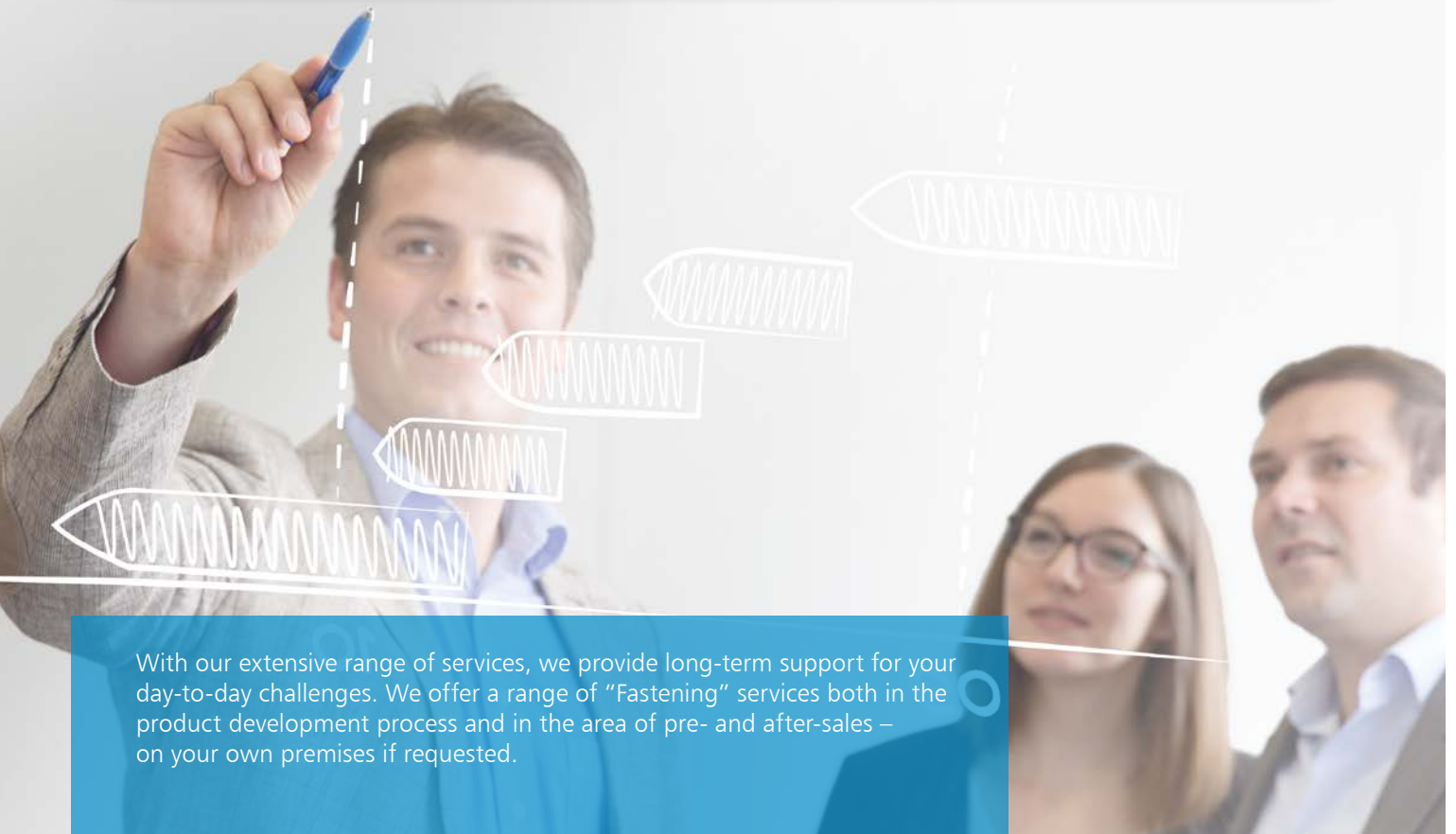


03 Services

Comprehensive services for your challenges



With our extensive range of services, we provide long-term support for your day-to-day challenges. We offer a range of “Fastening” services both in the product development process and in the area of pre- and after-sales – on your own premises if requested.



