Marine Generator Noise & Vibration

SOLAS MSC.337(91) Compliance Checklist

dB Limits by Ship Space • 8 Installation Observations & Field Fixes • Vibration Mount Selection
For applicable new SOLAS ships of 1,600 GT and above | ASO Genset, 2026

1. dB Limits by Ship Space (MSC.337(91) Ch. 4)

Maximum permitted A-weighted sound pressure levels by space type. Project targets may be tightened by a class-society comfort notation (e.g., DNV COMF-V) or a charter contract.

Ship Space	1,600 ≤ GT < 10,000	GT ≥ 10,000	Notes	Chk
Machinery spaces	110 dB(A)	110 dB(A)	Hearing protection required for entry; 110 dB(A) assumes compliant protectors are worn	[ ]
Machinery control room	75 dB(A)	75 dB(A)	Speech-intelligibility priority	[ ]
Workshop	85 dB(A)	85 dB(A)	Workshops part of machinery spaces covered by that limit	[ ]
Navigation bridge / chartroom	65 dB(A)	65 dB(A)	Alarm audibility priority	[ ]
Cabins & hospitals	**60 dB(A)**	**55 dB(A)**	Rest-quality priority; ≥10,000 GT tightened by 5 dB	[ ]
Messrooms & recreation rooms	65 dB(A)	60 dB(A)	≥10,000 GT tightened by 5 dB	[ ]
Offices	65 dB(A)	60 dB(A)	≥10,000 GT tightened by 5 dB	[ ]
Galley (no food-processing equipment)	75 dB(A)	75 dB(A)	Working-space category	[ ]
Open recreation deck	75 dB(A)	75 dB(A)	External space	[ ]

Personnel Exposure — Three Distinct Concepts

- **Lex(24) = 80 dB(A)** — the Code's 24-hour equivalent exposure criterion, evaluated across work, rest, and recreation periods.
- **Hearing protection zones** — personnel entering spaces with nominal levels above 85 dB(A) should be required to wear suitable hearing protection; zones must be signposted.
- **Peak limit 135 dB(C)** — unprotected personnel exposure above this instantaneous peak level is not permitted.

2. Eight Common Installation Observations & Field Fixes

Across ASO Genset marine field-service projects, eight recurring installation observations account for many of the accommodation-noise and vibration issues encountered. Each is preventable at specification stage.

#	Observation	Symptom	Field Fix	Chk
1	Mount natural frequency too close to excitation	Accommodation vibration comparable to or worse than a rigid installation	Recalculate against actual excitation spectrum; specify softer coil-spring or composite mounts with frequency ratio ≥ 3	[ ]
2	Rigid service connection short-circuits mount	Isolation ineffective despite correctly sized mounts	Replace rigid fuel/coolant/exhaust/electrical connections with flexible equivalents (adequate bend radius, slack, strain relief)	[ ]
3	Automotive-grade or unsuitable elastomer on marine skid	Premature deterioration from fuel, oil, ozone, temperature, seawater exposure	Replace with manufacturer-approved marine-grade mounts selected for actual service-environment envelope, in corrosion-protected housings	[ ]
4	Undersized ventilation attenuator	Enclosure insertion loss falls short of required spectral performance at site	Recompute splitter geometry with insertion-loss and pressure-drop calculation for actual airflow, spectrum, receiver location	[ ]
5	Exhaust silencer not matched to actual spectrum	Deck-space or accommodation exhaust noise dominates other paths	Reselect silencer element(s) to meet spectral insertion-loss and back-pressure limits; add complementary stage(s) as required	[ ]
6	Weight distribution across mounts not verified	Some mounts fully compressed while others under-loaded; isolation degrades unevenly	Provide vendor with per-mount static-load from actual CG; re-shim after dry-fit; re-verify deflection under running load	[ ]
7	Accommodation deck plating not damped	Cabin noise above applicable limit despite compliant machinery-space reading	Bond viscoelastic damping tiles to accommodation deck plating below cabin floors; add floating floor if required reduction is large	[ ]
8	Sea trial noise survey run at low load or in port	Sea-trial report passes; owner feedback appears post-delivery at operating load	Insist on Code-specified normal-service condition (generally ≥80% MCR in normal seaway); consider owner-requested follow-up survey after representative operating experience	[ ]

Field Note — Mount Changes Post-Delivery

Changing vibration isolation mounts, their type, arrangement, or mounting configuration on a delivered vessel may require review or approval depending on the applicable class rules and the scope of change. Coordinate any post-delivery isolation change with the vessel's class surveyor early in the planning stage so paperwork does not delay the next class renewal.

