Bauly

BAULY CHEMICALS

PRODUCT CATALOGUE

AUS 40

Aqueous Urea Solution 40%

Marine Emissions Control Solution

ISO 18611-1:2014 Certified · Australian Supply · Major Ports Nationwide

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Table of Contents

This catalogue provides comprehensive technical, commercial, and regulatory information about Bauly Chemicals' AUS 40 (Aqueous Urea Solution 40%) product for marine applications. Navigate using the section headings below.

DISCLAIMER

AUS 40 Product Catalogue — Bauly Chemicals

Please read before using this catalogue

1. General Information Only

This document — the 'AUS 40 Product Catalogue' (the Catalogue) — is published by Bauly Chemicals for general informational and commercial reference purposes only. The content is intended to provide vessel operators, marine engineers, fleet managers, procurement professionals, port operators, and other interested parties with a broad understanding of AUS 40 (Aqueous Urea Solution 40%), its applications in marine Selective Catalytic Reduction (SCR) systems, applicable quality standards, and Bauly Chemicals' supply capabilities.

Nothing in this Catalogue constitutes technical engineering advice, legal advice, regulatory compliance advice, marine safety advice, or any other form of professional advice specific to any individual vessel, engine system, operating profile, voyage, jurisdiction, or commercial arrangement. Bauly Chemicals strongly recommends that all readers consult qualified professionals — including certified marine engineers, naval architects, maritime lawyers, classification society representatives, flag state authorities, and other relevant experts — for advice specific to their vessel and circumstances.

2. Technical Information and Specifications

The technical specifications, physicochemical data, purity limits, consumption rates, storage parameters, and other technical information provided in this Catalogue are based on Bauly Chemicals' understanding of the ISO 18611-1:2014 standard and general marine industry practice at the time of publication. Technical specifications are provided for general reference only.

Actual product performance, consumption rates, NOx reduction efficiency, shelf life, and storage requirements may vary depending on the specific marine SCR system design, engine type, engine load profile, exhaust temperatures, ambient conditions, vessel age, and other operational factors unique to each installation. Vessel operators and marine engineers must consult their SCR system manufacturer's documentation, engine builder's specifications, and classification society requirements for technical guidance specific to their systems.

Bauly Chemicals makes no warranty, express or implied, that the technical information in this Catalogue will produce any particular outcome in any specific vessel or SCR system. Product specifications are subject to change without notice as manufacturing processes, quality standards, or supply chains evolve.

> **IMPORTANT**
> Always refer to your SCR system manufacturer's Operation and Maintenance Manual and your engine builder's documentation for vessel-specific AUS 40 consumption, storage, and dosing requirements. General data in this Catalogue is indicative only.

3. Regulatory and Legal Compliance

The regulatory information in this Catalogue — including references to International Maritime Organization (IMO) MARPOL Annex VI Regulation 13, NOx Tier emission limits, Emission Control Areas (ECAs), ISO 18611-1:2014, the Australian Maritime Safety Authority (AMSA), the Heavy Vehicle National Law (HVNL), and related frameworks — is provided for general awareness and educational purposes only.

Maritime regulatory frameworks are complex, jurisdiction-specific, vessel-type-specific, flag state-dependent, and subject to amendment and new interpretation by regulatory authorities without advance notice. The information in this Catalogue does not constitute legal advice and must not be relied upon as a substitute for obtaining current, independent advice from qualified maritime lawyers, classification societies, your flag state authority, or the relevant port state authorities.

In particular, the applicability of IMO Tier III requirements to any specific vessel depends on the vessel's construction date, engine installation date, flag state, trading area, and applicable exemptions — all of which must be verified by qualified professionals. Vessel owners and operators are solely responsible for ensuring their vessels comply with all applicable international conventions, flag state laws, port state requirements, and Australian maritime legislation at all times.

⚠ **COMPLIANCE RESPONSIBILITY**

Bauly Chemicals accepts no responsibility for any vessel's failure to comply with applicable maritime emissions regulations. Compliance is the sole responsibility of the vessel owner, operator, and their qualified advisers. Always obtain current advice from AMSA, your classification society, and maritime legal counsel.

4. Critical Product Use Warnings

The following warnings relate to the correct use of AUS 40. These are not exhaustive and do not replace the guidance in the product Material Safety Data Sheet (MSDS), SCR system manufacturer documentation, or relevant safety regulations.

🚨 **AUS 40 IS NOT INTERCHANGEABLE WITH AdBlue (AUS 32)**

AUS 40 contains 40% urea; AdBlue (AUS 32) contains 32.5% urea. These are different products formulated for different SCR systems. Using AdBlue in a marine AUS 40 SCR system, or using AUS 40 in a road vehicle or off-road equipment SCR system, will result in incorrect dosing, reduced NOx conversion performance, potential SCR catalyst damage, and potential system failure. Never substitute one product for the other under any circumstances.

🚨 **USE ONLY ISO 18611-CERTIFIED AUS 40**

Off-specification AUS 40 — including product manufactured without ISO 18611-1:2014 certification — may contain impurities that poison or irreversibly damage SCR catalysts. Catalyst replacement on a marine SCR system is extremely costly. Always purchase AUS 40 from a certified, reputable supplier and obtain a Certificate of Analysis confirming ISO 18611 compliance for each delivery.

⚠ **APPROVED STORAGE MATERIALS ONLY**

AUS 40 must only be stored and handled using ISO 18611-approved materials (HDPE, polypropylene, or 316L stainless steel). Contact with copper, brass, bronze, zinc, aluminium, or carbon steel introduces metallic contaminants that will damage SCR catalysts. Never use unapproved containers, pumps, hoses, or fittings for AUS 40.

⚠ **FREEZING RISK**

AUS 40 freezes at approximately -11°C. Vessels operating in cold climates must ensure that onboard AUS 40 storage tanks are equipped with appropriate heating systems to prevent freezing during operations. While AUS 40 can be thawed without quality degradation if done gradually, a frozen AUS 40 system may render the SCR system inoperable, creating a compliance risk in ECAs.

