

# Thermal Cyclic Moulding

TCM

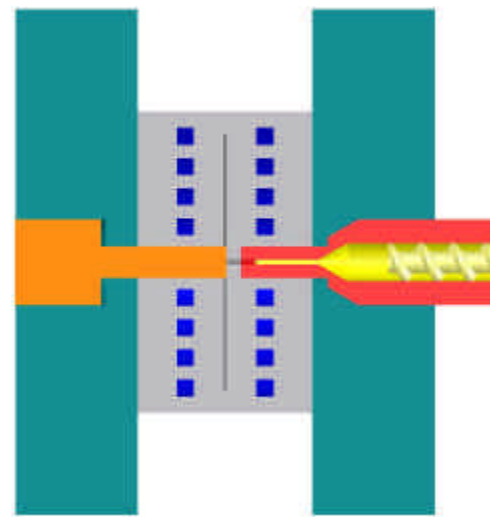
Stefan Olin  
CEO



# The moulding machine



# The principle of Moulding



# The Moulders Dilemma

Hot vs. Cold

High temperature on mould needed for good pit/groove replication

Low temperature on mould needed for short cycle time

# Traditional Moulding vs. TCM

## Traditional moulding

- Long cycle time
- High clamping force

due to:

- Passive heating
- Thermally "slow" mould materials

## TCM

- Short cycle time
- Low clamping force

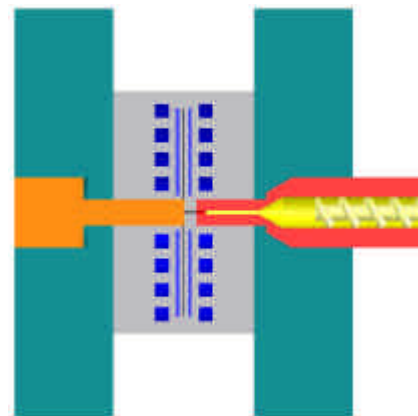
due to:

- Active heating and controlled cooling
- Thermally "fast" mould materials

# Thermal Cyclic Moulding

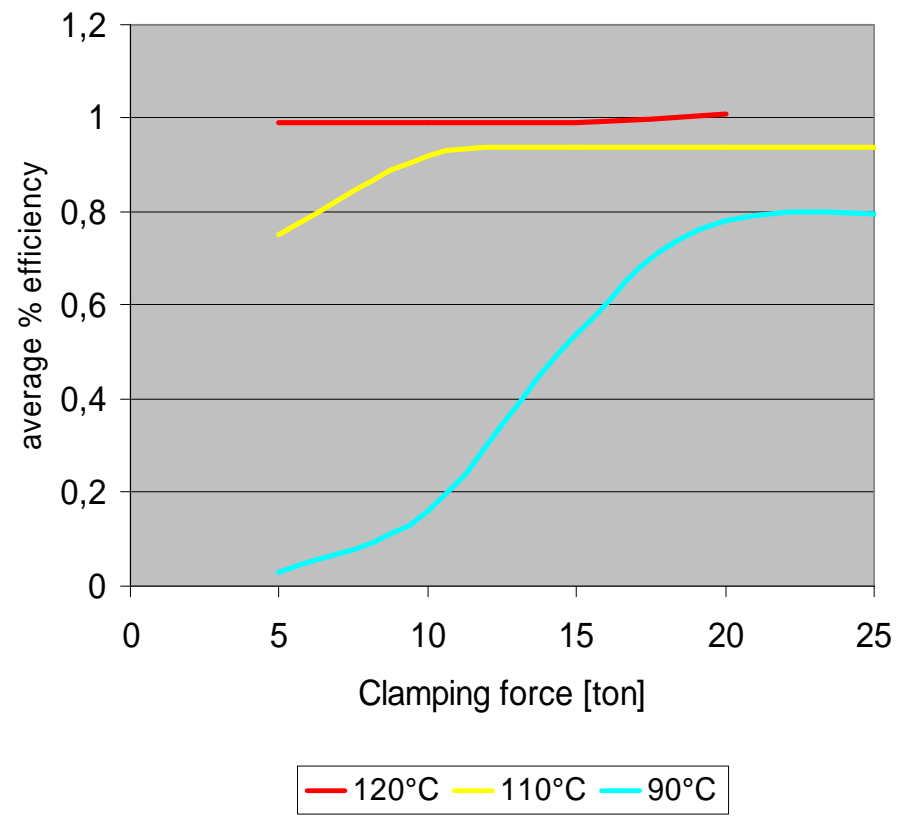
TCM is working with an active and rapid heating on the stamper and mirror side surfaces, allowing use of thermally "fast" mould materials in combination with controlled cooling water.

