

Flamblocker Environmental Fire Protection Solutions for Blue Flag Maritime Partners

**Supporting Sustainable Fire Safety in Marinas, Harbours, Shipyards and Maritime Infrastructure
Addressing Environmental Stewardship, PFAS Transition and Emerging Maritime Fire Risks**

Executive Summary

Maritime environments are undergoing a significant transition. Marinas, harbours, shipyards and vessel operators are increasingly challenged by the need to maintain high standards of safety while simultaneously reducing environmental impact and supporting sustainability objectives.

At the same time, European environmental policies and increasing public awareness regarding the environmental impact of certain firefighting chemicals are driving the search for environmentally responsible alternatives. The maritime sector is particularly affected due to the direct interaction between firefighting operations and sensitive marine ecosystems.

The transition towards electric vessels, hybrid propulsion systems, shore-power infrastructure, charging facilities and battery energy storage systems further introduces new fire protection challenges that traditional firefighting strategies were not originally designed to address.

For Blue Flag partners, these developments create a need for fire protection solutions that:

- Minimise environmental impact;
- Support responsible marina and harbour operations;
- Operate effectively with seawater;
- Integrate with existing firefighting equipment;
- Address both conventional and emerging fire risks;
- Reduce water consumption and associated environmental consequences;
- Support future-ready operational strategies.

Flamblocker has developed a portfolio of fire protection technologies designed to address these challenges.

Central to this portfolio is Flamblocker CF7, a PFAS-free and fluorine-free firefighting additive that combines operational effectiveness with environmental responsibility.

Supporting technologies include the MABO automatic fire suppression system for enclosed spaces and electrical infrastructure, AnoGaz battery fire mitigation technology for large energy storage applications, and a new generation of offshore and aviation firefighting foam currently undergoing development and certification.

Together, these technologies provide Blue Flag partners with a practical framework for sustainable maritime fire protection.

Please note. A dedicated Blue Flag database and evidence library has been developed within the Flamblocker website. This page is not public visible and can only be accessed via this direct link:

<https://www.flamblocker.com/blue-flag-information-platform-and-library>

Why Blue Flag Partners Are Evaluating Alternative Fire Protection Technologies

Current Maritime Challenge	Operational Consequence	Flamblocker Response
Increasing environmental scrutiny	Pressure to reduce environmental impact	PFAS-free and fluorine-free fire protection solutions
Growing restrictions on PFAS-containing products	Future compliance and procurement concerns	CF7 designed to support transition toward environmentally responsible fire protection
Dependence on freshwater supplies	Operational limitations in maritime environments	Full compatibility with seawater deployment
High water consumption during firefighting	Flooding, runoff and contamination risks	Demonstrated reduction in water demand
Electrification of vessels and marinas	Emerging battery fire risks	CF7 combined with Anoz battery fire mitigation
Expansion of electrical infrastructure	Increased vulnerability of critical systems	MABO automatic protection systems
Need to protect surrounding assets	Escalation of incidents and infrastructure damage	Thermal shielding and fire spread reduction characteristics
Future regulatory uncertainty	Long-term investment risk	Future-ready environmental and operational approach

Evidence-Based Review

This dossier is supported by operational test reports, environmental documentation, technical reports and video evidence.

Supporting information is available through the direct digital link to the dedicated webpage <https://www.flamblocker.com/blue-flag-information-platform-and-library>

Readers are encouraged to review both the written documentation and supporting evidence when evaluating the suitability of Flamblocker technologies for maritime applications.

1. Introduction

The objective of this document is to demonstrate how Flamblocker technologies can contribute to safer, more resilient and environmentally responsible maritime operations.

The document has been prepared specifically for Blue Flag stakeholders, marina operators, harbour authorities, shipyards, vessel operators and associated maritime partners seeking practical solutions that align with both operational requirements and environmental objectives.

Rather than focusing solely on firefighting performance, this document examines how modern fire protection technologies can support broader goals including environmental stewardship, pollution prevention, infrastructure resilience and emerging battery safety challenges.

2. About Flamblocker

Flamblocker is focused on the development, distribution and implementation of environmentally responsible fire protection technologies.

The company's approach is based on the principle that effective fire suppression and environmental protection should not be viewed as competing objectives.

Modern fire protection systems must not only control and suppress fires effectively, but also minimise secondary environmental impacts associated with firefighting operations.

