New construction to change the flow channel gap at the exit of an annular die

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My vision

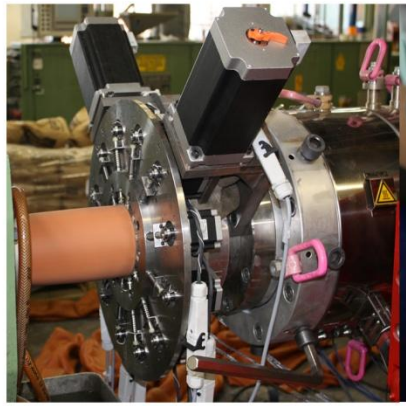
Actual situation

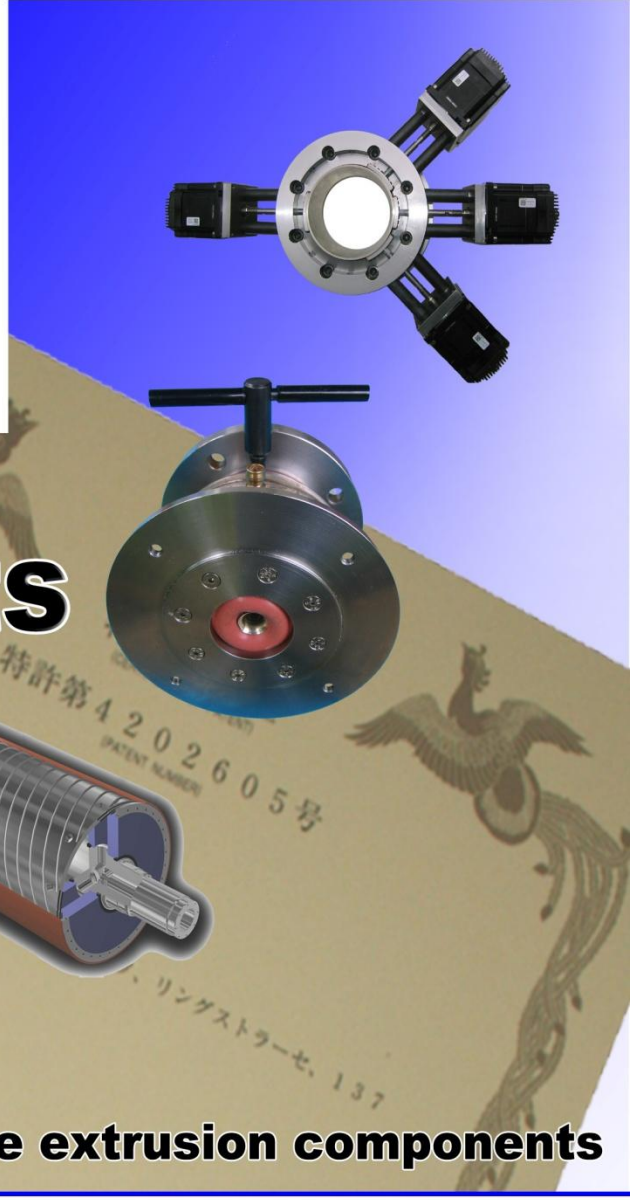
Conventional centering solution

The tilting solution

New solution to additionally shift the die in regard of the pin

Summery





We develop benefits

sensitively adjustable extrusion components

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Actual situation

Normal annular heads consist of a solid pin and a solid die and a fixed die gap

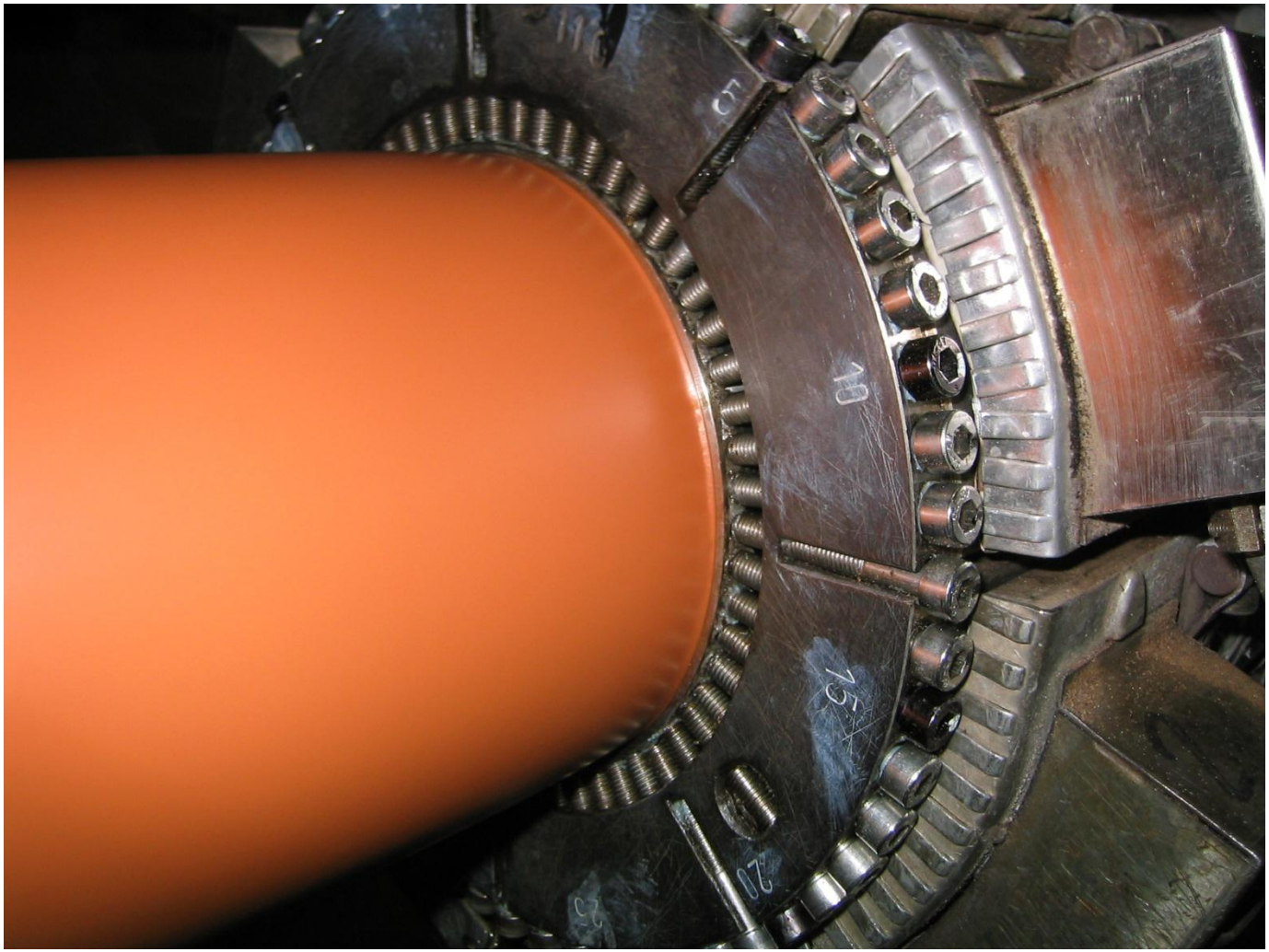
- Production of capillaries
- Production of tubes
- Production of blown film
- (Pipe production)

