Cleaning starts with the tray

Design of workpiece holders

Solutions based on practical examples

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1. Company data Metallform

2. Basic principles for optimally designed cleaning baskets

3. Design of workpiece holders with examples
   - Definition of workpiece carrier
   - Relevant factors
   - Standard Program – Possibilities and Limits
   - Special solutions – depending on the application
   - Examples

4. Conclusion

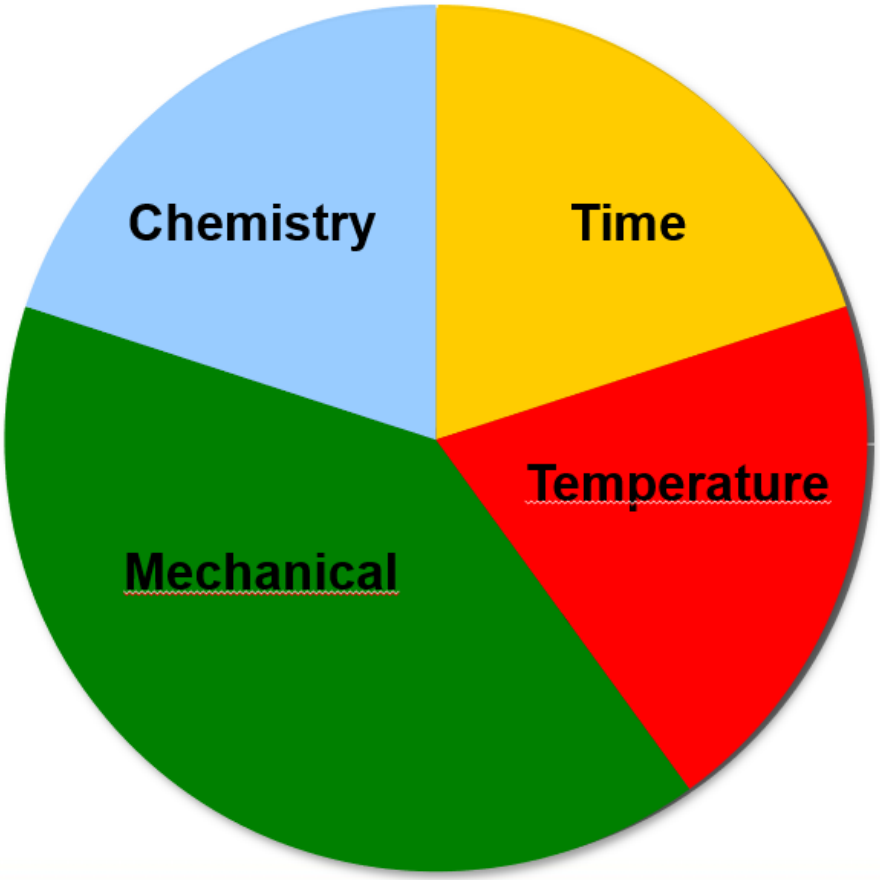
Company building

Dates and facts

Registered office :	Bretten-Gölshausen
Company was founded:	1983 as a company for stainless steel sheet processing
Team:	80 Employee
Production/storage space :	4.100 m²
Product ranges :	Sheet metal forming (since1983) cleaning baskets and workpiece holders for industrial parts cleaning (since1988)
Turnover p.a.:	approx. 9 Mio. EUR

2. Basic requirements

The 4 parameters of the cleaning process



Sinner Circle

Influence on the design of cleaning baskets

Open design is mandatory

- Optimum accessibility for the meachnics and drying
  => Shorter cleaning cycle times
  => reduction of drying time + better rinsing of particles and chipping
- Minimisation of media carry-over
  => extended bath service life/improved system availability

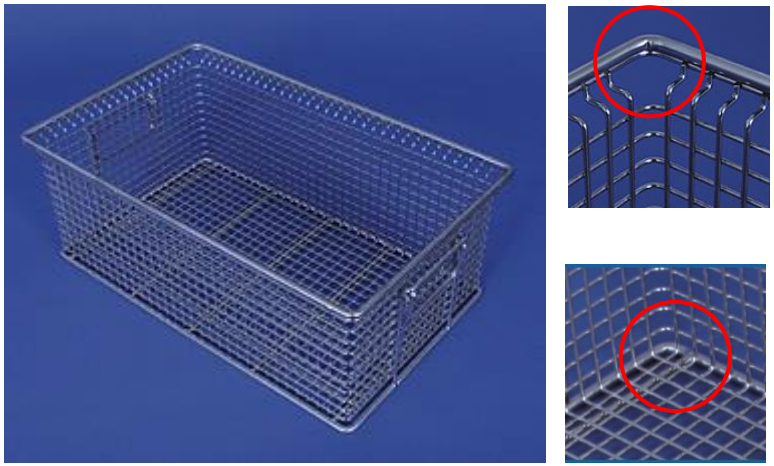


Fig.: MEFO-BOX – open design, no horizontal surfaces

Fig.: Non-Metallform product – compact design, horizontal surfaces at bottom and stacking frame

Influence on the design of cleaning baskets

Material has to be resistant to the cleaning media to avoid

- re-contamination of parts caused by the cleaning basket
  => better cleaning results
- additional contamination of the cleaning media
  => extended bath service life/improved system availability

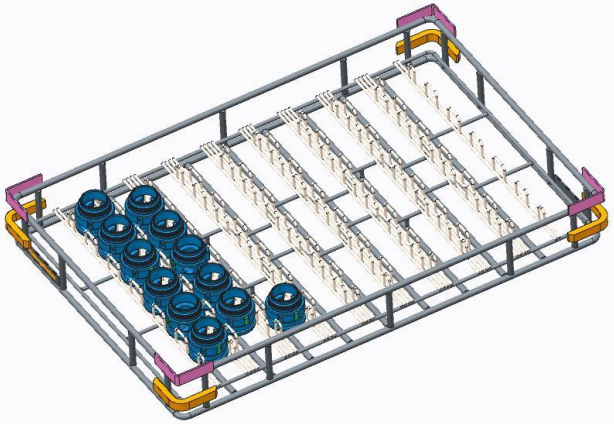
Fig.: Wire basket – made of stainless steel

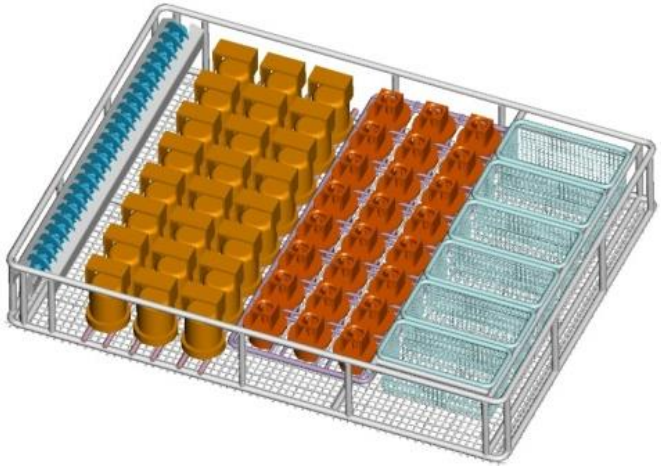
Fig.: Non-Metallform product – made of corrosive materials

