

Konstruktionsrichtlinie

Design Guideline

Mechanical Design

Procedures for machine construction internal / external

KRL

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Responsibility

GSI
Helmholtzzentrum für Schwerionenforschung GmbH
Planckstraße 1
64291 Darmstadt

www.gsi.de

Mechanical Design (MDS)

Reinhard Lotz

e-mail: r.lotz@gsi.de

Telephone: +49 (0) 6159 / 71 - 2004

Further Applicable Documents

- Technical Guidelines
- Data Exchange Guideline (DARL of Mechanical Design)

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1 General

1.1 Preamble

The design guideline (**KonstruktionsRichtLinie**), referred to as **KRL**, describes the procedures, that need to be adhered to, during the internal design process regarding machine construction. It is intended to harmonize or standardize and restructure the tools and work procedures.

This document does not replace training and professional consulting.

1.2 Note for Partners and Design Service Providers

This document provides external partners with insight into our methods and allows them to apply the same processes or corresponding processes to other types of systems.

The procedures to be adhered to and additional information are provided in Chapter 10.

1.3 Design Principles

All designs must be compiled according to the state of the art, according to the safety engineering standards required and with the appropriate documentation.

Designs must be safe !

Tolerance ranges, surface specifications, etc., must be chosen as large as possible and only as accurately as necessary. Unnecessary precision wastes time and money !
Appropriate selection of material and semi-finished goods (preferred GSI stock material), as well as design appropriate for the number of items required, are additional characteristics of efficient design.

Design efficiently and be cost-aware !

3D data are the basis for all subsequent processes in design. The availability of the respective, current data is very important.

Design is always based on 3D models !

2 Tools and Systems

This chapter describes the software used for design in the machine construction field. The tools and processes described below form an integrated work environment.

The use of the tools listed below is mandatory !

2.1 CAD-Programm (CATIA-V5)

CATIA-V5 made by *Dassault Systems* is the CAD tool for development in the machine/systems construction environment at GSI/FAIR.

User benefits

- Optimal cooperation due to identical data structures
- Powerful CAD tool with extensive functions
- Standardised procedures in the design process

2.2 PLM-System (*mySAP™* PLM / *SAP-CDI*)

The *mySAP™* PLM (**P**roduct **L**ifecycle **M**anagement) made by *SAP* is an integrated management solution for concurrent engineering in design.

The *CDI* (**C**ATIA **D**irect **I**ntegration) made by *CENIT* is used for seamless integration of CATIA and SAP.

This integration allows for secure and consistent administration of the engineering data and supports concurrent engineering during the entire product life cycle.

User benefits

- Central administration/search/finding of the current CAD data
- Support for parts list compilation
- Automatic label generation from SAP
- Standardised approval and change processes
- Avoids unnecessary interfaces

2.3 CAD-Data Quality (*Q-Checker*)

The *Q-Checker* made by *TransCAT* is a management system for product data quality. The *Q-Checker* must be used to check the current 3D-CAD geometries in CATIA-V5. It ensures adherence to essential standards and thus creates data of uniform quality that are optimised for data exchange.

User benefits

- Checking the quality requirements directly during the design phase
- Optimised data exchange
- Comparable CAD data quality regarding geometry, structure and method

2.4 Safety Engineering Evaluation (*SAFEXPERT*)

SAFEXPERT made by *IBF* is a management system for safety engineering evaluation according to the Machine Directive. It assists with adherence to current standards and directives. *SAFEXPERT* guides the user step by step through the conformity evaluation, including risk analysis and towards the CE mark, when required.

User benefits

- Central access to current standards and directives with full-text search.
- Structured risk analysis and risk evaluation
- Support for documentation / operating instructions

Some of the projects are very complex and may require other specialist groups to provide evaluations in their field of competence.

2.5 Drawing Archive

The drawing archive is used to store drawings and documents of various origins and may provide a wide range of users with direct access or cross-search facilities. Before archiving (external) documents, the customer has to name consisting trade mark rights and/or non-disclosure contracts in written form and give this information to MDS.

Access is provided for persons with the appropriate rights through the internet page of the GSI:

Info: www.gsi.de > @WORK > Service > Zeichnungsarchiv

The storage requires the availability of core master data:

- Drawing number
- Drawing type (part / assembly)
- Person responsible
- In the status "approved" also: inspector and releasing person
- Additional master data are desirable
- Description
- Page number (of part lists and drawings)
- Approval status

Note

Service providers / partners must provide their full address.

The drawing archive is internally linked to the approval system for CAD data in SAP and is automatically supplied with the approved drawings / parts lists. Intermediate steps and manual supply, e.g. of scanned documents, can be performed by the person in Mechanical Design who is responsible for the drawing archive, when this is required.

The archive allows visually supported search operations and comfortable output options. The archive is part of a continuous development process. Details concerning its functionality are therefore available in the current version of the online help function (Help button: "?").

Keyword Search

The drawing numbers in connection with the appropriate drawing names can only provide limited information concerning the content of the drawing. Extracting information from the drawing number or the name requires appropriate detail knowledge. The keyword search is intended to provide a wider circle of users (production, purchasing, scientists, etc.) with search criteria that increase the match probability of searches.

Keywords are allocated to significant parts / main assemblies to facilitate this option.

Keyword categories

- ▶ Part type
- ▶ Part function
- ▶ Part property

Examples for possible selection lists and their content

Category	Keyword Example
Part type	drive system, diagnostic system, alignment system, ...
Part function	shielding, lifting, cooling, measuring ...
Part property	walkable, electrical, non magnetic, ...

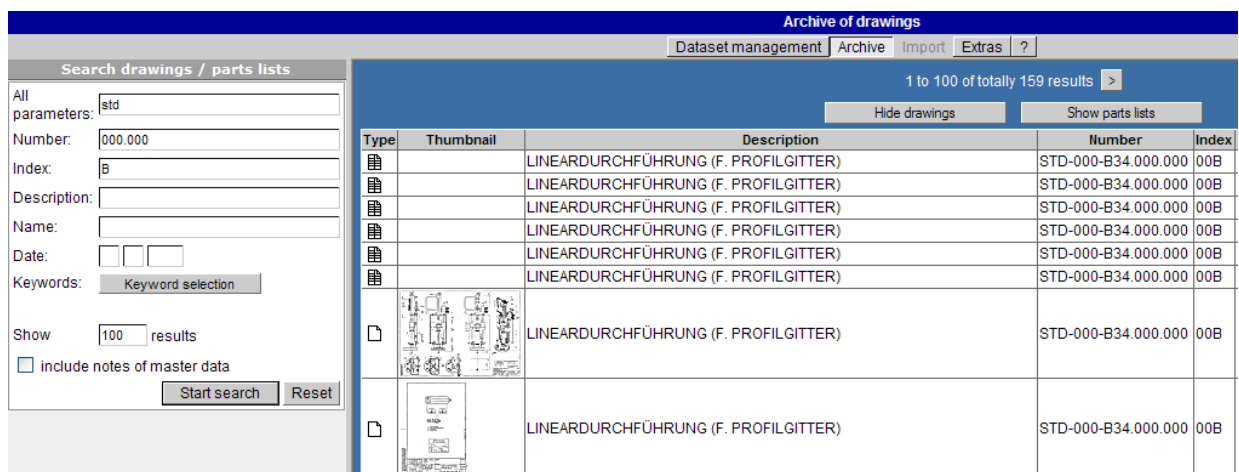


Figure 1 Drawing archive user interface

3 CAD-Settings

3.1 Procedures CATIA-V5

3.1.1 Starting Model CATIA-V5

Only the starting models provided by GSI may be used.

The respective, current starting model is stored at: `N:\Env_1_0_1\Startmodels`

3.1.2 Basic Model for CATDrawings

"GSI Standard" has to be selected as the basic model for CAD drawings when a new document is created.

Creation mode for views: Exact view

3.1.3 Layer

Design with CATIA-V5 does not make use of layers.

3.1.4 Colours

Colours are freely selectable for the design with CATIA-V5, but the restrictions listed below must be considered.

The following Colours are used by the system and may not be used for other purposes:

Colour	RGB-value	Use	Note
Red	255; 000; 000	Designates a CAD-Update	By the system

The following Colours may only be used for specific purposes:

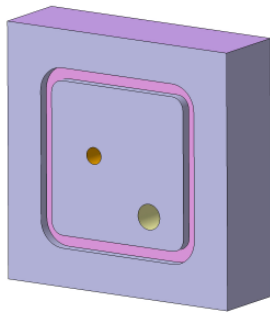
Colour	RGB-value	Use	Note
Ivory	255, 255, 175	Fitting bores $\leq IT^{*)} 8$	see Custom Colours
Bright orange	255, 175, 000	Thread	see Custom Colours
Pink	255, 175, 175	Sealing surfaces without cutting edges	see Custom Colours
Lilac	220, 175, 255	Functional surfaces, e.g. sliding surfaces	see Custom Colours

^{*)} IT = Basic tolerance according to DIN ISO 286-1

Custom Colours

The Colours and RGB values in the following table must be defined as custom Colours in order to facilitate easy, visual evaluation of the models for parts production.

Example



Processing type	CATIA-V5 Colour	RGB-Wert
Fitting bores Fitting surfaces	Ivory	255, 255, 175
Thread	Bright orange	255, 175, 000
Sealing surface	Pink	255, 175, 175
Functional surface	Lilac	220, 175, 255

Figure 2 Custom Colours

Note

The custom Colours must be defined by the user.

3.1.5 Lines

Define line types and line thicknesses according to DIN ISO 128-24 (1999-12).

Line group: 0.5

3.1.6 Labelling

Font Monospac 821 BT

Font size for:

- Measurements, production and drawing notes: 3,5mm
- View descriptions, section orientations, scales, position values: 5mm

3.1.7 Dimensions

All measurement entries are to be provided in mm (millimetre).

3.1.8 Scales

3D Designs (Modelling)

The design in 3D is always on a scale of 1:1.

Drawing Scales (Drawing Extraction)

Drawings are to be made on a scale of 1:1 where possible.

Reduction or enlargement scales can be used, where required.

Permitted scales are specified in EN ISO 5455.

Note

Beamline-drawings are only created/administrated by authorised persons in the organisational unit Mechanical Integration (MIN).

4 CAD-Procedures and Rules

CAD procedures and rules support a homogeneous and coordinated design process. The adherence to methods ensures, that all users apply the prescribed tools in the same way when working on the project. This forms the basis for successful concurrent engineering.

- No umlaut, special and space character may be used in the filename.
Example for forbidden characters: ä ü ö . : / () # \$ " ° ! % & * Ø ' ß
- Only the Latin alphabet is allowed to be used as name for a drawing.
- Mirroring of products and parts within a higher-level product is not permitted.
- All the parts used must be individually shown.
- Dimensions in the naming of drawings are not permitted (e.g.: "Tube 70mm long").
Exception e.g.: "Dipole 90°", "Deflection Magnet 7,5°"
- Materials in the naming of drawings are not permitted.

4.1 Parts

Procedures for Modelling Parts

- Parts must be shown as 3D models in a single part.
- At the end of the design, a part may only contain one single body.
Exceptions (e.g. for rotary flanges) are only permitted with the agreement of the design management.
- Parts always must be detailed designed (option for CNC production).
Comment: - also undercuts
- Parts with variable dimensions must be shown in their correct state of installation.
Comment: - Avoid intersections / gaps during the assembly.
- Basis for a correct DMU process (collision investigations).
DMU: Digital Mock Up

- The installation dimensions must be within the adjustment range.
- Ensure that the "residual" adjustment range is sufficient.

Example: Bellows, adjustment feet, springs, etc.

- Drill holes and counter bores must be created with the "hole" function.
Comment: Modelling, e.g. as pocket or embedded profile in a body contour, are not permitted.
- Associated drill holes must be produced with the Pattern Function.
- One sketch may not contain more than one profile.
- "Edge Fillets" and chamfers must be directly attached to the part.
- The material allocation is made in the part drawing using the GSI material library.

Info: *N:\Env_1_0_1Bibliotheken\materials\German\Catalog.CATMaterial*

- Parts must be checked by the Q-Checker and corrected, when required.
- Auxiliary geometries must be stored with the "geometrical sets".
- The flange bore arrangement must be taken from the technical guideline No. 3.81 ("Teilkreisorientierung bei Flanschverbindungen").

