

VESSEL AND APPARATUS CONSTRUCTION  
Competence in Stainless Steel



**Vessels and apparatus for:**

- Pharmaceutical Industry
- Biotechnology
- Cosmetics Industry
- Healthcare
- Food Industry
- Chemical Industry
- Machine Building
- Dye / Textile Industry

Page	Content
3	<b>Company</b> – Philosophy and Approach
4	<b>Production</b> – Unique and Series Production
5	<b>Engineering</b> – Consulting and Design
6	<b>Cutting</b> – Conventional, 3-Dimensional and Plasma
7	<b>Vessel Construction</b> – Prefabrication and Welding
8	<b>References</b>
10	<b>Surface Treatment</b> – Pickling
11	<b>Surface Processing</b> – Grinding
12	<b>Quality</b> – Approval and Shipment
13	<b>Certificates</b> – International Certifications
14	<b>Branches</b> – Variety and Know-how



# Company

## Philosophy and Approach

Who guarantees quality puts each area of the company onto a test bench. Because the customers does expect the best in all fields of their requirements and not only restricted to production or surface qualities.

A transparent teamwork belongs to it absolutely and results from clear scheduling, sophisticated planning goals, a reliable fulfillment of agreements as well as direct personal conversations.

Partners can rely on it since about two decades: At AMS, a selected machine equipment, technical experiences, ambition and craftsmanship are connected with each other – in order to guarantee excellent quality for all customers.



### → Milestones

- Beginning of the 60s: Production of wooden tub washing machines/transfer from wooden to stainless steel processing
- Beginning of the 70s: Complete change to stainless steel production
- Until the end of the 80s: Production of dye works machines
- 1990s: Reorientation to vessel and apparatus construction, former company name Aurich Edelstahl GmbH
- 02. July 2002: Foundation of the AMS Technology GmbH
- 2005: New building in the industrial park Limbach-Oberfrohna south
- 2008: Production capacity doubled to 6.200 m<sup>2</sup>
- 2010: Certifications ASME, U/U<sub>M</sub>-Stamp
- 2012: Chinese Manufacturing License
- From 2016: Certification by the rules of the Eurasian customs union



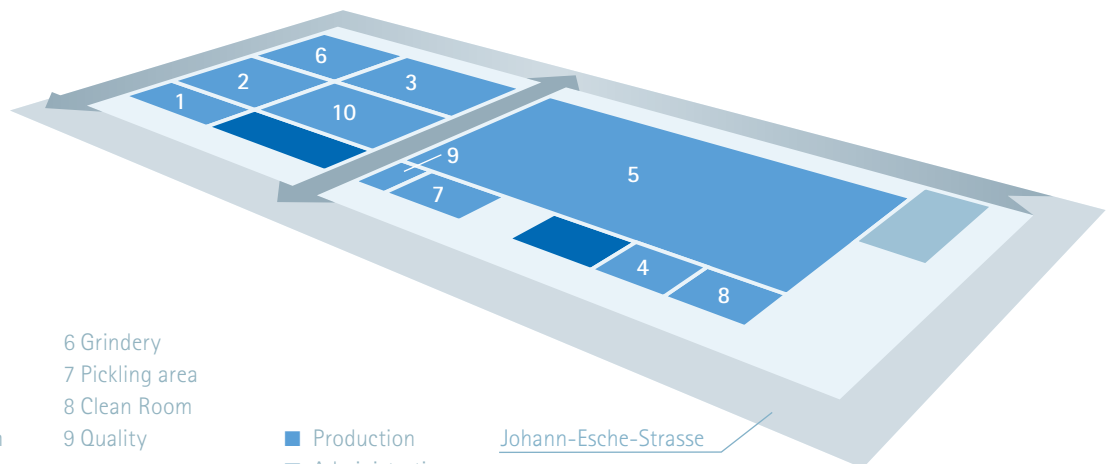
## Unique and Series Production

AMS offers high quality – from vessels, apparatus and plants in the milliliter sector until pieces that weigh 20 t at a diameter of up to 4.000 mm. The production

of uniques defines our business sector. But AMS can do more! At each time we are able to design, produce and deliver high volumes on schedule as well.