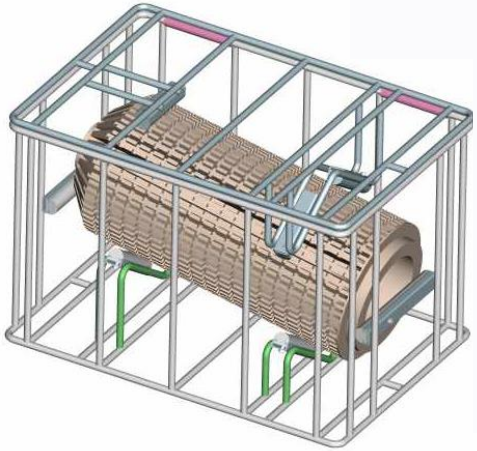
Influence on the design of cleaning baskets

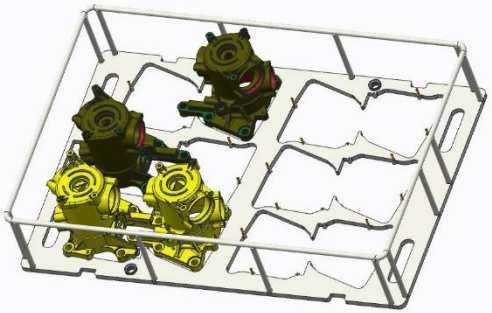
Optimal positioning of the parts & **minimization of contact and support points** mandatory

Type of fixation determined by the movement of goods
=> Avoidance of component damage
=> optimal cleaning without residual dirt stains
on components









Conclusion

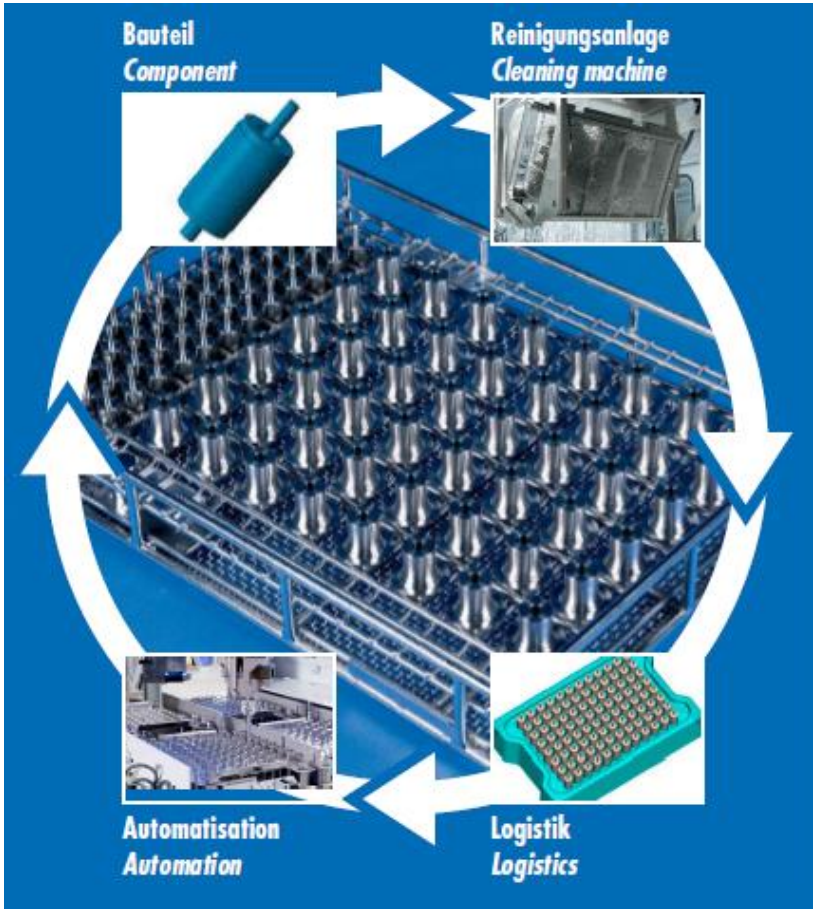
Optimally designed cleaning baskets make a cleaning system not better**,** but they **help the efficiency of the cleaning system too increase and exploit their potential to almost 100%.**

Closed basket limits cleaning results

Open basket improves efficiency of cleaning machine for maximum cleaning results

3. Consideration of processes beyond cleaning

Cleaning Rack
=
Connection



Relevant parameters

Cleaning machine

- Procedure
- Feeding to the plant
- Batch dimension
- Capping Batch
- Goods Movement
- Medium
- Drying
- Query
- Ultrasound

Part

- Geometry
- Quantity
- Material
- Weight
- Critical areas
- Parts layer
- Part family

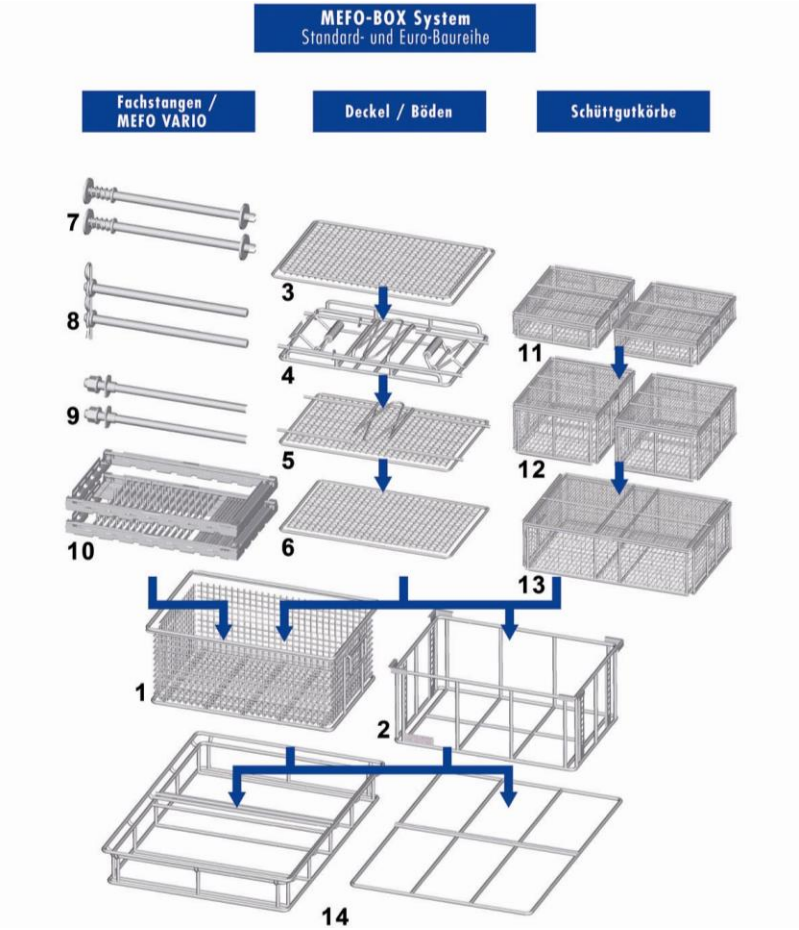
Customer

- Industry
- Quality / residual dirt requirement
- Existing basket systems
- Other transport containers

