

Advanced Container Coating Measurement

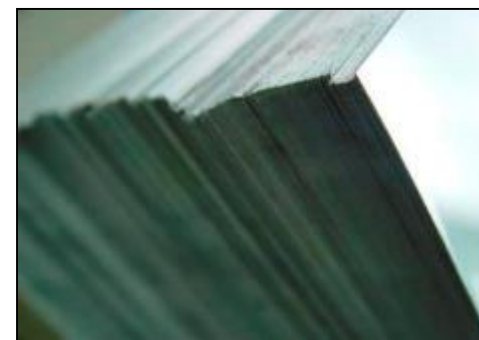
Film Weight Measurement & Coating Process Control



Industry, Technology
and Product Overview



Technology by SENSORY ANALYTICS



Evolution of Industry Film Weight Measurement

Weight Checks



Capacitance Gauges



Non-contact Optical tools



Total can or sheet weight

Weights by section

Thickness and mapping

Dedicated coating thickness & film weight control focus

Sensory is the sole source of SpecMetrix® ROI/EXR technology

- ❖ Unique optical technique for all container and metal coil coatings
- ❖ QA & process tools exclusively from Sensory, OEMs & global partners
- ❖ 10+ years of difference from all other metal industry optical gauges

SpecMetrix is fastest-growing optical thickness gauge brand

- ❖ Continued strong revenue growth and rapid team expansion
- ❖ Global sales and support teams in 50 countries – with 24/7 support
- ❖ Expanding list of OEM partners now include *SpecMetrix* technology
- ❖ Film weight gauge supplier of choice for most leading can makers

Globally recognized for innovation in film weight measurement

- ❖ **Winner:** Metpack Innovation (Gold) Award
- ❖ **Winner:** AIMCAL Technology of the Year
- ❖ **Winner:** ICE ASIA innovation Award



Real-Time Film Weight Measurement Data

Reduced plant production & QA costs

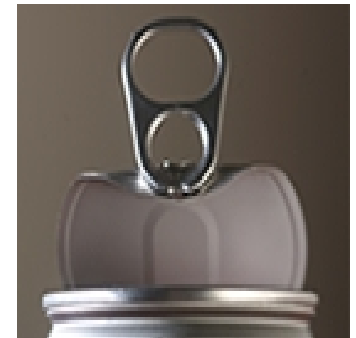
- ❖ Quicker & more accurate IC & OV weight checks
- ❖ Shorter spray set-up and change-over times
- ❖ Reduced customer issues and HFI
- ❖ Less waste and reduced time spent on film weight QA
- ❖ Optimized coating process + increased production
- ❖ One technology solution for all container coating QA

Improved coated product quality

- ❖ All container coatings accurately measured
- ❖ Immediate film weight results and mapping
- ❖ Actual weights, without reliance on calibration discs
- ❖ More QA data with improved documentation

