

Title: Merchant Shipping (Anti-Fouling Systems) Regulations 2024 Date: 11/09/2023 DMA No: DfTDMA302 Lead department or agency: Maritime and Coastguard Agency Other departments or agencies: Department for Transport		De Minimis Assessment (DMA)	
		Stage: Consultation	
		Source of intervention: International	
		Type of measure: Secondary	
Summary: Rationale and Options		Contact for enquiries: environment@mcga.gov.uk	
Total Net Present Value -£0.37m	Business Net Present Value -£0.36m	Net cost to business per year <small>(EANDCB in 2019 prices)</small> £0.04m	
Summary of Impacts – Explanatory Memorandum Impact Section			
<p>The Department for Transport (DfT) has not published an impact assessment for this measure as the direct impacts on business have been assessed at under £5m per year. Instead, light-touch internal analysis has been conducted, the findings of which are presented below.</p>			
Rationale			
<p>The United Kingdom (UK) is a signatory to the International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001¹ (“the Convention”). The International Maritime Organization (IMO) Marine Environmental Protection Committee introduced an international prohibition on the use of cybutryne as a biocide in anti-fouling systems (AFS). This was introduced as an amendment to Annex 1 to the Convention in Resolution MEPC331 (76)² and entered into force, for new ships, on 1 January 2023. As the existing United Kingdom (UK) regulations pre-date the amendment to the Convention, they do not currently include a prohibition on the use of cybutryne in anti-fouling systems. The rationale for intervention is to mitigate the effects of a market failure caused by marine pollution by cybutryne which is harmful to aquatic wildlife. A market solution would lead to underinvestment from ship owners in pollution control measures (into new AFS). Government intervention is required to correct these market failures, by ensuring compliance with the internationally required standards to protect the maritime environment.</p>			
Costs and benefits			
<p>The costs of this policy include familiarisation costs and costs to switch to alternative anti-fouling systems. These costs are anticipated to be minimal. The European Union (EU), the United States (US) and the UK have all banned the manufacture and sale of AFS containing cybutryne, limiting the number of ships in scope. Besides, there are alternative AFS with similar prices and application techniques, meaning that, considering the rolling implementation of 5 years for existing vessels, the change is cost neutral except for some new vessels. All costs to businesses are one-off or transitional costs and will be limited to familiarisation costs for most existing ships, and the costs of AFS change for some of the ships. The main benefit of the intervention is that it enhances protection of the marine environment around the United Kingdom (UK) environment by preventing damage to marine ecosystem and reducing pollution in UK waters. Additionally, there will be other benefits such as avoiding “gold plating” the original text (i.e., exceeding the original requirements), reduced future familiarisation costs as a result of ambulatory referencing (AR), and avoiding the risk of losing the UK low-risk status under the IMO audit scheme.</p>			
Risks			
<p>The risks associated with this intervention are considered to be low and legal risk is minimal. There is a low risk of challenge to the late implementation. Ambulatory reference provisions in the new Regulations will ensure as far as is possible that the implementation of the Convention remains up to date going forward.</p>			

¹ [https://www.imo.org/en/About/Conventions/Pages/International-Convention-on-the-Control-of-Harmful-Anti-fouling-Systems-on-Ships-\(AFS\).aspx](https://www.imo.org/en/About/Conventions/Pages/International-Convention-on-the-Control-of-Harmful-Anti-fouling-Systems-on-Ships-(AFS).aspx)

² [https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.331\(76\).pdf](https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.331(76).pdf)

Describe the policy options considered

The following options have been considered:

Option 0: do nothing – do not implement the amendment to the Convention. This option is not viable because it will result in the UK not fulfilling its international obligations under the Convention and would result in the UK's position being inconsistent with international requirements. This option would also leave UK waters unprotected from the adverse effects of cybutryne in anti-fouling systems.

Option 1: non-regulatory – publish guidance to advise industry. This option would result in the publication of a Merchant Shipping Notice or Marine Guidance Note to advise of the change to international obligations. It is not viable as it would not fulfil the UK's international obligations under the Convention and may lead to non-compliance, leaving UK waters unprotected from the use of cybutryne in anti-fouling systems.

Option 2 (preferred option): regulatory – introduce new UK regulations to revoke and replace, with modifications, the 2009 Regulations. The new Regulations will include the amendments made at the IMO to the Convention in order to prohibit the use of cybutryne in anti-fouling systems and ensure the UK is able to enforce such a prohibition. Ambulatory referencing will be used where appropriate to ensure updates to the Convention do not require extensive resources to implement in the future.

Rationale for DMA rating

The overall net cost to industry for the preferred option is £0.36m discounted over the 10 year appraisal period in the central scenario. The equivalent annual net direct cost to business (EANDCB) is £0.04m, well within the +/- £5m annual threshold for a de minimis assessment (DMA). Even in the high scenario (worst-case scenario), the EANDCB is £0.11m, still well below the £5 million boundary.

The measure does not have contentious or novel elements, significant wider social, environmental, financial or economic impacts, distributional impacts, large gross impacts, or disproportionate impacts on small, micro and medium businesses.

Will the policy be reviewed? Yes		If applicable, set review date: 02/2029		
Are these organisations in scope?	Micro Yes	Small Yes	Medium Yes	Large Yes

Senior Policy Sign-off: ✓ Date: 11/09/2023

Peer Review Sign-off: ✓ Date: 11/09/2023

Better Regulation Unit Sign-off: ✓ Date: 11/09/2023

1.0 Policy Rationale

- 1.1 The International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001³ ("the Convention"), aims to protect the marine environment and human health from the adverse effects of anti-fouling systems.

³ [https://www.imo.org/en/About/Conventions/Pages/International-Convention-on-the-Control-of-Harmful-Anti-fouling-Systems-on-Ships-\(AFS\).aspx](https://www.imo.org/en/About/Conventions/Pages/International-Convention-on-the-Control-of-Harmful-Anti-fouling-Systems-on-Ships-(AFS).aspx)

- 1.2 Anti-fouling systems are the coating, paint, surface treatment, surface or device put on the outside of a ship's hull to prevent the attachment of unwanted organisms. Anti-fouling paints work largely by releasing biocides into the water. Anti-fouling systems will therefore keep the hulls clean, protected from erosion and corrosion and may also have some environmental benefits, such as improving fuel efficiency and preventing the spread of invasive non-native species. Unfortunately, they can also be harmful to marine life. Some of the compounds found in certain anti-fouling paint can accumulate in marine organisms and find their way into other marine wildlife and further up the food chain. The Convention allows for the prohibition of use of certain compounds where required. It is important to note that there is no legal requirement for a ship to use an anti-fouling system. The decision to use an anti-fouling system is a commercial one made by the shipping owner or operator.
- 1.3 The Convention was adopted on 18 October 2001 and came into force on 17 September 2008. It was implemented into UK law by a combination of Regulation (EC) No 782/2003⁴ of the European Parliament and of the Council of 14 April 2003 on the prohibition of organotin compounds on ships ("the EC Regulation"), and the Merchant Shipping (Anti-Fouling Systems) Regulations 2009⁵ ("the UK Regulations"). The UK regulations were developed to provide offences, penalties and other enforcement mechanisms in relation to the EC regulation which was introduced to encourage early adoption of the Convention.
- 1.4 Following the entry into force of the Convention, concerns around the biocide cybutryne as an active substance in ships anti-fouling systems increased. A number of studies⁶ became available setting out the environmental and ecological impacts of cybutryne, with findings showing that cybutryne leaches into the environment following the anti-fouling systems natural deterioration. Significant negative impacts on the marine environment were observed, such as toxicity for a variety of maritime organisms⁷, and consequently the European Union (EU) decided to implement a ban on cybutryne as a biocide for EU countries from January 2017 (Commission Implementing Decision (EU) 2016/107⁸). As a result of this decision, cybutryne was 'not approved' in 2017 for use in anti-fouling systems by the Health and Safety Executive⁹. This prevented the manufacturer or sales of anti-fouling systems that contain cybutryne within the UK.
- 1.5 Following a successful prohibition of cybutryne in the EU, the International Maritime Organization amended Annex 1 of the Convention to include the prohibition of cybutryne in 2020 (Marine Environment Protection Committee 76) and amendments to the International Anti-Fouling System Certificate to reflect the changes. These amendment to the Convention entered into force for new ships on 1 January 2023 whilst existing ships have a 60-month rolling implementation period to replace or seal their existing anti-fouling system if it contains cybutryne.
- 1.6 Survey and certification requirements remain the same with certificates for existing ships being replaced during the routine cycle of surveys.
- 1.7 As the UK regulations pre-date the amendment to the Convention, they do not currently include a prohibition on the use of cybutryne in anti-fouling systems. This means that since the amendments entered into force on 1 January 2023 for new ships, the UK is unable to enforce the prohibition and will not be fulfilling its international obligations under the Convention. The UK is also unable to issue the new International Anti-Fouling System Certificate needed by UK ships which incorporates the amendments. However, statements of compliance will be issued to ensure UK flagged vessels operating internationally are still able to demonstrate their compliance.

