AUTODESK UNIVERSITY

Extracting More Information Out of Your Moldflow Insight Results

Jay Shoemaker

Sr. Simulation & Development Engineer | Shoemaker.JM@imflux.com

Jay Shoemaker

- 36 Years, Moldflow/Autodesk
  - Project Engineer
  - Customer Support
  - Training
  - Training material development
  - Certification
  - Editor of “Moldflow Design Guide” Hanser
  - SPE Mold Designer of the Year, 2011
- 1 Year, iMFLUX
  - Sr. Simulation & Development Engineer
- 25 Years, Western Michigan University
  - Adjunct Assistant Professor

Description

- Usually, several analysis are run on a given part to optimize the results
- Often, the changes in results are minor and subtle
  - Small changes are often the difference between a good design and great design
- The maximum and minimum values for a result are usually outliers that don't tell the whole story; instead, value distribution is critical
  - Volumetric shrinkage is a case in point: The range of shrinkage may be 1% to 10%, but most of the part is between 2.5% and 4%
  - You can see the trend when you look at the graphical results, but you can't quantify it
- When you export your data using an API script, you can use a spreadsheet to create a histogram Histograms become exceptionally useful when you compare them between studies
- In this class, we'll explore the use of histograms for looking at many types of Moldflow results

Learning Objectives

- Discover the power of histograms for looking at Moldflow results
- Discover how API scripts are used to generate the data
- Learn how to create a histogram of Moldflow data
- Learn about interpreting histogram data for various result types

Introduction to iMFLUX

WE ARE iMFLUX

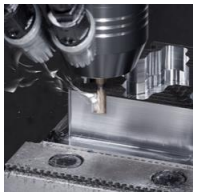
Innovators transforming the future of plastics injection molding

WE ARE iMFLUX









CREATED BY P&G, TRUSTED BY COMPANIES AROUND THE WORLD

COMPANY HISTORY

2011 CHALLENGE

2013 BEGINNING

2014 START UP

2016 PERFECTING

2018 PUBLICIZING

2019-2021 GROWING

LOW CONSTANT PRESSURE MOLDING

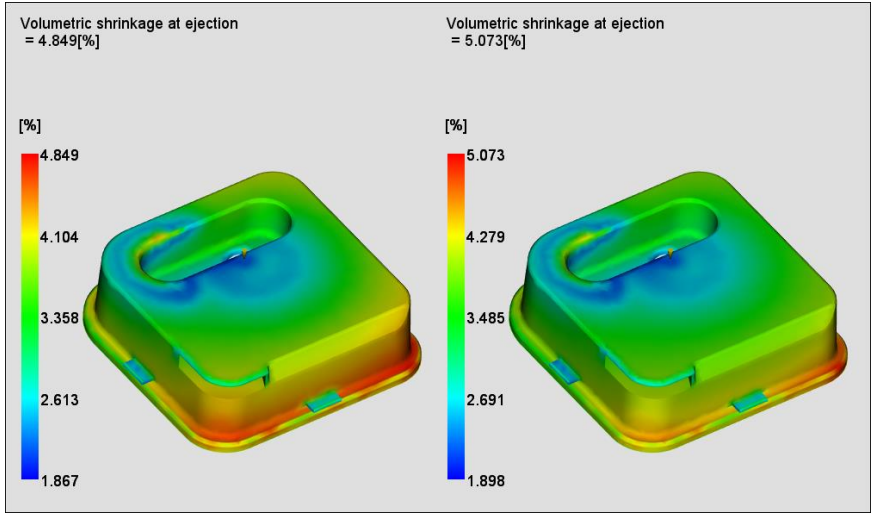
REINVEST INJECTION PRESSURE SAVINGS AND EXPERIENCE A WIDE RANGE OF BENEFITS

Extracting Data

Motivation

Started with Volumetric Shrinkage

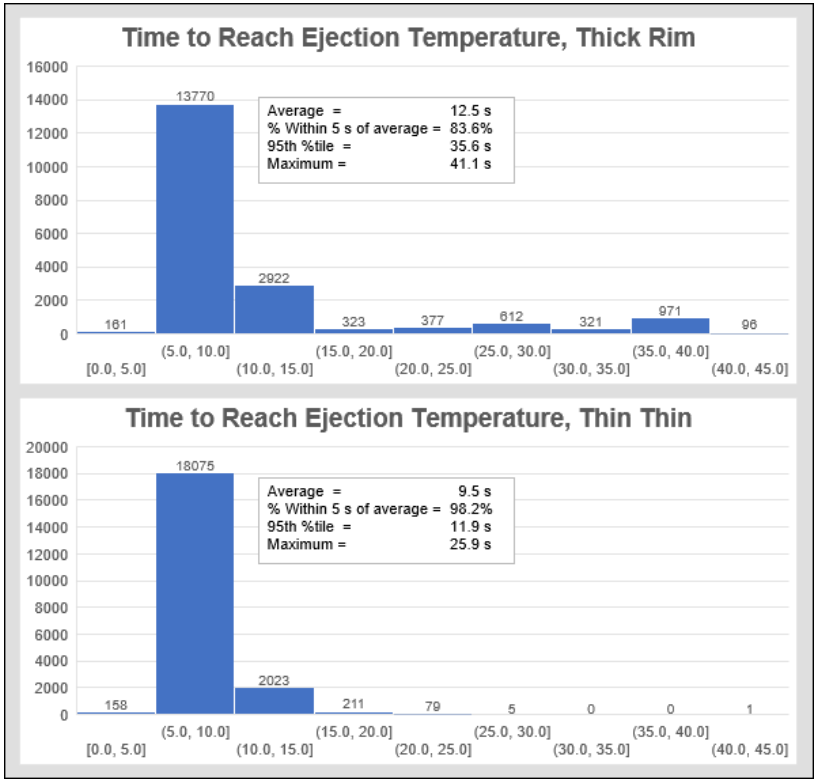
- Often difficult to quantify
  - Changes from one analysis to another
  - Variation within one study
- Maximum and minimums are not enough
  - Often the max and min don't change much but the distribution does
- Solution
  - Use Histograms



