

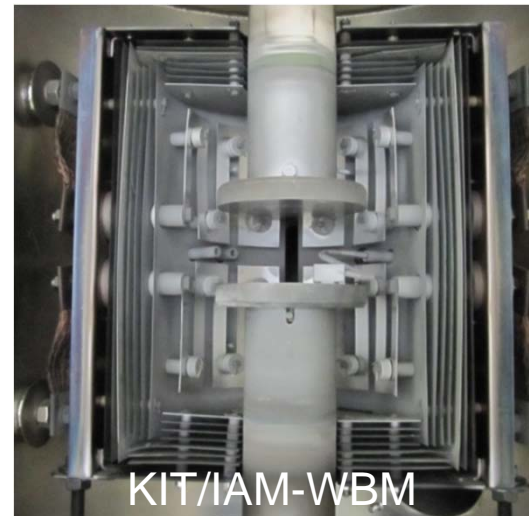
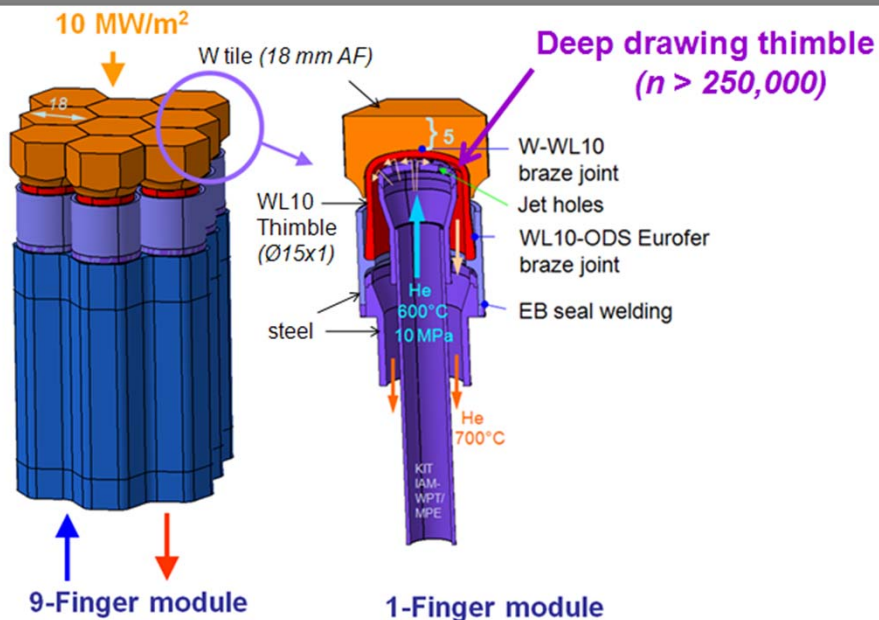
WP12-MAT-01-HHFM-04-06/KIT/BS
“Deep Drawing W Thimble”

Reporting period: July 2012 - February 2013

Principal Investigator: P. Norajitra (KIT)

With participations of: W. Basuki , L. Spatafora

KARLSRUHE INSTITUTE OF TECHNOLOGY (KIT)