Storage State

Parts may only be stored in updated form, commensurate (fit all in) with the size of the frame and in isometric view.

- The main body or the last element in the main body must be defined as "In Work Object".
- Constraints, sketches, planes as well as auxiliary geometries and axis systems must be hidden before check in ("Registering with SAP-CDI").
- Parts are derived from a drawing and provided with dimensions according to the standards and appropriate for production.

Exceptions: No drawing is required to establish unique allocation.
The parts can be produced without confusion, based on the parts list information (e.g. threaded rod).

4.2 Products (assemblies)

Procedures for Compiling Products

- Products are derived from a drawing and provided with dimensions according to the standards and appropriate for production.
- A parts list must be compiled for each assembly.
- Assemblies (also "welded assemblies") are compiled as products consisting of several parts.
- All parts within one product must be positioned relative to each other, using the required/sensible constraints. A significant part of the product must be defined as a reference.
- Groups of individual parts may not be stored as a part.
- Bores of flanges must be arranged in the lines of the Technical Guidelines No. 3.1 ("Teilkreisorientierung bei Flanschverbindungen").
- Before the release the assemblies must be revised by the CATIA service program CATDUA V5.

Note

The welding, soldering and adhesive joints of material-bonded connections are usually not modelled with the "connecting material". In individual cases, a fault contour (welding seam, solder seal or adhesive) can be introduced to provide a safety margin for collision detection investigations.

Storage State

- Products may only be stored in updated form, commensurate with the size of the frame and in an isometric view.
- Constraints that cannot be resolved must be deleted (constraints with yellow exclamation mark).
- Necessary 3D sections may remain in the product, but they must be deactivated.
- Constraints must be hidden before storage ("Registering with SAP-CDI").

4.3 Components

Components are used to group parts within a product. This can be useful when the parts must be grouped as functional units or fastening elements (e.g.: screw, washer, nut) and should be / must be jointly positioned.

- Fastening elements ("screw / washer / nut ... ") should be combined with the associated parts to form sensible components. Existing "sets" should be used for established constellations.
- The parts of a component should be put in relation to each other using constraints.
- Constraints that cannot be resolved must be deleted (constraints with yellow exclamation mark).
- Constraints, sketches, planes as well as auxiliary geometries and axis systems must be hidden before check in ("Registering with SAP-CDI").
- Components are directly administrated by CATIA and cannot be separately saved.
- Constraints created must be hidden.

Note

- Components are not recognised for the compilation of the parts list.
- Components can only be inserted into other products using copy and paste.
- Components cannot be opened in a separate CATIA-V5 window

4.4 Drawings

Drawings are 2D views that are derived from parts or products (assemblies). The derivation links them with the parts or products that define the geometry. It is mandatory to ensure, that always only one 3D-model (part or product) per drawing is derived. Additional geometry (e.g. fault contours or adjacent parts) can only be shown in an isolated view, so that no connection problem will arise.

Various criteria regarding the arrangement and presentation must be adhered to in order to increase the "legibility" of drawings and provide a clear overview.
These criteria are based on DIN-ISO 128-30.

The projection method 1 is applied:

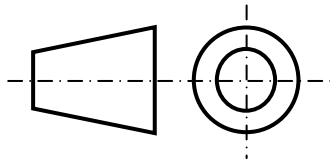


Figure 3 Projection method

The following types of drawings are used:

- **Part Drawings**
Part drawings are drawings that only show one single part.
- **Assembly Drawings**
If there is shown more than one part on a drawing, and if these parts are built in or connected (material-based connections, e.g. welded assembly), it is an assembly drawing. Assembly drawings always have a parts list.

Special case: Parts with a joint production process

In some cases, it is useful to provide information concerning possible, joint production and association of a part on the level of the part drawing. The following options for presentations are permitted as special case.

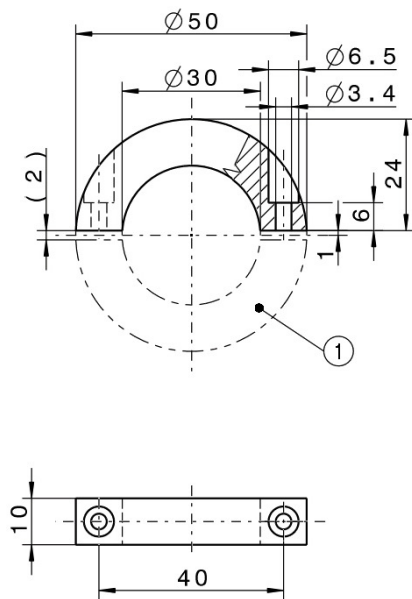
- **Special case 1** (on the basis of part drawings)

In this case the following must be observed:

- The drawings belong to the part drawing category
- Only one part may be shown as a real part (the one to be produced)
- Additional curves for information purposes must be shown as narrow lines with a dash-two point-line
- The complete assembly is performed in the higher-level assembly drawing
- Only the real 3d-part may be linked with the drawing
If there are additional views (dash-two point-line) of the correspondent part, they have to be isolated

The presentation must be completed according to the following example:

Content of the "first" part drawing

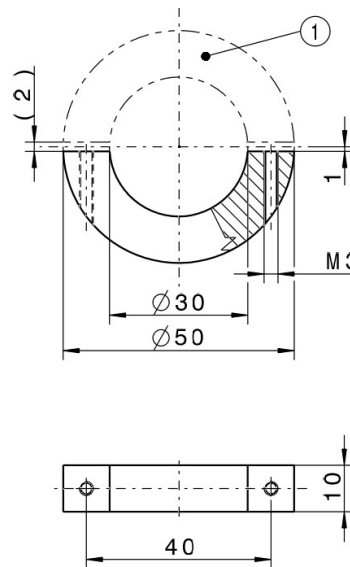


- ① Suitable counterpart, see:
 - Description
 - Drawing number:

Name (Description) and drawing number ...

... of the "second" drawing

Content of the "second" part drawing



- ① Suitable counterpart, see:
 - Description
 - Drawing number:

Name (Description) and drawing number ...

... of the "first" drawing

Figure 4 Parts with common production / part drawing (special case 1)

4.5 Skeleton Models

Skeleton models are parts that contain geometric elements such as points or lines. They are used as reference markers (insertion points) for parts and products (assemblies).

The Technical Guideline No. 3.75 ("Komponentenreferenz (Skelett)" describes the modalities for the creation of a required "Skeleton Model" for the DMU-compatible components. In this skeleton model component references are generated by lines points, and radii, depending on the ion optical layout (IOL). The purpose is the simple positioning of components on the IOL. Furthermore the positioning of magnet chambers to the magnet is made easier.

When a product to be produced has a skeleton model, this skeleton model must first be inserted and fastened.

Skeleton models can be very useful for a range of designs, e.g. vacuum chambers. One of their benefits is that they increase the readiness to make changes.

A skeleton model is a normal Catpart file in which the beam axis, connection flanges, support positions, etc. are described by curves, points and planes.

The skeleton model is in the first position of the product structure and is not listed in the parts list.

The following basic rule applies for the creation of skeleton model axes:

- X : Beam axis
- Y : Radial
- Z : Beam height

The following parts are then positioned in the skeleton model according to the constraints. No constraints should be attached to geometries (body surfaces, body edges...) as far as this is possible. It is better to use planes, axes, points, etc..

Note

Skeleton models must be hidden in the structure-tree when the assembly drawing is created and for the final "check-in" to the SAP-CDI.

Skeleton models are therefore subject to the approval strategy.

4.6 Standard and Purchased Parts

Standard and purchased parts are not designed in the normal way. These parts are procured according to specifications (standards / manufacturer information, etc.).

Standard parts are specified in the relevant standards (DIN / DIN EN / DIN EN ISO / DIN ISO / ISO / etc.). Standard parts can be procured from any manufacturer. The entries in the parts lists must be complete and according to the standards (name / dimensions / material / standard etc.).

Company-specific standards can be used in addition to the relevant, general standards.

Purchased parts are manufacturer-specific parts that are described in the respective supplier or manufacturer catalogues or similar documents. The entries into the parts list must be complete (name / dimensions / material / supplier with address / order number / etc.). The entries in the parts list must be adapted accordingly when manufacturer-/supplier-independent purchasing is possible.

- Released standard and purchased parts are listed in the standard / purchased part catalogue of the system.

Info: *O:\Kataloge-CDI\Norm-und Kaufteilkatalog\Norm-und Kaufteilkatalog.catalog*

- When a standard or purchased part cannot be found in the catalogue or when the part is not of "general interest", an appropriate drawing of the part with a drawing number according to the drawing numbering system can be created after agreement with the standard/purchased part representative in the Mechanical Design.

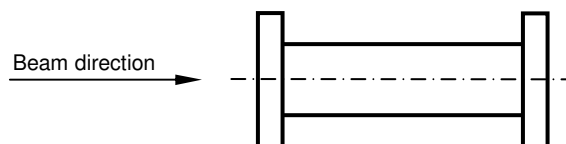
Note

Standard and purchased parts must always be installed in the CAD system according to the number of items actually required (corresponding to the entry in the parts list).

5 Document Design

5.1 Drawing Design

- When a drawing is created, the "GSI Standard" option must be selected in the "New drawing" selection menu. Other standards are not permitted.
- Drawings may only be created on the permitted format templates provided in the system.
- Drawings must be clear and comply with the standards.
- Hidden lines must be avoided. The style selected for the relevant views must be retained when hidden lines are necessary.
- If the function of a part or assembly are depends on beam direction, the beam direction is to specify on the drawing.

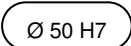


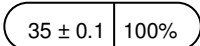
Several entries into other views are permitted for clarification purposes when complex diagrams are used.

- The system requires that the scale of the drawing is stored in a separate view on a scale of 1:1. This view can be used to store general information as well as surface symbols and edge symbols.

- The "page background" is changed by the system after each status change and may not be used for entries.
- The part or assembly must be shown in the typically required views on Page 1 of the drawing.
- Shaded or coloured views/elements (pictures) are not allowed.
- Presentations of developed views in drawings must have the following "headlines":
 - Abwicklung / developed view
 - ONLY FOR INFORMATION -

Such informative presentations of developed views may only be created, when the parts are relevantly komplex and the presentation is helpful. The production of the part must be ensured with the usual presentations.
- When assemblies are used, all parts should be marked with their parts list positions on Page 1 (take note of font sizes). When the space is not sufficient for the drawing format selected, additional pages for more detail / views / etc. must be provided. It may be useful to provide an additional ISO view for complex geometries to increase clarity.
- Position numbers and texts are part of the respective view, i.e. they must be placed into the respective view.
- When views or sections of individual components must be hidden or shown without sections, the "Overlay properties" function must be used.
- Dimensions not according to scale (Colour: brown) are not permitted.
- Unresolvable assemblies (welded assemblies, soldered and adhesive joints) can be detailed/ dimensioned as far as this is useful for the production process.
 - Comment: Not all parts must be individually drawn on drawings.
Complex geometries might require individual drawings.
- Individual drawings must be created of all "normal" assemblies (without material-based connections).
- When drill holes or threads are arranged in a polar configuration, the axes of coordinates must also be arranged in a polar configuration (e.g. for flanges).
- Inspection dimensions are dimensions that are particularly important and must therefore be monitored. They must be shown within a frame with a semi-circle. Additional information can refer to the percentage of units to be inspected, when required.

Examples:  Without information on percentage to be inspected

 With information on percentage to be inspected
- The link to the part/product that defines the geometry may not be removed (isolated).
- Neighbouring components or sections thereof, which are shown to increase the clarity of drawing, must be drawn by using the appropriate line group (dash-point-point, narrow / - · - · - · - · - · - · -) according to DIN ISO 128-24.
- Surface indicators, edge symbols as well as symbols for welding and soldering must be provided in the drawing.
 - Comment: Edge symbols must be taken from the following catalogue
O:\gsi\Kataloge\Werkstueckkanten\Kanten_DIN_ISO_13715.catalog
- The (production) drawings must contain all information required for production. In some cases, additional information may be required (assembly / operation / residual risks / ...).

- Cutting edge geometries of flanges may not be manually dimensioned.
Comment: Cutting edge symbols must be taken from the following catalogue
O:\gsi\Kataloge\CF_Schneidkanten\Schneidkanten.catalog
- General entries must be provided above the drawing title block.
When the space above the drawing title block is not sufficient to allow for a sensible arrangement, additional entries may be entered on the left side of the drawing title block.
The structuring principle to be adhered to is shown in Figure 5.
- Marking parts
If there is a marking of parts (type labels / gravings / laser / or the like) necessary, you have to fix the modality in individual cases.