Tool to Look at Results - Histograms

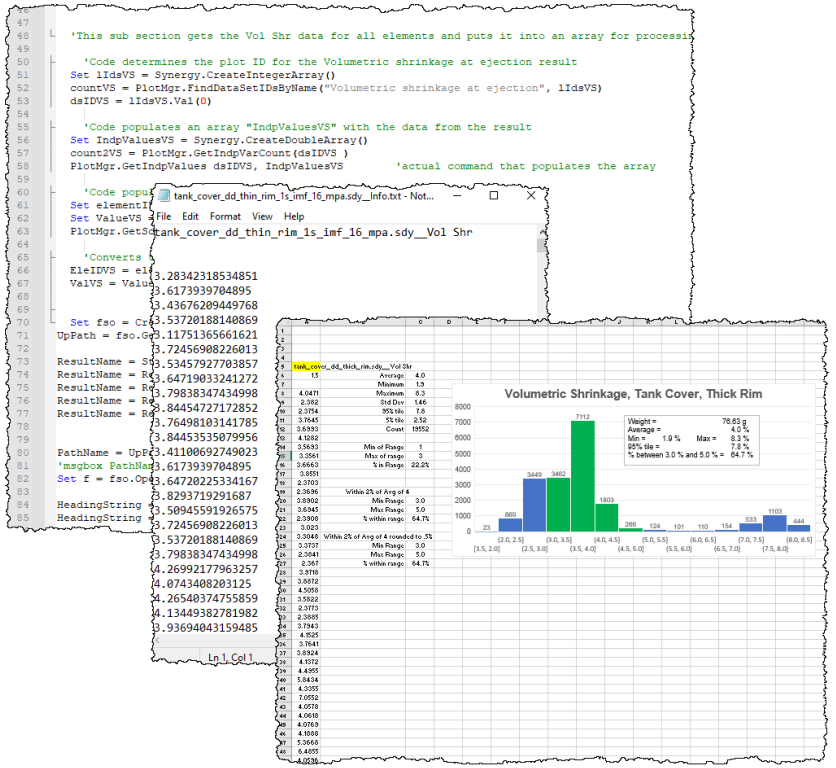
Adds new capability to your results interpretation toolbox

- Allows you to see the distribution of results
- Works well on any result where you would want uniform values
  - Time to reach ejection temperature
  - Temperature at flow front
  - Shear Rate, Maximum
  - Volumetric shrinkage
  - Frozen layer fraction
  - Mold temperature
  - Hold pressure



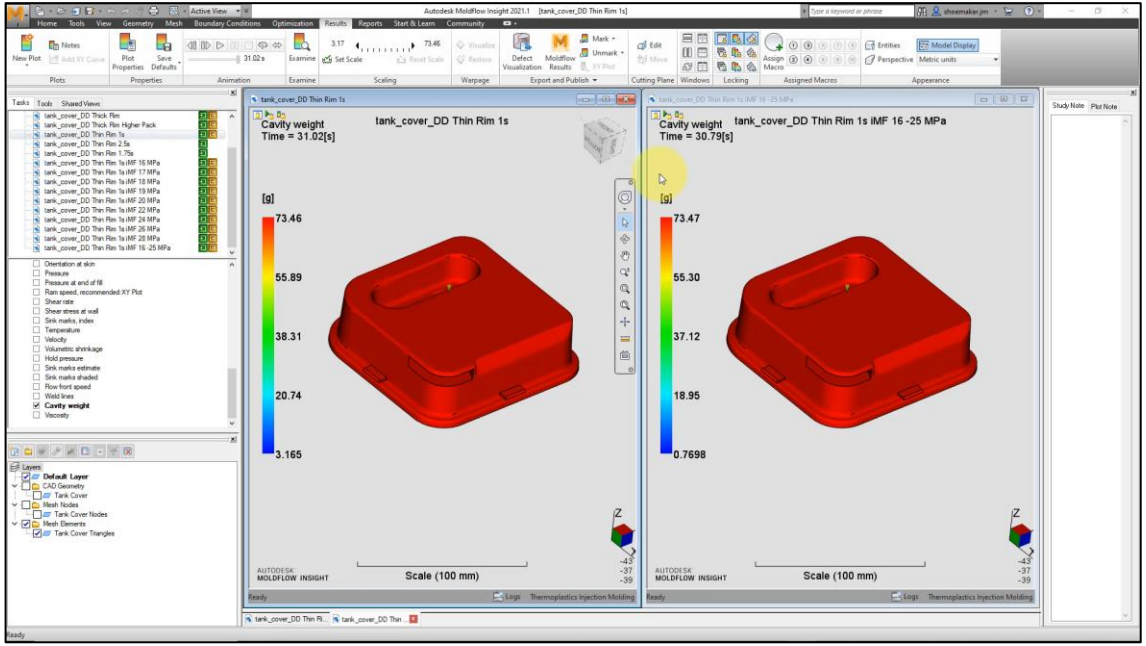
Procedure

- Run an API script
- Copy & paste data into a spreadsheet
- Refine Histogram
- Repeat



