

### 1 Area of application

This group standard specifies the handling of the process 'classification of characteristics of the company Thomas GmbH, hereinafter referred to as Thomas.

This includes all german locations.

The Group Standard and the resulting requirements apply to all internal and external persons involved in this process.

### 2 Description

This group standard describes the classification of product and process characteristics of products made by Thomas GmbH and specifies the identification of these characteristics in technical documents.

#### 2.1 Scope of application

This standard is applicable to all marketable products of Thomas GmbH (*referred to below as Thomas*) as well as to all individual parts which are used to manufacture these products and which are manufactured to Thomas's specifications.

Special characteristics call for greater attention as Thomas products are used in components associated with the roadworthiness of vehicles. These are generally understood to include parts and components belonging to

- brake systems
- steering and wheel suspension
- fuel supply and carburetion
- exhaust control and after treatment
- lighting
- passenger and pedestrian protection equipment
- locking and anti-theft devices

as any malfunction of these systems entails a major potential risk to man or environmental emissions.

#### 2.2 Documentation

This organizational instruction applies to all specifications governing the attributes of product and process characteristics.

Special characteristics must be identified in these documents according to this organizational instruction. This in particular includes

- Q characteristic list in PEM
- production control plan (PLP)
- design FMEA
- process FMEA
- product or assembly drawing
- system specifications for purchased parts and drawings of sub-units and individual parts, used to indicate special characteristics to suppliers
- work plans, work and test instructions for series production showing product or process characteristics.

**Note:** Program documentation and limit for automated testing must also be handled as test instructions.

- test plans for incoming goods and requalification
- operating instructions for products where appropriate

### 2.2.1 Identification of parts in safety devices and equipment

Parts used in safety devices and equipment are identified by Thomas in system specifications for purchased parts, in drawings of individual parts/assembly drawings and in FMEAs as follows:

***Part is used in safety devices and equipment (of vehicles). This requires special quality assurance measures with regard for the provision of evidence of conformity.***

## 2.3 Terms

### 2.3.1 Special characteristics

Special characteristics are product characteristics (*e.g. dimensions, materials*) or characteristics of production processes (*e.g. process parameters such as pressure, temperature, time*) which, with any non-conformance, may present a risk in relation to

- compliance with statutory provisions
- product safety
- function
- capability for assembly/dismantling
- subsequent manufacturing operations

Special characteristics thus call for particular attention when planning processes and carrying out measurement and testing.

Systems, components, parts or processes which directly affect safety, licensing or function can be safeguarded with special characteristics. The causality associated with risks must be foreseeable and should not exceed all probability.

Where no special characteristics are assigned for good reason despite there being a major impact on safety, licensing or function, this should be justified and documented in the FMEA.

### 2.3.2 (S) = Safety characteristics

are **special** product or process characteristics affecting safety.

### 2.3.3 (Z) = Characteristics relating to statutory provisions and official stipulations relevant to licensing

are **special** characteristics where failure to comply will invalidate vehicle licensing.

### 2.3.4 (F<sub>C</sub>, F<sub>T</sub>) = Function-critical characteristics

are **special** product or process characteristics with a major influence on the function of vehicles, proper fit or the appearance of components (e.g. through rust). These indicators of origin in subscript should be used from project number **118501**.

### 2.3.4.1 F<sub>c</sub> (F Customer)

are **function-critical** characteristics of **customer specifications**

### 2.3.4.2 FT (F Thomas)

are **function-critical** characteristics of **Thomas specifications**

### 2.3.5 Test characteristics

Symbol :

Example:

Test characteristics describe component properties that are relevant to the function and/or assembly. Test characteristics are characteristics that require safeguarding by inclusion in the production control plan and are to be monitored with an inspection severity agreed between Thomas and the supplier. Statistical monitoring is not mandatory.

### 2.3.6 Standard characteristics

All other characteristics

## 2.4 Derivation

Special characteristics are identified by the development team during the development process. This involves specifications made by the customer, a knowledge of statutory provisions and regulations, as well as an understanding of the function in the customer's system and the production processes in which our product will be incorporated.

### 2.4.1 (S) = Safety characteristics

The derivation and documentation of safety characteristics must be carried out with the level of care required by the German Product Liability Act while taking into account state-of-the-art technology. In the FMEA safety risks result in the severity score according [GS QM 027 - FMEA](#) and the assignment of safety characteristics according to section **"2.3.1 Special characteristics"**

### 2.4.2 (Z) = Licensing-relevant characteristics

They are derived from

- German road traffic regulations (StVZO)
- EU directives, BImSchG (German emissions pollution protection act)
- FMVSS (Federal Motor Vehicle Safety Standards)
- SULEV (US emissions standards)

- Legal requirements that customers have included in their specification

Statutory requirements adopted by customers in their specifications.

