

BLUNOX INSIGHT · NAVAL & DEFENCE

SCR Systems for Naval Vessels & Defence Applications

8 min read

Naval vessels and defence platforms present the most demanding environment in which any SCR system must operate. The consequences of a system failure at sea — on an operational patrol vessel, a frigate or a naval support ship — are fundamentally different from those in commercial shipping. Defence procurement reflects this: the standards for supplier qualification, system certification, cybersecurity, and through-life support are significantly more rigorous than in the commercial maritime sector.

BLUNOX A/S has navigated this environment successfully. We are JOSCAR-accredited, Cyber Essentials Plus certified, and have delivered SCR systems to both the Royal Navy and the Royal Danish Navy. This article explains what makes naval SCR procurement different, what compliance requirements apply, and how BLUNOX meets them.

Key Takeaways

- Naval vessels built from 2016 operating in NOx ECAs — including the North Sea — are subject to the same IMO Tier III limits as commercial ships
- Defence procurement adds a further layer: JOSCAR accreditation, Cyber Essentials Plus, MoD security clearances and through-life support obligations
- BLUNOX is JOSCAR-accredited and Cyber Essentials Plus certified — the two primary supplier qualification requirements for UK Royal Navy programmes
- BLUNOX is the sole SCR supplier for the Royal Navy Type 31 frigate programme
- BLUNOX has delivered 12 SCR systems across 6 vessels of the Royal Danish Navy Diana-class patrol vessel fleet
- The BLUNOX Digital Airless Multipoint system is engineered for the reliability, low maintenance and minimal signature demands of naval operations

1. Do Naval Vessels Have to Comply With IMO Tier III?

This is the first question most naval procurement teams ask — and the answer is nuanced. The IMO MARPOL Annex VI framework, which sets Tier III NOx limits, applies in principle to all ships. However, MARPOL Regulation 3 provides a sovereign immunity exemption: warships, naval auxiliaries and other vessels owned or operated by a state and used, for the time being, only on government non-commercial service are exempt from MARPOL requirements.

In practice, however, most European naval forces do not rely on this exemption. There are three main reasons why:

- Political commitment: NATO nations and EU member states have made explicit commitments to reduce military emissions in line with IMO targets. Relying on sovereign immunity to avoid compliance would conflict with these commitments and with national environmental legislation.
- Port access: naval vessels operate in and transit through commercial ports, anchorages and environmentally sensitive areas where emissions compliance — or the visible absence of it — attracts political and public scrutiny.
- Procurement policy: the UK Ministry of Defence and the Danish Søværnet both apply emissions compliance standards that align with or exceed IMO Tier III requirements on new platforms. This is now a standard specification line in naval contracts, not an optional extra.

In practice, the question for naval procurement is not 'must we comply with IMO Tier III?' but 'how do we achieve it — and who is qualified to supply the system?'

2. What Makes Naval SCR Procurement Different?

The technical requirements for an SCR system on a naval vessel are broadly similar to those for a commercial ship: achieve a defined level of NOx reduction across the full engine operating range, while meeting physical installation constraints and minimizing maintenance burden. But the procurement environment adds a series of additional requirements that commercial suppliers cannot always meet:

⚠ Defence-Specific Challenge	✓ BLUNOX Solution
Supplier qualification: defence supply chains require JOSCAR accreditation or equivalent — a formal assessment of financial standing, quality management, HSE, and security practices	BLUNOX holds full JOSCAR accreditation, enabling direct participation in supply chains without the need for a qualified intermediary
Cybersecurity: naval platform systems must meet defined cybersecurity standards to protect against electronic warfare and data exfiltration risks	BLUNOX holds Cyber Essentials Plus certification — the UK government's baseline cybersecurity standard for defence suppliers
Low observability: SCR systems on combat vessels must not increase radar cross-section, acoustic signature, or thermal signature beyond platform specifications	BLUNOX systems are designed with minimal external protrusion and low thermal emission profiles, and can be engineered to specific naval signature requirements
Reliability under operational stress: naval vessels operate in conditions — extreme sea states, high-tempo operations, long transits — where system failures have mission-critical consequences	The BLUNOX Digital Airless Multipoint system has no compressed air dependency, no long urea injection pipes and no complex mixer arrays — fewer components means higher inherent reliability

Through-life support: naval contracts require long-term support commitments covering spare parts, technical updates and on-call engineering support, often over a 25-30 year platform life	BLUNOX provides comprehensive through-life support agreements, including spare parts stocking, remote diagnostics and on-site technical support for the duration of platform service life
Classification and certification: naval vessels typically require certification from a defence-recognised class society or direct MoD approval	BLUNOX has navigated the certification process for both Royal Navy and Royal Danish Navy programmes and can help provide the technical documentation required for MoD or class society approval

3. BLUNOX Credentials for Defence Supply

JOSCAR Accredited UK Defence Supply Chain	Cyber Essentials Plus UK Gov. Cybersecurity Standard	Royal Navy Type 31 Sole SCR Supplier	Royal Danish Navy 12 Systems / 6 Vessels
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JOSCAR Accreditation

JOSCAR (Joint Supply Chain Accreditation Register) is the primary qualification mechanism for suppliers to the UK defence and aerospace sectors. Accreditation requires a formal third-party assessment covering financial robustness, quality management systems, health and safety, environmental management, and business continuity. BLUNOX holds full JOSCAR accreditation, enabling direct participation as a Tier 1 or Tier 2 supplier in Defence programmes without an additional qualification layer.

