

# HOW TO ACHIEVE A SUCCESSFUL GAUGE R&R PERMEATION STUDY

Best practice guidance to effectively conduct a permeation Gauge R&R study for film manufacturers.

## Questions answered in this technical note

A Gauge R & R (Gauge Repeatability and Reproducibility) study will help determine things such as a criterion for judging new measurement systems, comparing measurement systems, means for improving performance of measurement systems, process variation and acceptability level for a manufacturing process.

## Best practices for a successful Gauge R&R study

The following are best practice guidelines, so one may align controllable factors to successfully complete their permeation Gauge R&R study.

- Use samples from a robust production process
- Approach to sampling and reporting values (things to keep in mind)
- Proper operator training
- Use an SOP for user consistency
- Define time limit to complete study
- Randomize measurements



### Use samples throughout the manufacturing process

- 1) Customers need to evaluate their own samples to understand process variation as well as the repeatability of the permeation measurement system (i.e., permeation analyzers). The variation in the manufacturing process should be accounted for in the set tolerances, so the study is properly weighted between the repeatability of the measurement and the production process.

### Sample strategy and film tolerance

- 2) If the films have a history of meeting the allowable tolerances across the web, then you should randomly select samples across different sections of the web.

If the sample has a history of poor tolerance, then select it from the same web section (e.g., middle end) to minimize sample variability. This allows the study to focus on the 'controllable variables,' such as an appraiser's ability to prep the sample, apply grease, take a thickness measurement and properly set up a test.

Choose the most pristine area of the roll to sample from (e.g., no creases or scratches) .

### Ensure appraisers are properly trained

- 3) Every appraiser in the study should be trained on how to properly operate the instrument prior to starting the Gauge R&R. Analyzing a reference film will familiarize users with the instrument.

### Document the process

- 4) An SOP reflecting best testing practices should be followed to ensure every user is taking the same approach.



### Set guidelines and timelines

- 5) Provide a time limit on when the study should conclude to ensure the operators are always mindful of the study, and keeping the study moving along efficiently and effectively.

### Randomization of measurements

- 6) Randomization of the measurements should be done as far as who measures what and in what order, so uncontrollable factors are considered.

### Conclusion

Applying the above guidelines will provide the best approach for completing a successful Gauge R&R permeation study.

Please contact AMETEK MOCON to inquire about demoing a permeation analyzer.