Reduced environmental footprint

- ❖ Less solvent usage
- ❖ Less oven usage = lower emissions & energy costs



New Opportunities for Improved Can Coating Quality

Fast & Non-Destructive Test Method

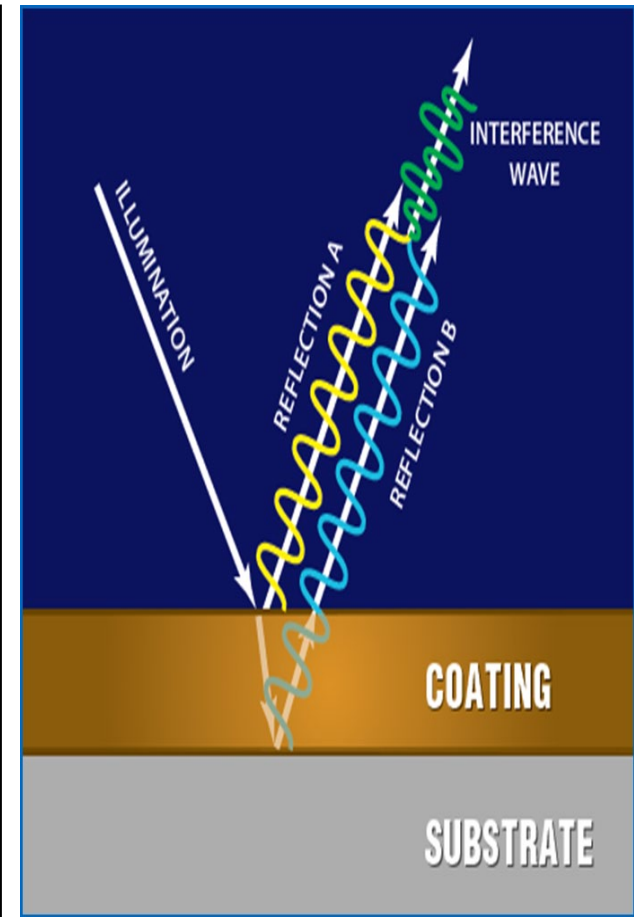
Non-Contact ROI Optical Measurements

Measurement of Wet or Dry Coatings

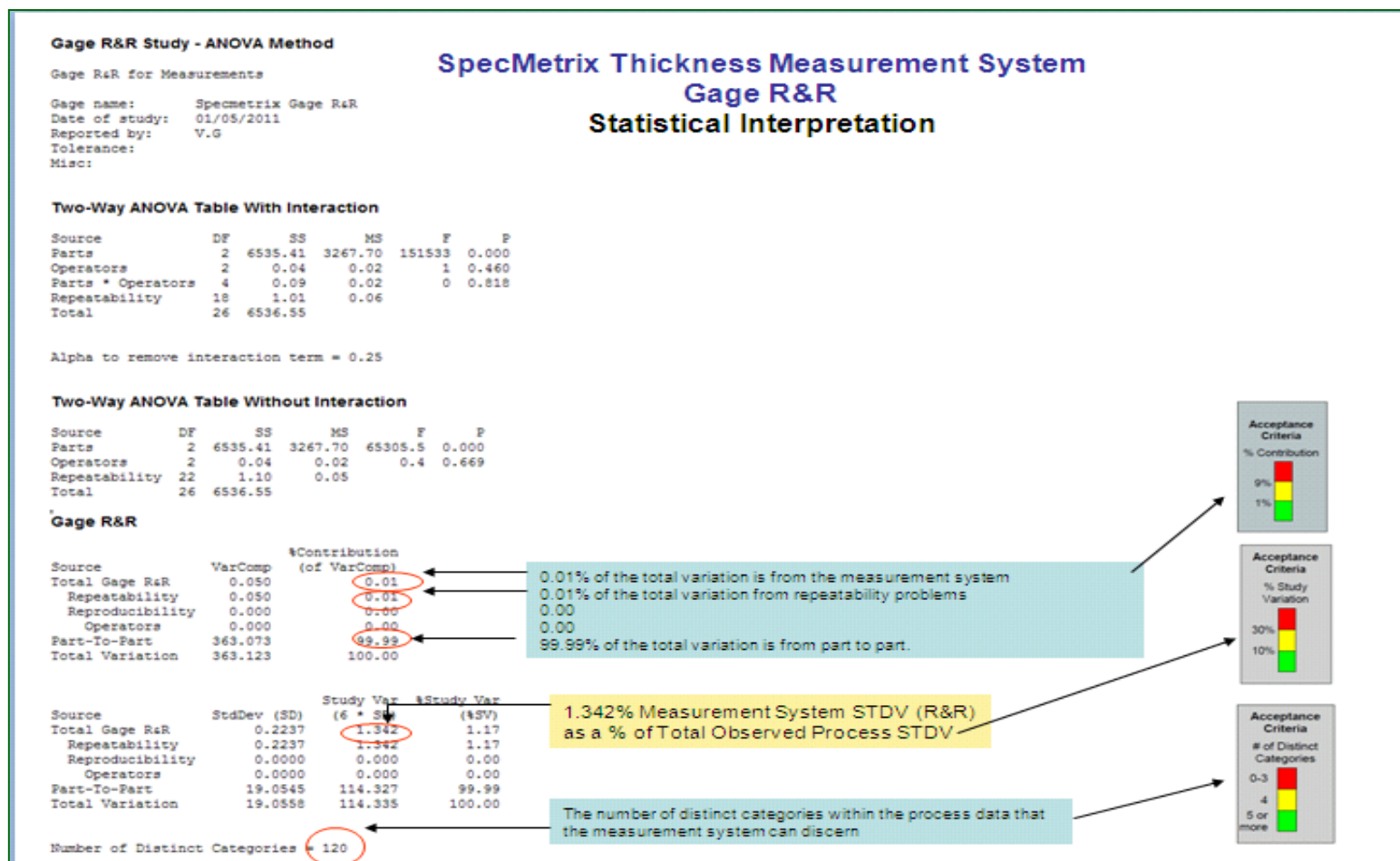
Automatic and Absolute Thickness Data

Measurement of Layers or Total Thickness

Current range: 0.15 to 250 micron thickness
(0.2 g/m² to 300g/m²) or (0.006 to 10 mils)



SpecMetrix Systems - Superior Gage R&R Results



All SpecMetrix systems ship with verified Gage R&R results of <5%

Metal packaging applications of highest impact

- ❖ 2-PC beverage and food containers
- ❖ Coated flat sheets and base coats – single/double layers
- ❖ Coated end-stock and metal coils
- ❖ Coatings over printed and colored sheets
- ❖ Closures, caps, tabs and ends
- ❖ Laminated films to metal substrates
- ❖ Aerosol, specialty containers and tubes



[View Images](#)



Broad Range of *SpecMetrix®* Certified Coatings:

Inside Spray

Over Varnish Over Print

Enamel

UV Coatings

Lacquers

Acrylic

Color Coatings

Multiple Coating Layers

Base Coats

Rim Coats

Wash Coats

Epoxy

Aluminized

White Coatings

Can Compounds

BPA-Free Coatings

Extended Range of Metal Packaging Industry Uses

Substrate Independent - Equally effective on coating applied on coil, steel, aluminum and tinplate flat sheets

Colors and prints - System measurement effectiveness is not impacted by any base colors, printed substrates or background lighting

Clear or pigmented coatings - System can read all applied wet/dry clear or pigmented coatings in real-time

Double layers and top coats - System can read single or double coating layers or provide total coating weights

Broadest industry application range - Spot coats, size coatings, meat release and varnish applied over prints, etc.

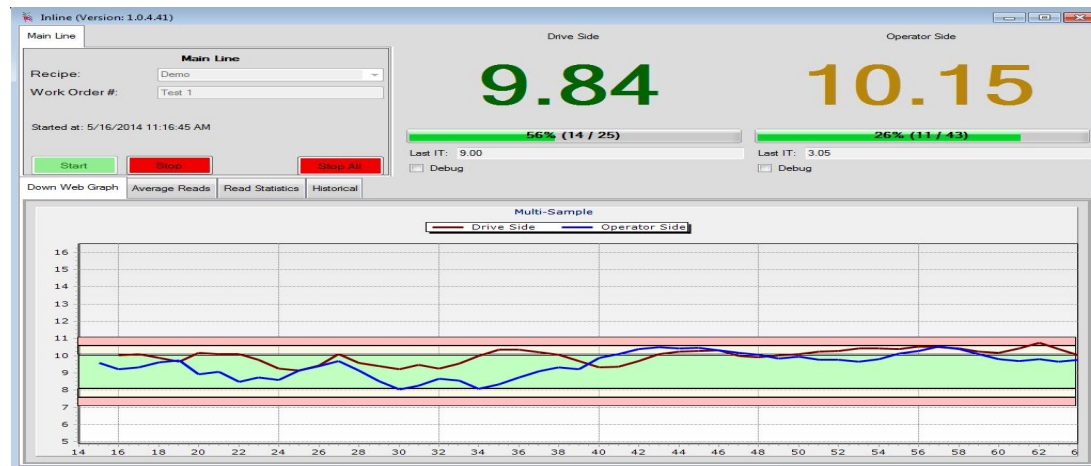
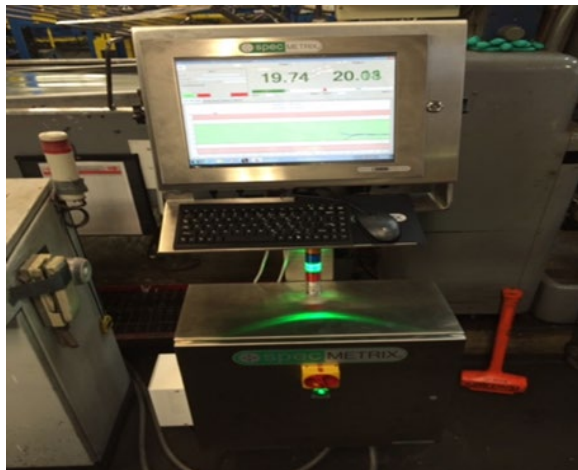
In-line film weight measurement on Coated Flat Sheets

Coated flat sheets: Cost-savings with increased quality

- ❖ In-line coating thickness measurement
- ❖ Up to 150 measurements per second
- ❖ Shows immediate film weight data
- ❖ Customer plant metrics are strong:
 - ❖ Significant coating and varnish cost savings
 - ❖ Set-up times shortened by over 40%
 - ❖ HFI and customer claims down by 50%
 - ❖ ROI demonstrated to be within 6-9 months