An exclusive processing of stainless steel belongs to the quality and self-conception.

Look and see and accompany us on a tour!



### → Overview

- |                            |                            |
|----------------------------|----------------------------|
| 1 Training/<br>Programming | 6 Grindery                 |
| 2 Cutting                  | 7 Pickling area            |
| 3 Prefabrication           | 8 Clean Room               |
| 4 Machining                | 9 Quality<br>assurance     |
| 5 Vessel<br>Construction   | 10 Packing<br>and Shipping |

- Production
- Administration
- Storage

Johann-Esche-Strasse

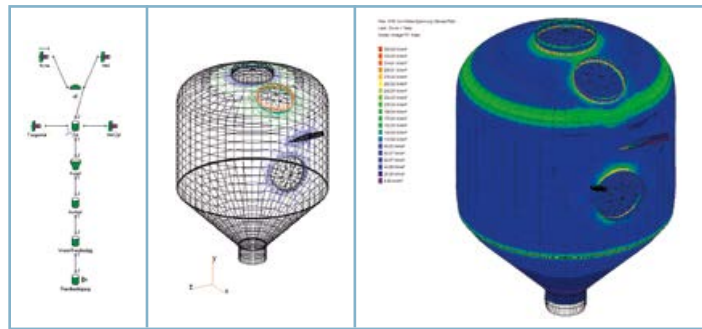
### → Facts and figures of production

- Vessel volume up to 60.000 l
  - Sheet metal thickness up to 20 mm
  - Individual vessel sizes up to 4.000 mm diameter
  - Vessel construction up to 20 t weight
  - Surface quality up to  $R_a 0,2 \mu m$
  - For highest requirements in pharmaceutical, cosmetic and food processing industry
- Internal quality standards guarantee superb results in the material processing, the welding execution and the surface technique as they are required at the high purity requirements of the pharmaceutical and food processing industry.



# Engineering

## Consulting and Design



Long-lasting experience is the essential criterion especially in the consulting period.

Customer demands are realized, optimized technologically and provided as production data in conjunction with the construction know-how of the AMS-engineers.

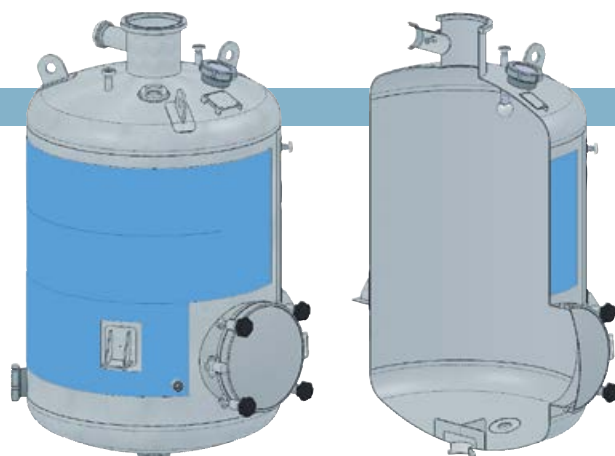
Therefore, the fabrication is very intimately connected with documentation services. Our colleagues are in direct contact with the quality assurance, the acceptance organizations (Technical Inspection Agency TÜV, Germanischer Lloyd etc.), independent test labs and with the customers.

