

Enhancing Polar Code Chapter 8 Compliance in Practice

Addressing the Survivability Gap Through Consistent Enforcement and Enhanced Equipment

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Executive Summary

The IMO Polar Code Chapter 8 establishes clear goal-based requirements for life-saving appliances and arrangements. It mandates “adequate thermal protection” and “sufficient thermal insulation” to support survival for the Maximum Expected Time of Rescue (METR) in prevailing polar conditions.

While the goal-based framework is fundamentally sound, current enforcement and interpretation practices often fall short of delivering the intended outcomes. Standard SOLAS/LSA immersion suits, designed and tested only for temperate conditions (calm 0–5°C water with mild air exposure), do not reliably provide functional survivability in realistic Arctic abandonment scenarios involving sub-zero air (–20°C+), wind chill, spray ingress, wet donning, and survivor dispersion. Independent evidence shows they can lose critical capabilities — dexterity for signaling/self-rescue and core temperature stability — well before 24 hours, even when METR is as short as 1 day.

The following regulatory and federal developments confirm and reinforce this practical gap:

Norwegian Maritime Authority (April 20, 2026 — Jan Reinert Vestvik, Project Manager Passenger Ship; CC: Bodil Pedersen): Confirmed that survival after abandonment relies on the types and combination of equipment, crew training, and good leadership per MSC.1/Circ.1614/Rev.1, para. 1.3. The NMA explicitly invited White Glacier to submit its proposal to the IMO via Norway or other member states when the revision of the Polar Code or interim guidelines is on the agenda.

Chile DIRECTEMAR (February 2026 — Roberto Alfaro Pérez, Jefe, Servicio de Inspecciones Marítimas, DIRSOMAR): Committed to verify immersion suit performance during Port State Control inspections in Punta Arenas when applicable. Response copied to central navigation/maneuver inspectors and the Punta Arenas PSC officer.

Lloyd’s Register (February 2026 — Case #00845510, Dean A. Biskupovich, GTCC Americas): Acknowledged that standard suits “may not consistently ensure 5-day survivability under realistic polar conditions, particularly where survivors are dispersed or wet.”

NOAA Dual Federal Sole Source Determinations (January 2023 & February 2026): The U.S. government has issued two consecutive Single Source Determinations for the Arctic 10+ — NM-AN2100-23-00514 (January 10, 2023, Joseph Brinkley, Safety

Management Branch) and 140802-26-0173 (February 10, 2026, LT Jaime Wolfston; CO: Isaac Bright) — both concluding following independent market research that no other manufacturer produces a survival suit providing equivalent polar protection and that the Arctic 10+ is the only commercially available solution. No other immersion suit in the global market holds a single equivalent determination, let alone two.

This white paper examines the gap between the Polar Code's intent and current practice. It demonstrates how enhanced immersion suits — such as the Arctic 10+, with proven multi-day performance — can serve as a practical, immediately available means to help operators, flag states, and recognized organizations achieve the Code's goal-based survivability objectives without requiring new mandatory rules.

Stronger, more consistent enforcement of existing Polar Code requirements, supported by performance-verified equipment where operational risks demand it, represents the most effective path forward.

1. The Polar Code's Goal-Based Survival Requirement

The Polar Code (Chapter 8.2.3) requires immersion suits and associated systems to provide adequate thermal protection for the maximum expected time of rescue in prevailing polar conditions. The framework deliberately allows flexibility through combinations of personal survival kits (PSK), group survival kits (GSK), heated life rafts, and other measures.

However, this flexibility assumes timely, effective deployment and use — assumptions that frequently do not hold in real polar abandonment scenarios where survivors may be dispersed, wet, hypothermic, or unable to access shared resources promptly.

