



PETWall *plus*®

Process Monitoring System



Process Monitoring, Thickness Measurement, and Quality Control of PET Containers

- Proactive process control feedback
- Vision inspection for random defect detection
- Thickness and distribution monitoring
- Preventative maintenance diagnostic tool for the blowmolder

PETWall *plus*® - PROCESS MONITORING SYSTEM

The PETWall plus® process monitoring system incorporates non-contact wall thickness measurement and random defect detection (optional) in one compact unit. The system mounts within the most popular blowmolders used in PET container manufacturing operations.

With the PETWall plus® system, a container producer can monitor every container in real-time, at production speeds, for deviations in material distribution as well as shifts, process problems, and random distribution related events. Changes in the process can be easily identified as they happen, facilitating proactive operator intervention and avoiding the delays associated with sampling methods. With the addition of vision inspection, the PETWall plus® systems ensure that defective containers will not leave the factory.

- Increase overall production efficiency
- Detect distribution-related defects
- Detect random base and seal defects
- Reduce or eliminate manual section-weight activity
- Facilitate lightweighting
- **Less than 1 year payback!**

Helps Improve the Blowmolding Process

Improved Efficiency

PETWall plus® systems identify process deviations in real-time. When a problem is identified, corrections can be made immediately, ensuring containers will meet critical performance specifications, permitting efficient blowmolder operation, and reducing rework and downtime.

Reduced Operator Learning Curves

PETWall plus® systems give operators with varying levels of knowledge and experience a common tool that can be used to provide immediate feedback for blowmolder adjustment. On a blowmolder equipped with the PETWall plus® system, operators can quickly see the results of blowmolder adjustment, leading to improved operation.

An Important First Step Toward Closed-loop Manufacturing

The PETWall plus® system gives you the ability to identify distribution-related defects as they happen. The detailed, cavity-correlated feedback on material distribution gives the blowmolder operator the information essential for pinpointing problems and ensuring the blowmolder operates efficiently to produce containers at desired performance levels. With the PETWall plus® system monitoring your production, process-related defects can be virtually eliminated.

Support Lightweighting

The PETWall plus® system provides a much finer measurement control of the blowmolding process, ensuring proper material distribution. This enables the processing of preforms with less material while still meeting container performance requirements.

Production reports are powerful, intuitive tools for monitoring system performance and identifying problem areas.

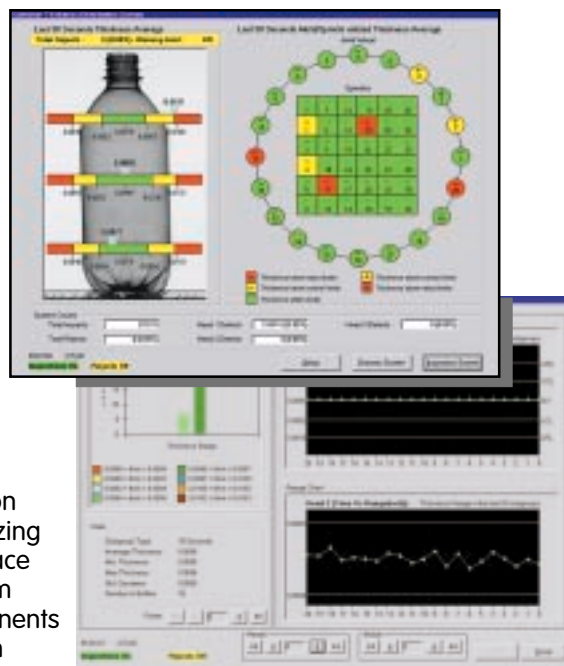
Features and Functions

Precise Thickness Measurement

PETWall plus® systems utilize Agr's proven IR absorption measurement technology to provide accurate and repeatable thickness measurements on containers, regardless of color and the presence of water vapor. The PETWall plus® system can incorporate up to 4 measurement zones per container, depending upon container size and blowmolder configuration. Each measurement zone is adjustable, permitting thickness measurement in the most critical areas including neck/shoulder, sidewall, and the heel area.

In-the-blowmolder Operation

All measurement sensors, as well as seal surface and base cameras, on the PETWall plus® with Vision system mount inside the blowmolder, utilizing the blowmolder's handling and reject system. This approach saves space and provides a stable platform for thickness measurement, and random defect detection. The compact design of the sensors and vision components permit continuous measurement and inspection without interfering with blowmolder operation.



- VISION-BASED DEFECT DETECTION

Eliminate Random Defects While Monitoring Material Distribution

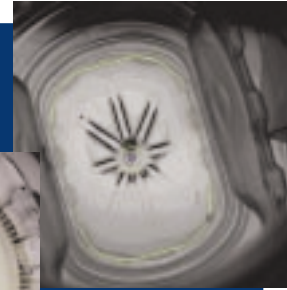
The PETWall plus® with Vision system offers a total process and quality control concept for PET container manufacturers. This is accomplished by combining the patented PETWall plus® non-contact wall thickness monitoring system components with a high-precision camera-based inspection system. With this combination, sidewall thickness distribution as well as random defect detection in the sidewall, base, and seal surface area can be accomplished with one compact system mounted within the blowmolder.