Rationale for intervention

⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32003R0782>

⁵ <https://www.legislation.gov.uk/ukSI/2009/2796/contents/made>

⁶ <https://echa.europa.eu/documents/10162/03a3085a-044e-41d8-8f18-248987e6f756>

⁷ <https://www.bimco.org/news/environment-protection/20210618-imo-bans-toxic-paint-substance-cybutryne>

⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016D0107>

⁹ <https://www.hse.gov.uk/biocides/uk-list-active-substances.htm>

- 1.8 The main economic rationale for this intervention is to mitigate the effects of a market failure, the negative externality of marine pollution. Ship owners responsible for the pollution of the marine environment only bear a smaller share of the costs than society as a whole. Ship owners do not face the full costs of pollution, and therefore may under-invest in methods which reduce pollution but do not improve their benefits.
- 1.9 It is difficult to estimate the efficiency of new AFS compared to AFS with cybutryne (e.g. in terms of fuel efficiency), but it is clear that AFS with cybutryne is still used as the ship owners do not face all of the costs of marine pollution by their AFS. Without regulation, incentives to change AFS and limit degradation of the maritime environment are suboptimal, since firms do not incur the full social costs associated with such practices and therefore are not sufficiently incentivised to change their AFS.
- 1.10 Not changing AFS could be a cost saving for ship owners while creating costs for the rest of society and other ship owners. Two types of ships could be in this position: (non-EU and non-US) foreign vessels in UK waters and UK-flagged ships in foreign waters outside of EU and US waters. For these ships, they can access AFS with cybutryne, and could keep using them to save costs, and hence continue to damage the environment and other ship owners. Without regulation, there is a risk that other solutions (e.g. market-led solution, subsidies for incentivisation) would lead to some stakeholders not following all protocols for the protection of the maritime environment in order to save costs, increasing cybutryne pollution. Hence, the market failure would not be fully addressed.
- 1.11 Government intervention is required to address this negative externality, by ensuring compliance with the internationally required standards with respect to the safety of the maritime environment. Additionally, the intervention would create a level-playing field for all vessels in UK waters, making sure foreign vessels in UK waters which could access AFS with cybutryne do not retain undue cost advantage over UK-flagged vessels.

Policy objective

- 1.9 There are a number of overarching policy objectives linked to this intervention. These are the alignment of UK legislation with international standards to ensure unified standards of regulations and a level playing field for those operating in the maritime sector as well as assurance that the UK's international obligations are met, thereby providing effective environmental protection.
- 1.10 The intended outcomes of this measure are to:
- a) **Fulfil the UK's obligations under the Convention.** To fulfil the UK's obligations under the Convention, there is the need to implement the amendment which prohibits the use of cybutryne in anti-fouling systems. The introduction of this amendment in UK law through the 2024 Regulations will place the UK in a position to enforce the prohibition.
 - b) **Protect UK waters.** The UK's Health and Safety Executive banned the manufacturer and sales of anti-fouling systems containing cybutryne in 2017 following Commission Implementing Decision (EU) 2016/107¹⁰. Whilst this ensures ships applying their anti-fouling system in the UK are unable to buy an anti-fouling system that contains cybutryne there is currently nothing stopping ships obtaining an anti-fouling system containing cybutryne abroad and then operating in UK waters. This currently leaves UK waters vulnerable to the adverse effects of cybutryne. The incorporation of this amendment into UK law will protect UK waters.
 - c) **Establish appropriate powers.** The UK regulations were made under section 2(2) of the European Communities Act 1972. Given that the UK is no longer a member of the EU,

¹⁰ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016D0107>

it is no longer possible to use these powers. Therefore, the UK will use powers under section 128(1)(e) of the Merchant Shipping Act 1995¹¹ by way of an Order in Council.

- d) **Simplify the legislative process.** The existing legislation (the EC Regulations and the UK Regulations) will be revoked, replaced and combined with the new amendments. Ambulatory referencing will be used to ensure updates to the Convention do not require extensive resources to implement in the future.

- 1.11 The proposed regulations will allow the UK to maintain its reputation under the mandatory IMO audit scheme. A poor performance, due to insufficient transposition, could result in the loss of the UK's "low risk status"; this could increase the frequency of inspections for UK flagged ships in foreign ports and hence increase cost to UK industry.

Options considered

- 1.12 Several options for approaching the implementation of the new amendments to the Convention have been considered. These are:
- 1.13 Option 0: do nothing – do not implement the amendment to the Convention. Option 0 has been reviewed and it has been determined that it is not optimal to follow this approach. There are several reasons for this. Firstly, the MCA and Department for Transport (DfT) have committed to tackling the backlog of outstanding international obligations that have not been implemented. If the 'Do Nothing' approach is followed and the amendment is not implemented in good time, this would be at odds with the previously stated intention. This option would result in the UK falling behind its international obligations under the Convention and would result in the UK's position being inconsistent with international requirements. If amendments to the Convention are not implemented in the UK, this is likely to be inconsistent with other IMO member states and leave UK waters unprotected from the adverse effects of cybutryne in anti-fouling systems.
- 1.14 Option 1: non-regulatory – publish guidance to advise industry. Option 1 has been considered and has been disregarded as it is not optimal. A non-regulatory intervention such as the issuing of a Marine Guidance Note (MGN) will not ensure that all ships comply and would not enable the UK to enforce the prohibition. This would result in the same circumstances as are outlined for Option 0. An MGN could set out the new prohibition but could not amend the existing survey and certification regime or enforcement provisions. An MGN can only provide guidance, meaning that it can be used to explain the new exemption to the relevant parts of industry, but it does not have the power to implement or enforce the amendment.
- 1.15 Option 2 (preferred option): regulatory – introduce new regulations to revoke and replace, with modifications, the 2009 Regulations. Option 2 is the only option which will provide clarity and certainty. The introduction of new UK regulations and associated guidance to incorporate the prohibition on the use of cybutryne in anti-fouling systems into UK law will ensure that the UK stays up to date with its international obligations. It will ensure the UK is able to enforce the prohibition and protect UK waters. Additionally, using powers in the Retained EU Law (Revocation and Reform) Act¹² will ensure we can revoke the existing regulations, combine them in a new SI with the amendments to include the prohibition on the use of cybutryne and ensure all the relevant anti-fouling regulations are in a single SI. This coupled with revised guidance and the use of ambulatory referencing where possible, simplifies the legislation for industry and ensures the UK remains up to date with its international obligations. The new SI will be made using powers in the Merchant Shipping (Control of Harmful Anti-Fouling Systems on Ships) Order 2022¹³ which was made under section 128 of the Merchant Shipping Act 1995.
- 1.16 **Option 2 is the preferred option for the reasons set out above.** Options 0 and 1 have not been fully assessed for cost impacts as they were dismissed at a relatively early stage. The potential cost savings of Option 2 are set out below.