Cyber Essentials Plus

Cyber Essentials Plus is the UK government's mandatory baseline cybersecurity certification for suppliers handling sensitive government contracts. It requires a certified external assessment of the organisation's cybersecurity controls, covering firewalls, secure configuration, access control, malware protection and patch management. For naval platform suppliers, this certification is increasingly a contractual prerequisite. BLUNOX is certified to Cyber Essentials Plus standard.

4. Naval References — Proven Delivery

BLUNOX has delivered SCR systems to two of Europe's most operationally active naval forces. Both programmes involved rigorous procurement processes, detailed technical qualification, and the full weight of defence-standard documentation and through-life support requirements.

Vessel / Programme	Customer / Flag	Vessel Type	Systems	Status
Type 31 Frigate Programme	Royal Navy (UK)	General Purpose Frigate	[TBC]	Contracted
HMS Tamar (P233)	Royal Navy (UK)	River-class OPV Batch 2	5	In Service
HMS Spey (P234)	Royal Navy (UK)	River-class OPV Batch 2	5	In Service
Diana-class (6 vessels)	Royal Danish Navy	Patrol Vessel	12	In Service

BLUNOX is the sole SCR supplier for the Type 31 programme. System quantities for Type 31 not publicly disclosed. Diana-class: 2 SCR systems per vessel across 6 hulls = 12 systems total.

5. The Technology — Why Digital Airless Multipoint Matters for Naval Applications

The BLUNOX Digital Airless Multipoint SCR system was not designed for naval applications as an afterthought. Its core characteristics — compactness, reliability, low maintenance burden, and independence from auxiliary compressed air systems — map directly onto the requirements of naval platform designers.

No compressed air dependency

Traditional SCR systems require a continuous supply of compressed air to atomise the urea solution for injection. On a naval vessel, this means an additional auxiliary system with its own maintenance requirements, failure modes, and space and weight implications. The BLUNOX TwinJet Nozzle system injects urea without compressed air, using patented digital dosing technology. One less system is one less potential failure point in an operational environment where reliability is not optional.

Ultra-compact footprint

Engine rooms on naval vessels are designed to minimise volume and weight while maximising combat system capacity. The BLUNOX SCR catalyst is dimensioned to fit within the existing silencer space on most naval engine configurations. No exhaust gas mixers, no long injection pipe runs, no flow conditioning equipment. The space recovered goes back to the platform designer.

Full load-range performance

Naval vessels operate across a wider engine load range than most commercial ships — from slow harbour manoeuvring to full-power transits and emergency response. The BLUNOX digital dosing system responds dynamically to engine load in real time, maintaining optimal NOx reduction across the complete operating envelope. This is critical for compliance: a system that only meets Tier III limits at steady-state cruise conditions would not pass naval acceptance testing.

Minimal acoustic contribution

Acoustic signature management is a central concern in naval platform design, particularly for anti-submarine warfare-capable vessels. BLUNOX SCR systems are typically configured with integrated sound attenuators, and the system design minimizes mechanical noise contribution from the urea injection and dosing components.

6. Through-Life Support — The Defence Requirement

Supplying equipment to a naval platform is not a transaction — it is a long-term commitment. Naval vessels have service lives of 25–35 years, and the procurement contract typically requires the supplier to maintain the capability to support the system throughout that period. This includes:

Spares	Guaranteed spare parts availability for the service life of the class, including components that may no longer be in production
Technical updates	Engineering changes to address obsolescence, technology improvements or evolving regulatory requirements
Remote support	Remote diagnostics and technical consultation, enabling at-sea fault diagnosis without requiring a physical visit
On-site support	Planned maintenance visits and unplanned callout support at naval bases and, where required, at deployed locations
Documentation	Through-life maintenance of technical documentation, including updating manuals to reflect hardware changes and regulatory updates

BLUNOX provides through-life support agreements structured to meet defence programme requirements. Our engineering team is based in Vedbæk, Denmark, with the capability to deploy to naval bases across Europe and further afield for on-site support when required.

Conclusion

The naval and defence market sets the highest bar in maritime procurement — and it should. The stakes of system failure at sea, in an operational context, are categorically different from those in commercial shipping. BLUNOX has invested in the credentials, the engineering rigour, and the through-life support capability that this market demands.

The result is a track record that includes some of Europe's most demanding naval programmes: the Royal Navy Type 31 frigate, the Royal Danish Navy Diana-class patrol vessels, and the River-class OPVs HMS Tamar and HMS Spey. In each case, the BLUNOX Digital Airless Multipoint SCR system was selected on the basis of technical merit, proven reliability, and the ability to meet the full spectrum of defence procurement requirements.

If you are evaluating SCR suppliers for a naval or defence programme, we would welcome the opportunity to demonstrate our credentials and technical capability. Contact us to arrange a qualification briefing.