Storage State

- Drawings may only be stored in updated form and commensurate with the size of the frame.
- They must be stored on Page 1 when several pages are used.

Special case: Rework Drawings

When the components require rework / modification, it is necessary to create a drawing that clearly shows the rework required. The name of the drawing is usually "similar" to that of the original part.
Example: E.g. the original part called "blind flange" becomes "adapter flange".

Clear entries on the drawing and the parts list according to the examples and notes below are required to make the need for rework obvious.

Marking of a Drawing Requiring Rework

When the original part is a designed part:

REWORK on:
Name of original part / drawing number: ... (revision status)

When the original part is a purchased part

REWORK on:
Name of purchased part / order number: ... / supplier, place and full address, when required

When the original part is a standard part

REWORK on:
Name of standard part / dimensions / additional information, when required / standard

The entry is made above the drawing title block.

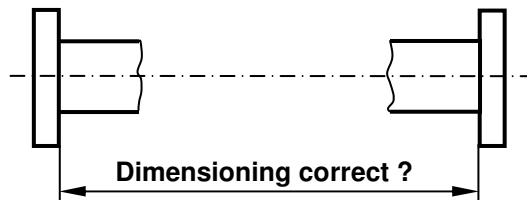
The "Rework" note must be entered in the REMARK field of the parts list.

Deviations required in special cases must be implemented according to the "uniqueness principle".

Notes for the dimensioning of work pieces, that are shown "broken" (shortened) (> Broken View)

To rule out the possibility, that wrong (too small ?) dimensions are edited by the CAD-system, when parts are shown broken, you have to observe these dimensions strictly during the entry and inspection.

- ▶ Take care in choosing the right reference of dimension at the part



Drawing Structure

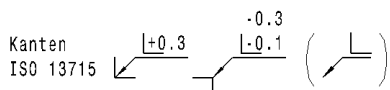
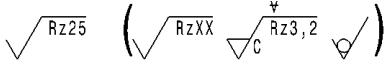






Structure level 6	<p>③ TEXT... (Texteintrag zur entsprechenden Note)</p> <p>② TEXT...</p> <p>① TEXT...</p>																																											
Structure level 5	<p>TEXT... (Freitext/ Erklärungen/ etc.)</p>																																											
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Figure 7 Text entries in drawings (structure levels)

- Structure level 1:** Surface specifications (mandatory)
- Structure level 2:** Edge conditions (mandatory)
- Structure level 3:** Entries that add general information to measurement data
- Structure level 4:** Technical guidelines to be applied
- Structure level 5:** Additional entries, when required (no NOTES)
- Structure level 6:** Text information concerning the NOTES for the drawing

Table Structure for Technical Guidelines on Drawings

Drawings that refer to technical guidelines must be provided with a standardised table according to the example below.

Technische Richtlinien / Technical Guidelines		
Nr. / No.	Stand zum Zeitpunkt der Zeichnungsfreigabe / Status at the time of design approval	Benennung / Description
F-TG-X-X.Xe	JJJJ-MM-TT	XXXXXXXX
F-TG-X-X.Xe	JJJJ-MM-TT	XXXXXXXX
Hinweis: Ein Beschaffungsvorgang ist nur mit den jeweils aktuellen, anwendbaren Technischen Richtlinien zulässig. Die Aktualität ist über den Einkauf sicherzustellen.		
Information: The purchasing procedure is only permitted with the current, applicable Technical Guidelines. The currentness of data has to be ensured via the purchase department.		

Figure 8 Drawing table: Technical Guidelines

- The pattern of the table is to take from the following catalogue.

Info: *O:\gsi\Kataloge\Textvorlagen ENMD\Textvorlagen_ENMD.*

Note

Fastening elements, e.g. screw, washer and nut are listed on the parts list of the assembly in which they are actually used to connect other assemblies/parts, i.e. once an assembly has been assembled, all the connecting elements have been installed as well. Connecting elements for a subsequent assembly are only shown with position numbers in the appropriate, "higher-level" assembly drawing. In some cases, it can be useful (for procurement) to specify "connecting element sets" / ("assembly sets") when "common" parts are used. These entries are only provided as additional information in the drawing and the appropriate parts list to prevent double/inappropriate procurement. These elements may not be provided with position numbers.

Text example "Assembly set"

Assembly set for CF 100 (not bakeable):

- 16 x hexagonal bolt ISO 4014 – M8 x 55 – 8.8 / galvanised
- 16 x hexagonal nut ISO 4032 – M8 – 8 / galvanised
- 16 x washer 7090 – 8 -200 HV / galvanised steel
- 1 x copper seal DN 100 / OFHC copper

5.2 Parts List Design

Parts lists must be compiled for all assembly drawings using the relevant format templates. The parts lists must include all parts required for production and handling according to the assembly drawing. Entries for consumable materials (adhesive / lubricant / etc.) may be required in some cases.

- Parts lists only exist for products (assemblies).
- Parts lists must be produced in Excel, using the valid format templates.
- Parts lists are to be attached to the drawing after processing in SAP-CDI.
- The parts list structure to be used is shown in Figure 7, structure levels in parts lists.
- Drawing numbers of components (parts) with material-based connections ("welded assemblies") that are described in detail in the assembly drawing are not listed in the parts list. The parts are stored in SAP-CDI as usual, but without derivation (drawing). However, SAP-CDI automatically inserts the "drawing number" when generating the parts list. These entries are to be deleted. Parts that have their dimensions specified in the assembly drawing have no unique, derived part drawing.

Special Case

The parts list contains a mix of parts without drawing number entry (dimensions provided in the assembly drawing) and parts with drawing number entry (dimensions provided on separate drawing) when a "welding assembly" contains complex parts that are easier to describe in a separate part drawing.

- Dimensions of metal sheets: The dimensions of the plate thickness and the approximate dimensions of the unfolded sheet (cutting dimensions = "length x width") are inscribed in the parts lists in the column "Dimensions".
Syntax: plate *thickness*, ca. *length* x ca. *width*
Example: plate 2, ca. 256 x ca. 473
- Dimensions of tubes: The approximate dimensions of the respective developed length (cutting dimension) is inscribed in the parts list in the column "Dimensions".
Syntax: tube *outside diameter* x *wall thickness* (length ca. ...)
Example: tube 12 x 1 (length ca. 254)

Parts List Structure

Parts lists must be structured according to the principle of structure levels shown below to provide a clear overview.

Item		Qty.	Description	Drawing No.	Dimensions (finished part)	Standard / Source of supply	Material	Remark
1								
2			Structure level 1					
3								
4			Structure level 2					
5								
6								
7			Structure level 3					
8								
9								
10			Structure level 4 ▶ 4.1 ▶ 4.2 ▶ 4.3 ▶ 4.4					
11								
12			Structure level 5					
13								
14								
15			6 Structure level					
16								

Sheet 1 of 1

Figure 9 Structure level in parts lists

- Structure level 1:** Assemblies
- Structure level 2:** Parts with drawing number in the current parts list
- Structure level 3:** Additional parts drawings
- Structure level 4:** Standard parts, structured in "blocks" with increasing dimensions:
 - 4.1** - All screws
 - 4.2** - All nuts
 - 4.3** - All washers
 - 4.4** - Other standard parts
- Structure level 5:** Purchased parts
- Structure level 6:** Other

Note

The structure levels must be separated from each other by empty lines. These empty lines make it possible to add information without changing the position numbers.

5.3 Notifications of Changes

When released drawings and parts lists must be reworked, a new rev.-status has to be created. The changes must be documented in a "Revision Documentation of Drawings". For each drawing a separate Revision Documentation of Drawings has to be created. And for this creation the respective actual template must be taken.


 Helmholtzzentrum für Schwerionenforschung GmbH Planckstraße 1, 64291 Darmstadt		Revision Documentation of Drawings			Rev.-Doc.-No. XXXX
		Prepared	Date TT.MM.JJJJ	Name M.Mustermann	Description XXXXXXXXXXXX
Remark				Drawing-No. XXXXXXXXXXXX	
				From Rev. X (before change)	To Rev. Y (after change)
No	Drawing Area or Part List	Modification			
		was (before modification)	is (after modification)		
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

Figure 10 Template Revision documentation of Drawings

The rev.-doc.-No. must be inscribed into the relevant field of the drawings- or parts list-title block. .

Note

The rev.-doc.-No. must be taken from the folder "Änderungsmittelungen" in MDS.

6 Preferred Information

6.1 Materials

The materials and the dimensions of parts for common applications must be selected to ensure that the material is listed in the GSI material store and is available in the dimensions required. In addition, the technical guidelines of GSI must be considered for the material selection.

The most important materials are registered in the GSI material library for CATIA users.

N:\Env_1_0_1\Bibliotheken\materials\German\Catalog.CATMaterial

Material Entries

Material entries on drawings and parts lists must be provided according to the following examples:

- Steel Types

Short name / main symbol	(EN 10027-1)	Example:	S235JR	X5CrNi18-10
EN material No	(EN 10027-2)	Example:	1.0037	1.4301

Syntax: EN material No. (short name)

Example: 1.0037 (S235JR)
1.4301 (X5CrNi18-10)

- Non-Ferrous Metals

Short name / main symbol	Example:	CuZn39Pb3	AlMg3	Cu-OF
EN material No	Example:	EN CW614N	EN AW-5754	EN CW008A

Syntax: EN material No. (short name)

Example: EN CW614N (CuZn39Pb3)
EN AW-5754 (AlMg3)
EN CW008A (Cu-OF)

Note

The equivalent descriptions according to AISI, ASTM, UNS, SS, AFNOR, BS, etc. are permitted as additional entries when they are required in individual cases.

6.2 Fits

In general, the following fit system is used:

basic hole system: **DIN 7154-1 / -2**

The drill hole has the tolerance zone position H for all tolerance combinations.
Exceptions are permitted when necessary (e.g use of purchased parts).

6.3 Tolerances

General tolerances are listed in the drawing title block as follows:

General tolerances for length and angle measurements: **DIN ISO 2768-mK**

General tolerances for welded structures: **ISO 13920-BF**

Note

General tolerances do not necessarily ensure the function, the production processes, the installation processes (etc.). Concerning lower-level dimensions general tolerances are potentially too exact or unsuitable because of the +/- tolerance zone. A precision, which is not required, causes avoidable costs. The selected tolerances must ensure the function, the production processes, the installation processes (etc.). This also relates to tolerances for potential connecting dimensions. The tolerances of the connecting dimensions must take into account the follow-up processes, e.g. the connection of neighbouring components by screwing, welding, or the like, and ensure process reliability.

Deviating / different tolerances required for individual entries are made directly in the drawing in the appropriate place.

Drawing presentation/entries:

- Form and position tolerances: **DIN ISO 1101**
- Welding and soldering: **DIN EN 22553**
- Surface characteristics: **DIN EN ISO 1302**

Comment

Drill patterns that are repeated should preferably be provided with theoretical dimensions.

A round (\emptyset) tolerance zone is preferable for position tolerances.

Example

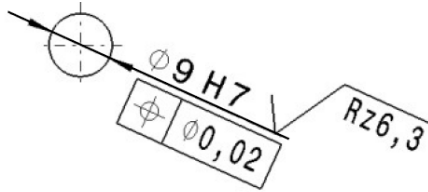


Figure 11 Position tolerance

6.4 Surface Information

The information concerning the surface characteristics of work pieces in drawings is listed in the title block:

Surface conditions **DIN EN ISO 1302**

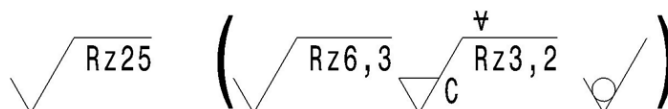
The surface characteristics should preferably be specified in Rz.

Preferential Entries

Rz 100	"Rough" requirement
Rz 25	"Normal" requirement
Rz 6,3	"Accurate" requirement (e.g. fits)
Rz 3,2	cutting edges (special requirement) ... with specification of the groove direction, when required
Rz 1	"Highly accurate" requirement (e.g. "special metal sealing surfaces") ... with specification of the groove direction, when required

Other roughness parameters, e.g. Ra, should only be used when absolutely necessary.

