



SHADOW industries

Engineering with a Purpose

Polyshot Brazed Core Mold Flow Analysis Project

Prepared for:

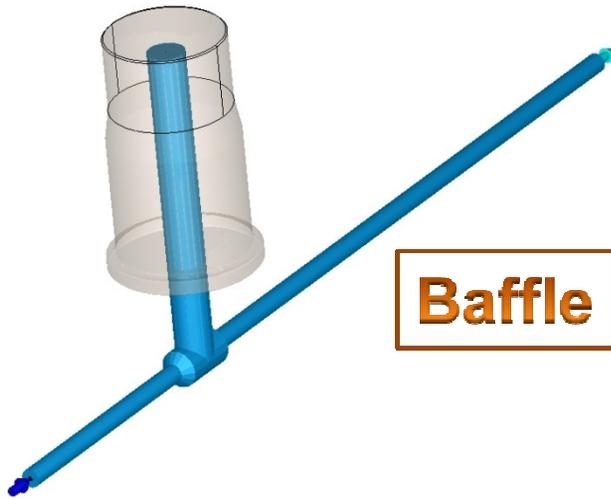
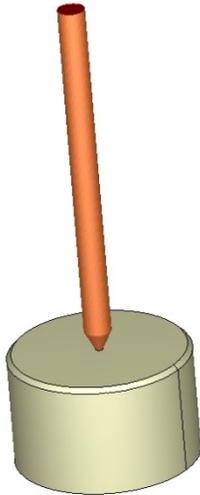
Doug Hepler
Polyshot Corporation
West Henrietta, New York



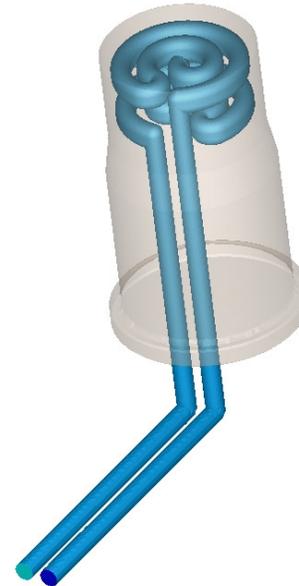
The purpose of this mold flow study was to evaluate the manufacturing performance change in a single cavity simple Cap mold with conformal cooling utilizing Polyshot's brazed core technology and one utilizing a standard baffle design.

Both scenario's inputs were identical with the exception of the mold insert and cooling configuration.

Cap



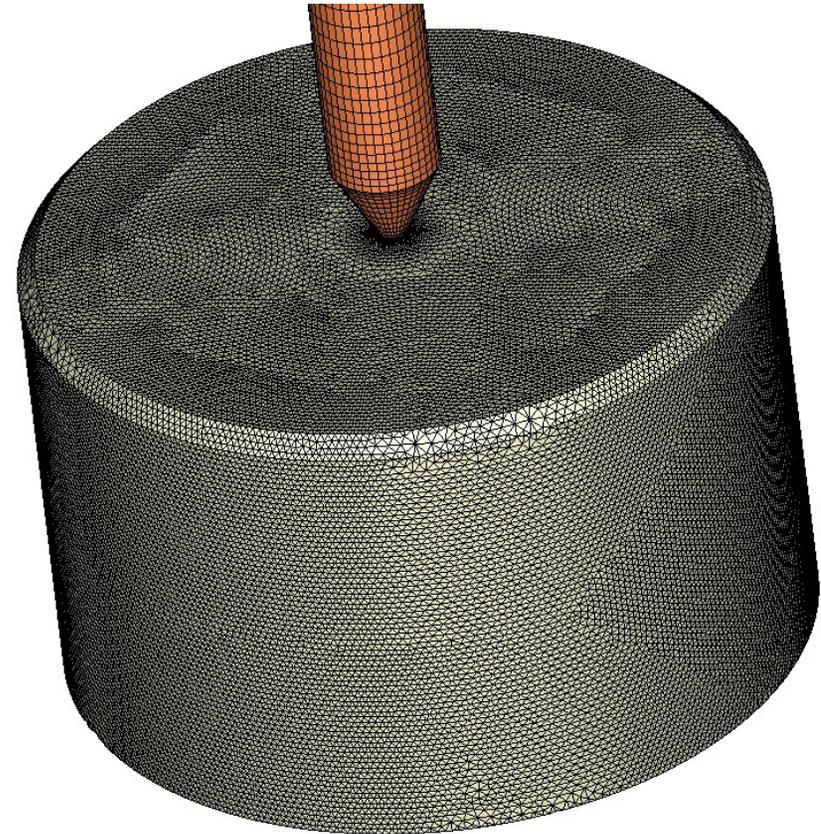
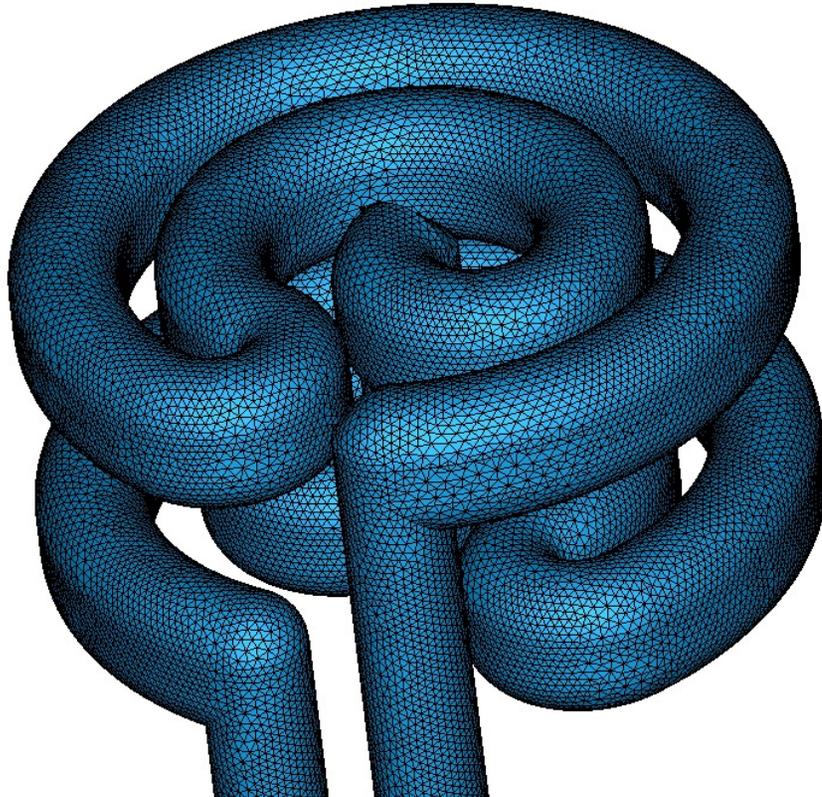
Baffle

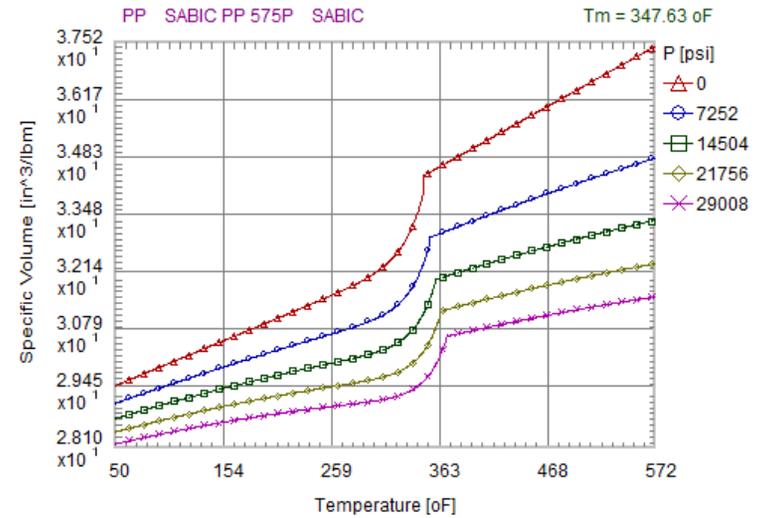
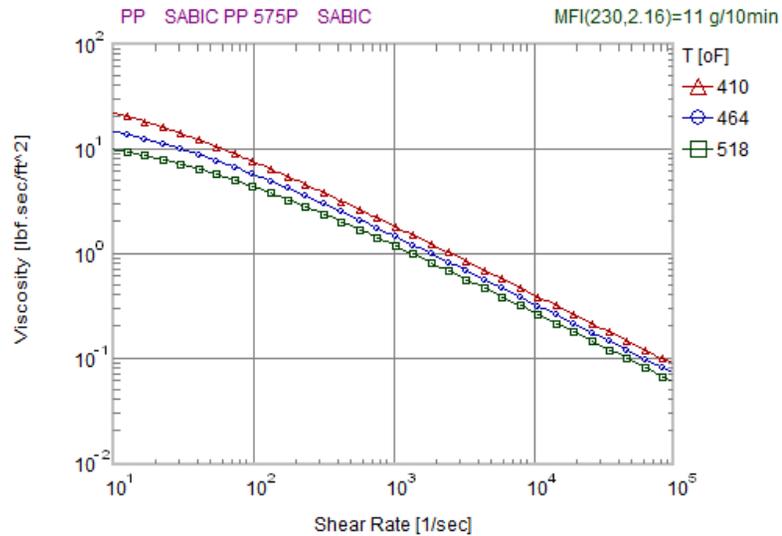