5. Safety Information

The safety information provided in this Catalogue is general guidance only and does not replace or supersede the Bauly Chemicals AUS 40 Material Safety Data Sheet (MSDS/SDS), applicable flag state and port state safety regulations, vessel safety management system (SMS) procedures, international maritime safety conventions (including SOLAS), or professional safety assessments conducted by qualified persons.

Marine operators and crew members handling AUS 40 should always consult the current MSDS before handling the product in any quantity. The current Bauly Chemicals AUS 40 MSDS is available at www.bauly.com.au/wp-content/uploads/2025/05/MSDS-AUS40-Version2.0-Bauly-Chemicals.pdf and is available from Bauly Chemicals upon request.

AUS 40 is classified as non-hazardous under normal conditions. However, basic safety precautions should always be observed: avoid prolonged skin and eye contact; ensure adequate ventilation in enclosed storage or dispensing areas; use appropriate personal protective equipment for bulk dispensing operations; and follow vessel safety management system procedures for chemical handling onboard.

6. Limitation of Liability

To the maximum extent permitted by applicable law, including the Australian Consumer Law (Schedule 2 of the Competition and Consumer Act 2010 (Cth)) and applicable international maritime law, Bauly Chemicals and its directors, employees, agents, contractors, and authorised representatives expressly disclaim all liability for any loss, damage, cost, expense, injury, environmental harm, or consequential loss of any kind arising out of or in connection with:

- Reliance on any information, specification, or guidance contained in this Catalogue;
- Errors, omissions, or inaccuracies in the Catalogue content, whether or not caused by negligence;
- Changes to applicable regulations, standards, or requirements occurring after publication of this Catalogue;
- Damage to marine SCR systems, catalysts, engines, or vessels arising from the use of AUS 40 in a manner inconsistent with the manufacturer's specifications, ISO 18611 requirements, or the guidance in this Catalogue;
- Cross-contamination of AUS 40 with incompatible fluids, materials, or substances;

- Non-compliance of any vessel with applicable IMO, MARPOL, flag state, or port state regulatory requirements, including but not limited to NOx Tier compliance failures;
- Port State Control detentions, flag state enforcement actions, fines, or other regulatory penalties arising from any vessel's emissions compliance status;
- Operational decisions made by vessel owners, operators, masters, or crew based on information in this Catalogue;
- Environmental harm arising from spills, incorrect disposal, or mishandling of AUS 40.

Nothing in this disclaimer limits or excludes any liability that cannot be excluded under the Australian Consumer Law or other mandatory consumer protection legislation that applies to Bauly Chemicals' supply of goods and services. Where Bauly Chemicals' liability cannot be excluded, it is limited to the fullest extent permitted by law.

7. IMO Standards, Classification Societies, and Flag State Requirements

References to IMO MARPOL Annex VI, NOx Technical Code, Tier I, Tier II, and Tier III emission limits, Emission Control Areas, and related international maritime instruments are provided for general informational context only. The application of these instruments to any specific vessel, engine, or operating scenario is highly technical and jurisdiction-specific.

Classification society rules — including those of Lloyd's Register, Bureau Veritas, DNV, ABS, ClassNK, RINA, and others — may impose additional requirements relating to AUS 40 storage, handling, system design, and documentation that are not covered in this Catalogue. Vessel operators must consult their relevant classification society and flag state authority for requirements specific to their vessel class and registration.

Bauly Chemicals is a product supplier and is not a classification society, flag state authority, or maritime regulatory body. Bauly Chemicals has no authority to certify, approve, or advise on vessel compliance with any maritime convention or flag state regulation.

8. Engine and SCR System Manufacturer Requirements

This Catalogue does not represent or purport to reflect the specific technical requirements of any individual engine manufacturer, SCR system manufacturer, or OEM. Engine builders such as MAN B&W, Wärtsilä, WinGD, Caterpillar Marine, MTU, Cummins Marine, and others, and SCR system suppliers, issue their own specific requirements for AUS 40 quality, storage, handling, dosing, and system operation. These OEM requirements take precedence over the general information in this Catalogue.

Bauly Chemicals does not warrant that its AUS 40 product is appropriate for use in any specific engine or SCR system without independent verification by the vessel operator and/or OEM. Vessel operators are responsible for confirming compatibility with their specific systems and for maintaining OEM-compliant documentation as required for warranty purposes.

9. Product Supply, Availability, and Pricing

All information regarding product availability, port locations, delivery capabilities, lead times, pack sizes, and pricing contained in this Catalogue is indicative only and subject to change without notice. Port

availability, stock levels, freight costs, and delivery capabilities depend on operational and logistics factors that may vary at any given time.

Nothing in this Catalogue constitutes a binding offer, commitment to supply, or guarantee of any specific price, delivery date, or product availability. All supply of AUS 40 by Bauly Chemicals is subject to Bauly Chemicals' current Sales Terms and Conditions, which are available at www.bauly.com.au/sales-terms-and-conditions/. A binding supply commitment exists only upon written order confirmation by Bauly Chemicals.

10. Third-Party Standards, Regulations, and References

This Catalogue references third-party international standards (ISO 18611, IMO instruments), regulatory bodies (AMSA, IMO, flag states), classification societies, engine manufacturers, and port authorities for informational purposes only. Such references do not constitute endorsement of, affiliation with, or approval by any of those third parties. Bauly Chemicals has no authority to represent any third party or make statements on their behalf.

Readers should obtain current official versions of all referenced standards and regulations directly from the relevant issuing authorities. Standards and regulations referenced in this Catalogue may have been amended, replaced, or supplemented since the publication date.

11. Environmental Responsibility

AUS 40 is not classified as an environmentally hazardous substance at normal working concentrations. However, large-quantity spills of AUS 40 into waterways, harbours, or the marine environment can introduce elevated nitrogen levels that may contribute to eutrophication and adverse ecological impacts. All AUS 40 spills in or near marine environments must be handled in compliance with MARPOL requirements, Australian marine pollution legislation, and the operator's vessel SMS spill response procedures.

Vessel operators and port facility operators are responsible for complying with all applicable environmental protection legislation in their jurisdiction. In the event of a significant AUS 40 spill into the marine environment in Australian waters, operators should immediately notify AMSA via the POLLUTION Hotline 1800 641 792 and their relevant state or territory Environment Protection Authority as required.