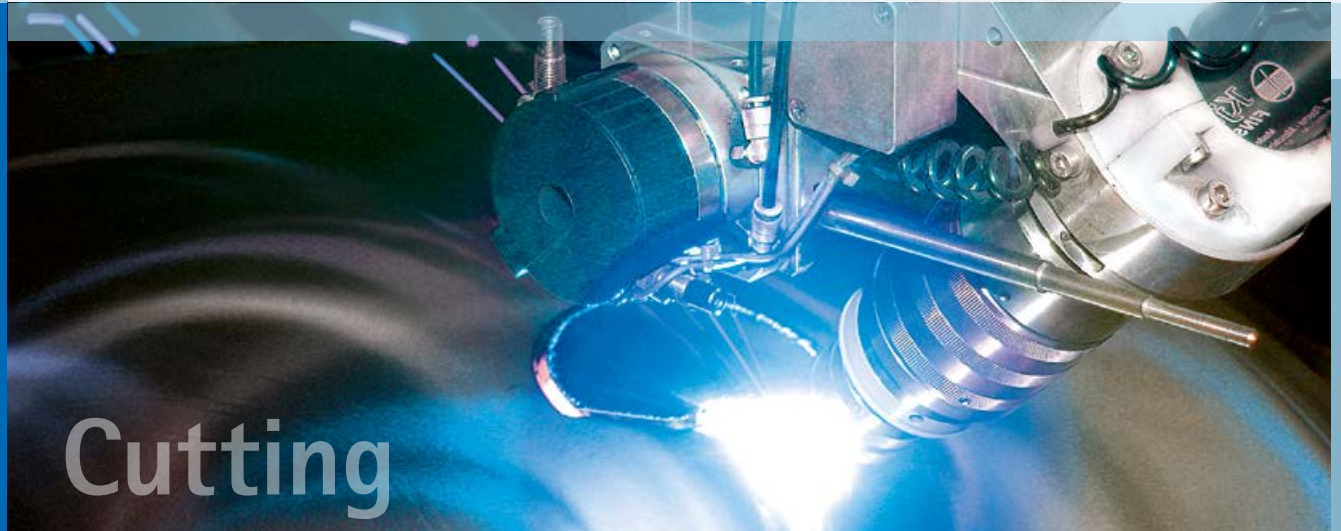
### → Engineering tools

- 2D Autocad
- 2D ZWCAD
- 3D PTC Creo Direct/Klietsch
- 3D Solid Works

### → Calculation tools

- WIN\_SHELL
- Compress





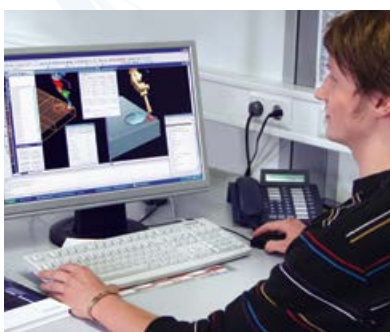
# Cutting

## Conventional, 3-Dimensional and Plasma



Sheet metal, bar and pipe material are cut on a modern electromechanical metal bandsaw and a hydraulic plate shear.

The plasma cutting robot machine enables 3-dimensional hole and beveling cuts. Therefore, vessel heads as well as flat metal sheets come to the machine on two mobile cutting tables, either separated to each other or coupled, with a total size of 4.270 x 4.120 mm each.



### → 3D-cutting of vessel heads

- Until 4.000 mm head diameter and 2.000 mm head height
- Sheet metal thickness depending on cutting angle from 5 to 50 mm
- Forms: hemispherical heads, elliptical heads, normally curved heads, curved discs, spherical dished covers, flat heads, diffuser heads, conical heads, torispherical heads and many more.

### → Flat cutting

- Until 8.000 mm length and 4.000 mm width
- Sheet metal thickness depending on cutting angle from 5 to 50 mm
- Bevel/chamfer types: upper cut bevels, lower cut bevels, vertical cuts, reverse upper cut bevels



# Vessel Construction

## Prefabrication and Welding

Coil or sheet metal is bended to vessel shells and cones up to a diameter of 4.000 mm and a length of 3.000 mm and welded to finished cylinders or cones in modern round bending machines. While border crimping conical heads on the sheet metal forming machine like the 'Eckold Kraftformer', sheet folding machines and press brakes edging or bending sheet metal components exactly.

Turned parts with drillings and millings to produce individual vessel flanges, nozzles or sleeves are produced in the own production department 'Machining'.