Conformal

622,301	Part elements
1,074,897	Cooling elements
2,949,503	Mold elements

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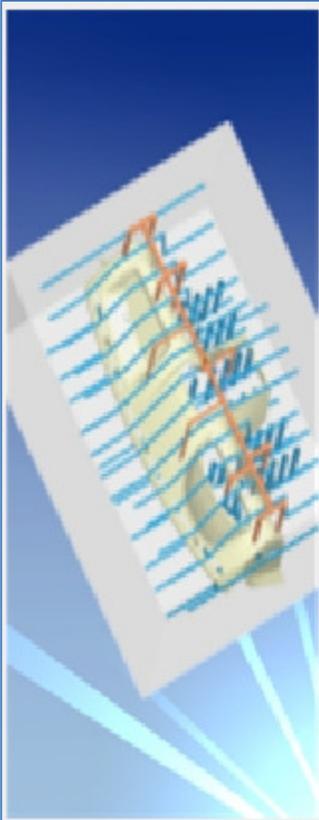




Polymer Grade Name Producer	PP SABIC PP 575P SABIC
Mechanical Properties	Pure polymer - Isotropic properties
Elastic Modulus	261072 (psi)
Poisson Ratio	0.38 (-)
CLTE	5.5556e-005 (1/oF)

Description	
Polymer	PP
Grade Name	SABIC PP 575P
Producer	SABIC
Comment	MFI(230,2.16)=11 g/10min ,D=0.905 g/cm3
Last modified date	2008/10/29
Process condition	
Melt temperature (minimum)	410 oF
Melt temperature (normal)	464 oF
Melt temperature (maximum)	518 oF
Mold temperature (minimum)	68 oF
Mold temperature (normal)	104 oF
Mold temperature (maximum)	140 oF
Ejection temperature	294 oF
Freeze temperature	330 oF

Units = English

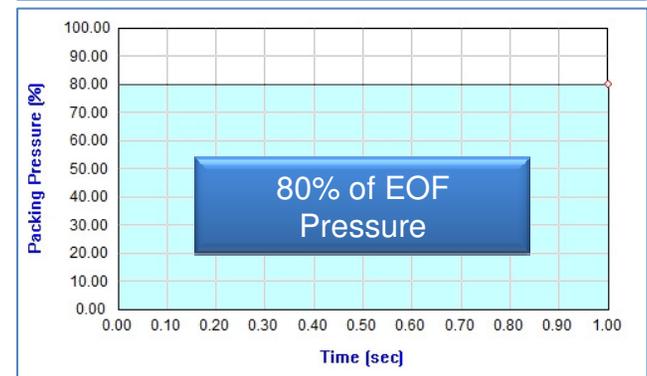
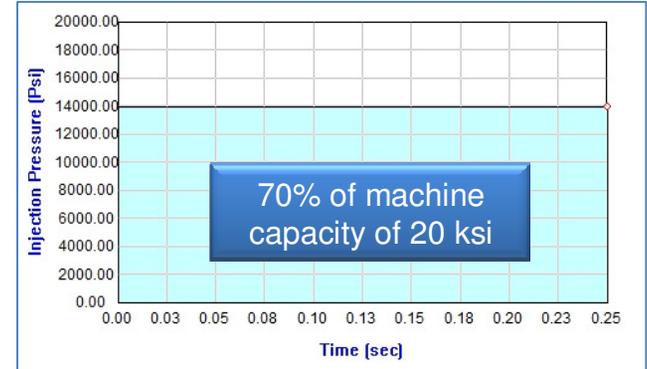
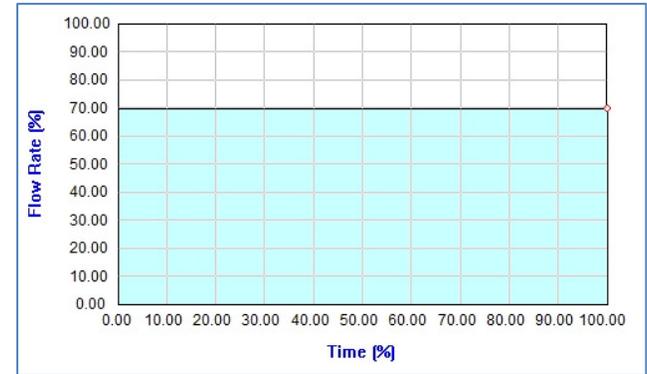


[Filling]	
Filling time (sec)	0.25
Melt Temperature (oF)	464
Mold Temperature (oF)	104
Maximum injection pressure (Psi)	20000
Injection volume (in^3)	0.568075
[Packing]	
Packing Time (sec)	1
Maximum packing pressure (Psi)	20000
[Cooling]	
Cooling Time (sec)	5
Mold-Open Time (sec)	3
Eject Temperature (oF)	293.63
Air Temperature (oF)	77
[Miscellaneous]	
Cycle time (sec)	9.25
Mesh file	Cap-Tetra-Conformal_m2.mfe
Material file	PP_CAPICORPEZER_1.mtr

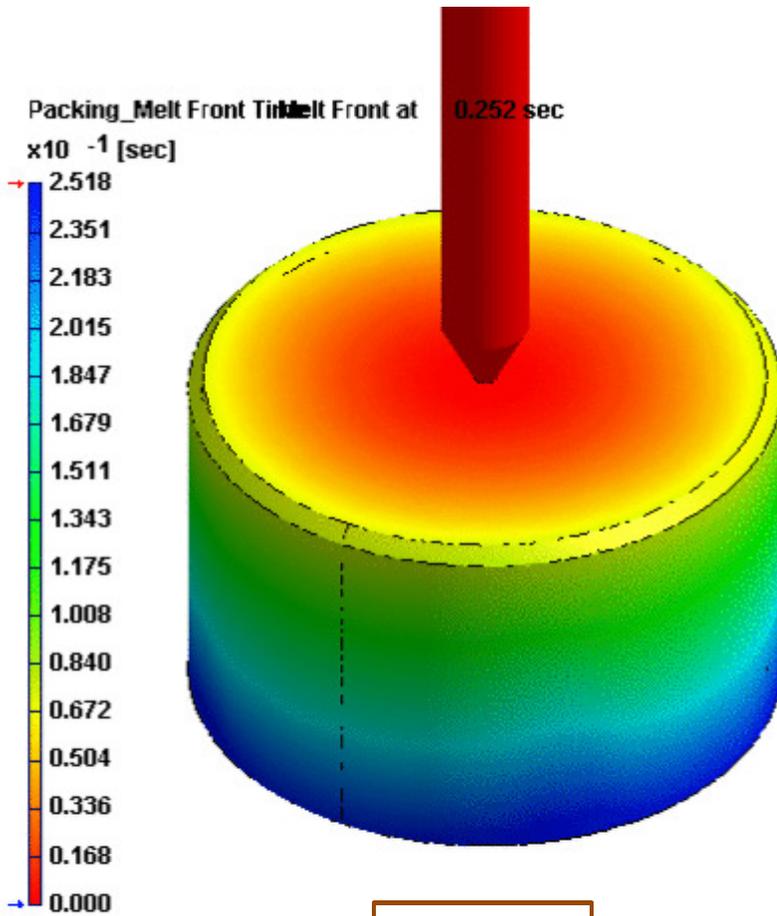
Cooling channel					
Channel ID	T (oF)	Q (in^3/sec)	Coolant	D (in)	Re
EC1 (Group 1)	80.0001	7.7	Water	0.31496	23292.2