In-Process Film Weight Control Systems – **Single**

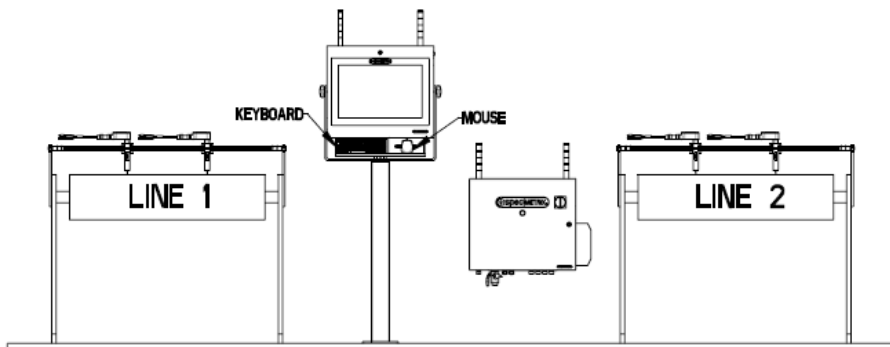


- ❖ In-line inspection of wet or dry flat sheets, end stock and metal/film laminates on a single coating line
- ❖ Real-time weight results for faster 1st piece approval
- ❖ Measures at over 600 metres per minute
- ❖ Running average shown – with all data saved or ported
- ❖ System takes 1 measurement per second from 2 or 3 fixed probes mounted on one line

In-Process Film Weight Control Systems - **Split**



- ❖ In-line inspection of wet or dry flat sheets, end stock and metal/film laminates **on 2 adjacent coaters**
- ❖ Replaces need to buy two single systems
- ❖ System includes two full control stations
- ❖ Lines share one centrally located processor and electronics cabinet
- ❖ Running average shown – with all data saved or ported to data system
- ❖ Split systems take 1 measurement per second from 4 probes mounted on two lines



In-Process Film Weight Control Systems - **Tandem**



- ❖ In-line inspection of wet or dry flat sheets on **two coaters on a tandem coating line**
- ❖ Replaces need to buy two systems
- ❖ System includes two full control stations
- ❖ Lines share a common processor and electronics cabinet
- ❖ Running average shown – with all data saved or ported to data system
- ❖ Tandem systems take 1 measurement per second from 4 probes mounted on two coaters on one tandem coating line

Expanding **SpecMetrix Certified** Facility Program



Select Designation for leading plants that:

- ✓ Exclusively use SpecMetrix coating thickness and film weight measurement
- ✓ Complete team training for all coater operators
- ✓ Removal of all alternate film weight measurement options from plant

= **SpecMetrix Certified** status for their plant

Demonstrated commitment to film weight control

Improved product quality and reduced costs

High profile award and related publicity

Industry recognition for innovation & excellence

2-PC Beverage & Food Containers

SpecMetrix® systems can measure all internal and external beverage & food container coatings:

- ❖ Inside spray
- ❖ Base coats
- ❖ Double coats
- ❖ Tab stock - all colors
- ❖ Coated end stock
- ❖ Rim coats
- ❖ Matte and textured finishes
- ❖ Wash coats
- ❖ Over-varnish - even over print or black



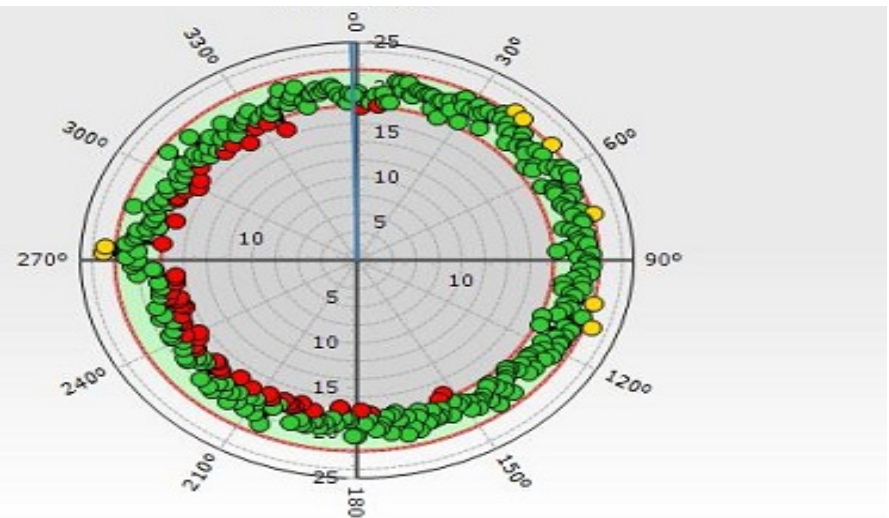
Impact: Compound measurement optimizes application

Compound thickness measurement:

- ✓ Absolute thickness data
- ✓ Overlap (waste) identification
- ✓ Process control and QA use
- ✓ New thickness specs are in process



Meas #	Angle	Thickness
280	279.00	19.33
281	280.00	20.34
282	281.00	19.46
283	282.00	18.58
284	283.00	19.23
285	284.00	19.18
286	285.00	17.28
287	286.00	19.06
288	287.00	21.25
289	288.00	19.75
290	289.00	19.14
291	290.00	19.53
292	291.00	18.53
293	292.00	19.13
294	293.00	17.90
295	294.00	17.96
296	295.00	19.06
297	296.00	19.27



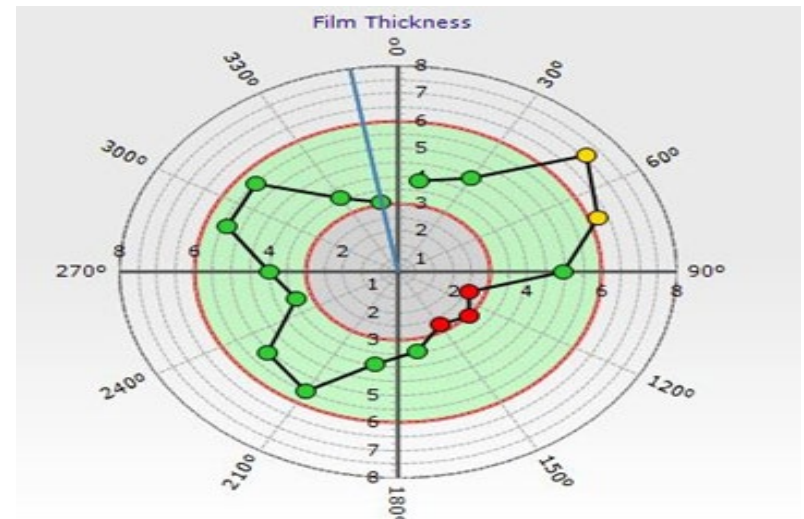
Impact: Rim Coat measurement assures applied thickness

Rim coat thickness measurement:

- ✓ Absolute thickness data
- ✓ Eliminated under application on rims
- ✓ Process control and QA use
- ✓ New thickness specifications in work