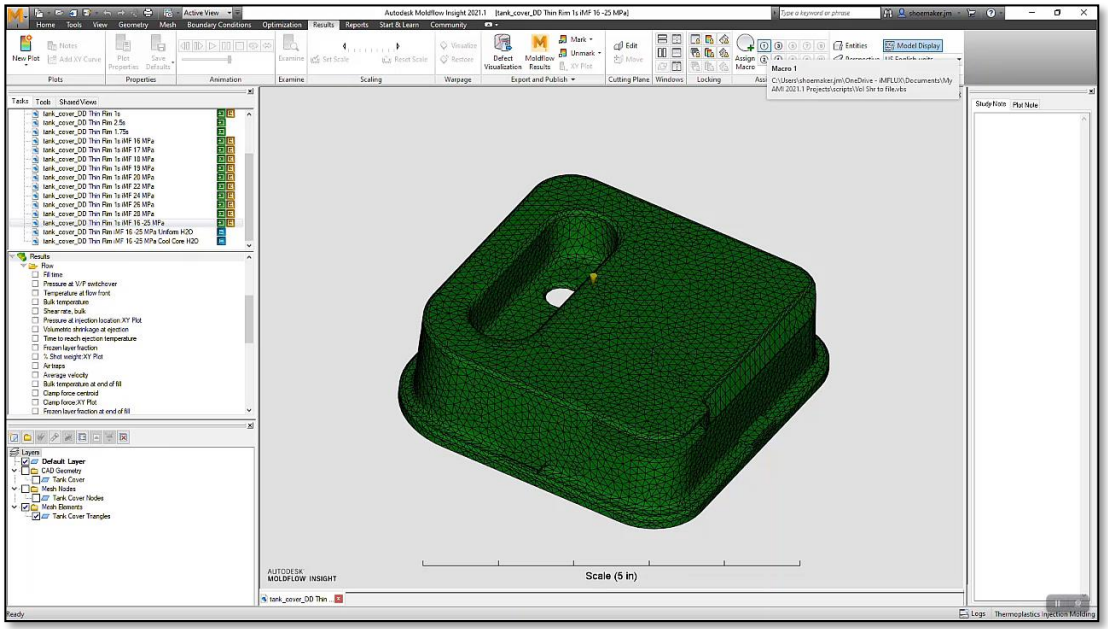
Procedure

- Macro panel moved to Results ribbon for quicker execution
- Have Excel templates set up for different types of data
- Execute script for each study
- Copy Excel sheet for each study



Three API Script Versions

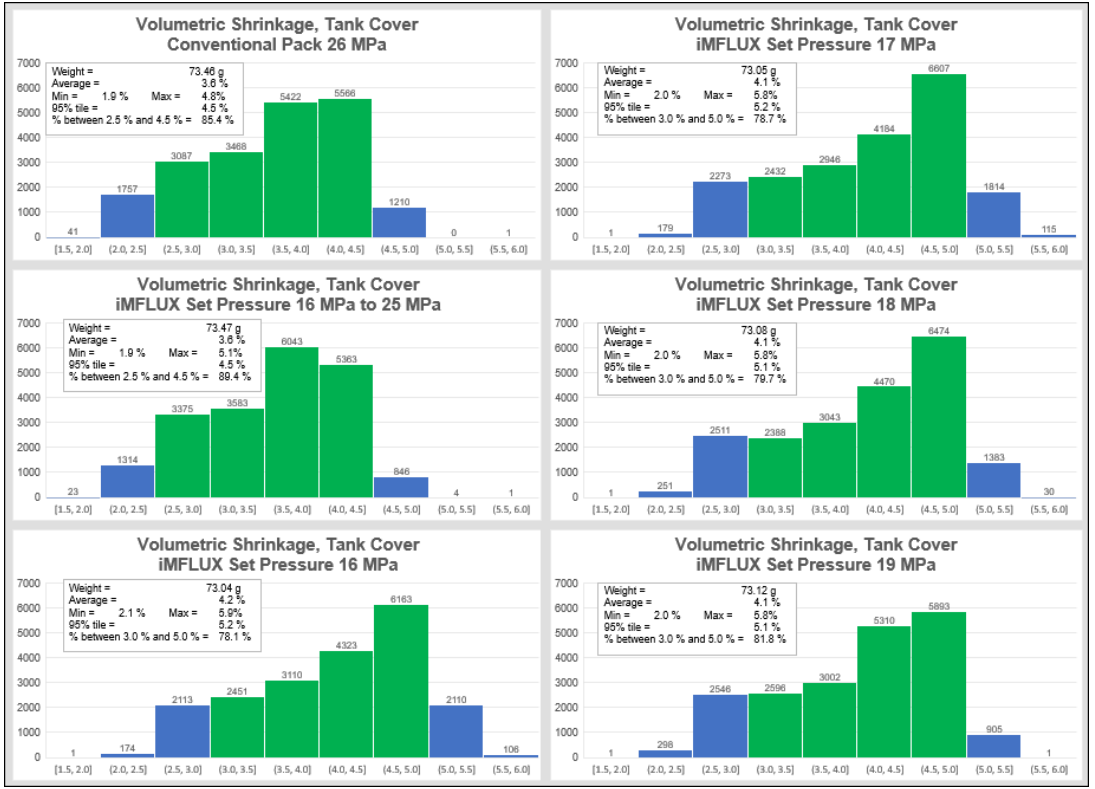
- Dual Domain or Midplane Volumetric Shrinkage at Ejection
- Any Single Dataset
  - Time to reach ejection temp
- Any Intermediate result
  - Average Volumetric Shrinkage



