







Why is surface finish important?

Consumers place high value on the surface characteristics of a product.

Particularly for durable goods: e.g. consumer electronics, automobiles, furniture, flooring.

The product performs over a period of time ...

... but the exterior makes an immediate impression.

Colour is a matter of taste ...

... but surface finish conveys a sense of quality.





Reflective quality

The appearance of an object is influenced by the way its surface modifies the light that strikes it.

Four main factors are responsible for this:-

- Specular reflection Gloss
- Absorption Colour
- Scattering Haze, Diffuse reflectance
- Transmission Transparency, Opacity





Glossmeter

- Quantitative Measurement
- Insensitive to surface effects Orange Peel, Haze, Waviness







Which angle is best for my application?







Glossmeter



$G \propto R/I$ Gloss $\propto Reflectance$ Incident

RHOPOINT

With Texture The light is reflected and scattered at the surface.

Reflective Appearance Quality







Glossmeters cannot detect texture







Why measure texture?

Orange Peel and Haze can reduce appearance quality at all stages of manufacture: Coating formulation, application and curing.

A Glossmeter cannot quantify these faults

The Rhopoint IQ measures 20/60/85° Gloss, Haze & DOI.

Anyone using or specifying a 20/60 ° 0r 20/60/85° can be upgraded to this technology.



Rhopoint IQ



20/60/85° Glossmeter

Distinctness of Image meter

Haze Meter

Reflected Image Quality





Rhopoint IQ

Standard glossmeter optics @ 60º & 85º

High definition 512 element diode array @ 20^o

Angular measurement range @ 20^o ±7.25^o in steps of 0.02832^o



Orange Peel / DOI







ABCDEFGHIJKLMNOPQRSTUVWXYZ **BCDEFGHIJKLMNOPQRSTUVWXYZA CDEFGHIJK**LMNOPQRSTUVWXYZAB GHIJKLMNOPQRSTUVWXYZABC IJKLMNOPQRSTUVWXYZABCDE **JKLMNOPQRSTUVWXYZABCDEF KLMNOPQRSTUVWXYZABCDEFG** _MNOPQRSTUVWXYZABCDEFGH MNOPQRSTUVWXYZABCDEFGH _MNOPQRSTUVWXYZABCDEFGH KLMNOPQRSTUVWXYZABCDEFG JKLMNOPQRSTUVWXYZABCDER IJKLMNOPORSTUVWXYZABCDE HIJKLMNOPQRSTUVWXYZABCD GHIJKLMNOPQRSTUVWXYZABC FGHIJKLMNOPQRSTUVWXYZAB

DOI

Loss of DOI is caused by structures 0.1 to 10mm

These structures are only visible up to 1m away.



Loss of DOI Orange Peel Roughness Rippled effect Texture

Causes Poor dispersion Migration of additives Reticulation Film weight too high Poor Lay Substrate



Distinctness Of Image - DOI



RHOPOINT

Causes of Orange Peel

Coating

Coating Thickness Viscosity and flow characteristics Technology Primer Thickness Clear coat/Varnish Thickness Particle size distribution Flake alignment Resin types and quality

Application

Improper gun adjustment and techniques. Overspray Dry spray Brush marks Improper flash or recoat time

Substrate Roughness/waviness Surface Energy Temperature



Curing Position vertical or horizontal Oven profiles Environmental conditions









Reflected Image Quality – RIQ NEW

Reflected Image Quality is a new measurement developed by Rhopoint Instruments to provide greater sensitivity when evaluating highly reflective coatings and the specular / diffuse element of lower gloss materials.





Two highly reflective surfaces having very small changes in texture show very little change in DOI , but will appear quite different visually.

Reducing the sensing distance around the specular angle and measuring the reflected distorted light around it, produces a higher resolution response with greater linearity, more in line with the visual experience.



Haze







Loss of reflective contrast

Halos around strong reflections



Haze



$G_h \propto H/I$ Haze $\propto Haze Reflectance$ Incident



Measurement in accordance with ASTM E430 – 20°± 2° (17°-19° / 21°-23°)



RHOPOINT Instruments



Yellow pigment in paint film

Haze Compensation

- For bright colours and metallics, a certain amount of diffuse light, reflected from within the material, is present in the Haze region.
- This diffuse light exaggerates the haze signal causing higher than expected readings.