Ø28 mm sheet, 700°C,
path-controlled ~1 µm/s

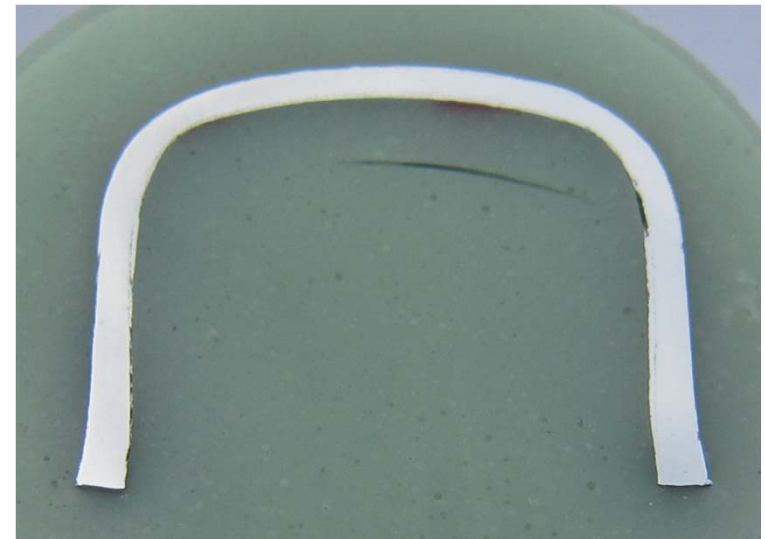
Last deep drawing tests results

W. Basuki, P. Norajitra, L. Spatafora, EFDA MON MTG, Ljubljana, June 2012



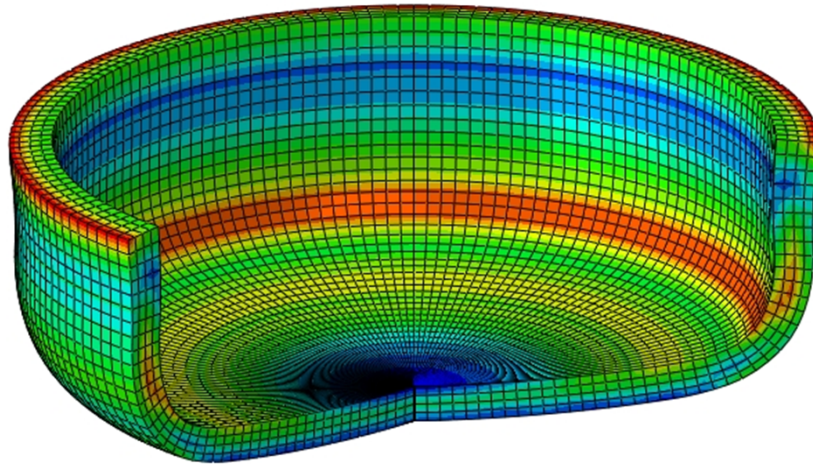
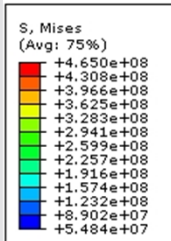
$h = \sim 12 \text{ mm}$

Best result achieved:
 $\varnothing 28$, 700 °C, new flat tool

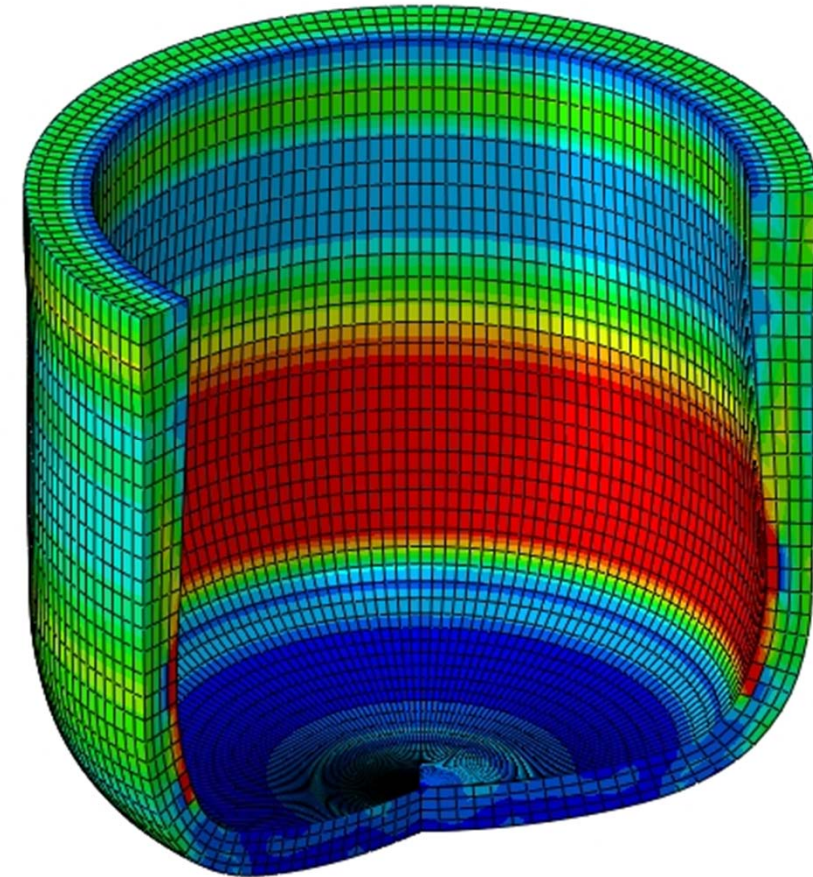
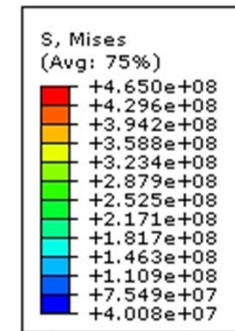


Sample EDM cut in
half and prepared

Optimisation: Computer simulation of 2-step deep drawing (DD) with W sheet, \varnothing 30 mm, 1 mm, @T = 1000 °C



ABAQUS



First step: $D_{\text{thimble}} = \varnothing 20 \text{ mm}$

Advantage of 2-step DD: Thimble wall thickness adjustable within good tolerance

Second step: $D_{\text{thimble}} = \varnothing 15 \text{ mm}$

Summary

- Best deep-drawing result was achieved with “thimble-like” punch shape at 700 °C.
- Computer simulation with ABAQUS shows that deep-drawing in two steps even enables a better result with respect to the thimble wall thickness.