¹¹ <https://www.legislation.gov.uk/ukpga/1995/21/section/128>

¹² <https://bills.parliament.uk/bills/3340>

¹³ <https://www.legislation.gov.uk/uksi/2022/1334/contents/made>

2.0 Rationale for De Minimis Rating

DMA Rating

- 2.1 This regulatory measure satisfies the de minimis assessment (DMA) threshold as the amendments being made are expected to have a low-cost impact and are not likely to directly result in an equivalent annual net direct costs to business (EANDCB) above +/-£5 million.
- 2.2 In this case, the EANDCB is approximatively £0.04m the central scenario (2019 prices and 2020 present value). In addition, in the high scenario the EANDCB is below the £5 million threshold, as it is around £0.11m.
- 2.3 None of the changes are controversial or contentious, given that the 2024 Regulations implement an internationally agreed convention signed by the UK and ambulatory referencing is now an established approach for international conventions such as IMO conventions¹⁴. An ambulatory reference is a reference in domestic legislation to an international instrument which is interpreted as a reference to the international instrument which allows regular modification of the national law without the need to pass a new statutory instrument¹⁵. These amendments also don't put any disproportionate impact on any market participants, specifically those classified as small or micro, thus not impacting on competition in the market. The measure does not have significant gross effects, distributional effects or wider effects. It is deemed proportionate to carry out a DMA, and a full impact assessment is not necessary
- 2.4 Through this intervention, the UK will also introduce AR provision in the new SI which will enable UK legislation to automatically give effect to the latest version of mandatory international standards in the future. This will ensure standards are unified and maintained with no discrepancy between UK and international regulations. The cost associated with future amendments cannot be monetised at this stage as there is currently no indication of what form future amendments may take. These costs are therefore not reflected in this impact assessment. It is proposed that regular post implementation reviews (PIR) will be undertaken to evaluate whether the use of ambulatory reference to the Convention as achieved its goal and is still valid, and to estimate the costs and benefits of all the technical amendments enacted since this assessment.

3.0 Costs and Benefits

Baseline (alternative counterfactual)

- 3.1 The costs and benefits for Option 0 are not included in the analysis following the Regulatory Policy Committee (RPC) guidance on the appraisal of international measures¹⁶. Option 0 is not the baseline against which the other options are compared. A constructed counterfactual is used instead to assess the impact of the international measure, if no prior compliance exists (contrary to the actual counterfactual, Option 0, which is the current situation where compliance is already high). Without an alternative counterfactual, the actual state of play would be used, which means that, as most ships on international voyage are already applying the regulations, the costs and benefits would be significantly lower. Hence, using the actual counterfactual would mean that the costs and benefits for most ships when the international measure came into force, before being implemented into UK law, would not be evaluated in any assessment. The whole impact of the regulations would not be evaluated, which would also create issues with respect to comparability with the impact assessments of domestic measures.

¹⁴ See for example <https://www.legislation.gov.uk/uksi/2021/1316/contents> or <https://www.legislation.gov.uk/uksi/2022/1169/contents>

¹⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/650190/Consultation_Outcome_Report_-_Load_Line_Regulations.pdf

¹⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/922150/RPC_case_histories_-_counterfactuals_Sep_20.pdf#:~:text=This%20document%20provides%2C%20in%20particular%2C%20guidance%20on%20how%20including%20the%20treatment%20of%20E2%80%98voluntary%2C%20action%20by%20businesses.

- 3.2 Maintaining the status quo would create uncertainty for operators, and the inability to make UK-flagged ships and all ships in UK waters comply with the international regulation would prevent the creation of a level-playing field. Doing nothing would see UK legislation remain as it currently is with no updates or amendments. Although this would require no resources to achieve, it would leave discrepancies between UK law and international standards and, over time, the regulations would become further and further out of sync with international requirements. This would be a cause for confusion and would create a two-tier regulatory system as UK operators would have to abide by the international standards when outside of the UK and outdated UK regulations when in the UK. It could also cause difficulties for example with mandatory ship certificates, as UK-issued certificate may not meet the international expectations, causing delays in port and possible Port State Control sanctions. It could also create reputational damage to the UK.
- 3.3 Indeed, even if in the actual counterfactual compliance is high within the industry, some vessel owners could apply lower standards due to the absence of transposition of the international measure into UK law, due to the presence of a market failure (negative externality). In the constructed counterfactual, an even larger base of ships owners could apply lower standards, increasing the probability of non-compliance (no change of AFS). In terms of benefits, actual high compliance means that few ships owners would benefit from the absence of enforcement, and the costs savings for companies implementing different standards would not compensate the increased costs and risks they would impose on other ships and the rest of society. In the constructed counterfactual, a larger proportion of ship management companies would benefit from costs savings with the application of lower standards, but the remaining use of AFS with cybutryne and its consequences would nullify this cost saving benefit to the ship management companies, leading to a worse social outcome.

Option 1: non-regulatory – publish guidance to advise industry

- 3.4 This option will not correct the current regulatory gaps, nor will it achieve the policy objectives or bring about the benefits from the specific updates being introduced. Mandatory amendments could not be introduced through this option. For example, prohibiting the use of AFS with cybutryne is not achievable under this option. A non-regulatory approach will increase the risks of UK ship owners using AFS with cybutryne (especially for ships built in locations outside the UK, the EU and/or the US). This will retain significant risks to the environment, the risk of Port State Control sanctions and the risk of reputational damage to the UK. Thus, this option would lead to a suboptimal outcome like the status quo. As such, it was concluded not to be a viable option.

Option 2 (preferred option): regulatory – introduce new regulations to revoke and replace, with modifications, the 2009 Regulations

- 3.5 This option is considered to be an effective option in addressing the market failure. This option will facilitate the implementation of mandatory amendments relating to the prohibition of AFS with cybutryne. The aim is to fulfil the UK's international obligations and internalise the social costs associated with pollution by ships at sea. This is considered to be the most effective option in achieving the main policy objectives of protecting the environment and also fulfilling our obligations under the Convention by implementing the amendments. The introduction of this amendment by virtue of UK regulations will ensure that the prohibition can be enforced.

Options assessment

- 3.6 For the assessment of the costs and benefits of the regulations, the rest of the section is focusing on Option 2 as it is considered the preferred option. Option 2 is evaluated against the baseline, which is the constructed counterfactual, replacing the Option 0 (do nothing), following the RPC guidance on counterfactuals. This means that all the costs and benefits of Option 2 are compared against this baseline. For instance, some ships started applying the international measure as soon as it came into force, but we assume no compliance prior to implementation in the UK law for the ships in scope for costs and benefits for Option 2. Regarding Option 1, as is mentioned before, it is a non-viable option and would not fulfil the policy objectives, so it is not assessed. As it is a non-regulatory option, an

assessment of this option would be based on the evaluation of Option 2, and the costs and benefits of Option 1 would be the same types of costs and benefits as this option, but their levels for Option 1 would only represent a share of the level of costs and benefits of Option 2. In other words, as only a fraction of stakeholders would follow the new non-mandatory guidance documents, the costs and the benefits of the new practice would only be, proportionally, a fraction of what they represent in the case of mandatory regulations. The specific ratio would be hard to assess, but based on the fact that it would be strictly below 100% of the costs and benefits of Option 2, it shows that even in the case of Option 1, the EANDCB threshold would not be attained.

Summary

- 3.7 The costs and benefits that have been identified for Option 2 for the new amendments will be outlined in the section below. Each bullet point features a cost or a benefit followed by whether they have been monetised or unmonetised for the duration of this analysis. Generally, more costs are monetised than benefits due to complexity in extracting data which accurately reflect the scale of the benefits. No existing impact study, available to the MCA, made by other countries which are signatories of the Convention has estimated the benefits
- 3.8 A ten year appraisal period has been used, with an implementation year of 2024.
- 3.9 The impact assessment calculator has been used in this analysis¹⁷.

