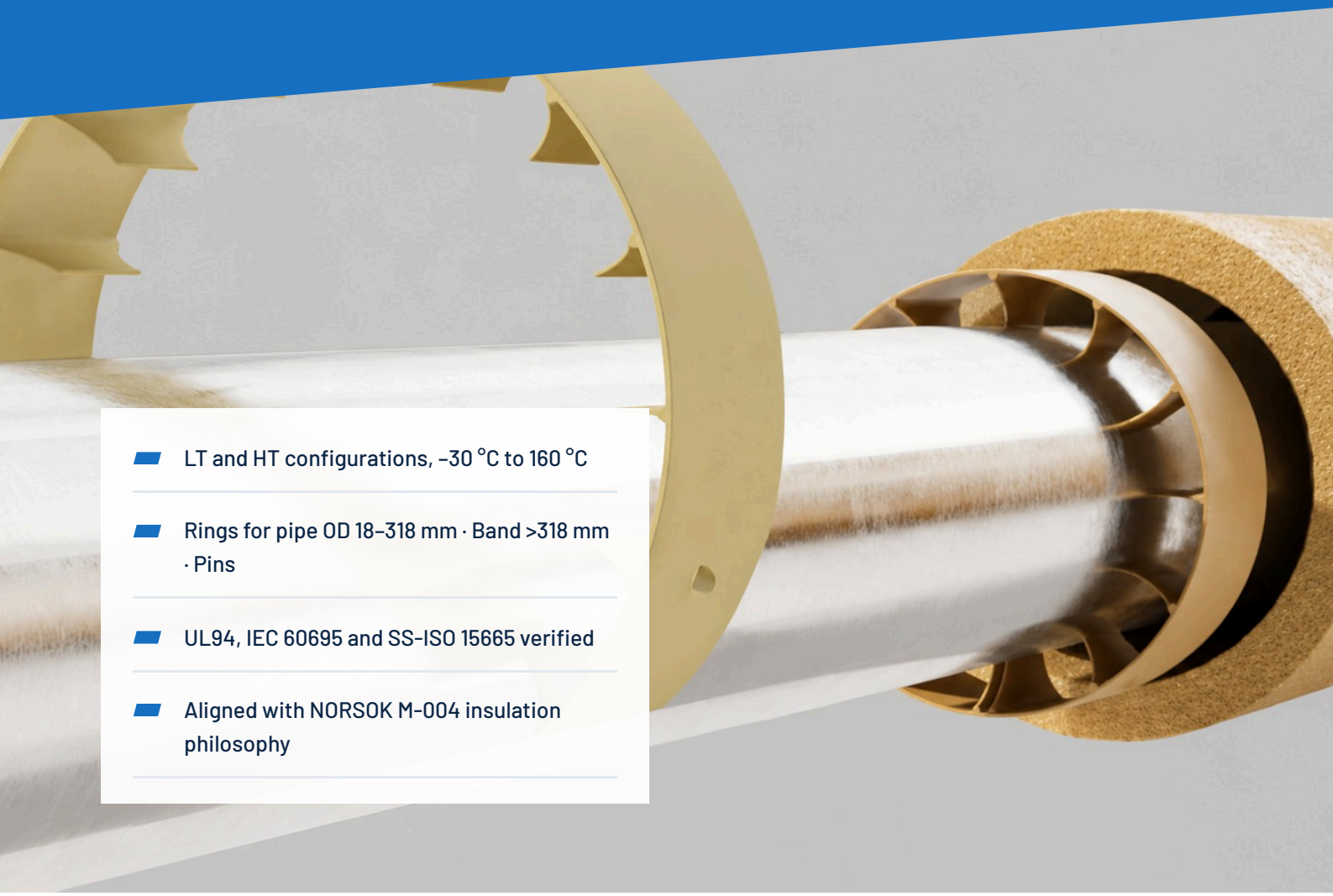
ESSGE-PLAST AB

TECHNICAL DATA SHEET & STANDARDS ALIGNMENT

ESSGE NCS TECHNICAL DATA

Non-Contact Insulation Spacer System – product configurations, dimensions, performance data and standards alignment.



