StackTeck®

Focused Expertise. Benchmark Performance.

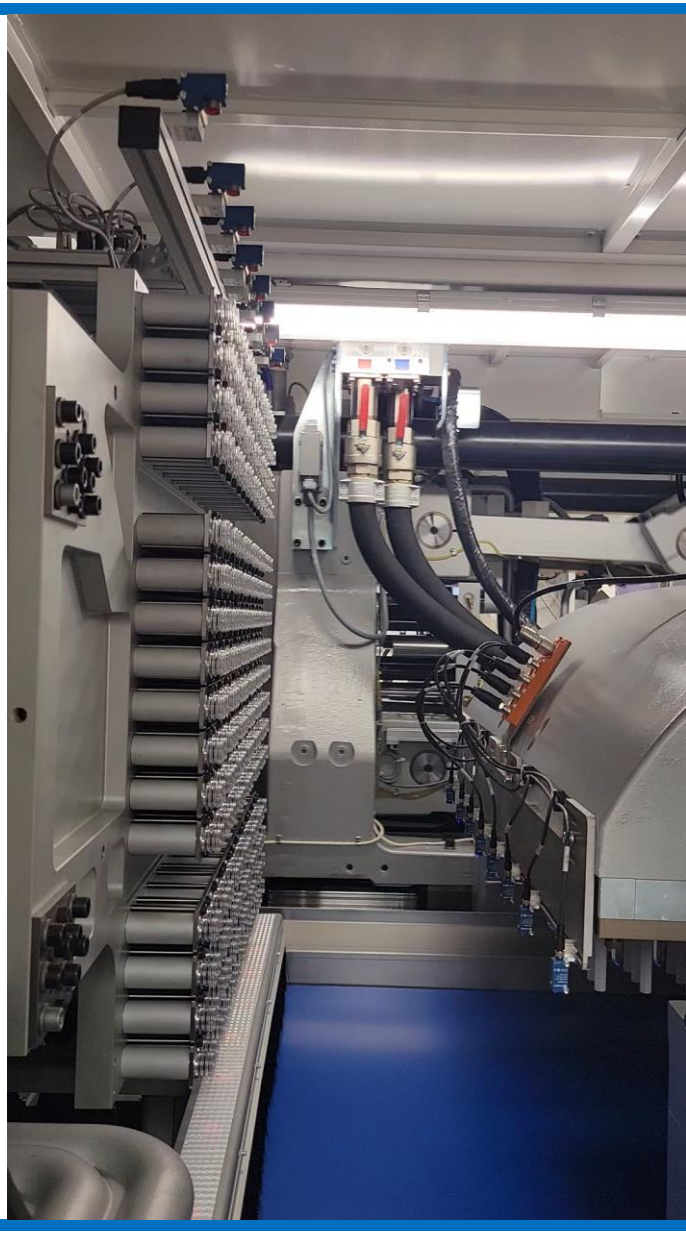
PiCOOL™ Technology

Advanced Post Mold Cooling of Preforms

Post Mold Cooling for PET Preform Systems

- As we know, the non operator side of most modern preform molding machines has an EOAT (shown in the video on the left) and a cooling/transfer station (on the right).
- Both provide post mold cooling
- The EOAT on the left cools the external surface of the preforms by conduction
- The cooling/transfer station cools the internal surface of the preforms by convection