Logistics

- Operation prior to/after cleaning
- Automation
- Packing
- Ergonomics

Standard program – MEFO-Basket System



1 **Wire-basket (**MW 6 bzw. 12 mm)

2 **Washing rack**

3 **Supporting lid**

4 **Clamping lid**

5 **Adjustable lid**

6 **Inserting bottom**

7 **Compartment rod with spring**

8 **Compartment rod with cotter pin**

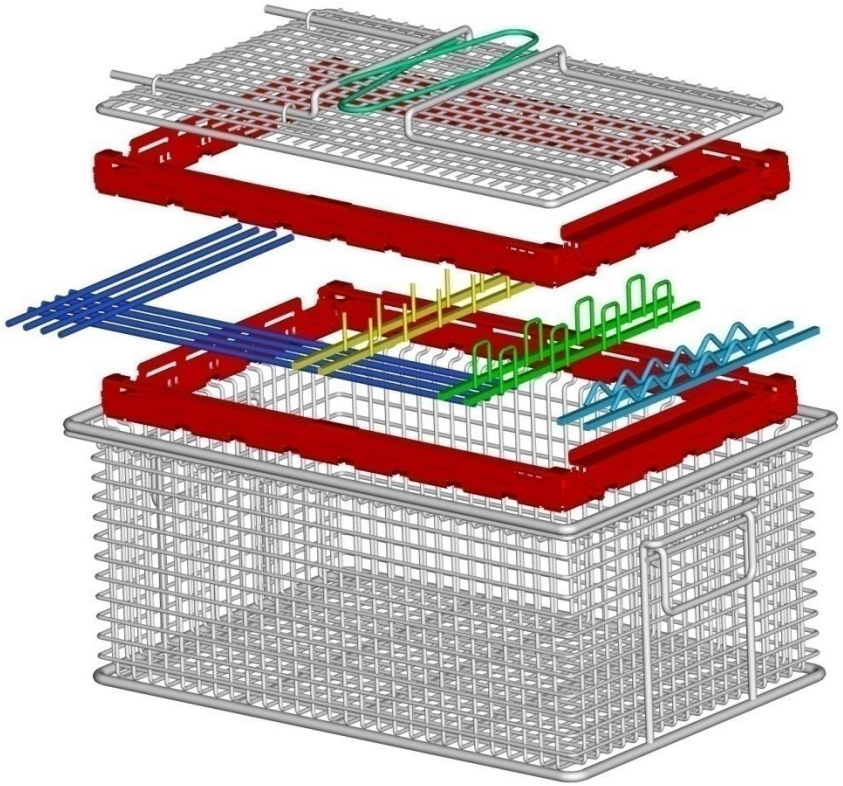
9 **Compartment rod with nut**

10 **VARIO-System**

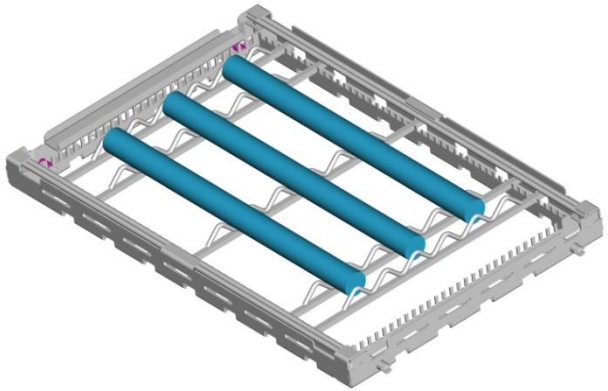
11. **bulk material baskets**

14. **Adapter frame**

Standard program – MEFO-Vario-System



With prism inserts

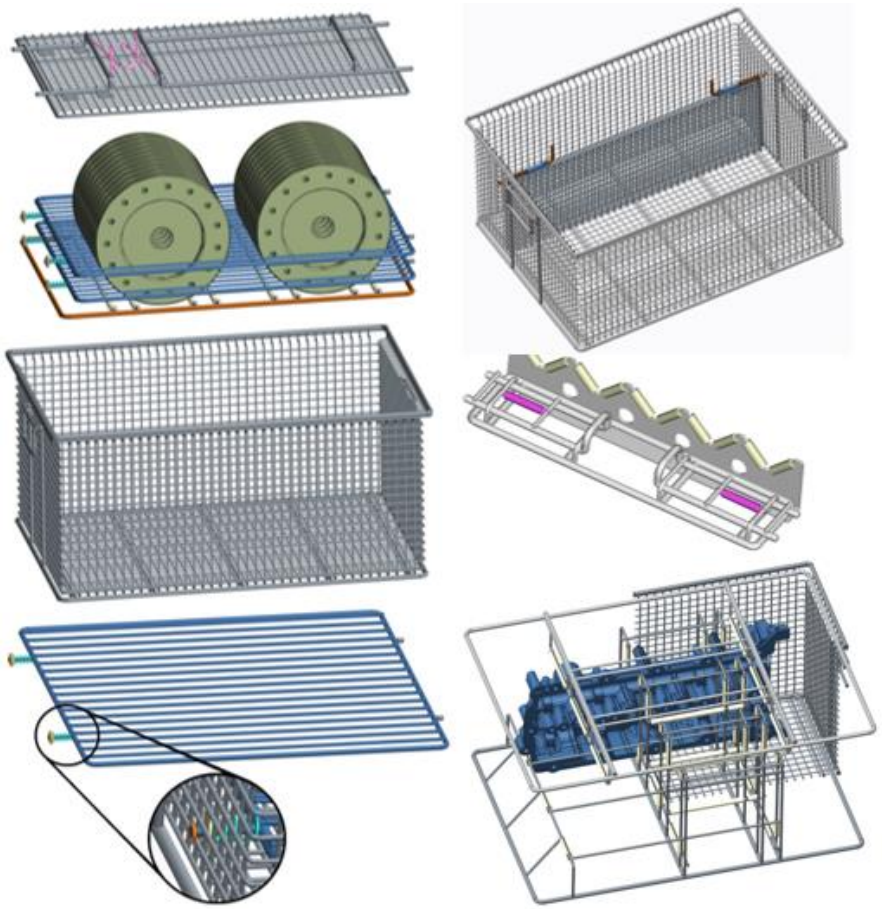


With compartment seperators

Customised solutions – Part-specific workpiece holders

… are recommendable if:

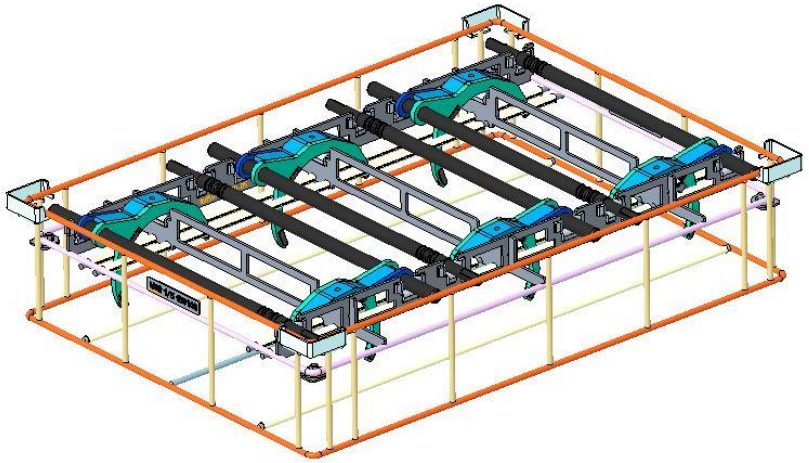
- small quantities
- throughput uncritical
- no handling prior to/after cleaning
- rapidly changing range of products
- part families

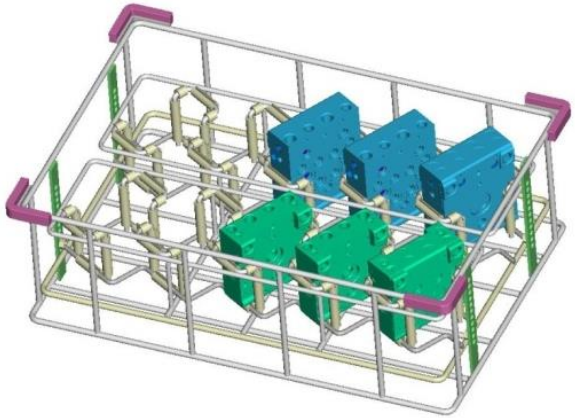


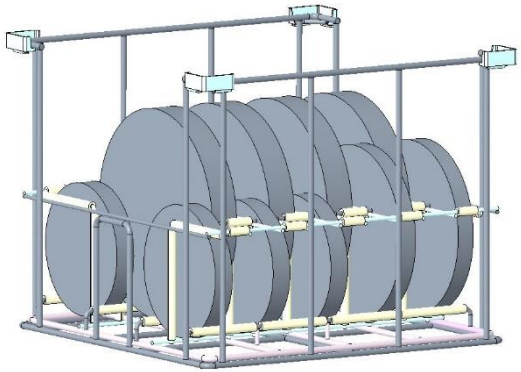
Customised solutions – Part-specific workpiece holders

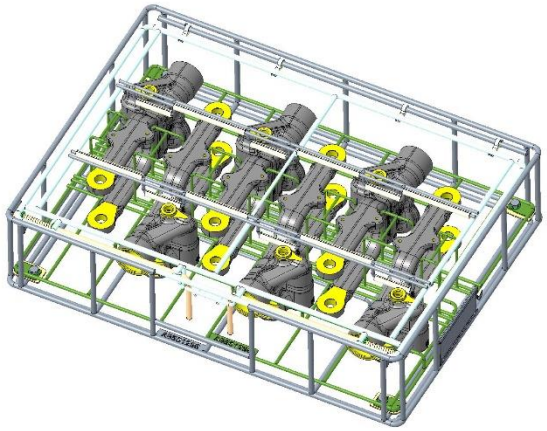
… are recommendable if:

- large quantities
- maximum throughput required
- additional handling prior to/after cleaning for example:
  -automatic loading/unloading, packing
- critical surfaces
- complex geometries





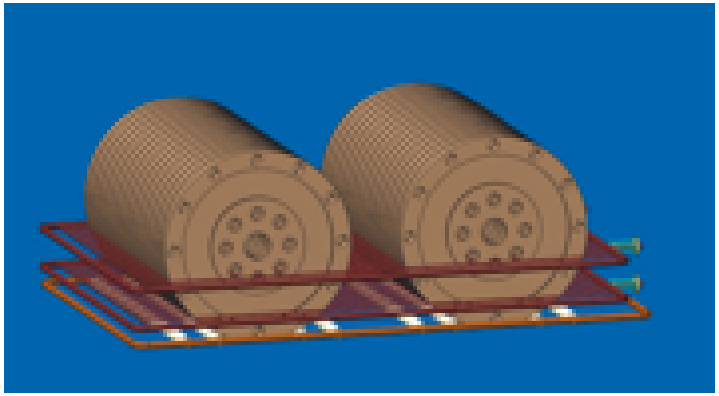




Application Example - flexible Solution for part-family

Task:

After the procurement of a new cleaning system with rotating Basket holder with standard batch dimensions can be used to create workpiece carriers for Accommodates various disc-shaped components.

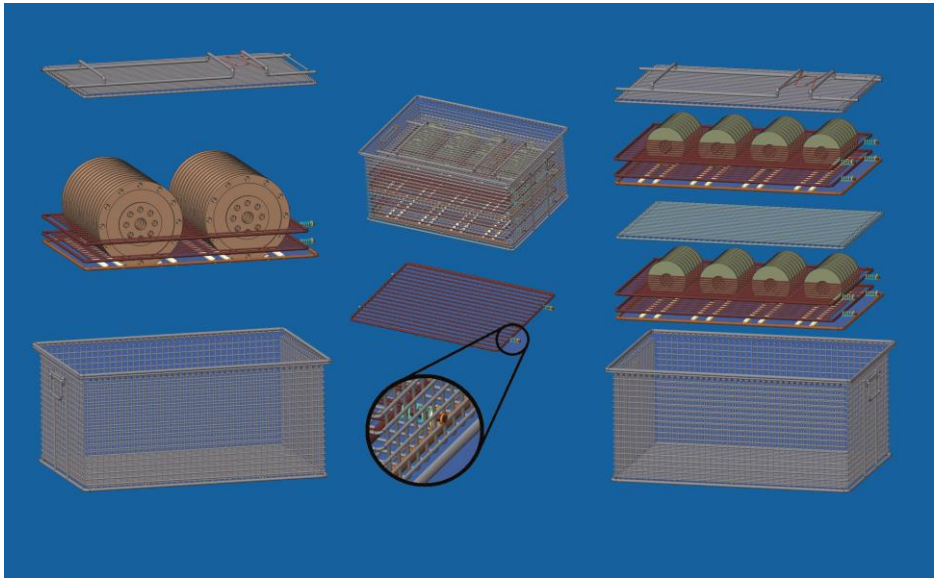


Customised solution – flexible basket inserts for part-family

Solution:

Mefo-Boxes with

part-specific shelves and shelves for different diameters.



