

# Assembly instructions for HPS carbide dies prestressed by STRECON containers

## Design of the STRECON tooling system

*Typical design of a STRECON tooling system for high-pressure synthesis:*

**Carbide die**  
*(responsibility of the customer)*

**Sleeve**

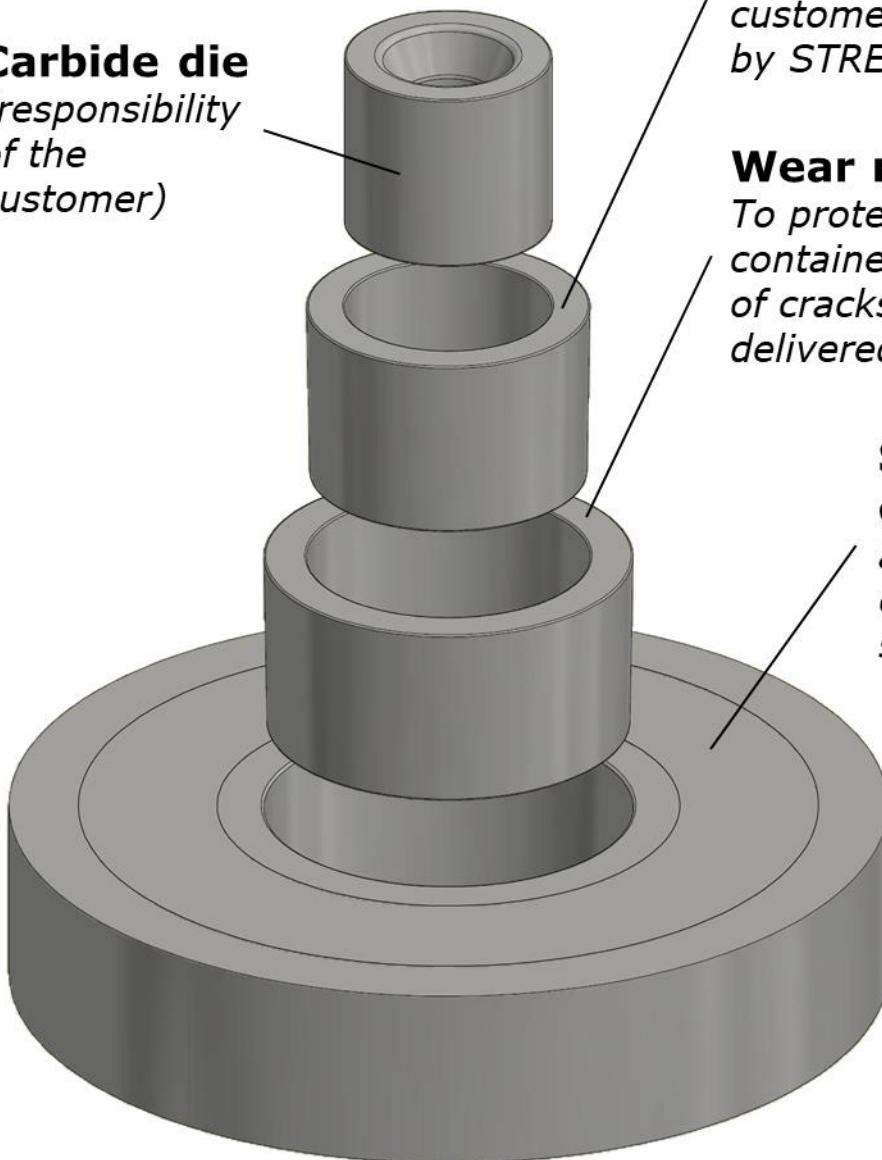
*manufactured either by customer or upon request by STRECON*

**Wear ring**

*To protect the STRECON container against propagation of cracks from the die; usually delivered by STRECON*

**STRECON container**

*a single unit consisting of winding core, stripwinding and casing*



This instruction describes the assembly and disassembly procedure for wear ring, sleeve and carbide die in a STRECON container. Some steps of the procedure may vary for customer specific designs. Please consult STRECON A/S in case of any doubts.

## Auxiliary tools for assembly and disassembly

STRECON recommends the following auxiliary tools which can be quoted and supplied by STRECON A/S upon request:

- (1) pressure pad for assembly/disassembly of wear ring
- (2) pressure pad for assembly and disassembly of die
- (3) common centering ring for all support blocks
- (4) support block for assembly of wear ring and die
- (5) support block for disassembly of wear ring
- (6) support block for disassembly of the die
- (7) pressure pad for disassembly of die from sleeve
- (8) support ring for disassembly of die from sleeve

The numbers refer to the positions in the following illustrations.

