ESSGE-PLAST AB

NON-CONTACT INSULATION SYSTEM

ESSGE NCS SPACER SYSTEM

Controlled stand-off distance between coated steel and insulation – to reduce wet-time and the risk of corrosion under insulation.



- Supports reduced wet-time inside insulation systems
- High mechanical stability and dimensional reliability
- Simple and repeatable installation methodology
- Designed for demanding industrial environments
- Compatible with existing insulation and cladding systems

THE PRINCIPLE

WHY NON-CONTACT INSULATION MATTERS

Traditional insulation systems often create localized contact areas where moisture may remain trapped against coated steel surfaces for extended periods of time.

In environments exposed to cyclic temperatures and atmospheric humidity, these conditions may significantly increase the risk of corrosion initiation beneath the insulation system.

By introducing controlled stand-off distance between the insulated surface and the insulation material itself, non-contact insulation principles help reduce wet-time, improve drainage behaviour and minimize localized coating stress.

This principle has become increasingly relevant within modern CUI mitigation strategies, particularly in offshore and process industry environments where long-term inspection accessibility and corrosion prevention are critical.

IN SHORT

ESSGE NCS keeps insulation away from the coated steel surface. The air gap lets moisture migrate to low points and drain out – instead of staying trapped against the pipe.



HT / LT HT (natural beige) and LT (black) spacer rings.

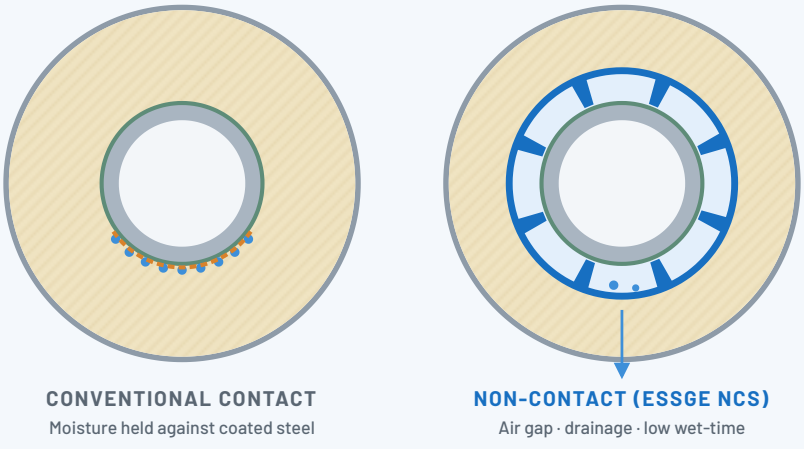


FIG. 1 Conventional contact insulation compared with non-contact insulation using ESSGE NCS (schematic).

−30…160 °C	**3.2 kN**	**3 pcs/m**	**≥30 dB**
Continuous operating range (HT configuration)	Spacer ring failure load (LT configuration)	Recommended spacers per metre, CC 330 mm	Acoustic Class C achieved – tested by RISE

01 DESIGNED TO REDUCE THE RISK OF CUI

Corrosion Under Insulation (CUI) remains one of the most challenging integrity issues across the process industry. Unlike many other corrosion mechanisms, CUI often develops hidden beneath intact cladding systems and may remain undetected for years before becoming visible through leaks, corrosion-induced wall thinning or coating failure.

In many cases, CUI is not caused by the insulation alone, but by the combined effect of moisture ingress, poor drainage, damaged coatings and inadequate support conditions within the insulation system. Localized contact points, compressed insulation and trapped water can create environments where corrosion develops rapidly, even when other protection systems have been properly designed.

ESSGE NCS has been developed specifically to address these challenges by creating controlled separation between the insulated surface and the surrounding insulation material. This separation helps reduce direct contact areas, supports improved drainage conditions and creates a more inspection-friendly geometry within the insulation system.

The spacer design can also improve accessibility for visual assessment and camera-based inspection, making it easier to identify conditions that may contribute to CUI at an earlier stage. By combining risk reduction with improved inspectability, ESSGE NCS supports a proactive approach to long-term asset integrity.