Haze Compensation

- The IQ automatically compensates by measuring the diffuse scatter caused by colour in a region adjacent to the haze angle.
- This techniques provides compatible readings on all types of solid colours, metallic coatings containing speciality pigments





Causes of Haze

Raw Materials

Dispersion Pigment properties Particle Size Binder compatibility Influence and Migration of additives Resin types and quality

Curing Drying Conditions Cure temperature

> **Post Coating** Polishing Marks Cleanliness Ageing and Oxidisation





Goniophotometric Curves - RSpec









Peak Specular Reflectivity (RSpec) - 20^o ±0.0991^o(0.1^o)

RHOPOINT

- Smooth Surface
- Medium Texture Surface
- High Texture Surface

Sample flatness compensation







require very flat surfaces to measure accurately.

20° Gloss & haze meters have fixed geometry. They The Rhopoint IQ uses a 512 element sensor that measures 20 +/- 7.25°. It mathematically determines the gloss angle.

Two similar appearance surfaces, one is curvedthe reflected light falls away from the centre of the array.

Law of Reflection

The direction of incoming light and the direction of outgoing light reflected make the same angle with respect to the surface.



Non-flat surfaces cause light to reflect on an incorrect part of the sensor and give inaccurate gloss results.



Light is reflected on different parts of the LDA. The instrument automatically compensates.



The instrument automatically compensates for non-flatness.



Statistics and onboard graphing

IQ	Reflectance 20° 💳
4 ∆	Gloss
100	92.5
80	logHaze
60	0.0
40	RIQ
	88.8
20	Rspec
9	18 19 20 21 22 23 92.5

GONIOPHOTOMETRIC CURVES

STATISTICAL ANALYSIS

Gloss Statistics 💿 💳					
4ŵ ▼IQ-STAT ▶GRAPH n=10					
20)၀	60	60°		
92.4		95	95.4		
Max	92.5	Max	95.7		
Min	68.3	Min	85.2		
Mean	82.8	Mean	91.4		
SD	11.3	SD	4.8		

TREND GRAPHS







QC Tool

Trigloss	+ IQ	
▼MENU ▲CUR	VE STAT	n=52
20°	60°	85°
73.3	88.0	90.3
RIQ	logHaze	Rspec
10.2	148.0	14.9
Batch: BATC	H.001 25/	11/13 12 19

Pass / Fail





Advanced data management

4 82.1 92.5 101.2 92.5 24.1 100.9 86.2 85.1 96.7 0 0 0 0 0 0 0





DATA MODE-•REAL TIME report builder.

DATA+ MODE-•REAL TIME Goniophotometric curves.

FAST & EASY ALPHANUMERIC Batch Naming (x1000)

SOFTWARE FREE
Memory download &
Management
Batch Statistics
Goniophotometric Curves



	Rhopoint IQ	BYK MICRO/ TRIMICROGLOSS	NOVO-GLOSS LITE NOVO-GLOSS TRIO
TEXTURE MEASUREMENT	DOI, HAZE, RSPC Gonio-Curves	NONE	NONE
GLOSS MEASUREMENT	20/60/85° or 20/60°	20/60/85° or 60°	20/60/85° or 20/60°, 20°, 60°, 45°
DIMENSIONS	140 x 62 x 47mm	155 x 73 x 48mm	185 x 120 x 57mm
CONSTRUCTION	Aluminium Optic, Chassis, Case, and Measurement plate.	Plastic Case, Chassis. Aluminium Measurement Plate	Plastic Case, Chassis. Steel/Aluminium Measurement Plate
SCREEN	FULL colour	LOW RES LCD	LCD/ LED
INTERFACE	6-Button Touch	Button and Wheel	4-Button
SOFTWARE	Data widget / Plug and Play	Easy Share	Novo-Soft
CONNECTIVITY	USB Bluetooth	USB Bluetooth	USB

	Rhopoint IQ	BYK MICRO/ TRIMICROGLOSS	NOVO-GLOSS LITE NOVO-GLOSS TRIO
STATISTICS	YES- with Graphs	YES	YES
BATCHING	YES- With user defined names	YES	NO
LANGUAGES	ALL including character based	ALL including character based	Simple Characters only
CALIBRATION	Fully Automatic	Fully Automatic	User Initiated
CLEANLINESS CHECK	YES- Independent of gloss function	YES-Gloss based	YES- Gloss based
CALIBRATION CERTIFICATION	BAM or UKAS/ISO17025	Manufacturer Certification	BAM
PRICE	20/60°- *** 20/60/85°- ***	60°- *** 20/60/85°- ***	60°- ** 20/60/85°- ***





Automotive









Aerospace





Marine Coatings





Mobile phones, tablets and laptops





Plastics







Coatings, Ink





Metal Polishing







Simple Sale



Glossmeters cannot detect the difference between these surfaces







QUESTIONS?