Example



▽ Vakuumfläche: keine Querriefen zulässig. Flächen sind geeignet zu schützen

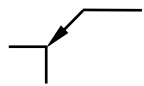
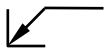
Figure 12 Surface information

6.5 Edge Conditions

Edge conditions in drawings

DIN ISO 13715

Preferential Entries

	"Rough" requirement	-0.1 to -0.5
	"Normal" requirement	-0.1 to -0.3
	"Special" requirement	when needed
	"Rough" requirement	0 to +0.5
	"Normal" requirement	0 to +0.3
	"Special" requirement	when needed

The number of symbols required and the specifications can be adapted to the requirements, when necessary.

Example

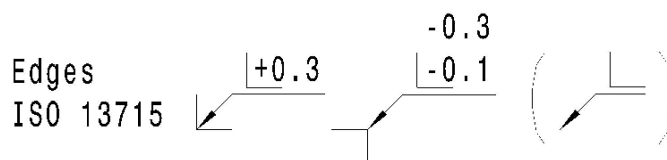


Figure 13 Edge conditions

Common requirements for edges are specified by an additional entry (in brackets) on the drawing that contains the deviating information.

Comment: Edge symbols must be taken from the following catalogue

O:\gsi\Kataloge\Werkstueckkanten\Kanten_DIN_ISO_13715.catalog

7 Design Process

The design process raises numerous questions that concern a range of specialist departments. Additional, affected specialist departments /groups and persons, e.g. in production / procurement / assembly might already be involved during the conceptual phase. Early exchange of information can help to integrate available knowledge effectively into the design. Cost-intensive corrections can be reduced to a minimum.

The designer is in charge for the respective design process.

The processing sequence of a design order together with the associated activities and responsibilities must be taken from the valid process description as per the GSI-process manual (process name, Konstruktion / process-ID: 2.1.6).

At this, the approach to development and designing after VDI 2221 (Figure 14) and the iterative process of risk minimisation (Figure 15) have to be considered, amongst others.

Each project is individually structured. It can therefore not be claimed that the information provided is complete. Possible deviations and/or supplements required must be determined by the project team members during the design process and must be appropriately implemented during the design process by the design team and possible additional persons / service providers / etc.

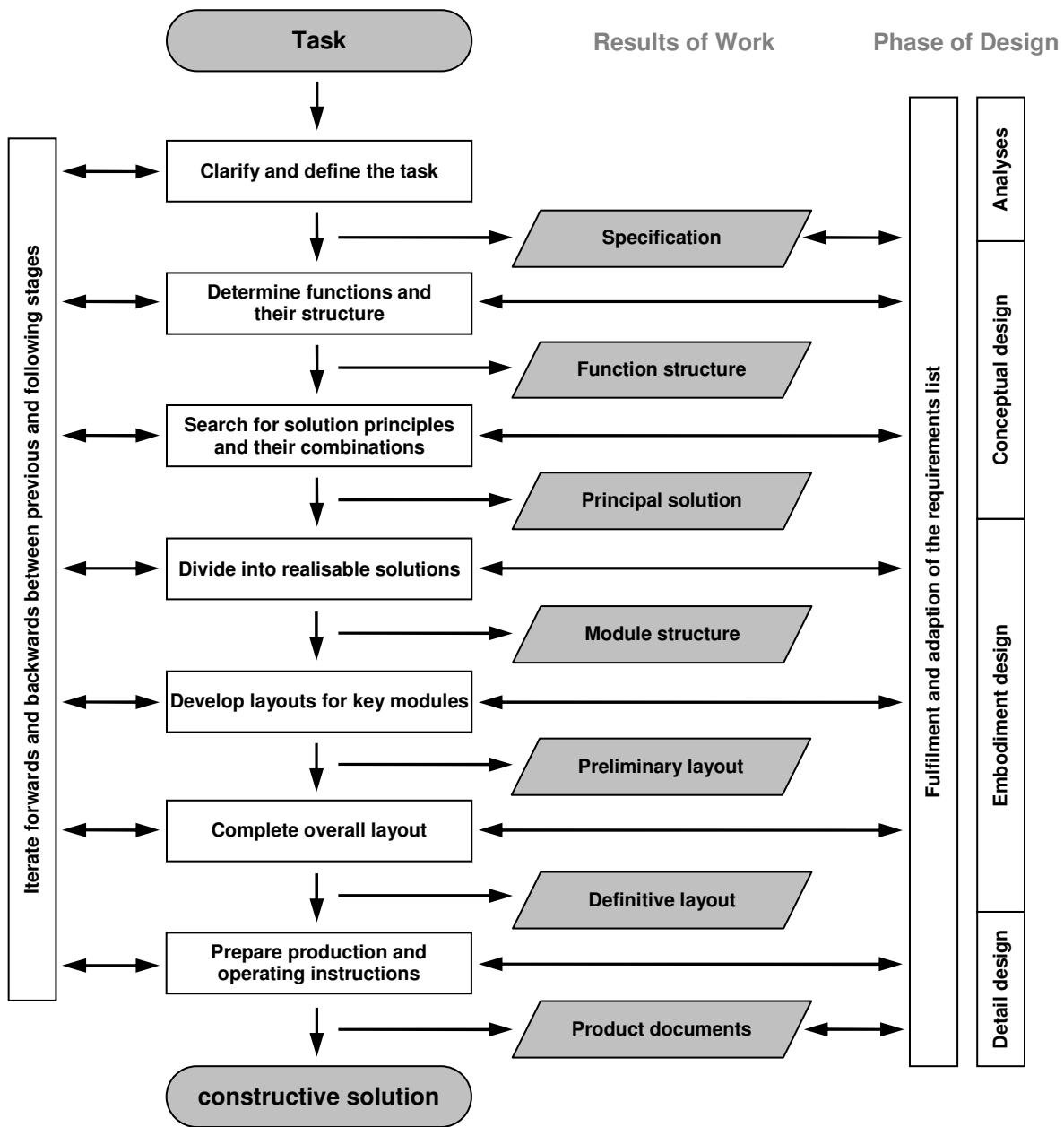


Figure 14 Procedure in Development and design after VDI 2221

7.1 Safety Engineering Evaluation

The safety engineering evaluation and documentation within the Mechanical Design must only be carried out by using the software SAFEXPERT. Each project team member is obliged to evaluate and document project developments that are subject to CE procedures / conformity evaluation in SAFEXPERT.

Within the design process it must be strictly checked, which guidelines and standards have to be followed.

Info

Frequently applicable guidelines at GSI are:

- Guideline 2006/42/EG (Machinery Directive)
- Guideline 2014/68/EU (Pressure Equipment Directive)
- Guideline 2014/35/EU (Low Voltage Directive)

Note

Performance of a **risk evaluation according to DIN EN ISO 12100** provides the basis for minimising possible safety risks with appropriate design and protective measures as far as this is reasonably possible.

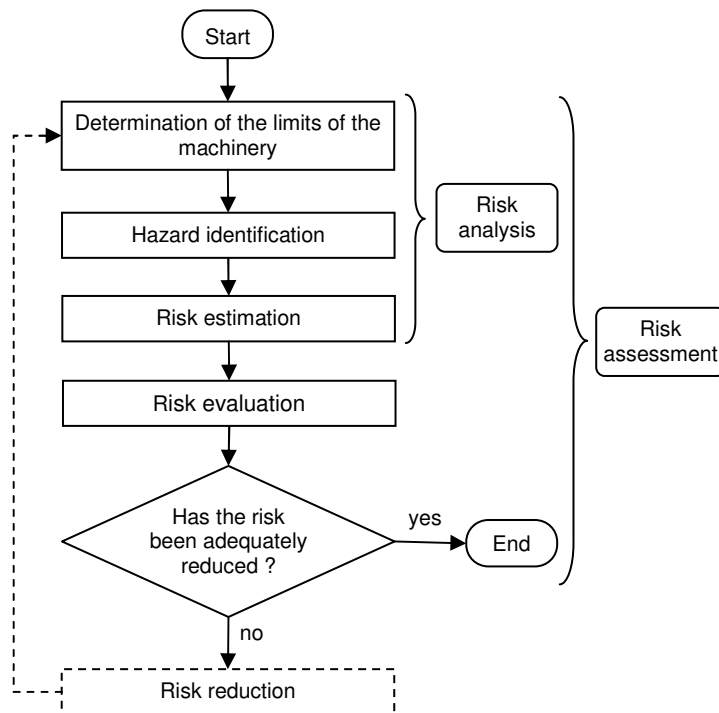


Figure 15 Iterative process of risk assessment

Machinery Directive 2006/42/EC – Annex I, General Principles:

“The manufacturer of machinery ... must ensure that a risk assessment is carried ...By the iterative process of risk assessment and risk reduction referred to above, the manufacturer or his authorised representative shall:

- determine the limits of the machinery, which include the intended use and any reasonably foreseeable misuse thereof,
- identify the hazards that can be generated by the machinery and the associated hazardous situations,
- estimate the risks, taking into account the severity of the possible injury or damage to health and the probability of its occurrence,
- evaluate the risks, with a view to determining whether risk reduction is required, in accordance with the objective of this directive,
- eliminate the hazards or reduce the risks associated with these hazards by application of protective measures, in the order of priority established in section 1.1.2 (b).”

Notes Concerning the Operating Instructions

One of the most important parts of the operating instructions are the safety instructions. The purpose of the operating instructions is to facilitate safe operation of the machine by the machine user. Safety instructions warn the user of residual risks that exist in specific life cycle phases and situations when handling the machine.

7.2 Approval Strategy

- Approval steps are performed in SAP according to the user rights.
- Documents, here drawings / parts lists / etc. are only valid when approved.
- Precursor versions are only relevant for information purposes (content are not binding).

A DIS (document information set) proceeds through the following release and processing steps:

code	Approval steps	Status stamp ...on drawing / parts list	Remark
AA	Beginning of work		State at creation
IA	Under preparation	FOR INFORMATION	State at document processing
IP	Inspection process	FOR INFORMATION	Processing successfully completed
IF	Awaiting approval	FOR INFORMATION	Inspection successfully completed
FR	Approved	APPROVED	Approval successfully completed
U	Obsolete	OBSOLETE	Documents that may no longer be used must be set to the "Invalid" status.
ZG	Rejected	FOR INFORMATION	When the inspection or release procedure determines a need for changes, the respective documents are rejected.
E	Editing	EDIT-STATUS	Informal, rights-dependent correction option on 2D level when strict specifications are adhered to. An effect on the 3D geometry data or the resulting parts implementation must be impossible. Example of a permitted supplement: Adding missing dimensions

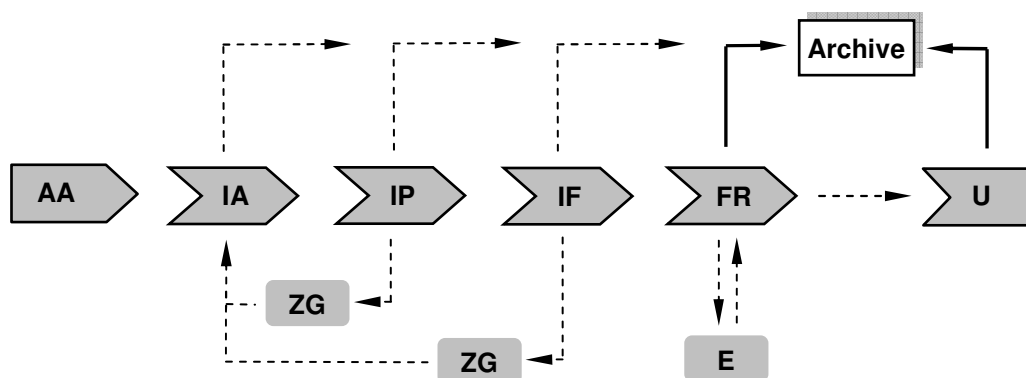


Figure 16 Status change during the approval process (schematic diagram)

Archive

After successful release in SAP, the drawings are automatically entered into the archive with their respective revision (Rev.-status). The documents may then be used by users with the appropriate access rights. Copies of drawings, which are not filed, must not be given to third parties.

7.3 Design- and Drawing- Compilation / Inspection

Conformity with the requirements and the quality of the design can only be assured when a continuous process of checking and coordination is maintained between the designer, inspector and the person with release authorization, as well as the whole project team.