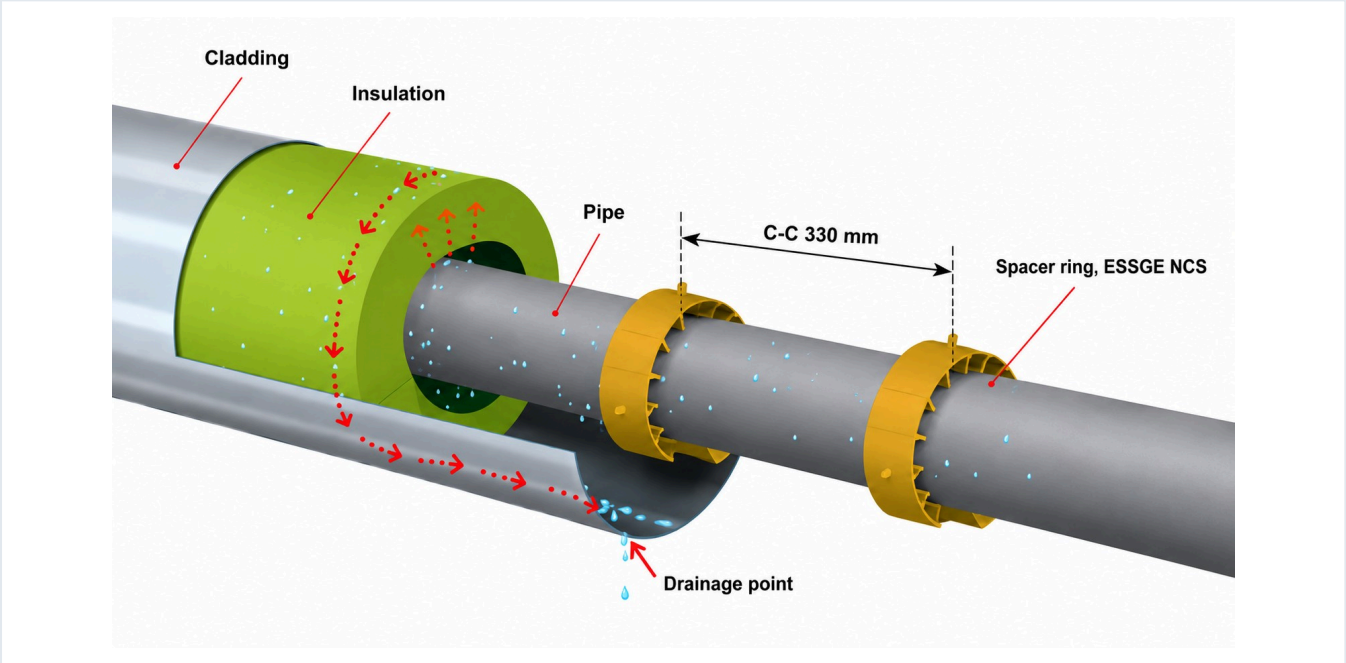


FIG. 2 Moisture migrates through the air gap toward low points and drains out of the insulation assembly. Spacer rings at C-C 330 mm.

CUI MITIGATION PRINCIPLES

CUI MITIGATION FACTOR	RELEVANCE FOR CUI PREVENTION	ESSGE NCS CONTRIBUTION
Reduced wet-time	Lower exposure time for moisture against coated steel	Creates non-contact insulation geometry
Improved drainage	Reduces water accumulation inside the insulation system	Supports water migration toward drainage points
Reduced coating stress	Minimizes localized pressure against coated surfaces	Spacer-based load distribution
Reduced moisture trapping	Limits formation of stagnant moisture pockets	Controlled stand-off distance
Improved inspection consistency	Supports repeatable installation geometry	Stable spacer positioning
Reduced metal-to-metal contact	Minimizes localized conductive contact points	Non-conductive spacer design

02 SUPPORTING MODERN CUI PREVENTION PHILOSOPHY

Over the past decades, industry standards and inspection methodologies have increasingly shifted focus from reactive maintenance toward preventive integrity management. This is especially evident within offshore, LNG (Liquefied Natural Gas) and petrochemical environments where inaccessible corrosion can result in significant operational and safety consequences.