12. Intellectual Property

13. Currency and Updates

This Catalogue was prepared based on information available at the time of publication and reflects Bauly Chemicals' product offerings, supply capabilities, and the regulatory environment as understood at that date. Maritime regulations, emission standards, ECA designations, and product specifications are subject to ongoing development and revision.

Bauly Chemicals may update, revise, or withdraw this Catalogue at any time without notice. The most current version of this Catalogue and related product information is available at www.bauly.com.au. Readers — particularly those making regulatory compliance or procurement decisions — are encouraged to confirm that they are working from the most current version and to verify all regulatory information against current official sources.

Disclaimer Summary — Key Points

Item	Summary
Purpose of this catalogue	General information and commercial reference only — not professional, legal, or engineering advice.
Technical specifications	Indicative only. Always refer to OEM and classification society documentation for vessel-specific requirements.
Regulatory information	For general awareness. Always obtain current, independent advice from AMSA, flag state, and legal counsel.
AUS 40 ≠ AdBlue	Not interchangeable. Using the wrong product in an SCR system causes damage and compliance failure.
ISO 18611 compliance	Always request a CoA from your AUS 40 supplier. Off-spec product damages SCR catalysts.
Safety information	Supplementary only. Refer to the current Bauly Chemicals AUS 40 MSDS for full safety guidance.
Limitation of liability	Bauly Chemicals excludes all liability to the maximum extent permitted by Australian law.
Supply & pricing	Indicative only. Subject to Bauly Chemicals Sales Terms and Conditions. Confirm all details before ordering.
Environmental spills	In Australian waters: notify AMSA (1800 641 792) and state EPA immediately.
Copyright	© 2026 Bauly Chemicals. All rights reserved.
MSDS document	www.bauly.com.au/wp-content/uploads/2025/05/MSDS-AUS40-Version2.0-Bauly-Chemicals.pdf
Contact for queries	adblue@bauly.com.au | www.bauly.com.au

By accessing and using this AUS 40 Product Catalogue, you acknowledge that you have read, understood, and agree to the terms of this disclaimer.

Section 1: Product Overview

AUS 40 — Aqueous Urea Solution 40% — is a precisely formulated, high-purity urea solution used as the reductant in marine Selective Catalytic Reduction (SCR) systems. It is the maritime industry's primary tool for reducing nitrogen oxide (NOx) emissions from ship engines and boilers to comply with the International Maritime Organization's Tier III NOx emission limits.

Bauly Chemicals supplies AUS 40 to vessel operators, shipping companies, port operators, and marine contractors across Australia, with stock availability at all major Australian ports including Brisbane, Sydney, Melbourne, Adelaide, Darwin, Townsville, and Newcastle.

1.1 The Problem AUS 40 Solves

Diesel combustion in marine engines produces nitrogen oxides (NOx) — a group of harmful atmospheric pollutants that contribute to smog, acid rain, respiratory illness, and the degradation of coastal and marine ecosystems. Large ship engines, with their enormous fuel consumption and long operating hours, are significant NOx emitters on a global scale.

The International Maritime Organization (IMO), through MARPOL Annex VI, has progressively tightened NOx limits across three Tiers. Tier III — which applies to vessels operating in designated Emission Control Areas (ECAs) — requires an approximately 80% reduction in NOx compared to the Tier I baseline. Selective Catalytic Reduction using AUS 40 is the most proven and widely adopted technology for achieving Tier III compliance.

> **KEY FACT**
> AUS 40 used in marine SCR systems achieves NOx reductions of up to 90%, enabling vessels to comply with IMO Tier III standards when operating in Emission Control Areas (ECAs).

1.2 AUS 40 vs AdBlue — The Critical Distinction

AUS 40 and AdBlue (AUS 32) are both aqueous urea solutions, but they are different products formulated for different applications. They are NOT interchangeable.

Property	AUS 40 (Marine)
Urea concentration	40%
Application	Marine SCR systems (ships, vessels)
Quality standard	ISO 18611-1:2014
Pack size (Bauly)	1,000L IBC
Regulatory framework	IMO MARPOL Annex VI / Tier III

1.3 Bauly Chemicals — Your Australian AUS 40 Partner

Bauly Chemicals is a leading Australian supplier of both AUS 40 and AdBlue, serving the full spectrum of Australia's marine, transport, mining, agricultural, and construction industries. Our AUS 40 is manufactured to ISO 18611-1:2014 standards and is available at all major Australian ports with reliable delivery scheduling to meet vessel operational requirements.

Section 2: Technical Specifications

The following technical data describes the physicochemical properties of Bauly Chemicals' AUS 40 product as manufactured to ISO 18611-1:2014 specifications.

2.1 Physicochemical Properties

Parameter	Specification / Value
Product name	AUS 40 — Aqueous Urea Solution 40%
Chemical designation	Aqueous Urea Solution (AUS 40)
ISO designation	AUS 40 per ISO 18611-1:2014
Urea content	40.0% ± 0.7% (w/w)
Water type	Deionised / demineralised water
Appearance	Clear, colourless liquid — free of visible particles or sediment
Odour	Essentially odourless (trace ammonia if degraded)
pH (at 20°C)	9.0 – 9.5
Density at 20°C	Approximately 1.11 kg/L
Viscosity at 20°C	Approximately 2.0 mPa·s (water-like, low viscosity)
Freezing point	Approximately -11°C
Boiling point	Approximately 103°C
Vapour pressure at 20°C	Approximately 2.3 kPa
Solubility in water	Completely miscible
Flash point	None — non-flammable
Flammability	Non-flammable
Toxicity classification	Non-toxic under normal use conditions
Environmental hazard	Not classified as environmentally hazardous (at normal concentrations)

2.2 Purity Limits — ISO 18611-1:2014

ISO 18611-1:2014 specifies maximum concentrations of impurities that must not be exceeded in compliant AUS 40. These limits protect the SCR catalyst from poisoning or damage. All Bauly Chemicals AUS 40 meets or exceeds these requirements:

Impurity Parameter	ISO 18611 Maximum Limit

Biuret	≤ 0.3%
Aldehydes (as HCHO)	≤ 5 mg/kg
Phosphates (as PO4)	≤ 0.5 mg/kg
Calcium (Ca)	≤ 0.5 mg/kg
Iron (Fe)	≤ 0.5 mg/kg
Copper (Cu)	≤ 0.2 mg/kg
Zinc (Zn)	≤ 0.2 mg/kg
Chromium (Cr)	≤ 0.2 mg/kg
Nickel (Ni)	≤ 0.2 mg/kg
Aluminium (Al)	≤ 0.5 mg/kg
Sodium (Na)	≤ 0.5 mg/kg
Potassium (K)	≤ 0.5 mg/kg
Conductivity at 20°C	≤ 100 µS/cm
Insolubles	None visible to naked eye

QUALITY ASSURANCE

Every batch of Bauly Chemicals AUS 40 is manufactured under quality-controlled conditions with batch traceability. Certificates of Analysis (CoA) are available upon request.

Section 3: How AUS 40 Works — The SCR Process

Understanding the Selective Catalytic Reduction (SCR) process is essential for vessel operators, marine engineers, and compliance officers responsible for NOx emission management aboard modern vessels.

3.1 The SCR System — An Overview

Selective Catalytic Reduction is an aftertreatment technology installed in the exhaust system of marine diesel engines and boilers. It uses AUS 40 as a chemical reductant to convert harmful nitrogen oxides (NOx) in the exhaust stream into harmless nitrogen gas (N_2) and water vapour (H_2O).

Unlike combustion-based NOx reduction methods that reduce engine performance, SCR operates entirely in the exhaust aftertreatment phase — meaning engine power, fuel efficiency, and operational performance are fully maintained while achieving very high NOx reduction rates.

3.2 Step-by-Step Process

Step 1 — Engine Combustion:

The marine diesel engine or boiler combusts fuel, generating exhaust gases that contain significant concentrations of nitrogen oxides (NO and NO_2), collectively referred to as NOx.

Step 2 — AUS 40 Storage and Dosing:

AUS 40 is stored in dedicated onboard storage tanks, typically constructed of HDPE or stainless steel 316L. The vessel's SCR electronic control unit (ECU) continuously calculates the precise quantity of AUS 40 required based on engine load, exhaust gas flow rate, NOx sensor readings, and exhaust temperature. The dosing system injects the calculated quantity of AUS 40 into the exhaust stream upstream of the SCR catalyst.

Step 3 — Thermal Decomposition:

The heat of the exhaust gases (typically 200–450°C for marine engines) causes the AUS 40 to undergo thermal decomposition (thermolysis). In this process, the urea in the solution breaks down into ammonia (NH_3) and isocyanic acid (HNCO). The isocyanic acid then rapidly hydrolyses to produce additional ammonia and carbon dioxide (CO_2).

Step 4 — Catalytic Reduction:

The ammonia-laden exhaust gases pass through the SCR catalyst — typically a ceramic or metallic honeycomb structure coated with a catalytic material such as vanadium pentoxide, tungsten trioxide, or zeolite compounds. Inside the catalyst, the ammonia reacts selectively with the NOx molecules in the presence of oxygen to produce nitrogen gas and water vapour. This reaction is highly selective — it targets NOx while having minimal effect on other exhaust components.

Step 5 — Slip Catalyst and Clean Exhaust:

Any residual unreacted ammonia (ammonia slip) that passes through the SCR catalyst is captured and converted by an ammonia slip catalyst (ASC), preventing ammonia from being released to atmosphere. The treated exhaust gas — now significantly reduced in NOx content — exits through the stack.

3.3 Key Chemical Reactions

Primary SCR Reactions:

$$4\ NO + 4\ NH_3 + O_2 \rightarrow 4\ N_2 + 6\ H_2O$$

$$4\ NO_2 + 4\ NH_3 + O_2 \rightarrow 4\ N_2 + 6\ H_2O$$

$$2\ NO + 2\ NO_2 + 4\ NH_3 \rightarrow 4\ N_2 + 6\ H_2O\ (Fast\ SCR)$$

End result: NOx + Ammonia (derived from AUS 40 urea) → Nitrogen gas + Water vapour. Both products are naturally abundant in the atmosphere and completely harmless.

3.4 SCR System Components in Marine Applications

Component	Function in Marine SCR System
AUS 40 storage tank	Stores AUS 40 onboard. Must be HDPE or 316L SS. Typically equipped with level, temperature, and quality sensors.
AUS 40 supply pump	Pressurises and delivers AUS 40 from tank to dosing injector at correct flow rate.
Dosing injector/lance	Atomises AUS 40 into fine droplets for injection into the exhaust stream. Precise dosing critical.
Decomposition section	Allows sufficient residence time for AUS 40 to decompose into ammonia before the catalyst.
SCR catalyst unit	Core NOx reduction unit. Ceramic or metallic honeycomb with catalytic coating.
Ammonia slip catalyst (ASC)	Downstream of SCR unit. Oxidises any unreacted ammonia passing through the main catalyst.
NOx sensors (upstream/downstream)	Monitor NOx before and after catalyst to verify performance and optimise dosing.
SCR ECU / Dosing Control Unit	Electronic controller that calculates required AUS 40 dose in real time based on engine conditions.
AUS 40 tank heating system	Prevents freezing of AUS 40 in cold climate operations (freezes at -11°C).

Section 4: Vessel Applications

AUS 40 is required in any marine vessel equipped with an SCR system to comply with IMO Tier III NOx limits. The following vessel categories and engine types rely on AUS 40 for emissions compliance.