Engineering Services

- Fast Designer
- Fast Creator
- Fastener Testing Center
- Fastener Express

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On-Site Services

- International Customer Service
- International Application Engineers
- Ramp up Service
- Mobile Testing Service

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Production Services

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Fastening Academy

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Digital Services

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Engineering Services – Fast Designer

Fast Designer: Sound expertise – reliable predictions

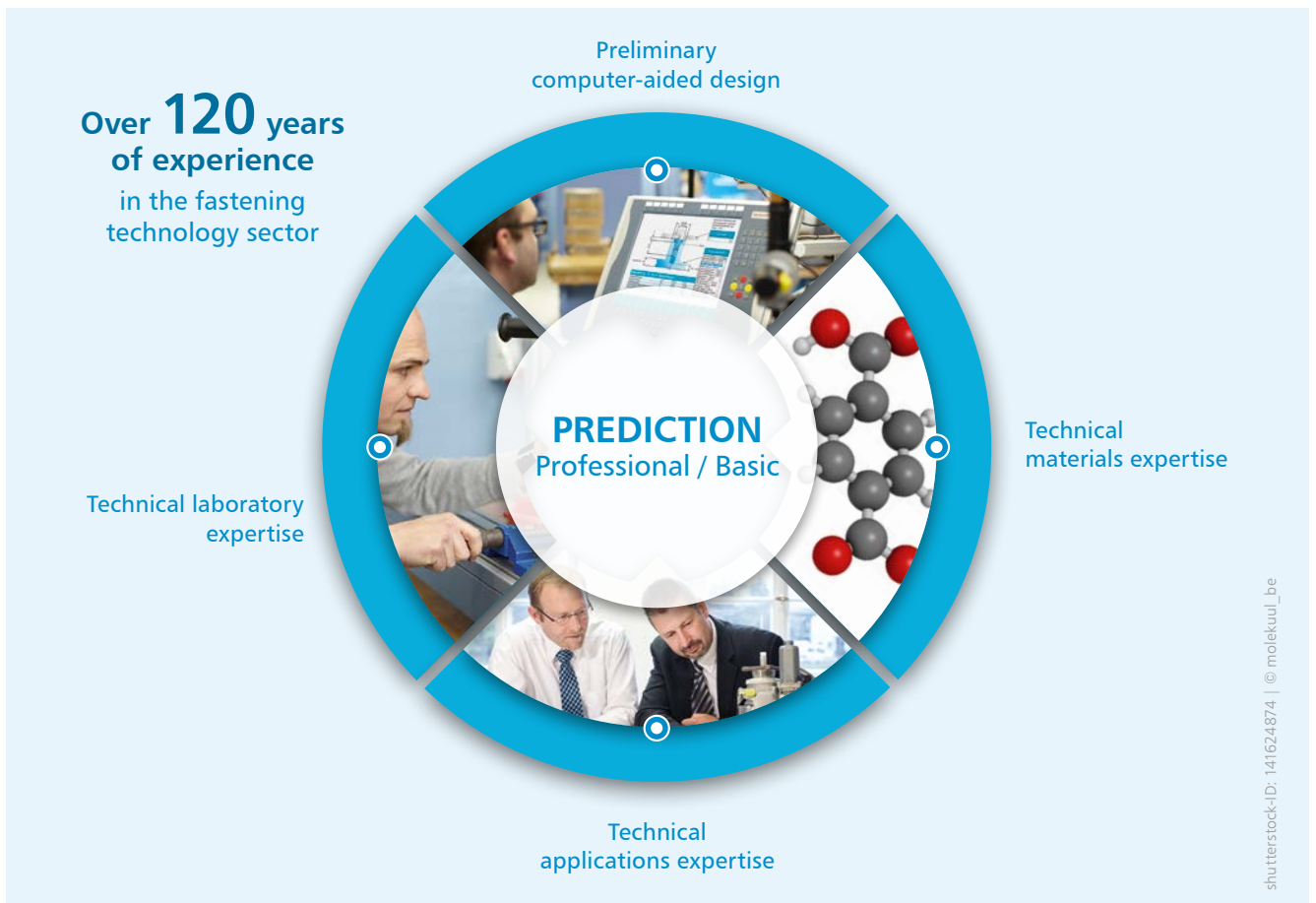
Are you designing a component that needs to be screw-fastened to another component? Need to know how the materials will handle the fastening with regard to stability and clamping force in the long term? Which method of fastening will be the most beneficial in terms of cost and efficiency?