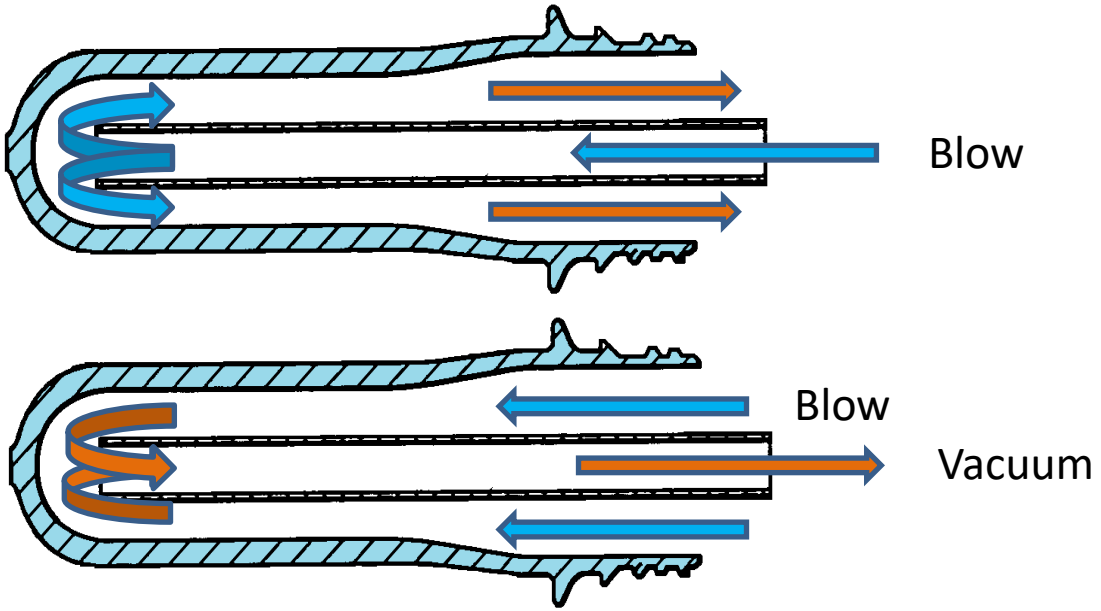
- PiCOOL technology is used on the right side



PiCOOL™

Existing Conventional Post Mold Cooling Technology

- In the preform molding industry, there are 2 main technologies used for the cooling/transfer stations
- Both provide internal convective cooling by introducing a stream of air into the preform, either by blowing air in, or in a reverse manner by drawing air out
- Both methods have their advantages, and both offer improvements to cycle time and preform quality



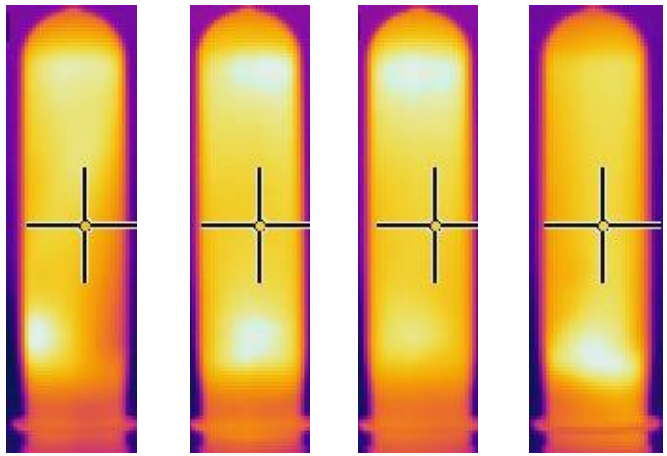
PiCOOL™ Post Mold Cooling

So why did we set out to develop a new method that we now call PiCOOL?

Thermal Variations

- We found through thermal imaging that preforms often have significant temperature variations, both lengthwise and circumferentially about the preform
- This became a limitation when trying to accelerate cycle times, as certain sections of a preforms' surface were hotter than others.
- We then embarked on a project to improve the cooling uniformity at the final stage of molding

- Here's an example of a preform that shows different hot areas as it's rotated
- Both top to bottom, and around it's circumference
- These hot areas could result in deformation issues, contact marks, or sticking to one another

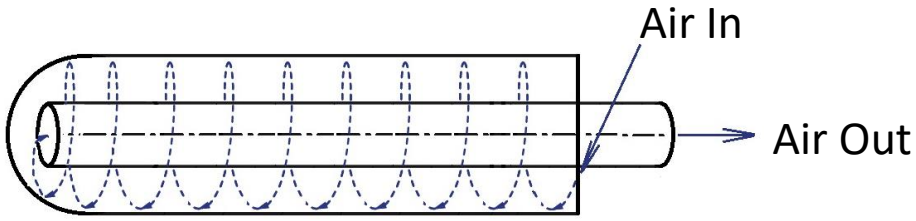


PiCOOL Concept

- This led to the tornado style cooling method illustrated below
- It's a unique method that directs an air stream on the interior surface of the preform

