

# APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:  
**AMMM00000GV**  
Revision No:  
**1**

**This is to certify:**

That  
**A.W. Schumacher GmbH**  
**Ennepetal, Germany**

is an approved manufacturer of  
**Copper Alloy Castings**

in accordance with  
**DNV GL rules for classification – Ships**

and the following particulars:

<b>Application area</b>	<b>Castings for valves, fittings and general application</b>
<b>Alloy type</b>	<b>Phosphor bronze, Gunmetal, Leaded gunmetal, Leaded bronze, Al-bronze, Sn-bronze, Pb-Sn Bronze</b>
<b>Manufacturing method</b>	<b>Sand casting</b>
<b>Max. weight</b>	<b>See page 2</b>
<b>Max. wall thickness</b>	<b>See page 2</b>
<b>Heat treatment condition</b>	<b>See page 2</b>
<b>Additional approval conditions</b>	<b>See page 2</b>

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 **2019-07-08**

for **DNV GL**

This Certificate is valid until **2022-04-30**.

DNV GL local station: **Essen**

Approval Engineer: **Stefan Röhr**

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**Thorsten Lohmann**  
**Head of Section**



Job Id: **263.11-005933-2**  
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## Particulars of the approval

### Castings for valves, fittings and general application

Alloy type / grade	Casting method <sup>1)</sup>	Max. weight [kg]	Max. wall thickness [mm]	Heat treatment condition <sup>2)</sup>
Phosphor bronze	SC, IC	1 000	40	AC
Gunmetal	SC, IC	1 000	40	AC
Leaded gunmetal	SC, IC	1 000	40	AC
Leaded bronze	SC, IC	1 000	40	AC
Al-bronze	SC, IC	1 000	40	AC
Sn-bronze	SC, IC	1 000	40	AC
Pb-Sn Bronze	SC, IC	1 000	40	AC

Remarks:

- 1) SC: Sand Casting; IC: Investment casting
- 2) AC: As cast

### Additional approval conditions

Including the cast copper alloy grades:

- CuSn5Zn5Pb2 acc. to DIN 1982
- CuAl10Fe5Ni5 acc. to DIN 1982
- CuSn10 acc. to DIN 1982