Costs

- Familiarisation costs (direct, monetised) – cost to business
- MCA surveyors training costs (direct, monetised) – cost to government
- Total cost for AFS change (direct, monetised) – cost to business

Benefits

- Reduced pollution by cybutryne (unmonetised)
- Elimination of the risk of gold plating (unmonetised)
- Maintaining the UK's low risk status, minimising inspections of UK-flagged ships in foreign ports (unmonetised)
- Maximising cost saving to the public sector through ambulatory referencing (unmonetised)

Ships in scope

- 3.8 The ships impacted by the proposed regulations are detailed in Table 1 below. The UK Ships Register¹⁸ database was used to obtain the number of commercial ships in the UK register in August 2023, excluding fishing ships and non-commercial small ships as they are very unlikely to be based outside of the UK, the EU and the US and therefore could not have AFS with cybutryne due to earlier sales and manufacturing bans. The number of commercial ships provisionally registered in the UK flag was also included as a conservative assumption, but it should not have a significant impact as only 210 commercial ships were provisionally registered in August 2023. Not all of these ships are in scope, due to cybutryne bans in the UK, the EU and the US, hence only UK-flagged ships based outside of these areas would be impacted by the regulations. Clarksons data¹⁹ on the World Fleet Register can be used to estimate the proportion of UK-flagged ships based outside of the UK, the US and the EU. Based on the locational data provided by Clarksons, it is possible to estimate the proportion of UK-flagged ships based

¹⁷ April 2023, <https://www.gov.uk/government/publications/impact-assessment-calculator--3>

¹⁸ <https://www.ukshipregister.co.uk/>

¹⁹ <https://www.clarksons.net/n/#/portal>

abroad, outside of the areas mentioned. Estimations were done twice, once in October 2022 and once in August 2023. Due to frequent changes of location, these estimates are used as limits of the confidence interval for the true proportion of ships in the UK Register which are based abroad outside of the areas mentioned. The number of UK-flagged ships possibly using AFS with cybutryne can be calculated for 2023. As the implementation year is 2024, the annual growth rate of the number of commercial ships in the UK Register needs to be estimated. To account for ships leaving and joining the UK flag every year, the total number of ships in the UK fleet is used to estimate the growth of the number of ships in the UK flag over the years. The two observations available for the UK Register can be used to estimate the monthly growth rate of ships in the Register, which can be converted into an annual growth rate, which allows the estimation of the number of ships in scope for the regulations for 2024.

- 3.9 However, as the change of AFS is cost neutral for ships built before 1 January 2023 (see monetised costs section), the ships mentioned above would only be impacted by familiarisation costs. In addition, ships in construction outside of the UK, the US and the EU from 1 January 2023 ordered before that date would not benefit from the rolling implementation and would have to change their AFS at an earlier date than expected, and therefore they will be impacted by the new regulations. Seaweb²⁰ can be used to obtain the number of ships in construction in these areas during that period, with information on their size to estimate the costs for change of AFS.
- 3.10 In practice, not all UK-flagged ships based abroad will have business activities contributing to the UK economy. Depending on the definition of UK businesses in the maritime sector, they might be excluded from this definition, and therefore excluded from the analysis. According to the RPC guidance on UK businesses definition²¹, “economic activity located in the UK” is the defining characteristic to decide if a business is considered to be a UK business. Flag has been used in previous analyses for regulatory impact studies as the determining factor to define business activity²². Following the principle of erring on the side of conservative assumptions where issues are not clear cut, belonging to the UK flag is used as a proxy for economic activity in the UK.

Table 1: existing ships in scope of the regulations (UK ships register)

Description	Low scenario	Central scenario	High scenario
Commercial ships (Part 1 Registered) in August 2023	14,966	14,966	14,966
Commercial ships (Part 1 Provisional) in August 2023	210	210	210
Commercial ships (Part 1 Registered) in October 2022	14,880	14,880	14,880
Commercial ships (Part 1 Provisional) in October 2022	92	92	92
Annual growth rate of the number of ships in the UK Register	0.35%	0.69%	1.04%
Proportion of UK flagged ships based abroad (based on Clarksons data on the World Fleet Register)	9.7%	17.93%	26.16%
Number of ships in scope for familiarisation	1477	2740	4012
Number of ships in scope for AFS change (still in construction after 1 January 2023, ordered before) from Seaweb	24	24	24

Monetised Costs

²⁰ <https://www.spglobal.com/marketintelligence/en/mi/products/maritime-ship-tracker-ais-live-ship-data-seaweb.html>

²¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/858862/Issues_around_defining_a_business.pdf

²² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1087840/impact-assessment-harbours-seafarers-remuneration-bill.pdf

- 3.11 Table 2 summarises the costs which have been identified for the regulations in this international measure. All costs in the tables below will be monetised and are direct costs to UK businesses, except costs related to the familiarisation of MCA surveyors. All the costs are transition/one-off costs, as individuals only perform them once. It is assumed that new ships and new MCA surveyors will not have to get familiarised with the new legislation. Indeed, as there are no specific and new tasks (e.g. specific training) for new businesses or surveyors from the regulations, the additional texts to be read is insignificant compared to existing maritime regulations that the new businesses and surveyors would have to read anyway. Hence, monetisation of the familiarisation costs for newcomers is insignificant and therefore it is excluded based on proportionality.
- 3.12 The costs from AFS change are limited to vessels ordered before the cut-off date (1 January 2023) but finished after that date, which means that they do not benefit from the 60-month rolling implementation. For existing vessels built before that date, due to technical characteristics or AFS with cybutryne and the rolling implementation of 5 years, the regulations are costs neutral (except for familiarisations costs). Indeed, AFS with cybutryne last at most 5 years, and they are usually changed following inspections involving dry-docking, which coincide with the lifecycle of AFS with cybutryne. The previous coating would not have to be removed²³. Hence, the change of AFS for existing vessels would not require any additional intervention. Regarding the costs of inputs, the prices from one of the companies²⁴ which used to commercialise paints with cybutryne and now sell substitute paints without cybutryne²⁵ can be used to compare the change of prices of inputs. The price of the substitute paint is found online between \$275.95 and \$299.95 per gallon²⁶ (between £209.29 and £241.46 based on the average 2023 USD-GBP exchange rate²⁷), and the price of paint with cybutryne from the same manufacturer is between \$262.98²⁸ and \$364.79²⁹ (between £211.70 and £293.66 based on the average 2023 USD-GBP exchange rate²⁵). The original paint with cybutryne uses two different types of biocides, mainly cuprous oxide and a small dose of cybutryne³⁰, and the substitute is obtained by increasing the amount of cuprous oxide to prevent the need for cybutryne, which is more expensive in pure form than cuprous oxide (around \$25-\$35 per kg at 99% industrial grade³¹ against \$10 per kg at 99% industrial grade for cuprous oxide³²). Hence, for existing vessels built before 1 January 2023, the new regulations are cost neutral except for familiarisation.
- 3.13 For vessels ordered before 1 January 2023 but still in construction after this date, they will not benefit from the rolling implementation, meaning that they will need to have an AFS without cybutryne before being launched. If they have already applied an AFS with cybutryne, which is possible if they are constructed outside of the UK, the US and the EU, they will need to change AFS, meaning additional labour costs and additional input costs. As a conservative assumption, it will be assumed that all UK-flagged ships which meet the location and status criteria stated above will have to change their AFS.
- 3.14 Values will be expressed as 2023 constant prices (following Green Book guidance³³). For the EANDCB, the total net present social value, and the business net present value, they will be expressed in 2019 constant prices with the present value base year being 2020, following the

²³ <https://www.bimco.org/news/environment-protection/20210618-imo-bans-toxic-paint-substance-cybutryne#:~:text=In%202020%2C%20organisations%20and%20member%20states%20of%20the,their%20lifetimes%20showed%20very%20lo w%20concentrations%20of%20cybutryne%3A>