## Cleaning and lubrication of contact surfaces

### 1 Cleaning

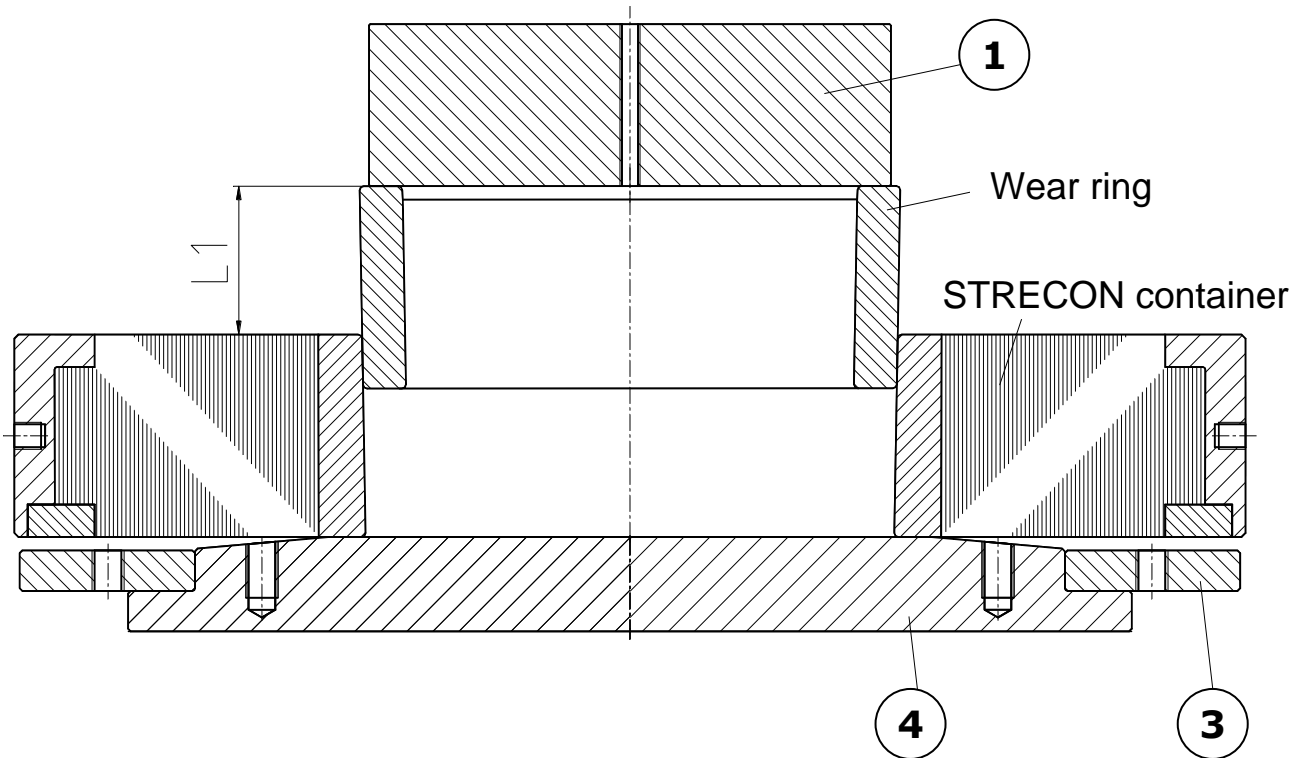
- All contact surfaces must be thoroughly cleaned from grease and oil. This applies to the carbide die insert as well as to the wear ring, sleeve and STRECON container.
- Use a degreasing solvent to clean the contact surfaces.

### 2 Lubrication

- Lubricate all contact surfaces by low-friction assembly powder and paste with molybdenum disulphide ( $\text{MoS}_2$ ).
- Apply a thin uniform layer of paste to the contact surfaces.
- After application of paste, apply a uniform layer of powder.
- The best way to apply the powder is by means of a soft brush with fine hair. If this is done by "dabbing" the brush with the powder on the greased surfaces, you can avoid the grease to be applied to the brush, and you can secure, that you create a grease layer with a powder layer on top, not a mixture of each component.