Conclusion:

- A wide range of possible combinations
- Conversion without spending a lot of time
- Space required for Storage minimized
- Future-proof

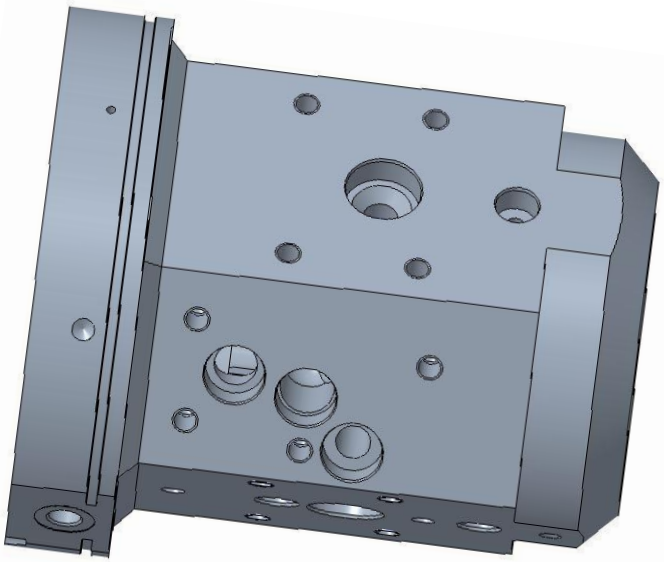
Application Example - Workpiece holder for a heavy part

Task:

A **heavy component** is laboriously assembled from above and below with adapters in one Workpiece carrier screwed together.

The screw connection deteriorates **the cleaning result** of the component.

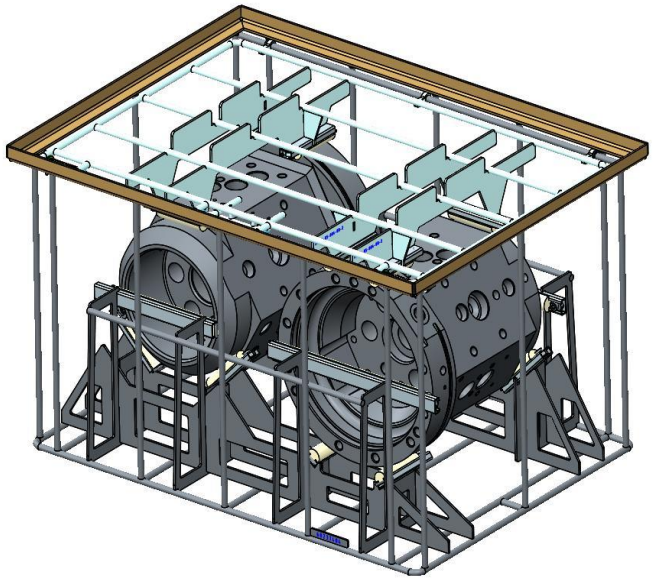
The burden on the employees is due to the manual handling very high.



Customised solution - Workpiece holder for Crane loading

Solution:

- Frame with captive hinged lid, which the components directly lifted in with a hoist
- Component protection at critical points



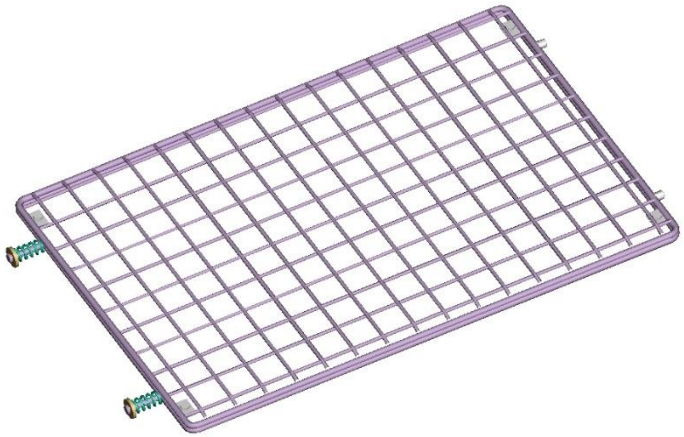
Conclusion:

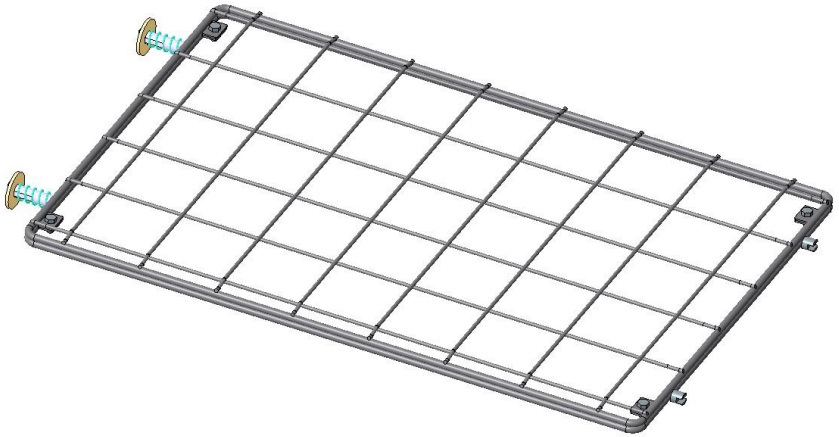
- Handling facilitated
- Set-up time shortened
- Better cleaning results

Application Example - flexible system for Assortment of turned parts

Task:

A wide variety of turned parts that are manufactured in large quantities, are to be cleaned in racks with interchangeable, part-specific mounts ecome.





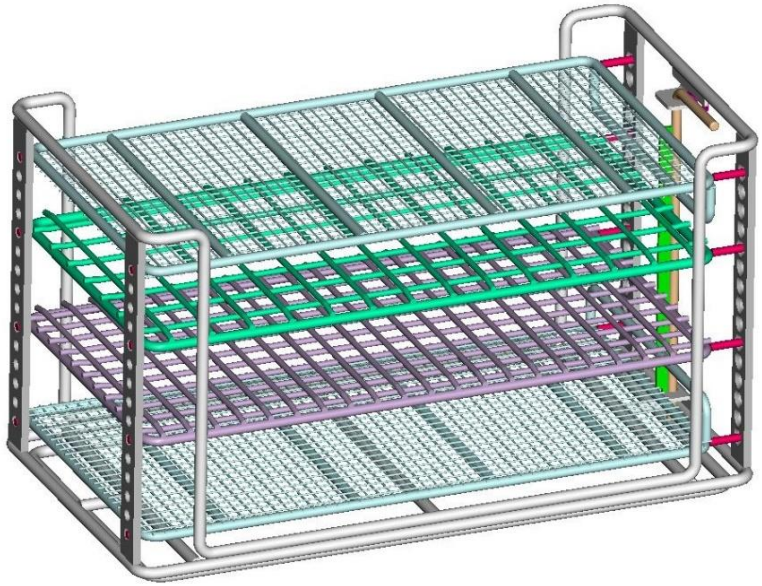
Customised solution – flexible basket inserts for part-family

Solution:

- Lattice shelves adapted to turned parts
- Universal base frame
- Variable height can be used
- Quickly changeable

Conclusion:

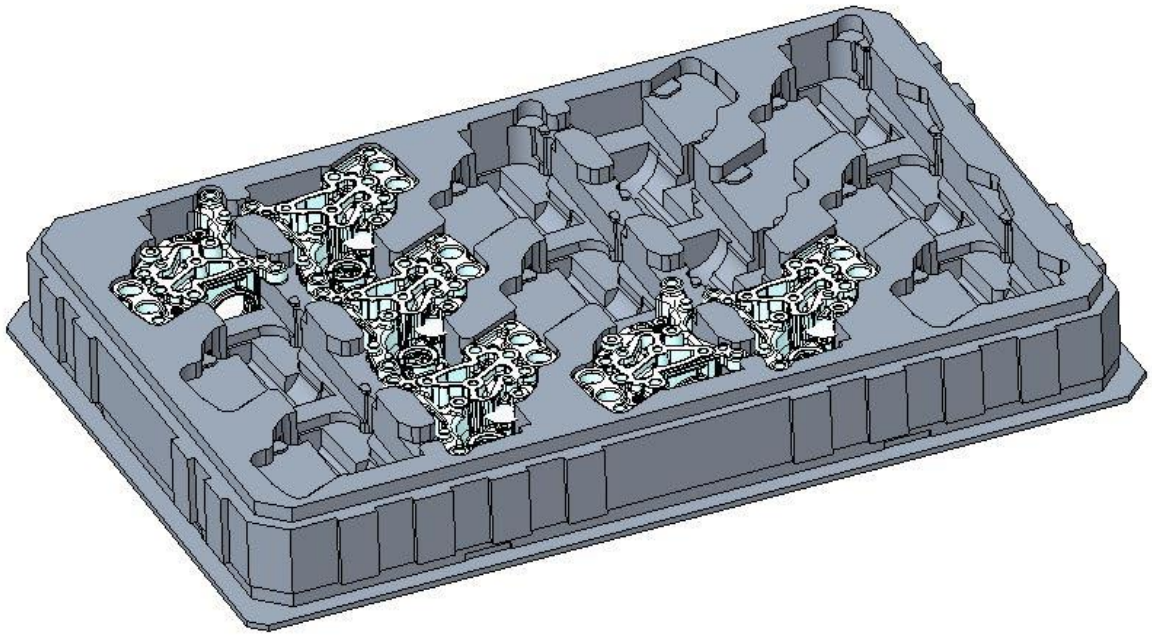
- Future-proof
- Expandable at any time
- Space required for storage minimized



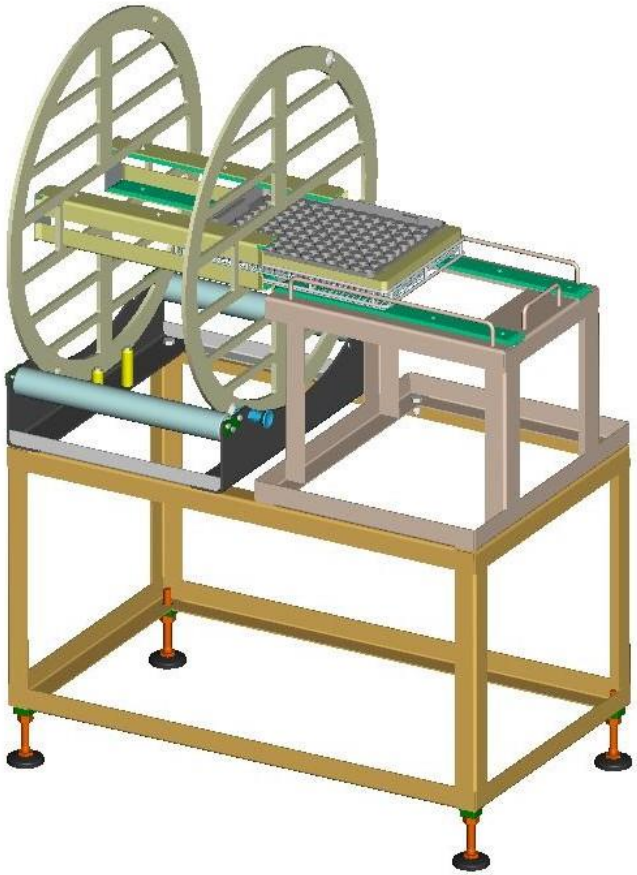
Application Example – Conversion of plastic trays

Task:

When rebuilding a production line, components made of blisters without large handling effort can be absorbed in a workpiece carrier



Inversion process with turning device



Procedure:

- Inserting blister with components
- Hang up Tray with recording contour pointing downwards
- Pushing an locking components into the receptacle
- Rotate the pick-up rack by 180°C manually
- Unlocking and removing the blister
- Components are isolated in the tray

Customised solution - Conversion of plastic trays in workpiece holder

Solution:

- Workpiece carrier was matched to the blister and adapted to the conditions of removal

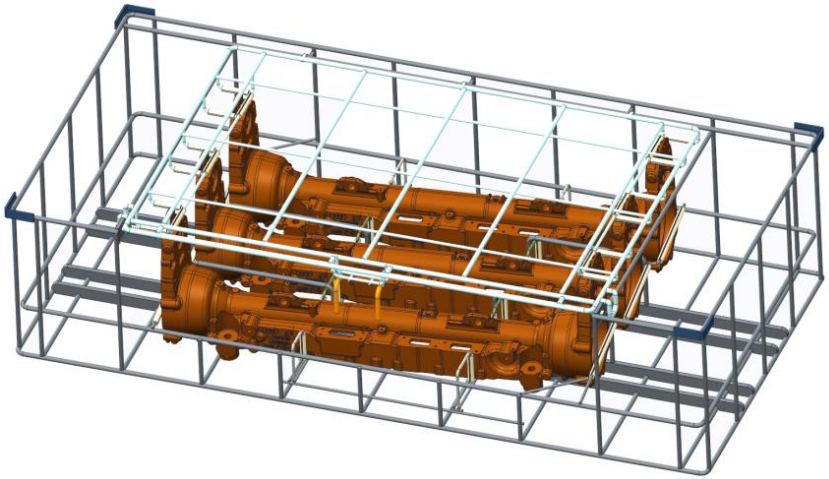
Conclusion:

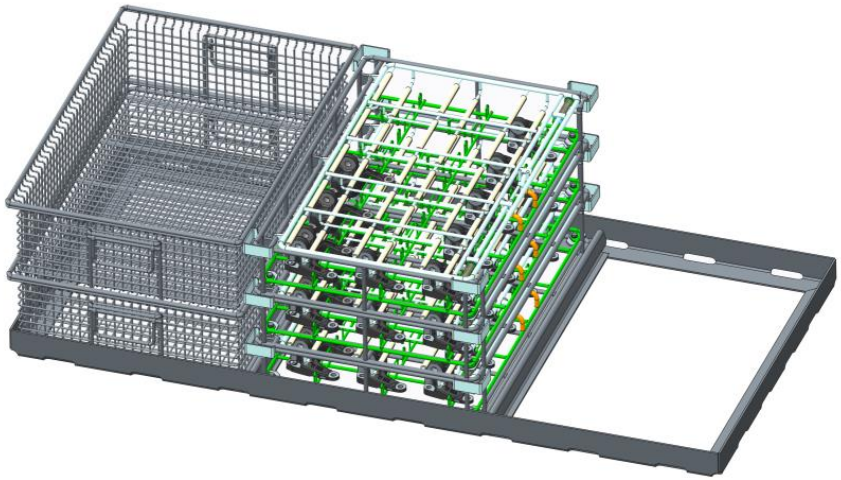
- Time savings during implementation
- Optimal integration of the workpiece carrier into the assembly process

Application Example – Special batch size

Task:

Development of a new basket system that makes it possible to use a wide variety of components taking into account the aspects of ergonomics, open design And secure holding of the components.