Flamblocker's technology portfolio currently addresses:

- Conventional fire risks;
- Fuel-related fire incidents;
- Electrical fires;
- Lithium-ion battery incidents;
- Battery energy storage systems;
- Protection of critical infrastructure;
- Maritime and offshore applications.

The Flamblocker portfolio includes:

Flamblocker CF7

A PFAS-free and fluorine-free firefighting additive suitable for a wide range of fire scenarios.

MABO

An automatic fire suppression technology designed to protect enclosed spaces, electrical cabinets and technical infrastructure.

AnoGaz

A specialised technology developed for battery fire mitigation and thermal runaway control.

Offshore and Aviation Foam Programme

A new generation firefighting foam currently undergoing testing and certification for specialised offshore and aviation applications.

3. Environmental and Regulatory Drivers

3.1 Protecting Marine Ecosystems

Marinas, harbours and coastal facilities operate within environmentally sensitive environments where even relatively small incidents can have significant ecological consequences.

Traditional firefighting operations may generate contaminated runoff, introduce chemical residues into surrounding waters or require substantial quantities of extinguishing media.

Protecting marine ecosystems requires more than effective fire suppression. It requires firefighting technologies that support pollution prevention, resource efficiency and responsible operational practices.

3.2 The Transition Towards PFAS-Free Fire Protection

Across Europe, increasing attention is being given to the environmental persistence of PFAS substances and their potential impact on ecosystems and water resources.

Maritime environments are particularly sensitive because firefighting discharges may enter surface waters directly or indirectly through drainage systems and runoff pathways.

As a result, marina operators, harbour authorities, shipyards and vessel owners are increasingly seeking fire protection solutions that support environmentally responsible operations while maintaining operational effectiveness.

Flamblocker CF7 is a PFAS-free and fluorine-free firefighting additive developed to support this transition.

The product is supported by manufacturer documentation, including its Safety Data Sheet and associated declarations, and is designed to provide effective fire suppression while minimising environmental impact.

3.3 Sustainable Infrastructure and Future Readiness

The maritime sector is experiencing rapid technological change.

Electric vessels, hybrid propulsion systems, shore-power facilities and battery energy storage systems are becoming increasingly common throughout marinas and harbours.

Fire protection strategies must therefore evolve beyond traditional approaches and consider battery-related fire risks, electrical infrastructure protection, environmental sustainability and long-term regulatory readiness.

Flamblocker technologies have been developed with these emerging challenges in mind.

4. Maritime Fire Challenges

4.1 A Changing Risk Environment

Historically, maritime fire protection focused primarily on conventional vessel fires involving fuel systems, accommodation areas, engine rooms and cargo-related incidents.

While these risks remain important, today's maritime environment is increasingly characterised by a combination of traditional fire hazards and emerging energy-related risks. Modern marinas, harbours and shipyards are no longer solely managing fuel-related fire scenarios; they are increasingly managing energy-storage related risks as well.

The growing deployment of electric vessels, hybrid propulsion systems, shore-power infrastructure, charging stations and battery energy storage systems requires a broader approach to fire protection.

As a result, modern maritime fire protection must address both conventional fire risks and emerging technologies while maintaining compatibility with environmental protection objectives.

4.2 Conventional Vessel and Infrastructure Fires

Conventional maritime fire incidents may involve:

- Engine compartments;
- Fuel systems;
- Accommodation spaces;
- Workshops and maintenance facilities;
- Warehouses and storage buildings;
- Port infrastructure;
- Harbour service vehicles.

These incidents require rapid suppression, protection of adjacent assets and minimisation of operational disruption.

In many cases, secondary damage caused by heat, smoke, water and environmental contamination may exceed the direct damage caused by the fire itself.

4.3 Electrical Infrastructure Risks

Modern maritime facilities increasingly depend on electrical infrastructure.

Examples include:

- Shore-power installations;
- Charging stations;
- Switchboards;
- Electrical cabinets;
- Marina control systems;
- Communication equipment;
- Energy management systems.

Electrical fires often develop differently from conventional fires and may spread rapidly through critical infrastructure if not controlled at an early stage.

Protecting these systems is becoming increasingly important as maritime facilities continue to electrify their operations.

4.4 Battery and Energy Storage Risks

The maritime sector is undergoing a significant transition toward electrification.

This includes:

- Electric propulsion systems;
- Hybrid propulsion systems;
- Battery-supported auxiliary systems;
- Battery energy storage installations;
- Electric tenders and support vessels;
- Electric recreational equipment;
- Charging infrastructure.

