



Weber Automotive

## Surface finish and porosity specification of cast parts

## WAN ZG - 0002

*English Version*

### 1. SCOPE OF APPLICATION

The standard WAN ZG-0002 – Surface finish and porosity specification of cast parts – is applicable to all components made for Weber Automotive if:

- There is no other specific standard specified on the Weber Automotive generated drawing.
- or
- The parts are made to drawings generated by third parties.

Differing specifications for surface finish and porosity on drawings precede the definitions contained in this standard.

### 2. AUTHORIZATION

The standard WAN ZG-0002 Index A is valid from: June 19, 2006  
WAN ZG-0002 exists in both German and English. In case of differing interpretations the German version is legally binding.

Release authorized by:

Markdorf, June 14, 2006

signed: Eberhard Wizgall  
Vice President & CTO

### 3. CHANGES:

Source document was created at May 19, 2006

Stage of revision: A

Responsible for changes: First originator

Document management: DEP Quality Management/ Environmental Protection  
DEP Standards and Patent

Summary of changes:

First Edition

This standard supersedes documents WM-QF-064 and WM-QF-058.

Author: FE-PT/ R. Schürer	Pages:: 5	Replaces issue from::
Checked: FE-P/ A. Niedermeier	Stage of revision: A	
Release: GF/ E. Wizgall	Distributed: P-QM/UM / M. Pleikies	Date of Issue: June 19,2006

## WAN ZG-0002

## 4. CONTENTS

## 4.1. General specification of surface finish

## 4.1.1 If not specified differently on the drawing, the following are to be used:

• Machined surfaces (tolerance grade IT 11): (excluding drilled mounting holes)	25	Rz
• Drilled mounting holes:	40	Rz
• Cast alloy – pressure die casting surfaces:	25	Rz
• Cast alloy – gravity die cast surfaces: (Excluding combustion chamber surfaces)	100	Rz
• Combustion chamber surfaces		
○ Pressure die cast:	16	Rz
○ Gravity die cast:	25	Rz
• Sand cast surfaces:	63-250	Rz
	rough 625	Rz
• Investment cast surfaces:	16	Rz
• Forged surfaces:	100	Rz
• Rolled surfaces (Drawing callout „rolled“)	3,25	Rz
• Flow surface	<100	Rz

## 4.1.2. General specifications for raw surfaces

- Surface conditions, as released, require sample re-approval if process changes (e.g. changes of release compound, die coating or surface treatment) are implemented.
- Visible surfaces, defined as such on the drawing, must be free of visible defects. (Definition of visible defect: Visible with normal vision from a distance of 60cm)
- No release compounds containing silicone may be used for Aluminium castings.

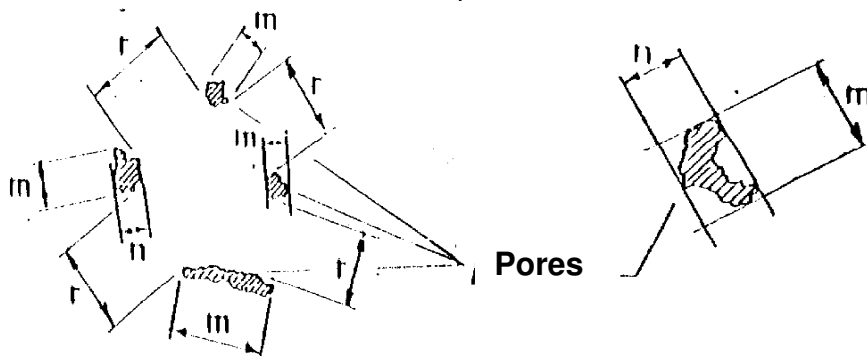
## 4.2. Assessment of porosity for cast parts – porosity classes

## 4.2.1. General specifications

- The defined porosity class (4.4 – row 1) applies to the entire part and is the minimum quality requirement for all machined surfaces. Areas where higher specifications are necessary due to function, geometry (e.g. wall thickness), strength, pressure integrity etc. are to be specified. (4.4 – row 2)
- Porosity classification is to be indicated on a machined surface or suitable section on the drawing.
- Limit samples may be defined. The limit sample catalogue requires written authorisation by the responsible engineer and is to be retained by supplier and QS/Goods inwards as well as together with the component documentation. Parts within limit samples do not require a deviation request or special release.
- Documentation about supplier testing processes for quality assurance (X-Ray-, Ultrasonic-, crack- and leakage testing etc.) is to be part of the initial sample approval.
- Testing results of the different batches are to be documented and communicated to Weber Automotive on request.
- Additional testing (e.g. 100% crack testing, Leakage testing) is to be explicitly specified on the drawing.