## Assembly of the wear ring in the STRECON container

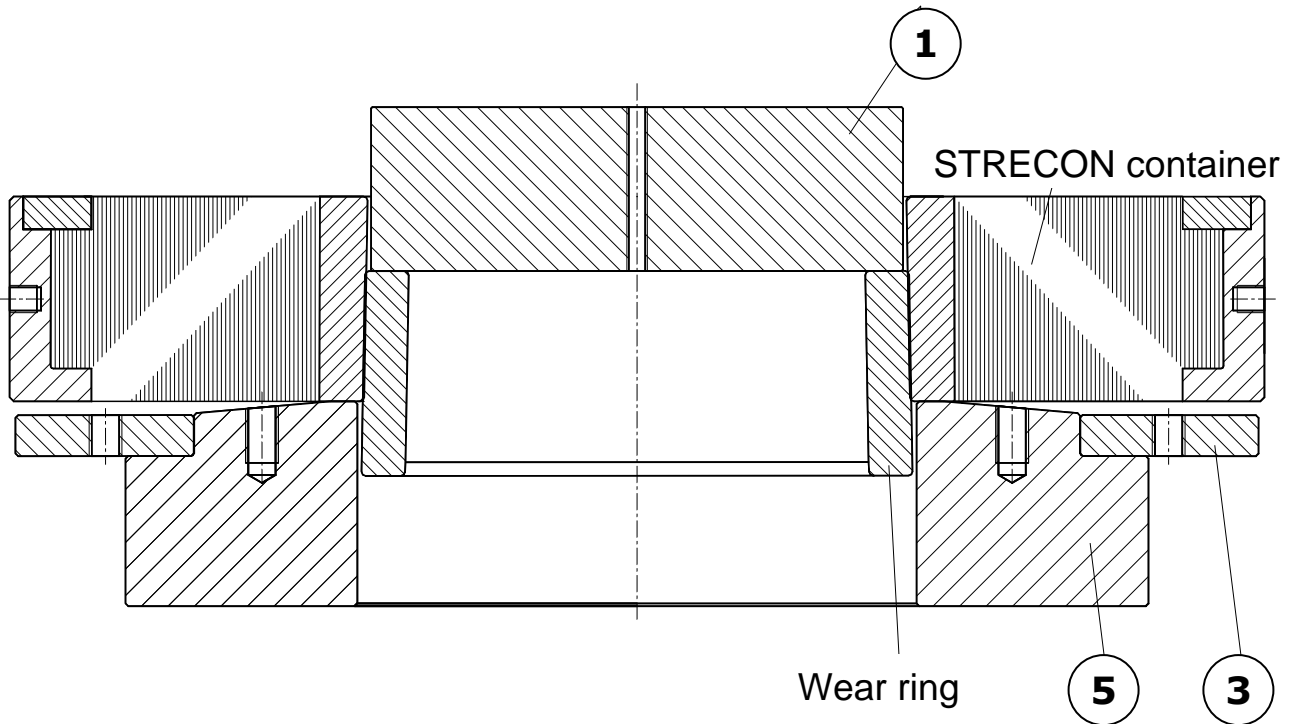
- Place the STRECON container on the support block (4), with the large diameter of the inner core pointing upwards. To facilitate the centering, mount the centering ring (3).



- Place the wear ring in the STRECON container, with the large diameter pointing upwards. Before pressing the wear ring into the STRECON prestressed container, measure the insertion length  $L_1$ . Deviations from calculations of more than a few millimeters are not acceptable.
- Press in the wear ring by means of the pressure pad (1). Observe the press force during insertion. If large deviations occur (i.e. higher than 50%), stop the operation, press out the wear ring, and repeat the whole surface preparation.
- Before pressing in the wear ring, measure the smallest inner diameter (at the point where the corner radius meets the inner diameter).
- Measure the smallest inner diameter at the same point as before insertion and compare the results with calculations of the expected inner diameter.

## Disassembly of wear ring from the STRECON container

- Place the STRECON container on the support block (5), with the smallest diameter of the inner core pointing upwards. To facilitate the centering, mount the centering ring (3).
- Press out the wear ring by means of the pressure pad (1).



- Compare the registered press force with the calculated press force (can be provided by STRECON A/S).