So, all pre-produced components are assembled, aligned, adjusted and welded together on large assembly and welding work stations.

The welding-in of all nozzles into the openings of the vessel heads which cut by robot before, the adjustment and the placement of the legs, the support brackets and the individual mounting parts belongs to the production variety as well as the implementation of heating or cooling systems and other additions and installations.



### → Prefabrication / Metal Forming

- 3-Roll round bending machines
  - Sheet metal thickness
    - Initial rounding of 2 to 15 mm
    - Circular form bending of 3 to 20 mm
  - Usable length
    - of 2.050 to 3.050 mm
- 2-Roll round bending machine
  - Sheet metal thickness up to 3 mm
  - Usable length up to 800 mm

### → Machining

- Universal milling machine
  - Working areas 1.160 x 260 mm
    - or 1.000 x 400 mm
- CNC-fast radial drilling machine
  - Workpiece dimensions
    - (LxWxH) 2.950 x 1.050 x 1.300 mm
- Cycle-controlled turning machine
  - Distance between centers 1.000 mm
  - Diameter 570/340 mm

### → Welding

- 50 TIG welding devices
- 5 MIG/MAG welding devices
- 5 TIG cold wire welding devices
- Automatic gantry welding system
  - for round / longitudinal welds and half-pipe coils
- Automatic welding machine for pipe / flange connections

# CHEMISTRY

METALLURGY COSMETICS

E-MOBILITY FOOD

# MECHANICAL ENGINEERING

# BIOTECHNOLOGY

PHARMACY

## References

# SEMICONDUCTOR

Vacuum cover



Machine frame



Spirits storage



Cocoa mixer



Bayonet closing



### → Chemical Industry, Machine Building, Dye Works, Textile Industry, Foodtech

- Adsorption vessel
- Activated carbon filter
- Preparation vessel
- Washing filter
- Aroma tank
- Component for meat processing machine
- Carburizing vessel
- Distillation column
- Precipitation reactor
- Dye pre-mixing unit
- Fat melting vessel
- Fruit digester
- Cocoa mixer
- Crystallization vessel
- Machine frame
- Multilayer filter
- Process mixer / dryer
- Buffer return gas compressor
- Sprinkling cooler
- Tube bundle heat exchanger
- Salt-water evaporator
- Acid / lye container
- Loose material mixer / dryer
- Sterile pressure vessel
- Vacuum cover
- Drop process tower
- and many more



METICS

TECH

SURFACE TREATMENT

SOLAR

TECHNOLOGY

HEALTHCARE

RESEARCH

DYEING

Bioreactor



Cosmetics mixer



Mobile pharmaceutical mixer



→ Pharmacy, Biotech, Cosmetics, Healthcare

- Preparation vessel stationary / mobile
- Antibody vessel
- Bioreactor
- Blood plasma vessel
- CIP-vessel
- Cryo-vessel
- Precipitation reactor
- Fermenter
- Inactivation vessel
- Cosmetics mixer
- Culture vessel
- Mixing vessel
- Pasteurization vessel
- Pharmaceutical mixer stationary / mobile
- Pharmaceutical agitator vessel
- Sample taking vessel
- Buffer preparation vessel
- Buffer filtrate vessel
- PW-vessel
- Agitator vessel
- Lotion / Creme mixer
- Sterilization vessel
- Lubrication unit
- WFI-vessel
- Weighing container
- Fluidized bed dryer
- and many more



# Surface Treatment

## Pickling

The pickling bath is especially designed for the vessel and apparatus construction.

The treatment of large components is also possible with dimensions of 6.500 x 1.800 x 1.800 mm and a capacity of 20 m<sup>3</sup>. Complete vessels are spray pickled in the spraying area of 140 m<sup>2</sup>.

Electropolishing as well as glass bead blasting are executed by reliable regional partners. All necessary protocols and proofs of the surface quality and executed procedures are created of course.



