Marine Wet Stacking Prevention Checklist

A printable engine-room reference covering visual inspection, EGT trend review, lube oil analysis triggers, and the load bank test protocol. Based on ASO Genset marine delivery commissionings across DNV, ABS, LR, BV, and CCS classed vessels.

> **QUICK REFERENCE — Why Marine Vessels Are Vulnerable**
>
> Marine generators routinely operate below ~30% of rated load during port stays, drift fishing, anchorage, and SOLAS emergency monthly tests. Combustion temperatures below the OEM-dependent threshold leave unburned fuel and carbon to accumulate in the exhaust system, on injector tips, and on piston crowns. Prevention is structurally cheaper than recovery.

1. Daily / Weekly Engine-Room Walk-Around

- ☐ **Exhaust outlet:** dry gray-to-black soot only (oily, wet, glossy residue = wet stacking signal).
- ☐ **Exhaust manifold flanges:** no oily weeping at gasket joints.
- ☐ **Turbocharger housing:** dry, no residue accumulation.
- ☐ **Below muffler outlet:** no drip stains on deck or transom.
- ☐ **Visible smoke at load:** no black or blue smoke during normal load operation.

2. Operational Discipline (Every Watch)

- ☐ **Online generator load:** currently above the OEM-dependent threshold (commonly around 30-50% of rated load).
- ☐ **If two gensets online:** consider switching to one if loads permit (one at 60% is healthier than two at 30%).
- ☐ **Avoid extended idle:** no extended no-load running beyond 30 minutes.
- ☐ **Warm-up after cold start:** ramp to at least 50% load within 5-10 minutes; do not idle warm.
- ☐ **Cool-down before shutdown:** 3-5 minutes at reduced load before stop.

3. Monthly EGT and Performance Review

- ☐ **Per-cylinder EGT trend reviewed** against OEM-published EGT-vs-load curve.
- ☐ **Cylinder-to-cylinder EGT spread** within OEM-specified limit (typically ±15-25°C, engine-dependent).
- ☐ **No systematic drift below** the OEM-published low-load EGT band.
- ☐ **Step-load response:** engine accepts load cleanly without prolonged smoke event.

4. Quarterly Lube Oil Analysis

- ☐ **Oil sample sent to marine oil analysis lab** (every 250 operating hours or quarterly).
- ☐ **Soot loading:** within OEM trend band, no acceleration vs prior sample.
- ☐ **Fuel dilution:** below OEM threshold (typically 1-2%).
- ☐ **Wear metals (Fe, Pb, Cu):** within trend, no abnormal spike.

5. Semi-Annual / Annual Load Bank Testing

- ☐ **Main generators:** full load bank test every 6-12 months (at least 4 hours at 100% rated load, EGT logged throughout).
- ☐ **SOLAS emergency generator:** load bank cycle annually, in addition to the monthly no-load functional test.
- ☐ **EGT data logged** every 15 minutes throughout the load bank cycle.
- ☐ **Borescope inspection** scheduled if any symptom indicators above are present.
- ☐ **Class society survey:** exhaust system condition and combustion quality addressed at annual machinery survey.

RED FLAGS — Investigate Immediately

- ☐ **Visible oily residue** at exhaust outlet or weeping from manifold flanges.
- ☐ **Black or blue smoke** during step-load events that previously cleared cleanly.
- ☐ **Fuel consumption increase** of roughly 5-10% vs commissioning baseline.
- ☐ **Reduced maximum continuous power** output noticed by chief engineer.
- ☐ **Class society surveyor finding** noted in annual machinery survey.

Severity Decision Tree (Recovery Path)

Assumes normal OEM compliance and standard marine fuel quality conditions. Decision logic is cumulative — each row assumes findings above are also present.

Diagnostic Findings	Recommended Recovery Action
Visual residue only (no EGT or oil changes)	Controlled high-load burn-off via load bank
+ EGT drift or cylinder imbalance	Full load bank cycle + post-cycle borescope
+ Oil soot loading rising over multiple samples	Injector pop-test and service (clean or replace)
+ Hard carbon visible on piston crown or valves	Top overhaul (head, valves, carbon removal)

Disclaimer: *All thresholds in this checklist are OEM-dependent and represent typical field operating ranges, not absolute specifications. Specific values vary by engine configuration, fuel grade, and duty cycle. Always refer to the engine OEM service manual for definitive limits and procedures. Recommendations are derived from anonymized operational datasets from commissioned marine generator installations.*

For full methodology, see: *asogenset.com/marine-generator-wet-stacking-prevention-guide/*
Marine generator sizing guide: *asogenset.com/marine-diesel-generator-sizing-guide/*
Class society comparison: *asogenset.com/abs-vs-dnv-vs-ccs-marine-generator-classification/*