4.1 Vessel Types

Vessel Type	Application Notes
Bulk carriers	Large diesel main engines; high AUS 40 consumption on long voyages. Critical for ECA compliance.
Container ships	Major global trade vessels. ECA routing through North Sea, Baltic, North America requires Tier III compliance.
Oil and product tankers	Diesel-electric and conventional diesel propulsion. AUS 40 required for ECA operations.
LNG and LPG carriers	Dual-fuel vessels may use SCR on diesel backup engines. AUS 40 for diesel mode operations.
Cruise ships and ferries	High visibility vessels with intensive ECA exposure. AUS 40 critical for port and coastal operations.
Offshore support vessels (OSVs)	Platform supply vessels, anchor handlers, construction vessels. Intensive coastal and ECA operations.
Ro-Ro and vehicle carriers	Frequent port calls in ECAs. Consistent AUS 40 supply required at ports of call.
Dredgers and port equipment	Operate extensively in nearshore and port ECA zones. SCR increasingly common.
Tugs and harbour craft	Short-range vessels with intensive local port operations within ECAs.
Research and survey vessels	Government and scientific vessels increasingly equipped with SCR for emission compliance.
Fishing vessels (large commercial)	Larger offshore fishing vessels with Tier III-compliant engines require AUS 40.

4.2 Engine and Machinery Types

- Main propulsion diesel engines: 2-stroke and 4-stroke slow/medium-speed marine diesels from MAN B&W, Wärtsilä, WinGD, Caterpillar Marine, MTU, and Cummins Marine.
- Auxiliary diesel generators: Onboard power generation engines requiring Tier III compliance in ECAs.
- Marine boilers: Steam-generating boilers using diesel fuel where SCR aftertreatment is fitted.

- Diesel-electric propulsion systems: AUS 40 required for the diesel generator sets within the propulsion system.
- Hybrid propulsion: AUS 40 required during diesel operating modes in hybrid diesel-electric or diesel-LNG vessels.

4.3 Where AUS 40 is Required — Emission Control Areas

Vessels operating in IMO-designated Emission Control Areas (ECAs) must comply with Tier III NOx limits. Current global ECAs relevant to international shipping include:

ECA	Geographic Coverage	Tier III Applicable From
North American ECA	US and Canadian coastal waters within 200nm	2016 (new vessels)
US Caribbean Sea ECA	Caribbean Sea near US territories	2016 (new vessels)
Baltic Sea ECA	Enclosed Baltic Sea — EU states	2021 (new vessels)
North Sea ECA	North Sea including English Channel	2021 (new vessels)
Mediterranean Sea ECA	Designated Mediterranean waters	2025 (proposed/enacted)
Australian Ports & Coastal	Voluntary/State standards at major ports	Varies — check AMSA guidance

AUSTRALIAN RELEVANCE

While Australia is not yet a formally designated IMO ECA, the Australian Maritime Safety Authority (AMSA) enforces MARPOL Annex VI requirements on vessels in Australian waters. International vessels calling at Australian ports are subject to flag state Tier III obligations when applicable.

Section 5: Regulatory Compliance

Understanding the regulatory framework that mandates AUS 40 use is essential for vessel owners, operators, and fleet managers. This section outlines the key international and Australian regulations relevant to AUS 40 and marine NOx emissions.

5.1 IMO MARPOL Annex VI — NOx Emission Tiers

The International Maritime Organization's International Convention for the Prevention of Pollution from Ships (MARPOL), Annex VI, Regulation 13, establishes the NOx emission limits for marine diesel engines. The three tiers apply progressively based on vessel construction date and the area of operation:

IMO Tier	Construction Date	NOx Limit (n = engine speed rpm)
Tier I	On or after 1 January 2000	17.0 g/kWh (at n < 130 rpm) — baseline limits
Tier II	On or after 1 January 2011	14.4 g/kWh (at n < 130 rpm) — ~20% reduction
Tier III	On or after 1 January 2016 (ECA)	3.4 g/kWh (at n < 130 rpm) — ~80% reduction — AUS 40 required

Tier III limits apply to vessels constructed on or after 1 January 2016 when operating in designated Emission Control Areas. For all other ocean areas, Tier II limits remain applicable. The step change from Tier II to Tier III — approximately 80% NOx reduction — is what makes SCR with AUS 40 the dominant compliance solution.

5.2 ISO 18611-1:2014 — The Product Quality Standard

ISO 18611 is the international quality standard specifically governing AUS 40. It is the marine equivalent of ISO 22241 (which covers AdBlue for road vehicles). ISO 18611 specifies:

- The correct urea concentration (40.0% ± 0.7%)
- Maximum allowable levels of all impurities and contaminants
- Physical and chemical properties the product must meet
- Test methods for verifying compliance
- Packaging and labelling requirements
- Storage and handling requirements

Bauly Chemicals AUS 40 is manufactured in full compliance with ISO 18611-1:2014 at all times. Certificate of Conformity and Certificates of Analysis are available to customers upon request.

5.3 Australian Maritime Safety Authority (AMSA)

AMSA is responsible for enforcing MARPOL Annex VI in Australian waters. Australian-flagged vessels must comply with applicable Tier requirements based on their construction date. Foreign-flagged vessels operating in Australian waters must comply with their flag state's MARPOL obligations. AMSA conducts Port State Control (PSC) inspections that include verification of MARPOL Annex VI compliance, including AUS 40 onboard carriage, SCR system operation, and International Air Pollution Prevention (IAPP) Certificate verification.

> ⚠ **COMPLIANCE RISK**
>
> Failure to carry sufficient AUS 40, operating with a non-functional SCR system, or using off-specification AUS 40 can result in detention by Port State Control authorities, AMSA enforcement action, and flag state sanctions. Always ensure compliant, ISO 18611-certified AUS 40 is onboard.

5.4 Engine Manufacturer Warranty Requirements

All major marine engine manufacturers — including MAN B&W, Wärtsilä, WinGD, Caterpillar Marine, MTU, and others — specify ISO 18611-compliant AUS 40 as a requirement for SCR system warranty validity. Using off-specification AUS 40 may void the SCR catalyst warranty and create liability for engine damage repair costs. Bauly Chemicals recommends retaining delivery documentation and Certificates of Analysis for AUS 40 used onboard as part of your maintenance records.