Luxury yachts in particular are increasingly equipped with substantial onboard battery capacity used for propulsion, hotel loads, stabilisation systems, emergency power and energy management functions.

While these technologies provide significant operational benefits, they also introduce risks associated with thermal runaway, re-ignition and prolonged fire incidents.

As a result, battery fire mitigation is becoming an increasingly important element of maritime safety planning.

4.5 Environmental Consequences of Maritime Fire Incidents

Maritime fire incidents present unique environmental challenges.

Potential consequences include:

- Contaminated firefighting runoff;
- Release of pollutants into surface waters;
- Damage to sensitive marine ecosystems;
- Vessel flooding;
- Vessel instability;
- Vessel sinking;
- Secondary environmental contamination.

For Blue Flag partners, managing these environmental consequences is as important as controlling the fire itself.

The most effective fire protection strategies therefore seek to reduce both fire damage and the environmental impacts associated with emergency response activities.

5. Flamblocker CF7

5.1 Overview

Flamblocker CF7 is a PFAS-free and fluorine-free firefighting additive developed to enhance the effectiveness of water-based firefighting operations.

CF7 has been designed to support rapid fire suppression while simultaneously reducing water consumption and minimising environmental impact.

The product is suitable for a wide range of applications and can be deployed using conventional firefighting equipment already used throughout maritime environments.

This allows marina operators, harbour authorities and vessel operators to integrate CF7 into existing firefighting strategies without requiring major operational changes.

5.2 Seawater Compatibility

One of the most significant advantages of Flamblocker CF7 for maritime operators is its compatibility with seawater.

Marinas, harbours and vessels are surrounded by an effectively unlimited supply of seawater. However, many firefighting solutions remain dependent on freshwater supplies or require dedicated logistics to maintain operational readiness.

CF7 can be deployed using seawater, allowing emergency responders to utilise immediately available resources without dependence on dedicated freshwater reserves.

This provides several operational benefits:

- Immediate availability of extinguishing media;
- Reduced freshwater dependency;
- Simplified logistics;
- Improved operational flexibility;
- Enhanced suitability for maritime environments.

For Blue Flag partners, seawater compatibility represents an important contribution to both operational readiness and sustainable resource management.

5.3 Reduced Water Consumption

Water remains the primary firefighting medium used throughout the maritime sector.

However, large-scale water deployment may create secondary challenges including:

- Vessel flooding;
- Increased vessel instability;
- Contaminated runoff;
- Environmental pollution;
- Increased clean-up requirements.

Operational testing has demonstrated that the use of CF7 can significantly reduce water consumption compared with water-only firefighting approaches.

Reduced water consumption provides several advantages:

- Faster fire control;
- Reduced runoff volumes;
- Reduced environmental contamination;
- Reduced flooding risk;
- Reduced clean-up requirements.

For maritime operators, reduced water usage may also contribute to maintaining vessel stability during firefighting operations.

5.4 Vessel Stability and Environmental Protection

One of the lesser recognised challenges during vessel firefighting operations is the effect of accumulated firefighting water.

Large quantities of water introduced into enclosed spaces can contribute to:

- Free-surface effects;
- Reduced stability;
- Increased flooding;
- Increased risk of sinking.

By reducing overall water demand, CF7 may contribute to reducing these secondary risks. In addition to protecting vessels and infrastructure, this may also reduce the likelihood of environmental contamination associated with vessel flooding or sinking.

For Blue Flag partners, this represents an important connection between operational firefighting effectiveness and environmental protection.

5.5 Operational Integration and Readiness

One of the key advantages of Flamblocker CF7 is its ability to be integrated into existing firefighting operations without requiring fundamental changes to equipment, vehicles or deployment procedures.

CF7 can be deployed using conventional firefighting equipment already available to marina fire brigades, harbour emergency services and vessel-based firefighting teams. Existing pumps, hoses, monitors, firefighting vessels and fire trucks remain fully usable.

Operational experience has demonstrated that significant reductions in water consumption can already be achieved when CF7 is used within existing firefighting practices. Firefighters are therefore able to benefit from the product's enhanced wetting, cooling and encapsulating characteristics without the need for immediate changes to established operating procedures.

Additional reductions in water consumption may be achieved through dedicated training and optimisation of deployment techniques. However, such optimisation should be viewed as an opportunity rather than a requirement.