Fast Designer provides your answer.



Fast Designer – ARNOLD’s prediction program – is based on the four components illustrated below; these are areas in which ARNOLD has been continuously extending its expertise over 120 years. The program produces the most reliable prediction results possible and ARNOLD uses these to determine

the most appropriate fastening solution for your particular requirements. With just a few details – such as the nominal diameter and the material – ARNOLD can already draw significant conclusions about your design.





Engineering Services – Fast Creator

The best solution with Fast Creator

The component is defined on the basis of your requirements and our expertise.

“Fast Creator” is used to configure the appropriate fastener from ARNOLD’s own standard range to match your requirements. And of course we also offer further help with developing parts from your drawings.

The “Fast Creator” product configurator

The fastest, safest way to your customised fastening solution.

- ⊕ Configuration from ARNOLD’s own standard range
- ⊕ Many documents to download
- ⊕ Technical drawings and CAD data immediately available
- ⊕ Free to My ARNOLD users



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ARNOLD Fast Creator: Your space for in-depth technical information about the latest fastening technologies.

Engineering Services – Fastener Testing Center

ARNOLD UMFORMTECHNIK's Fastener Testing Center offers you a full service programme wherever you need to carry out checks, tests, measurements or qualifications on metal components. The most up-to-date test equipment and highly qualified staff provide the right platform for high-quality and neutral results.

Mechanical Inspections

Inspecting the mechanical properties of components

Testing range:

- 1.1 Pulling tests to DIN EN 10002-1 / DIN EN ISO 898-1
 - at ambient temperature on screws
 - at ambient temperature on wire sections
- 1.2 Torque / breaking torque to DIN EN 20898-7
- 1.3 Pressure test/pressure resistance to DIN 50106
- 1.4 Hardness test to DIN EN ISO 6507 (HV10, HV0.3)
- 1.5 EHT measurement
- 1.6 Hardness processes

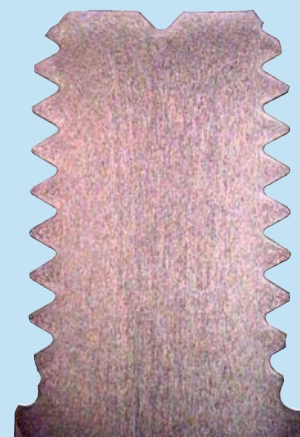


Metallography

Assessment of joints in heat-treated and case-hardened steels

Testing range:

- 2.1 Macro and micro-grinding
- 2.2 Micro-structure analysis
- 2.3 Carbonisation condition
- 2.4 Degree of cleanliness DIN 50602
- 2.5 Ascertaining grain size ASTM E112
- 2.6 Ascertaining coating thickness
- 2.7 Measurement