- LT and HT configurations, –30 °C to 160 °C
- Rings for pipe OD 18–318 mm · Band >318 mm · Pins
- UL94, IEC 60695 and SS-ISO 15665 verified
- Aligned with NORSOK M-004 insulation philosophy

DOCUMENT ID	REVISION	DATE	CLASSIFICATION
ESSGE-NCS-TDS-001	2.0	2026-05-08	External · English

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10 NORSOK & insulation class alignment
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13 Cladding, drainage & material compatibility
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01 DEFINITIONS & ABBREVIATIONS

TERM	DEFINITION
C-C	Center-to-center distance between adjacent spacer elements or support points.
CUI	Corrosion Under Insulation – corrosion occurring on insulated equipment due to moisture trapped beneath the insulation system.
OD	Outside diameter of a pipe, vessel or component.
ID	Inside diameter. Insulation ID refers to the internal diameter of the insulation assembly.
DN	Nominal diameter according to metric piping standards. A reference size, not necessarily the actual pipe diameter.
NPS	Nominal Pipe Size according to ASME piping standards – a dimensionless designation.
ITP	Inspection and Test Plan – project-specific document defining inspection activities, verification requirements and acceptance criteria.
IPT	Installation Performance Test – practical verification of installation methodology, system functionality or performance under representative conditions.
PTFE-free	Absence of polytetrafluoroethylene (PTFE, Teflon®). ESSGE NCS does not use PTFE in its material composition.
Stand-off distance	The controlled separation maintained between the insulated surface and the insulation material by means of spacer elements.
Wet-time	The period during which moisture remains in contact with a surface. Reduced wet-time is generally associated with reduced corrosion risk.
Non-contact insulation	An insulation philosophy in which insulation material is intentionally separated from the insulated surface to reduce moisture retention, improve drainage and support corrosion mitigation.
FROSIO	Norwegian certification scheme for personnel inspecting surface treatment, corrosion protection and insulation. FROSIO certifies inspectors, not products.
UL94	Underwriters Laboratories flammability standard classifying the burning behaviour of polymeric materials.
IEC 60695	International standard series for fire hazard testing of materials and components.
NORSOK	Norwegian petroleum industry standards for safe, cost-effective and standardized offshore and industrial solutions.

02 PRODUCT DESCRIPTION

ESSGE NCS is a non-contact insulation spacer system developed to support industrial insulation assemblies where corrosion mitigation, drainage capability and long-term insulation stability are important operational considerations.

The system is designed to create controlled separation between insulated surfaces and insulation material, supporting reduced wet-time, improved drainage behaviour and reduced localized contact against coated surfaces.

INTENDED FOR USE IN

- Hot insulation systems
- Cold insulation systems
- Industrial process piping
- Vessels and tanks
- Offshore and onshore environments
- Acoustic insulation assemblies

MODULAR PRODUCT FAMILY

ESSGE NCS Ring · ESSGE NCS Band · ESSGE NCS Pin

03 PRODUCT CONFIGURATION

ESSGE NCS is available in two primary material and temperature configurations designed for different operational environments and insulation requirements. The LT and HT terminology used throughout this specification refers to these configurations.

CONFIGURATION	DESCRIPTION
LT	Low Temperature configuration for continuous operating temperatures from –30 °C to 100 °C (PTFE/Teflon-free). **Identified by its black colour.**
HT	High Temperature configuration for continuous operating temperatures from –30 °C to 160 °C (PTFE/Teflon-free). **Identified by its natural brown/beige colour.** No colour additives are used.



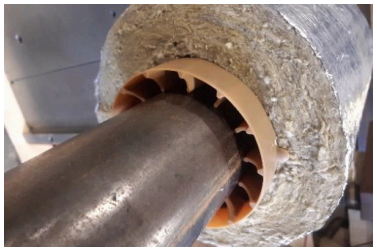
HT / LT HT ring (beige) and LT ring (black).