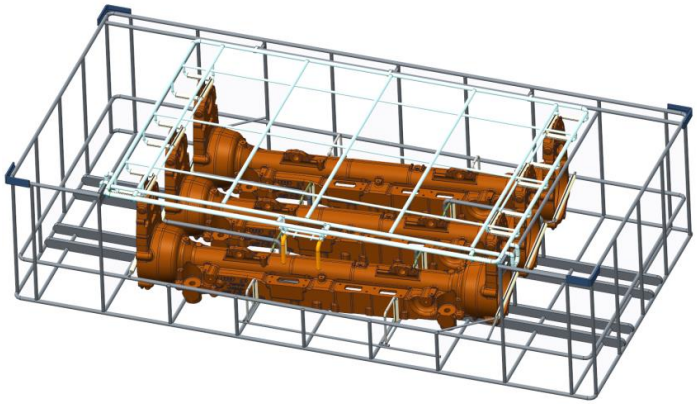
Customised solution - Special batch size

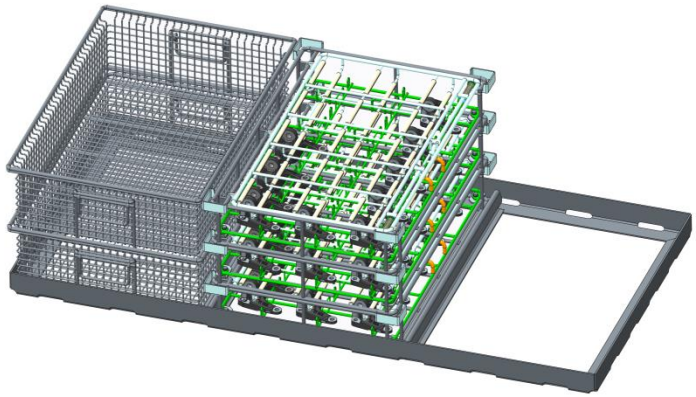
Solution:

- **Batch length** according to the **largest component**, width is standard dimension.
- Workpiece carrier for small components in a handy **standard footprint Adaption**
- Adaptation to special batch dimensions by **adapter frame**

Conclusion:

- **Optimum flushing** and avoidance of **component damage** due to special workpiece carriers
- **Future-proof**, as the size is compatible with Mefo-Box-System.
- **Easy handling** due to small units



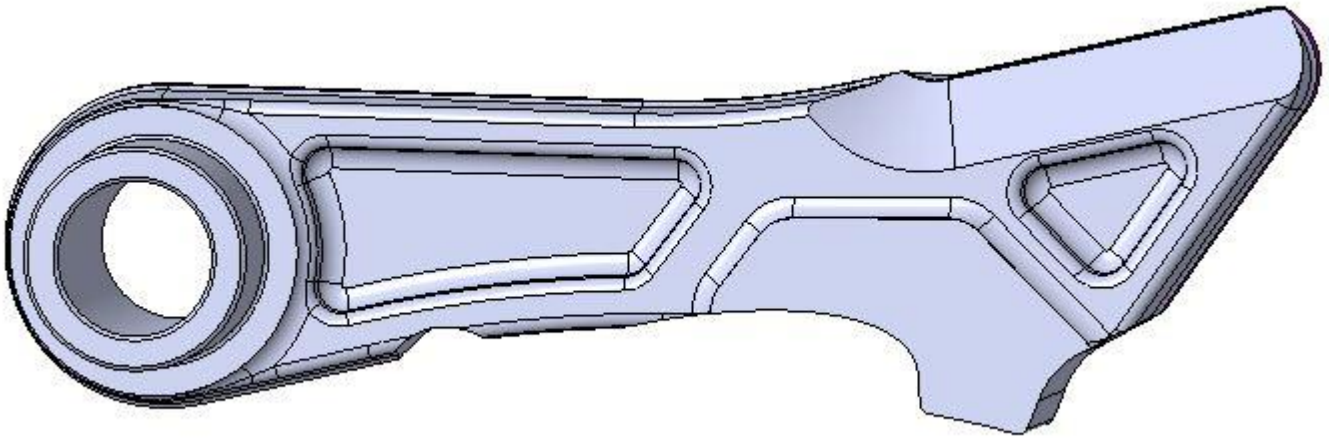


Application example - Workpiece carrier for automated use

Task:

Components are to be removed from plastic blisters by means of a gripping robot and be positioned in the product carrier

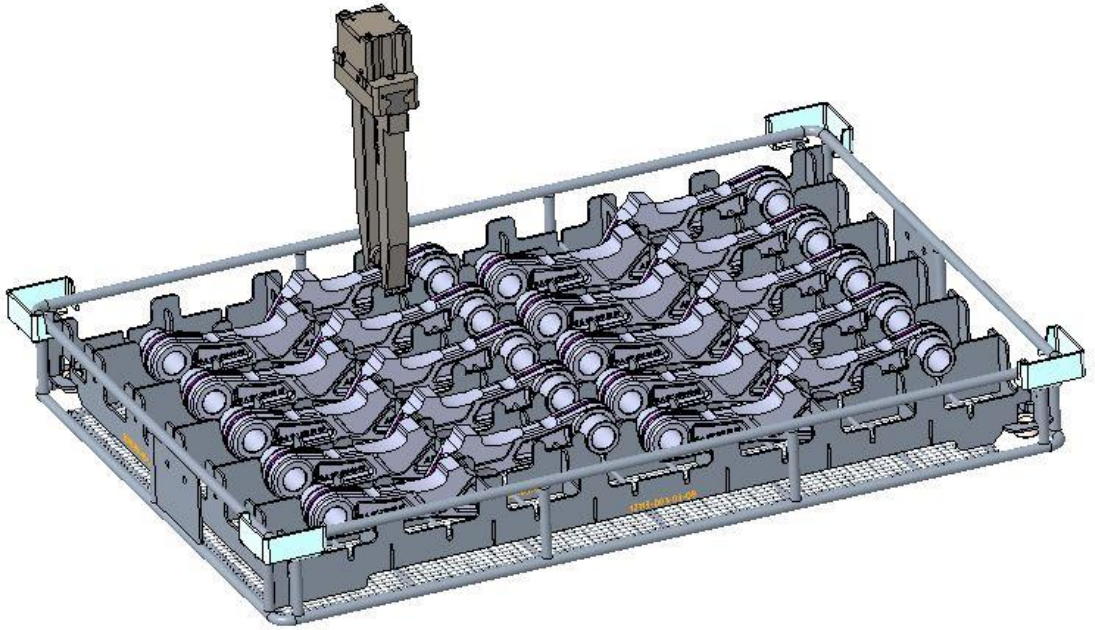
After cleaning, the process should be done in reverse.