Section 6: Features and Benefits of AUS 40

6.1 Product Features

Feature	Detail
High-purity urea concentration	40.0% ± 0.7% — precisely formulated for marine SCR systems. Higher concentration than AdBlue optimises performance in large marine engines.
ISO 18611-1:2014 compliant	Manufactured to the international standard for marine AUS 40. Accepted globally by all major marine classification societies.
Clear, colourless appearance	Indicates product purity. Discolouration signals potential contamination.
Essentially odourless	No ammonia odour when fresh and correctly stored. Safe for crew handling without specialist PPE.
Non-toxic and non-flammable	IMDG non-hazardous. No special dangerous goods classification required for shipboard carriage.
Low viscosity	Water-like flow properties for easy pumping, transfer, and precise dosing injection.
Chemically stable	Stable at recommended storage temperatures. Does not degrade rapidly under normal conditions.
Compatible with HDPE and 316L SS	Non-corrosive to approved storage materials, protecting onboard tanks and pipework.
Produced in Australia	Locally manufactured. No international freight delays. Consistent quality, reliable supply at Australian ports.
Available at 8 Australian ports	Brisbane, Sydney, Melbourne, Adelaide, Perth, Darwin, Townsville, Newcastle.

6.2 Operational Benefits for Vessel Operators

IMO Tier III Compliance

AUS 40 enables vessels to achieve the NOx reductions required by IMO Tier III limits when operating in Emission Control Areas. Without functional SCR and a compliant AUS 40 supply, vessels may not legally operate in ECAs — which covers major trading routes through North America, the Baltic, and the North Sea.

No Engine Performance Penalty

Unlike some NOx reduction approaches that require de-rating engines or modifying combustion parameters (with associated fuel efficiency penalties), SCR with AUS 40 operates entirely in the exhaust aftertreatment system. Engine power, torque, and fuel consumption are unaffected by SCR operation.

Fuel Efficiency Preservation

Because AUS 40 does not alter engine combustion, fuel efficiency is fully maintained. In contrast, alternative NOx reduction strategies such as exhaust gas recirculation (EGR) can impose fuel efficiency penalties. For a large vessel covering millions of nautical miles over its service life, this represents significant long-term cost avoidance.

Cost-Effective Compliance

AUS 40 is widely regarded as the most cost-effective technology for achieving Tier III compliance. The capital cost of SCR equipment and the ongoing cost of AUS 40 supply are substantially lower than the cost of alternative fuel systems (such as LNG conversion) or the financial exposure from non-compliance (fines, detention, loss of trading access to ECAs).

Environmental and Corporate Responsibility

Reducing NOx emissions by up to 90% makes a meaningful contribution to air quality improvement in port cities and coastal regions. For shipping companies with environmental, social, and governance (ESG) commitments, demonstrable Tier III compliance via AUS 40-equipped SCR systems is a tangible sustainability outcome.

Regulatory Future-Proofing

As ECAs expand globally and new ECAs are established — including possible future ECAs in the Asia-Pacific region — vessels already equipped with SCR and AUS 40 supply arrangements are well-positioned to comply with future requirements without additional capital investment.

Section 7: Storage and Handling

Correct storage and handling of AUS 40 is critical for maintaining product quality, protecting SCR catalyst systems, and ensuring crew safety. This section provides comprehensive guidance for vessel operators and port facility managers.

7.1 Temperature Requirements

Temperature Condition	Effect on AUS 40
Below -11°C	AUS 40 freezes. Onboard tanks must be equipped with heating systems for cold-climate operations. Thaws without degradation if re-heated gradually.
0°C to 30°C	Optimal storage temperature range. Full quality and shelf life maintained.
30°C to 40°C	Acceptable for short periods. Slight increase in degradation rate. Avoid prolonged storage above 30°C.
Above 40°C	Accelerated degradation. Urea begins to break down to biuret and ammonia. Shelf life significantly reduced.
Direct sunlight / unshielded deck storage	Avoid. Solar heating can raise container temperatures well above ambient. Use shaded, ventilated storage areas.

7.2 Approved Storage Materials

AUS 40 reacts with certain metals, introducing contaminants that can damage SCR catalysts. Always use approved materials for all containers, tanks, pumps, pipes, fittings, and hoses in contact with AUS 40.

Material	Suitability for AUS 40
High-density polyethylene (HDPE)	APPROVED — preferred material for storage tanks and IBC containers.
Polypropylene (PP)	APPROVED — suitable for tanks, fittings, and pipework.
Stainless steel 316L	APPROVED — preferred for tanks, pipework, and dosing equipment.
Stainless steel 304	CONDITIONALLY APPROVED — check with system manufacturer. 316L preferred.
Titanium	APPROVED — suitable for marine environments.
Carbon steel / mild steel	NOT APPROVED — corrodes in contact with AUS 40, causing contamination.
Aluminium	NOT APPROVED — reacts with AUS 40, introduces aluminium ions.

Copper, brass, bronze	NOT APPROVED — severely reactive. Even trace contact causes catalyst damage.
Zinc / galvanised surfaces	NOT APPROVED — zinc contamination destroys SCR catalysts.
Standard rubber (NBR, EPDM-unspecified)	CAUTION — use only AUS 40-rated rubber compounds. Consult manufacturer.

7.3 Onboard Storage Recommendations

- Dedicated AUS 40 storage tank, sized to provide adequate supply for voyages including ECA transits.
- Tank material: HDPE or 316L stainless steel. Tank must be clearly labelled 'AUS 40' or 'MARINE UREA SOLUTION'.
- Tank equipped with: level sensor, temperature sensor, fill connection, vent, drain, and heating coil (for cold-climate operations).
- Separate fill connection from all fuel and other fluid connections to prevent cross-contamination.
- Tank venting system to prevent pressure buildup. Vents must not be directed towards crew areas.
- Position tank in accessible location for regular level monitoring and access for inspections.

7.4 Shelf Life

Under correct storage conditions (0°C to 30°C, in sealed HDPE or stainless steel container, out of direct sunlight), AUS 40 has a shelf life of 12–18 months from date of manufacture. Shelf life is reduced in higher temperature storage conditions. Always check the manufacture date on delivery and implement first-in, first-out stock rotation for long-voyage vessel provisioning.