The operational benefits of CF7 are already realised when incorporated into existing firefighting practices.

5.6 Multi-Class Fire Protection

Maritime environments contain a wide variety of potential fire scenarios. Flamblocker CF7 has been developed as a multi-class firefighting additive capable of supporting response to multiple fire types using a single product platform.

Potential applications include:

- Solid combustible materials;
- Fuel-related incidents;
- Cooking oil and galley fires;
- Vehicle fires;
- Electrical incidents;
- Lithium-ion battery related events.

This versatility simplifies emergency preparedness and reduces the need for multiple specialised extinguishing products.

For maritime operators, this may contribute to more efficient inventory management, simplified training requirements and improved operational flexibility.

5.7 Environmental Profile

Environmental performance is a central consideration for Blue Flag partners.

Flamblocker CF7 has been developed with environmental responsibility as a core design objective.

The product is:

- PFAS-free;
- Fluorine-free;
- Biodegradable;
- Non-corrosive;
- Suitable for deployment within environmentally sensitive environments.

Supporting documentation includes manufacturer declarations, Safety Data Sheets and independent environmental testing addressing biodegradability, ecotoxicity and material compatibility.

For organisations seeking environmentally responsible fire protection solutions, these characteristics support broader sustainability and environmental stewardship objectives.

6. Operational Evidence

Fire protection technologies should ultimately be assessed not only on technical specifications, but also on their demonstrated performance under operational conditions.

To support transparency and independent evaluation, Flamblocker has conducted and participated in multiple operational demonstrations designed to evaluate firefighting effectiveness, water consumption, fire control, environmental considerations and applicability within real-world scenarios. For each operational demonstration referenced within this dossier, supporting documentation and video evidence are available through the appendices and Digital Evidence Library.

This approach allows decision makers, marina operators, harbour authorities and technical evaluators to review both written reports and actual operational footage.

6.1 Forest Fire Operational Test

The forest fire operational test was conducted to assess the performance of Flamblocker CF7 under realistic wildfire conditions.

Particular attention was given to suppression effectiveness, water consumption and the potential for re-ignition following extinguishment.

Key Findings

- Rapid suppression was achieved.
- Water consumption was significantly reduced compared to conventional approaches.
- Fire control was maintained after extinguishment.
- No observed re-ignition occurred following suppression.

Of particular significance was the observation that internal heat remained present within the burned timber while external fire activity did not re-establish itself. This suggests that CF7 contributes not only to extinguishment but also to containment and isolation of residual heat.

For maritime operators, this characteristic may be particularly relevant when protecting adjacent vessels, infrastructure, cargo and critical assets where prevention of fire spread is a primary objective.

Supporting Documentation

Appendix A – Forest Fire Operational Test Report

Video Evidence

Video – Forest Fire Operational Demonstration

<https://www.flamblocker.com/blue-flag-information-platform-and-library>

6.2 Vehicle Fire Operational Test

The vehicle fire operational test was conducted to compare conventional water deployment with deployment using Flamblocker CF7.

The objective was to assess extinguishment efficiency, water consumption and incident control performance.

Key Findings

- Faster fire control was achieved.
- Water consumption was reduced.
- Fire suppression was achieved using conventional firefighting equipment.
- No specialist deployment equipment was required.

The test demonstrated that operational benefits can be achieved without significant changes to existing firefighting practices.

For marina operators and harbour authorities, this supports straightforward integration into existing emergency response procedures.

Supporting Documentation

Appendix B – Vehicle Fire Operational Test Report

Video Evidence

Video – Vehicle Fire Operational Demonstration

<https://www.flamblocker.com/blue-flag-information-platform-and-library>

6.3 Electric Vehicle Fire Operational Test

The transition toward electrification is creating new fire protection challenges throughout both terrestrial and maritime environments.

The EV fire operational test was conducted to evaluate the deployment of Flamblocker CF7 in a lithium-ion battery related fire scenario.

Key Findings

- Effective fire suppression was demonstrated.
- Cooling performance was demonstrated.
- Deployment using conventional firefighting equipment was achieved.
- Applicability to emerging battery-related risks was demonstrated.

As electric vessels, hybrid propulsion systems and battery-supported infrastructure continue to expand within marinas and harbours, technologies capable of supporting battery fire response become increasingly important.