²⁴ <https://www.pettitpaint.com/media/4219/ultima-sr40-8-28-2017.pdf>

²⁵ <https://pettitpaint.com/odysseyhd>

²⁶ See <https://www.jamestowndistributors.com/product/product-detail/336401>, <https://www.westmarine.com/pettit-paint-odyssey-hd-multi-season-copolymer-ablative-antifouling-paint-gallon-P019762863.html> and <https://www.go2marine.com/black-bottom-paint-odyssey-hd-ablative>

²⁷ 2023 average exchange rate from USD to GBP from 10/08/2023 <https://www.exchangerates.org.uk/USD-GBP-spot-exchange-rates-history-2023.html>

²⁸ <https://boater-supplies.com/product/pettit-ultima-sr-40-antifouling-paint/>

²⁹ <https://yachtgurus.us/products/ultima%C2%AE-sr-40-pettit?variant=44116078854445>

³⁰ <https://www.pettitpaint.com/media/4219/ultima-sr40-8-28-2017.pdf>

³¹ <https://www.echemi.com/produce/pr2306051034-cybutryneirgarol-1051-99-99-powder-28159-98-0-hsd.html>

³² https://www.chemicalbook.com/ProductDetail_EN_1458858.htm

³³ <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

EANDCB calculator guidance³⁴. The latest edition of the EANDCB calculator³⁵ (April 2023 version) has been used for the analysis.

Table 2: Costs identified for the international measure

Costs associated	Type of costs
Familiarisation costs	One-off (transition)
MCA surveyors additional training (not a cost to business)	One-off (transition)
Total costs for AFS change	One-off (transition)

Familiarisation costs

- 3.15 The main idea behind familiarisation costs is that it takes time away from the daily activities of crew, Masters and ship owners, who could be employed elsewhere (i.e. the opportunity cost). It should be noted that the tasks do not seem to change on the ship types, as they will have to perform the same type of tasks, with the same guidance documents to read. The list of documents to read are listed in Table 3. The relevant employees will have to read the statutory instrument (SI), which is 13 pages long, but they will also have to read the MGN which is 7 pages long), which is part of the process of familiarisation with the 2024 Regulations. It must be assumed in the alternative counterfactual that the relevant employees are not familiar with the regulations. Based on the information available to the MCA, for each ship, the Master and the officer in charge of the vessel will need to be familiarised with the new regulations in order to understand changes with respect to the regulations. Table 4 provides details on the assumptions used for the monetisation of the familiarisation costs.
- 3.16 Based on estimates used in previous DMAs and IAs produced in the MCA³⁶, it is estimated that the time spent on reading one page of complex information is 3 minutes. This will be the central estimate, the low estimate being half of that reading time per page (1 minute and 30 seconds per page) and the high estimate being 50% higher than the central estimate (4 minutes and 30 seconds per page).
- 3.17 Table 3 provides information on the familiarisation costs for the proposed regulations. Based on length and proportion of changes for each relevant document, the total time for familiarisation for each document is calculated and presented in the table, rounded to the nearest minute. It is assumed that managers, directors and senior officials' pay is similar to the pay of the management used to run a shipping operation. Regarding wage costs, Annual Survey of Hours and Earnings (ASHE) hourly gross wage data³⁷ on "managers, directors and senior officials" is used to calculate the familiarisation costs to a ship owner. It should be noted that even though the ASHE estimates are provisional for the year 2022, the estimates selected here are considered precise by the Office for National Statistics (i.e. with a coefficient of variation under or equal to 5%). The median will be used in the central scenario, and the 25th percentile wage and 75th percentile wage will be used in the low and high scenarios, respectively.
- 3.18 According to the Office for Budget Responsibility (OBR) in their Fiscal Sustainability report (published in July 2022)³⁸, an annual increase in average earnings of 3.8% is expected in the long term, which means that the provisional hourly gross wage for 2022 used for transition costs applicable in 2024 will need to be adjusted using this expected average earning growth rate, which is a nominal growth rate. This is then deflated using the Transport Analysis Guidance (TAG) databook³⁹ Gross Domestic Product (GDP) deflator to obtain costs in real 2023 prices. In addition, the wage data will be uplifted by 26.5% in line with Transport Analysis Guidance⁴⁰ to

³⁴ <https://www.gov.uk/government/publications/impact-assessment-calculator--3>

³⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1150244/impact-assessment-calculator-april-2023.xlsx

³⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1087840/impact-assessment-harbours-seafarers-remuneration-bill.pdf

³⁷ 2022 provisional, Table 14.5a. See

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashtable14>

https://obr.uk/docs/OBR_FSR_July_2020-1.pdf

³⁸ <https://www.gov.uk/government/publications/tag-data-book#full-publication-update-history> – latest version used (31/05/23 update).

⁴⁰ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1120686/TAG_Unit_A4.1_-_Social-impact-appraisal_Nov_2022_Accessible_v1.0.pdf

account for non-wage labour costs to business such as national insurance and employer pension contributions. All the labour costs in this DMA, except for MCA surveyor's costs (see the section below), will follow the same process (TAG non-wage labour costs uplift, OBR average earnings growth update over the appraisal period and application of GDP deflator to express costs in 2023 prices). The familiarisation costs can be found in Table 3, with the total being for the whole appraisal period.

Table 3: Familiarisation costs

Familiarisation	Low scenario	Central scenario	High scenario
Statutory Instrument familiarisation time	20 minutes	39 minutes	59 minutes
MGN familiarisation time	11 minutes	21 minutes	32 minutes
Number of employees required to familiarise for each ship	2	2	2
Type of relevant employees	Management	Management	Management
ASHE hourly gross wage percentile	25 th	50 th	75 th
ASHE hourly gross wage (2022)	£15.07	£22.08	£33.61
Adjusted hourly labour cost, 2024 (2023 prices)	£20.15	£29.53	£44.95
Ships in scope, 2024 estimate	1477	2740	4012
Total familiarisation costs (2023 prices) over the whole appraisal period	£29,772.48	£161,834.95	£540,999.57

MCA surveyors training costs

3.19 MCA surveyors will still need familiarisation to ensure that they are aware of the changes and the regulations. Using the constructed counterfactual, as no prior compliance is assumed, the assumptions of no prior knowledge of the new amendments is used. Hence, additional costs for MCA surveyors related to the regulations need to be monetised. Time estimates from the familiarisation costs will be used here as the tasks required in familiarisation are essentially the same. Based on the MCA internal human resources (HR) data on MCA surveyors labour costs, the average hourly labour cost for one MCA surveyor is £50.27 in 2022. This includes costs to MCA related wages, non-pensionable allowances, pensions, and National Insurance.

3.20 According to the MCA HR, there were 144 MCA surveyors in 2022, and assuming 4 new MCA surveyors recruited every year (based on HR long terms averages), it means that there will be 152 MCA surveyors in 2024. It is assumed that no retraining is needed for MCA surveyors who have been trained as the checks performed by MCA surveyors for these regulations are relatively simple requirements which are quite constant. This is not a cost to businesses as this will be paid by the MCA; therefore, it will not be included in the EANDCB. The total costs in Table 4 are for the whole appraisal period.