3. Vibration Mount Selection — 5-Step Procedure

Correctly sized vibration isolation is the most cost-effective structureborne-noise reduction available on a marine generator installation. Use this five-step procedure at specification and installation stage.

STEP 1 Define Excitation Spectrum

[ ] Shaft rotational frequency: 25 Hz (1,500 rpm) or 30 Hz (1,800 rpm) and its orders
[ ] Engine firing orders (each cylinder fires once every two revolutions in a four-stroke engine)
[ ] Alternator electromagnetic forces (typically at line frequency and multiples)
[ ] Ancillary machinery on the skid
[ ] Structural resonances that couple back into the mounted assembly

STEP 2 Choose Mount Family

[ ] Elastomeric (8–15 Hz natural frequency) — auxiliary marine gensets, mid-power range
[ ] Coil spring (3–6 Hz) — larger sets, comfort notation, requires snubbers
[ ] Composite spring+elastomer (4–8 Hz) — common on comfort-notation newbuilds

STEP 3 Verify Frequency Ratio

[ ] Frequency ratio = excitation frequency ÷ mount natural frequency
[ ] Target ratio ≥ 3 as a design target (isolation begins above $\sqrt{2} \approx 1.4$)
[ ] Confirm supplier's tested transmissibility data across the full excitation spectrum

STEP 4 Weight Distribution & Static Load

[ ] Determine actual centre-of-gravity from the genset skid arrangement
[ ] Compute per-mount static load; supply to mount vendor
[ ] Verify all mounts operate at intended deflection under running load
[ ] Re-shim after dry-fit if needed

STEP 5 Material & Environment

[ ] Elastomer compound approved for fuel/oil/ozone/temperature/seawater exposure
[ ] Housing corrosion-protected to match location (stainless or hot-dip galvanised)
[ ] All service connections (fuel, coolant, exhaust, electrical) confirmed as flexible
[ ] Automotive-grade mounts NOT used on marine skid

> **Class Society Overlay — Comfort Notations**
> Class societies (ABS, DNV, Lloyd's Register, Bureau Veritas, CCS) enforce MSC.337(91) through their own noise-plan approval procedures when acting as recognized organizations on behalf of the flag Administration. Some societies (notably DNV through its **COMF-V** notation) offer voluntary comfort standards that may impose materially lower limits, depending on the notation, comfort rating, vessel type, and space category.

REFERENCES & FURTHER READING

1. IMO Resolution MSC.337(91) — *Code on Noise Levels on Board Ships*, adopted 30 November 2012, mandatory under SOLAS Reg II-1/3-12 from 1 July 2014
2. ISO 2923 — *Acoustics — Measurement of noise on board vessels*
3. ISO 20283-5:2016 — *Mechanical vibration — Habitability on passenger and merchant ships* (replaces ISO 6954:2000)
4. ASO Genset — *Marine Generator Noise & Vibration Guide*, asogenset.com, 2026
5. ASO Genset — *Marine Generator Commissioning & Sea Trial Checklist*
6. ASO Genset — *Custom Offshore Generator Cabin Design Guide*

7. Engine and mount OEM data sheets — always take excitation spectrum, transmissibility data, and material compound compatibility from the specific supplier documentation

Disclaimer *— This checklist is a general engineering reference derived from ASO Genset field-service projects across offshore, fishing, yacht, workboat, and inland/coastal marine installations. Applicable flag Administration and classification society requirements, project contract terms, and specific mount / silencer / enclosure manufacturer data always take precedence over the general figures shown here. For project-specific marine noise and vibration compliance advice, contact ASO Genset engineering.*