### → Pickling

#### Pickling bath

- Size 6.500 x 1.800 x 1.800 mm
- Usable volume 20 m<sup>3</sup>

#### Spray pickling area

- Size of room 140 m<sup>2</sup>
- Tools: Rail connection into the production hall, own crane system



# Surface Processing

## Grinding

The grindery is a completely protected hall area of 540 m<sup>2</sup>. Two filter systems for air cleaning and recirculation guarantee that it is not possible to spread dust particles to other production areas.

Two modern belt grinding machines are used for the internal and external grinding of vessels and heads as well as for the execution of cylindrical grinding works. A double belt grinding machine is installed for grinding, matting and polishing flat surfaces.

Furthermore, our colleagues grind and polish manually at ten work stations in order to remove processing traces and to create each required surface quality.



### → Grinding

#### Vessel and head grinding machines

- Diameter of 250 to 4.000 mm
- Length up to 3.000 mm
- Head diameter up to 4.000 mm
- Reachable surface quality R<sub>a</sub> 0,2 μm
- Longitudinal and round grinding

#### Pipe grinding machine

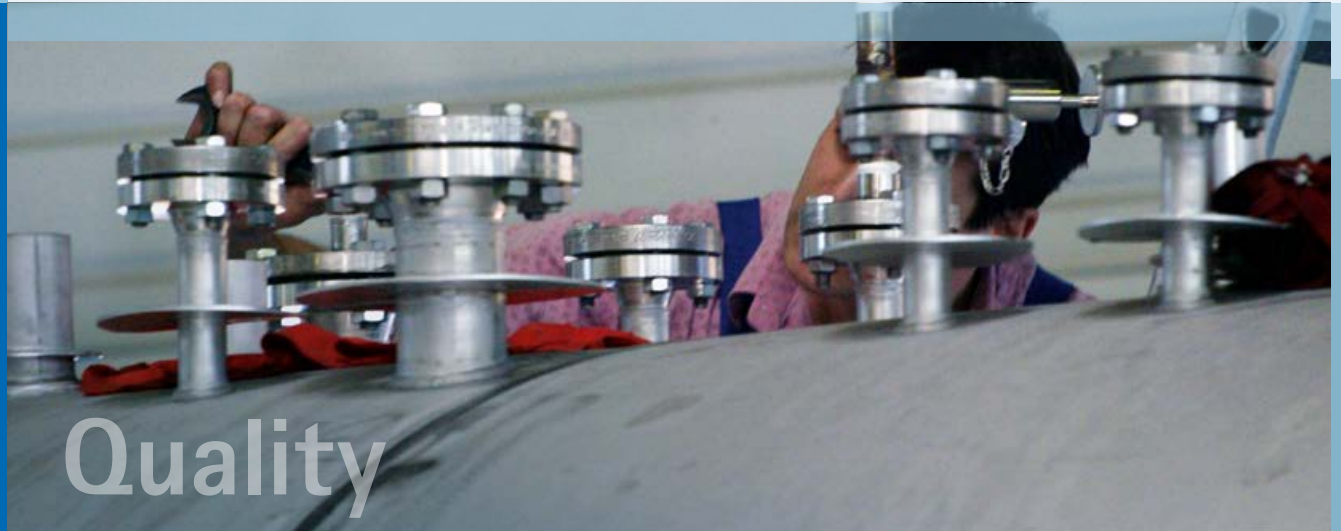
- Diameter from 10 to 100 mm

#### Double belt grinding machine

- Work space 1.000 x 4.000 mm

#### Manual grinding work stations

- 10 work stations with integrated exhaust system for individual grinding and polishing works by professional stainless steel grinding craftsmen



## Approval and Shipment

Afterwards, the finished vessels are transferred to the quality assurance. The colleagues of this department check each product for dimensional accuracy, pressure resistance as well as absence of cracks.

Furthermore, all necessary measuring data are documented exactly for the approval of the Technical Control Board (TÜV) according to the requirement specification.