PRODUCT NAMING

Products follow the convention **HT/LT + [Pipe OD range]**. HT and LT identify the temperature configuration, and the numerical suffix specifies the applicable pipe outer diameter range in millimetres. Available size ranges are **18–25, 28–38, 42–57, 60–80, 83–114, 121–163, 169–222 and 230–318 mm**. For example, **HT18-25** and **LT18-25** are intended for pipes with an outer diameter between 18 mm and 25 mm.

04 PRODUCT COMPONENTS

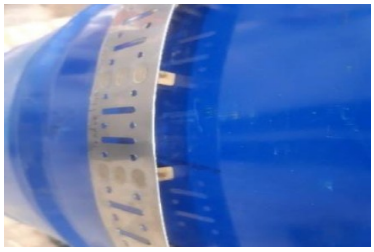
ESSGE NCS is based on a modular non-contact insulation concept consisting of multiple spacer configurations designed for different installation geometries and operational requirements. Rings, Bands and Pins allow flexible integration into both pipe and vessel insulation assemblies.



ESSGE NCS RING

Maintains controlled separation between the insulated surface and insulation material. The ring geometry supports stable insulation positioning, reduced contact areas and improved drainage.

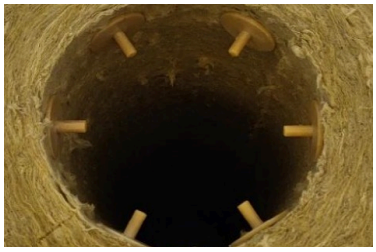
PIPE OD 18–318 MM



ESSGE NCS BAND

For flexible installation around varying pipe diameters and geometries. The integrated spacer design supports stable insulation configuration while maintaining non-contact principles.

PIPE OD >318 MM · TANKS · VESSELS



ESSGE NCS PIN

For localized spacing and support in complex insulation geometries. Flexible placement contributes to reduced moisture retention and improved insulation stability.

BENDS · ELBOWS · FLANGES

05 PRODUCT DIMENSIONS & CONFIGURATIONS

ESSGE NCS RING

ESSGE NCS Spacer Rings are designed for pipe dimensions from 18 mm to 318 mm outer diameter. For larger pipe dimensions or more complex insulation geometries, the ESSGE NCS Spacer Band system is recommended.

The ring configuration maintains controlled stand-off distance between the pipe surface and insulation material while supporting stable insulation geometry and improved drainage behaviour.

PARAMETER	DESCRIPTION
Pipe OD	Pipe outer diameter
Air gap (height)	Controlled stand-off distance
Width	Spacer ring width
Leg	Spacer element creating the air gap
Ear	8 mm
Insulation ID	Insulation inner diameter

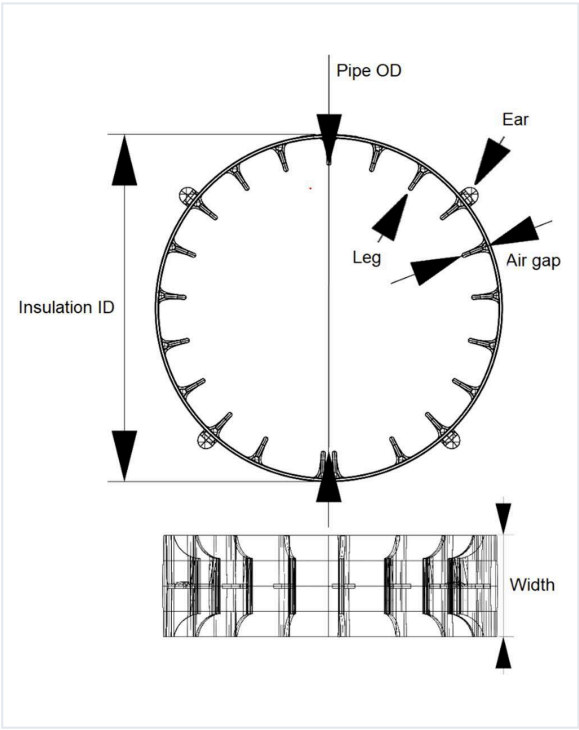


FIG. 1 ESSGE NCS Ring – dimension reference.