2. Evidence of the Practical Gap in Standard LSA Suits

Standard SOLAS/LSA immersion suits were never designed nor tested for polar conditions. They are certified for short-duration immersion in calm 0–5°C water. Key evidence includes:

- **Lloyd's Register (Case #00845510, February 2026):** Standard suits “may not consistently ensure 5-day survivability under realistic polar conditions, particularly where survivors are dispersed or wet.”
- **Ergopro 2022 Independent Tests (Ergopro Ltd, Trondheim, Norway):** Tests were conducted at 0°C water, –20°C air, and 10 m/s wind — a combined wind chill equivalent of –30°C. The MSC.81(70) protocol permits a maximum of 500g of simulated water ingress; Ergopro independently extended the test to 2+ litres of water ingress — more than four times the regulatory maximum. The Arctic 10+ performed equivalently to the Arctic 25+ under both conditions: core temperature drop of only –0.5°C over 6 hours, skin temperatures maintained above 10°C at all extremities, and manual dexterity preserved. Standard neoprene suits lose 40–45% of thermal protection with just 1 litre of ingress.

- **USCG RDC 2023 Arctic SAR Simulation Study:** METR frequently exceeds 5 days in remote and ice-bound scenarios, with functional risks onset much earlier. The study modeled six realistic SAR scenarios in the U.S. Arctic AOR and found that in several cases, particularly those involving large victim loads far from shore-based infrastructure, METR significantly exceeds the IMO 5-day baseline.
- **NOAA Dual Federal Sole Source Determinations (2023 & 2026):** Two consecutive U.S. government determinations — NM-AN2100-23-00514 (January 2023) and 140802-26-0173 (February 2026) — each following independent market research, recognized the inadequacy of standard suits for sub-zero air, wind, and ingress exposure and concluded that the Arctic 10+ is the only commercially available solution.

These findings confirm that reliance on minimum LSA suits plus PSK/GSK often fails to deliver the functional survivability required by Polar Code Chapter 8 in practice.

3. Regulatory Momentum and Enforcement Opportunities

Several administrations and recognized organizations are already engaging substantively with the survivability gap:

- **Norwegian Maritime Authority (April 20, 2026 — Jan Reinert Vestvik, Project Manager Passenger Ship):** Confirmed the NMA's position referencing MSC.1/Circ.1614/Rev.1 and explicitly invited White Glacier to submit its proposal to the IMO via Norway or other member states when the revision of the Polar Code or interim guidelines is on the agenda. This is a significant and formal opening for a coordinated IMO submission.
- **Chile DIRECTEMAR (February 2026 — Roberto Alfaro Pérez, Jefe DIRSOMAR):** Committed to verify immersion suit performance during Port State Control inspections at Punta Arenas when applicable. The response was copied to central navigation/maneuver inspectors and the Punta Arenas PSC officer.
- **Lloyd's Register (February 2026 — Case #00845510):** Acknowledged the survivability gap and noted that the recognized pathway for updating immersion suit standards is to collaborate with a national administration or industry association to submit a proposal to the IMO Maritime Safety Committee.
- **Transport Canada (May–June 2026 — Vyacheslav Gorodetskyy, Senior Marine Safety Inspector, Arctic & Large Vessels):** Confirmed receipt of White Glacier's regulatory brief and distributed it to colleagues engaged in international and domestic discussions on personal life-saving equipment.

These developments indicate growing recognition among key administrations and recognized organizations that consistent enforcement of existing goal-based requirements is needed.

4. Practical Solution: Enhanced Equipment to Meet Existing Goals

No new mandatory tier is proposed. Instead, enhanced immersion suits that demonstrably exceed minimum LSA performance — such as the Arctic 10+ with patented features (US Patent 11,332,225), 4.87 CLO thermal performance, and an integrated five-day survival protocol — offer operators and flag states a proven, immediately available way to achieve the Polar Code’s survivability objectives in high-risk operations.

These suits maintain core stability, dexterity, and self-rescue capability for extended periods even under realistic polar conditions (wet donning, ingress, wind chill). They complement, rather than replace, existing LSA equipment and support the combination-based approach endorsed by IMO and NMA guidance.