In the FMEA licensing-relevant risks result in the severity score according [GS QM 027 - FMEA](#) and the assignment of licensing-relevant characteristics according to section “**2.3.1 Special characteristics**”

### 2.4.3 (F) = Function-critical characteristics

Function-critical characteristics are derived from knowledge of the critical steps in the overall production process in relation to the characteristics specified by the customer and from the potential effects of failure with a severity score according [GS QM 027 - FMEA](#).

**F<sub>C</sub>(F Customer)** = Function-critical characteristics from customer specifications are special characteristics of individual parts or product / process characteristics, determined on the basis of F-characteristic requirements of the customer, indicated in the customer's drawing or specifications and may also be broken down into individual parts.

**F<sub>T</sub>(F Thomas)** = Function-critical characteristics from Thomas specifications are special characteristics of individual parts or of a product which are important for the function of the product.

#### 2.4.3.1 Knowledge of critical process steps at the supplier's plant

The obligation regarding the analysis of customer requirements also applies to Thomas's suppliers. Suppliers must analyse their production processes and identify special characteristics in their manufacturing documents according to knowledge of their processes and Thomas's requirements. Where these characteristics are not identified as S-, Z- or F-characteristics, they may be identified as test characteristics according to section “**2.4.5 Inheritance**” under consideration of section “**2.3.5 Test characteristics**”.

#### 2.4.3.2 Risk assessment in the product FMEA and process FMEA

In the FMEA identification is carried out in the classification column of the relevant form. This can be entered under the causes or consequences of failure, severity, etc.

### 2.4.4 Information about (S)-, (Z)- and (F)- characteristics provided by the customer or their own customers

These features are in the customer documentation with the symbols / license plate of the customer chapters (e.g. as graphic signs in the assembly drawing of the customer) see “**4.1 Conversion table of special characteristic**”.

If a project with a new client is started, so DAM shall be informed specifically negotiated for the identification of features, so that the list can be supplemented by “**4.1 Conversion table of special characteristic**” by DAM.

Should it be noticed in the course of a project that a feature marking is used on a client document, which is not listed in the Annex to this GS, DAM has to be informed so that the collection can be supplemented.

### 2.4.5 Inheritance

(S)- (Z)- and (F)- characteristics can be passed on within the process chain to upstream processes or assigned to product characteristics of individual parts. Here (S)- or (Z)- characteristics can be merged into one or more (F)-characteristics after consultation of the engineering director.

If higher-level regulations are applicable or where the process is especially stable (*score for probability of occurrence  $P=1$* ), inheritance need not be carried out, although this must be justified and documented in the FMEA.

For example, the strength of a radially symmetrical interference fit assembly is monitored with 100% control of the press forces as the strength of the assembly has been identified as a safety characteristics. The diameters of the individual part are identified as (F)- characteristics to minimise risk and possible rejects due to excessive tolerances with statistical process control.

### 2.5 Identification

Identification of the characteristics in the documents is carried out according to the specifications applicable to the documents.

### 2.6 Handling of special characteristics

The measures to be agreed with the suppliers in the APQP process for handling (S)- (Z) and (F)- characteristics are documented in Item Development Management (*AEM –list of special characteristics*) and are incorporated in the FMEA. It should be borne in mind here that in the case of special characteristics, particular care must be taken when planning test procedures.

Identification and further handling of special characteristics by suppliers is laid down in the Quality Assurance Agreement.

#### 2.6.1 Measurement system analysis

Measurement System Capability certificates must be available for measuring and test systems used to check special characteristics.

#### 2.6.2 Validation and requalification:

The validation and requalification of products and processes generates information about the attributes of characteristics. Where suitable statistical methods prove that characteristics are not subject to the expected variation (*greater or smaller*), the FMEA and test planning should be adapted (*tap into potential for increased efficiency and improvement*).

#### 2.6.3 Non-conformance

##### 2.6.3.1 (S)- and (Z)- characteristics:

Non-conformance is not permitted as minimum requirements are at issue here.

**No authorisation of non-conformance is possible.**

### 2.6.3.2 (F)- characteristics:

Non-conformance is possible provided that compliance with customer requirements is ensured.