Histogram Result Interpretation

Histogram Interpretation

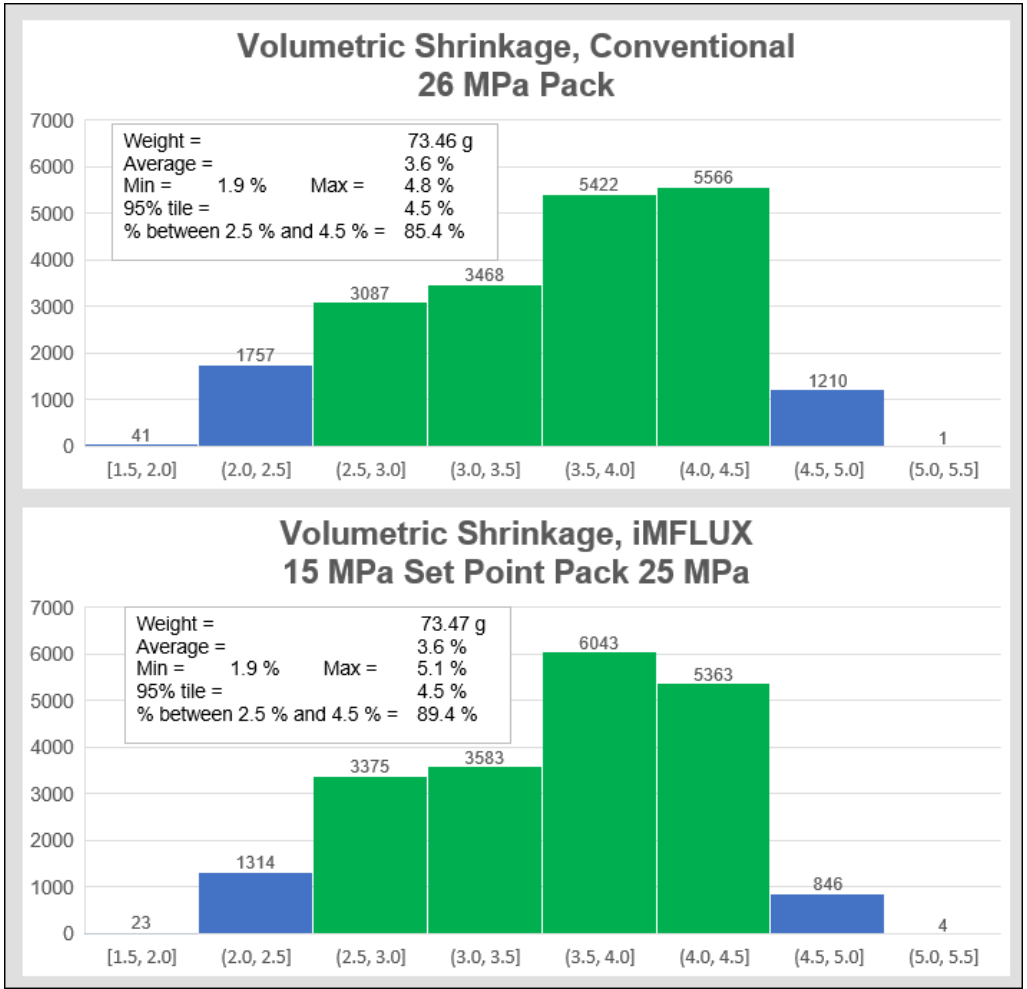
- Have an objective/problem to investigate
- Understand the model
- Scale the X and Y axes the same
- Possibly change bar colors