Actual situation

Special head constructions which give rise to vary the flow channel gap

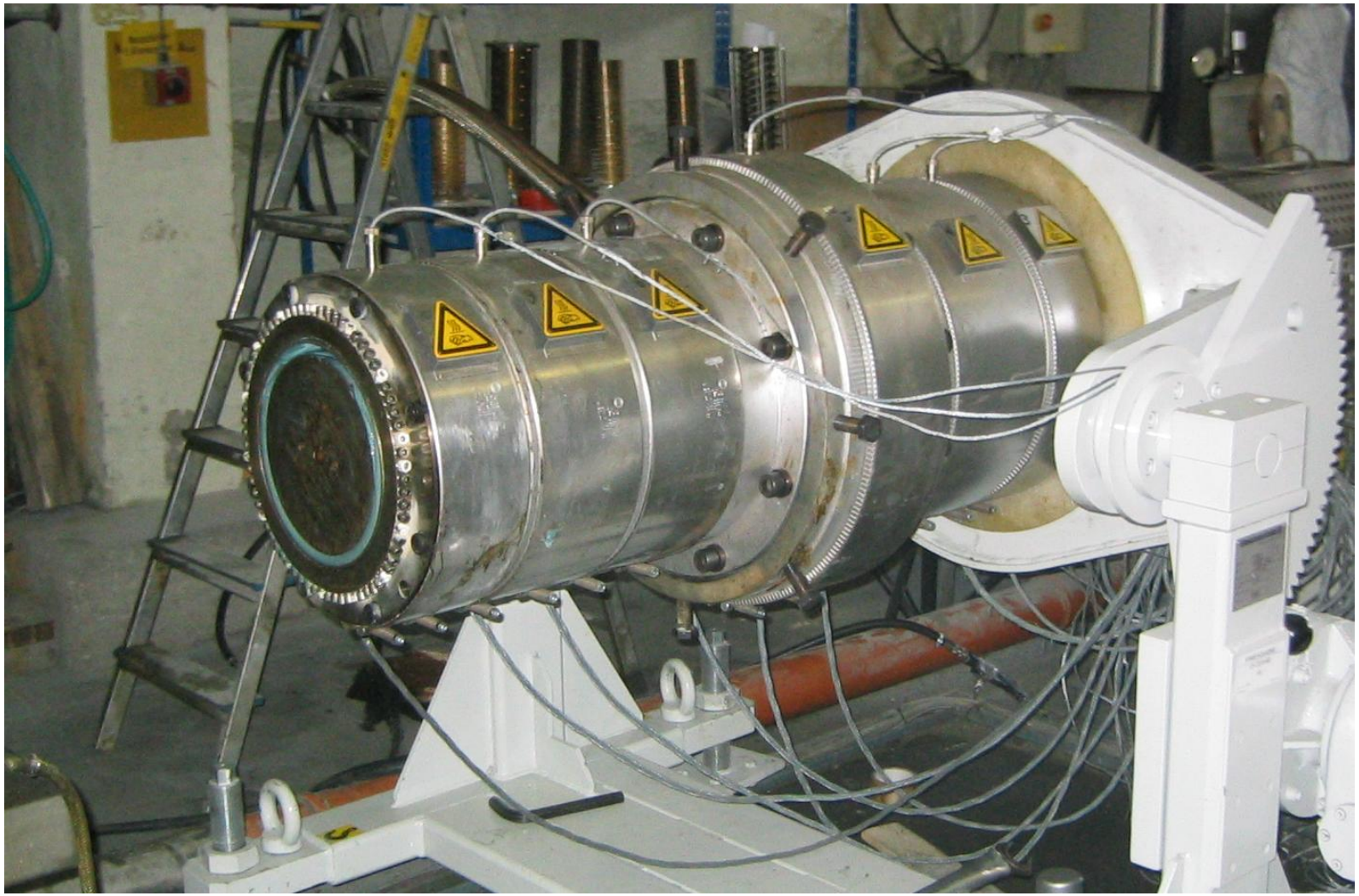
- Heads for foamed sheets and foamed films
- Heads for extrusion blow molding
- Quick switch heads for pipes
- Flex Ring heads

