

# Introduction to PCD tool types



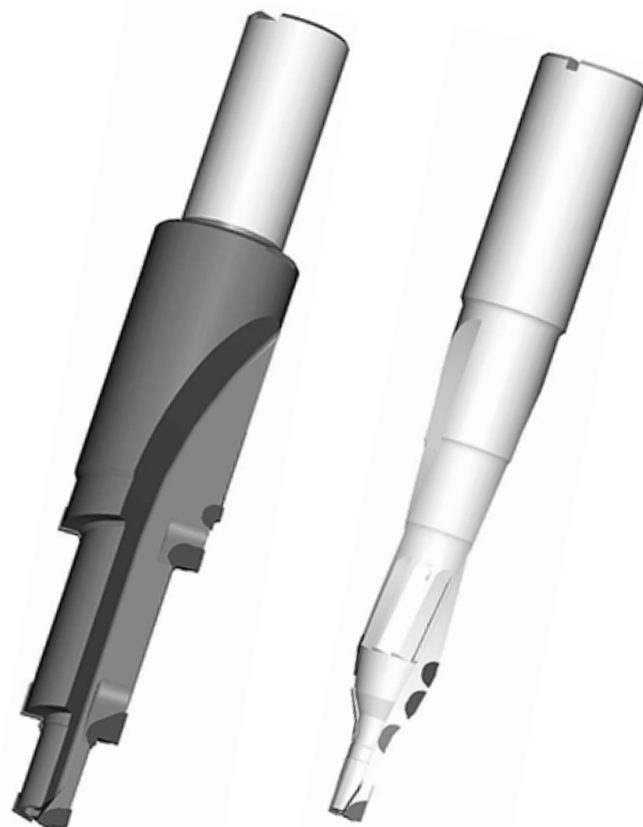
## PCD Drills and step drills

# Drills and stepdrills



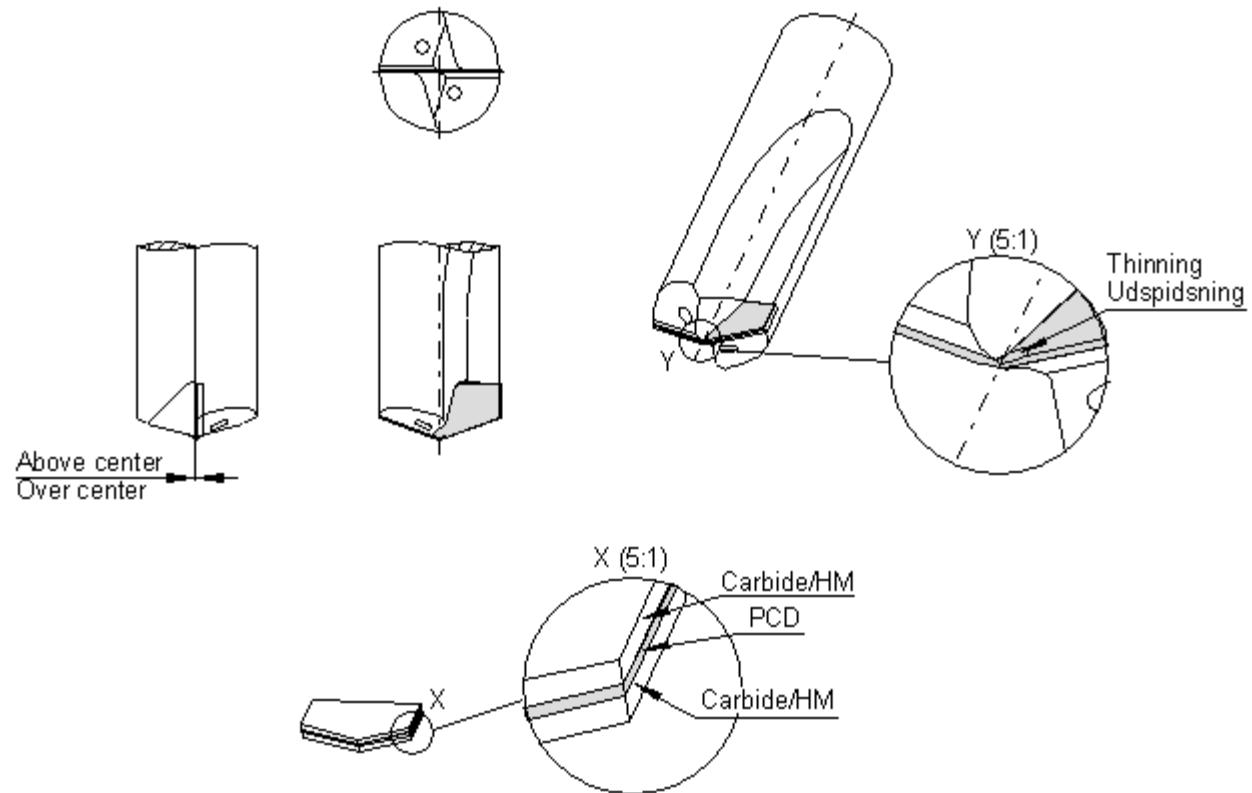
## Contents:

- Choice of drill design
- Capability
- Surface finish and hole tolerance
- Tool life
- Tool examples



# Drills and stepdrills

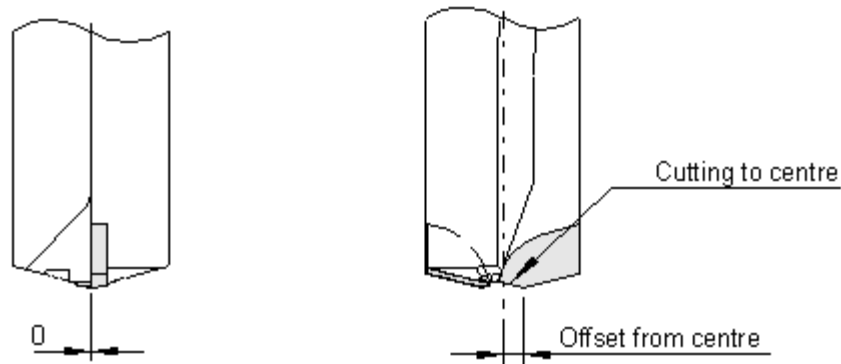
Choice of drill design – Sandwich drill point:



# Drills and stepdrills



Choice of drill design – Twin point drill point:

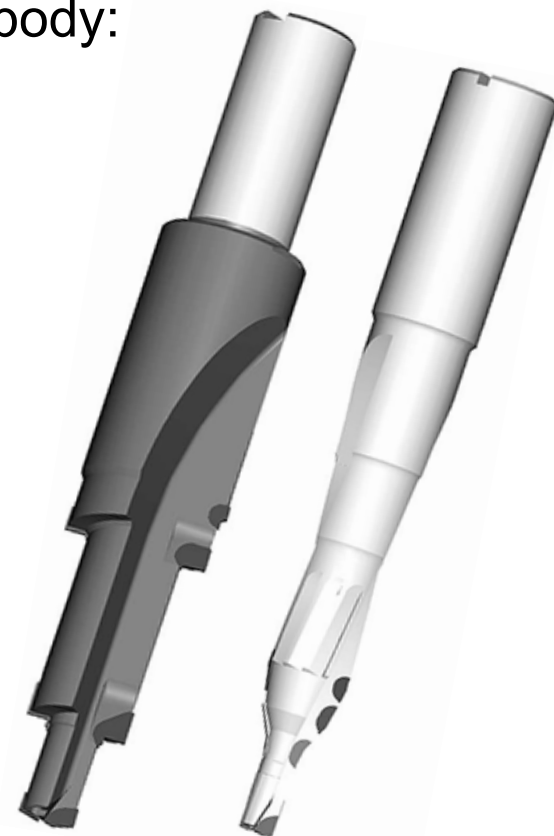


# Drills and stepdrills



Choice of drill design – carbide- or steel tool body:

- Carbide is stiffer (vibrations)
- Carbide can have guide pads
- Steel body might wear off
- Carbide body usually has higher performance
- Large diameter are expensive in carbide
- Price difference also depends on number of PCD tips
- Carbide is easier to make as helical



# Drills and stepdrills



Choice of drill design – straight flute or helix:

- UNIMERCO's PCD Helidrill is new in the market
- A helix helps the chip transportation
- Helix offers better support of the tool
- Helix has limitations with regard to internal coolant channels
- Future standard at UNIMERCO will be helix
- Drilling results will be shown later



# Drills and stepdrills



## Capability:

- Twin point on carbide body:  $\varnothing 5 - \varnothing 32$
- Twin point on steel body:  $\varnothing 5 - \varnothing 32$
- Sandwich point on carbide body:  $\varnothing 5 - \varnothing 25$
- Sandwich point on steel body: not available
- Step drills can have larger stepdiameters than the above



# Drills and stepdrills



## Surface finish and hole tolerance:

- Achievable surface finish and hole diameter tolerance, depends on many factors including material type, cutting data, lubrication conditions etc.
- Under good conditions, both drill points should be able to offer Ra 0.5 in hole finish
- Under good conditions, the Twin point should be able to offer IT7 tolerance with CPK 1.33
- Under good conditions, the Sandwich point should be able to offer IT6 tolerance with CPK 1.33





# Drills and stepdrills



## Tool life:

- Tool life is very difficult to predict as it depends very much on the machining conditions, such as: stability, run out, coolant, material type, cutting data etc.
- No direct comparison can be made to carbide
- In most extruded, solid and cast aluminium, tool life should likely be minimum 50,000 holes
- Maximum can be as much as over 500,000 holes

