Replaces:
RN 860-3:2024-05-03

Delivery conditions for Castings

Aluminium alloys

Content

Page

Changes

2024-05-24:

The following changed in comparison to RN 860-3:2024-05-03:

a) Updated references
b) Chapter 4.2: Information on surface roughness added
c) Chapter 5 a): Correction regarding the authorisation of IACS member societies

1 Scope

This factory standard applies in addition to the standards for raw castings of aluminium alloys acc. to EN 1706, especially for components made from EN AC-AlSi7Mg0,3 [T6](EN AC-42100), quoted in chapter 2 and has priority over the standards listed below.

2 References

The following documents, cited in part or in whole, shall apply for the use of this standard. In the case of dated references, only the referenced edition applies; in the case of undated references, the latest edition of the referenced document (including all amendments) applies. The applicable version of the standards listed below shall apply to all contents not covered by this factory standard.

EN 1370	Founding – Examination of surface condition
EN 1559-1	Founding - Technical conditions of delivery - Part 1: General
EN 1559-4	Founding - Technical conditions of delivery - Part 4: Additional requirements for aluminium alloy castings
EN 1706	Aluminium and aluminium alloys - Castings - Chemical composition and mechanical properties
EN 10204	Metallic products – Types of inspection documents
EN 12258-1	Aluminium and aluminium alloys - Terms and definitions - Part 1: General terms
EN ISO 6506-1	Metallic materials - Brinell hardness test - Part 1: Test method
EN ISO 6892-1	Metallic materials - Tensile testing - Part 1: Method of test at room temperature
EN ISO 8062-3	Geometrical product specifications (GPS) – Dimensional and geometrical tolerances for moulded parts – Part 3: General dimensional and geometrical tolerances and machining allowances for castings
RN 72	Packaging and Preservation; Supply parts for production
RN 79	Colour coatings
RN 1936	Labelling; Raw material, parts and gearboxes
0-123-73126	HB measuring points
0-124-77303	Production specification radius design

3 Designations

Materials for parts of aluminium alloys are named acc. to EN 1706:

Table 1 Materials and part categories

Part category	EN 1706 designation
A) Housings	chemical: EN AC-AlSi7Mg0,3 numerical: EN AC-42100
B) Covers, bearing housing, shaft nuts and other small parts	

4 Part-specific requirements

4.1 Chemical composition

Table 2 Chemical composition in % (mass fractions) for AlSi7Mg0,3

	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Pb	Sn	Ti
min.	6.5	-	-	-	0.25	-	-	-	-	-	-
max.	7.5	0.19	0.05	0.1	0.45	-	-	0.07	-	-	0.25

4.2 Further requirements

mechanical properties:	▪ Values for **AlSi7Mg0,3** for separately cast test bars casting method: sand casting tensile strength Rm: ≥ 230 N/mm² 0.2 %-yield strength $Rp_{0.2}$: ≥ 190 N/mm² elongation at break A5: ≥ 2 % ▪ Brinell hardness: 75 to 100 HBW, but approx. **85 HBW** in the area of bearing points
heat treatment:	▪ T6 (solution annealed and fully artificially aged) ▪ casting stress-relieved on delivery
samples:	▪ separately cast test samples for the preparation of the material certificate acc. to chapter 5 d)
external and internal condition:	▪ blasted, polished, crack-free, oil-tight, homogeneous appearance, water- and oil-tight under operating conditions
Surface roughness:	▪ inspection acc. to EN 1370 using BNIF reference samples raw-cast state: 5 S1 to 6 S1 ground surfaces: 1 S2 to 2 S2
surface defects:	▪ at the manufacturer: VT for conspicuous porosities and cracks ○ production stage: after heat treatment ○ scope: each casting, entire surface ○ description: visually locate and mark conspicuous porosities and cracks
general tolerances, machining allowances:	▪ see drawing
Radius design: (only part category A)	▪ acc. to production specification 0-124-77303 (unless specified otherwise in drawing or order)