Checklist for Drawing Compilation and Inspection

- All requirements are carried out (completeness) ?
- Are all information, views and sections available, which are necessary for the clear presentation?
- unnecessary sections and vies must be eliminated
- Have no double/unnecessary details been provided?
- Are the views folded correctly; if not, are they labelled (e.g. view in direction X)?
- Is the part drawn in the operating position?
- Have cross-sections been choosed practice-oriented (not too complicated)?
- Are the sections folded (described) correctly accordant to the stated directional arrows?
- Have standard parts, which lie in the same section plane, been displayed correctly (not cut)?
Example: wedges, feather keys, ribs, if they are positioned lengthwise in the drawing
rivets, pins, bolts, axes, shafts, and screws
- Has the following been considered:
centre lines existent/hatchures executed correctly / cuircular edges
- Does the dimensioning follow a strategy of function or production?
Dimensioning based on a reference plane or the like
- Can the following dimensions, tabulated due to their importance, be taken directly from the drawing?
 1. inspection dimensions,
 2. Dimensions, which are necessary for the single process steps.
 3. Dimensions, which are important for the function (e.g. slot width, hole spacing, centre distance).
- Have only visible edges been dimensioned?
- Is the solution proposal sensible and appropriate for the technical requirements ?
- Concept / draft release available (CDR- / PDR-protocol) ?
- Implementation according to the state of the art ?
- Functional, cost-aware design (e.g.: concept, materials, tolerances, etc.) ?
- Design appropriate for the number of items required ?
- Design appropriate with regard to production, installation maintenance, etc. ?
- Safe design / risk assessment available ?
- Sufficient safety engineering documentation (including SAFEXPERT) ?
- (Brief) assembly instructions available ?
- (Brief) instructions for the machinery available ?
- Comprehensible and clear drawing and parts list structure provided ?
- Dimension inspection / tolerance check required and performed ?
- Title block data / other entries complete, meaningful, short ?
- Were the applied standards and directives adhered to / considered ?

e.g.:	Produktsicherheitsgesetz/ ProdSG	Product Safety Act
	Richtlinie 2006/42/EG ¹⁾	Machinery Directive
	Richtlinie 2014/68/EU ¹⁾	Pressure Equipment Directive
	EN ISO 12100	Safety of Machinery

DIN EN ISO 13857

Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs

DIN EN 349

Safety of machinery- Minimum gaps to avoid crushing of parts of the human body

Note

¹⁾ For any questions concerning these matters contact persons in MDS are available.

- Were the applied technical guidelines of GSI adhered to / considered ?
- Reference to additional technical guidelines (when required) that must be applied in subsequent steps (e.g. cleaning, etc.) in the view of the designer.
- Were the procedures for the application of the different tools adhered to (e.g. CAD / PDM) ?
- Is the data quality assured (Q-Checker) ?
- Proof, documentation of calculations / basis for calculations available ?
- Are additional required proofs, certificates / etc. available ?
- Are Additional required documentation available ?
- At Revision status: Have meaningful notification of change been provided ?
- At Revision status: Have the notification of change been provided in the system ?
- Have keywords for relevant assemblies (or parts, if applicable) been allocated ?
- Is the documentation complete (drawing set / project folder / etc.) ?
- etc.

The list cannot be guaranteed to be complete and may contain additional points specific to the order.

Note

When designs require solution proposals that are not described in the standards of the technical guidelines, the solution proposal must be agreed upon with the appropriate specialist group / department.

7.4 Design- and Drawing-Approval

The release can and may only be provided when the order evaluation and the inspection were fully and successfully completed.

Confirmation is provided by the relevant persons in the appropriate systems.

Approval Note of the Customer at the End of the Order

When the customer is not integrated in the release process of the system, the set of drawings must be agreed upon with the customer before internal inspection and approval. When the customer agrees that the requirements are fulfilled, the corresponding assembly drawing must be provided with an appropriate release note near the header (name / date / signature). This drawing (with the release note) must be stored as a document in the drawing archive in the respective master data set. The original remains with the designer in the project folder.

Check List for Drawing Approval

- Was the inspection successfully and fully completed ?
- Are there still open questions by the designer or the inspector ?
- Are additional releases required for overall release ?
- Is the release note of the orderer available on the (assembly-) drawing ?
- Random samples for the inspection scope
- Are all requirements fulfilled ?
- Are all required technical documents available ?
 - safety engineering documentation
 - instruction manuals
 - assembly instructions

8 Project Documentation

8.1 Project Folder

The project folder must contain all the project information required. Any design order (design project) must be documented in a comprehensible manner.

All important documents such as specifications, proofs, calculations, releases, etc. must be stored in a structured form in a project folder, in addition to data files, e-mails, etc.

Content of the Project Folder

The overview shown below provides general information concerning the possible content and is intended to promote standardisation. It is possible that not all registers are used or that they are not sufficient, depending on the scope of the application. In such cases, an appropriate, project-specific register has to be created. When several folders are required for a project, their back labels must be marked accordingly. Small(mini) projects must be documented in a project binder.

► For an overview, see the following page

1	Projektauftrag Dokumente z.B.: Auftragskarte, Auftraggeberspezifikation, Zeitplan, MDS-Projekt-Checkliste, ...	Project Order Documents e.g.: order card, customer specification, timeline, project checklist of dept. MDS, ...	1
2	Anforderungsliste Dokumente: aktuelle Anforderungsliste, veraltete Stände, Freigabe der Anforderungsliste, ...	Requirements List Documents: updated requirements list, obsolete status, approval of requirements list, ...	2
3	Schriftverkehr (intern / extern) geordneter Schriftverkehr zum Projektauftrag Dokumente z.B.: Protokolle, Anfragen, ...	Correspondence (int.- / external) Sorted correspondence for project order Documents e.g.: minutes, inquiries, ...	3
4	CDR/PDR (C onceptual/ P reliminary D esign R eview) vollständige Dokumentation zum CDR/PDR Dokumente z.B.: Konstruktionsentwürfe, CDR/PDR-Protokoll, genehmigter Konstruktionsentwurf, ...	CDR/PDR (C onceptual/ P reliminary D esign R eview) Complete documentation of CDR/PDR- Documents e.g.: design concepts, CDR/PDR-minutes, approved design concept, ...	4
5	Sicherheit Dokumentation zum Nachweis der Produktsicherheit entsprechend dem Stand der Technik / Normen / Richtlinien ... Dokumente z.B.: Risikobeurteilung (SAFEXPERT), ...	Safety Documentation in proof of product safety according to the state of the art / standards / guidelines ... / Documents e.g.: risk assessment (SAFEXPERT), ...	5
6	Fachfreigaben Dokumentation zu erforderlichen Fachfreigaben Dokumente z.B.: Zeichnungen mit Freigabevermerk, ...	Professional Approvals Documentation of necessary professional approvals Documents e.g.: drawings with approval note, ...	6
7	Technische Unterlagen produktabhängig z.B. gem.: Anhang VII / 2006/42/EG ► MRL Dokumente z.B.: Montage-/Betriebsanleitung, Fertigungsdokumentation, Sicherheitshinweise, ...	Technical Documents Product-dependent e.g. annex VII / 2006/42/EG ► EC machinery directive Documents e.g.: assembly-, manufacturing-, safety instructions, user manual, ...	7
8	Konstruktionsunterlagen Dokumente z.B.: Daten-/Katalogblätter verwendeter Kaufteile, Materialinfos, Referenzzeichnungen, Prinzipskizzen, Untersuchungen, ...	Design Documentation Documents e.g. data- / catalog sheets of used purchased parts, material infos, reference drawings, schematic diagram, analysis, ...	8
9	Berechnungsnachweise nachvollziehbare Dokumentation der sicheren Auslegung Dokumente z.B.: manuelle Berechnungen, FEM-Berechnungen, Beurteilung der Ergebnisse, ...	Calculation Proof Reproducible documentation of safe dimensioning Documents e.g.: manual calculation, FEM calculation, assessment of results, ...	9
10	Prüfung ggf. aus der Zeichnungsprüfung resultierende Unterlagen und Notizen, ...	Check Resulting documents and notes from the test of the drawings if necessary, ...	10
11	FDR (Final Design Review) vollständige Dokumentation zum FDR Dokumente z.B.: FDR-Protokoll, FDR-Zeichnungsfreigabe, ...	Final Design Review Complete documentation of FDR Documents e.g.: FDR minutes, FDR approval of drawing, ...	11
12			12

Figure 17 Table of contents of project folder

Back Labelling on Project Folder

Minimum specifications for back labelling of a project folder:

Distribution Principle

Projektbearbeiter oder Betreuer ¹⁾ Responsible Designer ¹⁾	
Jahr / Year	
Auftragsnummer Project number Projekttitel Project title Firmenname bei Externauftrag ¹⁾ Company name for external order ¹⁾	
Ordner Folder	von of
MDS	

Example (in this case an external order)

Mr Sample	
2012	
0-9902 Holding device Engineering Office Ingenius GmbH Sample city	
Ordner Folder	von of 1 of 3
MDS	

¹⁾This folder is used to store the communication documents associated with external orders. It does not replace the project folder in the delivery scope of the service provider.

Figure 18 Back labelling on project folder

Back Labelling on Project Binder

Minimum specifications for back labelling of a project binder:

Distribution Principle	Example																																				
<table border="1"> <tr> <td colspan="2">Projektbearbeiter Responsible Designer</td> </tr> <tr> <td colspan="2">Jahr / Year</td> </tr> <tr> <td>Projektnummer Project number</td> <td></td> </tr> <tr> <td>Projekttitel Project title</td> <td></td> </tr> <tr> <td>Projektnummer Project number</td> <td></td> </tr> <tr> <td>Projekttitel Project title</td> <td></td> </tr> <tr> <td>Projektnummer Project number</td> <td></td> </tr> <tr> <td>Projekttitel Project title</td> <td></td> </tr> <tr> <td>etc.</td> <td></td> </tr> <tr> <td>Ordner Folder</td> <td>von of</td> </tr> <tr> <td colspan="2" style="text-align: center;">MDS</td> </tr> </table>	Projektbearbeiter Responsible Designer		Jahr / Year		Projektnummer Project number		Projekttitel Project title		Projektnummer Project number		Projekttitel Project title		Projektnummer Project number		Projekttitel Project title		etc.		Ordner Folder	von of	MDS		<table border="1"> <tr> <td colspan="2">Mustermann</td> </tr> <tr> <td colspan="2">2012</td> </tr> <tr> <td>0-9914</td> <td>Holding device</td> </tr> <tr> <td>0-9958</td> <td>Support</td> </tr> <tr> <td>0-9972</td> <td>holding device</td> </tr> <tr> <td>Ordner Folder</td> <td>von of 1 of 1</td> </tr> <tr> <td colspan="2" style="text-align: center;">MDS</td> </tr> </table>	Mustermann		2012		0-9914	Holding device	0-9958	Support	0-9972	holding device	Ordner Folder	von of 1 of 1	MDS	
Projektbearbeiter Responsible Designer																																					
Jahr / Year																																					
Projektnummer Project number																																					
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etc.																																					
Ordner Folder	von of																																				
MDS																																					
Mustermann																																					
2012																																					
0-9914	Holding device																																				
0-9958	Support																																				
0-9972	holding device																																				
Ordner Folder	von of 1 of 1																																				
MDS																																					

Figure 19 Back labelling on project binder

Location of Project Folders

The location of the project folder is the workplace of the respective project team member, when no other agreements were concluded.

8.2 Project Files

Significant project information must be stored in the form of additional documents to the drawings in the drawing archive, in addition to storage in the project folder. Appropriate PDF documents, e.g. an excerpt of the project folder, must be created, when required. These files are important and must be selected by the project team member(s) and forwarded to the person in the drawing archive responsible for storage.