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## 4.2.2. Definition, size of pores and spacing



size = m

spacing = r

Maximum depth =  $m_{\max}$  of PK is also applicable to exceptions

Name		max m	min r / area	depth	X	Exceptions
Pore Class 0	PK 0	0.1 mm	1 P. per 50x50 mm	0,02 mm	n/a	n/a
Pore Class 1	PK 1	0.4 mm	r = 8 mm		$\leq 0.2$ mm	n/a
Pore Class 2	PK 2	0.4 mm	r = 8 mm		$\leq 0.2$ mm	PK 2 A1
Pore Class 3	PK 3	0.7 mm	r = 15 mm		$\leq 0.4$ mm	PK 3 A1
Pore Class 4	PK 4	1.0 mm	r = 30 mm		$\leq 0.6$ mm	PK 4 A1
Pore Class 5	PK 5	2.0 mm	r = 30 mm		$\leq 1.0$ mm	PK 5 A1

**Notes:**

Pores with a maximum size of |X| are not counted, if the function of the part in terms of strength and leakage is not affected.

**PK 2 A1:**

For each 25cm<sup>2</sup> continuous machined surface, the following is permissible:

- One concentration of three pores with a minimum spacing of 1 mm.
- A single pore with a maximum size of 0.6 mm.

**PK 3 A1**

For each 25cm<sup>2</sup> continuous machined surface, the following is permissible:

- One concentration of three pores with a minimum spacing of 1.5 mm.
- A single pore with a maximum size of 1.0 mm.

**PK 4 A1:**

For each 25cm<sup>2</sup> continuous machined surface, the following is permissible:

- One concentration of three pores with a minimum spacing of 2 mm.
- A single pore with a maximum size of 1.5 mm.

**PK 5 A1:**

For each 25cm<sup>2</sup> continuous machined surface, the following is permissible:

- One concentration of three pores with a minimum spacing of 5 mm.
- A single pore with a maximum size of 5.0 mm with a minimum spacing of 5 mm.

**WAN ZG-0002****4.2.3. Suggested use / Surface definitions:****4.2.3.1. Porosity class 0 is used for:**

- Sealing surfaces with coated metal seals

**4.2.3.2. Porosity class 1 is used for:**

- O-Ring sealing surfaces
- Head gasket functional surfaces for gaskets with  $\leq 3$  layers
- Finished cylinder and cylinder bore surfaces

**4.2.3.3. Porosity class 2 is used for:**

- Sealing surfaces for paper seals
- Sealing rings for Flange nuts (Oil Drain Plug)
- Head gasket functional surfaces for gaskets with  $\geq 3$  layers
- Pre-machined Cylinder bore surfaces for Nicasil coating.
- Sealing flanges less than 2 mm width

**4.2.3.4 Porosity class 3 is used for:**

- Shaft seal seats
- Cylinder and cylinder bore Surfaces for accepting cast iron liners
- Coolant areas

**4.2.3.5. Porosity class 4 is used for:**

- Roller bearing seats
- Sealing flanges wider than 3 mm.

**4.2.3.5 Porosity class 5 is used for:**

- Clearance surfaces
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**4.3. General specification for permitted rework processes for cast raw parts****4.3.1. No restrictions****4.3.2. No welding or filling is permitted.****4.3.3 Welding and filling is permitted only as defined in Weber Automotive authorised rework instructions.****4.3.4. Compressive treatment using high-isostatic pressing**

**Rework by welding or high-isostatic pressing necessitates the repeated heat treatment of parts as specified.**

**WAN ZG-0002****4.4. Definition of WAN ZG-0002 on Drawing**

Left of the drawing title block a reference to WAN ZG-0002 and the marking size is to be included as shown below:

**4.4.1 General specifications**

<b>Oberflaechenbeschaffenheit und Porenklassen für Gussteile nach</b> <b>Surface finish and porosity specification of cast parts according to</b> <b>WAN ZG-0002</b>	
<b>Allgemeine Porenklasse nach 4.2.2.:</b> <b>General porosity specification</b>	<b>PK ?</b>
<b>Bereiche abweichender Porenklassen:</b> <b>Areas of differing porosity specification</b>	<b>Ja/nein</b>
<b>Zulässige Reparaturverfahren nach Punkt:</b> <b>repair allowed as per chapter:</b>	<b>4.3.?.</b>

**4.4.2 Definition of specific surfaces**

<b>Flächendefinition nach Anwendungsrichtlinie/ Face specification according to chapter 4.2.3</b> <b>WAN ZG-0002</b>			
<b>Fläche</b> <b>face</b>	<b>Zeichnungskordinaten</b> <b>Drawing section</b>	<b>nach Punkt</b> <b>per chapter</b>	<b>Porenklasse</b> <b>Porosity specification</b>