Supporting Documentation

Appendix C – Electric Vehicle Fire Operational Test Report

Video Evidence

Video – Electric Vehicle Fire Operational Demonstration

<https://www.flamblocker.com/blue-flag-information-platform-and-library>

6.4 Protection of Adjacent Assets and Critical Infrastructure

One of the most important objectives during any fire incident is preventing escalation and protecting surrounding assets.

Operational demonstrations conducted by firefighters in Karlovac, Croatia, illustrated the ability of CF7-treated surfaces to provide a temporary protective barrier against thermal exposure.

While such demonstrations are not intended to replace established firefighter safety procedures, they provide a visual indication of CF7's ability to reduce thermal transfer and isolate heat.

Potential Maritime Applications

- Protection of neighbouring vessels;
- Protection of marina infrastructure;
- Protection of harbour equipment;
- Protection of electrical installations;
- Protection of evacuation routes;
- Limitation of fire spread.

For Blue Flag partners, reducing fire spread may contribute directly to both safety and environmental protection objectives by limiting the scale and consequences of fire incidents.

Video Evidence

Video – Thermal Shield Demonstration

<https://www.flamblocker.com/blue-flag-information-platform-and-library>

7. Independent Evidence and Validation

Effective decision making requires access to transparent and verifiable information. Flamblocker therefore supports its technologies through a combination of operational testing, technical documentation, environmental assessments and manufacturer documentation.

The objective is to allow stakeholders to independently review available evidence and assess suitability for their specific operational environments.

7.1 Manufacturer Documentation

Product information is supported through manufacturer documentation including:

- Safety Data Sheets;
- Product Declarations;
- Technical Data Sheets;
- Operational Guidance Documentation.

These documents provide detailed information regarding product characteristics, handling requirements, safety considerations and operational deployment.

<https://www.flamblocker.com/blue-flag-information-platform-and-library>

7.2 Environmental Documentation

Environmental performance is supported through independent testing and documentation addressing:

- Biodegradability;
- Ecotoxicity;
- Material Compatibility;
- Environmental Characteristics.

These assessments assist operators in evaluating the environmental profile of the technology and its suitability for deployment within environmentally sensitive maritime environments.

<https://www.flamblocker.com/blue-flag-information-platform-and-library>

7.3 Operational Validation

Operational validation is supported through documented demonstrations including:

- Forest Fire Operational Test;
- Vehicle Fire Operational Test;
- Electric Vehicle Fire Operational Test;
- Thermal Shield Demonstrations.

These demonstrations provide practical insight into real-world deployment characteristics and operational effectiveness.

<https://www.flamblocker.com/blue-flag-information-platform-and-library>

7.4 Evidence-Based Assessment

This dossier has been prepared using an evidence-based approach.

Where operational claims are presented, supporting documentation and demonstration material are referenced through appendices and the Flamblocker Digital Evidence Library.

Stakeholders are encouraged to review the supporting documentation in conjunction with this dossier when evaluating potential implementation strategies.

7.5 Flamblocker Digital Evidence Library

To ensure continued access to current information, Flamblocker maintains a Digital Evidence Library containing technical documentation, environmental reports, operational demonstrations and supporting information.

Access is provided through a direct link to a dedicated webpage within the Flamblocker website. This webpage is publicly visible and can only be accessed via this direct link:

<https://www.flamblocker.com/blue-flag-information-platform-and-library>

This approach ensures that Blue Flag partners can access the most recent documentation without requiring updates to printed materials.

8. Complementary Technologies for Maritime Risk Management

While Flamblocker CF7 provides the primary firefighting solution discussed within this dossier, modern maritime environments increasingly require layered protection strategies.

The growing transition from traditional fuel risks toward energy-related risks creates a need for specialised technologies capable of protecting critical infrastructure and battery systems.

8.1 MABO Automatic Fire Suppression Technology

MABO is an automatic fire suppression technology designed to protect enclosed spaces and technical infrastructure.

The system activates automatically when exposed to elevated temperatures and is particularly suited for applications where immediate intervention may not be possible.

Potential Maritime Applications

- Electrical cabinets;
- Shore-power installations;
- Technical rooms;
- Control rooms;
- Communication systems;
- Machinery spaces;
- Infrastructure cabinets.

For marina operators and harbour authorities, MABO offers an additional layer of protection for critical electrical and operational infrastructure.

Supporting documentation is provided in Appendix H.

8.2 AnoGaz Battery Fire Mitigation Technology

The increasing use of lithium-ion batteries throughout the maritime sector creates new safety challenges.