Histogram Interpretation

Example – Volumetric Shrinkage

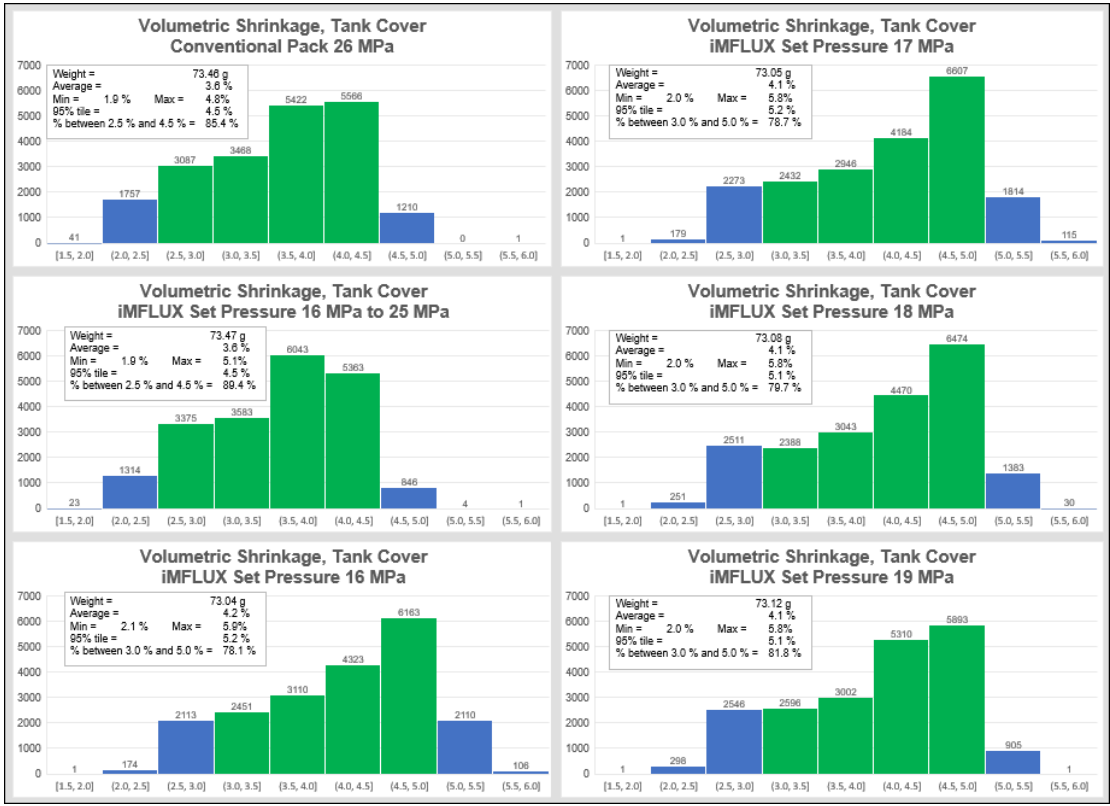
- Objective
  - Compare iMFLUX process to optimized conventional process
- Interpretation
  - Nearly identical results
  - iMFLUX slightly heavier
- Action
  - Consider iMFLUX process to lower weight and maintain shrinkage uniformity



Histogram Interpretation

Example – Volumetric Shrinkage

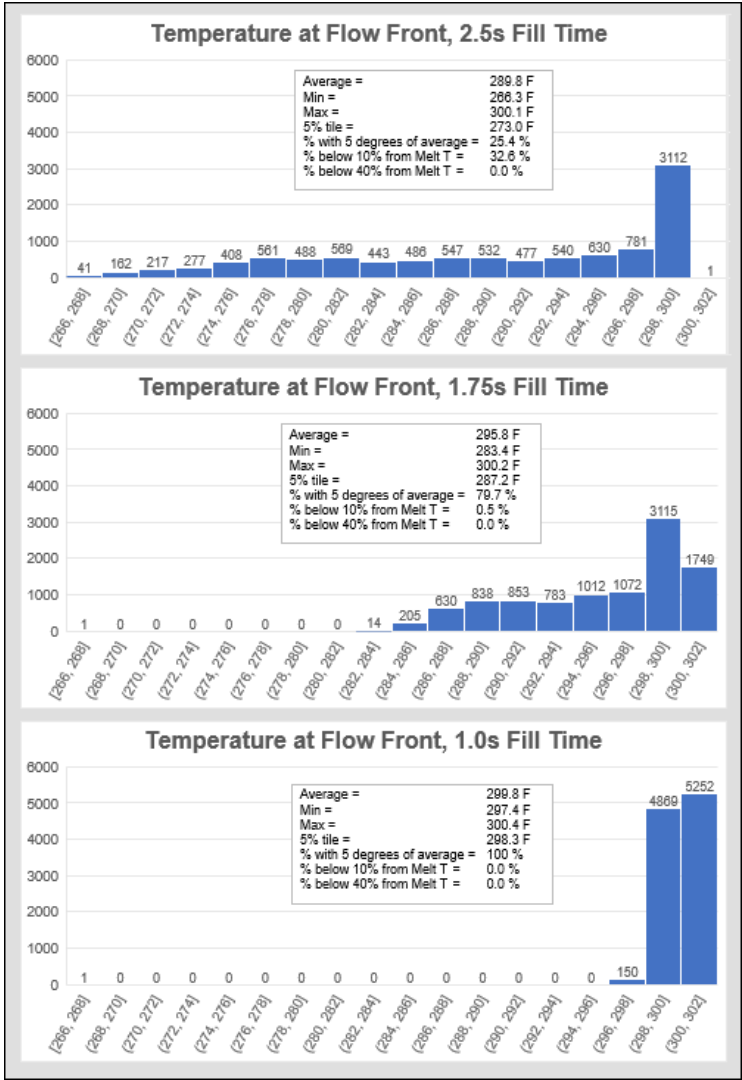
- Objective
  - Investigate how subtle changes in pressure influence volumetric shrinkage
- Interpretation
  - Small changes in results
  - Practically identical results
  - Nearly the same weight
- Action
  - Consider lowering the set point pressure more