Meas#	Degrees	Sample 1	Sample 2	Sample 3	Sample 4
		Thickness (μ)	Thickness (μ)	Thickness (μ)	Thickness (μ)
1	0-20°	4.12	3.20	2.90	5.55
2	20-40°	5.44	5.10	2.78	5.42
3	40-60°	6.71	5.05	2.32	5.87
4	60-80°	5.93	6.71	2.20	5.22
5	80-100°	4.48	6.38	2.52	2.46
6	100-120°	2.15	4.99	3.53	2.07
7	120-140°	2.70	5.40	2.80	1.99
8	140-160°	2.53	6.26	3.18	2.04
9	160-180°	2.70	4.82	3.86	2.33
10	180-200°	4.27	4.65	3.96	2.36
11	200-220°	5.05	4.59	4.80	2.79
12	220-240°	4.25	4.32	5.18	2.13
13	240-260°	3.62	3.52	3.81	1.89
14	260-280°	3.45	3.10	3.95	3.41
15	280-300°	5.06	3.17	3.66	4.59
16	300-320°	5.47	2.51	4.52	4.58
17	320-340°	3.17	2.92	3.20	4.92
18	340-360°	3.26	2.59	2.43	5.23



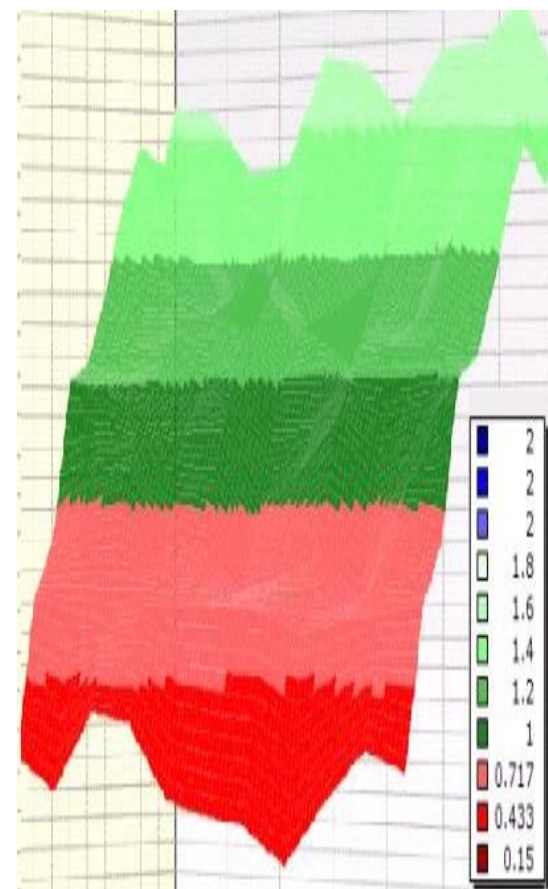
Impact: Wash coat measurement generates savings



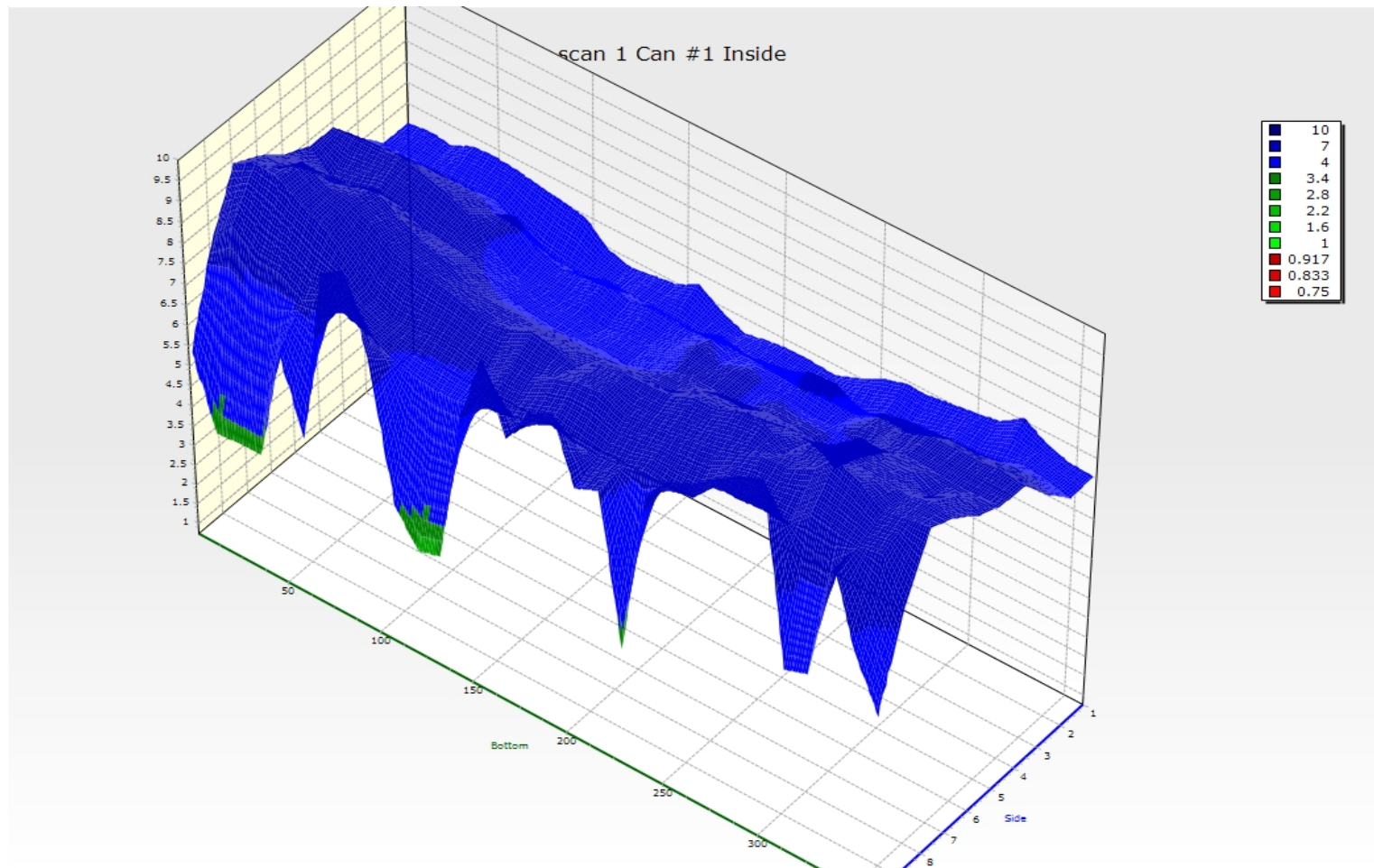
Real-time coating thickness data can:

- Help improve plant processes
- Reduce coating or production costs
- New thickness specification established