AnoGaz has been developed specifically to address battery-related fire incidents and thermal runaway scenarios.

Potential Maritime Applications

- Battery energy storage systems;
- Charging infrastructure;
- Electric vessels;
- Hybrid vessels;
- Battery rooms;
- Technical energy storage spaces.

Particularly within the luxury yacht sector, battery capacity is increasing significantly due to the adoption of hybrid propulsion systems, hotel load batteries, stabilisation systems and advanced onboard energy management technologies.

As a result, battery risk management is becoming an increasingly important element of maritime safety planning.

AnoGaz complements CF7 by providing a specialised technology focused on larger battery-related incidents and thermal runaway mitigation.

Supporting documentation is provided in Appendix H and I.

8.3 Offshore and Aviation Fire Protection Programme

Flamblocker is currently developing and certifying a next generation firefighting foam intended for specialised offshore and aviation applications.

The programme is focused on delivering high-performance firefighting capabilities while maintaining alignment with environmental responsibility objectives.

At the time of publication, testing and certification activities remain ongoing. Future updates will be made available through the Flamblocker Digital Evidence Library.

Evidence-Based Review

This dossier is supported by operational test reports, environmental documentation, technical reports and video evidence.

References to supporting documentation are provided throughout the document through appendices and QR-code access to the Flamblocker Digital Evidence Library.

Readers are encouraged to utilise both the attached documentation and the digital resources when assessing the suitability of Flamblocker technologies for maritime applications.

9. Blue Flag Application Models

The Blue Flag programme promotes environmental responsibility, operational excellence and sustainable management practices throughout marinas, harbours and coastal facilities.

The following application models illustrate how Flamblocker technologies may support Blue Flag partners in addressing both current and emerging fire protection challenges.

These models are intended as conceptual implementation frameworks and may be adapted to the specific requirements of individual facilities, operators and vessel owners.

9.1 Blue Flag Marina Model

Modern marinas increasingly combine traditional marine operations with advanced electrical infrastructure, charging systems and energy storage technologies.

As a result, marina operators must manage a broader range of risks than ever before.

Recommended Technology Framework

Flamblocker CF7

Primary firefighting capability for:

- Vessel fires;
- Fuel-related incidents;
- Workshop fires;
- Vehicle fires;
- Marina infrastructure fires;
- Initial battery-related response.

MABO

Protection of critical infrastructure including:

- Shore-power installations;
- Electrical cabinets;
- Communication systems;
- Control rooms;
- Technical facilities.

AnoGaz

Protection of:

- Battery storage systems;
- Charging infrastructure;
- Electric vessels;
- Hybrid vessels;
- Technical battery rooms.

Operational Benefits

- Reduced water consumption;
- Seawater compatibility;
- Reduced environmental impact;
- Improved protection of marina infrastructure;
- Improved readiness for battery-related incidents.

9.2 Blue Flag Harbour Model

Commercial harbours typically involve larger operational areas, more complex infrastructure and increased interaction between vessels, vehicles and industrial activities.

Recommended Technology Framework

Flamblocker CF7

Primary emergency response capability for:

- Vessel incidents;
- Fuel fires;
- Infrastructure fires;
- Vehicle and equipment fires;
- Initial battery-related incidents.

MABO

Protection of:

- Electrical distribution systems;
- Harbour control facilities;
- Technical infrastructure;
- Communication systems.

AnoGaz

Protection of:

- Energy storage systems;
- Charging infrastructure;
- Electrified harbour operations.

Operational Benefits

- Reduced water demand;
- Reduced contamination risk;
- Protection of critical infrastructure;
- Improved operational resilience.

9.3 Electric Marina Model

The increasing adoption of electric and hybrid vessels is creating a new generation of marina environments.

These facilities require specialised consideration of battery safety, charging infrastructure and energy storage systems.

Recommended Technology Framework

Flamblocker CF7

Operational firefighting capability.

MABO

Infrastructure protection.

AnoGaz

Dedicated battery fire mitigation.

Strategic Objective

Support safe electrification while maintaining environmental responsibility and operational readiness.

9.4 Luxury Yacht and Superyacht Model

Modern luxury yachts increasingly incorporate substantial onboard energy storage systems.

These systems may support:

- Hybrid propulsion;
- Hotel loads;
- Stabilisation systems;
- Emergency power systems;
- Renewable energy integration.

As battery capacity increases, so does the importance of specialised fire protection planning.