- The air stream enters the preform in a spiral direction, continuously wrapping around the internal surface picking up heat, then exiting through a center exhaust tube
- The spiral trajectory of the air stream forces the air over the internal curvature of the preform (concave shape)

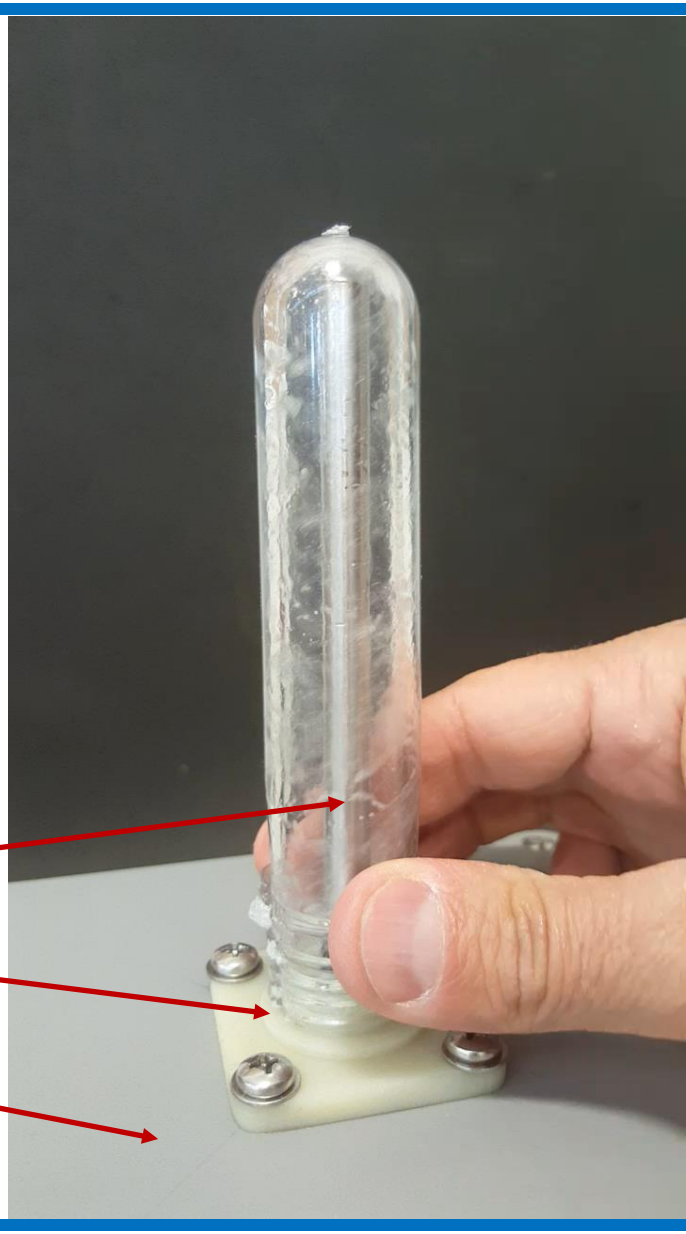
- The concave shape generates extreme turbulent action of the air stream:
  - Effectively 'scrubbing' the internal surface layer of the preform
  - Creating a uniform cooling profile both axially and circumferentially
  - And significantly improving heat transfer to result in a colder preform temperature