Customised solution - Workpiece carrier for automated use

Solution:

- Workpiece carrier was adapted to the conditions in coordination with the customer, automation specialist and system manufacturer.



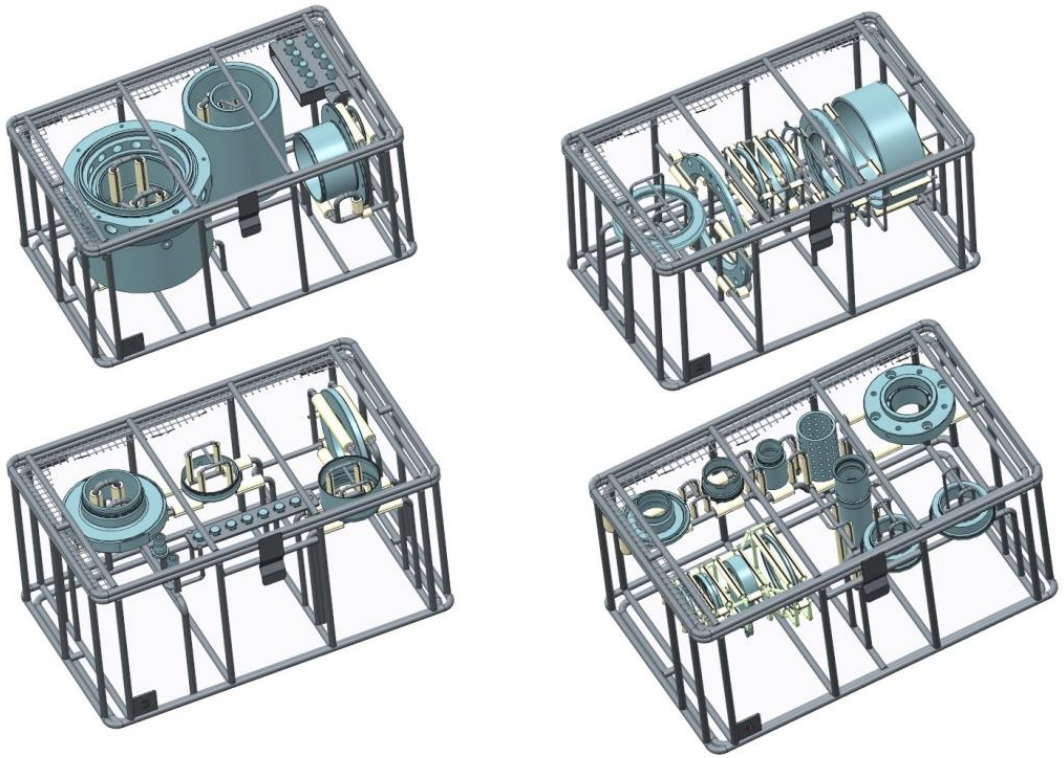
Conclusion:

- Personnel savings during implementation
- Faster handling when loading and unloading the WT

Application Example – Part-specific workpiece holders for Assemblies

Customized Solution:

- Special mounts adapted to series parts with component protection
- Universal base frame with positioning option for special shots



Conclusion:

- Set-up times reduced
- Safe positioning of the components. As a result, no damage
- Better cleaning results due to minimization of contact surfaces

4. Result

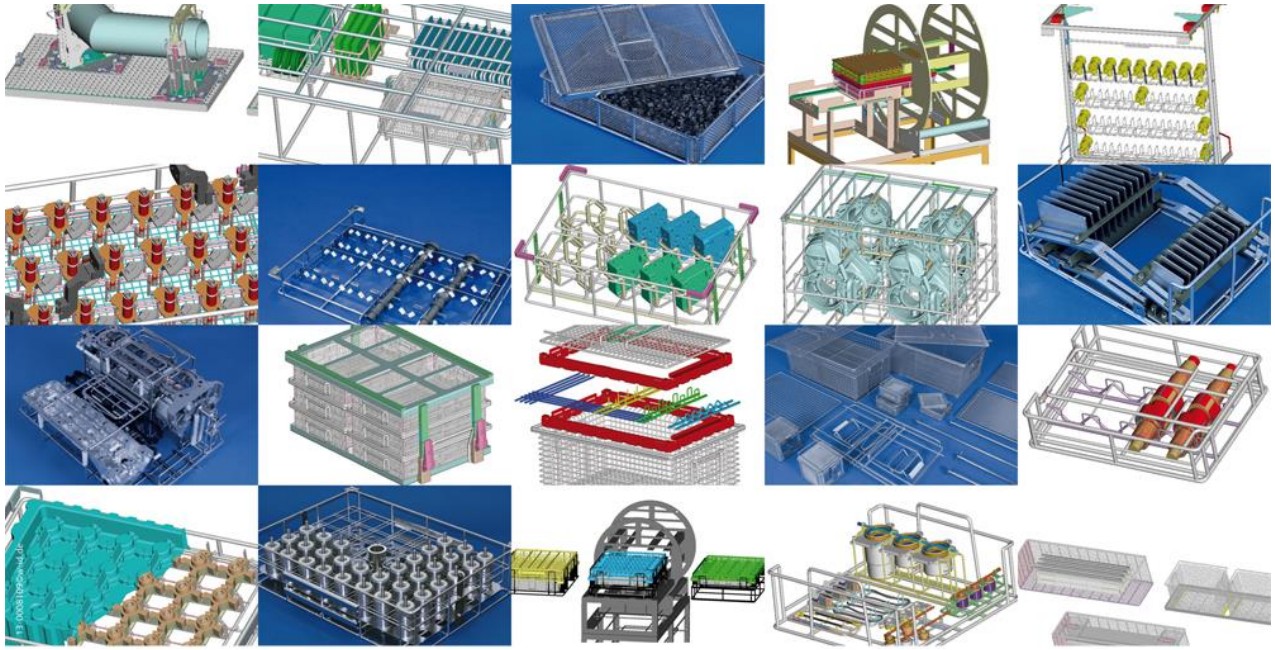
Only the timely observation of the workpiece carriers is possible the achievement of optimal cleaning processes and results.

In addition, it opens up potential for process optimization and thus significant cost savings.

Future / Development

- The trend is towards more automation and flexibility
  - This will require more precise tolerances in the future
  - Closer coordination with customers and automation companies
  - Even closer cooperation with cleaning system manufacturers
  - Before the start of series production, testing of the automation by means of prototypes

There is a solution for every application - we would be happy to find it for you...



Thank you very much for your attention

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