

Boero Yachtcoatings antifouling paints

Comparative LCA of MAGELLAN 630 EXTRA and GIRAGLIA 633 EXTRA against ALTURA 619 EXTRA (BAU) on a steel superyacht hull

1 INTRODUCTION

Three Boero antifouling paints for superyacht hulls, all made in Rivalta Scrivia, Italy: MAGELLAN 630 EXTRA (self-polishing copolymer, tin-free), GIRAGLIA 633 EXTRA (hydrophilic matrix, high copper content) and ALTURA 619 EXTRA (long-life, very high copper content).

The study compares the two paints declared innovative, MAGELLAN (Scenario 1) and GIRAGLIA (Scenario 3), with Boero's standard paint ALTURA (Scenario 2, BAU), on the same yacht. Goal: identify the paint with the best environmental performance.

2 METHODOLOGY

Functional unit. 1 m² of coated steel surface per yacht over the 20-year reference service life.

System boundaries. Stated as cradle to gate (§1.3), same for all three. Modelled: *upstream* raw materials; *core* manufacturing, packaging, production waste; *downstream* first application (airless spray), use (maintenance coats; copper, zinc and biocide emissions to water), end of life (hull steel recycling; for ALTURA also incineration of remaining paint).

Impact methods. CML-IA baseline v3.07 (GWP100, ODP, POCP, EP, AP, NOx, SOx, PM); AWARE v1.04 (water scarcity); ReCiPe 2016 Endpoint (H) for Ecopoint.

Data sources. Primary data from Boero where possible (bills of materials, invoices, measurements, counters). Ecoinvent v3.8; SimaPro 9.3.0.2. No allocation. Proxies for raw materials not in the database.

Maintenance. MAGELLAN, GIRAGLIA: new top coat every 2 years, old paint not removed. ALTURA: 70 µm refresh every 2 years plus full replacement (old paint removed) every 2.86 years.

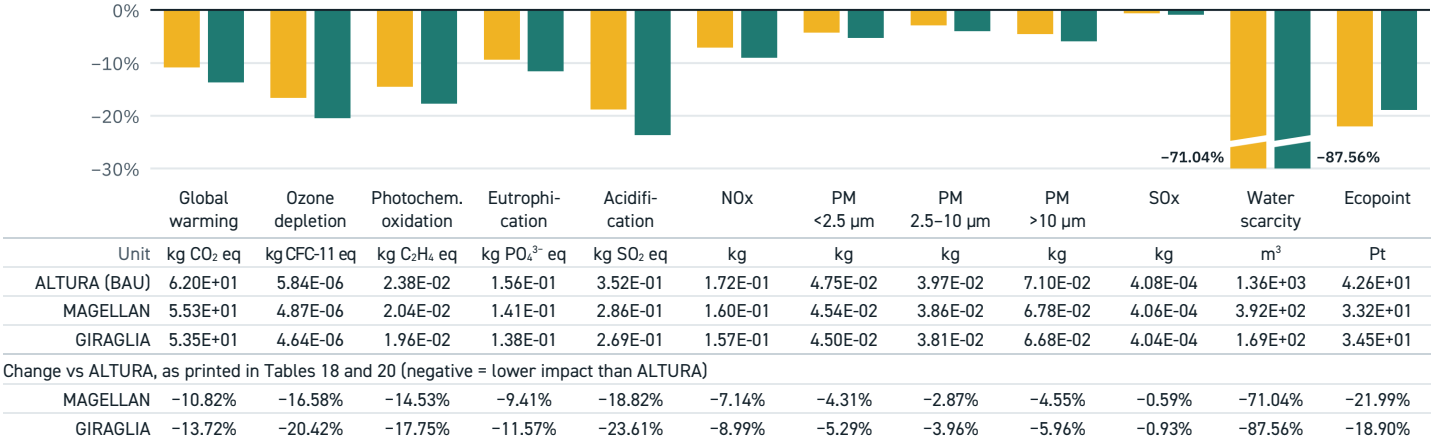
BAU reference. ALTURA 619 EXTRA, Boero's standard paint. Distribution for all: by truck, 80% to Italy and France, average 400 km.

Assumed data. Application, use and end of life (no Boero data; assumptions agreed with Boero); machinery use times; transport to other EU customers; spray application only.

Standards. ISO 14040:2006; ISO 14044:2006/Amd 2:2020.

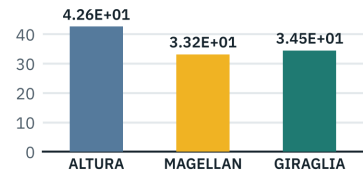
3 RESULTS per functional unit (1 m² for 20 years)

Change vs ALTURA 619 (BAU =benchmark), report Tables 18 and 20 in full report



The report's only graph is Figure 1 (stacked Ecopoint totals). Here the bars plot the printed changes; water-scarcity bars are cut at -30% and labelled. The Ecopoint chart shows the Table 20 totals side by side.

Ecopoint (Pt per m²)



Ecopoint by damage category

Pt per m²	MAGELLAN	ALTURA	GIRAGLIA
Human health	3.30E+01	4.09E+01	3.43E+01
Ecosystems	2.44E-01	1.68E+00	2.47E-01
Resources	3.36E-02	3.76E-02	3.22E-02
Total	3.32E+01	4.26E+01	3.45E+01

Values as printed in Table 20.

Ecopoint by process (Tables 23-25)

Pt	MAGELLAN	ALTURA	GIRAGLIA
Core, per kg	7.09E-01	5.87E-01	2.64E-01
1st application, m²	2.72E-01	6.68E-01	2.50E-01
Use phase, m²	6.77E-01	9.67E+00	2.01E+00

Per m², the report gives the core process as 215.32 mPt for ALTURA and 207.79 mPt for MAGELLAN.

Values from Table 20.

4 KEY FINDINGS

Both new paints are lower than ALTURA in all 11 indicators and 3 damage categories. Largest gaps: water scarcity (-71.04%, -87.56%), ecosystems (-85.45%, -85.27%); smallest: SOx (-0.59%, -0.93%).

MAGELLAN 630 has the lowest Ecopoint total: -21.99% vs ALTURA (GIRAGLIA -18.90%). The report picks MAGELLAN on this basis.

GIRAGLIA 633 is lowest on every midpoint indicator in Table 18, and on resources (Table 20).

Maintenance drives ALTURA's result. The report links it to two-step maintenance: a refresh every 2 years plus full replacement every 2.86 years. Its use phase is 9.67E+00 Pt per m², vs 6.77E-01 (MAGELLAN) and 2.01E+00 (GIRAGLIA).

Trade-off in production. Per kg, MAGELLAN's manufacturing has the highest impact (7.09E-01 Pt). The report also says GIRAGLIA's use-phase impact is of the same order of magnitude as ALTURA's.

Keep in mind: all three are Boero paints; the BAU is Boero's own standard paint. Boundaries are stated as cradle to gate, but application, use and end of life are modelled with assumptions agreed with Boero, and many raw materials use proxies. The report's summary says MAGELLAN has the least damage.