

## Assembly exercises

### Assembly process

In industrial manufacturing, the repeated fashioning of individual prefabricated components and assemblies into a finished product, unit or device is called assembly.

The entire assembly process comprises the assembly operations:



Joining (DIN 8593)

- joining together
- filling
- pressing on and impressing
- joining by moulding
- joining by forming
- welding
- soldering
- bonding
- textile joining



Handling (VDI 2860)

- retaining
  - ▶ changing quantities
  - ▶ dividing
  - ▶ merging
- moving
  - ▶ turning
  - ▶ positioning
- securing
  - ▶ holding
  - ▶ detaching
- inspecting
  - ▶ checking



Special operations

- cleaning
- aligning
- marking
- lubricating
- ...

### Design based on assembly requirements

An optimum design based on assembly requirements is characterised by the fact that only a few simple, unique or essential steps are required to assemble a product. Similarly, a parallel assembly of components should be planned at the design stage. If fully automated assembly is planned, this requires sophisticated solutions especially for the automated, safe grasping

of the workpiece. In design based on assembly requirements, the prerequisites and constraints have to be taken into account when building the product in assembly. Design based on assembly cannot be learned by theoretical teaching, but must be practised.

### Specifications for the design

Excerpt from the book, Grundlagen der Konstruktionslehre, Klaus-Jörg Conrad

#### When designing individual parts:

- design parts so that the ordering of the parts before assembly is not needed
- simplify position and orientation of the parts by external features, such as symmetrical shape
- simplify positioning by bevels, grooves, recesses, guides, etc.
- design joints so as to be easily accessible for tools and observation of the assembly process

#### When designing assemblies:

- structure product division with clear, testable assemblies in order to perform assembly operations with simple types of movement
- choose functional tolerances, but not too tight
- take note of disassembly and recycling in the design stage
- simplify or avoid calibration processes by means of good accessibility
- reduce number of individual components and joints
- design repetitive assemblies

### Assembly exercises

The assembly exercises from GUNT are part of the GUNT-Practice Line. This series of units has been designed specifically for the areas of assembly, maintenance and repair (see also catalogue 2). Together with cutaway models, these units represent a practical addition to the field of engineering design. With our assembly exercises, we offer lecturers an interface between general, rather theoretical learning content and application-based, practical work.

#### Learning objectives

Develop broad knowledge of assembly technology as a basis for the design of assemblies

Introduction to technical terms and technical language

Familiarisation with machine elements and standard parts

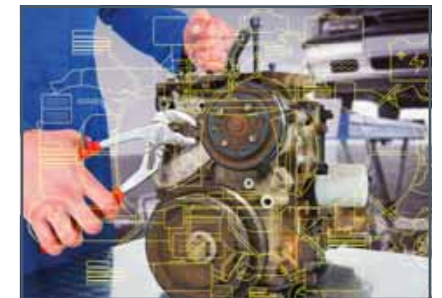
Recognise assemblies, understand functions, describe systems

Read and understand technical documentation

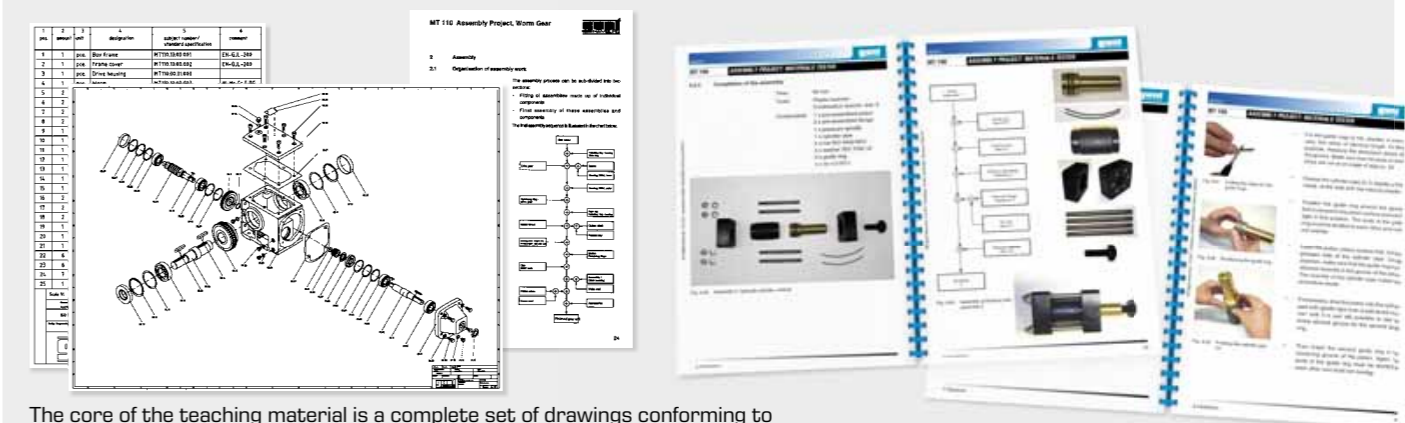
Plan and execute assembly steps and sequences

Familiarisation with typical tools and devices

Check and evaluate work results



### Our instructional material for assembly exercises



The core of the teaching material is a complete set of drawings conforming to standards. In addition to the assembly drawing with parts list, you will find all manufacturing drawings of the individual parts. So you are able to produce your own parts, or have them manufactured for you.

### Multimedia instructional material for MT 120 assembly exercise



GUNT attaches great importance to innovative, state-of-the-art solutions and modern ways of imparting knowledge in the preparation of instructional material.



MT 120  
Assembly exercise: spur gear

Montage / Assembly