Training and inspection methodologies such as FROSIO place strong emphasis on the importance of installation quality, drainage capability, coating protection and the reduction of moisture-retaining geometries inside insulated systems. These principles have also influenced the development philosophy behind ESSGE NCS.

A well-performing insulation system is not only dependent on insulation material selection, but also on how the system behaves mechanically over time. Poorly distributed loads, unstable supports or metallic contact points may gradually damage protective coatings and create localized areas where moisture accumulates.

ESSGE NCS is designed to help create a more controlled and stable insulation structure, supporting both installation consistency and long-term maintainability.

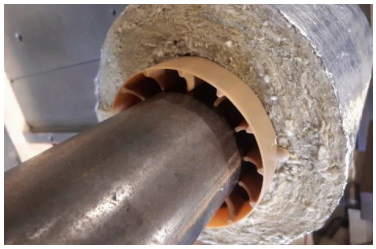
03 ONE MODULAR SYSTEM – THREE COMPONENTS

ESSGE NCS is based on a modular non-contact insulation concept, with spacer configurations designed for different installation geometries and operational requirements.

Industrial insulation systems are exposed to large temperature variations, vibration, humidity, offshore exposure and repeated maintenance activities throughout their service life. ESSGE NCS components are developed to withstand these conditions while maintaining their structural function inside the insulation system.

The non-conductive design also eliminates several of the challenges associated with traditional metallic spacer solutions, including thermal bridging and unintended metal-to-metal contact against coated surfaces.

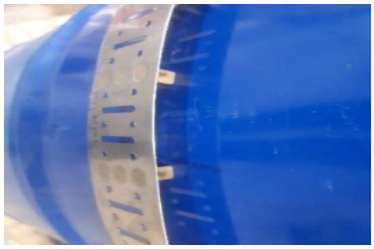
The system has been evaluated for demanding industrial operating conditions including elevated temperatures, cyclic thermal exposure and corrosive environments.



NCS RING

Maintains controlled separation between the insulated surface and the insulation material. Its engineered geometry enables fast and repeatable spacing on straight pipe sections while supporting stable insulation positioning, reduced contact areas and improved drainage.

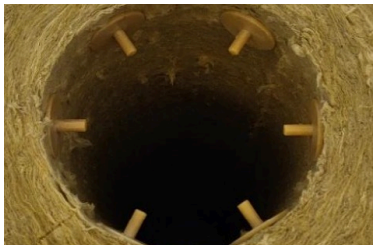
PIPE OD 18–318 MM



NCS BAND

Developed for large-diameter equipment, tanks and vessels where flexible adaptation to varying geometries is required. The integrated spacer design supports stable insulation configuration while maintaining non-contact principles.

PIPE OD >318 MM · TANKS · VESSELS



NCS PIN

Designed for targeted spacing and support in complex insulation geometries where additional stand-off control is required. Flexible placement contributes to reduced moisture retention and improved insulation stability.

BENDS · ELBOWS · T-CONNECTIONS

TEMPERATURE & MATERIAL PERFORMANCE

PROPERTY	LT VARIANT	HT VARIANT
Continuous operating temperature	–30 °C to 100 °C	–30 °C to 160 °C
Short-term exposure	140 °C	219 °C
Spacer ring failure load	3.2 kN	3.0 kN
Pin failure load	1.0 kN	2.0 kN
Material configuration	Polymer-based spacer system	AISI 316L band with integrated polymer spacers
Fire behaviour	UL Recognized 94-5VA / 94V-0	UL Recognized 94-5VA / 94V-0
Smoke & toxicity	IEC 60695 F1	IEC 60695 F1

LT components are identified by their black colour. HT components have a natural beige colour – no colour additives are used.

