

The development of progressive cooling systems of moulds for container glass IS machines

The project involves development of a new and progressive cooling system of the glass molds. The existing cooling technology of glass molds are based solely on compressed air cooling. Compared to existing technology, the newly developed system should have the following advantages: (1) minimization of the energy needed to compress of a large amount of air and its transport to relatively large distances, (2) it opens the possibility for utilization of waste heat from cooling in other technologies, such as recovery energy, heating, cooling, (3) significant improvements in the working environment for employees by reducing of the ambient temperature and noise resulting from the expansion of compressed air into the surroundings, (4) it will be possible to develop an intelligent mold cooling based on a controlled supply of coolant to each part of the mold and therefore to achieve higher product quality and increase machines productivity. The project is based on mutual cooperation of Sklostroj Turnov CZ, s.r.o. and the Technical University of Liberec (TUL), where Sklostroj gives into a project long-term experience with the production and sale of glass machines and TUL gives theoretical knowledge of thermodynamics, fluid mechanics and numerical simulations.

Code	TA01020313
State providing funder	TA ČR (TA0) https://www.tacr.cz/en/homepage/
Programme	TA – ALFA (2011-2016) https://www.tacr.cz/en/alfa-programme/
Total eligible costs	9 570 000 CZ
Total project subsidy	6 190 000 CZ
Subsidy FME TUL	3 000 000 CZ
TUL project number	17871
Contractor	Sklostroj Turnov CZ, s.r.o. https://www.sklostroj.cz/en#utm_source=firmy.cz&utm_medium=ppd&utm_campaign=firmy.cz-198884
Project participant	TUL, Faculty of Mechanical Engineering
Principal investigator TUL	doc. Ing. Václav Dvořák, Ph.D.
Department	Department of Power Engineering Equipment http://www.fs.tul.cz/en/construction/energy-equipment/research-and-innovations/
Period	2013-2015

<https://www.rvvi.cz/cep?s=jednoduche-vyhledavani&ss=detail&n=0&h=TA03010852>

Costs (year) TUL	2013	2014	2015	Total
Non-investment (CZK)	1 000 000	1 000 000	1 000 000	3 000 000
Investment (CZK)	0	0	0	0
Total (CZK) TUL	1 000 000	1 000 000	1 000 000	3 000 000

Project results [EN](#)

2013	Article	RIV/46747885:24210/13:#0006323 - Numerical solution of optimal design for axisymmetrical cooling canal (2013)
2014	Article	RIV/46747885:24210/14:#0006316 - Shape optimization of the current body located in the cooling canal (2014)
2014	Article	RIV/46747885:24210/14:#0006320 - Numerical results of plunger cavity optimal design (2014)

2015	Article	RIV/46747885:24210/15:00002987 - Two-periodic cooling process in glass forming (2015)
2013	Article	RIV/46747885:24510/13:#0001150 - Numerical solution of optimal design for axisymmetrical cooling canal (2013)
2013	Article	RIV/46747885:24510/13:#0001150 - Numerical solution of optimal design for axisymmetrical cooling canal (2013)
2014	Article	RIV/46747885:24510/14:#0001205 - Shape optimization of the current body located in the cooling canal (2014)
2015	Article	RIV/46747885:24510/15:#0001208 - Optimization of the Insulation Barrier in the Cooling Process (2015)
2018	Article	RIV/46747885:24510/18:00006391 - Numerical solution of the pressing devices shape optimization problem in the glass industry (2018)
2016	Prototype	RIV/60111739:_____/16:N0000004 - Modernizovaná chladící forma (2016)