7.5 Safety Data

Safety Parameter	Status
Classified as hazardous (IMDG)	No — not classified as dangerous goods for maritime transport
Toxicity	Non-toxic under normal use. Mildly irritant to skin and eyes on prolonged contact.
Flammability	Non-flammable. No fire or explosion risk.
Skin contact	Wash with water. No long-term health risk from incidental contact.
Eye contact	Rinse immediately with clean water for 15 minutes. Seek medical advice if irritation persists.
Inhalation	Vapours from degraded product contain ammonia — avoid inhaling. Use ventilation in enclosed storage areas.
Spill response	Small spills: absorb with inert material, flush with water. Large spills: contain and collect. Notify environmental officer.

MSDS availability	Current MSDS available from Bauly Chemicals: bauly.com.au or by request from adblue@bauly.com.au

IMPORTANT

Always refer to the current Bauly Chemicals AUS 40 Material Safety Data Sheet (MSDS/SDS) for complete safety and emergency response information. The MSDS is available at www.bauly.com.au/wp-content/uploads/2025/05/MSDS-AUS40-Version2.0-Bauly-Chemicals.pdf

Section 8: Supply Information

Bauly Chemicals provides reliable, quality-assured AUS 40 supply to vessel operators across Australia's major ports and export locations.

8.1 Product Packaging

Pack Format	Specification
Container type	1,000 Litre IBC (Intermediate Bulk Container)
Container material	HDPE tank in galvanised steel cage on wooden/plastic pallet
Net volume	1,000 litres (1.11 tonnes)
Dimensions (approx.)	1,200mm (L) × 1,000mm (W) × 1,160mm (H)
Gross weight (approx.)	1,200 kg (including IBC tare weight)
Pallet type	Forklift-compatible. HDPE or timber pallet options available.
Fill connection	DN50 butterfly valve or equivalent — compatible with standard marine transfer fittings
Labelling	ISO 18611, AUS 40, product name, batch number, manufacture date, MSDS reference
Minimum order	Contact Bauly Chemicals for current minimum order requirements

8.2 Port Availability — Australia

Port / Location	State	Supply Arrangement
Brisbane	QLD	Direct supply. Ex-stock. Contact for lead time.
Sydney	NSW	Direct supply. Ex-stock. Contact for lead time.
Melbourne	VIC	Direct supply. Ex-stock. Depot in Sunshine & Dandenong.
Adelaide	SA	Direct supply. Ex-stock. Contact for lead time.
Perth / Fremantle	WA	Supply from Adelaide SA. Ex-stock. Contact for lead time.
Townsville	QLD	Direct supply. Ex-stock. Contact for lead time.

Newcastle	NSW	Direct supply. Ex-stock. Contact for lead time.
Darwin	NT	Supplied from Brisbane or Adelaide. Allow for transit time.
Other Australian ports	Various	Enquire. Freight arrangements available from nearest hub.
International / Export	Global	Export available. Contact for documentation and logistics.

8.3 How to Order AUS 40 from Bauly Chemicals

Step 1 — Submit an Enquiry:

Contact Bauly Chemicals via the online enquiry form at www.bauly.com.au/enquiry-aus-40-1000l-ibc/ or by email to adblue@bauly.com.au. Include your vessel name, required volume, delivery port, and required delivery date.

Step 2 — Receive a Quote:

Bauly Chemicals will respond promptly with a competitive, all-inclusive delivered price for your location and volume requirements.

Step 3 — Confirm Order and Pay:

Confirm your order by email and arrange payment on receipt of invoice. Bauly Chemicals accepts EFT and other payment methods.

Step 4 — Delivery:

AUS 40 is delivered by road freight to the nominated warehouse or agent address. Delivery scheduling is coordinated with your vessel schedule to minimise turnaround time at port.

DOCUMENTATION

Bauly Chemicals provides: Delivery docket, Tax invoice, Certificate of Analysis (CoA) on request, Certificate of Conformity to ISO 18611 on request, and MSDS documentation. These documents support vessel record-keeping for MARPOL compliance and PSC inspection requirements.

Section 9: AUS 40 vs AdBlue — Key Differences

AUS 40 and AdBlue (AUS 32) are frequently confused because both are aqueous urea solutions used in SCR systems. However, they are distinct products with different formulations, standards, and applications. Using the wrong product in an SCR system can cause serious damage and compliance failure.

Parameter	AUS 40 (Marine)
Product name	AUS 40 / Marine Urea Solution
Urea concentration	40.0% (± 0.7%)
Water percentage	60% deionised water
Quality standard	ISO 18611-1:2014
Primary application	Marine diesel engines and boilers
SCR system type	Marine SCR (large-scale, high exhaust temperature)
Regulatory framework	IMO MARPOL Annex VI Tier III
Pack sizes (Bauly)	1,000L IBC
Freezing point	Approximately -11°C
Interchangeability	NOT interchangeable with AdBlue
Available at Bauly	Yes — all major Australian ports

CRITICAL WARNING

DO NOT use AdBlue (AUS 32) in a marine AUS 40 SCR system, and DO NOT use AUS 40 in a road vehicle or off-road equipment SCR system. The different urea concentrations will cause incorrect dosing, SCR catalyst damage, and potential system failure. Always use the correct product for the specific application.

Section 10: Frequently Asked Questions

Q: Can I use AdBlue instead of AUS 40 in my vessel's SCR system?

No. AdBlue (AUS 32) has a 32.5% urea concentration, while AUS 40 contains 40% urea. Marine SCR systems are calibrated for the higher concentration of AUS 40. Using AdBlue will result in incorrect dosing, reduced NOx conversion efficiency, and may trigger system faults or damage the catalyst. Always use ISO 18611-compliant AUS 40 in marine SCR systems.

Q: How much AUS 40 does my vessel typically consume?

AUS 40 consumption depends on the size and type of engine, engine load, and operating conditions. As a general guide, large slow-speed main engines consume AUS 40 at approximately 3–7% of their diesel consumption rate. Medium-speed auxiliary engines typically consume 4–8%. Contact your SCR system manufacturer or marine engineer for vessel-specific consumption data and voyage planning guidance.

Q: What happens if the AUS 40 tank runs empty at sea?