PiCOOL™ patent granted 2018

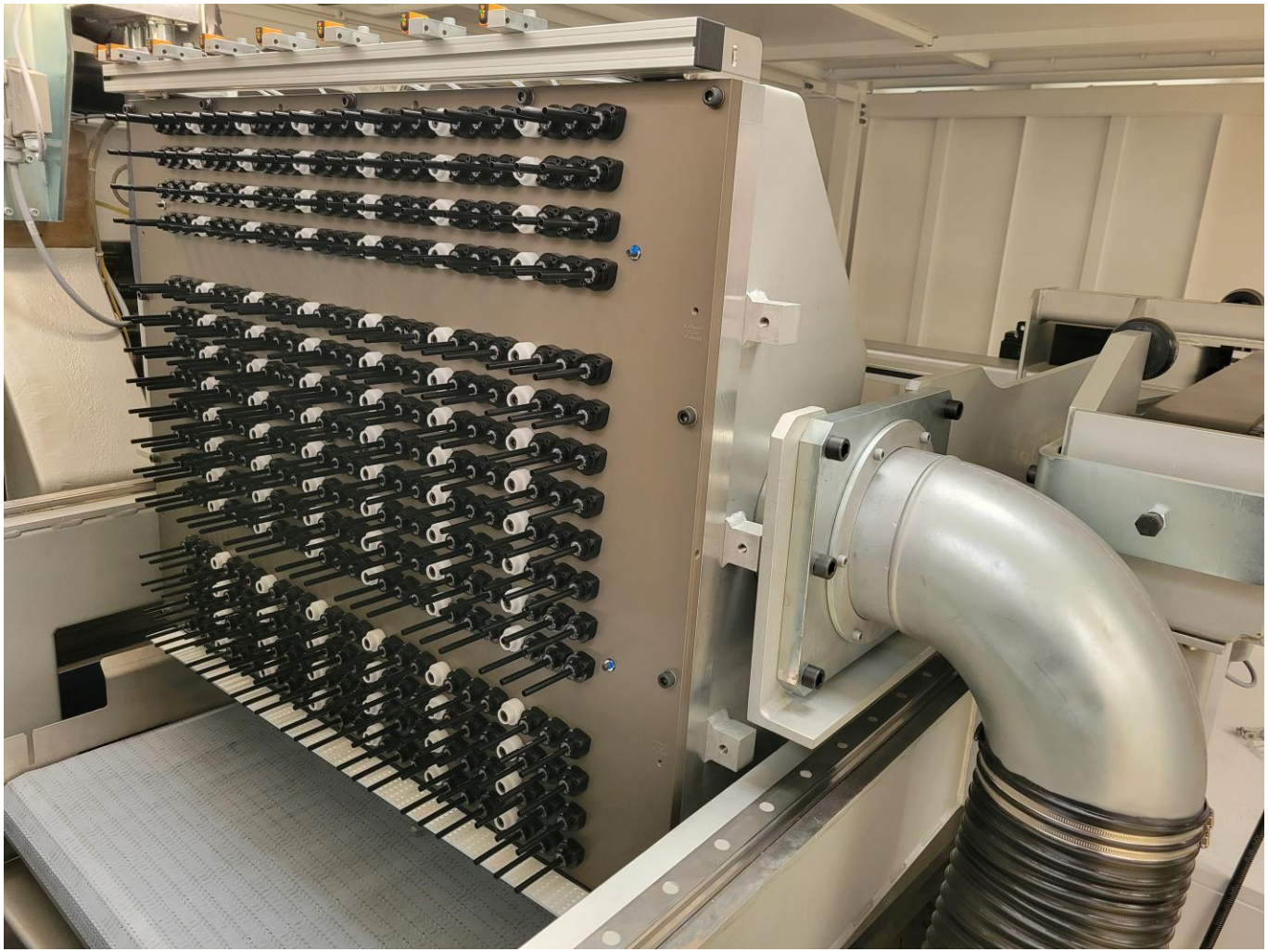
PiCOOL Action

- To visually show the PiCOOL action, a PiCOOL test unit was prepared
- A preform is placed onto the PiCOOL test unit
- The internal surface of the preform has been sprayed with a viscous liquid to help visually show the air stream action