Wash coat savings at D&I food can makers have exceeded US \$500K per plant

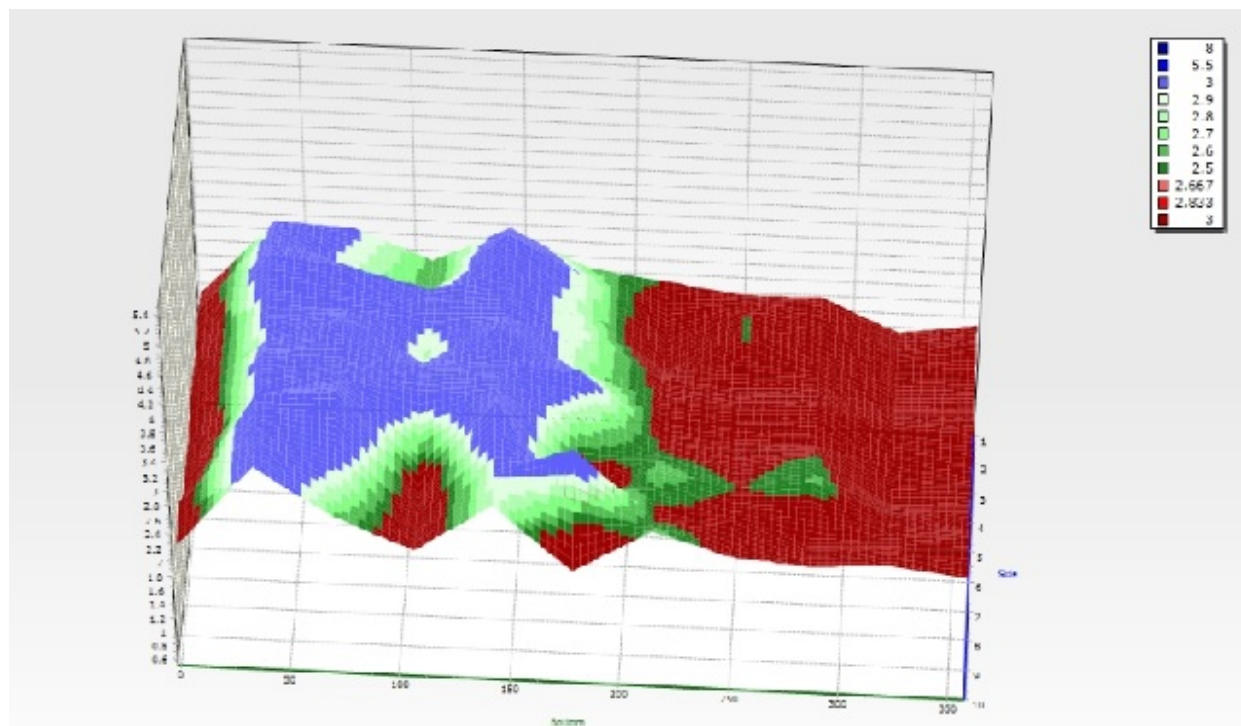


Inside Spray Issues identified with film weight mapping



Over-application of Inside Spray on most of a 2-PC beverage can

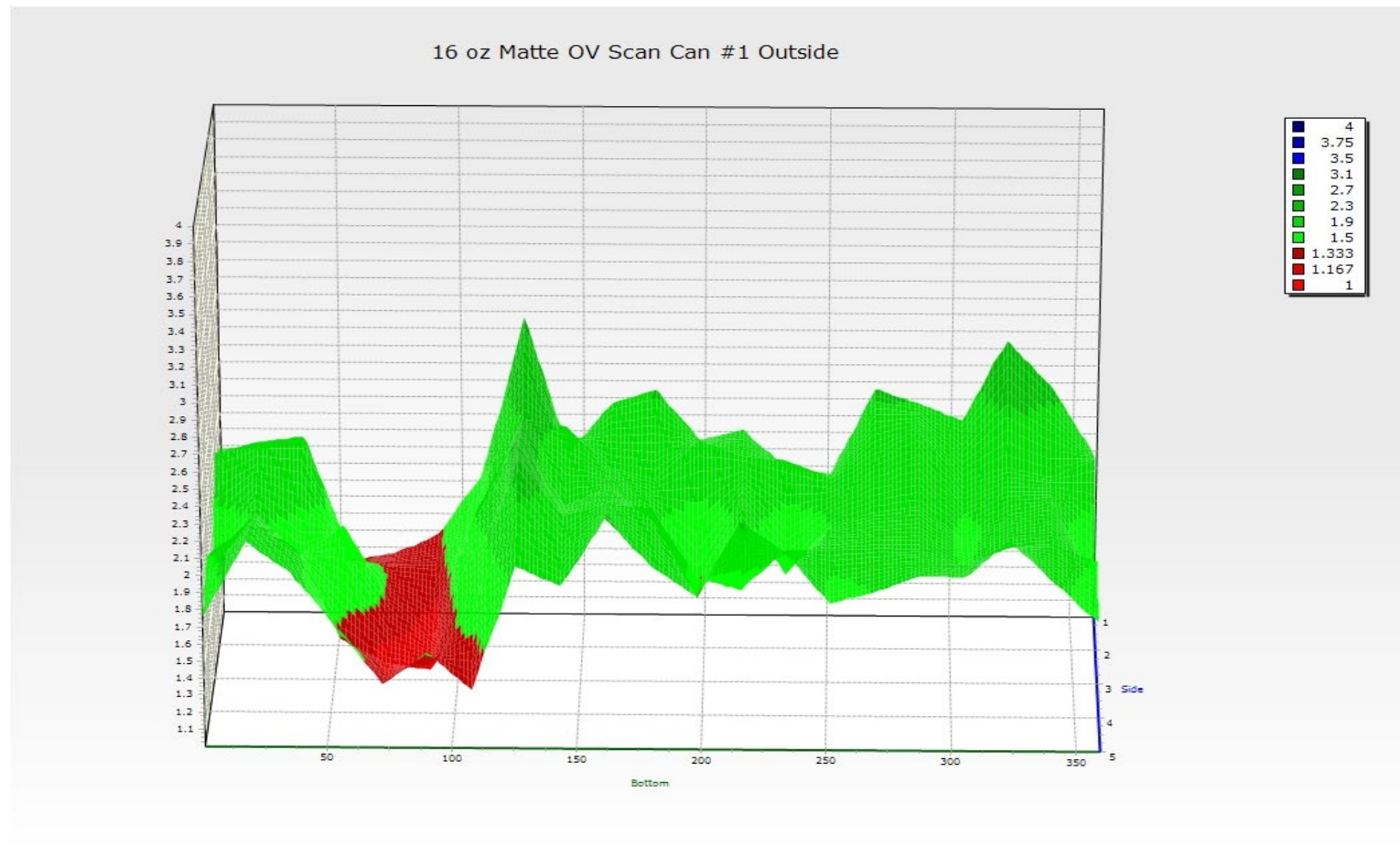
Over-Varnish measurement mapping defines overlap area