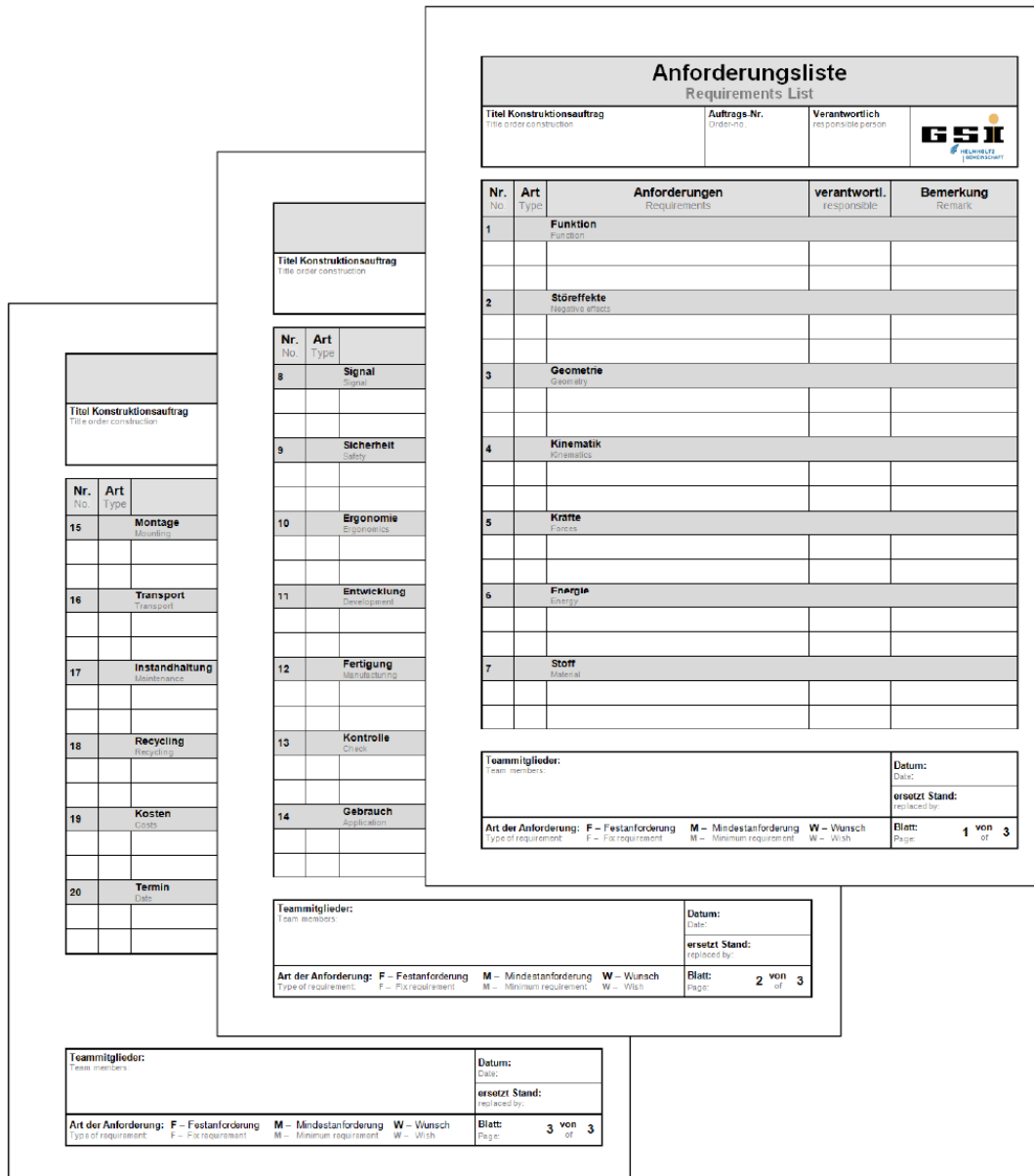
Examples

Measuring reports / documents to QA measures / assembly instructions / operating instructions / test protocols / important calculations (FEM data and reports) / acceptance protocols / safety engineering documentation, risk evaluation (PDF print version > including extracts from Safexpert) / documents of internal production control / data sheets of "exotic" components, materials, etc. / test instructions / important design decisions / etc.


8.3 Requirements List

The requirements list serves to clarify the task and is therefore the design basis. The intention is to work out clearly the requirements and requests in the project team. Thus the requirements list is an important tool to avoid mistakes, and it goes under a constant update, according to the proceeding state of knowledge.

In order to standardize, the usage of the following form is mandatory:



Anforderungsliste
Requirements List

Titel Konstruktionsauftrag Title order construction		Auftrags-Nr. order no.	Verantwortlich responsible person	
Nr. No.	Art Type	Anforderungen Requirements	verantwortl. responsibility	Bemerkung Remark
1	Funktion Function			
2	Störeffekte Negative effects			
3	Geometrie Geometry			
4	Kinematik Kinematics			
5	Kräfte Forces			
6	Energie Energy			
7	Stoff Material			

Teammitglieder:
Team members:

Datum:
Date:

ersetzt Stand:
replaced by:

Art der Anforderung: F – Festanforderung M – Mindestanforderung W – Wunsch
Type of requirement: F – Fix requirement M – Minimum requirement W – Wish

Blatt: 1 von 3
Page: 1 of 3

Figure 20 Carrying out the requirements

Note

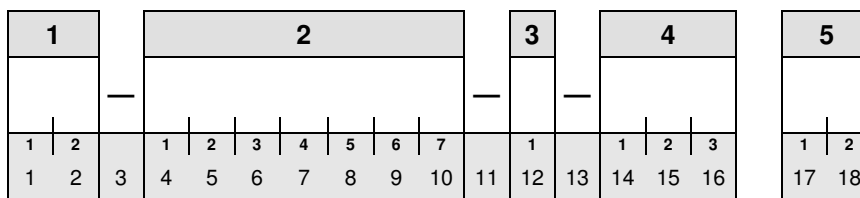
The last valid version of the requirements list has to be stored in the drawing archive, as a document to the created (released) drawing / to the created (released) set of drawings.

9 The Drawing Number System of Design Drawings

The drawing number system for design drawing provides information on the name, drawing type, diagrammatic "component allocation", origin of the drawing and the revision status (index) of the document / file.

The limited information content of drawing numbers is supplemented by suitable component names and the option of adding keywords to significant parts or assemblies.

9.1 SYNTAX Drawing Number

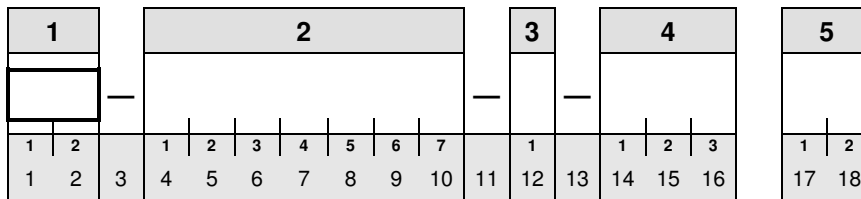


1	Equipment Code	Information concerning the part type / technical focus
2	Number block	Document number
3	Information field I	Drawing- / document-type
4	Information field II	Additional information (part document number)
5	Rev.-status	

To 1: Equipment Code

The equipment code allows a first, rough identification using the part type or function. It is part of the general naming convention for the FAIR-Project.

The FAIR-equipment-codes are 2-digit-letter-combinations as shown in Figure 21. A selectable Code List is stored in the system.



► List of available equipment codes, see the following pages.

9.1.1 Equipment Code FAIR

Equipment Code FAIR				
No.	Meaning	1	2	Remark
1	System Design	S	D	
2	Building Equipment	B	E	
3	Magnets	M	G	
4	Magnet Testing	M	T	
5	Power Converters	P	C	
6	RF-Systems	R	F	
7	Injection/Extraction	I	E	
8	Beam Diagnostics	B	D	
9	Vacuum	V	C	
10	Particle Sources	P	S	
11	Electron Cooling	E	C	
12	Stochastic Cooling	S	C	
13	Special Installations	S	I	
14	Local Cryogenics	C	L	
15	Cryogenics	C	X	
16	Building Blocks	B	B	
17	Controls	C	O	
18	Dumps/Collimators	D	C	
19	Gas Supply	G	S	
20	Radiation Safety	R	S	
21	Alignment	A	L	
22	Link to existing Facilities	L	F	
23	el. Power	E	L	
24	Quench Detection	Q	D	
25	Targets Super-FRS	T	S	
26	Targets pbar	T	P	
27	Ventilation, Air Condition	A	V	
28	Compressed Air	C	A	
29	Heating	H	T	
30	Total MSR - System	M	S	
31	Water Cooling	W	C	
32	Experiment Devices	E	D	
33	Civil Construction	C	C	
34	Machine Protection	M	P	
35	Operating	O	P	
36	Support	S	U	
37	FAIR all Technical Systems/Accelerators	X	X	
38	Specific Area in the Mechanical Design	K	A - Z	see Figure 22

Figure 21 Equipment code FAIR (digit 1 and 2 according to FAIR classification list)

9.1.2 ENMD-Equipment Codes (Mechanical Design)

Equipment Code for Design				
Detail of No. 38 according to Figure 21				
Nr.	Meaning	1	2	Remark
1	Training area	K	A	
2	Independent, Small Assemblies		B	
3			C	
4			D	
5	Independent Parts		E	
6			F	
7			G	
8			H	
9			I	
10			(J)	
11	Purchased Parts...(without catalogue)		K	...not of general Meaning
12			L	
13			M	
14			N	
15			O	
16	Presentation Drawings		P	
17			(Q)	
18			R	
19	Standard Components		S	
20			T	
21			U	
22			V	
23	Tools / Devices		W	
24			X	
25			Y	
26			Z	

Figure 22 Specific equipment codes mechanical design

To 2: **Number Block** (document number)

The 7-digit document number is assigned by the system.

1	2	3	4	5
—	—	—	—	
1 2 1 2	1 2 3 4 5 6 7 4 5 6 7 8 9 10	1 2 3 11 12 13	1 2 3 14 15 16	1 2 17 18

2	Description	Remark
Numerical	Document number	Provided by the system

To 3: **Information Field I** (3rd digit of the document type)

Information Field I provides information concerning the basic type of drawing.

The system automatically distinguishes between a **p**art or an **a**ssembly. It is also possible to mark skeleton models manually with an **S**.

1	2	3	4	5
—	—	—	—	
1 2 1 2	1 2 3 4 5 6 7 4 5 6 7 8 9 10	1 2 3 11 12 13	1 2 3 14 15 16	1 2 17 18

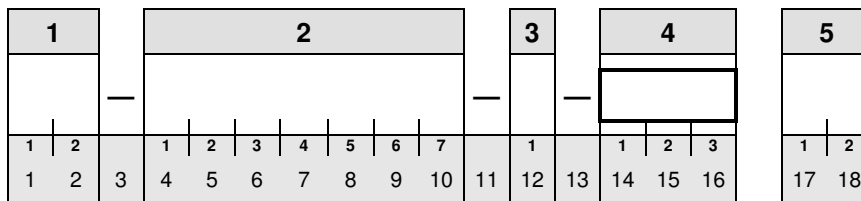
3	Description	Remark
P	Part	Preliminary entry by the system
A	Assembly	Preliminary entry by the system
S	Skeleton Model	Manuel entry

Note

Skeleton modules are filtered out during the parts list creation.

To 4: **Information Field II** (part document)

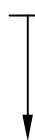
The information Field II allows the creation of documents with "related" content/topics while retaining the equipment codes and the document numbers, i.e. a "main" drawing (Entry 000) can be supplemented by drafts, versions and specification drawings.



0 0 0 **Main Drawing** 000: Automatic allocation/default, can be changed when required

Possible entries when required > resulting defaults > manual change options

1	2	3
---	---	---



- Numerical entry from 01 to 99
- Automatic allocation / manually changeable
i.e. entries do not have to be consecutive

Typ	Description	Remark	Approval ¹⁾ required
0 0 0	Main Drawing	automatic / manual	yes
E __	Draft- (Concept-) drawing	automatic / manual	no (content are not binding)
V __	Version drawing	automatic / manual	yes
S __	Specification drawing	manual	yes
I __	Information drawing	manual	no (content are not binding)

¹⁾ acc. Chapter 7.2 Approval Strategy

► **Draft (Concept) Drawings**

Up to 99 draft drawings can be created (E01 – E99).

A draft drawing may become a main drawing or a version drawing.

The digits 1 to 13 of the draft drawing number are identical with those of the main drawing.

► **Version Drawings**

Up to 99 version drawings can be created (V01 – V99).

The digits 1 to 13 of the version drawing number are identical with those of the main drawing.

The description (in the title block) of the version drawing must be linked to that of the main drawing.

► **Specification Drawings**

Up to 99 specification drawings can be created (S01 – S99).