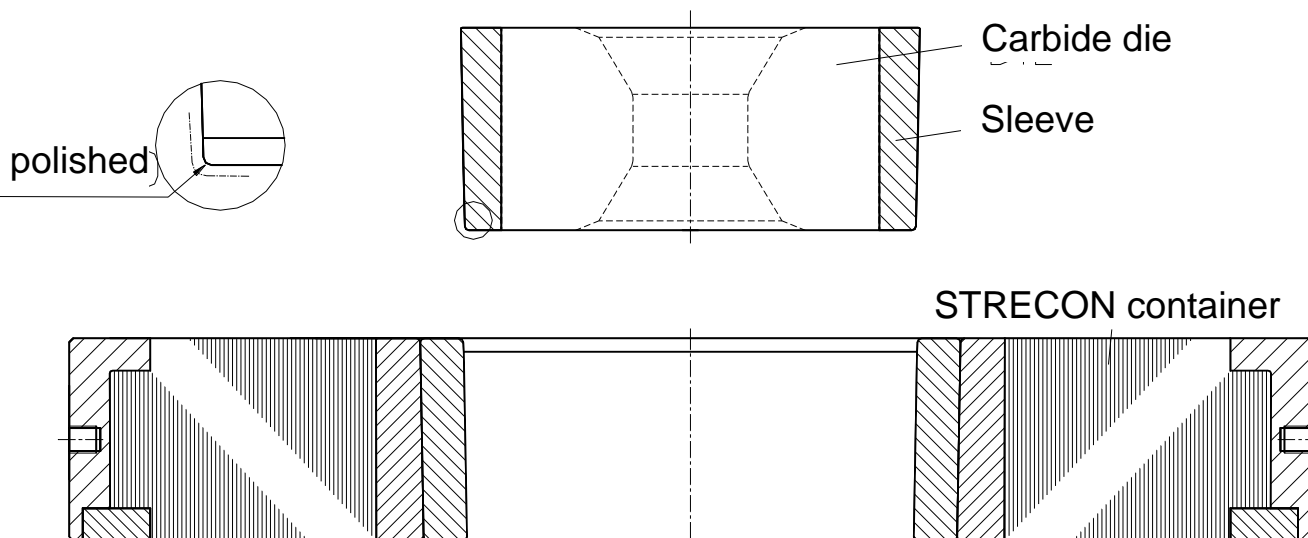
### Your data for assembly/disassembly of wear ring

Please note the data that corresponds to your tooling system:

Calculated insertion length L1:		mm
Calculated assembly force:		tons
Smallest inner diameter of wear ring <u>before</u> assembly:		mm
Calculated smallest inner diameter of wear ring <u>after</u> assembly		mm
Calculated press force for disassembly of the wear ring:		tons

## Assembly of carbide die + sleeve in container + wear ring

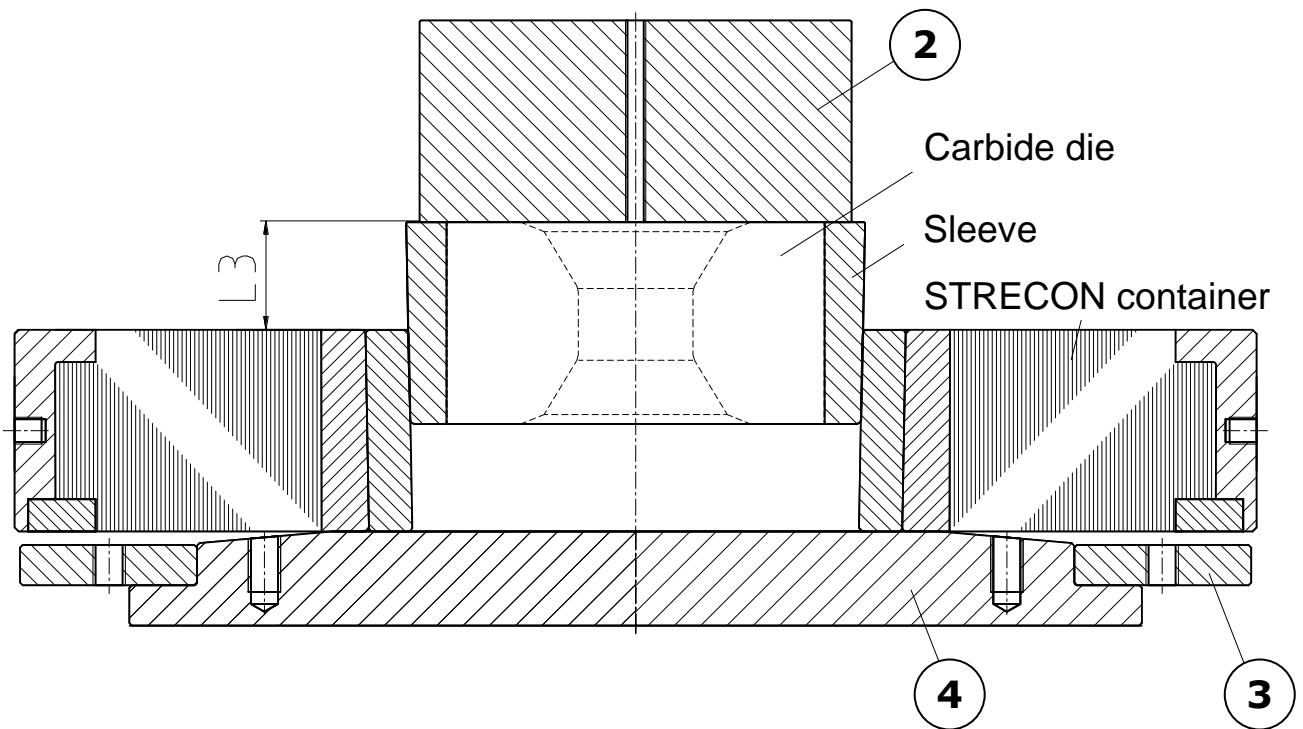
The fitting surface of the sleeve should be ground with a finish of  $R_a = 0.4 \mu\text{m}$ . Special care must be taken that the surface is smooth in heavily loaded areas, so that the gliding film will not be damaged. A polishing quality  $R_a = 0.05 \mu\text{m}$  is recommended in these areas.