Table 4: MCA surveyors training costs

Familiarisation	Low scenario	Central scenario	High scenario
Total familiarisation time per surveyor (hours)	0.5	1	1.5
Number of surveyors: existing surveyors (2024 estimate)	152	152	152
Labour cost per surveyor, hourly in 2024 (2023 prices)	£53.15	£53.15	£53.15
Total costs for additional surveyors training (2023 prices) over the whole appraisal period	£4,039	£8,078	£12,118

Total costs for AFS change

- 3.21 As explained in the monetised costs section, the AFS change will create additional costs only for vessels which have an AFS with cybutryne after 1 January 2023 but do not benefit from the rolling implementation as they are vessels launched after that date and would need to change their AFS earlier than their next inspection. This would only be possible for ships ordered before 1 January 2023 and still in construction after that date.
- 3.22 For ships ordered after, the international convention would be applied, meaning that shipyards would have changed the array of AFS they can propose, ship owners ordering new vessels would have to follow the regulations, and the use of a different AFS would be at no cost, as new inputs or labour are required only if a first AFS with cybutryne was already applied on the ship in construction and needs to be changed before the end of its lifecycle.
- 3.23 For existing vessels before the cut-off date, they benefit from the rolling implementation which means that the regulations do not create labour or input costs for them. Only shipyards outside of the UK, the EU and the US would be able to provide an AFS with cybutryne. Hence, at most, the regulations will create labour and input costs due to an early change of AFS for ships ordered before the cut-off date but still in construction after that date (as they may have an AFS with cybutryne but do not benefit from the rolling implementation) in shipyards located outside of the UK, the US and the EU. Based on Seaweb data⁴¹, only 24 UK-flagged vessels meet these criteria. It is assumed that all of them have already applied an AFS with cybutryne and had to change it, as a conservative assumption, even if in practice some of them may have already decided early to use an AFS without cybutryne.
- 3.24 A change of AFS earlier than the end of its lifecycle would imply both labour costs and input costs. Shipyard painters will need to apply another coating of paint on top of the existing coating of anti-fouling paint. Indeed, based on research by the International Paint and Printing Ink Council, removing the previous coating of AFS is not necessary and a new coating can be applied over the previous coating⁴². As a conservative assumption, it is assumed that the wage cost for shipyard painters outside of the UK, the US and the EU is aligned with the wage cost of shipyard painters in the UK, even if it is likely to be lower. Due to the unavailability of data, this is the most accurate estimation of the maximum wage costs for shipyard painters to change the AFS. The closest occupations in the ASHE study (provisional 2022) are “boat and ship builders and repairers” and “metal plate workers, smiths, moulders and related occupations” which are both highlighted as relevant for shipyard work in the SOC2020 code⁴³.
- 3.25 Following the principle of erring on the side of conservative assumptions when there is uncertainty, the first occupation is chosen as the mean gross hourly wage is higher and it is more directly related to shipyards. None of these occupations have data for the 25th percentile and 75th percentile of the wage distribution, so a range will be used based on a 50% increase compared to mean in the high scenario. For the low scenario, applying a 50% decrease to the average would lead to a gross hourly wage below the UK minimum wage, so, for the low scenario, the National Living Wage is used instead⁴⁴. The average is used instead of the median in the central scenario as, for both occupations cited above, the median is less accurate than the mean. The Transport Analysis Guide (TAG) non-wage labour costs uplift of 26.5%⁴⁵ and the Office for Budget Responsibility Fiscal Sustainability Report wage growth assumption of 3.8%⁴⁶ are used to estimate the nominal labour costs for shipyard painters, with GDP deflators from the most recent TAG data book⁴⁷ used to estimate the costs in 2023 prices. The labour costs assumptions can be found in Table 5.
- 3.26 Regarding labour costs, estimates on the time to paint the hull of a ship, the area where the anti-fouling paint is applied, are limited. Hapag-Lloyd, a German international shipping company, recently

⁴¹ <https://www.spglobal.com/marketintelligence/en/mi/products/maritime-ship-tracker-ais-live-ship-data-seaweb.html>

⁴² <https://mfame.guru/imo-forbids-cybutryne-in-ships-as-it-harms-marine-life/#:~:text=%E2%80%9CAccording%20to%20the%20result%20of%20the%20analysis%2C%20it.cybutryne%20in%20an%20anti-fouling%20system%20%28AFS%29%20by%20Japan%29.%E2%80%9D>

⁴³ <https://www.ons.gov.uk/methodology/classificationsandstandards/standardoccupationalclassificationsoc/soc2020>

⁴⁴ <https://www.gov.uk/national-minimum-wage-rates>

⁴⁵ <https://www.gov.uk/government/publications/tag-unit-a4-1-social-impact-appraisal>

⁴⁶ https://obr.uk/docs/OBR_FSR_July_2020-1.pdf

⁴⁷ May 2023 v1.21, <https://www.gov.uk/government/publications/tag-data-book>

tested a new Hull Treatment Carrier (HTC), a robot designed to paint the hull of a ship, in shipyards in Hamburg, Marseilles and Singapore, and they provided estimates of the efficiency of this robot⁴⁸. The HTC can paint uniformly between 600 and 800 square meters per hour, and it can paint around 77% of the hull of a ship. The reasons for the use of a robot are the increased efficiency and the uniformity of the coating of the hull. It is unlikely that the HTC is used for ships in scope for a change of AFS. However, this estimate will be used as a basis for evaluating the efficiency of shipyard painters. Based on information from the MCA policy team, it is assumed that on average two shipyard painters can be as efficient as the HTC. This assumption can be interpreted as the HTC being twice as efficient as shipyard painter. Alternatively, it can be interpreted as the HTC being only slightly more efficient than a shipyard painter but when including the area which cannot be painted by the HTC, the full painting of a hull at the speed of the HTC would require two painters. To account for uncertainty, a +/- 50% range is used on the number of painters needed to paint the hull. Seaweb provides data on the length, draught and breadth of each ship in scope, meaning that the area to be painted can be estimated in square meters. It is assumed that each ship has four sides, one left side equal to its right side, and a front side equal to its back side. It is a conservative assumption as some ships will have a smaller front side, but the data from Seaweb is not sufficient on the design of each ship in scope to determine this characteristic.

- 3.27 Regarding input prices, it is assumed that shipyards would fully transfer the cost of new anti-fouling paints used for the ships in scope to them, and it is assumed that the closest anti-fouling paint substitute would be used as it is the cheapest option following the requirements of the new regulations. The price of the substitute paint is found online between \$275.95 and \$299.95 per gallon⁴⁹. The price is assumed to be nominal across the period. The average price is used in the central scenario, while the minimum price and the maximum price are respectively used in the low and high scenarios. Based on the areas to be painted estimated for the labour costs, the total quantity of paint needed for the 24 ships in scope can be estimated^{50,51} and then the cost for the input costs for all ships in scope can be evaluated, in 2023 prices (in pounds sterling⁵²). All the assumptions for costs and the total costs for AFS change throughout the period can be found in Table 5.

⁴⁸ <https://www.hapag-lloyd.com/en/company/about-us/newsletter/2019/07/hapag-lloyd-tests-ship-painting-robots.html>

⁴⁹ See <https://www.jamestowndistributors.com/product/product-detail/336401>, <https://www.westmarine.com/pettit-paint-odyssey-hd-multi-season-copolymer-ablative-antifouling-paint-gallon-P019762863.html> and <https://www.go2marine.com/black-bottom-paint-odyssey-hd-ablative>

⁵⁰ <https://www.theglobalgraphenegroup.com/lightening-up-ships-and-keeping-rust-at-bay/#:~:text=Cargo%20ships%20can%20take%20upwards,paint%20cover%20400%20square%20feet.>

⁵¹ https://en.wikipedia.org/wiki/Square_foot

⁵² 2023 average exchange rate from USD to GBP from 10/08/2023 <https://www.exchangerates.org.uk/USD-GBP-spot-exchange-rates-history-2023.html>

Table 5: Total costs for AFS change

Assumptions and costing	Low scenario	Central scenario	High scenario
Number of painters required	1	2	3
ASHE hourly gross wage (2022) and minimum living wage for the low scenario	£10.42	£15.77	£23.66
Adjusted hourly labour cost, 2024 (2023 prices)	£13.94	£21.09	£31.64
Square meters painted by painters per hour	800	700	600
Price of a gallon of antifouling paint (2023 price, £)	£209.29	£224.30	£241.46
Number of UK-flagged ships in scope	24	24	24
Average area to paint on a side of a ship in scope (square meters)	929.98	929.98	929.98
Average area to paint on the front/back of a ship in scope (square meters)	155.93	155.93	155.93
Average area to paint (whole ship) (square meters)	2,172	2,172	2,172
Total costs of labour for AFS change (2023 prices)	£908	£3,141	£8,245
Total costs of paint inputs for AFS change (2023 prices)	£195,706	£314,606	£677,357
Total costs for AFS change (2023 prices) over the whole appraisal period	£196,614	£317,7467	£685,602