The insulation inner diameter is calculated by adding twice the air gap to the pipe outer diameter:

Insulation ID = Pipe OD + (Air gap × 2)

ESSGE NCS SPACER RING – SIZES (SAME FOR HT AND LT)

RING SIZE	SUITED FOR PIPE OD	AIR GAP HEIGHT	WIDTH	INSULATION ID
18–25	18–25 mm (0.71–0.98″)	15 mm (0.59″)	48 mm (1.89″)	48–55 mm (1.89–2.17″)
28–38	28–38 mm (1.10–1.50″)	16 mm (0.63″)	48 mm (1.89″)	60–70 mm (2.36–2.76″)
42–57	42–57 mm (1.65–2.24″)	16 mm (0.63″)	48 mm (1.89″)	74–89 mm (2.91–3.50″)
60–80	60–80 mm (2.36–3.15″)	18 mm (0.71″)	48 mm (1.89″)	96–116 mm (3.78–4.57″)
83–114	83–114 mm (3.27–4.49″)	18 mm (0.71″)	48 mm (1.89″)	119–150 mm (4.69–5.91″)
121–163	121–163 mm (4.76–6.42″)	18 mm (0.71″)	48 mm (1.89″)	157–199 mm (6.18–7.83″)
169–222	169–222 mm (6.65–8.74″)	18 mm (0.71″)	48 mm (1.89″)	205–258 mm (8.07–10.16″)
230–318	230–318 mm (9.06–12.52″)	16 mm (0.63″)	48 mm (1.89″)	262–350 mm (10.31–13.78″)

Note: Spacer sizing is based on pipe outer diameter (OD), not nominal pipe size (DN/NPS).

RING MARKING

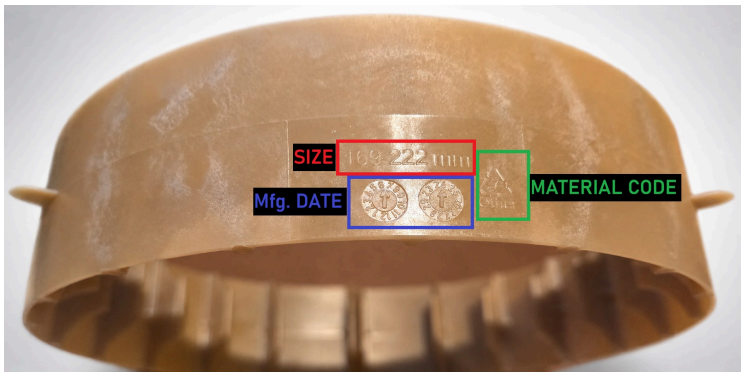


FIG. 2 Marking on the top side of the ring.

The ring size is always marked on the top side of the ring. In the example shown, the ring size is **169–222 mm**.

The manufacturing date is indicated by two date codes: the right-hand code represents the year (2024) and the left-hand code the month (06, June).

The recycling symbol **"7"** identifies the material as *Other Plastics* – an engineering polymer that may require specialized recycling streams depending on local practice.

DIMENSIONAL FLEXIBILITY

The ESSGE NCS Spacer Ring is designed to allow dimensional flexibility during installation. A ring intended for 100% pipe circumference coverage may be expanded and installed with coverage down to approximately **75%** of the pipe circumference while still maintaining the required stand-off distance and mechanical insulation support.

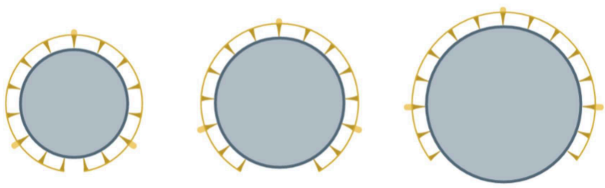


FIG. 3 Ring coverage from 100% down to approx. 75% of the circumference.

ESSGE NCS BAND

ESSGE NCS Spacer Band is designed for pipe systems, tanks, vessels and insulation geometries exceeding 318 mm outer diameter where standard spacer rings are not applicable.