Mold metal ID
Mold Metal [P20]
Mold Insert-1 [H13]

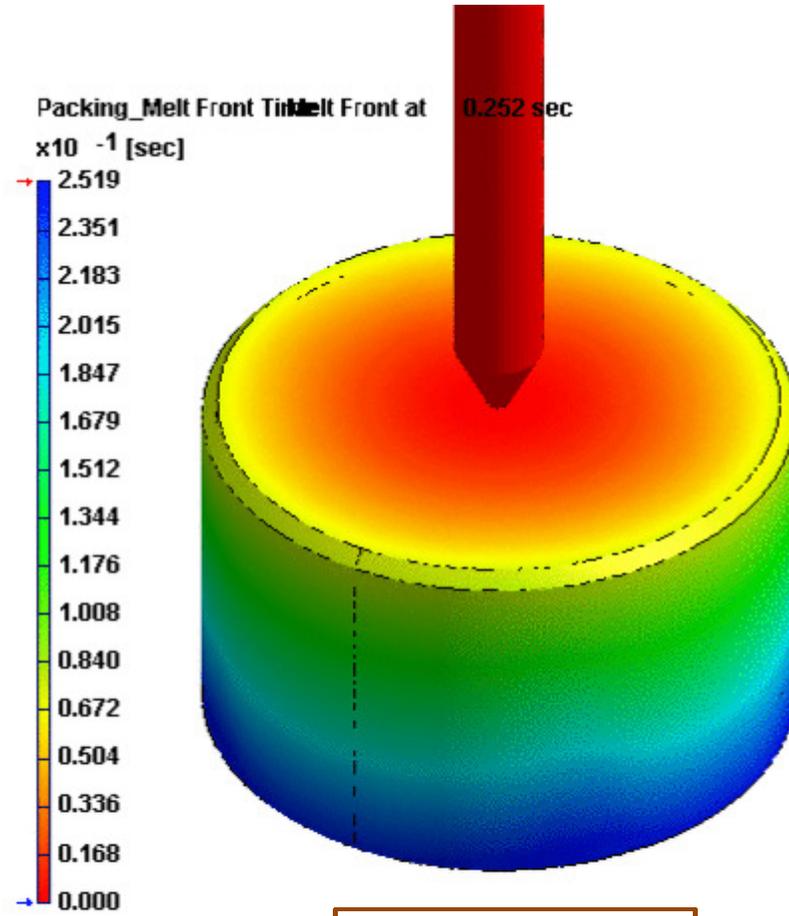
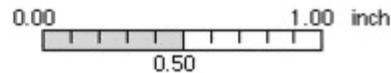
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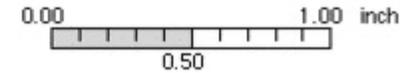
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Animated

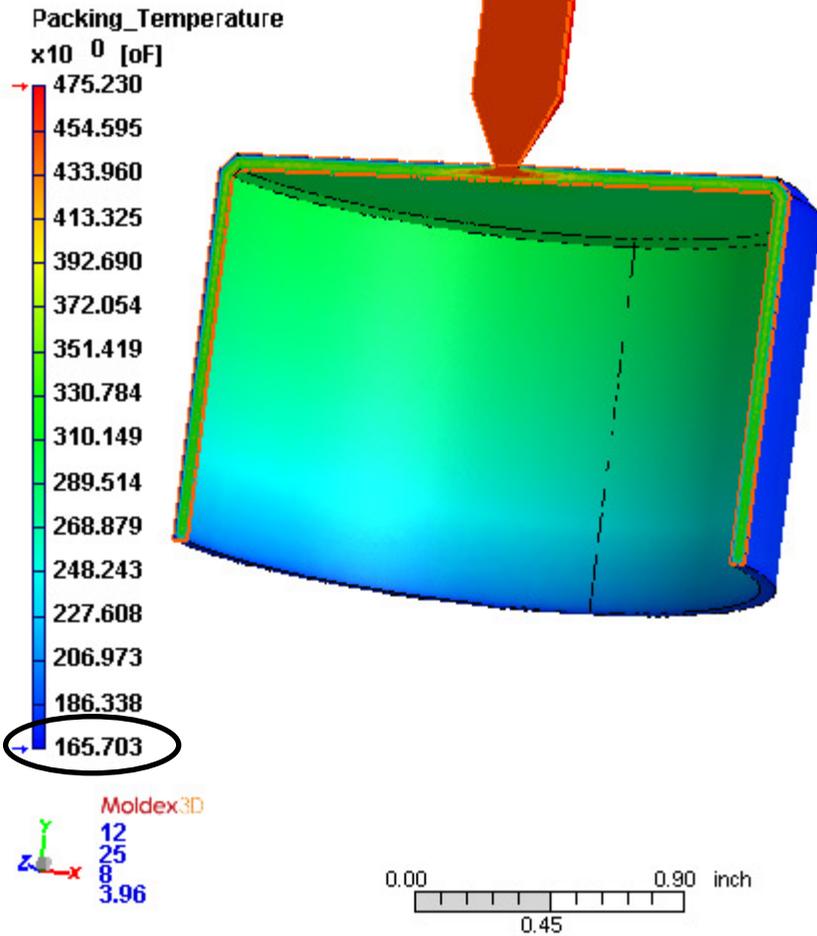
Animation will play when shown as a slide show.



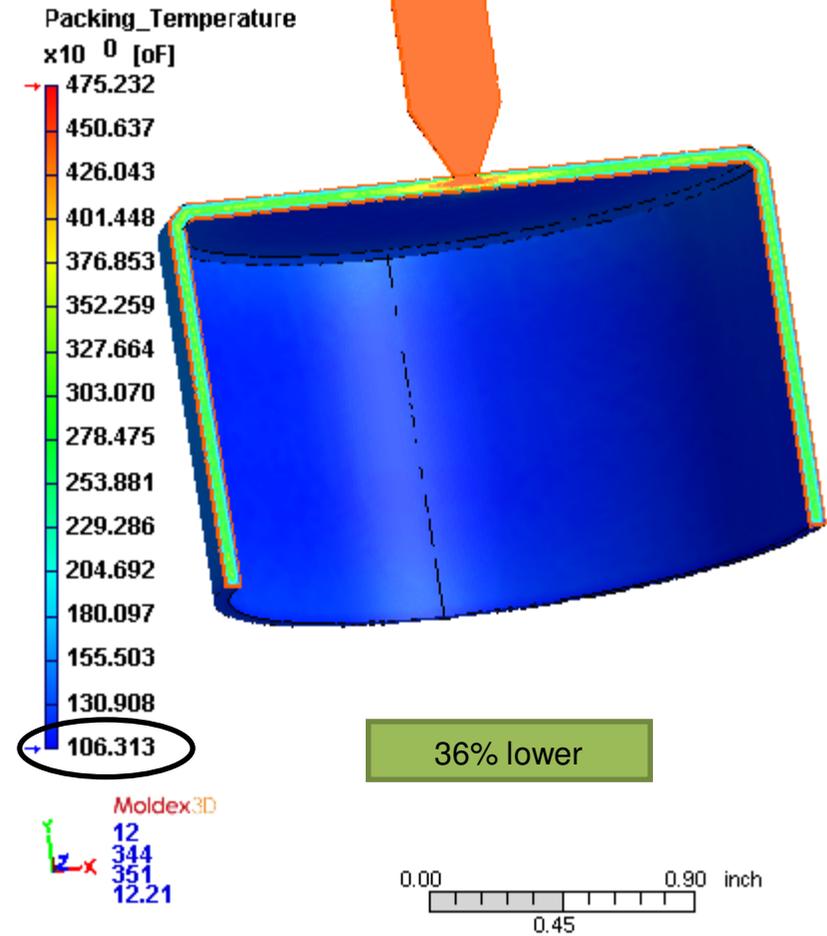
Part Temperature at End of Packing Phase