Non-monetised costs

- 3.25 The ‘do nothing’ option risks reputational damage to the UK and maritime environment, which is difficult to quantify with enough precision and reliability. This could have potential implications on the wider UK maritime sector.
- 3.26 Future amendments to international regulations on AFS may lead to further costs to UK businesses, which through ambulatory referencing will automatically come into force. However, for the reasons discussed in Section 2.0, it is expected that any future amendments to the international regulations will continue to be implemented by UK ship owners and that any associated costs will continue to be incurred under the Do Nothing scenario in order for them to continue operating internationally.
- 3.27 The cost associated with future amendments cannot be monetised at this stage as there is currently no indication of what form future amendments may take. These costs are therefore not reflected in this DMA. It is proposed that regular post implementation reviews (PIR) will be undertaken to evaluate whether the use of ambulatory reference has achieved its goal and is still valid, and to estimate the costs and benefits of all the technical amendments enacted since this assessment.

Non-monetised benefits

- 3.28 No benefits were monetised for these regulations. This is due to a lack of available data and complexity. For instance, data on costs and frequency of inspections of UK-flagged ships in foreign ports, in the case of “low risk status” and under other status, are not available. Regarding complexity, the frequency of new Conventional amendments, the process for transposition into UK law, or the probability of losing the “low risk status” for the UK are unknown and very variable. This is also the case for AFS, as the monetisation of benefits in terms of cybutryne pollution would need estimates on its impact on the maritime environment. The impact of the

contamination of UK waters by pollution from cybutryne examined above has never been monetised based on existing knowledge. Hence, no benefits could be monetised, but they are qualitatively assessed below.

- 3.29 All the benefits considered below are direct benefits to businesses, and would have been included in the EANDCB if they were monetised, except for the benefits regarding costs savings for the public sectors (e.g. costs and resource savings from the AR).
- 3.30 The main benefit of Option 2 compared to the baseline (i.e. constructed counterfactual where compliance is assumed to be non-existent) is that the regulations eliminate the risk for the UK of losing its “low risk status” under the IMO audit scheme. Losing its “low risk status” would mean an increase in the frequency of inspections of UK-flagged ships in foreign ports. Hence, Option 2 provides a potential cost and resource saving to the UK industry compared to the baseline scenario by preventing further inspections, which represent costs to the UK industry during international travels. UK ships will be in line with international requirements and will not be penalised by other contracting states. This also represents a reputational benefit for the UK. It will also create for them a level-playing field. In the case of Option 1, as it is based on a non-regulatory intervention, mandatory amendments would not be introduced and only a fraction of the impacted companies would follow the new guidance, not eliminating completely the risks for the UK.
- 3.31 It would also result in some cost savings to government from implementing future amendments regarding AFS, due to the ambulatory referencing, as some of these amendments would automatically apply. There would be a resource saving from not having to transpose the amendments into UK legislation, with the associated cost savings to government in respect of time spent by policy officials, economists, lawyers and MPs, and not having to produce additional legislation. This is a moderate benefit, based on the time and costs of the process to transpose international law into UK legislation.
- 3.32 The risk of “gold plating” the original text (i.e. exceeding the requirements of the original measure) would also be eliminated, as it would be the original text which would be incorporated into UK law. It is hard to assess qualitatively the size of this benefit, but it is expected that this is a small benefit, as “gold plating” is not a common issue.
- 3.33 This ambulatory reference option, by efficient implementation of Convention amendments, also supports the UK status not only as host to the IMO, but also as a Category A member of the IMO Council, which is important to the UK’s influence as a maritime nation. The specific contribution of implementation of Convention amendments to UK’s influence is difficult to assess, but overall the benefit should have a small to medium impact.
- 3.34 In a scenario where future amendments to the international regulations on AFS are implemented in UK law via new regulations, ambulatory referencing would result in cost savings to industry as shipowners would only have to consult the changes in the future amendments and not the whole regulations in their entirety. Familiarisation costs resulting from future amendments will therefore be lower as it will require less time for shipowners and other relevant employees to familiarise with any future amendments. The UK government will provide guidance and clarification of the international text in M notices, where necessary.
- 3.34 Generally, the proposed regulations will implement higher standards in the protection of the marine environment in UK waters and beyond. As such by minimising the use of cybutryne in AFS and its impact on the marine environment, the regulations provide protection to the UK environment, indirectly benefiting UK population health and economy. This benefit is expected to have a medium impact.

Business Impact Target Calculations

3.35 The regulatory provisions that implement new or changed obligations from international commitments and obligations are excluded from the Business Impact Target (BIT). In addition, as the EANDCB is within the DMA threshold, this policy is a non-qualifying regulatory measure, and outside the scope of BIT reporting. Although these regulations are excluded from the scope of the BIT, in this section, we have estimated the costs to UK business of complying with the international requirements, that are not already incorporated into UK legislation, to demonstrate the impact businesses would have faced from these international obligations. This why an alternative counterfactual has been used. A proportionate approach has been adopted to estimate the costs to UK businesses.

Summary of the monetised costs and benefits

3.36 The monetised costs are summarised in table 6 for the whole appraisal period (2023 prices).

Table 6: Summary table for costs and benefits

Costs in 2023 prices (for the whole appraisal period)	Low scenario	Central scenario	High scenario
Total familiarisation costs	£29,772.48	£161,834.95	£540,999.57
MCA surveyors training costs	£4,039.25	£8,078.49	£12,117.74
Total costs for AFS change	£196,613.92	£317,746.60	£685,601.82
Total costs	£230,425.65	£487,660.04	£1,238,719.13
Total costs for businesses	£226,386.40	£479,581.54	£1,226,601.39
Total net present social value (2019 prices, 2020 present value)	-£174,747.99	-£369,826.94	-£939,407.93
Business net present value (2019 prices, 2020 present value)	-£171,684.75	-£363,700.45	-£930,218.20
EANDCB (2019 prices, 2020 present value)	£19,945.52	£42,252.99	£108,068.32

3.36 The net social present value in 2019 prices and 2020 present value for Option 2 is -£369,800 in the best estimation over the 10-year appraisal period. The discount rate applied was 3.5%, in line with Green Book guidance.

3.37 This leads to an EANDCB of £42,000 in the central scenario, in 2019 prices and 2020 present value. It should be noted that the net costs to business and the net value to society could be over-estimated, as the benefits identified in the analysis have not been monetised and included in these measures.

Sensitivity Analysis

3.37 A break-even analysis or the use of switching values have not been assessed as this would not be proportionate, as conservative assumptions and high/central/low scenarios have been used whenever possible throughout the analysis, and as the EANDCB in the high scenario is still below the +/- £5 million EANDCB threshold, at around £110,000 in 2019 prices and 2020 present value.

3.38 In providing information on costs and benefits, assumptions had to be made due to a lack of applicable data; these assumptions have some uncertainty around them as they are dependent on many factors. To take into account this uncertainty, a high/central/low range has been provided for many assumptions used throughout to present a range of different possible cost and benefit impacts that could arise, which will all be checked at consultation. Whenever possible, conservative assumptions and ranges have been used in order to avoid underestimating costs, especially in the case of the most critical assumptions of the model which are the number of ships and the number of shippers in scope.

Risks and unintended consequences

- 3.38 There are no significant risks associated with this amendment.
- 3.39 As this amendment is an amendment to an international convention, the UK, as a signatory, should ensure domestic implementation. Failure to do so could result in the UK being out of sync with other parties to the regulations and UK ships may risk being non-compliant with international requirements when they trade internationally.
- 3.40 No unintended consequences have been identified. UK ships will continue to be surveyed and to have their levels of compliance checked through the current survey and certification regime.