It is recommended to inspect the inner surface of the wear ring. The surface must be undamaged, i.e. free of cracks or cold weldings. Otherwise, the wear ring must be pressed out and be reground or replaced.

The carbide die with sleeve must be inserted in at least two steps, e.g. 50% of the insertion length the first time and full insertion length the second time.

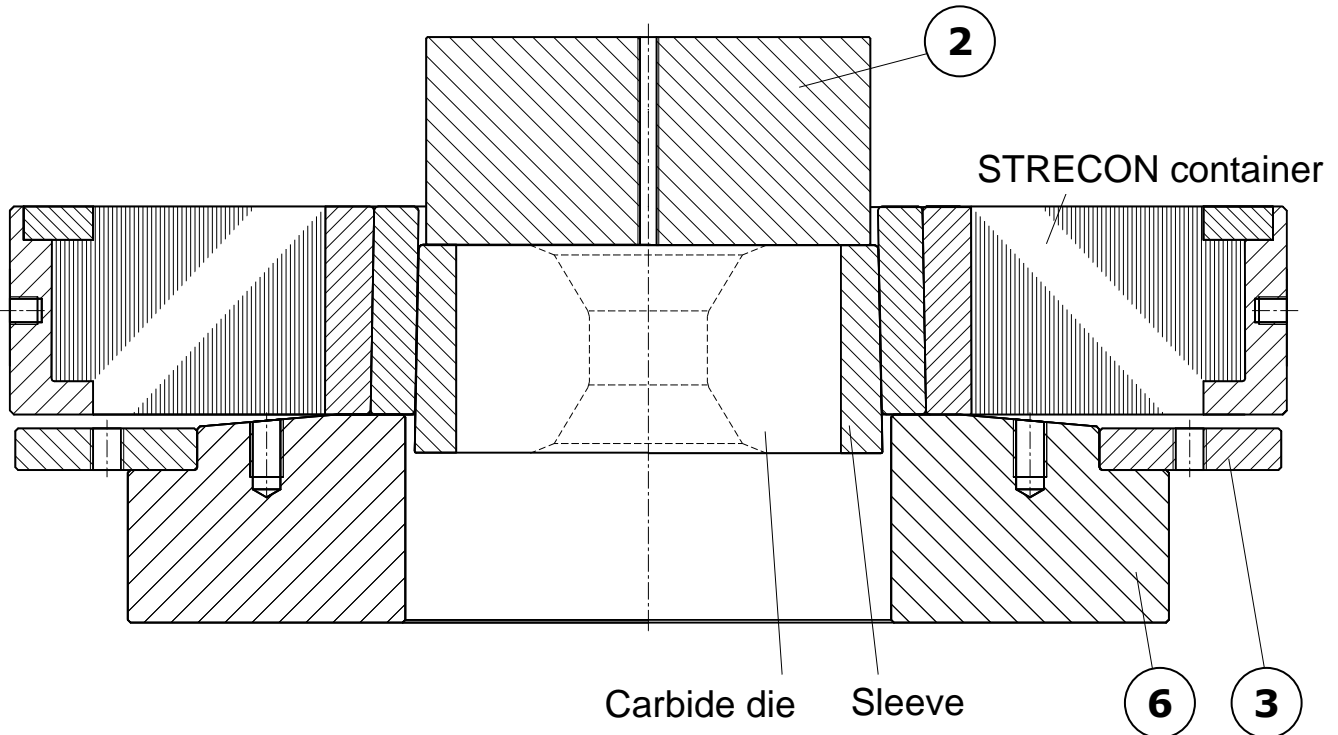
- Prepare the contact surfaces (cleaning and lubrication).
- Place the STRECON container with wear ring on the support block (4), with the large diameter of the wear ring pointing upwards. To facilitate the centering, mount centering ring (3).
- Place the carbide die in the STRECON prestressed container with the large diameter pointing upwards. Before pressing the carbide die into the STRECON prestressed container, the insertion length  $L_3$  should be measured. Deviations from calculations of more than a few millimeters are not acceptable.