SpecMetrix® ACS Systems help plants to:

Optimize coating application
Minimize overlap areas

OV Mapping helps to catch coating process defects

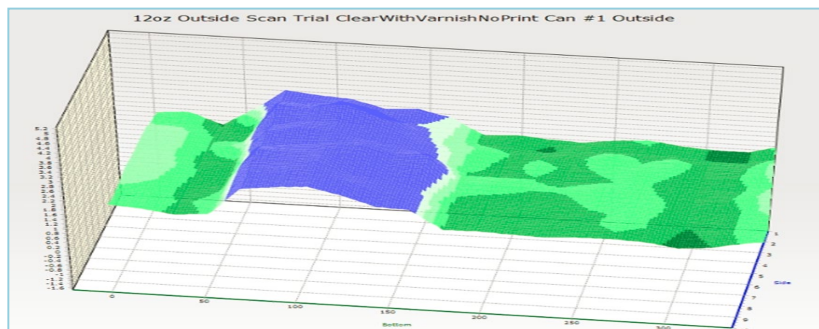


Insufficient OV application on a double wrap application

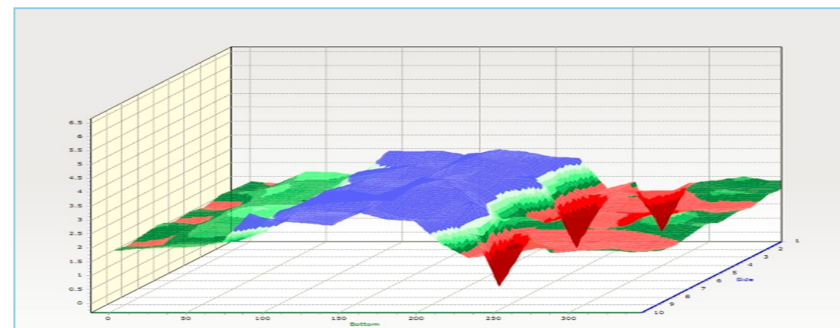
Over-Varnish mapping shows the actual OV film weights



OV map: Can without ink



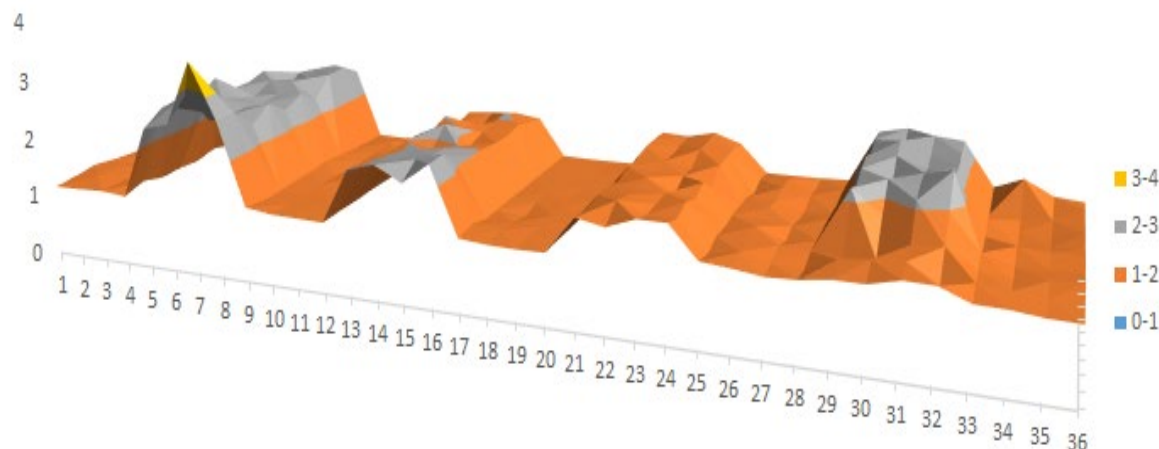
OV map: Can with ink



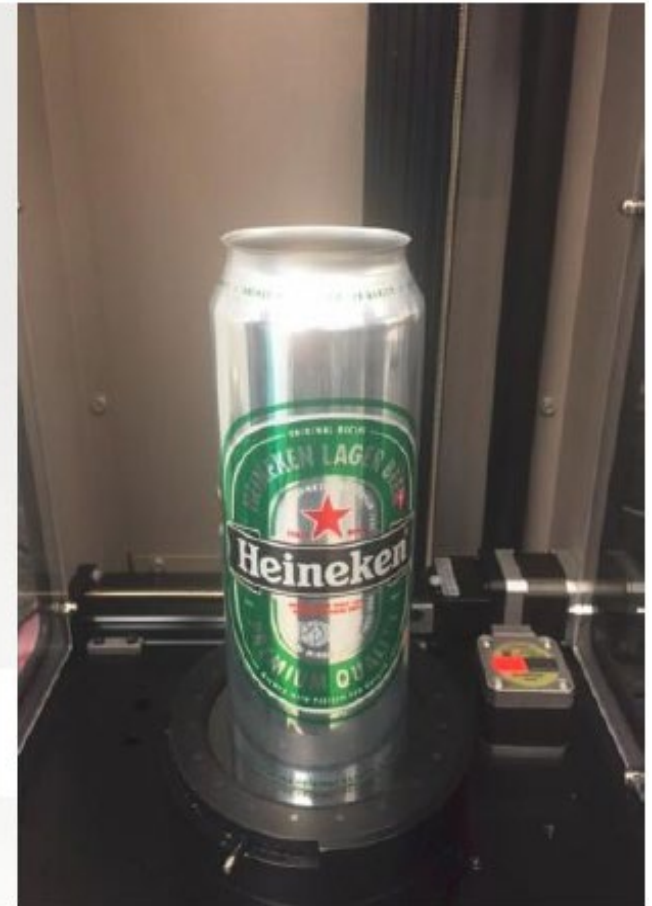
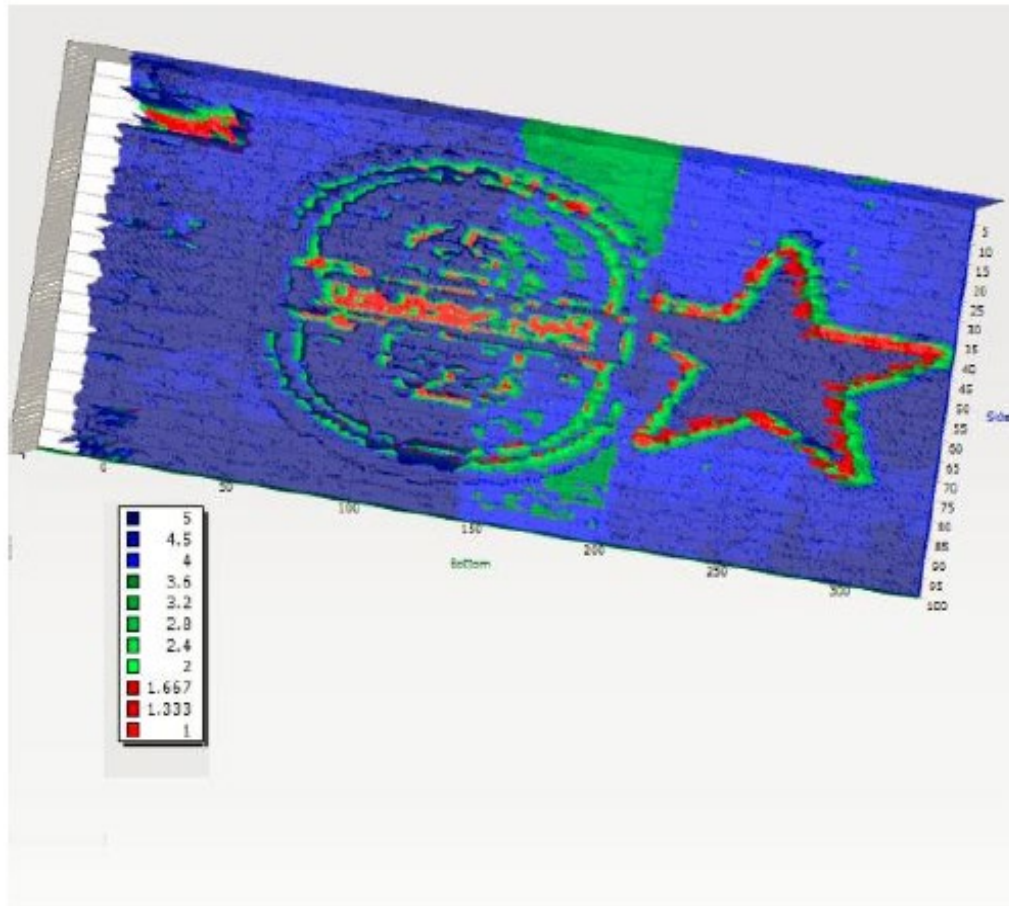
Bare can OV measurement causes over-application of coatings on printed can