After finishing the checks, AMS-assemblers mount insulation materials if required, create the external finish and execute the final cleaning as well as the passivation of the vessels. Due to the agreement, the deliverable vessels are prepared, packed and shipped for sea or truck transport.



### → Quality assurance / Measuring devices

#### Video Endoscope

- For images and film sequences at inaccessible or invisible areas
- Working length 4.500 mm
- Four times 150° bendable

#### Metal spectrometer

- For material identification

#### Roughness measuring device

- For the determination of surface roughness  $R_a$ ,  $R_z$ ,  $R_{max}$
- Measure scope until 0,1  $\mu\text{m}$

#### Wall thickness measuring device

- Measure scope with standard probe from 1,2 to 250 mm

#### Residual oxygen measuring device

- For the measuring and exact definition of the gas concentration at the forming and inert gas welding

#### Ferrite concentration measuring device

- Non-destructive measuring of the ferrite concentration



# Certificates

## International Certifications

AMS delivers worldwide pressurized vessels and apparatus made of stainless steel. Permissions and certificates that are valid internationally and in the particular countries are presupposed for that.

The AMS verifies these quality requirements as a welding production company and owns all certificates in order to provide its products in Europe as well as in the scope of the ASME-standards.

We do conform to Russian regulations as the TR (GOST-R)-certification, special hygiene permissions or qualifications by WHG.

The ‚Chinese Manufacturing License D1/D2‘ permits AMS to import pressure devices into China.



Whether process mixers to Australia, evaporators or crystallizers to Vietnam, biochemical reactors to China, sterile vessels to Slovakia, cosmetic mixing apparatus to the USA or desalination systems to Africa – AMS owns excellent know-how, all necessary permissions and complete experiences in the execution of complex projects.

### → Certificates

- Manufacturing Licence for PR China for pressure vessels of the category D1/D2
- ASME Section VIII Div.1 U-Stamp/ U<sub>M</sub>-Stamp

- WHG (Water Resources Act)
- CE – Certificate
- TR (GOST-R) - Certificate Russia
- Hygiene certificate for Russia
- PED 2014/68/EU – AD 2000 HP 0

- DIN EN ISO 3834-3
- EN 13445 (in preparation)
- Internal production check with control of the approval (Module A1)



# Branches

## Variety and Know-how

Vessel construction out of stainless steel is exciting. Each order is different, each branch has its own approaches, each technology needs special parts and equipments in the vessels itself.

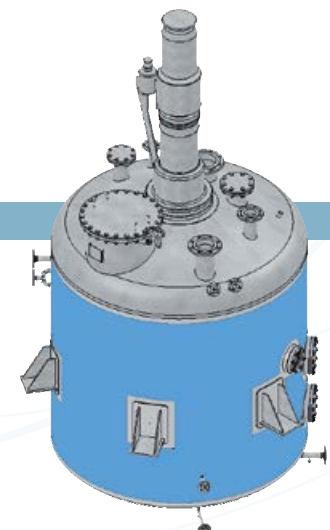
The vessels and apparatus of AMS are tools in a strict sense in which and with whom complex technological processes are executed.

Tools that have to work extremely reliable – and so they do. So it does not matter for which branch AMS works: Quality is necessity and own approach at the same time!



### → Smart branch mix

- Pharmaceutical Industry
- Biotechnology
- Cosmetics Industry
- Healthcare
- Food Industry
- Chemical Industry
- Machine Building
- Dye / Textile Industry







## AMS

Apparate-Maschinen-Systeme  
Technology GmbH  
Johann-Esche-Strasse 4  
09212 Limbach-Oberfrohna  
Germany

Phone: +49 3722/50 33 - 0

Fax: +49 3722/50 33 - 33

E-Mail: [info@ams-systeme.de](mailto:info@ams-systeme.de)

[www.ams-systeme.de](http://www.ams-systeme.de)



Partner at:



[www.fertigungsnetzwerk.de](http://www.fertigungsnetzwerk.de)