Patented Technology
The PETWall plus is protected by one or more of the following US Patents or foreign counterparts thereof:
6863860; 6985221

CONTAINER BASE INSPECTION

Effectively identifies defects and anomalies on round and non-round* containers within the entire base region, from the heel to the mold parting line. Typical defects that can be detected include:

- Holes in feet and gate
- Underblown base/feet
- Impurities, dark spots and unmelts
- Off-center and cracked gates
- Folds throughout the base



SIDEWALL INSPECTION

Effectively identifies random defects and process-related problems that occur in the neck and sidewall region. Typical problems detected include:

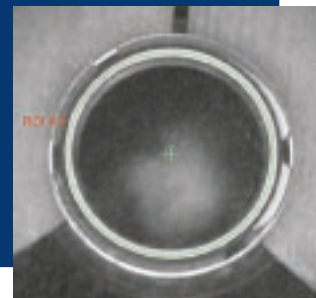
- Clarity
- Consistency
- Neck folds
- Impurities - dark spots, foreign material, un-melts



CONTAINER SEAL SURFACE INSPECTION

Effectively identifies defects that can compromise the seal integrity of a container. Typical defects identified include:

- Short shots
- Nicks, dents, and scratches
- Ovality problems



AVAILABLE OPTIONS

* **Non-round base inspection** - for base inspection of square, rectangular, and elliptical shapes.

Partial mold set option - facilitates both wall thickness measurement and vision-based defect detection when the blowmolder is operating with a partial mold set.

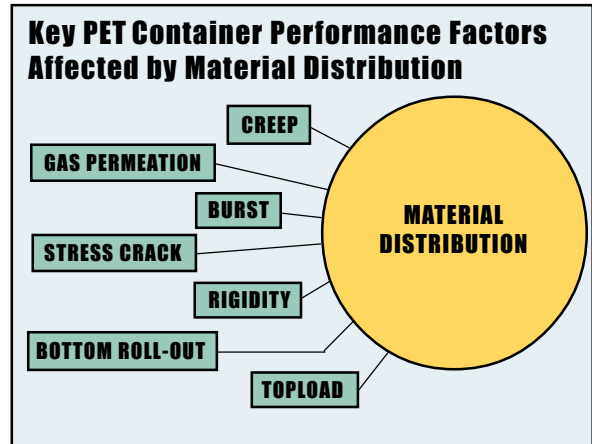
M-Rule shelf-life module - offers a convenient means to monitor and manage material utilization and predict CO₂ or O₂ shelf-life data on a real time basis.

“Shortened reaction time for detecting and solving problems . . . results in significant financial savings”

Meeting the Needs of the PET Container Industry

Consistent material distribution is a key factor in the performance of PET containers. A number of container features and performance factors that impact the quality of a container are directly related to variations in material distribution (see diagram).

The PETWall plus® system is designed to provide real-time feedback for wall thickness and distribution control. By providing the ability to monitor the wall thickness and distribution of every container produced, the PETWall plus® system can alert you to shifts or process problems as they happen, giving you the information you need to consistently produce containers to specification.



Features and Specifications

Seamless Integration into Blowmolder – PETWall plus® systems are designed to work seamlessly within your blowmolder, utilizing the blowmolder’s timing signals and reject system without interfering with bottle production. Versions of the PETWall plus® system are available for a wide variety of the most common blowmolders in use today.

Other Key Features:

- Remote Access
- Automatic Thickness Calibration
- One-Touch Vision Set-up
- Partial Mold Set Compatibility (optional)
- Alarm Log
- Multiple Security Levels
- Data Export for SPC Monitoring



SPECIFICATIONS

THICKNESS MEASUREMENT		
Accuracy ±.0010 inches (±0.025mm) *		
Repeatability ±.0003 inches (±0.008mm) *		
CONTAINER SPECIFICATIONS	Thickness Measurement	Vision Inspection
Height	Min. - 4 inches (102mm) Max. - blowmolder dependent	6.63 inches (168mm) 14 inches (356mm)
Diameter	2-5 inches (50.8-127mm)	2.5-6.0 inches (63-152mm)
Thickness Range	.002-0.03 inches (0.05-0.76mm)	N/A
Finish Size	N/A	28, 38, 43mm
Inspection Rate	Up to 70,000 bph - depending on blowmolder configuration	Up to 70,000 bph - depending on blowmolder configuration
Color	Translucent colors only	
UTILITIES		
Electricity		
Standard Voltage 115 VAC @ 50/60 Hz		
Optional Voltage 230 VAC @ 50/60 Hz		
Air		
Minimum Pressure 60 psi (4.2kg/cm ²)		
Minimum Volume 4 cubic feet (0.113 cubic meters)		
ENVIRONMENTAL REQUIREMENTS		
Operating Temperature		
Standard System 50°-115°F (10°-47°C)		
Operating Humidity		
Standard System 10-85% (non-condensing)		

* On non-decorated, round containers at a 99% confidence interval

Agr® reserves the right to alter design and/or specifications without notification.