Specification drawings contain less information than conventional assembly or part drawings .

They show minimum requirements (e.g. limit dimensions, connection measures, basic principles) in addition to the specifications. When a main drawing is required (in-house design), digits 1 to 13 of the specification drawing number are identical with the drawing number of the main drawing.

Summary

Equipment-code			Document-number								Information field I		Information field II			Rev.-Status		
1	2	3	4	5	6	7	8	9	10	11	12		13	14	15	16	17	18
See selection list			Provided by the system								Automatic allocation P / A		Automatic allocation 000			Automatic allocation to ZZ		
			0000001 to 9999999								Manual S		Semiautomatic / manual E / V / S / I with number					
											P Part A Assembly S Skeleton		000 Main Drawing E __ Draft V __ Version S __ Spec. I __ Info 01 to 99					

► For examples see following page

9.2 Examples for Drawing Numbers

Example 1: Part MAIN drawing / magnets
Description: Auflage

M	G	—	1	2	3	4	5	6	7	—	P	—	0	0	0	0	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Example 1.1: Part DRAFT drawing for example 1
Description: Auflage

M	G	—	1	2	3	4	5	6	7	—	P	—	E	0	1	0	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Example 1.2: Part VERSION drawing for example 1
Description: Auflage justierbar

M	G	—	1	2	3	4	5	6	7	—	P	—	V	0	4	0	C
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Example 2: Assembly / MAIN drawing / vacuum
Description: Kammer

V	C	—	7	6	5	4	3	2	1	—	A	—	0	0	0	0	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Example 2.1: DRAFT drawing for example 2
Description: Kammer CF-Ausführung

V	C	—	7	6	5	4	3	2	1	—	A	—	E	1	5	0	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Example 2.2: INFORMATION drawing for example 2
Description: Kammer

(SAP-Comment: bei T = 80 K)

V	C	—	7	6	5	4	3	2	1	—	A	—	I	0	1	0	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Example 2.3: SKELETON for example 2
Description: Skelett

M	G	—	7	6	5	4	3	2	1	—	S	—	0	0	0	0	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Example 3: Assembly / SPEZIFICATION drawing / beam diagnostic
Description: Diagnosekammer

B	D	—	2	4	6	8	9	0	3	—	A	—	S	0	1	0	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

9.3 Information Drawings

If there are one or more drawing(s) necessary, that go with a production drawing (reference drawing), with a content not relevant to construction, but important to document, you have to create relevant

information drawings.

If for instance the dimensions of an extremely cooled down component (model of a cooled component) deviate from the “warm” production stage, you have to exclude a confusion with the production drawings in the documentation. As reference drawings (“warm” presentation) and information drawings (e.g. “cold” presentation) are associated with each other, information drawings have to be labeled as follows:

Text entry on the information drawing (syntax)

Note concerning the information drawing:

The information drawing at hand shows “...a text for the purpose of the I-drawing ...”

It complements the drawing: name / drawing number (rev.: -) of the reference drawing

The entry is made above the header, at the relevant position (structure level 5).

Example 1

Name of the reference drawing

Testing magnet

Number of the reference drawing

MG-1111111-A-000 (B)

1.1 Name of the information drawing

Testing magnet (SAP-Comment: at T=80K)

information drawing number

MG-1111111-A-I01 (-)

-Text entry on the I-drawing

Note concerning the information drawing:

The information drawing at hand shows the adjustment measurement with 80K

It completes the drawing: testing magnet/ MG-1111111-A-000 (B)

1.2 Name of the information drawing

Testing magnet (SAP-Comment: at T=4K)

information drawing number

MG-1111111-A-I02 (-)

-Text entry on the I-drawing

Note concerning the information drawing:

The information drawing at hand shows the adjustment measurement at 4K

It completes the drawing: testing magnet / MG-1111111-A-000 (B)

Example 2

Name of the reference drawing

Testing magnet bent

Number of the reference drawing

MG-1111111-A-V05 (-)

2.1 Name of the information drawing

Testing magnet bent (SAP-Comment: at T=80K)

Information drawing number

MG-1111111-A-I03 (-)

-Text entry on the I-drawing

Note concerning the information drawing:



The information drawing at hand shows the adjustment measurement at 80K

It completes the drawing: testing magnet bent / MG-1111111-A-V05 (-)

- ▶ For the presentation of the text entry on the I-drawing concerning example 1.1 und 1.2 see the following page.

Text entry on the information drawing concerning example 1.1

Note concerning the information drawing:
 The information drawing at hand shows the adjustment measurements at 80K
 Reference drawing: testing magnet/ MG-111111-A-000 (B)

Copying of this document and giving it to others and the use of communication of the contents thereof are forbidden without express authority. Offenders are liable to the payment of damages. All rights are reserved in the event of the grant of a patent or the registration of a utility model or design.		Projection 		Rev. No.	Rev.-Doc.-No.	Date	Name	
		Surfaces DIN ISO 1302						
 Helmholtzzentrum für Schwerionenforschung GmbH Planckstrasse 1, 64291 Darmstadt		Dimensions without tolerance indication DIN ISO 2768-mK EN ISO 13920-BF		Weight Material		Scale 1:1		
		Description Testing magnet		Size A3				
Drawn	Date	Name	Drawing No. MG-111111-A-I01				Rev.	Sheet 1 of 1
Checked			Drawing No. MG-111111-A-I01				-	
Approved			Drawing No. MG-111111-A-I01					
		Prev. Deg.		Repl. for				
5		6		7		8		

Text entry on the information drawing concerning example 1.2

Note concerning the information drawing:
 The information drawing at hand shows the adjustment measurements at 4K
 Reference drawing: testing magnet/ MG-111111-A-000 (B)



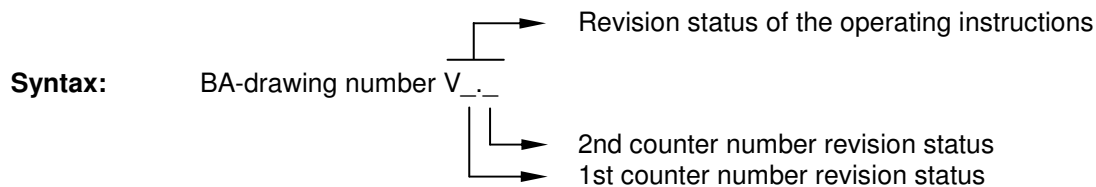
Copying of this document and giving it to others and the use of communication of the contents thereof are forbidden without express authority. Offenders are liable to the payment of damages. All rights are reserved in the event of the grant of a patent or the registration of a utility model or design.		Projection 		Rev. No.	Rev.-Doc.-No.	Date	Name	
		Surfaces DIN ISO 1302						
 Helmholtzzentrum für Schwerionenforschung GmbH Planckstrasse 1, 64291 Darmstadt		Dimensions without tolerance indication DIN ISO 2768-mK EN ISO 13920-BF		Weight Material		Scale 1:1		
		Description Testing magnet		Size A3				
Drawn	Date	Name	Drawing No. MG-111111-A-I02				Rev.	Sheet 1 of 1
Checked			Drawing No. MG-111111-A-I02				-	
Approved			Drawing No. MG-111111-A-I02					
		Prev. Deg.		Repl. for				
5		6		7		8		

Figure 23 Information drawings (Example “Cold model drawings“)

9.4 Operating Instructions / Safety Information

When a component requires operating instructions / safety information (BA), the document number of the operating instructions will be made up by the appropriate drawing number extended by "BA" and the revision number of the operating instructions / safety information.



Example

Reference drawing number	Resulting number of the operating instruction
VC-1234567-A-000	BA-VC-1234567-A-000 V1.0

Operating instructions may be valid or remain valid for various revisions of the associated drawing. The format for the version of the operating instructions was therefore arranged in a different way to the format for the drawing number to prevent mix-ups with the version of the drawing (00, 0A, 0B, ..., XX).

The "initial revision status" for operating instructions is: V1.0

1st Counter Number Revision Status

The 1st counter number of the revision status is increased when the change in the operating instructions concerns changes to the safety engineering content.

2nd Counter Number Revision Status

The 2nd counter number of the revision status is increased when the change in the operating instructions does not concern changes to the safety engineering content.

Example: Layout changes, text changes without safety engineering background, etc..

Operating instructions are stored on the "O" drive:

O:\ Betriebsanleitungen \ Projektnummer_Titel \ BA-Zeichnungsnummer Rev.-Stand

Example: O:\ Betriebsanleitungen \ 0-1234_Testkammer \ BA-VC-1234567-A-000 V1.0

10 Procedures for External Service Providers / Designs

You were provided with insight into our way of working and information on the tools used in the GSI design environment to make our cooperation as effective as possible.

Contract partners (external service providers / engineering offices / others) must commit to certain minimum requirements in order to achieve this goal.

Adherence to / consideration of existing laws, regulations, directives and relevant standards is obviously mandatory for appropriate contract fulfilment.

Examples: German Device and Product Safety Act (GPSG)

Directive 2006/42/EC (Directive on machinery)

EN ISO 12100 Safety of machinery

DIN EN ISO 13857 Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs

EN 349 Safety of machinery- Minimum gaps to avoid crushing of parts of the human body

The technical guidelines of GSI must be considered according to the project requirements.

The variety of possible tasks results in different order categories (types of design orders).

The following minimum requirements are binding for a type of design order to avoid misunderstandings with regard to the type and scope of the service to be provided.

The following types of design orders are used:

▶ **Concepts**

▶ **Drafts**

▶ **Developments**

The allocation of design orders to external service providers must only be done by MDS or at least with the participation of MDS. This ensures that the drawings and documents, which have been commissioned, meet the standard of MDS and the required filing criteria.

For external service providers it is possible to use the drawings frames and title block structures of the GSI. External title blocks can be accepted, when they contain all necessary details due to DIN EN ISO 7200.

10.1 Concepts

Concepts include qualitative, functioning structures in CAD and are to be documented by supplementary descriptions when this is required for better understanding. Data and documents are the basis for subsequent processing steps (drafts / developments).

Minimum Scope of Concept Documentation

The contractor must at least provide the following services:

- Determine the functions to be fulfilled and the function structure
- Description of the concepts in a report (data files and printed version)
- Development status (CAD data files and printed version)
- Evaluation of the work results
- Solution selection and analysis of weaknesses, when required
- A look at the next steps

The documents and data must completely be handed over to the customer according to the Chapter "document handover / data exchange" (10.4).

The result of concepts must be accepted by the respective customer and the Department Mechanical Design in writing.

10.2 Drafts

Drafts include implementable solutions drawn to scale in CAD that can be implemented as complete, functional designs for further development/addition of details.

Drafts are supposed to be feasible in the traditional way (functionality / producibility / etc.). They follow the basic design rules (clear / simple / safe). The quality of drafts must allow for subsequent development without ambiguity, i.e. all function- and production-relevant requirements must be specified.

Minimum Scope of Draft Documentation

The contractor must at least provide the following services:

- Draft drawing(s) according to scale with all geometrical information and according to the requirements listed above
- Description of the draft in a report (data files and printed version)
- Evaluation of the work result and an overview of the next steps (data files and printed version)
- CAD data suitable for further development/details (CAD data files and printed version)

Selection of possible contents of a draft description:

- Design criteria and resulting calculations
- Significant surface and tolerance information
- Special purchased parts, etc.
- Material selection
- Unusual production methods
- Functional dimensions
- Etc.

The documents and data must completely be handed over to the customer according to the Chapter "document handover / data exchange" (10.4).

The result of drafts must be accepted by the respective customer and the Mechanical Design in writing.

10.3 Detailing

Detailing includes full documentation (technical documentation) that must be handed over to GSI without exceptions.

Minimum Scope of Detailing

The contractor must at least provide the following services:

Drawings, Parts Lists

A complete, production-ready set of drawings (part drawings, assembly drawings, parts lists and change messages for the creation of new revisions, when required) and all additional documentation that may be required (see: project folder).

The following minimum information concerning the GSI-internal data administration is required for drawings and parts lists when headers according to DIN EN ISO 7200 are used.

- Complete company information ¹⁾
- Part number (Drawing number)
- Release date (= Date of release by the approving person of the service provider)
- Page number / number of pages (Page ... of ...)
- Title (name / name of the drawing)
- Approving person (i.e. name of releasing person in print with signature on the printout)
- Author (i.e. name of person responsible in print)
- Document type
- Change index (revision status)

¹⁾ A transfer of the right of use to GSI by contractual arrangements remains unaffected.