Flex Ring pipe die

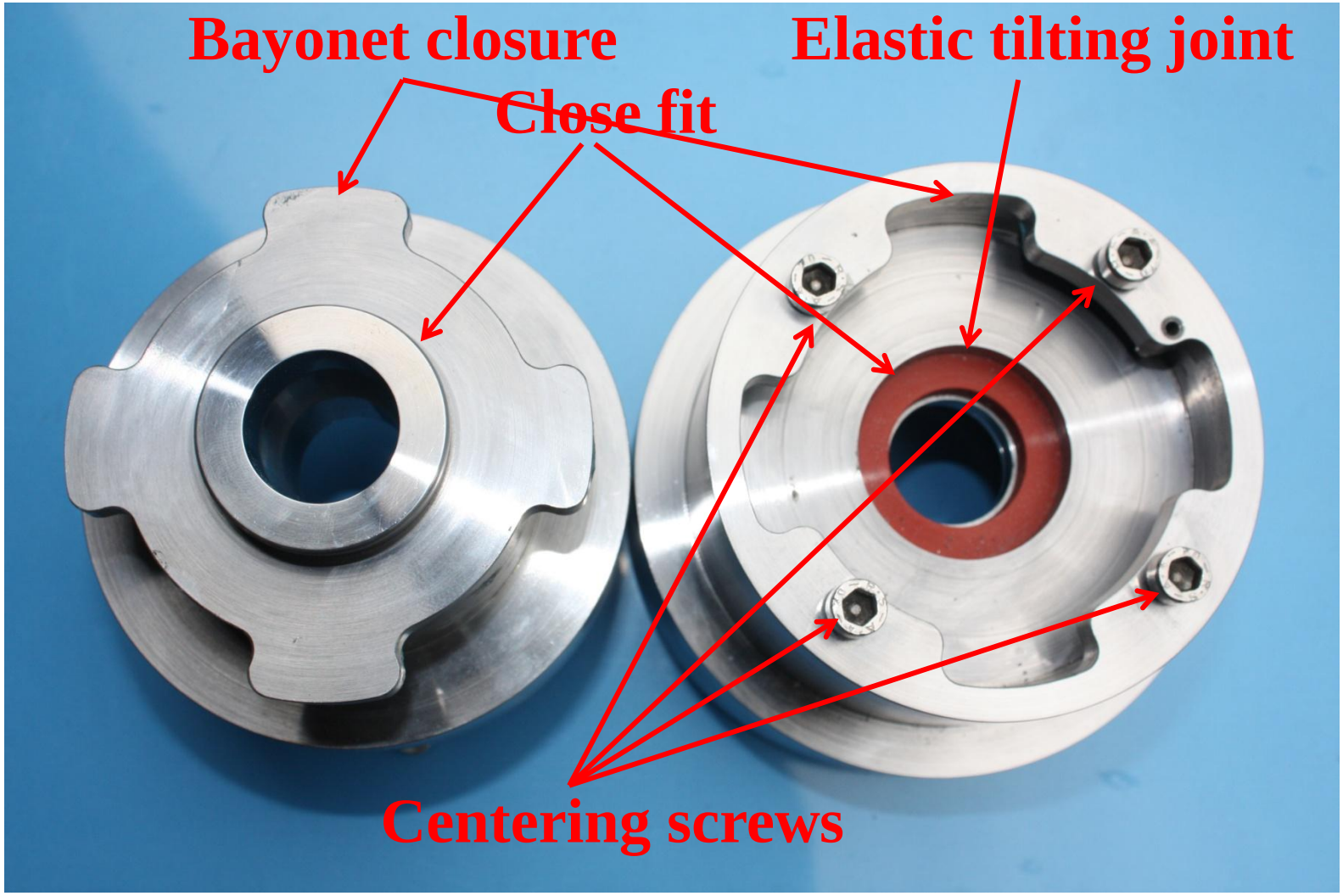


Flex Ring die for foamed films

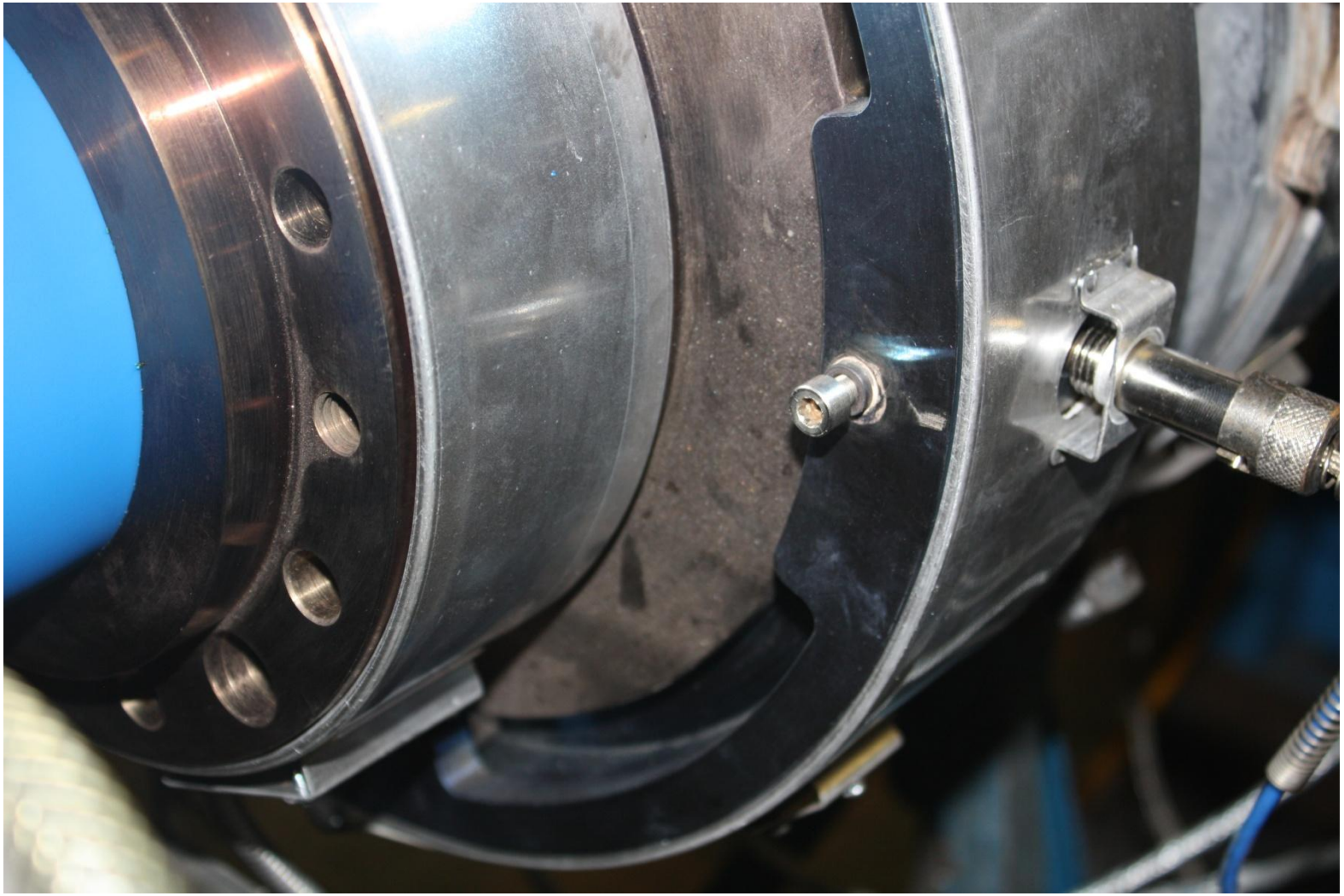
