

APPROVAL OF MANUFACTURER CERTIFICATE

This is to certify:

That
LES BRONZES D'INDUSTRIE S.A.
Amneville les Thermes, Moselle, France

is an approved manufacturer of
Steel Castings

in accordance with
DNV GL rules for classification – Ships

and the following particulars:

Application area	Castings for hull structures and equipment Casting for machinery Castings for boilers, pressure vessels and piping systems Ferritic steel castings for low temperature service Stainless steel castings
Steel type(s)	Carbon, Carbon-manganese, Austenitic stainless, Austenitic-ferritic (Duplex) stainless, Martensitic stainless,
Casting method	Centrifugal casting
Max. weight	20 000 kg
Heat treatment condition	See page 2

Manufacturer(s) approved by this certificate is/are accepted to deliver according to DNV GL, DNV and GL rules. Materials to be applied to DNV GL classed object shall fulfill the material requirements in the applicable DNV GL class rules.

Issued at **Hamburg** on **2018-07-12**

This Certificate is valid until **2021-07-31**.

DNV GL local station: **Le Havre**

Approval Engineer: **Stefan Röhr**



for **DNV GL**

Digitally Signed By: Wildhagen, Christian

Location: DNV GL Hamburg, Germany

Signing Date: 22.08.2018, on behalf of

Thorsten Lohmann
Head of Section



Particulars of the approval

Castings for hull structure and equipment

Steel type	Grade ^{3) 4)}	Casting method ¹⁾	Max. weight [kg]	Delivery condition ²⁾
C and C-Mn	VL C400UW, VL C440UW, VL C480UW	CC	20 000	N, NT, QT

Castings for machinery

Steel type	Grade ^{3) 4)}	Casting method ¹⁾	Max. weight [kg]	Delivery condition ²⁾
C and C-Mn	VL C400U, VL C440U, VL C480U, VL C520U	CC	20 000	N, NT, QT

Castings for boilers, pressure vessels and piping systems

Steel type	Grade ^{3) 4)}	Casting method ¹⁾	Max. weight [kg]	Delivery condition ²⁾
C and C-Mn	VL C450H	CC	20 000	N, NT, QT
	VL C490H	CC	20 000	N, NT, QT

Ferritic steel castings for low temperature service

Steel type	Grade ^{3) 4)}	Casting method ¹⁾	Max. weight [kg]	Delivery condition ²⁾
C and C-Mn	VL C450L	CC	20 000	N, NT, QT
	VL C490L	CC	20 000	N, NT, QT

Stainless steel castings

Steel type	Grade ^{3) 4)}	Casting method ¹⁾	Max. weight [kg]	Delivery condition ²⁾
Austenitic	GX 2 CrNi 18 10 (304L) GX 5 CrNi 19 9 (304) GX 6 CrNiNb 19 10 (347) GX 2 CrNiMo 19 11 2 (316L) GX 5 CrNiMo 19 11 2 (316) GX 5 CrNiMo 19 11 3 (317)	CC	20 000	SHT
Austenitic	GX2CrNi19-1 ⁵⁾ GX2CrNiMo28-20-2 ⁵⁾ X2NiCrMoCu25-20-5 ⁵⁾	CC	20 000	SHT
22 Cr Duplex	GX 2 CrNiMoN 22 5 3	CC	20 000	SHT
25 Cr Duplex	GX 2 CrNiMoCuN 25 6 3 3	CC	20 000	SHT

Remarks:

- 1) CC: Centrifugal Casting
- 2) N: Normalized
NT: Normalized and Tempered
QT: Quenched and Tempered
SHT: Solution Heat Treated (Solution Annealing)
- 3) Certification of any material applied to classed object shall fulfill the applicable material requirements in the DNV GL class rules
- 4) Incl. equivalent grades in acc. to other standards
- 5) Possible application and certification to classed object is subject to case by case approval

Additional approval conditions:

Including austenitic stainless steel for low temperature service;
 Including martensitic stainless steel castings subject to special approval

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That
LES BRONZES D'INDUSTRIE S.A.
Amneville les Thermes, Moselle, France

is an approved manufacturer of
Copper Alloy Castings

in accordance with
DNV GL rules for classification – Ships

and the following particulars:

Application area	Castings for valves, fittings and general application
Alloy type(s)	P- bronze Al-bronze, Sn-bronze, Pb-Sn-bronze, Mn-bronze (Cu1), Ni-Al-bronze (Cu3), Centrifugal casting
Casting method	Centrifugal casting
Max. weight	20 000 kg
Heat treatment condition	See page 2

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Head of Section



Particulars of the approval

Castings for valves, fittings and general application

Alloy type / grade ³⁾	Casting method ¹⁾	Max. weight [kg]	Heat treatment condition ²⁾
P-bronze	CC	20 000	AC
Al-bronze	CC	20 000	AC, QT
Sn-bronze	CC	20 000	AC
Pb-Sn-bronze,	CC	20 000	AC
Mn-bronze (Cu1)	CC	20 000	AC
Ni-Al-bronze (Cu3)	CC	20 000	AC

Remarks:

- 1) CC: Centrifugal Casting
- 2) AC: As cast; Quenched and tempered
- 3) Certification of any material applied to classed object shall fulfill the applicable material requirements in the DNV GL class rules