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

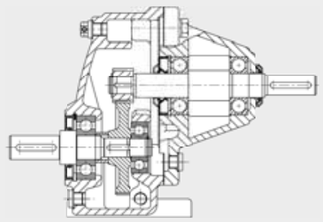
Assembly exercises

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.

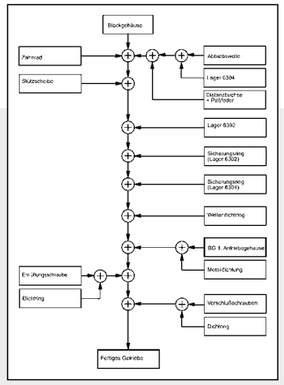
Learning objectives
Develop broad knowledge of assembly technology as a basis for the design of assemblies
Introduction to technical terms and technical language
Familiarisation with machine elements and standard parts
Recognise assemblies, understand functions, describe systems
Read and understand technical documentation
Plan and execute assembly steps and sequences
Familiarisation with typical tools and devices
Check and evaluate work results

The typical scope of delivery of our assembly exercises is shown using the example of the MT 152 spur gear:

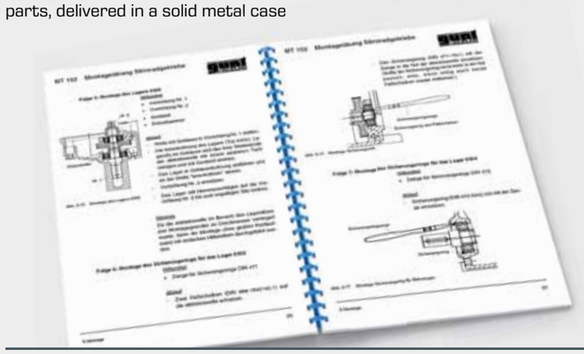
Spur gear deconstructed into individual parts, delivered in a solid metal case



Engineering drawing



Assembly plan



Extract from the documentation

Assembled spur gear