Recommended Technology Framework

Flamblocker CF7

Primary firefighting capability.

MABO

Protection of technical compartments and electrical systems.

AnoGaz

Protection of battery systems and energy storage spaces.

Strategic Benefit

Supports the transition toward advanced onboard energy systems while maintaining a high level of safety and environmental responsibility.

9.5 Shipbuilding and Refit Facilities

Shipyards and refit facilities often encounter a combination of fuel risks, electrical risks and battery-related hazards during vessel construction and maintenance activities.

A layered protection strategy may assist in reducing operational risks while supporting environmental management objectives.

10. Proposed Demonstration Programme

Flamblocker recognises the importance of independent evaluation and practical validation. To support informed decision making, Flamblocker proposes a demonstration programme specifically tailored to Blue Flag stakeholders and maritime operators.

The objective is to provide transparent, evidence-based evaluation under realistic operational conditions.

Demonstration A – Seawater Deployment

Objective

Demonstrate the performance of Flamblocker CF7 using seawater.

Evaluation Criteria

- Ease of deployment;
- Operational effectiveness;
- Compatibility with maritime operations;
- Practical implementation.

Strategic Importance

This demonstration directly addresses one of the primary operational concerns within maritime environments.

Demonstration B – Conventional Fire Scenario

Objective

Demonstrate suppression of a conventional fuel-related fire.

Evaluation Criteria

- Extinguishment effectiveness;
- Water consumption;
- Fire control performance.

Demonstration C – Battery Fire Scenario

Objective

Demonstrate battery-related fire response capabilities.

Evaluation Criteria

- Cooling performance;
- Fire control;
- Thermal management.

Strategic Importance

Addresses growing battery-related risks within marinas and vessels.

Demonstration D – Water Consumption Comparison

Objective

Compare conventional water deployment with Flamblocker CF7 deployment.

Evaluation Criteria

- Water consumption;
- Extinguishment time;
- Operational effectiveness.

Strategic Importance

Supports environmental and vessel stability objectives.

Demonstration E – Asset Protection and Thermal Shielding Objective

Illustrate the ability of CF7 to reduce thermal transfer and assist in protecting adjacent assets.

Evaluation Criteria

- Thermal isolation;
- Protection of surrounding areas;
- Fire spread limitation.

Strategic Importance

Demonstrates potential benefits for protecting neighbouring vessels, infrastructure and critical equipment.

11. Strategic Outlook

The maritime sector is entering a period of significant technological and regulatory change. Several developments are expected to influence future fire protection strategies:

- Continued electrification of vessels;
- Increased deployment of shore-power systems;
- Growth of battery energy storage technologies;
- Increasing environmental expectations;
- Continued transition away from PFAS-containing firefighting products;
- Greater emphasis on sustainability and environmental stewardship.

Blue Flag partners are uniquely positioned to lead this transition by adopting technologies that combine operational effectiveness with environmental responsibility.

Flamblocker's technology portfolio has been developed with these trends in mind and is intended to support the long-term evolution of maritime fire protection strategies.

12. Conclusion

Modern maritime environments face a unique combination of environmental, operational and technological challenges.

Marinas, harbours, shipyards and vessel operators must simultaneously address traditional fire risks, emerging battery-related hazards, increasing environmental expectations and evolving regulatory requirements.

Flamblocker technologies have been developed to support this transition. Flamblocker CF7 provides a PFAS-free and fluorine-free firefighting solution designed to enhance firefighting effectiveness while reducing water consumption and supporting environmental responsibility.

Its compatibility with seawater, ability to integrate with existing firefighting equipment and demonstrated operational performance make it particularly relevant for maritime applications.

Supporting technologies including MABO and AnoGaz provide additional layers of protection for critical infrastructure and battery-related risks, reflecting the growing importance of electrical systems and energy storage technologies throughout the maritime sector.

Together, these technologies provide Blue Flag partners with a practical pathway toward environmentally responsible fire protection while supporting safety, resilience and future readiness.

The combination of operational evidence, environmental documentation, technical validation and practical demonstration opportunities allows stakeholders to evaluate these technologies using transparent and evidence-based criteria.

Flamblocker welcomes the opportunity to work with Blue Flag and its partners to further explore how sustainable fire protection technologies can contribute to safer and more environmentally responsible maritime operations.

<https://www.flamblocker.com/blue-flag-information-platform-and-library>

www.flamblocker.com

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