

Engineering drawing and cutaway models



Engineering drawings present a very abstract image of the components or devices with precise specifications. Using geometric and graphical features such as lines and symbols, as well as alphanumeric characters such as digits and letters, a three-dimensional object is described in two dimensions.

Reading and understanding engineering drawings is a fundamental element in the development of professional competence in all engineering disciplines.

Engineering drawing course

The engineering drawing course is composed of two modules. The first module uses geometric models to develop spatial concepts. The second offers the application of rules and standards in technical communication with selected components, cutaway models and assembly exercises that help with the understanding of functions and assembly. An important educational objective of the course is the presentation of specific

applications and the use of real workpieces and standard parts. This is intended to develop engineering-related communication skills. The actual drawing tasks are developed from a larger technological environment.

Model sets for developing spatial concepts



Model constructed in a corner of a room with folded representations

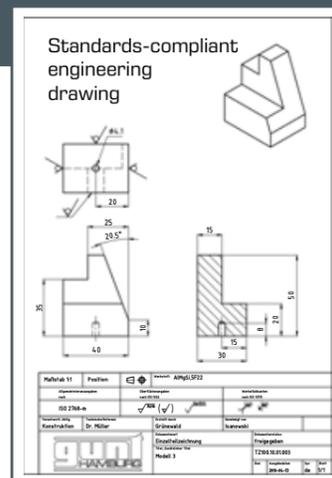
The representation of a body and the "folding" (or changing of the direction of projection) causes difficulties for many students. It requires a large capacity for abstraction and spatial imagination. These skills can be developed with appropriate training. The GUNT geometric models have been designed to teach spa-

tial imagination. These skills are vital for creating perspective drawings and interpreting drawings and sketches, known as the ability to "read" drawings.

Components and assembly exercises for teaching rules and standards in engineering communication

The creation of an engineering drawing, whether manually or computer assisted, follows binding rules – the drafting standards – that do not permit any ambiguity. The drafting standards of the DIN (Deutsches Institut für Normung, German Institute for Standardization) take account of the standards and recommendations of the ISO (International Organization for Standardization) and are therefore applicable internationally. The published drafting standards, identified by the name DIN, ISO or EN ISO, include, for example:

- precise identification and use of line styles, hatches and colours as well as the representation of views and sections
- isometric and diametric representation; simplified representation
- dimension inscriptions, tolerance abbreviations
- drawing-sheet formats, title blocks, standard font
- fits; basic terms of tolerances and fits
- surface characteristics



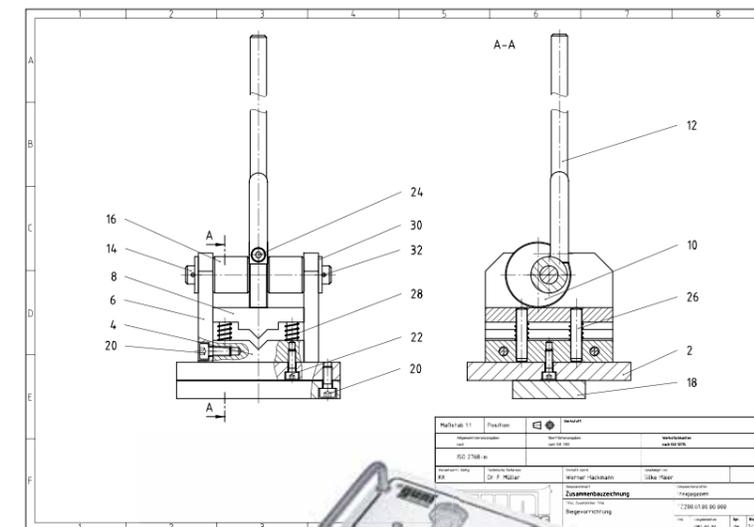
Standards-compliant engineering drawing

Cutaway models and assembly exercises to demonstrate the functions

Using assembly exercises links engineering communication to the associated technical operations such as assembly and manufacturing. In this way, theoretical and practical learning content supports the skills of reading and understanding drawings, graphs and schematics.

Real understanding can only be achieved by doing and by one's own drawing activity.

Engineering animations such as cutaway models are ideally suited to representing processes and functions. GUNT uses up-to-date original parts for its cutaway models. Movement and switching functions are maintained.



General arrangement drawing

The components and assembly exercises of GUNT teach:

- the standards-compliant execution of engineering drawings
- the recognition of standardised representations
- the understanding of contexts of individual components

The ability to read drawings is demonstrated using:

- general arrangement drawings and exploded drawings
- raw casting drawing, production drawings

The types of drawings and their role and content in terms of standardisation are precisely explained.



Assembled lever press