

MCS N 51 / AN 51**Technical drawings - Special features**

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Replace : 03-2017

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Technical drawings - Special features

1 Purpose

This company standard describes the meaning of "special features" and their execution on technical drawings. In addition, it explains how internal and external suppliers are generally to proceed with special features.

If special features are listed on technical drawings in accordance with this specification, this company standard and related specifications must always be complied with by all suppliers.

2 Scope of application

This company standard applies at MAN ES to engines and components for which the Augsburg plant is responsible for development, as well as turbochargers. As of the date of publication, it must be implemented in all newly created drawings.

3 Terms and definitions

Special features of parts, assemblies or components are characterised by the fact that non-fulfilment may endanger persons, cause an engine or turbocharger standstill or not comply with legal requirements. These can be, for example, dimensional tolerances, shape and position tolerances, surface specifications, hardness specifications or manufacturing processes.

It is particularly important to execute these features according to specification. Therefore, if necessary, an increased production and testing effort is accepted.

4 Marking on technical drawings and documents

4.1 Basic Information

Special features are marked on technical drawings and other technical documents with numbers preceded by a double cross. The double cross and number are enclosed in round brackets. Example: (#1)

Marking conforms to DIN EN ISO 129-1

Each special feature is assigned a unique number within a drawing, no number is used twice. The numbers do not necessarily have to form a continuous series, "gaps" are possible.

The number is always inserted to the right of the special feature; in the case of shape and position tolerances, the number can alternatively be positioned right-justified above the frame.

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4.2 Drawing header


Drawings with special features shall be marked near the drawing head with the following note:


XXX (#1) (#2) Besondere Merkmale nach MCS N51
Special features acc. to MCS N51


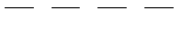
4.3 Examples of marking on the drawing

61 ± 0.1 (#1)

Rz 10 (#2)
Rz 2.5

 0.02 (#5)

(#4)
 $\phi 0.05$ A B

	Induktiv gehärtet / inductive hardened (48+5) HRC (#7) SHD 400 = 1,5 + 3,5
	Bereiche dürfen gehärtet sein Hardening permitted in these areas
	Nicht gekennzeichnete Bereiche dürfen nicht gehärtet werden. It is not permitted to harden unmarked areas.

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5 Implementation in production and quality assurance

5.1 Production

For areas preparing production (also includes the extended workbench as well as external suppliers), the marking is a clear indication that special attention is paid to the execution of the special features in accordance with the drawing when drawing up the work plan and selecting suitable production processes.

Irrespective of the marking of special features on the drawing of a component, the production is not released from the binding nature of the other drawing requirements (e.g. dimensional specifications, tolerance specifications, manufacturing and testing specifications).

5.2 Production monitoring

The marking of special features enables a targeted inspection according to the prescribed drawing specifications.

Special features are to be inspected on a random basis (directly or indirectly) depending on the batch size.

The scope and location of the inspection are determined internally at MAN ES by the quality department (inspection planning) in consultation with process planning and design. The basis for this is a documented internal instruction on inspection frequencies (FK0735).

Specifications for external suppliers on inspection frequencies can be found in Q Guideline 10.09012-4504.

5.3 Documentation

MAN-ES uses the Q-DAS CAQ system internally as the basis for standardised recording. This is done via Procella input masks or direct connection of measuring machines. Alternatively, the production control sheet (FK sheet) 0051 can be filled in.

The scope of the documentation is determined by the quality department in coordination with production and design.

Specifications for external suppliers regarding the required documentation can be found in Q Guideline 10.09012-4504.

6 Applicable documents

DIN EN ISO 129-1

Q10.09012-4504 Process capability requirement for suppliers

FK 0051 Test report for special characteristics

FK 0735 Test frequencies (MAN-ES internal)

Work instructions (only MAN-ES internal, construction)