In addition to cylindrical pipe applications, the Spacer Band may be configured into grid-based support structures for:

The band is supplied in continuous lengths and cut to the required dimension during installation. It is mechanically fastened during assembly, typically using rivets or equivalent methods compatible with the insulation system design.

Only polymer spacer elements are intended to contact the insulated surface. This minimizes direct metal-to-metal contact against coated steel surfaces and helps reduce localized galvanic interaction and coating stress.

- Tanks and vessels
- Large flat insulation surfaces
- Complex geometries
- Non-standard insulation assemblies

PARAMETER	DESCRIPTION
Air gap	Stand-off distance between surface and insulation
C-C	Center-to-center distance between spacer feet
Width	Total width of the band configuration
Foot	Integrated spacer element maintaining separation

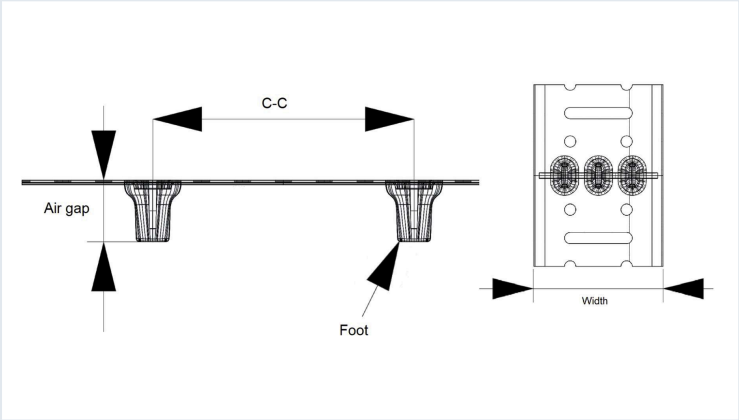


FIG. 4 ESSGE NCS Band – dimension reference.

ESSGE NCS BAND

PROPERTY	VALUE
Configuration	HT
Suited for OD	>318 mm*
Air gap height	15 mm
Width	46 mm
C-C distance	64 mm

* Band length is virtually unlimited – additional sections can be connected using pop rivets.

ESSGE NCS PIN

ESSGE NCS Pins are designed for insulation geometries requiring flexible and localized stand-off control where conventional spacer rings may not be suitable. The pins are inserted directly into the insulation material and may be positioned individually.

Pins are particularly suitable for smaller pipe bends and elbows **below 169 mm OD**, where spacer rings may become too wide to fit properly on the inner radius of the bend.

Pins may also be used together with Spacer Band grid configurations on tanks, vessels, flat insulation surfaces and large assemblies. Additional pins can be installed where softer insulation materials require supplementary support to prevent compression toward the insulated surface.

The pin system requires no special installation tools and is available in both LT and HT configurations.

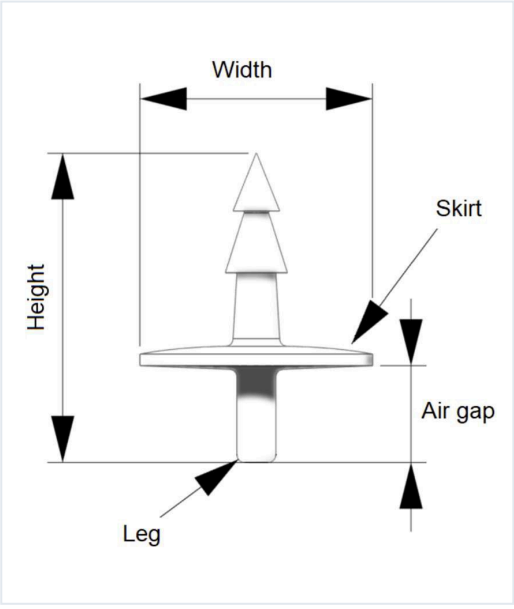


FIG. 5 ESSGE NCS Pin – dimension reference.