Conventional centering solution



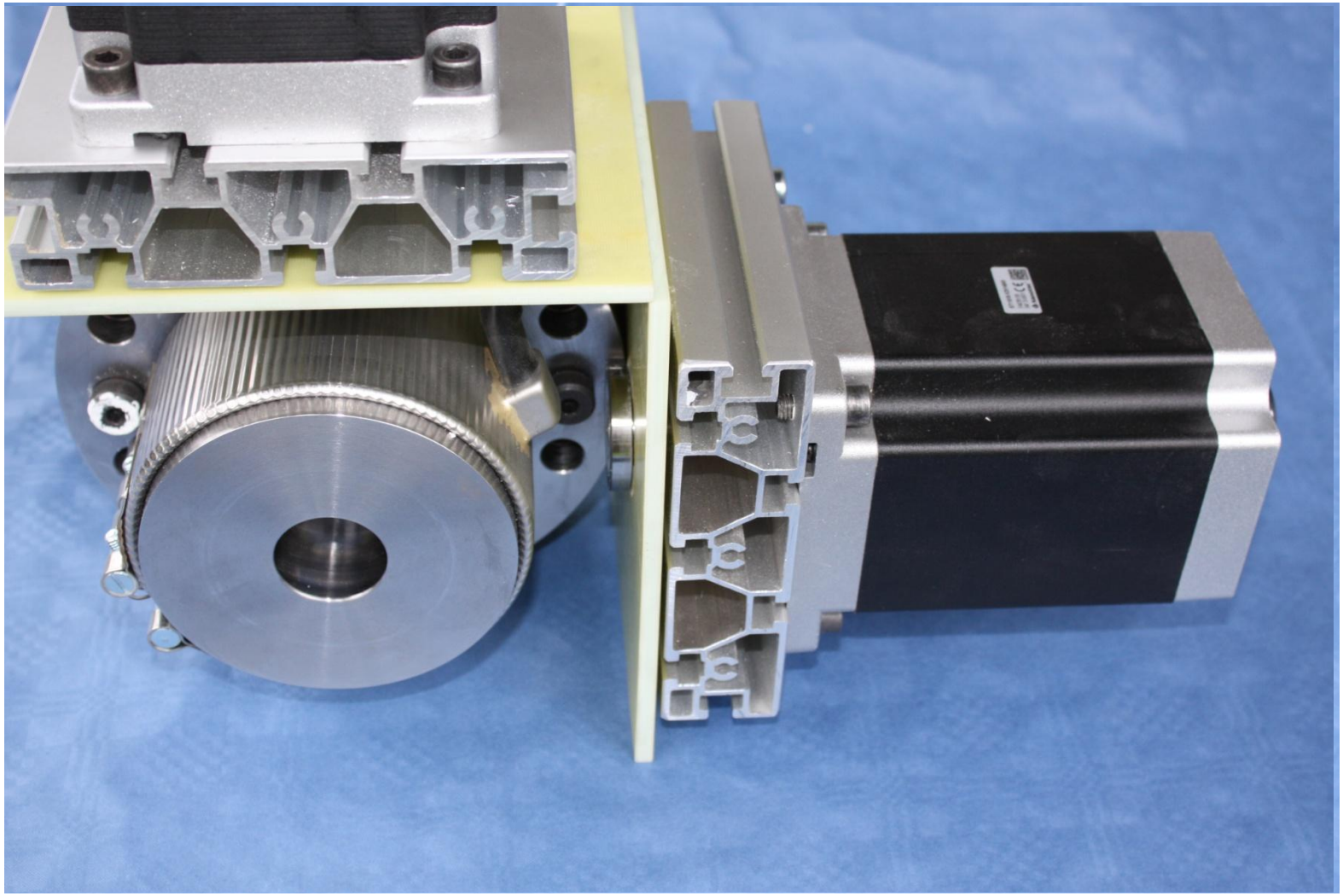
Tilting pipe die having a bayonet closure and small adjusting screws