Metrics

Measurement of components

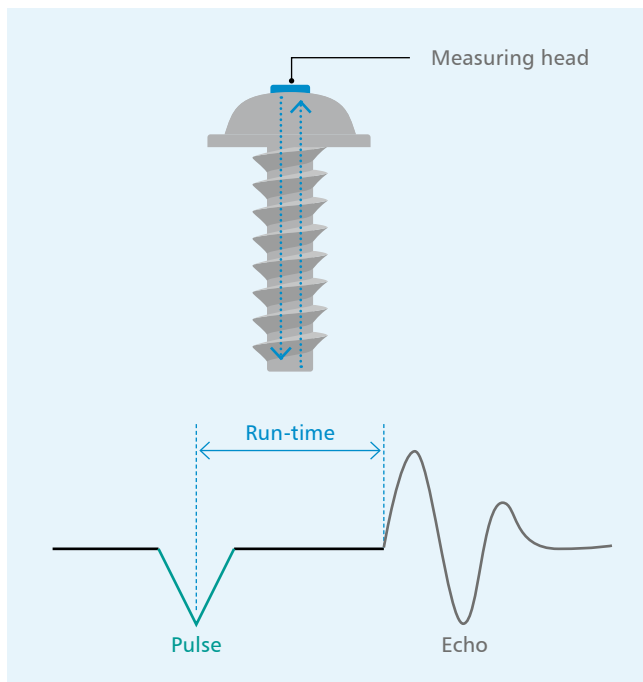
Testing range:

- 3.1 3D measurement
- 3.2 Profile measurement
- 3.3 Length and diameter
- 3.4 Radii and angles



Engineering Services – Fastener Testing Center

Preload force ultrasonic measurement is based on the pulse-echo process and it determines the run-time difference of an ultrasonic pulse induced on a loaded and unloaded screw.



The benefits

- + Measurement on original screws
- + No additional parting line
- + Measurement of several screw positions
- + Long term investigations possible
- + Field tests are possible



How it works

A piezo element and a measuring instrument induce an ultrasonic pulse one end of the screw. The pulse courses through the fastener and is reflected at the other end in the form of an echo. When it courses through the screw a second time, this echo is recorded on the measuring instrument and the run-time of the ultrasonic pulse is measured. The run-time is specific to each screw and increases as the screw is tightened in the elastic area due to its expansion and the acousto-elastic effect that occurs.

By comparing run-times under no load (reference run-time/reference measurement) and after the screw has been tightened, it is possible - taking further factors into account – to draw conclusions about the preload force.

Range of applications

Nominal diameter and clamping length

When supplying the necessary components for set-up and qualification, it is possible in principle to carry out an ultrasonic-based preload force measurement in the following fields of application:

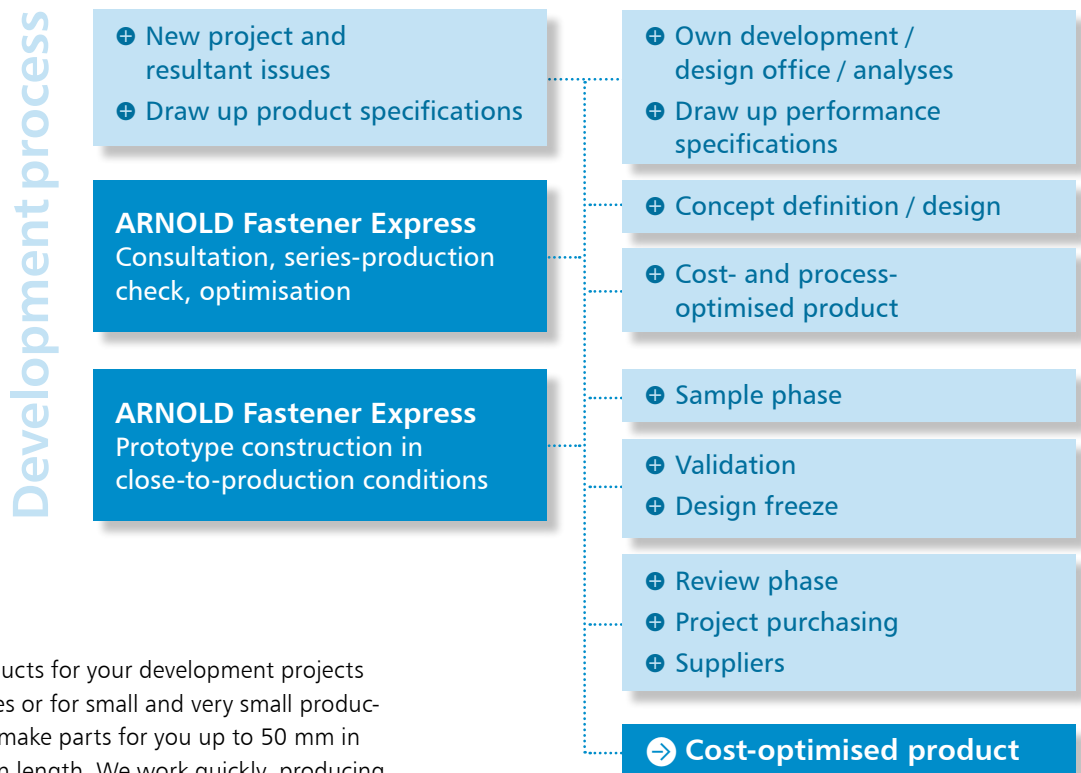
Areas of application	Nominal diameter	Clamping length
Metric thread	≥ 3.0 mm	≥ 1.0 mm
Direct screw fastening of metals	≥ 3.0 mm	≥ 1.0 mm