TYPICAL APPLICATIONS

- Pipe bends and elbows
- T-connections
- Flanges
- Reducers
- Irregular insulation sections
- Localized support areas
- Custom insulation geometries

PARAMETER	DESCRIPTION
Height	Total height of the pin
Width	Maximum outer width of the pin head
Air gap	Stand-off distance to the insulated surface
Skirt	Upper support surface distributing insulation load
Leg	Support section creating separation against the surface

PROPERTY	VALUE
Available configurations	LT HT
Height	48 mm
Width	30 mm
Air gap height	12.5 mm

LOAD LIMITATION

ESSGE NCS Pins support insulation and cladding loads within the insulation system. They are not intended for external mechanical loads or foot traffic, which require dedicated structural support or walkway systems.

06 SYSTEM FUNCTION & CUI MITIGATION

ESSGE NCS is designed according to non-contact insulation principles intended to support reduced moisture retention and improved insulation system behaviour over time.

Traditional insulation systems may create localized contact areas where moisture remains trapped against coated steel surfaces for extended periods. In cyclic operating environments, these conditions may increase the risk of CUI, coating degradation and maintenance requirements.

The ESSGE NCS system supports several principles commonly associated with:

- Industrial CUI mitigation strategies
- FROSIO-related insulation inspection methodologies
- NORSOK-oriented insulation philosophy
- Long-term asset integrity management

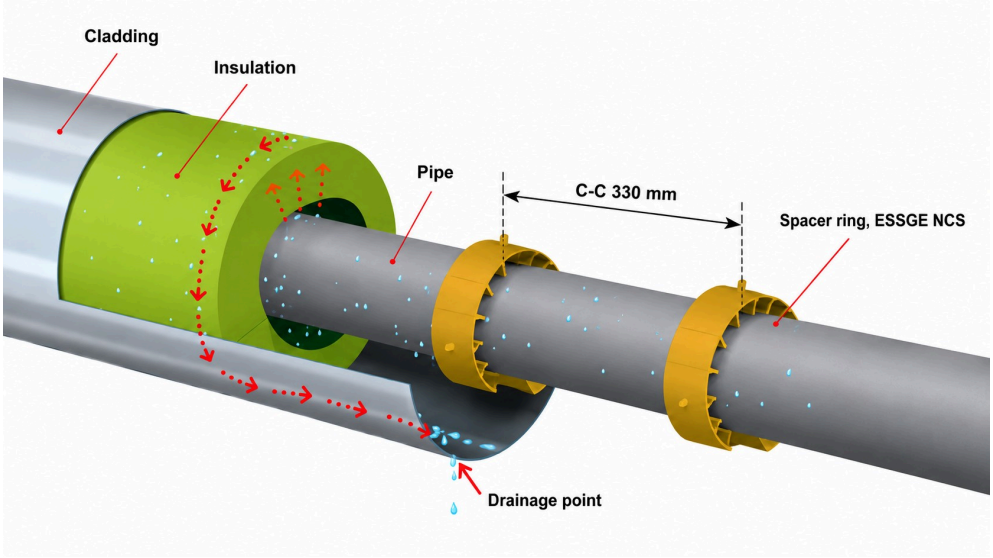


FIG. 6 Moisture migrates toward the cladding, condenses at low points and drains out of the insulation assembly.

OBSERVED INTEGRITY FACTOR	ESSGE NCS CONTRIBUTION
Reduced wet-time	Supports reduced moisture exposure against coated surfaces
Improved drainage	Supports water migration toward drainage points
Reduced coating stress	Reduces localized pressure against coated steel
Controlled stand-off distance	Maintains insulation separation geometry
Reduced metal-to-metal contact	Non-conductive spacer configuration
Installation repeatability	Supports stable and repeatable insulation geometry

07 OPERATING CONDITIONS & MECHANICAL PERFORMANCE

OPERATING TEMPERATURE

PROPERTY	LT	HT
Continuous operating temperature	–30 °C to 100 °C	–30 °C to 160 °C
Short-term exposure	140 °C	219 °C

MECHANICAL PERFORMANCE

PROPERTY	LT	HT
Spacer ring failure load	3.2 kN	3.0 kN
Pin failure load	1.0 kN	2.0 kN

SPACER INSTALLATION REQUIREMENTS

PARAMETER	REQUIREMENT
Recommended spacer quantity	3 spacers per metre
Recommended spacer distance	CC 330 mm
Additional support	4 spacers first and last metre

MATERIAL CONFIGURATION

PROPERTY	LT	HT
Base material	Polymer-based spacer system	AISI 316L stainless steel band with integrated polymer spacers
Non-conductive design	Yes	Yes
Corrosion resistant	Yes	Yes

The AISI 316L configuration used in the HT variant supports compatibility with corrosive industrial environments and contributes to improved material compatibility within insulation assemblies.