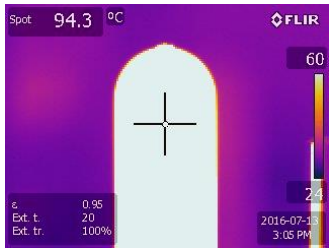
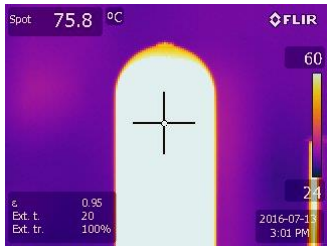
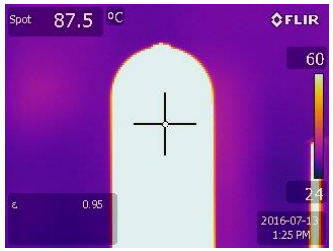
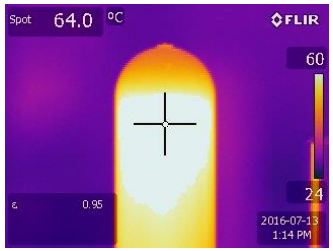
PiCOOL™

PiCOOL 96 cavity 4-stage assembly in NETSTAL PET-LINE 4000 system (side-entry)

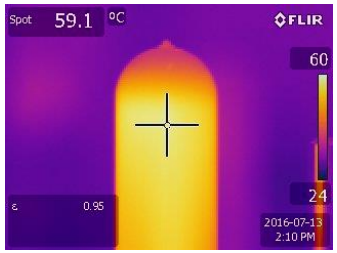


PiCOOL Case Study 1

- 42.8g preform, 4.0mm wall thickness
- 14.9s cycle time
- PiCOOL temperature reduction = 15.7°C
- **2.2s cycle time reduction with PiCOOL**

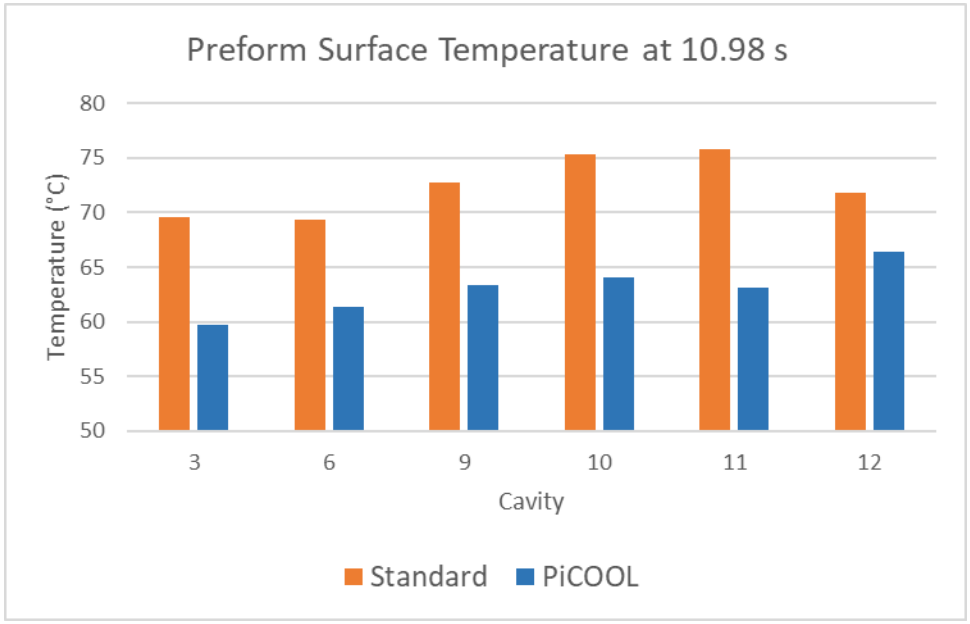
	1 Stage	2 Stages	3 Stages
Standard			
PiCOOL™			
	- 6.8°C	- 11.8°C	- 15.7°C