Note

Shaded or coloured views/elements (pictures) are not allowed.

Document Layout

All documents must be provided with a suitable number system. The use of GSI drawing numbers is not permitted without written approval by Mechanical Design.

All documents must have a clearly identifiable release status and an appropriate revision status.

A higher revision status of a document can only be created when the previous one has been released.

All documents must be provided with full company information of the service provider.

Project Folder

All documents must be handed over to GSI in released form at the end of the contract.

The signed originals are handed over in a folder complete with a table of contents and the appropriate registers. The back labelling of the project folder must include the following minimum information:

- Title of the main drawing
- Drawing number of the main drawing and revision status
- GSI order No.
- Company name of the service provider
- Year
- ... possible, additional information as agreed upon

Extent of the Technical Documentation

The minimum scope of the technical documentation is based on the legal specifications. Directive 2006/42/EC (Machinery Directive) determines the minimum scope for machines and partial machines in Appendix VII. When the machine directive is not applicable due to the type of design, the document scope must be provided as far as this is applicable.

Typical minimum content:

- General description of the design
- Complete set of drawings / parts lists
- Assembly instructions
- instructions for the machinery
- Maintenance plans
- Information concerning risk reduction / residual risks
- Applied safety and health protection requirements
- Applied standards / directives / etc.
- Check lists / internal production control
- Proofs of calculation / inspection
- Other (depending on project and order)

One original copy of documents subject to release procedures (drawings / parts lists / etc.) must be stored in the project folder in its original size (printed version) and provided with the name (in print) and signature of a person authorised by the service provider.

10.4 Document Handover / Data Exchange

The delivery scope includes all developments and documents in paper form (printed version / single) as well as in "file form" (data files). The procedures to be adhered to, regarding the exchange formats and the tools to be used, are described in the following document:

Data exchange guidelines

Procedures for machine construction internal / external

in its currently valid version.

10.5 Design Guideline Specifications to be Used

The following chapters of the design guidelines are binding when CATIA-V5 is used

Chapter 3 CAD settings

Chapter 4 CAD procedures and rules

The application of the following chapters is mandatory as far as they are system-independent:

Chapter 5 Document design

Chapter 6 Preferred information

CAD System

The CAD system to be used by the service provider must be specified in the contract. Preferably, CATIA-V5 should be used.

10.6 Supporting Tools

10.6.1 CAD-/ SAP Guest Account

It is possible to enter data into the GSI systems by using a guest account. Appropriate contractual regulations must be compiled to use a guest account.

The guest account user is in such cases obliged to enter in all documents the "company name" and "operator name" of the service provider as additional data in the document information set in SAP.

The handover of a full project folder according to the minimum requirements is retained.

10.6.2 Standard and Purchased Part Catalogues

Process-independent CAD data sets with the standard and purchased parts that should preferably be used are available to our external partners in neutral format (STEP AP214). The data can be made available as needed.

10.6.3 Technical Guidelines

The technical guidelines can be made available as needed.

10.7 Procedures for Using GSI Templates

Different templates for drawings and parts lists may be used. So the service provider can use GSI-templates, after consultation and case-dependent. The use of the templates of the service provider is also possible.

If drawings and parts lists are created and the data added onto GSI-templates by means of a GSI-guest-account, the origin and the responsibility must be seen clearly on the documents.

As external service providers do not have the right to release within the GSI-SAP-field, there takes place a formal release by the system (SAP-CDI-status-change) by authorized GSI-staff in SAP.

When using the GSI-templates, the following cases are distinguished:

- **Case 1:** The processing is done responsibly by the service-provider at GSI
- **Case 2:** The processing is done responsibly by the service provider at the service provider's
- **Case 3:** The processing is done by the service provider under the guidance of GSI

As the case may be, it is mandatory, that the service provider integrates additional title blocks / inscriptions on any drawing / parts list. The service provider is responsible for the completeness and correctness of the details.

When using the GSI-templates, the service provider must necessarily consider the following points.

Positioning of additional title blocks on drawings



Figure 24 Additional title block drawings/position on the drawing frame

10.7.1 The processing is done responsibly by the service provider at GSI

- Case 1

The status change by GSI is done "on behalf of" the service provider, who has viewed his design and responsibly found it complete and correct. This status change by the system must not be mixed up with an approval by the customer. Because of the continued, order-related coordination with the service provider the status change in the system will take place not until the order has reached a release-staged, verified jointly.

Marking of the drawing with additional title block / responsible processing by the service provider at GSI / use of GSI-templates:


Responsible for design Muster Design GmbH Musterstrasse 1 12345 Musterhausen			Copying of this document and giving it to others and the use of communication of the contents thereof are forbidden without express authority. Offenders are liable to the payment of damages. All rights are reserved in the event of the grant of a patent or the registration of a utility model or design.		Projection 	Rev. No. Rev.-Doc.-No. Date Name
GSI Helmholtzzentrum für Schwerionenforschung GmbH Planckstrasse 1, 64291 Darmstadt			Surfaces DIN ISO 1302		Dimensions without tolerance indication DIN ISO 2768-mK EN ISO 13920-BF	Weight Material Scale
Drawn TT.MM.JJJJ Checked TT.MM.JJJJ Approved TT.MM.JJJJ	Date TT.MM.JJJJ TT.MM.JJJJ TT.MM.JJJJ	Name A. Mustermann B. Mustermann C. Mustermann	Date Name Gastaccount GSI GSI	Description Description Drawing No. GSI-Drawing-No. Rev. Sheet of Prev. Dwg. Repl. for		

Figure 25 Marking of the drawings (case 1)

As to parts lists the information is given in the field of the parts list title block, which is marked below. As the space is limited, the absolutely certain company information is sufficient. Parts lists are always linked to a correspondent drawing, therefore the further information can be taken from the correspondent drawing.

Marking of the parts list with company information in the marked field / responsible processing by the service provider at GSI / use of GSI-templates:

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GSI GSI Helmholtzzentrum für Schwerionenforschung GmbH Planckstrasse 1, 64291 Darmstadt			Date Name Gastaccount GSI GSI		Description Description Drawing No. GSI-Drawing-No. Rev. Prev. Dwg. Repl. for		
Item 1 2	Qty. 1 2	Description Description Description	Drawing No. Drawing No. Drawing No.	Dimensions (finished part) Dimensions (finished part) Dimensions (finished part)	Standard / Source of supply Standard / Source of supply Standard / Source of supply	Material Material Material	Remark Remark Remark

Figure 26 Marking of the parts lists (case 1)

10.7.2 The processing is done responsibly by the service provider at the service provider's

- Case 2

Marking of the drawing with additional title block and entry of the processor in the drawing title block / responsible processing by the service provider at the service provider / use of GSI-templates:



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	 Helmholtzzentrum für Schwerionenforschung GmbH Planckstrasse 1, 64291 Darmstadt		Surfaces DIN ISO 1302	Dimensions without tolerance indication DIN ISO 2768-mK EN ISO 13920-BF		Weight Material	Scale	
	Drawn TT.MM.JJJJ A. Mustermann	Checked TT.MM.JJJJ B. Mustermann	Approved TT.MM.JJJJ C. Mustermann	Description		Drawing No. <i>external-Drawing-No.</i>		Rev. Sheet of
	Date Name		Prevl. Dwg.		Repl. for			

Figure 27 Marking of the drawings (case 2)

Marking of the parts list with information about the company and the processor in the parts list title block / responsible processing by the service provider at the service provider / use of GSI-templates:


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 GSI Helmholtzzentrum für Schwerionenforschung GmbH Planckstrasse 1, 64291 Darmstadt		Date Name	Description		Drawing No. <i>external Drawing-No.</i>			Rev.
Drawn TT.MM.JJJJ A. Mustermann		Checked TT.MM.JJJJ B. Mustermann		Approved TT.MM.JJJJ C. Mustermann		Prevl. Dwg.		Repl. for
Item	Qty.	Description	Drawing No.	Dimensions (finished part)	Standard / Source of supply	Material	Remark	
1								
2								

Figure 28 Marking of the parts lists (case 2)

10.7.3 The procession is done by the service provider under the guidance of GSI

- Case 3

In order to retrace the person, who does the drawing compilation, and the delegated service provider, the drawings and parts lists must be marked by additional information on the GSI-templates.

Marking of the drawing with an additional title block/processing is done under the guidance of GSI / use of the GSI-templates:



Drawn by Muster Design GmbH Musterstrasse 1 12345 Musterhausen			Copying of this document and giving it to others and the use of communication of the contents thereof are forbidden without express authority. Offenders are liable to the payment of damages. All rights are reserved in the event of the grant of a patent or the registration of a utility model or design.				Projection  Surfaces DIN ISO 1302		Rev. No.	Rev.-Doc.-No.	Date	Name
Drawn	Date	Name	 Helmholtzzentrum für Schwerionenforschung GmbH Planckstrasse 1, 64291 Darmstadt		Dimensions without tolerance indication DIN ISO 2768-mK EN ISO 13920-BF		Weight Material		Scale			
	TT.MM.JJJJ	Max Mustermann			Description		Drawing No. GSI-Drawing-No.		Rev.	Sheet of		
Drawn		Gastaccount			Checked GSI		Approved GSI		Prevl. Dwg.		Repl. for	

Figure 29 Marking of the drawings (case 3)

Marking of the parts list with information about the company and the processor in the parts list title block / processing is done under the guidance of GSI / use of the GSI-templates.


Copying of this Document, and giving it to others and the use of communication of the contents thereof, are forbidden without express authority. Offenders are liable to the payment of damages. All rights are reserved in the event of the grant of a patent or the registration of a utility model or design.			Drawn by Max Mustermann Muster Design GmbH Musterstrasse 1 12345 Musterhausen			Rev. No.	Rev.-Doc.-No.	Date	Name	
 GSI Helmholtzzentrum für Schwerionenforschung GmbH Planckstrasse 1, 64291 Darmstadt			Date		Name		Description			
			Drawn		Gastaccount					
			Checked		GSI					
			Approved		GSI					
						Drawing No.		GSI-Drawing-No.		Rev.
						Prevl. Dwg.		Repl. for		
Item	Qty.	Description	Drawing No.	Dimensions (finished part)	Standard / Source of supply	Material	Remark			
1										
2										

Figure 30 Marking of the parts lists (case 3)

10.7.4 The processing is done using the templates of the service provider

When templates (title blocks) of the service provider show the minimum information of the internal data management of the GSI, they can be taken, using a suitable drawing number system of the service provider and taking into account the modalities of the KRL/DARL.

0		-	-	-	-							
Index	Revisions	Drawn	Checked	Approved	Date							
Muster Design GmbH Musterhausen						DEPARTMENT						
Project						ORDER NUMBER						
Description						DRAWING NUMBER						
Drawn	Datum:	Name:	Prepared	Datum:	Name:	Rev.- Index						
Checked	Datum:	Name:	Approved	Datum:	Name:	Scale	1:	Drawing dimension:	DIN A3			
Orig.:						Supersedes:			Superseded by:			Sheet of
Measurements excluding indications of tolerances: Structural steel engineering acc. to DIN EN ISO 13920 - B Mechanical engineering acc. to DIN ISO 2768-mK						Geometrical Product Spec. acc. to DIN EN ISO 1302 Thermal Cutting acc. to DIN EN ISO 9013						
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Figure 31 Example of a potential title block of a service provider

10.8 Release confirmation by the service provider

As the data for the service provider were created in an "external system", the "final" state must be documented for both parties, the service provider and GSI, at the end of the contract.

The service provider confirms in a letter with the original signature of an appropriately authorised person that he bears the full responsibility for the design as it is assigned by a work contract.

The confirmation must be provided according to the sample letter provided below.

► ... see following page

11 Trademarks

CATIA[®] is a registered trademark of Dassault Systéms.

SAP[®] is a registered trademark of the SAP-AG.

CDI[®] is a registered trademark of the CENIT-AG.

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All further (registered) trademark are in possession of the respective owner.

12 Space for Notes

A series of 25 horizontal dotted lines providing space for notes.



HELMHOLTZ

SPITZENFORSCHUNG FÜR
GROSSE HERAUSFORDERUNGEN



Helmholtzzentrum für
Schwerionenforschung GmbH

Planckstraße 1
64291 Darmstadt