01/07/2013

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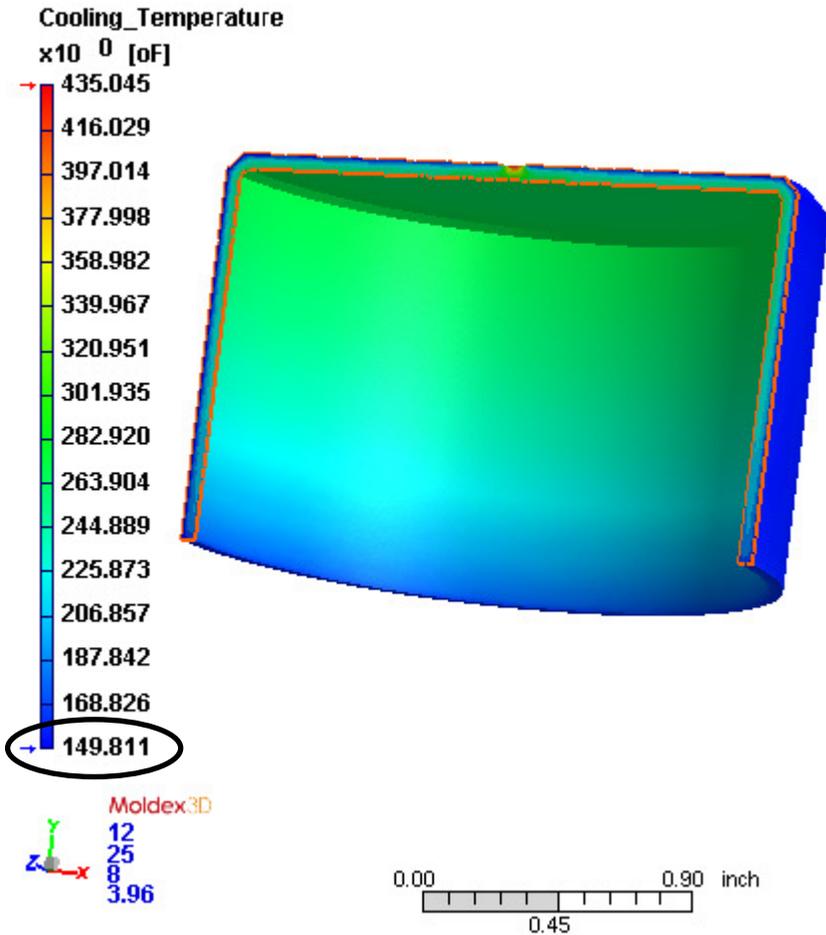
36% lower

Conformal

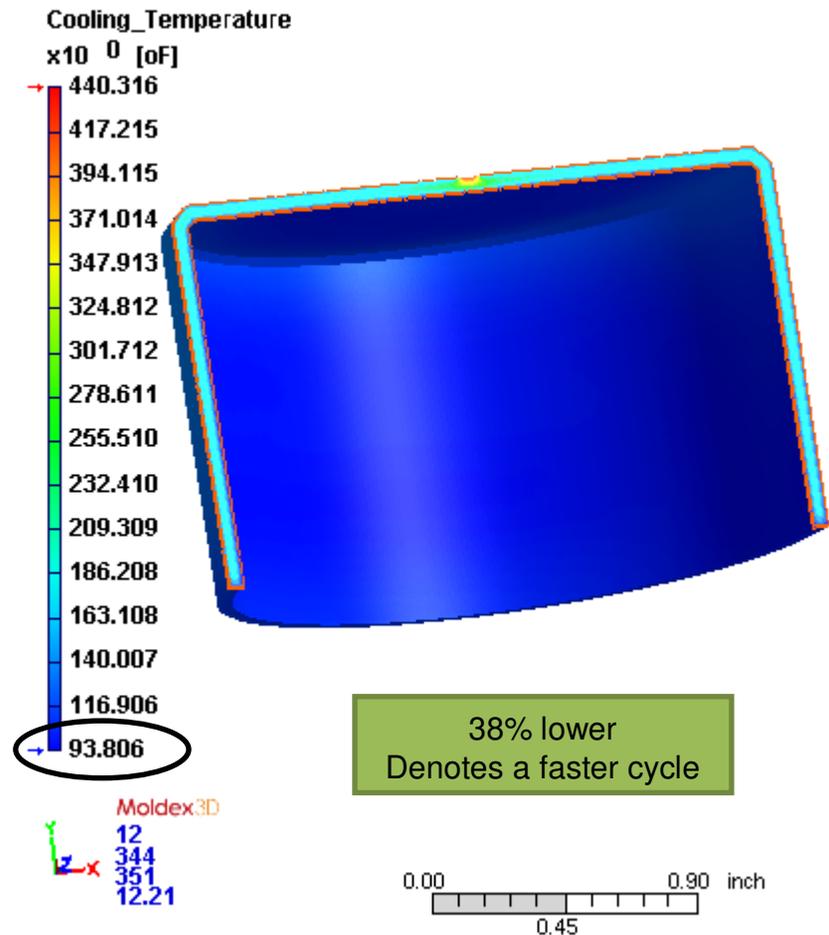


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38% lower
Denotes a faster cycle

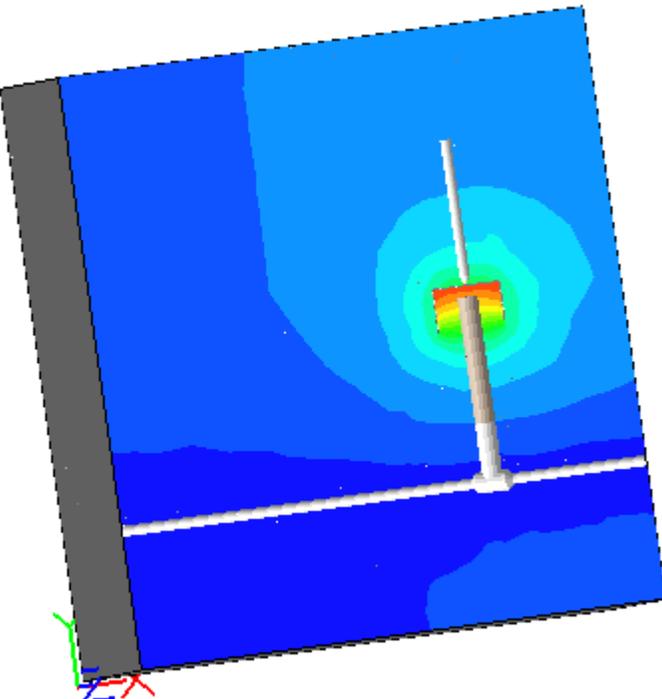
Conformal



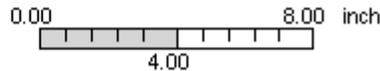
Mold Temperature at End of Cooling Phase (Cross Section View) 01/07/2013

Req'd Cooling Time
3.1 sec

Cooling_Temperature
 $\times 10^0$ [oF]