Histogram Interpretation

Example – Temperature at Flow Front

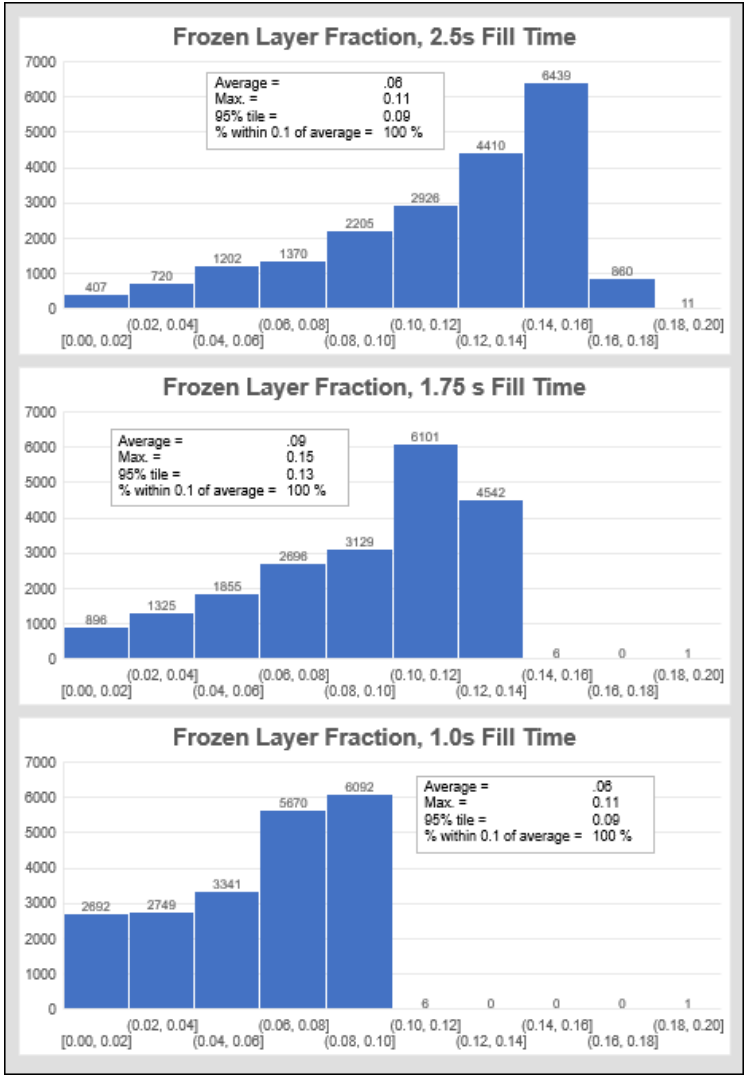
- Objective
  - Determine an acceptable injection time
- Interpretation
  - 2.5 sec may be too slow, many high temp drops
  - 1.75 sec acceptable but could be faster
  - 1.0 sec nearly perfect, very uniform
- Action
  - 1.0 sec is good, needs confirmation



Histogram Interpretation

Example – Frozen Layer Fraction

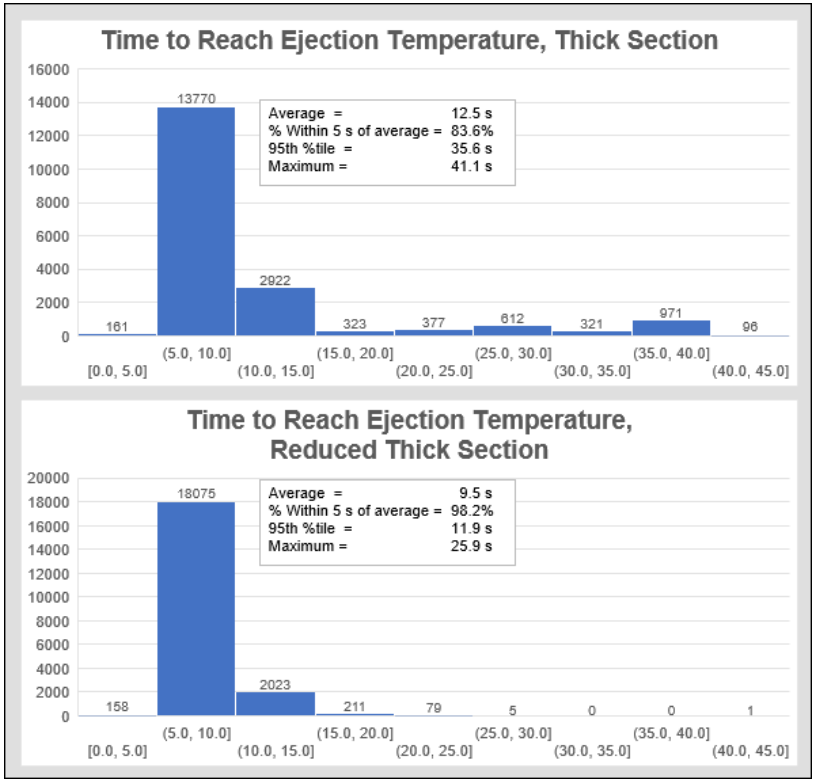
- Objective
  - Determine an acceptable injection time
- Interpretation
  - 2.5 sec, no too high elements but many
  - 1.75 sec, acceptable but should be faster
  - 1.0 sec, nearly perfect, very uniform
- Action
  - 1.0 sec is good, needs confirmation