4.3 Requirements for parts in Yacht Premium version

Surface roughness:	▪ raw-cast state, outer surfaces: 2 S1 to 3 S1 raw-cast state, inner surfaces: 5 S1 to 6 S1 ▪ mechanically machined surfaces: 1 S2 to 2 S2 ▪ thermally processed surfaces: 1 S3 to 2 S3
Surface treatment:	▪ shot-blasted acc. to EN ISO 12944-4 ▪ degree of preparation inside: Sa2½ outside: Sa3
Coating:	▪ acc. to RN 79
Order designation:	▪ RN 860-3 YP

4.4 Treatment of bad spots by manufacturer

Repair:	▪ repair leaks and larger porosities with production welds by qualified welders after approval by REINTJES ▪ do not fill bad spots, but grind them properly (no visible impurities, shrink holes etc., minimized notch effect)
Documentation:	▪ measure bad spots, write dimensions clearly and legibly on the casting (indicate length, width, depth, residual wall thickness and position) ▪ photograph model number for identification (housings only) ▪ photograph casting so that bad spot(s) can be localized ▪ make close-ups so that dimensions of bad spot(s) are clearly visible
Information, Approval:	▪ Photographs of casting and/or bad spot(s) and ▪ short description of bad spot(s) (type, position, dimensions etc.) must be sent to the purchasing and quality assurance departments of REINTJES for an assessment and the decision for further action

5 Other requirements

a) Steel and forging plant
- certified acc. to: DIN EN ISO 9001 ff.
- approved by at least one member society of IACS

b) Packaging and Preservation
- RN 72

c) Labelling
- RN 1936

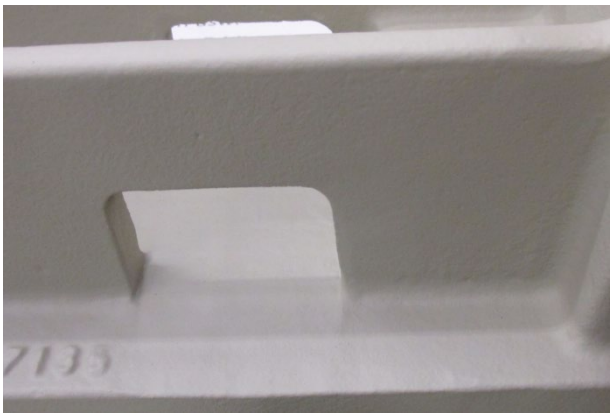
d) Documentation (must be digitally available upon delivery)
- inspection certificate 3.1 in accordance with EN 10204 indicating as-delivered condition (heat treatment), chemical composition, Brinell hardness, tensile strength, yield strength and elongation at break
- test certificate 2.2 in accordance with EN 10204 for part category B
- REINTJES quality control plan (geometric dimensions)
- Drawings (only if requested in the order):
  - initial sample acceptance drawing
  - inspection drawing 0-123-73126 for HB measuring points (only for part category A)
- evidence of radioactivity

6 Additional storage time for open components (e. g. housings)

For housings with a parting surface opening ≥750 x 750, an additional ageing period of 6 weeks must be observed. If this cannot be adhered to in individual cases, a gap dimension check must be carried out. The hubs and parting surface screw connections must be loosened for this purpose. The gap dimension in the diagonal must not exceed 0.3 mm. If the gap dimension is exceeded, the parting surfaces must be machined again.