08 FIRE, SMOKE & MATERIAL CLASSIFICATION

NOT A FIRE PROTECTION SYSTEM

ESSGE NCS is not classified as a fire insulation system or passive fire protection system. The product has not been certified according to hydrocarbon fire classes, jet fire classifications or marine fire insulation standards. Material-level testing and classification data are available for the spacer materials.

STANDARD / PROPERTY	CLASSIFICATION	ESSGE NCS STATUS
UL94	94-5VA / 94V-0	VERIFIED
IEC 60695	F1	VERIFIED
Smoke density & toxicity	F1	VERIFIED

Fire classification requirements are normally determined by the complete insulation assembly and selected fire scenario (A/B/H classification).

09 ACOUSTIC PERFORMANCE

ESSGE NCS has been evaluated as part of acoustic insulation configurations tested according to SS-ISO 15665:2004 by RISE Research Institutes of Sweden, an accredited ISO/IEC 17025 laboratory.

The system is not intended to function as an autonomous acoustic barrier, but contributes to improved insulation geometry and acoustic performance when integrated into complete insulation assemblies.

STANDARD	CLASSIFICATION	STATUS
SS-ISO 15665:2004	Acoustic insulation testing	TESTED BY RISE
Class A	≥10 dB	VERIFIED
Class B	≥20 dB	SELECTED CONFIGS*
Class C	≥30 dB	SELECTED CONFIGS*

* Verified for pipe dimensions 300–650 mm.

10 NORSOK & INSULATION CLASS ALIGNMENT

NORSOK M-004 defines insulation classes and insulation system philosophy for offshore and industrial environments. ESSGE NCS is designed to support several insulation classes through non-contact insulation principles and controlled stand-off geometry.

CLASS	PURPOSE	ESSGE NCS RELEVANCE
Class 1	Heat conservation	APPLICABLE
Class 2	Cold insulation	APPLICABLE
Class 3	Personnel protection	LIMITED APPLICABILITY
Class 4	Frost protection	APPLICABLE
Class 5	Fire insulation	NOT CLASSIFIED
Class 6	Acoustic insulation (A)	SUPPORTED THROUGH TESTED ASSEMBLIES
Class 7	Acoustic insulation (B)	SUPPORTED THROUGH TESTED ASSEMBLIES
Class 8	Acoustic insulation (C)	SUPPORTED THROUGH TESTED ASSEMBLIES
Class 9	Condensation control	STRONG RELEVANCE

> Class 9 condensation control is considered one of the most relevant insulation classes for ESSGE NCS, due to the system's focus on reduced wet-time, improved drainage behaviour and minimized moisture retention.

11 STANDARDS & SYSTEM INTEGRATION

STANDARD / SYSTEM	RELEVANCE	ESSGE NCS STATUS
NORSOK M-004	Insulation philosophy and insulation classes	APPLICABLE
NORSOK M-501	Coating systems and corrosion protection	SYSTEM COMPATIBLE
NORSOK S-001	Technical safety philosophy	SYSTEM RELEVANT
IPS	Project-specific insulation systems	COMPATIBLE
ITP	Inspection and test planning	SUPPORTS INSPECTION CONTROL
IPT	Method verification	PRACTICALLY VERIFIED
ISO 9001	Quality management	APPLIED WITHIN DOCUMENTATION GOVERNANCE
ISO 12241	Insulation thickness calculations	REFERENCED IN DESIGN VERIFICATION
SS-ISO 15665:2004	Acoustic insulation testing	VERIFIED
UL94	Fire classification	VERIFIED
IEC 60695	Smoke & toxicity classification	VERIFIED

NORSOK M-004 functions as the primary insulation philosophy framework connecting insulation classification, installation methodology and long-term system behaviour.