Tilting die in operation



New blow molding die with tilting joint

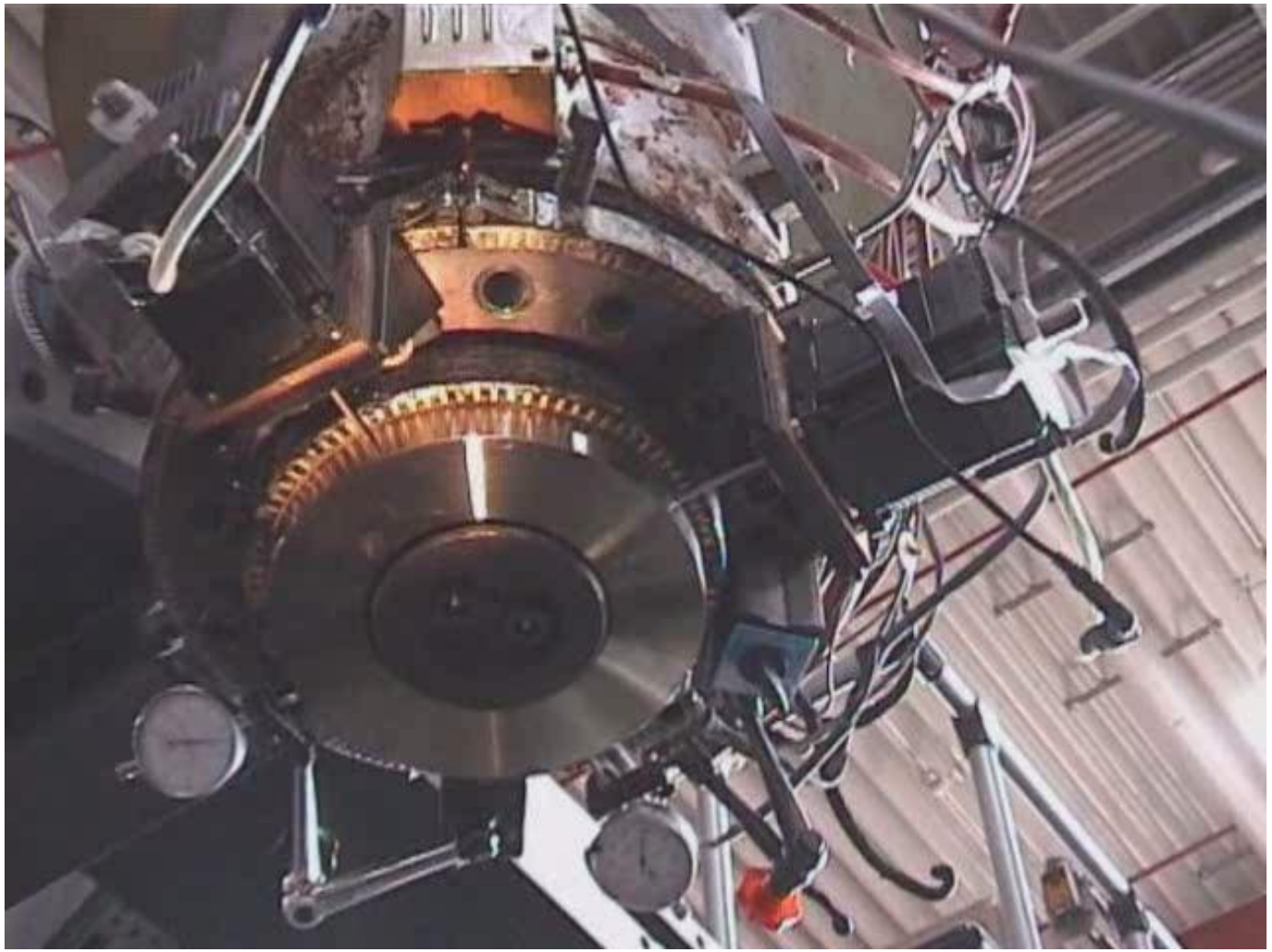


Advantage of the tilting technology

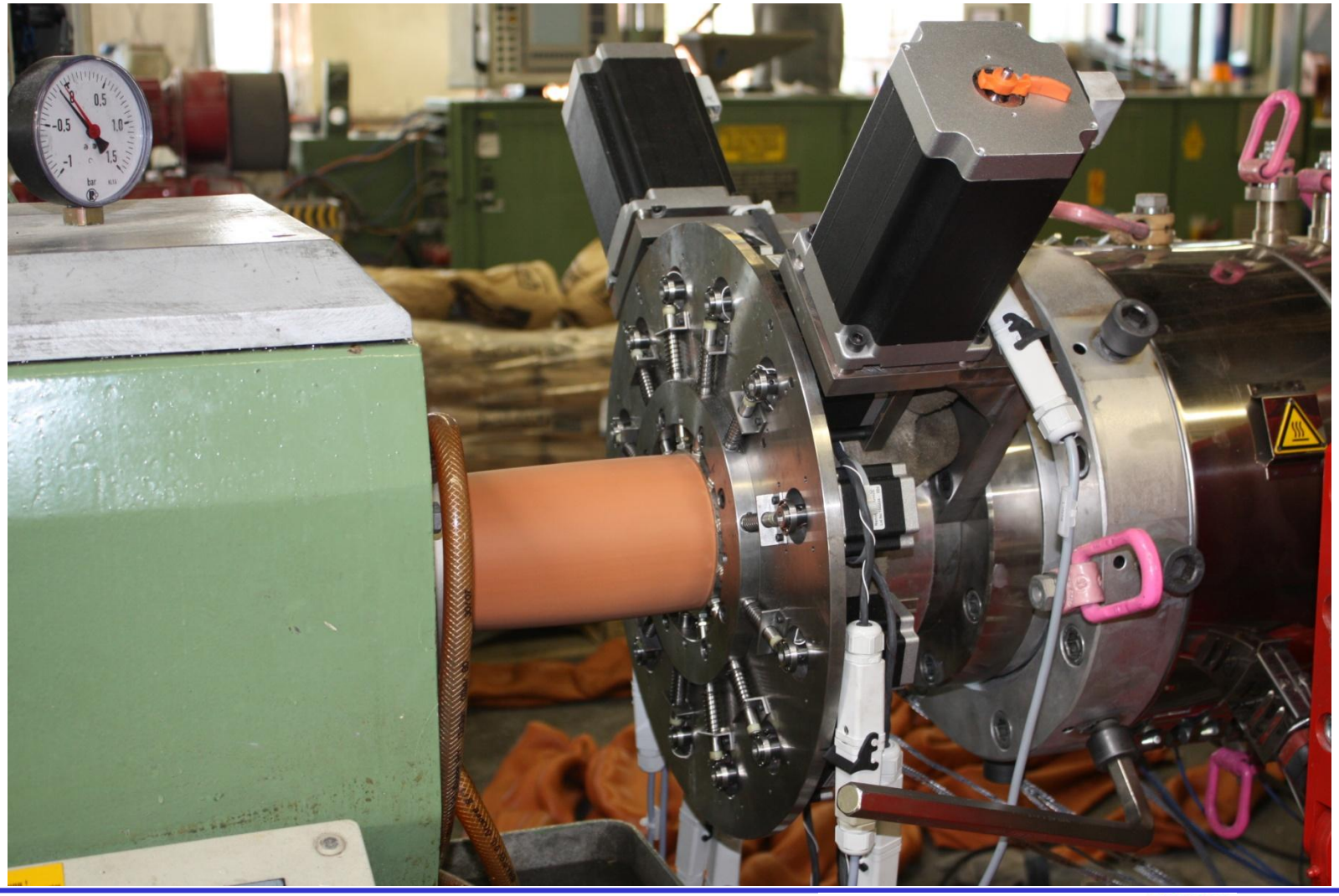
- **It allows for a very sensitive and precise centering of the die in regard to the pin**

- **It is the first technical solution which realizes that every position that has existed can be exactly reproduced at every time!**