fotoID: 4429 | © Gismo

Engineering Services – Fastener Express

In record time to market with prototypes and functioning models. With Fastener Express you have a comprehensive range of fasteners (screws, nuts, rivets, etc.) and functional parts at your fingertips within a very short time.



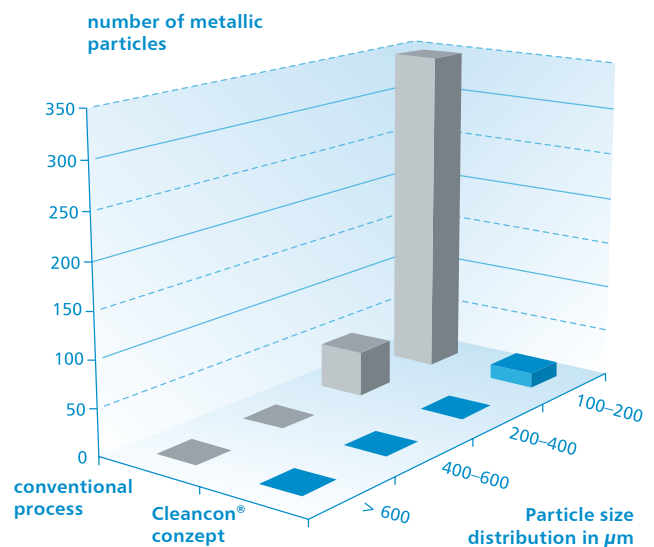
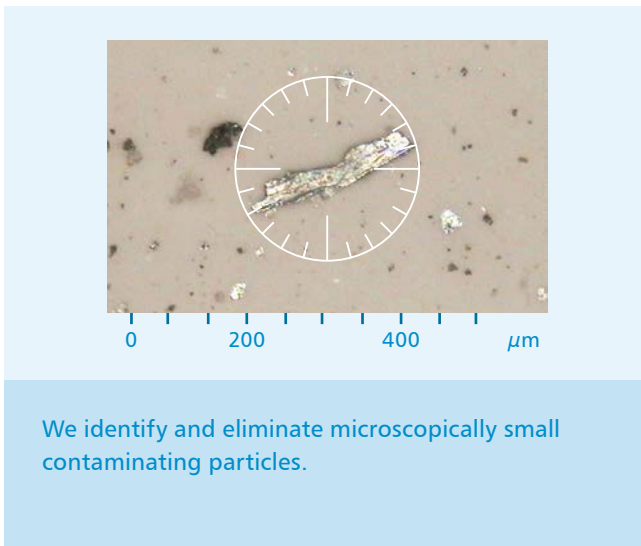
Whether you need products for your development projects and your own prototypes or for small and very small production runs, ARNOLD will make parts for you up to 50 mm in diameter and 200 mm in length. We work quickly, producing parts that are technically perfect and immediately ready for use.

