



# AUSTRALIAN MARITIME INDUSTRIES

*"From the land down under, to the heart of Texas"*

## Technical Appendix

For Engineers, Naval Architects & Procurement Teams

### 1. Hull Materials

#### Plate Aluminium

- **Alloy:** Typically 5083-H116 / 5083-H321 or 5052-H34
- **Construction:** Fully welded plate and framing system
- **Yield Strength:** ~215 MPa (5083-H116)
- **Fatigue Resistance:** Excellent under cyclic loading
- **Corrosion Resistance:** High in marine environments

#### Fiberglass (FRP)

- **Material:** Polyester or vinyl ester resin with glass reinforcement
- **Construction:** Moulded laminate (hand-laid, vacuum infused, or chopper gun)
- **Strength:** High tensile strength but brittle under impact
- **Failure Mode:** Cracking, delamination, osmotic blistering

### 2. Structural Behaviour Under Load

| Aspect                   | Plate Aluminium     | Fiberglass       |
|--------------------------|---------------------|------------------|
| Impact Response          | Plastic deformation | Brittle fracture |
| Damage Visibility        | Immediate           | Often hidden     |
| Structural Redundancy    | High                | Limited          |
| Repair Strength Recovery | Near-100%           | Variable         |

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### 3. Weight & Power Efficiency

- Aluminium hulls typically weigh **20–40% less** than equivalent fiberglass hulls.
- Reduced displacement enables:
  - Smaller engine requirements
  - Lower fuel burn rates
  - Improved acceleration and handling

### 4. Maintenance Considerations

#### Aluminium

- No gelcoat maintenance
- No osmotic blistering
- Corrosion managed through proper alloy selection, isolation, and coatings
- Simple weld-based structural repairs

#### Fiberglass

- Gelcoat degradation and UV damage
- Osmosis risk if laminate is compromised
- Structural repairs require composite specialists and curing time

### 5. Lifecycle & Total Cost of Ownership (TCO)

- Aluminium vessels typically deliver **lower TCO** over 10–30 years due to:
  - Reduced fuel consumption
  - Lower maintenance costs
  - Faster repair turnaround
  - Longer hull lifespan
- Strong residual value, especially in commercial and government sectors

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## 6. Customization & Modularity

- Aluminium allows:
  - Structural modifications post-delivery
  - Modular outfitting and mission-specific fit-outs
  - Easier compliance with changing regulations or roles

## 7. Environmental & Sustainability Factors

- Aluminium is **100% recyclable** without loss of material properties.
- Longer service life reduces replacement frequency and material waste.
- Lower fuel consumption contributes to reduced emissions over the vessel's lifecycle.

## Summary for Decision-Makers

For applications where durability, adaptability, lifecycle cost, and operational reliability are critical, plate aluminium provides measurable advantages over fiberglass.

It is not just a hull material - it is a long-term engineering solution.

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