**Authorisation of non-conformance is possible under consideration of the economic risks where higher-level regulations are applicable or the process is especially stable (score for probability of occurrence  $P=1$ ). This can be brought about by Quality Assurance in agreement with the design engineer of the product and is justified and documented in the FMEA.**

## 3 Associated Documents

- DIN EN ISO 129-1:2022-02: Technical product documentation (TPD) – Presentation of dimensions and tolerances - Part 1: General principles
- [GS QM 027 - FMEA](#)
- This company directive is to be treated as an applicable document for all documents in accordance with Section “2.2 Documentation”. A special note for the labeling of characteristics in tables and figures on the company directive is therefore dispensable.
- VDA Volume “Product Development – Process Description special features (BM)”, 1. Edition 2011
- Qualitätssicherungsvereinbarung (QSV) / Quality Assurance Agreement (QAA) of Thomas GmbH in its current version.

**4 Advice**

The German version is binding!

Please notice German version when making amendments!

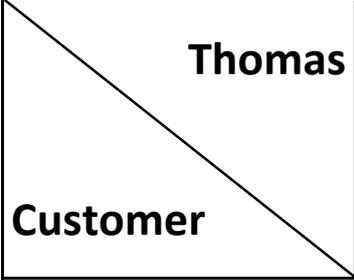
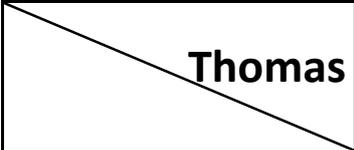
Please notice GS QM 027 when making changes with regard to special characteristics!

**4.1 Conversion table of special characteristic**

This table translates the characteristic hallmark of Thomas customers in Thomas internal feature identifier, serving Thomas internally to register the characteristic mark in the relevant documents (*FMEA, drawing, control plan, work / study plans, work / inspection instructions*).

<div style="text-align: center;"><b>Thomas</b></div> <div style="text-align: center;"><b>Customer</b></div>	<div style="text-align: center;"><b>S and/or Z</b></div>	<div style="text-align: center;"><b>F</b></div>
	<div style="text-align: center;">Special characteristic (relevant to licensing and/or safety)</div>	<div style="text-align: center;">Special characteristic (relevant to "fit and function")</div>
<div style="text-align: center;"><b>Thomas Magnete</b> up to 2002-04-09</div>	<div style="text-align: center;"><b>D</b></div>	
<div style="text-align: center;"><b>Thomas Magnete</b> from 2002-04-10 up to 2004-07-31</div>	<div style="text-align: center;"><b>S</b></div>	<div style="text-align: center;"><b>B</b></div>

<div style="text-align: right;"><b>Thomas</b></div> <div style="text-align: left;"><b>Customer</b></div>	<b>S and/or Z</b>	<b>F</b>
	Special characteristic (relevant to licensing and/or safety)	Special characteristic (relevant to "fit and function")
<b>Albonair</b>	<b>S</b>	<b>F</b>
<b>BMW</b>		
	old: <b>D</b> new: <b>S and L / CoP</b>	old: <b>S</b> Prohibition on modification new: <b>F</b>
<b>Caterpillar</b>		desing: process:
<b>Chrysler</b>		
<b>Conti Teves</b>	„D“	„W“
<b>Daimler</b>	<b>S / Z</b>	<b>F</b>
<b>Emitec</b>	<b>S</b>	<b>F</b>
<b>Ford Motor Co.</b>		
	<b>CC / YC</b>	<b>SC/YM</b>

	<b>Thomas</b>	<b>S and/or Z</b>	<b>F</b>
	<b>Customer</b>	Special characteristic (relevant to licensing and/or safety)	Special characteristic (relevant to "fit and function")
<b>General Motors</b>			
<b>GETRAG</b>	<b>A</b> (danger to persons) <b>C</b> (safety and statutory provisions)	<b>M</b>	
<b>GFT</b>	new: 		
	old: <b>CC</b> new: Product FMEA: <Y <b>C</b> > Process FMEA: < <b>C</b> >	old: <b>SC</b> new: Product FMEA: <Y <b>M</b> > Process FMEA: < <b>M</b> >	
<b>GKN Driveline</b>			
<b>INA/Schaeffler</b>	<b>CC</b>	<b>SC</b>	
<b>Inergy</b>	<b>S / R</b> Safety / Regulation Key Characteristics	<b>SC</b> Significant Characteristics	
<b>ISE Automotiv now (Metalsa)</b>	<b>C</b>	<b>L / F</b> legal / relevant to function	
<b>Kautex</b>		<b>K<sub>x</sub></b>	
	<b>Thomas</b>	<b>S and/or Z</b>	<b>F</b>

Customer	Special characteristic (relevant to licensing and/or safety)	Special characteristic (relevant to "fit and function")
Mercedes	S / Z	F
Navistar		
PSA		
Renault		
Siemens		
VOLVO		
VW / Audi		
VW / Porsche	up to 2009: D / L new: A	new: S
Webasto	new: CC	old: WSC new: YS
ZFLS	*A*	FK / PK relevant to function / critical to production