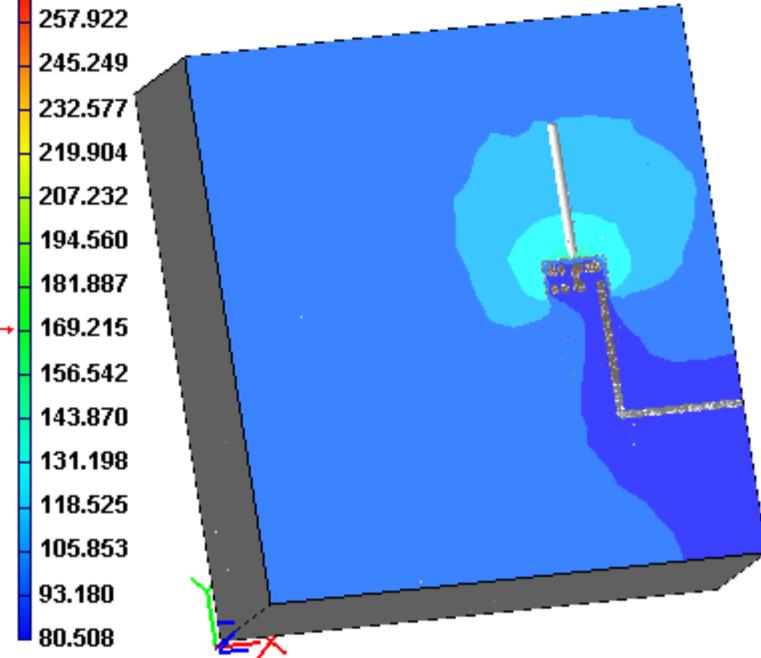
Moldex3D
3
343
352
1.41



Baffle

Req'd Cooling Time
1.9 sec

Cooling_Temperature
 $\times 10^0$ [oF]



Moldex3D
12
344
351
1.32

Showing much cooler mold inserts when results are scaled to identical values

Conformal

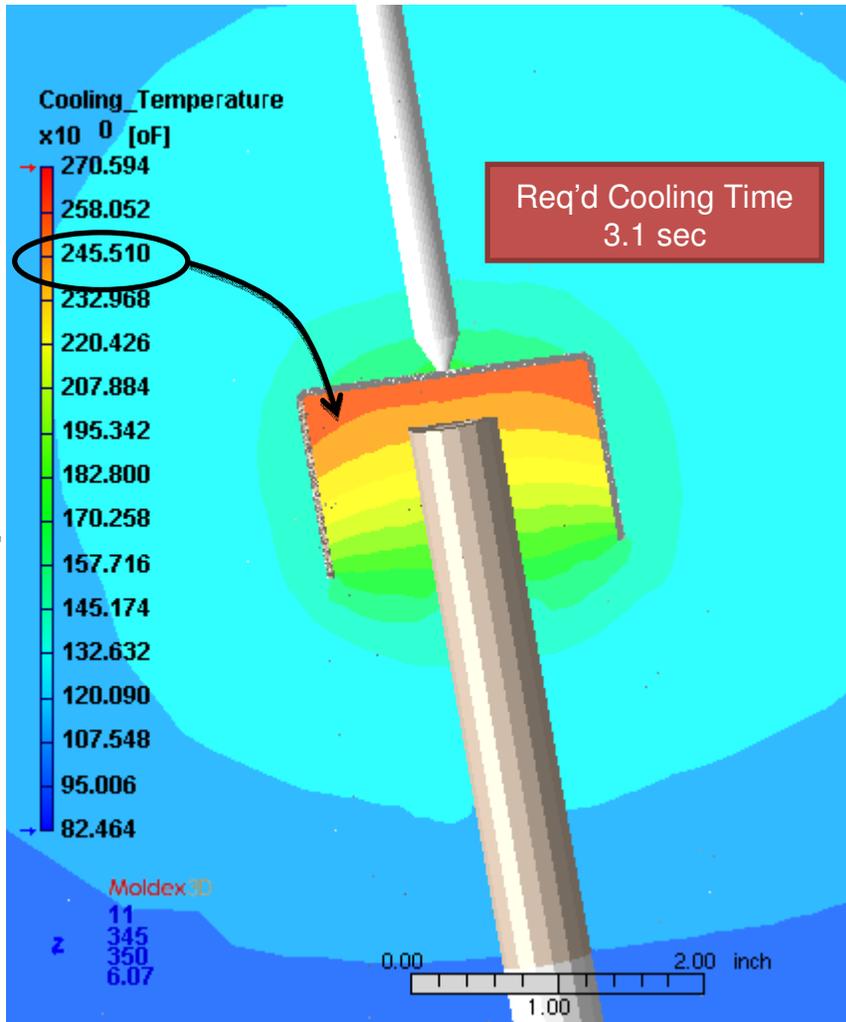


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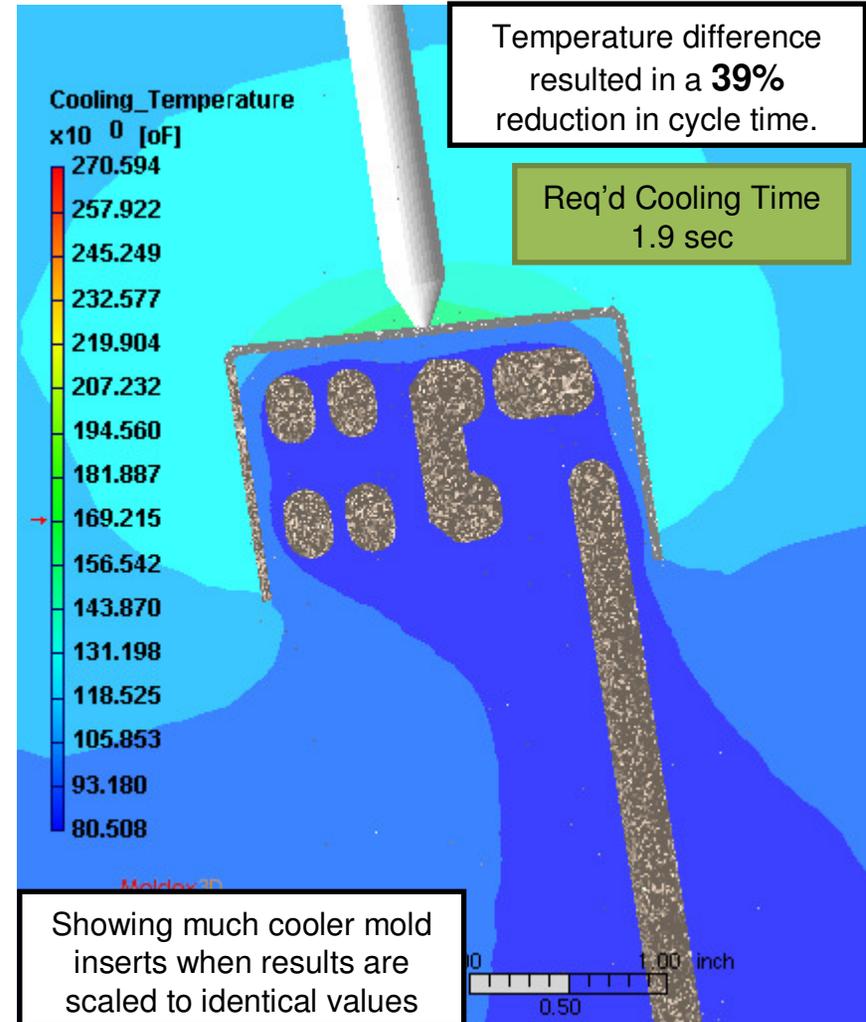
Temperature difference
resulted in a **39%**
reduction in cycle time.