If the AUS 40 tank runs empty, the SCR system will cease operating and NOx emissions will rise above Tier III limits. Depending on the vessel's location, this may constitute a MARPOL violation. Most modern SCR control systems will alert the crew well before the tank reaches empty and some may generate an engine alarm or log entry. Vessels should always carry sufficient AUS 40 for the full voyage including all planned ECA transits, with an adequate safety reserve.

Q: Does AUS 40 need to be stored in a special tank on the vessel?

Yes. AUS 40 must be stored in a dedicated tank constructed of approved materials — HDPE or 316L stainless steel. The tank must be clearly labelled and kept separate from all fuel, lubricant, and other fluid systems to prevent cross-contamination. In cold-climate operations, the tank should be equipped with a heating system to prevent freezing below -11°C.

Q: Is AUS 40 classified as a dangerous good for shipping?

No. AUS 40 is not classified as a dangerous good under the IMDG Code and does not require special dangerous goods documentation for maritime transport. It is non-toxic, non-flammable, and poses minimal health and safety risk under normal handling conditions.

Q: Can Bauly Chemicals supply AUS 40 to my vessel at short notice?

Bauly Chemicals maintains stock at major Australian ports and can accommodate urgent requirements wherever possible. We recommend providing as much advance notice as practical — particularly for larger volumes — to ensure delivery coordination with your vessel's port call schedule. Contact adblue@bauly.com.au for urgent enquiries.

Q: What documentation does Bauly Chemicals provide with AUS 40 supply?

Bauly Chemicals provides a delivery docket and tax invoice with every supply. Certificates of Analysis (CoA) confirming ISO 18611 compliance are available on request. A Certificate of Conformity is also available for customers requiring formal compliance documentation for flag state or classification society records.

Q: How should AUS 40 be disposed of if it is no longer needed?

AUS 40 is not classified as a hazardous waste. Small quantities may be diluted with large amounts of water. Large quantities should be handled by a licensed waste contractor. Do not dispose of AUS 40 into the marine environment or storm water drains due to its nitrogen content, which can cause eutrophication of water bodies.

Section 11: Contact and How to Order

11.1 Bauly Chemicals Contact Details

Contact Method	Details
AUS 40 Enquiry Form	www.bauly.com.au/enquiry-aus-40-1000l-ibc/
Email	adblue@bauly.com.au
Website	www.bauly.com.au
AUS 40 Product Page	www.bauly.com.au/aus-40-urea-solution-for-marine-engines/
Sales Enquiry (General)	www.bauly.com.au/salesenquiry/
Invite to Tender	www.bauly.com.au/invite-us-to-tender/
International Trade	www.bauly.com.au/diesel-exhaust-fluid-export/

11.2 Information to Include in Your Enquiry

To receive a prompt and accurate quote, please include the following in your AUS 40 enquiry:

- Vessel name and IMO number (if applicable)
- Required volume of AUS 40 (litres or number of IBCs)
- Delivery port or location
- Required delivery date or vessel ETA
- Contact name, company, and email address
- Any special delivery requirements (dock access, crane, specific delivery window)

> ⚓ **READY TO ORDER?**
> Contact Bauly Chemicals today for a fast, competitive quote on AUS 40 supply to your vessel or port location. We are committed to keeping Australian vessels compliant, operational, and emissions-ready at every port of call.

Appendix: Quick Reference Data

A. AUS 40 Quick Reference Card

Item	Quick Answer
What is it?	40% urea + 60% deionised water. Marine SCR reductant.
Quality standard	ISO 18611-1:2014
NOx reduction potential	Up to 90% in correctly operating marine SCR systems
Freezing point	Approximately -11°C
Ideal storage temperature	0°C to 30°C
Shelf life	12–18 months (correct storage)
Appearance	Clear, colourless, odourless liquid
Hazard classification	Non-hazardous (not IMDG dangerous goods)
Pack size (Bauly)	1,000L IBC
Same as AdBlue?	NO — different concentration (40% vs 32.5%) and standard (ISO 18611 vs ISO 22241)
Australian port supply	Brisbane, Sydney, Melbourne, Adelaide, Perth, Darwin, Townsville, Newcastle
Contact	adblue@bauly.com.au / www.bauly.com.au

B. Approved Storage Materials

Material	Approved for AUS 40?
HDPE (High-Density Polyethylene)	YES — preferred
Polypropylene (PP)	YES
Stainless Steel 316L	YES — preferred for metallic components
Stainless Steel 304	Conditionally — check with OEM
Titanium	YES
Carbon steel	NO
Aluminium	NO
Copper / Brass / Bronze	NO — severely damaging to SCR catalyst
Zinc / Galvanised	NO
EPDM rubber (AUS 40 rated)	YES — must be specifically rated

C. Glossary

Term	Definition
AUS 40	Aqueous Urea Solution 40% — the marine SCR reductant specified by ISO 18611.
AUS 32 / AdBlue	Aqueous Urea Solution 32.5% — for road and off-road diesel vehicles. ISO 22241.
SCR	Selective Catalytic Reduction — exhaust aftertreatment technology using urea to reduce NOx.
NOx	Nitrogen oxides (NO and NO_2) — harmful combustion pollutants that SCR systems remove.
IMO	International Maritime Organization — UN body governing global shipping regulations.
MARPOL	International Convention for the Prevention of Pollution from Ships.
Annex VI	MARPOL annex covering air pollution from ships, including NOx Tier regulations.
Tier III	IMO NOx emission limit — ~80% reduction vs Tier I. Applies in ECAs for vessels built ≥ 2016.
ECA	Emission Control Area — IMO-designated zones with strict Tier III NOx requirements.
AMSA	Australian Maritime Safety Authority — enforces MARPOL in Australian waters.
PSC	Port State Control — vessel inspection by port authority for international compliance.
ISO 18611	International standard specifying quality requirements for AUS 40.
Biuret	Urea degradation byproduct. ISO 18611 limits biuret to ≤0.3% to protect SCR catalysts.
IBC	Intermediate Bulk Container — 1,000L pallet-mounted container for AUS 40 supply.
CoA	Certificate of Analysis — laboratory test report confirming batch compliance with ISO 18611.
MSDS/SDS	Material Safety Data Sheet / Safety Data Sheet — product safety information document.