Production Services – Cleancon®

More safety due to ultra-fine cleaning

Your electronic and hydraulic components can be at risk from contamination by microscopically small particles. Every conventional manufacturing process produces such contaminating particles. And particularly in small and compact components this contamination can cause entire systems to fail. To enable us to meet your requirements for significantly improved operating safety, we have developed a special production process that guarantees technical cleanliness in the manufacture of our fasteners.

Tracking down contamination



In conventional manufacturing the number of metallic contaminating particles 100–200 µm and 200–400 µm in size is much higher (shown in grey) than with Cleancon's® ultra-fine cleaning processes (shown in blue).

Step by step to perfect cleanliness



1. Requirements profile

- + limiting values defined
- + ambient factors considered
- + surface specified
- + test specifications
- + packaging requirements

2. Production

- + cleaning processes during manufacture

3. Clean room

- + ultra-fine cleaning
- + low-friction coating (optional)
- + packing

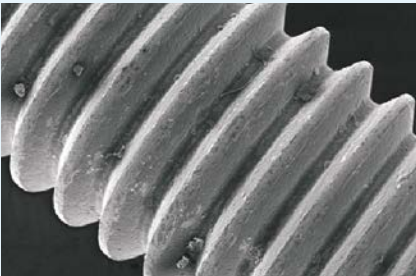
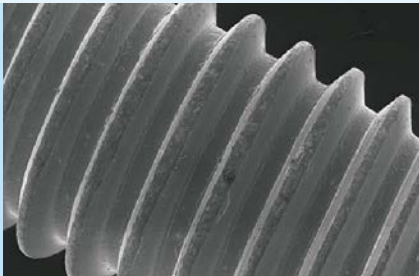

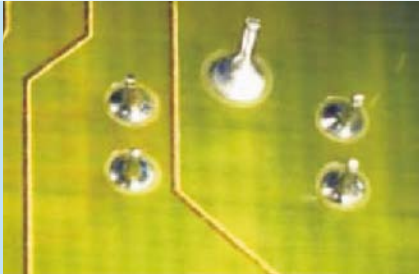
4. Cleanliness analysis to VDA 19.1 standard

- + adapted extraction procedure
- + analyse of
 - particle size distribution
 - gravimetry

5. "Clean" packaging

- + position-holding, anti-static inner packaging
- + customisable outer packaging

1:1 comparison of normal and ultra-fine with Cleancon[®]

No ultra-fine cleaning	After Cleancon [®] ultra-fine cleaning
	
<p>The contaminating particles can be clearly seen under the electron microscope (left).</p>	
	
<p>Contaminated fasteners result in contaminated applications (left). On the right is a technically clean screw fastening on a PCB ultra-fine cleaning with Cleancon[®].</p>	

Cleancon[®] gives you a clean advantage

- ⊕ We make sure of your project's economic success by tailoring the process precisely to your requirements.
- ⊕ You can use our ultra-fine cleaned fasteners to implement your smaller structures, and achieve better output densities. So you can fully exploit the opportunities for component miniaturisation.
- ⊕ Since our Cleancon[®] parts indicate significantly better quality, you and we receive fewer complaints.

Moreover, you benefit from some great enhancements:

- ⊕ longer service life for your hydraulic, mechanical, fluid systems etc., because they suffer less wear.
- ⊕ fewer failures of functional and safety components, such as your electronic control systems.