This combine a god pit/groove replication at short cycle time!

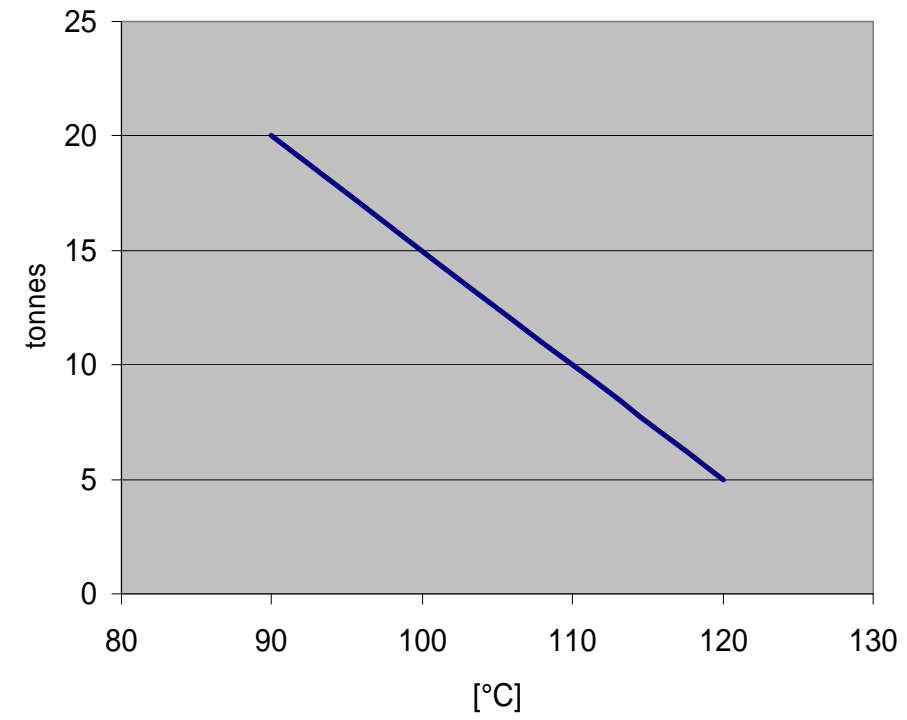


# Clamping Force

DVD pit replication  
as 1st order diffraction



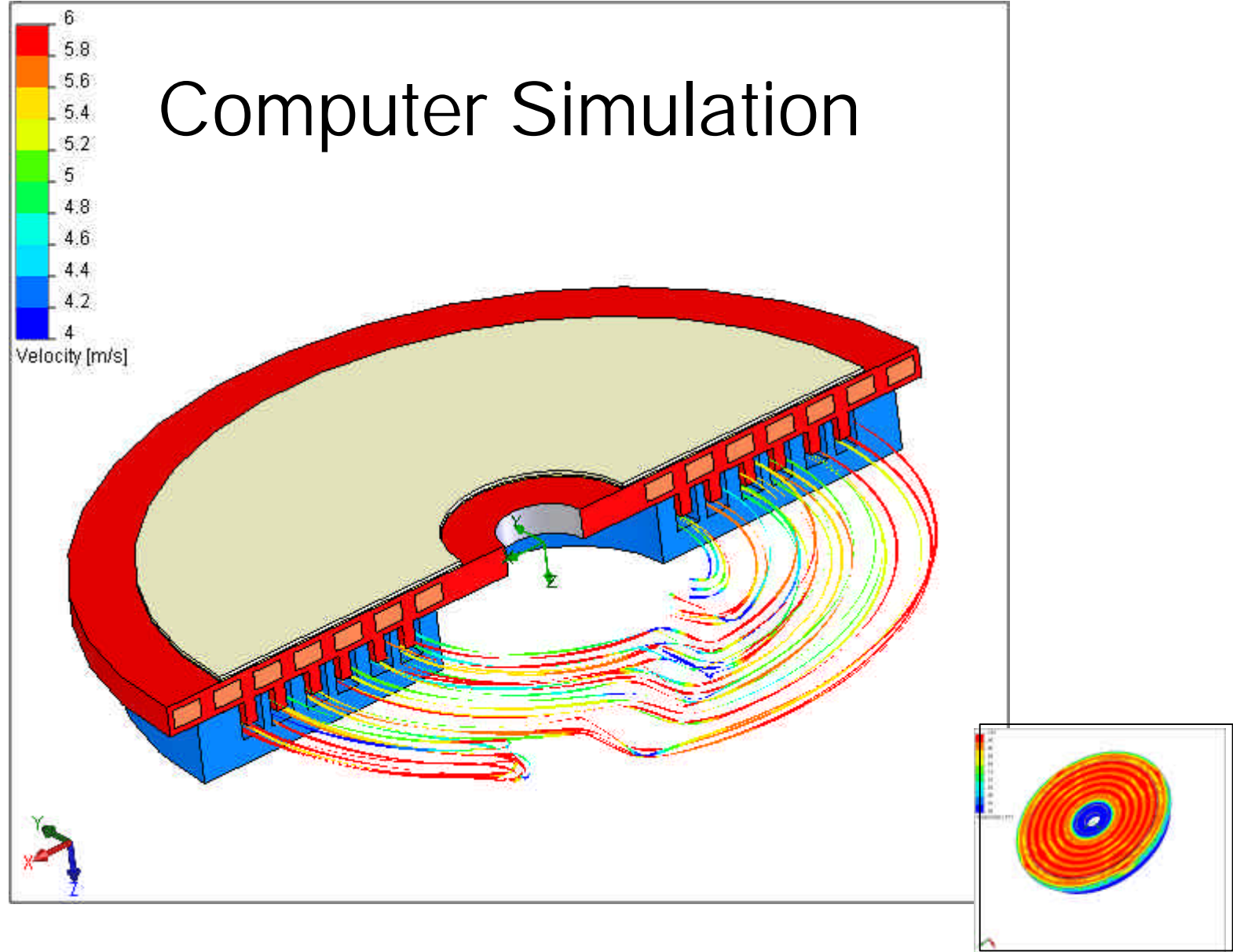
Clamping force for replicating DVD pits



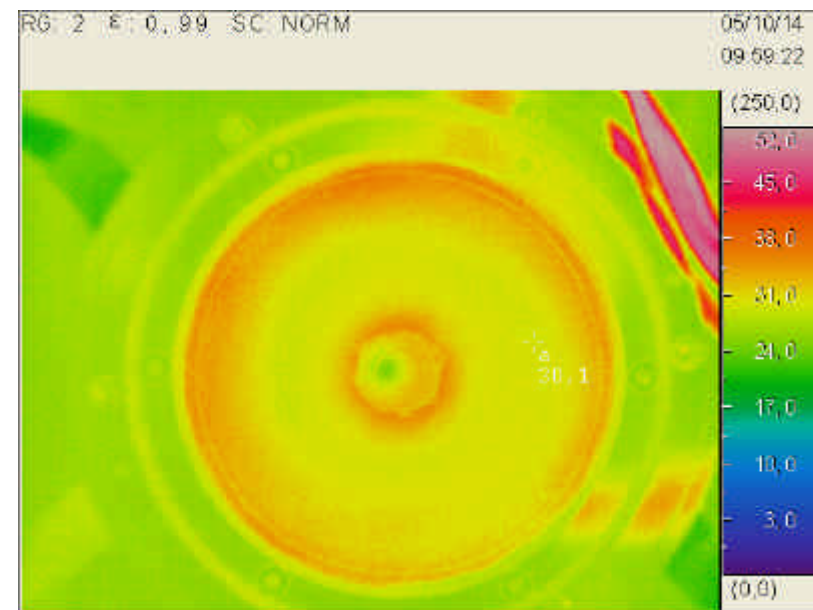
# Unrivalled Thickness/Area Ratio

- Thin film moulding
  - Thickness down to  $<25 \mu\text{m}$  for a 120 mm substrate
  - Aspect ratio of 2500 :1

# Computer Simulation



# IR Camera Measurement



# Examples of TCM Applications

- Optical discs
  - DVD, DVD-R

Short cycle time, low clamping force and good pit/groove replication

# Examples of TCM Applications

- Optical discs

- DVD, DVD-R

- Short cycle time, low clamping force and good pit/groove replication

- Blu-ray

- L0 substrate without ski jump
    - Moulded L1 substrate/cover layer