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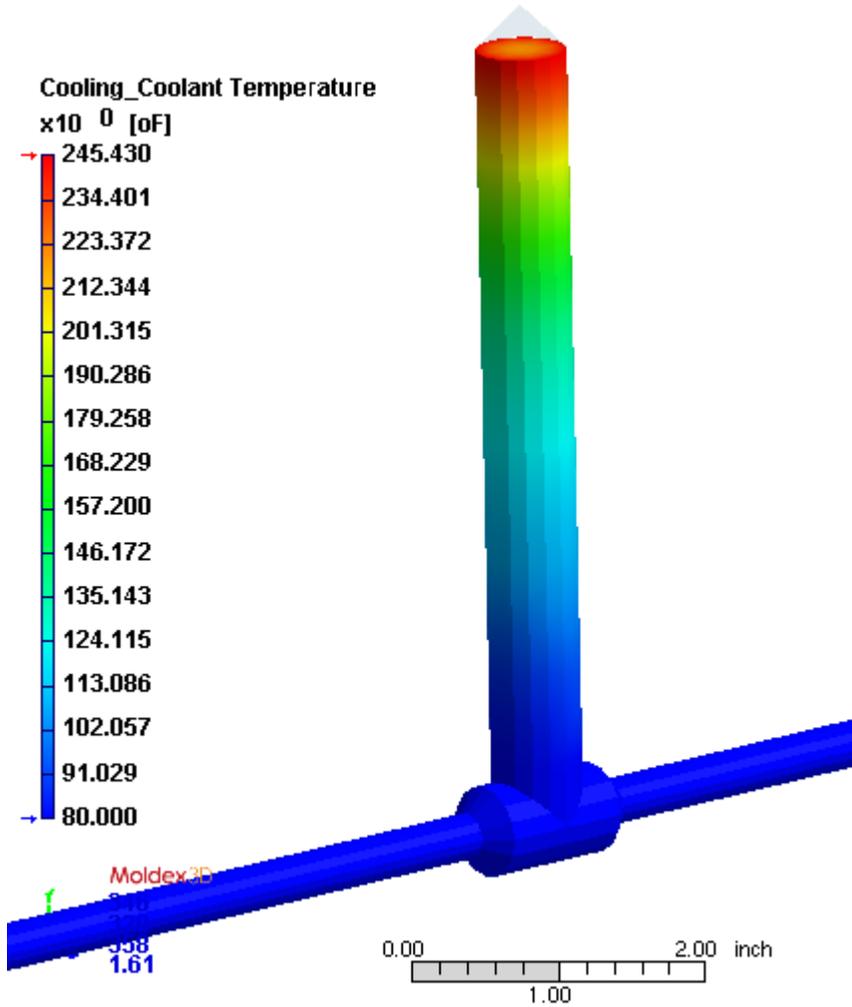
Baffle



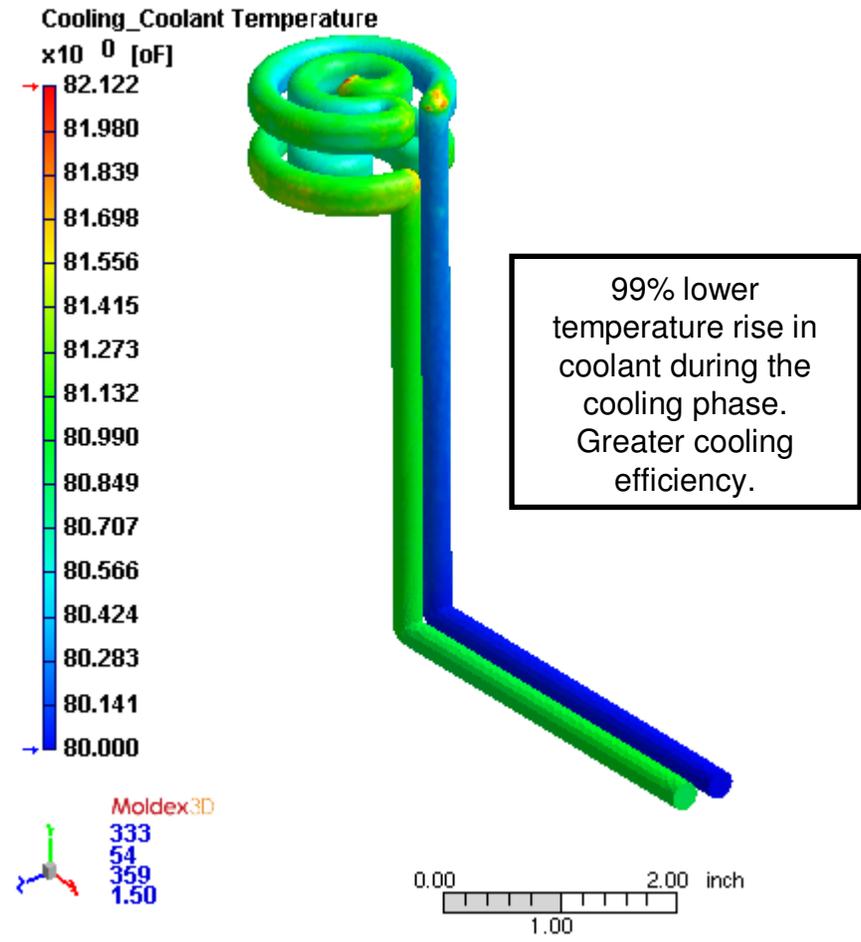
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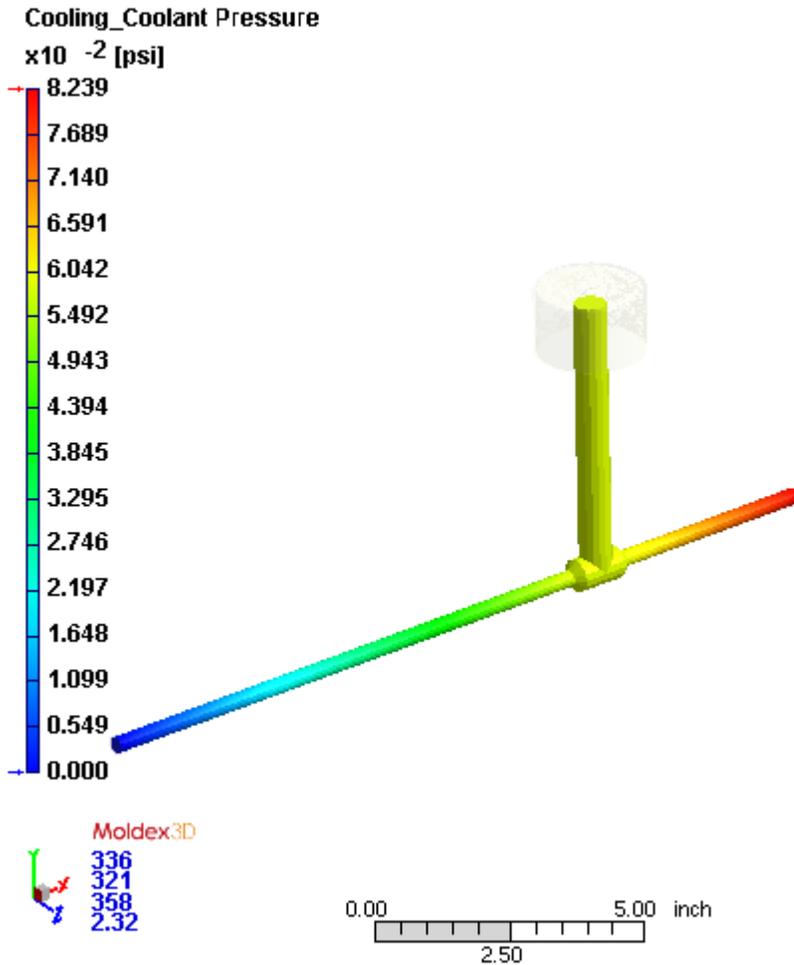


99% lower temperature rise in coolant during the cooling phase. Greater cooling efficiency.

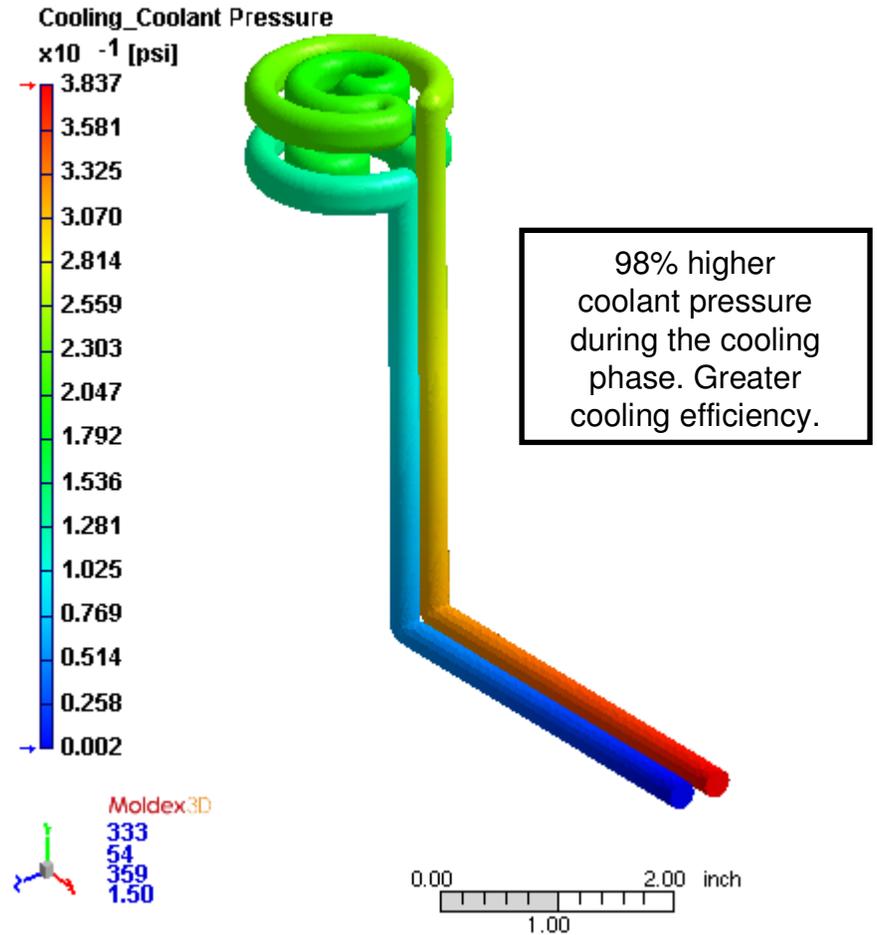
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Conformal