Histogram Interpretation

Example – Time to Reach Ejection Temperature

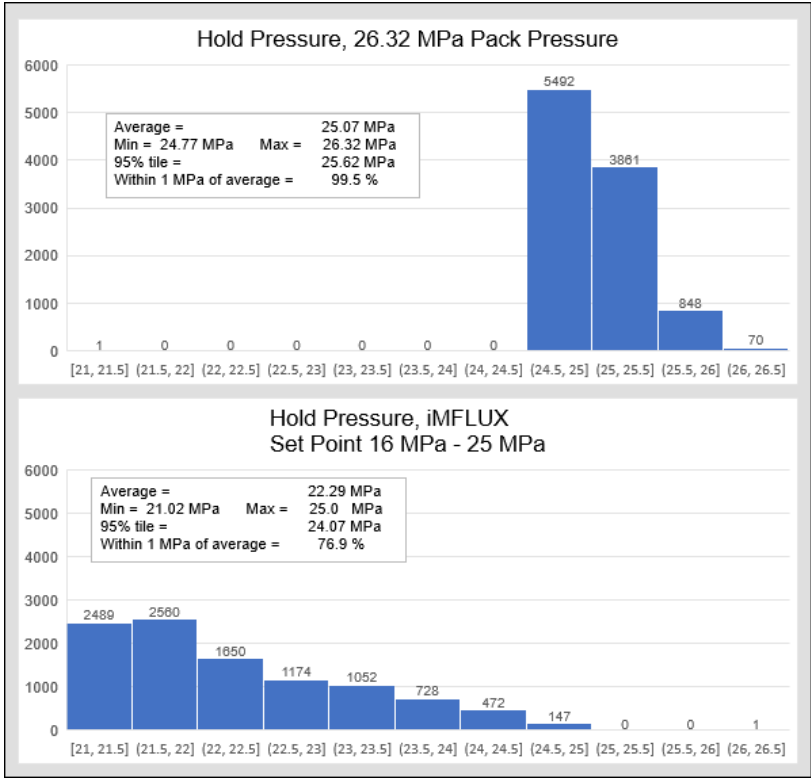
- Objective
  - Determine a cycle time
- Interpretation
  - Top study, has thick section > 35 sec
  - Bottom study, thick section gone, 98% below 15 sec
- Action
  - Get design change approved



Histogram Interpretation

Example – Hold Pressure

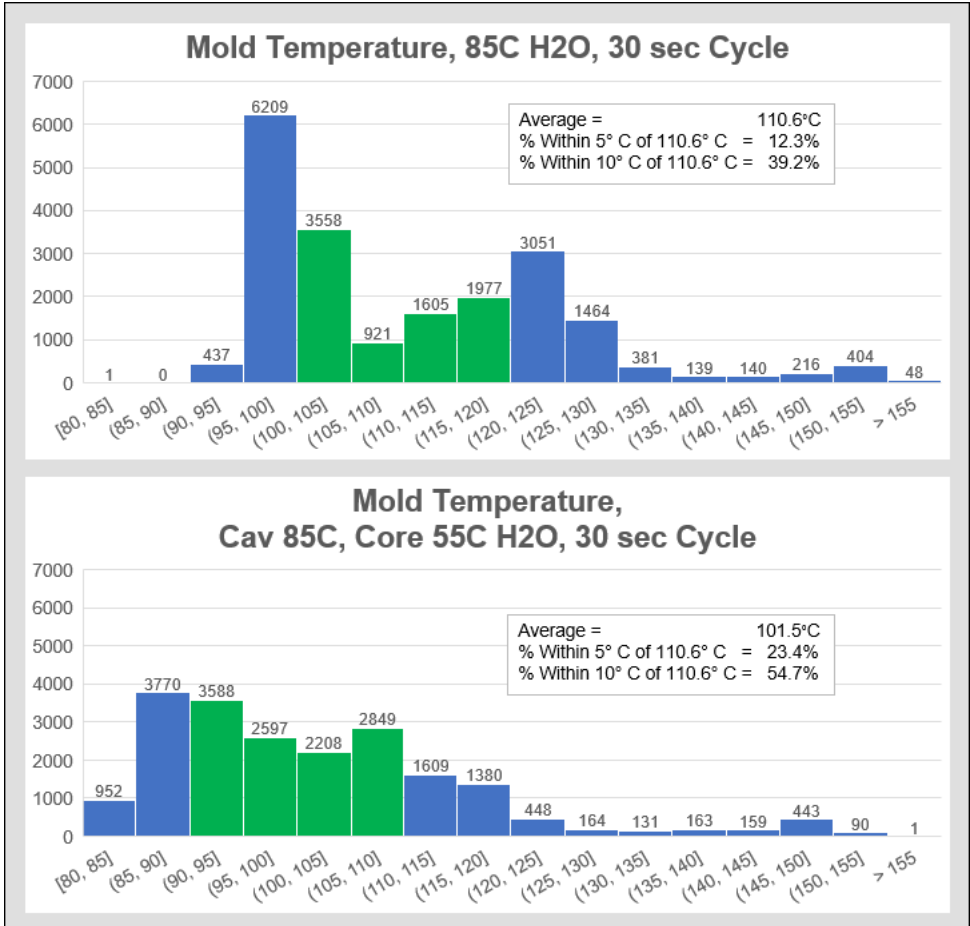
- Objective
  - Compare the uniformity of results conventional to iMFLUX
- Interpretation
  - Both rather narrow ranges but conventional is narrower
  - Volumetric shrinkage nearly identical
  - Not as strong a correlation of hold pressure to volumetric shrinkage with iMFLUX
  - Supports pack as you fill benefit of iMFLUX
- Action
  - Compare trends in future studies