Performance Comparison: Arctic 10+ vs. Standard Neoprene Suits

Feature	Arctic 10+ / Arctic 25+	Standard Neoprene Suits
Thermal Stability	Core drop only -0.5°C over 6 hours at 0°C water / -20°C air / 10 m/s wind	Loses up to 45% protection with 1 litre ingress
Water Ingress Tolerance	Tested at 500g (regulatory max) AND 2+ litres (Ergopro extended test); equivalent performance in both	Rapid heat loss; unsafe skin temperatures with 1 litre ingress
Wet Donning Performance	Stable with 2.0–2.3 kg internal moisture	Rapid heat loss; potentially unsafe
Manual Dexterity	Preserved post-immersion; survival tasks completed	Often impaired due to cold stress
Bare Hand Access	Arms withdrawable inside suit	No internal mobility
Splash Protection	Built-in tent for wind and wave shielding	None
Calorie Intake Support	Allows eating and drinking inside suit	No access
Polar Code Suitability	Independently tested under realistic polar conditions; exceeds MSC.81(70)	Not validated for polar scenarios

5. Conclusion and Call to Action

The Polar Code’s goal-based framework is the correct approach. The challenge lies in consistent interpretation and enforcement to ensure real-world survivability. The evidentiary record — now including two consecutive U.S. federal sole source determinations, formal acknowledgments from Lloyd’s Register, Transport Canada, Chile DIRECTEMAR, and the Norwegian Maritime Authority, and independent testing by Ergopro — establishes this gap on the institutional record with a clarity and authority that warrants action.

The Norwegian Maritime Authority has explicitly invited a formal IMO submission via Norway when the revision of the Polar Code or interim guidelines is on the agenda. White Glacier stands ready to

support that process and welcomes parallel engagement from all flag states, recognized organizations, and the IMO community.

White Glacier is prepared to support:

- Technical briefings and pilot programs for flag state safety inspectors and recognized organizations.
- Contribution to future IMO discussions, including formal submission via a member state, on refinements to survivability assessments and LSA performance requirements in polar waters.
- Practical implementation of enhanced equipment where operational risk profiles — particularly METR exceeding 12–24 hours in remote or ice-bound environments — warrant it.

Better enforcement of existing requirements, supported by performance-verified solutions, will meaningfully improve safety for crews and passengers in polar waters.

Contact

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Key References

- NOAA Single Source Determination NM-AN2100-23-00514 (January 10, 2023 — Joseph Brinkley, Safety Management Branch, NOAA Office of Marine and Aviation Operations)
- NOAA Single Source Determination 140802-26-0173 (February 10, 2026 — LT Jaime Wolfston; CO: Isaac Bright, Safety Management Branch)
- Norwegian Maritime Authority Reply (April 20, 2026 — Jan Reinert Vestvik, Project Manager Passenger Ship; CC: Bodil Pedersen) — Sjøfartsdirektoratet
- Chile DIRECTEMAR Acknowledgment (February 2026 — Roberto Alfaro Pérez, Jefe, Servicio de Inspecciones Marítimas, DIRSOMAR)
- Lloyd's Register Reply Excerpt (February 2026 — Case #00845510, Dean A. Biskupovich, GTCC Americas)
- Transport Canada Engagement (May–June 2026 — Vyacheslav Gorodetsky, Senior Marine Safety Inspector, Arctic & Large Vessels, Design & Equipment Standards)
- Ergopro 2022 Independent Test Report (Ergopro Ltd, Trondheim, Norway — including 2+ litre extended ingress test beyond MSC.81(70) regulatory maximum)
- USCG RDC 2023 Arctic SAR Simulation Study — “Verify International Maritime Organization Polar Code Survival Time Requirement: Arctic Search & Rescue Simulation Model”
- MSC.1/Circ.1614/Rev.1 — Interim Guidelines on Life-Saving Appliances and Arrangements for Ships Operating in Polar Waters
- US Patent 11,332,225 — White Glacier Arctic 10+ reflective bubble insulation technology (valid to 2041)