3D Distribution graph OV thickness on test can with colored stripes

	No Print	White	No Print	Light Green	No Print	Dark Green	No Print	Black	No Print
<i>Can 22 (10.1719)</i>	1.19	2.77	1.21	2.16	1.19	1.80	1.31	1.41	1.24
	1.25	2.64	1.20	2.17	1.23	1.80	1.30	1.45	1.30
	1.24	2.40	1.20	2.04	1.19	1.82	1.36	1.47	1.34
	1.22	2.52	1.22	2.03	1.17	1.77	1.33	2.02	1.34
	1.20	2.46	1.24	1.96	1.19	1.74	1.33	2.23	1.37
	1.21	2.41	1.24	1.99	1.19	1.73	1.32	2.13	1.29
	1.23	2.43	1.23	1.95	1.19	1.78	1.28	2.20	1.34
	1.23	2.45	1.21	1.95	1.19	1.83	1.30	2.23	1.33
	1.19	2.39	1.21	1.86	1.19	1.83	1.32	2.24	1.48
	1.20	2.35	1.21	1.86	1.19	1.81	1.29	2.09	1.41
AVERAGE	1.21	2.48	1.22	2.00	1.19	1.79	1.31	1.95	1.34



OV Applied over Print: High Resolution 100X100 Scan



Highly accurate OV measurement data shows ink color impact on OV thickness

Monster Energy: Higher Performance for 2-PC Containers



SpecMetrix systems are the exclusive film weight measurement systems of Monster Energy



Coca-Cola/Monster deal is driving a global energy drink sales surge

ACS Coating Measurement Systems for Metal Containers



SpecMetrix ACS-1 system

SpecMetrix® ACS Lab systems

- Single can coating evaluations
- Food, Beverage, and Aerosol use
- Overall film weight measurements
- Film weight mapping
- Inside spray and wash coat use
- Compound thickness measurement

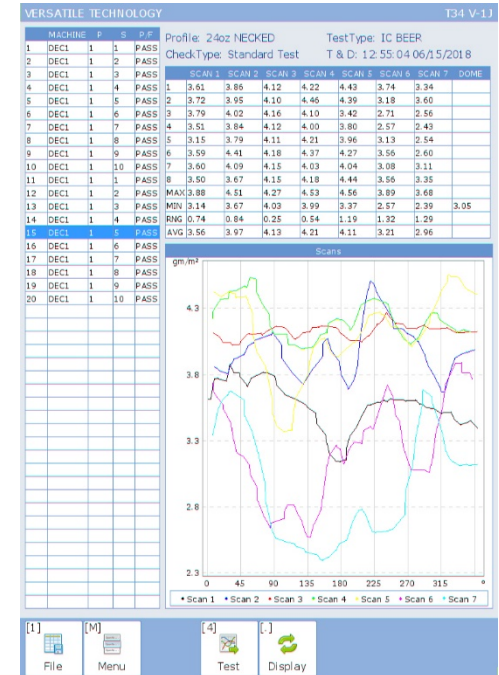
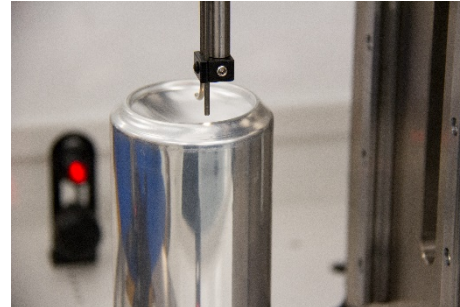
SpecMetrix® ACS Container Coating Measurement Systems



SpecMetrix ACS-10 coating thickness measurement system

- ✓ Multiple pocket version of impactful ACS-1 Lab systems
- ✓ ACS-10 is in wide use at many leading metal container leaders
- ✓ Number of pockets driven by number of spray systems per line

SpecMetrix ACS-T34 Automated Film Weight Measurement Systems



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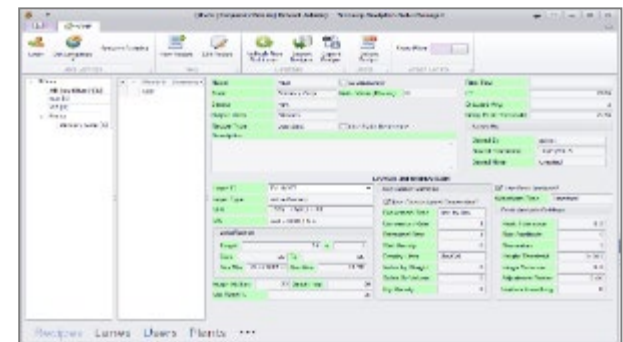
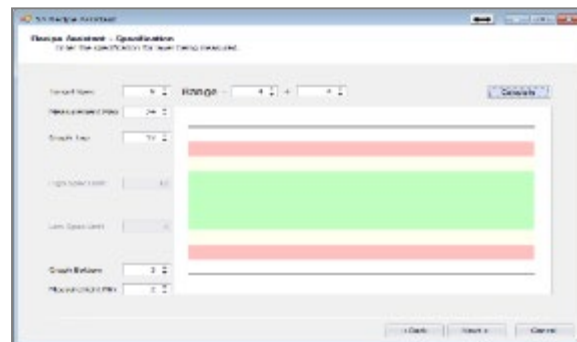
Technology by SENSORY ANALYTICS