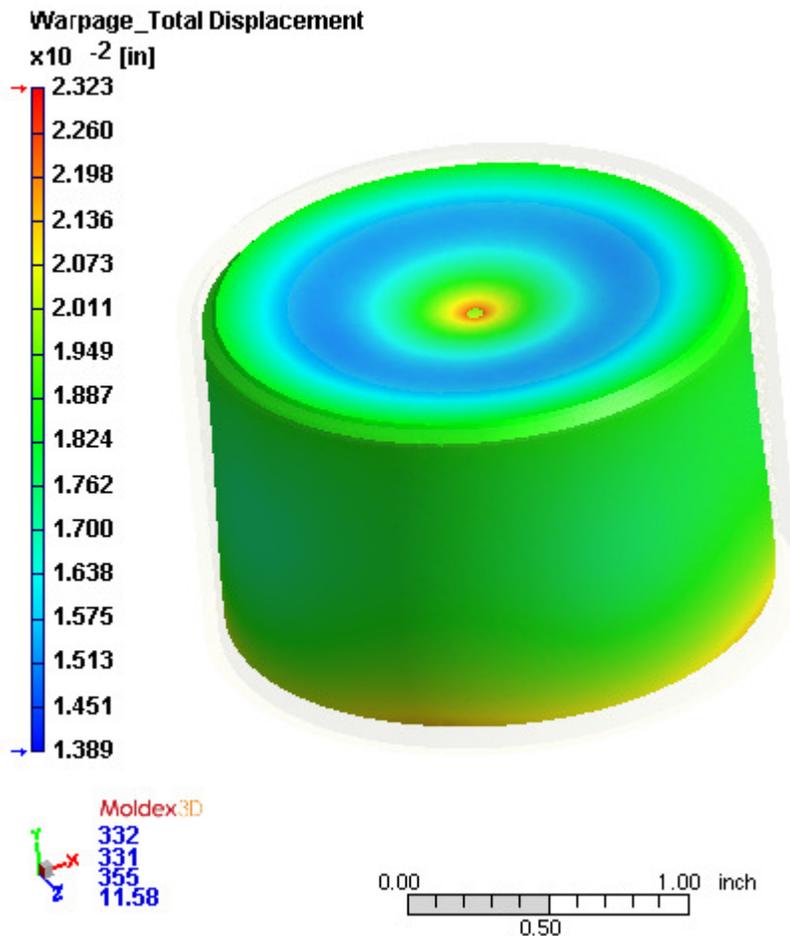


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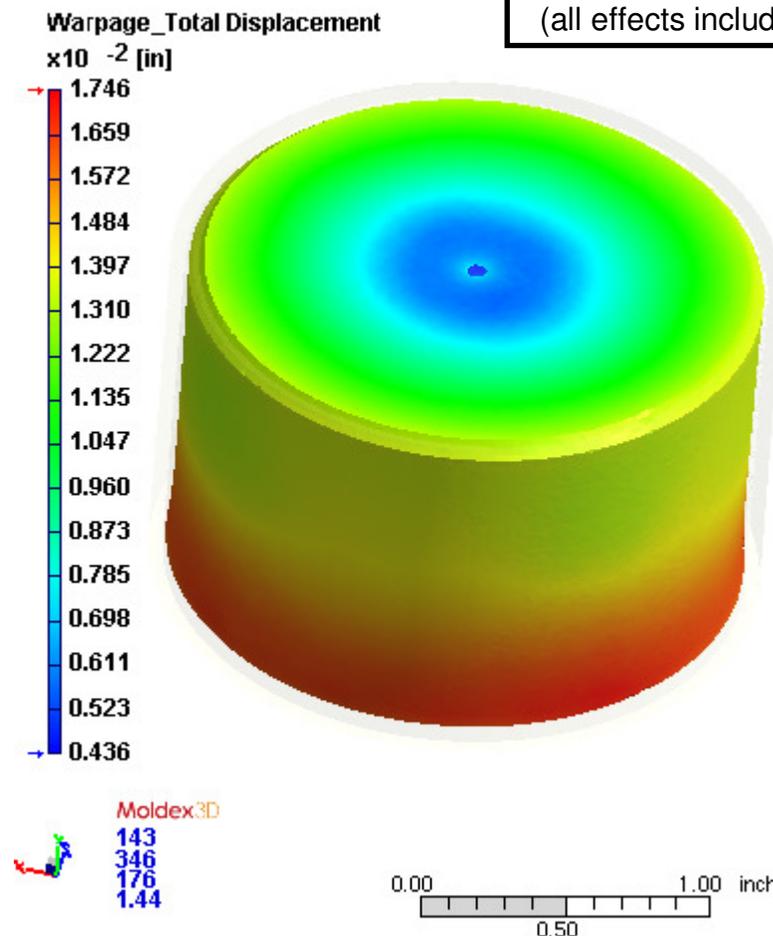
5X Magnification

25% lower
total warpage
(all effects included)