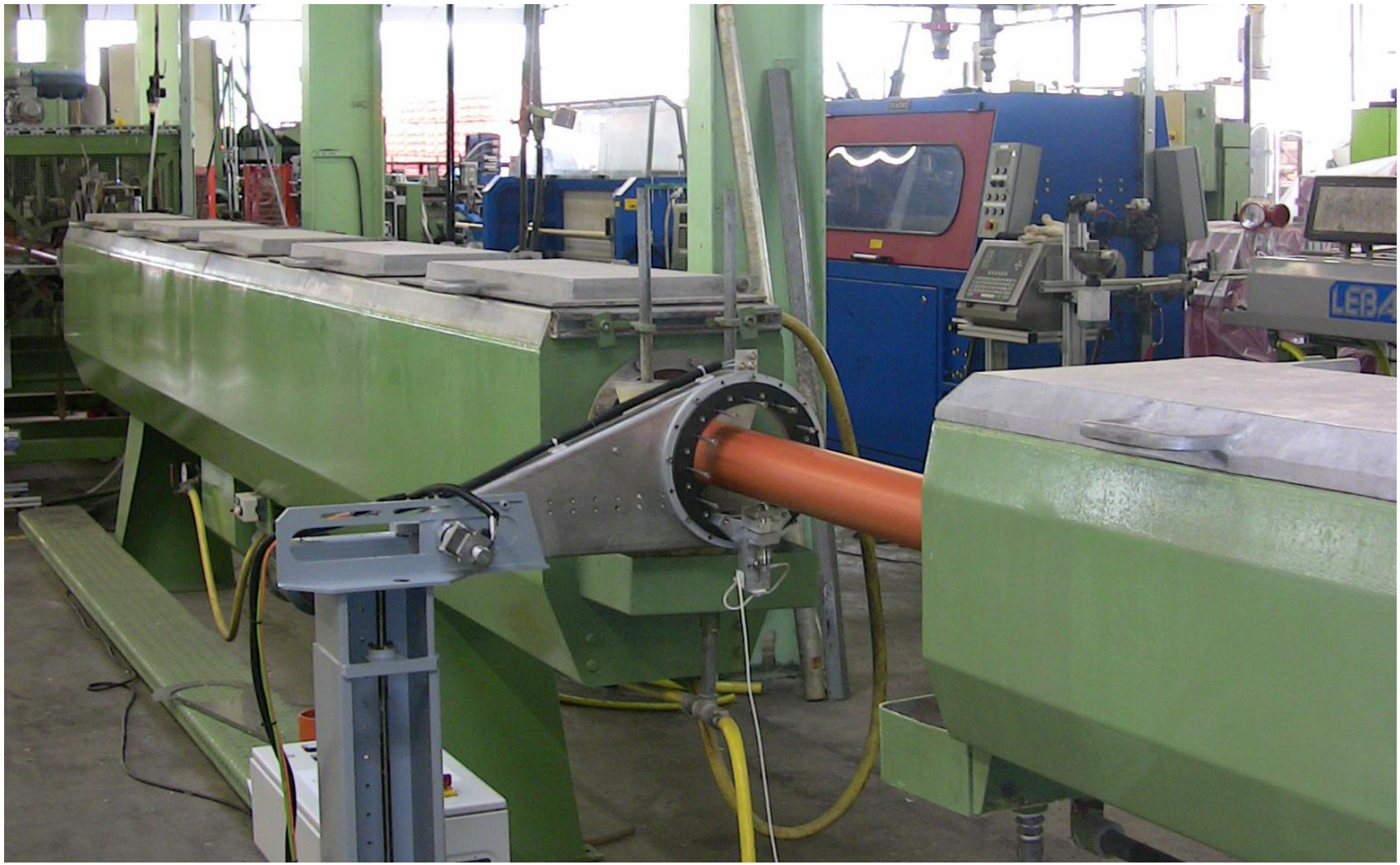
Blow molding die equipped with an elastic tilting joint and two stepper motors