Cleanroom services: cleaning, coating, packing

Our aim is for Cleancon® to meet our own extremely high requirements for technical cleanliness. That's why we have developed a special production process, at the end of which the fasteners are placed into a specially designed clean room for ultra-fine cleaning.

Since we also apply the optional low-friction coating, and pack the fasteners inside the cleanroom there are no further downstream processes that could cause contamination.

This is where we perform the following services for you:

- ⊕ the manufactured fasteners are subjected to the ultra-fine cleaning process using the most up-to-date plant technology
- ⊕ optionally: a low friction coating can be applied directly after the cleaning process
- ⊕ shipment packaging for clean consignments



Staying clean with CLEANPAC®

To ensure that the parts arrive to you immaculately clean, in the condition in which they leave our clean room, we developed our CLEANPAC® system. This innovative packaging ensures that the articles cannot rub against one another during shipment. It prevents more particles from forming. The ultra-fine cleaned particles are fastened into position with the CLEANPAC® system. The onion-skin principle enables us to create customised packaging round the anti-static inner packaging.





Our test laboratory gives you reassurance

Part of the ultra-fine cleaning process is to consult with you beforehand to specify the cleanliness values you want to achieve, and to define your requirements. We can check and provide evidence of the results in our own test laboratory. The laboratory contains a comprehensive range of state-of-the-art test equipment, capable of carrying out cleanliness analyses to VDA, volume 19.1 requirements. Using an adapted extraction process we can analyse fasteners in our laboratory, in particular for

- + particle size distribution using light microscopy
- + gravimetry

ARNOLD is your committed expert

At the request of the Automotive and Automotive supplier industries, the Fraunhofer Institute for Production Technology and Automation (IPA) in Stuttgart founded the "Montsa" Industry Association to create a discussion platform for issues surrounding "clean" assembly. As a manufacturer and service provider in the fastening technology sector, Arnold Umformtechnik is making a major contribution to research into fastening technology on the subject of "clean" assembly. Arnold has taken active part in the revision of the VDA 19 standard and is actively involved in drawing up the forthcoming regulations on the subject.

MontSa

**Industrieverbund
„Sauberkeitsgerechte
Montage“**

Fraunhofer Institut
Produktionstechnik und
Automatisierung

Production Services – Assembly

Integrating ready-to-install components

When you develop a new part, you need to engineer a component assembly with an integral joining element. Here, a technically high-quality and economically attractive solution is required - a solution that will best integrate into the overall development process as well as into the series production run that follows. This is where our Assembly service offers you professional support.

Assembly - development

Working with you, we develop the best possible solution for your component and integrate it perfectly into your overall project.



Assembly - production

With our own production capacities we can produce technically high quality and economically attractive ready-to-install modules.



Integrating assembly into your development and series production process

Your new project

- ⊕ Define the various steps of the project
- ⊕ Sub-project for ready-to-install module
- ⊕ Coordinate sub-projects within the context of the overall project
- ⊕ Sample phase
- ⊕ Test phase
- ⊕ Design freeze

- ⊕ Start of production

Assembly - development

- ⊕ Analysis of the module requirements
- ⊕ Development (components and tools)
- ⊕ Prototyping
- ⊕ Testing
- ⊕ Approval

Assembly - production

- ⊕ Tool-making
- ⊕ Small, medium, and bulk production runs

The advantages to you

- ⊕ Development and production of ready-to-install fastening modules from a single source
- ⊕ Intelligent fastening technology ensures cost-optimisation right from the start
- ⊕ Reduces component diversity, handling and investment in processing technology.