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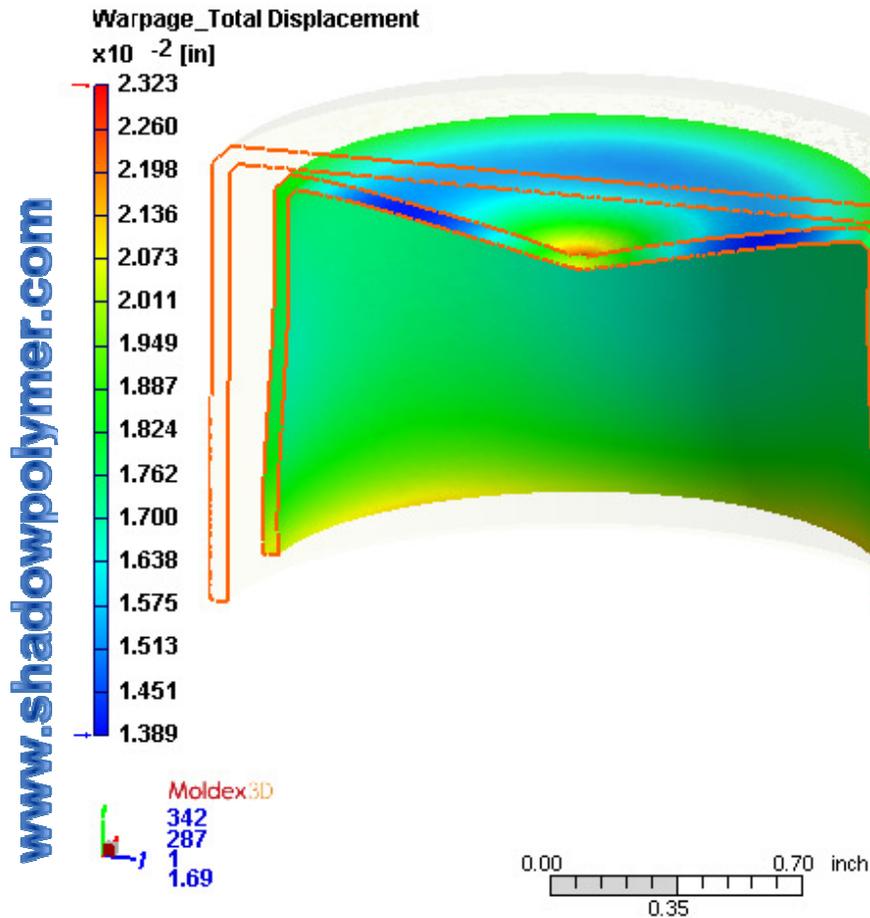
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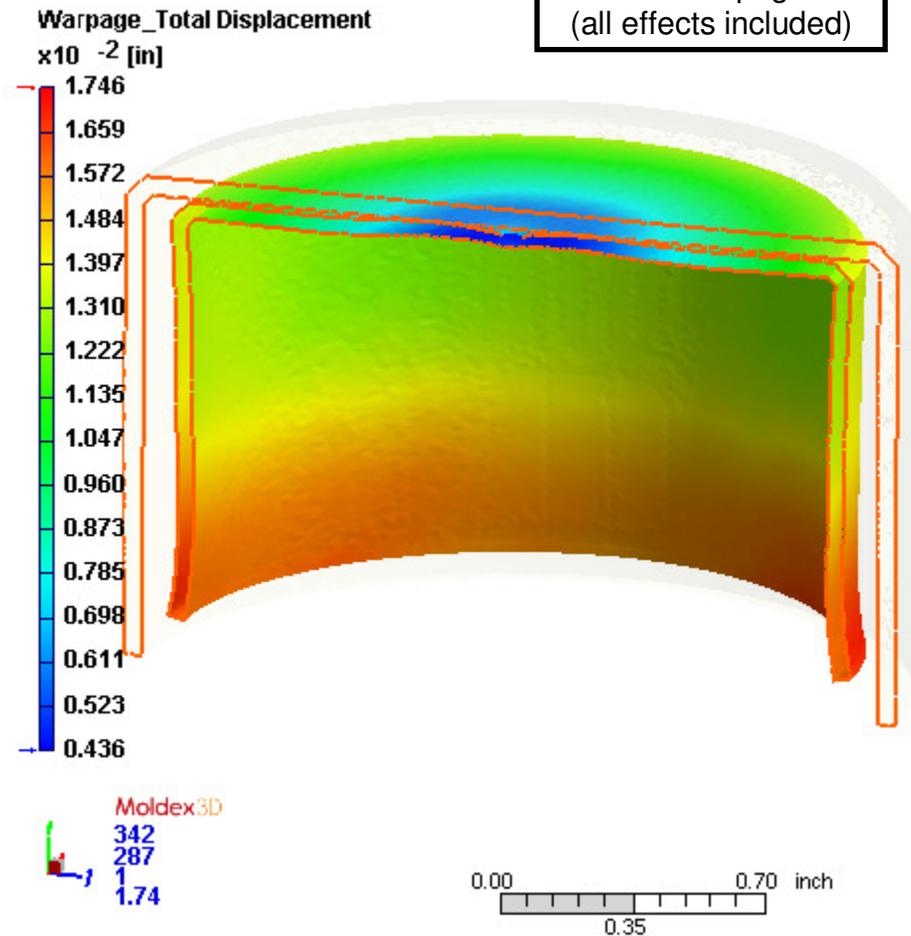
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10X Magnification

25% lower total warpage (all effects included)



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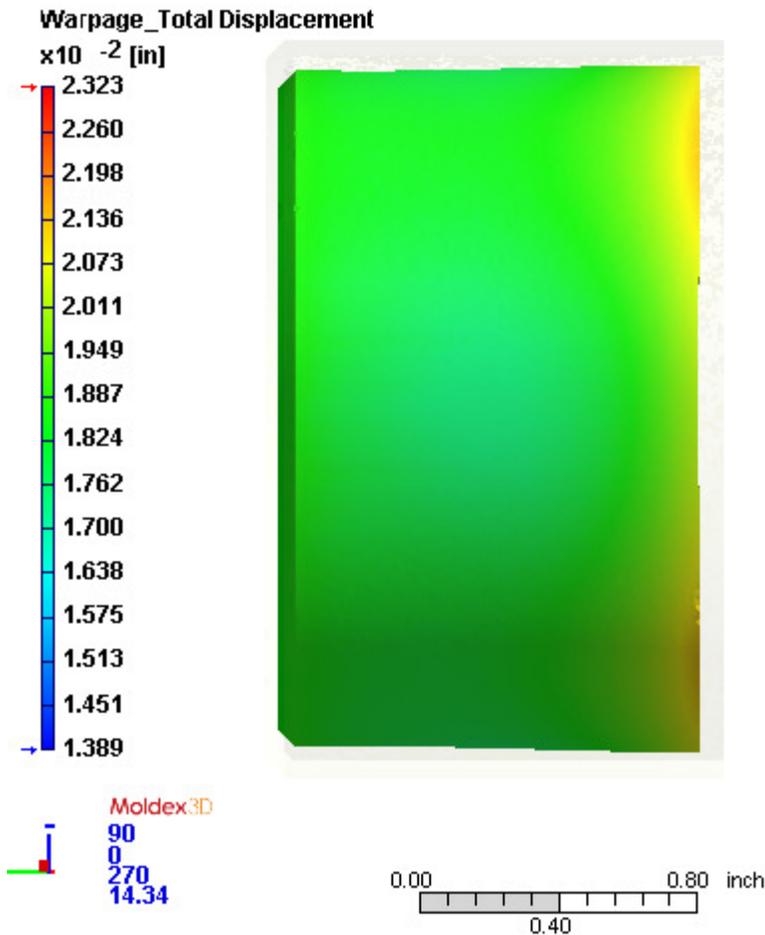
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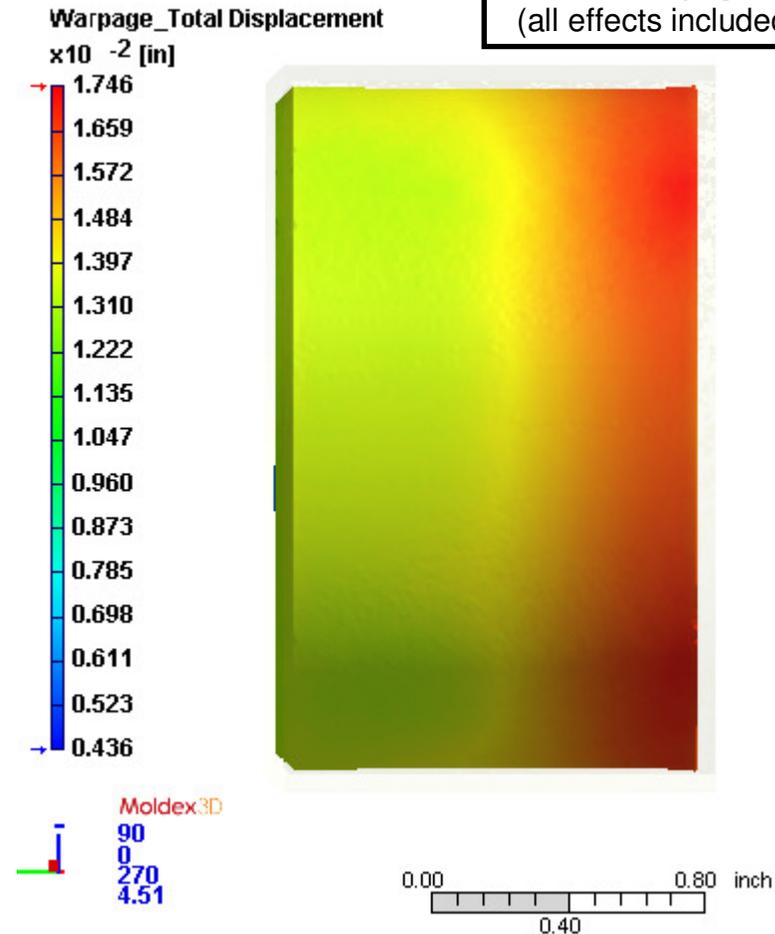
5X Magnification

25% lower
total warpage
(all effects included)

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Conformal



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