SpecMetrix® Software and Integration

SpecMetrix Systems – Operating Software Features

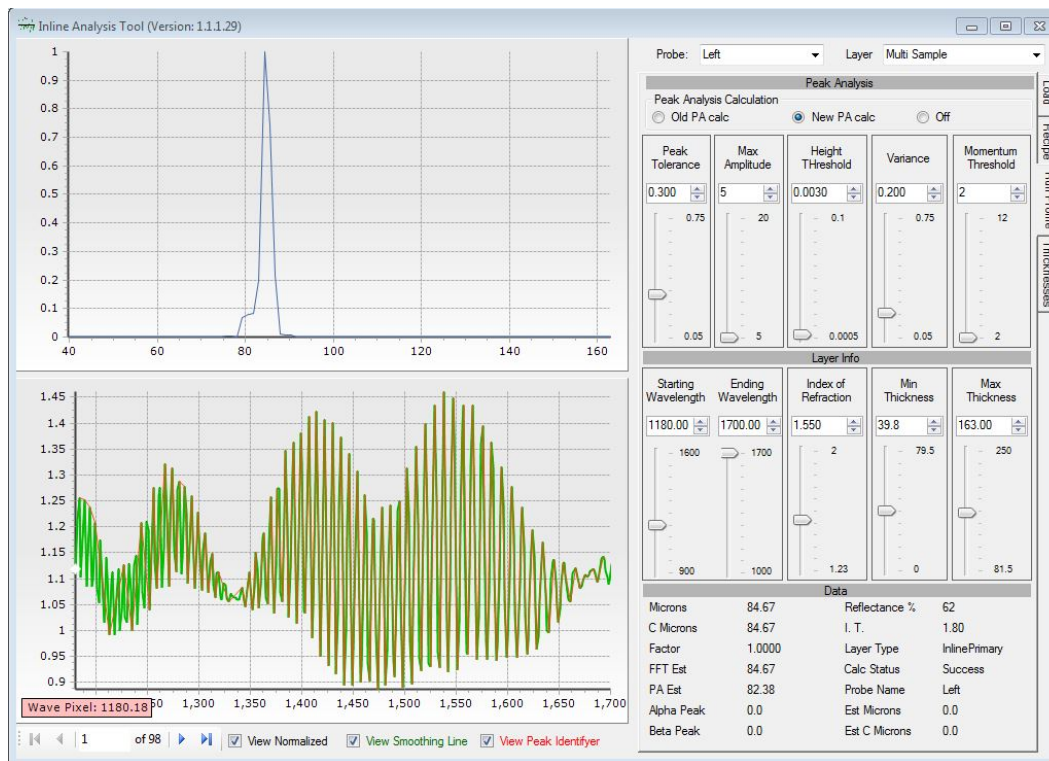


User friendly system navigation
 Host country language options
 Easy to use coating Recipe Editor
 Available Recipe Wizard feature
 Secured User/Administrative levels
 Corporate database functionality
 On-line Support and S/W updates



SpecMetrix® In-line Coating Measurement Systems

In-Line Analysis Tool



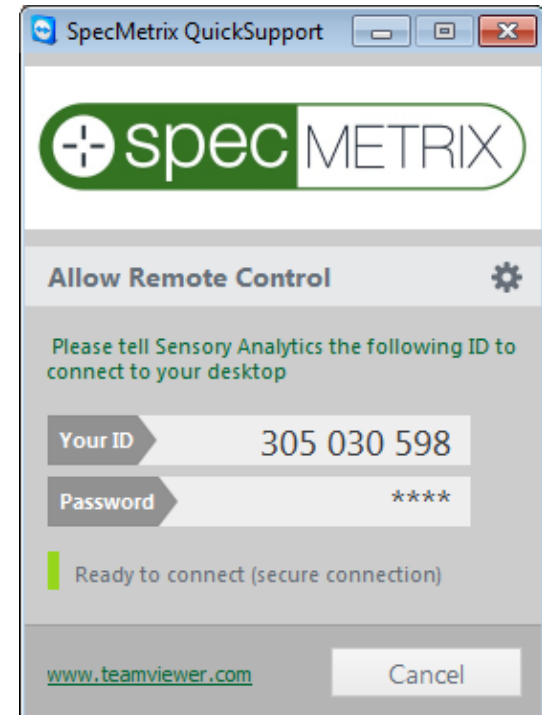
Review recipe setup dynamically by changing variables

Easy Data Integration to Coater and Plant Systems

- OPC and PLC communication are available through Kepware standard interface software with standard tag ID's.
 - Many options available – Allen-Bradley, Siemens, GE, Wonderware, OPC
 - Sensory will provide list of field names, customer is responsible for programming their PLC side
 - Sensory will assist with final communication testing
- SpecMetrix will monitor a port for Incoming messages if customer wants to control startup of measurements and recipes from another system
 - Coating ID
 - Batch ID
 - Start/Stop commands
- SpecMetrix will send the following Outgoing messages:
 - Heartbeat telegram every 10 seconds
 - Data telegram with measurement data every 5 seconds
 - Status telegram with any signal errors

Remote Assistance

- Sensory Analytics is always available to help! 24/7 customer support line to assist with recipe or hardware questions
- Teamviewer remote desktop support is also provided with every system
- Allows Sensory technicians to quickly diagnose problems
- Sensory can modify recipes remotely during a live batch to keep production up and running



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- | | | | | | | | |
|------------------------|-------|----------------|-------|---------|-------|------------|-------|
| INSPECTOR'S REPORT NO. | | STEEL | | GOLD | | STEEL/GOLD | |
| DATE | | TIME | | TIME | | TIME | |
| YEAR MADE | _____ | MATERIAL | _____ | DATE | _____ | FINISH | _____ |
| TYPE | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| SURFACE TREATMENT | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| YES | _____ | NO | _____ | _____ | _____ | _____ | _____ |
| % REPAIR _____ | | % REPAIR _____ | | REMARKS | | | |
| % CRACK _____ | | % | | | | | |
- HOLD FOR INSPECTION**
- NO. 10-11-12



Improving the performance of all coated metal products

SENSORY ANALYTICS

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See all of these  systems firsthand at www.specmetrix.com

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Gage R&R reports

Product videos