12 INSTALLATION & INSPECTION RELEVANCE

ESSGE NCS is designed to support:

- Controlled insulation spacing
- Stable insulation geometry
- Compatibility with conventional insulation systems
- Integration with cladding systems
- Repeatable installation methodology
- Inspection accessibility
- Controllable installation parameters
- Sufficient clearance to inspect the pipe surface through bottom drainage openings using borescopes, cameras and other inspection equipment

Installation parameters including spacer distance, spacer positioning, mounting configuration and insulation geometry can be verified through project-specific inspection and test plans (ITP).

The system has been practically evaluated in multiple installation configurations related to both CUI mitigation and acoustic insulation performance.

> Recommended installation practices are described in **ESSGE NCS – Installation Guide** (ESSGE-NCS-IG-001).

13 CLADDING, DRAINAGE & MATERIAL COMPATIBILITY

ESSGE NCS is intended for integration into complete insulation systems incorporating conventional cladding materials and insulation assemblies.

THE SPACER PRINCIPLE SUPPORTS

- Improved drainage behaviour
- Water migration toward low points
- Reduced moisture retention
- Compatibility with cladding systems
- Stable insulation geometry

MAY BE INTEGRATED WITH

- Stainless steel cladding
- Aluminium cladding
- Aluzink cladding
- Offshore insulation systems
- Onshore industrial insulation systems

The HT configuration references acoustic testing performed in combination with 1 mm steel cladding systems.

COMPONENT	RELEVANCE
AISI 316L band	Suitable for corrosive industrial environments
Stainless fastening systems	Compatible with industrial insulation assemblies
Cladding fasteners	Project-specific selection
Sealants & tapes	Determined by insulation system requirements

Material compatibility should always be evaluated according to environmental classification and insulation system design. Using compatible materials throughout the assembly supports reduced galvanic corrosion risk.

14 CERTIFICATION & VERIFICATION

SYSTEM / VERIFICATION	STATUS
RISE acoustic testing	VERIFIED
ISO/IEC 17025 laboratory testing	VERIFIED
UL94 material classification	VERIFIED
IEC 60695 F1 classification	VERIFIED
FROSIO	INSPECTOR CERTIFICATION – NOT PRODUCT

ABOUT FROSIO

FROSIO is a personnel certification system related to insulation and surface treatment inspection methodologies and should not be interpreted as product certification.

15 INDUSTRIAL APPLICATIONS & REFERENCES

ESSGE NCS IS SUITABLE FOR

- Process piping
- Offshore systems
- LNG facilities
- Petrochemical plants
- Insulated vessels and tanks
- Hot and cold insulation systems
- Acoustic insulation assemblies
- Industrial utility systems

REFERENCE PROJECTS

PROJECT	APPLICATION	PERIOD
Kårstø Gas Processing Facility	20-metre insulated pipeline	2012–2014, 2014–present*
Industrial tank installation	Tank insulation system	2022–present

* The original installation (2012–2014) was opened for inspection in 2014. After verification of satisfactory pipe condition, the insulation was reinstated using ESSGE NCS and has remained in continuous operation since 2014. See ESSGE NCS – Reference Cases (ESSGE-NCS-RC-001).



BAND Band grid installed.



AFTER Mineral wool fitted.

ESSGE-PLAST AB

CONTACT

TALK TO THE ESSGE NCS TEAM

For technical documentation, installation guidance and product information, please contact us.

Technical & product information	**essgencs@essgeplast.se**
General information	**info@essgeplast.se**
Phone	**+46 631 50 230**
Website	**www.essge.com**

ESSGE NCS is available through ESSGE-Plast AB and selected industrial distribution channels, including ISOPartner.

The information contained in this document is provided for general technical guidance only and is subject to change without notice. Final system design, insulation configuration and suitability for specific operating conditions remain the responsibility of the customer and/or installation contractor. For detailed engineering limitations and installation requirements, refer to the applicable ESSGE technical documentation.

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