Wider considerations

Competition assessment

- 3.41 The new measures apply equally to UK-flagged ships, and they will mostly impact the ones based abroad, outside of the UK, the US and the EU. Considering the costs per company are quite low and the compliance of ships and companies in scope is already quite high, the regulations are not expected to create significant barriers to entry to commercial operations necessitating international voyage. The enforcement of the international measure will ensure that there is a level playing field between operators, especially as the regulations ensure that the ban for cybutryne applies now equally to all UK-flagged vessels wherever they are based, which suppresses a potential cost advantage for ships using AFS with cybutryne.
- 3.42 The regulations will have a negligible impact on the British coating industry. The coatings industry has not raised concerns in relation to this amendment. A representative of one of the world's leading paints and coatings manufacturers 'Jotun' noted: "the ban of cybutryne is a non-issue for Jotun, as it's not been used in any of our antifouling coatings for more than 20 years. Although cybutryne was among potential candidates to replace tributyltin (TBT) – when that too was banned by the IMO, back in 2001 – we realised its low degradation rate in seawater might lead to the same issue of environmental persistence". One member of the British Coating Foundation noted that cybutryne has not been added to products since the ban of TBT, furthermore they did not expect that the prohibition of use of cybutryne in anti-fouling systems internationally would impact other members of the British Coatings Foundation. Hence, the competition within the British coating industry is unlikely to be affected.

Small and Micro Business Assessment (SaMBA)

- 3.42 Based on fleet data from Clarksons' data and the UK Register, the companies affected by the AFS amendments are unlikely to be small or micro businesses. Indeed, regarding familiarisation costs, ships being based abroad and going on international voyages are usually owned by medium or large companies. Based on information in the UK register, ships in Part 1 of the UK Register are large commercial vessels, which means that they are unlikely to be the property of small or micro businesses. Regarding the change of AFS, based on Seaweb data, they have a median gross tonnage (GT) of 2,000, with a minimum size of 140GT and a maximum size of nearly 150,000GT. It is usually assumed that the larger the ship, the larger the company owning it. Considering that large ships ordered abroad are those likely to be affected by the regulations, it confirms that the new regulations will most likely impact large companies, it may impact some medium companies, and it will not have an impact on small and micro businesses.
- 3.43 These regulations pose little to no risk to disproportionately affect any businesses, specifically small, micro and medium businesses. The impact on smaller businesses is not disproportionate. No exemptions are in place for micro or small businesses, so if any small, micro or medium businesses were in scope then they would have to comply with the regulations in the same way large businesses do. An exemption has not been considered as business exemptions would not

be compliant with the AFS amendments and the same safety standards need to be met regardless of firm size. Small and micro businesses are very unlikely to be impacted (see above). Regarding medium businesses, they tend to have smaller and fewer ships than larger companies, meaning that the potential cost for AFS change would be smaller for medium businesses.

Equalities Impact Assessment

3.44 The MCA considers that there are no effects, positive or negative, on outcomes for persons in relation to their age, disability, gender assignment, pregnancy and maternity, race, religion or belief, sex, sexual orientation, and marriage or civil partnership.

Justice Impact Test

3.45 The MCA will liaise with the Ministry of Justice on the Justice Impact Test.

Trade Impact

3.46 The MCA considers that there will be no trade impact from the introduction of this amendment.

3.0 Post implementation review

1. **Review status:** Please classify with an 'x' and provide any explanations below.

<input type="checkbox"/>	Sunset clause	<input checked="" type="checkbox"/>	Other review clause	<input type="checkbox"/>	Political commitment	<input type="checkbox"/>	Other reason	<input type="checkbox"/>	No plan to review
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Regulations to be reviewed every five years to ensure continued suitability.

2. **Expected review date** (month and year, xx/xx):

0	2	/	2	9	Five years from when the Regulations come into force
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3. Rationale for PIR approach:

The level of evidence and resourcing needed to carry out a post implementation review (PIR) for these regulations is low, as the impact of the regulations is expected to be limited. The review will establish whether or not the legislation has broadly achieved its objectives and met its success criteria; namely to protect UK waters by ensuring that non-UK flagged ships do not use an AFS containing cybutryne in UK waters. It will also review whether or not there have been unintended effects. It will use readily available monitoring data and/or management information for evidence and be conducted in-house. The use of ambulatory referencing will also be monitored.

Monitoring data and/or management information might include:

- Feedback from industry (formal and/or informal)
- Enforcement data
- Survey and inspection data
- Ambulatory referencing

Annex A: Consultation Questions

- Do you consider the assessment of the impacts and costs of the changes resulting from the proposed 2024 Regulations compared to the current regulations to be accurate? Yes / No. If no, how would you expect the impact to vary? Please provide a brief explanation of why/why not.
- Are you/do you know of a small, medium and/or micro business(es) that will be disproportionately affected by any of the measures outlined? If yes, please provide relevant details and evidence.
- Do you foresee any unintended consequences of the proposed 2024 Regulations that have not been mentioned in the consultation documents? If yes, please provide any relevant insights and/or evidence.
- Do you have any additional comments to add to the response?
- Do you think that the draft regulations will implement the requirements of the Convention accurately and appropriately? Yes / No. If no, please provide further details.
- Do you consider that you have received sufficient notification of the requirements with which you will have to comply? Yes / No. If no, please provide further details.
- Do you think, where the UK has some discretion, it has been used accurately and appropriately? Yes / No. If no, please provide further details.
- Regulation 6(3) (prohibitions and requirements for ships) provides:

(3) Paragraph (2) does not apply to a fixed or floating platform, a floating storage unit or a floating production storage and off-loading unit—
(a) constructed before 1st January 2003; and
(b) which has not been in dry dock on or after 1st January 2003.

Paragraph (2) contains the prohibition to not bear an organotin compound which acts as a biocide in anti-fouling systems, and the requirement to bear a coating which forms a barrier to prevent an organotin compound, which acts as a biocide, from leaching.

- Do you consider that the dates in paragraph 3(a) and (b) are still necessary? Yes / No, they are not required. If yes, please provide further details.
- Are you content with the removal of the dates in paragraph 3(a) and (b)? Yes / No. Please provide further details.

The 2009 Regulations implemented the EC Regulation and as such applied the survey and certification requirements in a specific way. The draft regulations will apply them in a slightly different way which is more in line with the Convention requirements. The table below shows the comparison:

	Ship Specifications	2009 Regulations	Draft Regulations
AFS Certificates and Declarations	Ships of 400GT and above	All ships need to comply with survey and certification requirements.	Only ships engaged on international voyages need to comply with survey and certification requirements.
	Ships of under 400GT and 24m or more in length	All ships need an AFS declaration.	Only ships engaged on international voyages need to an AFS declaration.

- Do you agree with the proposed changes? Yes / No. If no, please provide further details.
- Do you agree that the offences and penalties as set out in the draft regulations are necessary, fair and proportionate? Yes / No. If no, please provide further details.
- Is there a way that the penalties can be further streamlined? Yes / No. If so, please provide further details.
- Do you have any additional comments to add to the response? Do you feel that the proposed penalties will act as an effective deterrent for non-compliance with the requirements of the draft regulations? Yes / No. If no, please provide further details.
- Does the proposed MGN (guidance) meet your needs in terms of (i) format; and (ii) content? Yes / No. If no, please provide further details.
- Do you feel there is a better way of providing guidance in respect of the requirements in the draft regulations? Please provide reasoning for your answer. Yes / No. If yes, please provide further details.
- Are you able to provide possible estimates of the costs of complying with the draft regulations? Yes, I can provide cost estimates / No, I can't provide cost estimates. If yes, please provide further details.
- Do you have any additional comments to add to the response?