Histogram Interpretation

Example – Mold Temperature

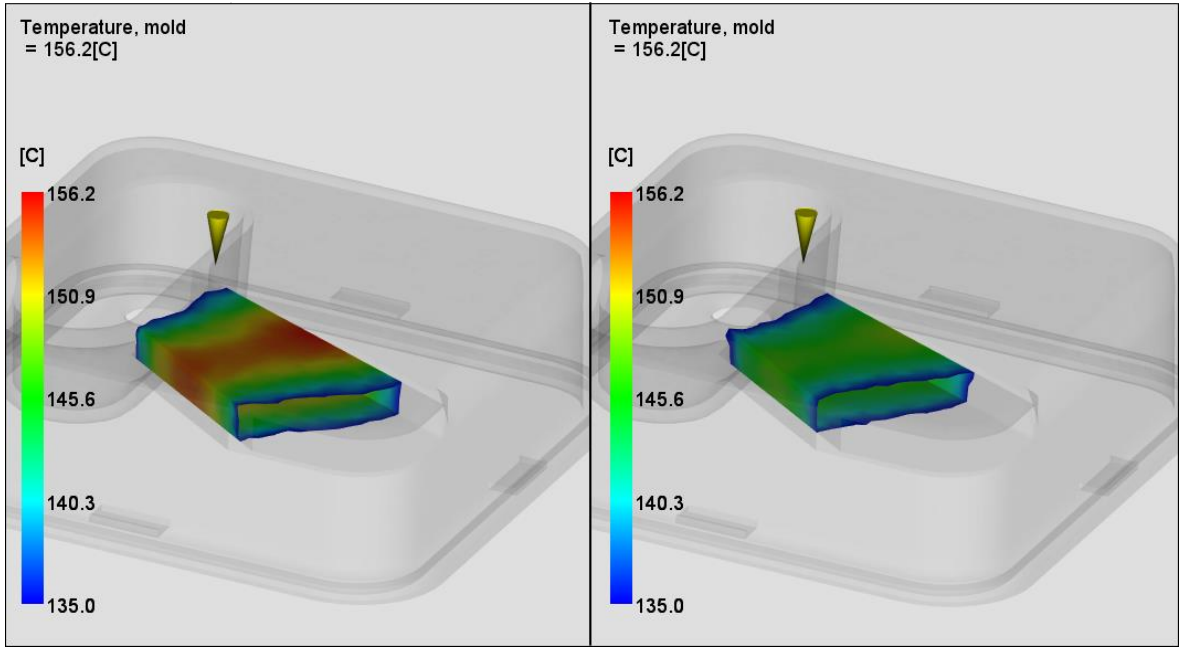
- Objective
  - Determine the influence of lowering the core water temperature
- Interpretation
  - Lowered over all temperature
  - Made results more uniform
  - Still a hot area
- Action
  - Scale results with min 135C to find area



Histogram Interpretation

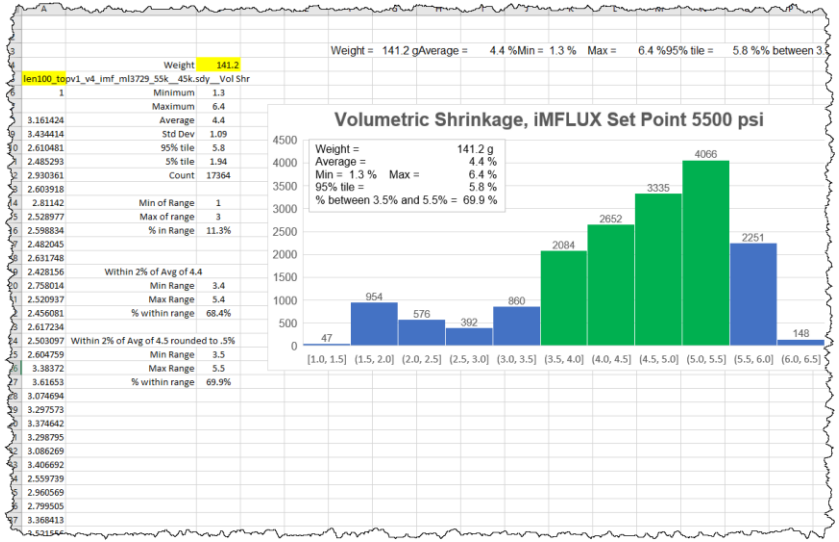
Example – Mold Temperature

- Interpretation
  - High temperature in slide not influenced much by the cavity or core water lines
- Action
  - Add cooling to the slide



Summary

- API's used to extract a result from Synergy
- Data copied into an Excel template
- A histogram automatically created
- Data from additional studies added
- Histograms copied to the same page
- Results interpreted
- Actions taken based on data



Questions?

iMFLUX

» FEARLESS INNOVATION

Contact Information

Jay Shoemaker

Sr. Simulation & Development Engineer

Shoemaker.jm@imflux.com

+1.513.805.6207

3550 Symmes Road

Hamilton, OH 45015, USA

www.imflux.com

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