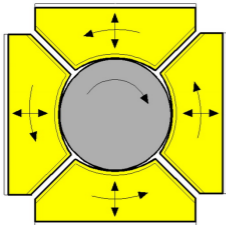


## Rotary swaging: process

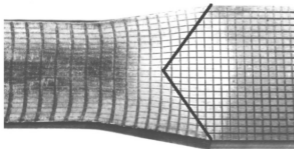


Incremental forming

Radial oscillation of dies

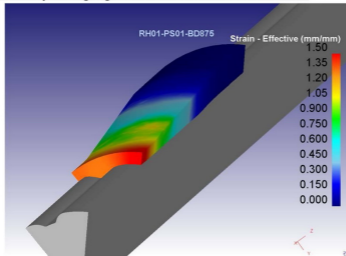
Relative rotational  
movement between dies  
and workpiece

## Rotary swaging: material flow

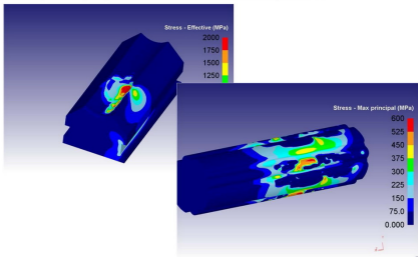


The rotary swaging process generates a homogenous material flow. This allows using the complete degree of deformation through the complete section of the workpiece. High degrees of deformation are possible, brittle materials can be formed.

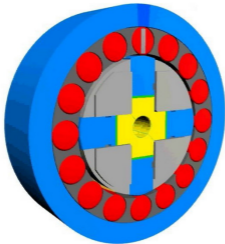
## Rotary swaging: FEM-simulation material flow



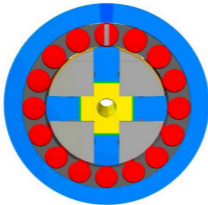
## Rotary swaging: FEM-simulation tooling stress



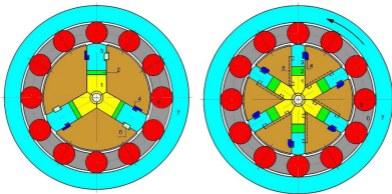
Rotary swaging: operation principle swaging head



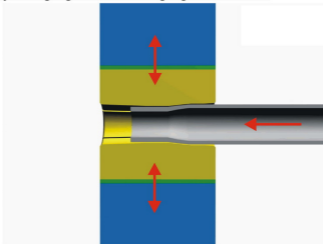
## Rotary swaging: operation principle swaging head



## Rotary swaging: number of dies

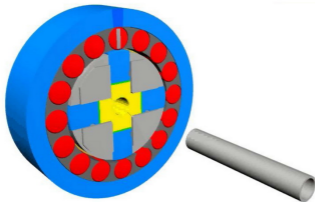


## Rotary swaging: infeed swaging

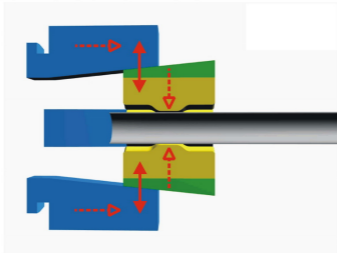




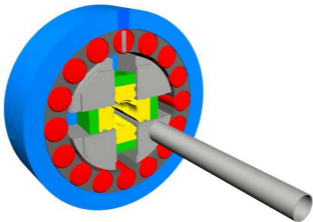
## Rotary swaging: infeed swaging



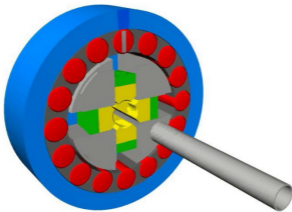
## Rotary swaging: plunge swaging



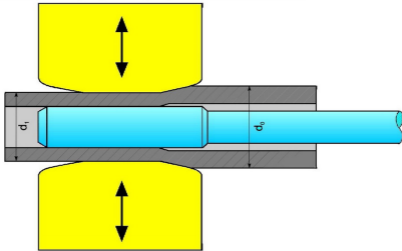
## Rotary swaging: plunge swaging



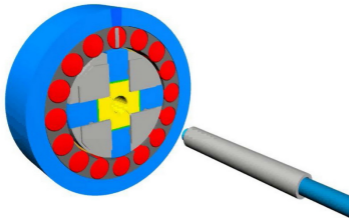
## Rotary swaging: swaging of non circular cross-sections



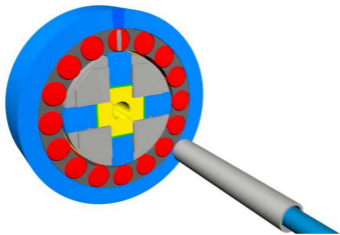
Rotary swaging: swaging over a mandrel



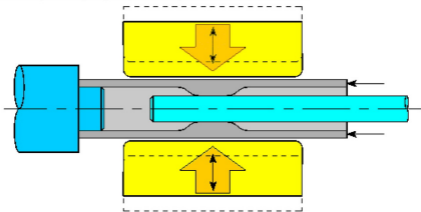
Rotary swaging: swaging over a mandrel



Rotary swaging: swaging over a mandrel

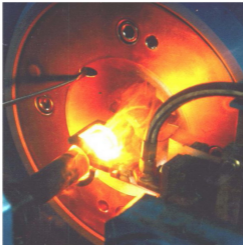


## Rotary swaging: upsetting wall thickness

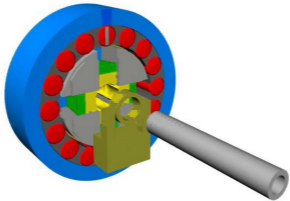




## Rotary swaging: local heating



# Rotary swaging: upsetting

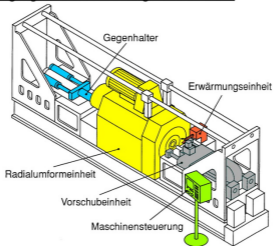


## Rotary swaging

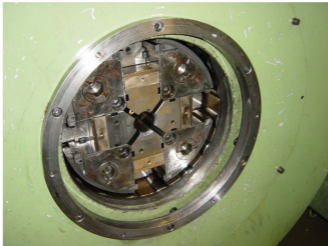
### Highlights:

- dimensional application range: 0.2mm – 140mm outside diameter
- very high forming ratios due to positive state of stresses
- high flexibility / multiple design opportunities
- low tooling costs / high life time of tooling
- achieving high tolerances especially on the inside of tubular parts
- possibility of producing very long parts as the forming force is applied radially
- cold formed part / possibility of taking advantage of hardness increase
- homogenous internal stress distribution / little deformation during heat treatment

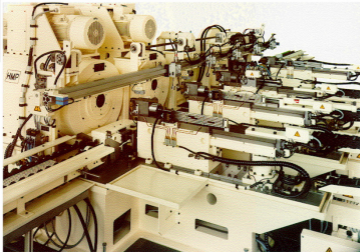
## Rotary swaging: machine design features



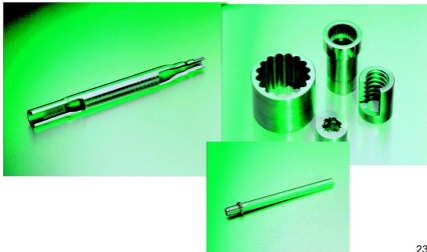
## Rotary swaging: machine design features



## Rotary swaging: machine design features



## Rotary swaging: examples of applications



## Rotary swaging

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