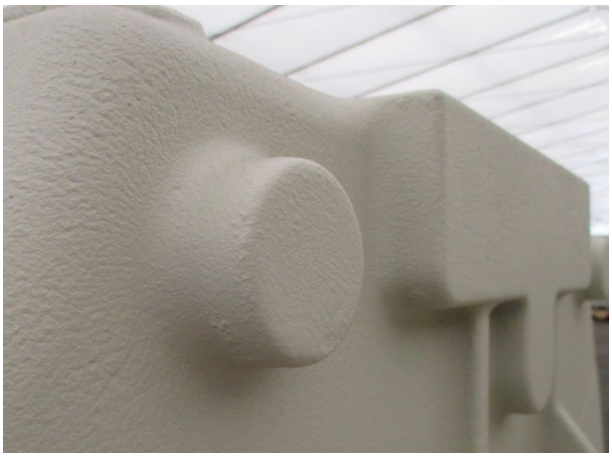
Appendix A Illustrations for Yacht Premium version

OK:



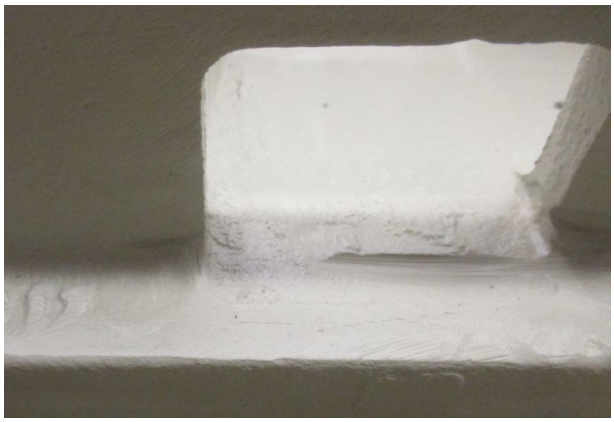
uniform surface

uniform surface



uniform surface

NOT OK:

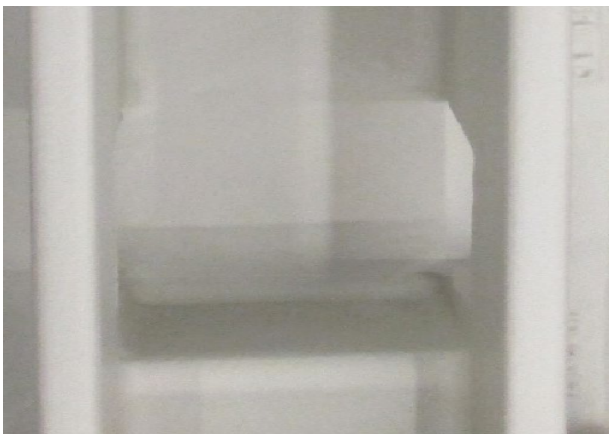


significant machining marks

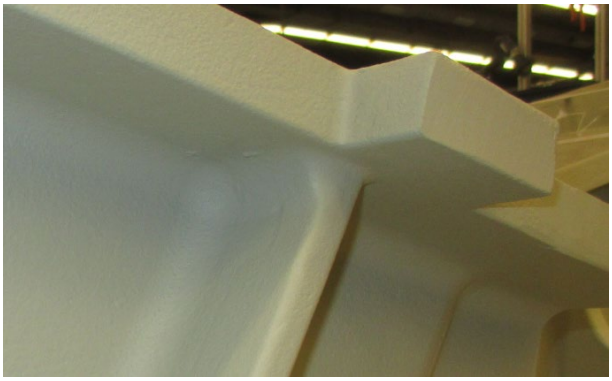
uneven suface

uneven suface

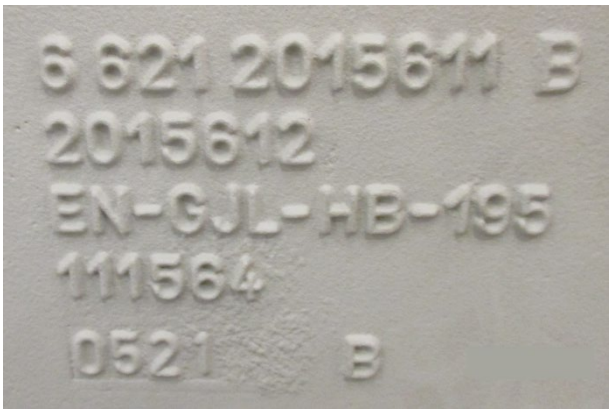
OK:



burr-free transitions



uniform radii and transitions

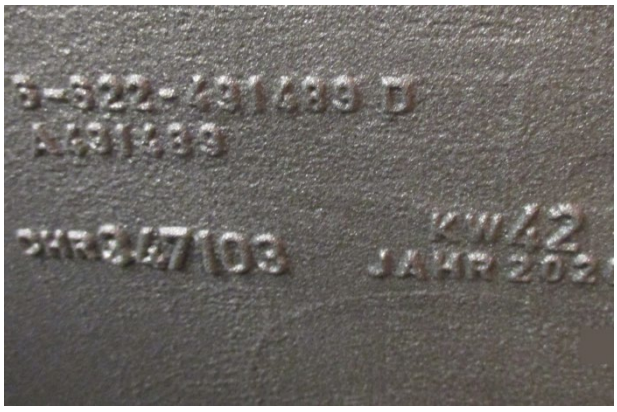


labeling easy to read, even font size

NOT OK:

burr is present

constriction present



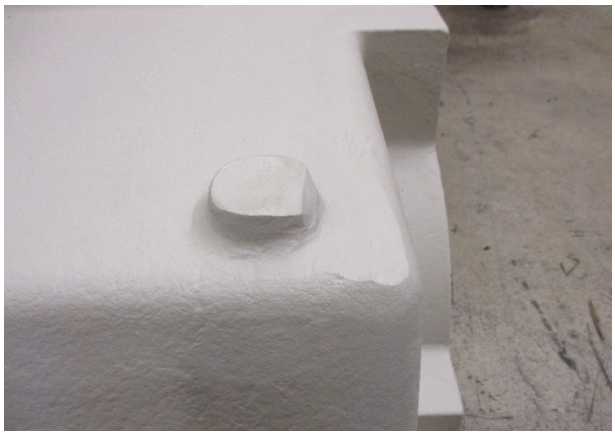
labeling difficult to read, different font sizes

Further examples of poor casting:

porosities

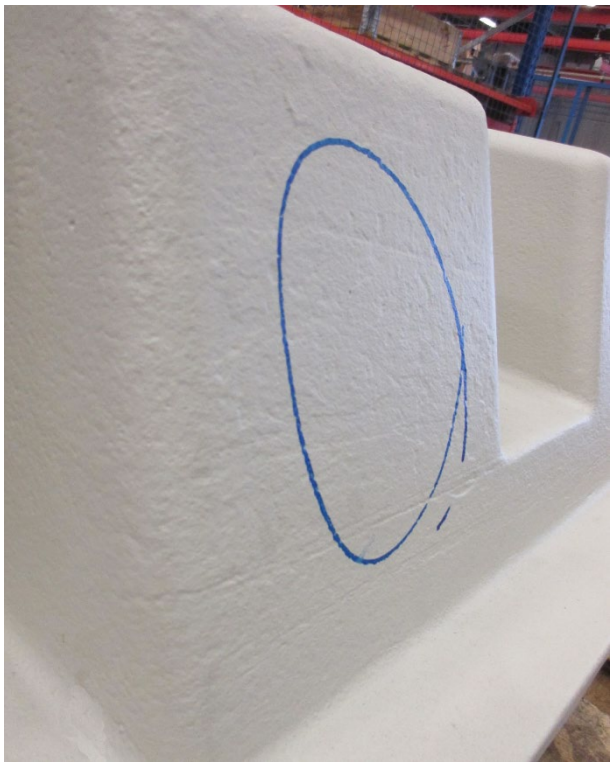
material defects

surface defects



missing material

constriction at the transition, machining marks



very rough surface