POROSITY STANDARD

ALUMINIUM SAND CASTINGS

DSF 3.2.14

Definition:

The term Porosity is used by both the casting manufacturer and customer when describing casting defects, this single term describes a broad range of holes or voids that are a result of product/ tool design or manufacturing process or a combination of each.
Understanding the various porosity type defects and their causes will help to capture many of these issues with constructive dialogue between product designer, tool designer & casting manufacturer (including material selection) being an essential prerequisite. Porosity in a casting does not automatically mean the casting is defective.

Properties:

ASM (DEK) has adopted the following self- imposed acceptable Porosity Level standards. This is an unaided visual judgement (no magnification) based on the following three types, when required these zones will be clearly identified on the component drawing:-

- **Porosity Level 1.**

Pin point porosity, not larger than 0.25mm in any direction is acceptable, providing it is widely distributed, not grouped or connected. Random pits, not larger than 0.4mm in any direction is acceptable, provided they are surrounded by dense parent material being a minimum of 6mm apart, frequency of pits must be minimal.

- **Porosity Level 2.**

Pin point porosity, not larger than 0.4mm in any direction is acceptable, providing it is widely distributed, not grouped or connected. Random pits, not larger than 0.8mm in any direction is acceptable, provided they are surrounded by dense parent material being a minimum of 6mm apart, frequency of pits must be not be excessive.

- **Porosity Level 3.**

Random pits, not larger than 1.25mm in any direction are acceptable. Exposed chain porosity must not exceed 3mm in length. Unless otherwise specified, exposed porosity on machined parts will conform to this level.

For more demanding applications the component drawing will identify the following non-destructive testing:-

- **Radiographic Inspection**. These images will reveal internal defects eg: voids.
- **Dye Penetration**. Cost effective alternative to Radiographic inspection, identifies surface flaws only; penetrating liquid contains materials that fluoresce in ultra violet light.

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ASM (DEK) Application:

This standard applies to any ASM (DEK) designed component used on a machine, or suppllied as a spare by the vendor.
All components must meet the criteria set out in this standard, unless a concession has been granted by ASM (DEK).
Where conflict is found between this standard and any other specification, the priority should be as follows:-

1st Customer Specified Requirement.
2nd ASM (DEK) Engineering specification.
3rd Purchasing contract
4th This standard

This standard is not an exhaustive list, any component displaying a non-specified sympton which may cause a customer issue should be reviewed only by authorised ASM(DEK) personnel.

Only upon this approval can the component be released from ASM (DEK) or its vendor.

Acknowledgement:

This ASM (DEK) standard is based on advise given in the following (withdrawn) documents:-

ISO 10049: 1992: Aluminium alloy castings - Visual method for assessing porosity
ISO 9915: 1992: Aluminium alloy castings – Radiograghy testing