12.7 sec cycle time to achieve same temperature as standard



PiCOOL Case Study 2

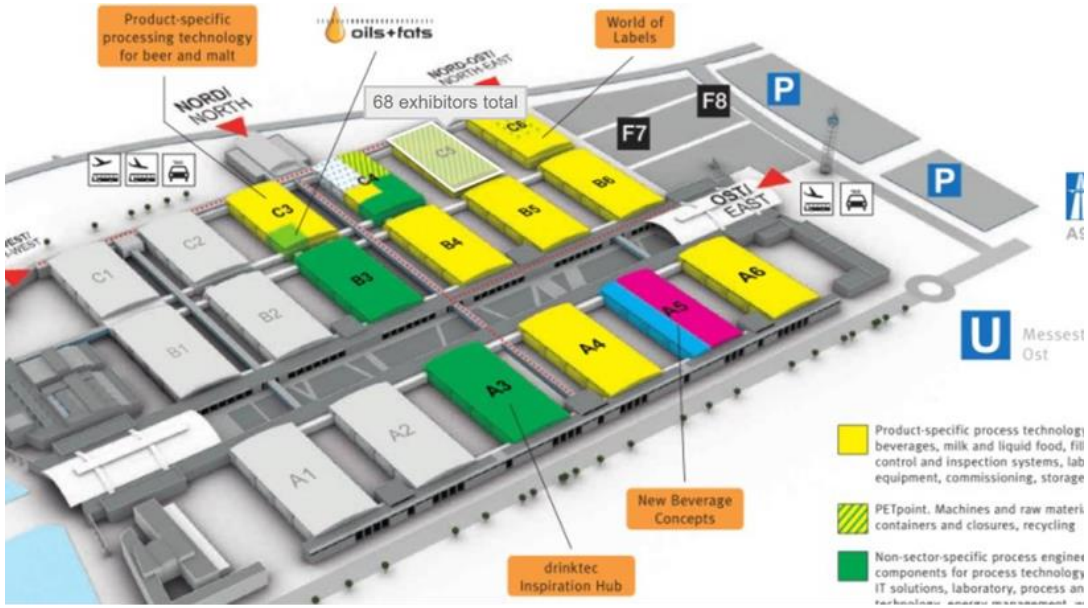
- 72 cavity 16g preform, 3.4mm wall thickness
- Temperature reduction average = 9.4°C
- **1.3s cycle time reduction with PiCOOL**

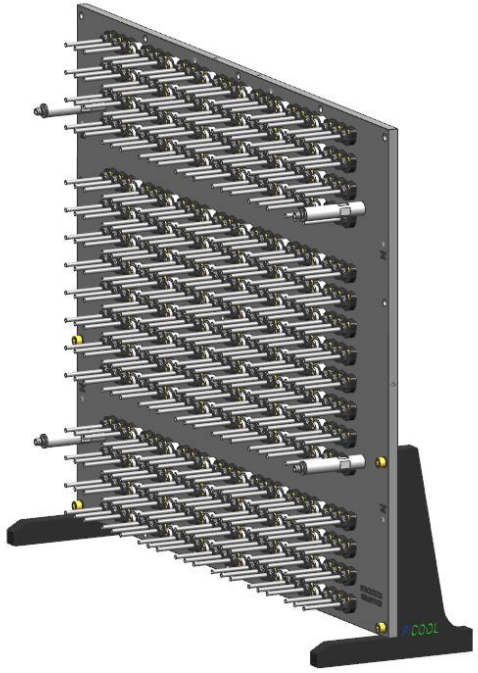


	Cycle Time Comparison (s)	
	Standard	PiCOOL
Cycle Time	10.98	9.64
Injection time	1.36	1.24
Hold Time	4.62	3.90
Cooling Time	2.20	1.70
Lock-to-Lock Time	2.80	2.80

Come visit us at Drinktec between September 12 to 16, 2022 in Munich, Germany.

- You will find us in hall C5 booth number 221
- PiCOOL will be on display
- We'll be happy to show you more PiCOOL details & our latest innovations for PET preforms
- We look forward to meeting you in Munich!





StackTeck®

Focused Expertise. Benchmark Performance.

Thank You

Contact us:
Phone: 1-888-700-8555

Website: www.stackteck.com