The development and production program

Assembly of sheet metal components



Application examples

- + Sheet-metal parts with PIAS[®] or Rivtex[®] pierce-clinch nuts
- + Sheet-metal parts with STRUX[®] or Rivtex[®] self-clinching screws
- + Customised sheet metal parts with EPS special fasteners

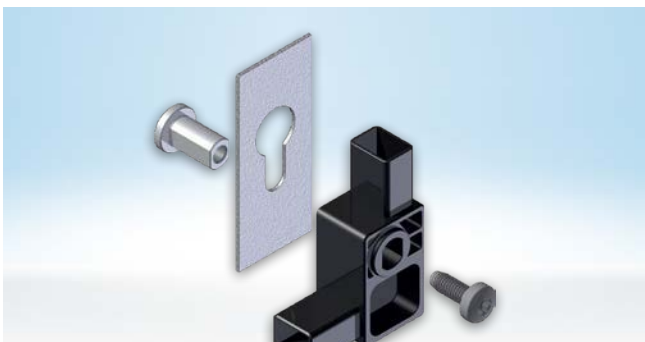
Assembly of individual modules



Application examples

- + Sheet-metal bending and stamped parts combined with formed parts
- + Multi-material component assemblies
- + Screw / bushing combinations

Assembly of plastics



Application examples

- + Plastic-to-metal fasteners
- + Plastic-to-sheet metal fasteners
- + Plastics fasteners with functional parts

Digital Services – My ARNOLD

Your space for in-depth technical information about the latest fastening technologies

My ARNOLD – this is your ARNOLD

- + "Fast Creator" product configurator
- + Many documents to download
- + Technical drawings and CAD data immediately available
- + Free to My ARNOLD users



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Digital Services – ARNOLD App

Mobile access to our experts:
24 hours – around the clock

The ARNOLD App

- + Company information at a glance
- + Core competencies at a glance
- + Availability of all films and simulations from ARNOLD TV



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Digital Services – ARNOLD Newsletter

Always up-to-date
with the latest ARNOLD technology

ARNOLD Newsletter

- + Always current information about new groundbreaking developments and technologies
- + Exclusive topics of interest to industry professionals
- + Free of charge – but not for nothing



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Digital Services – ARNOLD TV

Experts explain,
simulations show things clearly

ARNOLD TV

- + Complex production processes are clearly presented in detail
- + ARNOLD experts provide exciting insights into unique technologies
- + Lots of information about the long-established and innovative ARNOLD company
- + Available via:
www.arnold-fastening.com



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On-Site Services – International Customer Service

With ARNOLD you're on the safe side: ensuring consistently high system availability by training your plant and repair technicians, and by selecting suitable maintenance contracts and spare parts packages.

On-Site Services – International Application Engineers

Our experts provide on-site support with your development projects.

With our international network of qualified application experts, we provide long-term support for your challenges in the development process and in the area of pre- and after sales.



On-Site Services – Ramp up

We assist you with production start-up for your component with our tailored Ramp-up Engineering service.



On-Site Services – Mobile Testing Service: we test screw fastenings at your own premises

Our sales engineers will come directly to you with the appropriate measuring equipment to carry out application investigations at your premises.

This on-site analysis gives you several advantages:



- + We can carry out investigations in extremely close-to-production conditions, for example directly on your assembly line, and thus "live" in the application.
- + You can directly influence the way the tests are carried out and the test conditions.
- + We save your time and expense, because we bring all the equipment that is required to you.
- + We test important screw parameters in your original components, without them needing to leave your premises.
- + Comprehensive investigation report after the site visit.

ARNOLD Fastening Academy

The people and their knowledge are a company's greatest asset. That's why investing in these factors is a step towards a sustainably successful future. With the Fastening Academy, ARNOLD UMFORMTECHNIK offers a training series with

which it is possible to train employees with different standards of knowledge. The Basic, Advanced, Professional and Expert modules ensure that the transfer of knowledge is matched to each participant's level of knowledge. Speakers are all experts in fastening technology and the industries associated with fastening technology, speaking on topics covering materials, surfaces, machining technology, etc.



Fastening Academy

- + Educational model from beginner to expert
- + Possible to start at any time
- + Practice-based speakers with many years of application expertise
- + Extensive opportunities for further training
- + Also available as in-house courses on site at your premises