04 VERIFIED ACOUSTIC PERFORMANCE

Acoustic insulation configurations incorporating ESSGE NCS have been independently tested by RISE Research Institutes of Sweden according to SS-ISO 15665:2004. **Class A, B and C were all achieved.**

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

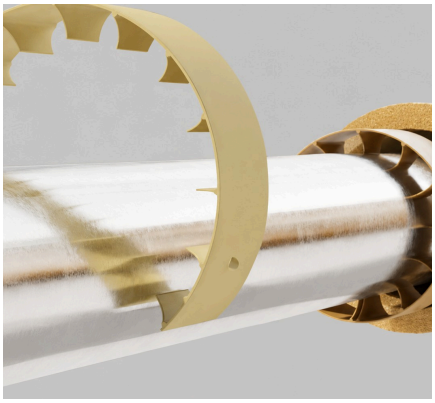
* Class B and Class C were achieved in the RISE tests. RISE tested one spacer size only, on pipe dimensions 300–650 mm – results for other sizes have not been tested.

INSPECTION & MAINTAINABILITY

Inspection accessibility and maintainability are increasingly important parts of modern integrity programmes and risk-based inspection strategies. Systems that support predictable installation quality and stable insulation geometry simplify both inspection planning and long-term maintenance work.

ESSGE NCS contributes to this by supporting controlled stand-off distances and reducing localized stress points against coated surfaces – an approach aligned with the industry's move toward preventive corrosion management rather than reactive repair.

05 APPLICATIONS



PIPE NCS Ring on straight pipe runs.



BAND NCS Band grid on a vessel during installation.



AFTER Mineral wool insulation fitted over the NCS Band.

ESSGE NCS is designed for industrial insulation systems where long-term corrosion prevention, drainage capability and insulation stability are important operational considerations.

The system is suitable for both hot and cold insulation across offshore installations, petrochemical facilities, LNG infrastructure, process plants and energy production systems.

The modular design allows ESSGE NCS to be integrated into both new-build projects and maintenance or retrofit activities where improved CUI mitigation performance is desired.

TYPICAL APPLICATIONS

- Process piping
- Insulated pipe supports
- Vertical piping systems
- Vessels and tanks
- Elbows and reducers
- Offshore topside systems
- Industrial utility systems
- Acoustic insulation assemblies

06 STANDARDS & SYSTEM INTEGRATION

Modern insulation systems are rarely evaluated as isolated products. In industrial projects, insulation performance is closely connected to inspection philosophy, installation methodology, coating systems and long-term integrity management. ESSGE NCS has been developed to support this broader system perspective.

INDUSTRY STANDARDS & SYSTEM INTEGRATION

STANDARD / SYSTEM	RELEVANCE FOR ESSGE NCS	ESSGE NCS ALIGNMENT
NORSOK M-004	Defines insulation classes and CUI prevention philosophy	INTEGRATED
IPS	Project-specific insulation specifications	COMPATIBLE
ITP	Inspection and test planning	SUPPORTS INSPECTION CONTROL
ISO 9001	Quality management systems	APPLIED WITHIN DOCUMENTATION GOVERNANCE
DAL / Design loads	Mechanical and environmental load philosophy	CONSIDERED IN SYSTEM DESIGN

VERIFICATION & COMPLIANCE OVERVIEW

AREA	STATUS
CUI mitigation philosophy	INTEGRATED
NORSOK-relevant environment	APPLICABLE
ISO 15665 acoustic testing	VERIFIED BY RISE
UL fire classification	VERIFIED
IEC 60695 smoke/toxicity	VERIFIED
FROSIO-relevant inspection principles	SUPPORTED
Inspection & installation control	SUPPORTED
Non-conductive spacer design	INTEGRATED

LONG-TERM RELIABILITY THROUGH SIMPLICITY

One of the core ideas behind ESSGE NCS is that long-term reliability often depends on reducing unnecessary complexity. A stable and well-controlled insulation support structure can significantly improve the overall performance of the insulation system throughout its operational lifetime.

By combining non-conductive spacer technology with a modular, installation-friendly design, **ESSGE NCS provides a practical solution** for industrial environments where corrosion prevention, durability and inspection reliability are critical priorities.

RELATED DOCUMENTS

PRODUCT DATA SHEET | TDS & STANDARDS ALIGNMENT | INSTALLATION GUIDE | REFERENCE CASES

ESSGE-PLAST AB

CONTACT

TALK TO THE ESSGE NCS TEAM

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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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