Closed-loop control of excentric and asymmetric thickness differences



Online wall thickness measuring system for core-foamed pipes

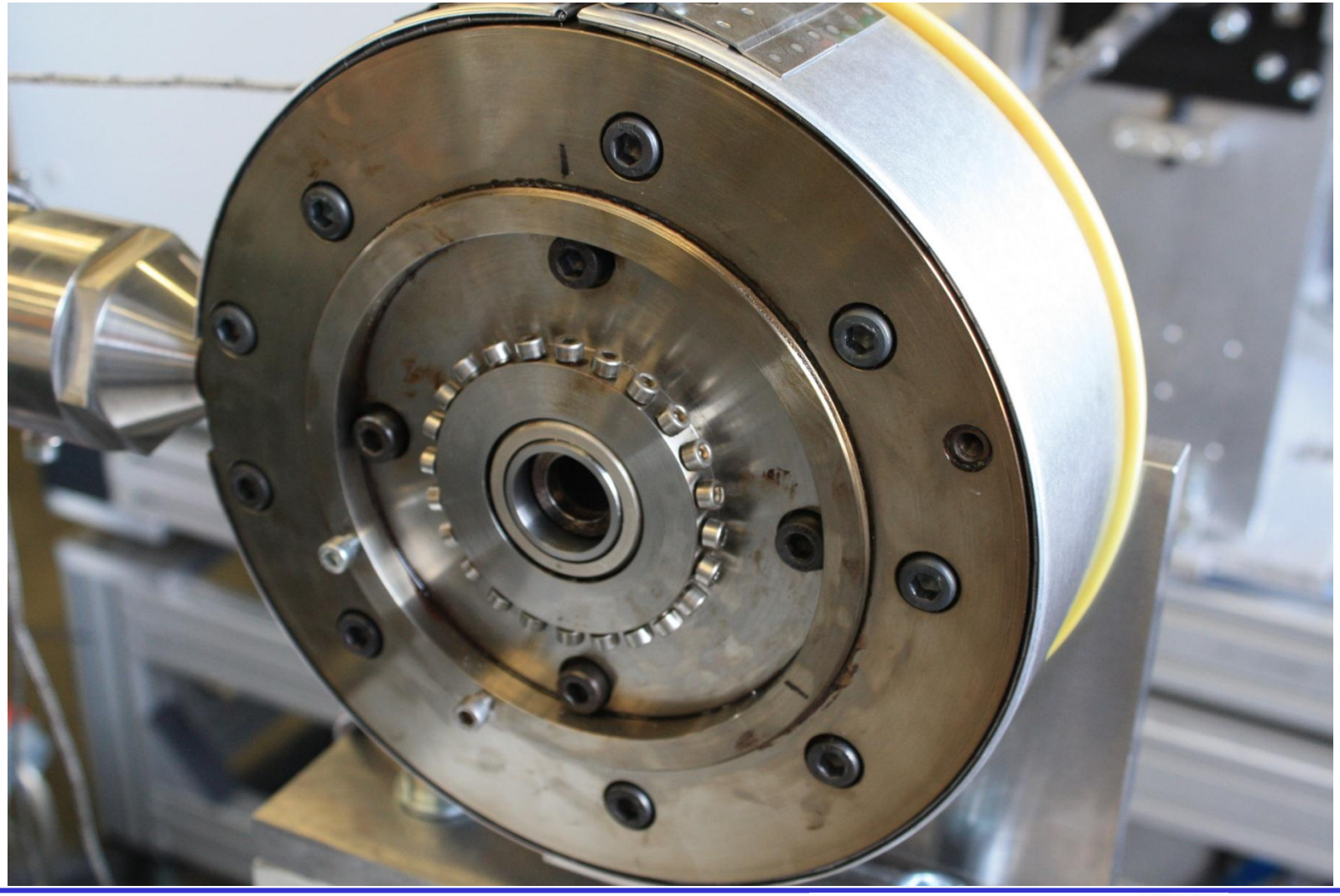


New solution to change the size of the die gap

1. Use a pin that is slightly conical at its end

2. Use a thicker elastic tilting joint and compress it over its complete circumference by an equal amount

Tilting die with gap adjustment



Limitations of the use of elastic tilting joints

1. The use is restricted to operating temperatures below 300 °C

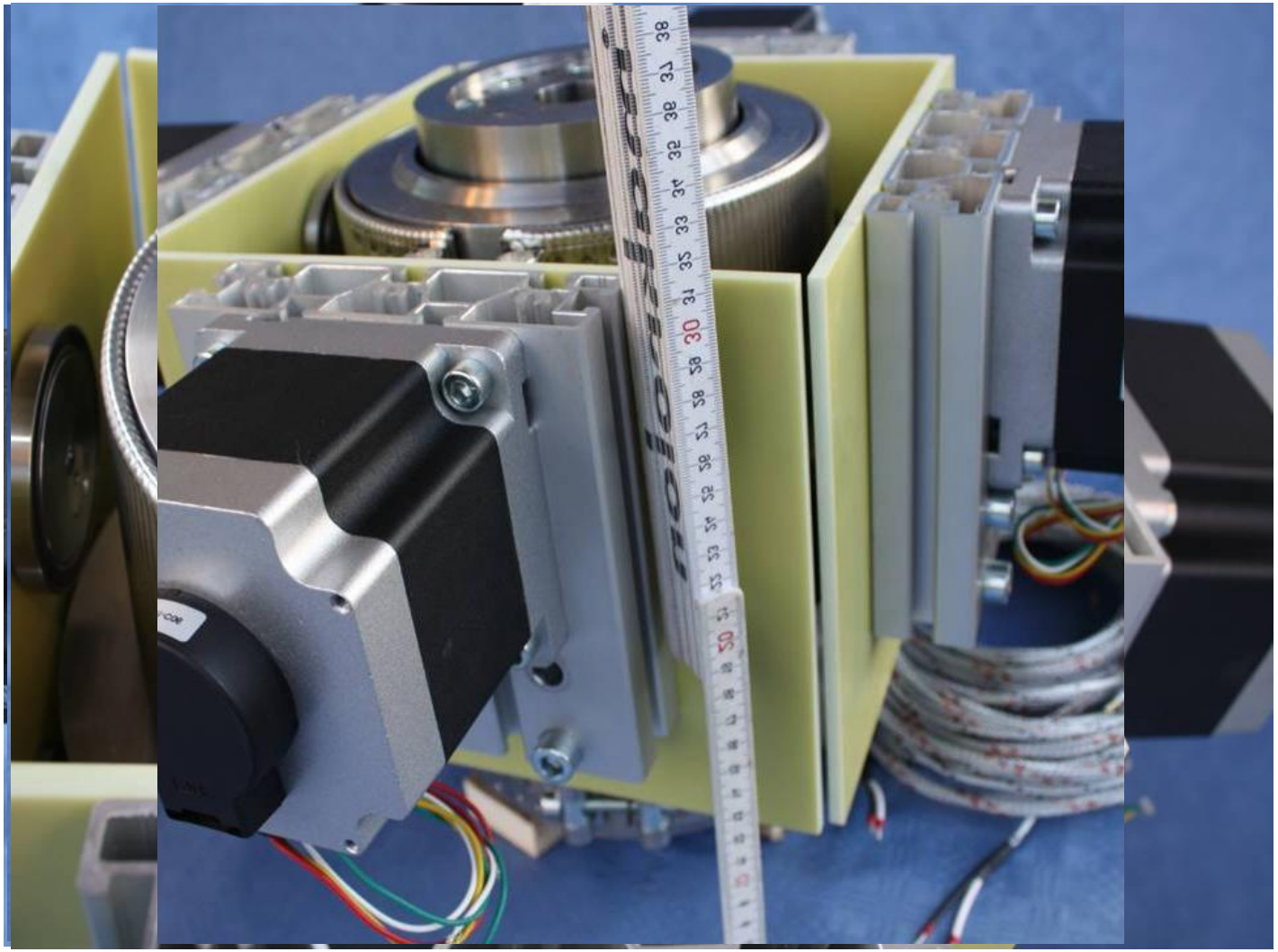
2. The elastomeric material is rather sensitive to wear when using abrasive compounds

3. The amount of compression of the tilting joint is limited and thus only small variations of the flow channel gap are possible

Development of tilting joints manufactured out of steel

A special new steel part was developed that fulfils three functions in an annular head. First it seals the dividing area between the head and the die, second it allows for a tilting of the die and third it gives rise to shift the die in regard to the pin.

New GWDS blow molding head with an integrated patented three functional device



Summary

- **The tilting solution facilitates the centering of an annular die**
- **It realizes a precise and reproducible positioning of the die in regard to the pin**
- **It is a precondition to establish an automatic adjustment**
- **An adjustment of the gap is possible while the process is running**
- **A thee functional steel device is in development to overcome the limitations of elastomeric tilting joints. It opens up new processing possibilities especiall in extusion blow molding**