- Press in the carbide die by means of the pressure pad (2). Observe the press force during insertion. If large deviations occur (i.e. higher than 50%) stop the operation, press out the die, and repeat the preparation.
- If large deviations should occur after the carbide die has been more than half inserted, it is recommended to increase the press force as much as needed to insert the carbide die in full length. If the carbide die is pressed out after it has been half inserted, cracks may occur due to release of compressive stresses.

## Disassembly of carbide die + sleeve from container + wear ring

- Place the STRECON container on the support block (6), with the smallest diameter of the wear ring pointing upwards. To facilitate the centering, mount the centering ring (3).
- Press out the carbide die by means of the pressure pad (2).



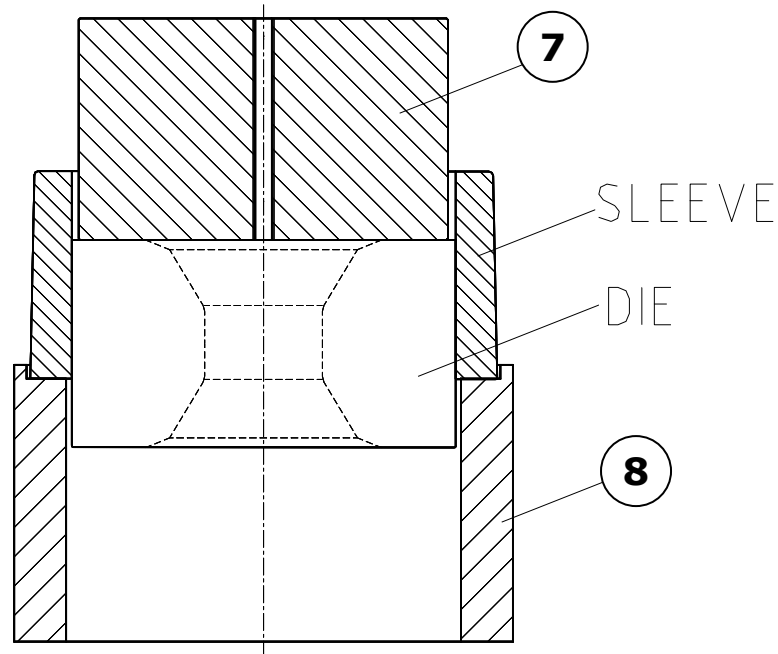
## Your data for assembly/disassembly of carbide die

Please note the data that apply for your tooling system:

<i>First insertion at 50% length</i>		
Calculated insertion length L2:		mm
Calculated assembly force:		tons
<i>Second insertion at full length</i>		
Calculated insertion length L2:		mm
Calculated assembly force:		tons
<i>Calculated press force to press out the carbide die</i>		
Inserted at 50% length:		tons
Fully inserted:		tons

## Disassembly of the carbide die from the sleeve

- Place the carbide die with sleeve on the support ring (8) with the smallest diameter of the sleeve pointing upwards.
- Press out the carbide by means of the pressing block (7).



- Usually, the sleeve is heat-shrink fitted on the carbide die with a certain interference. The outer diameter of the carbide die is cylindrical, so the die can be pressed out in both directions. To obtain the largest area for support of the sleeve when it is being pressed out, it is recommended to place the die with sleeve with the largest diameter downward.
- The force required to press out the die cannot be calculated, as this depends on how long the die has been in use, internal pressure, hardness, surface roughness etc.

## Technical Support

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