

Trusted Everywhere

Enabled by Advanced Materials





FOUNDED IN

2018

INTELLECTUAL PROPERTY

Comprehensive portfolio of patents, trademarks, trade secrets and know-how

Growing Team

Our Team

30+ in Singapore, with a global network of 100+

7,000+ sqft

Office

Purpose-built Singapore HQ to accelerate materials and optics innovations in-house.

Billion+ litres

Fuel Marked

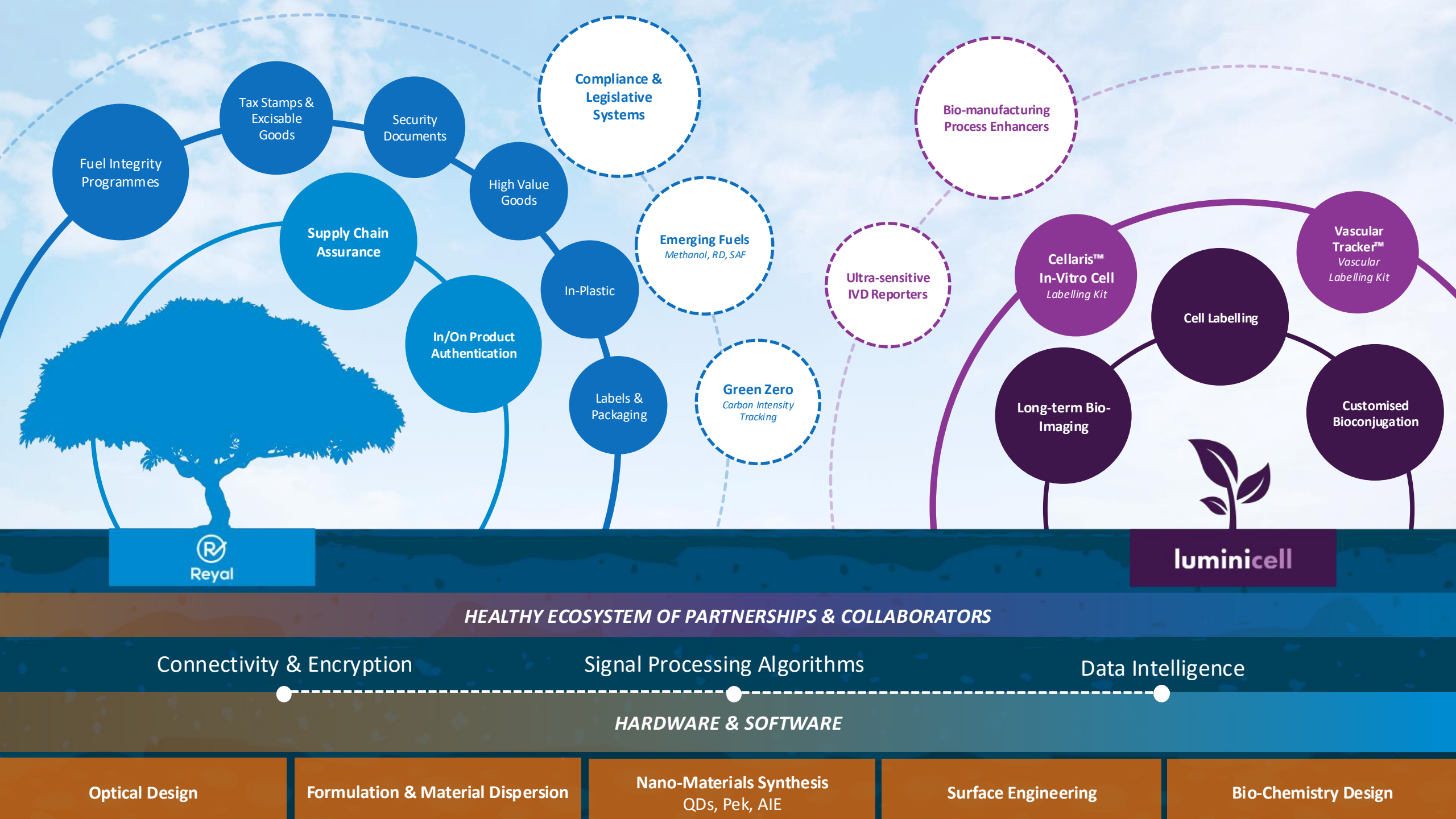
Enabling large-scale operations for governments and enterprises

ISO Compliance



ISO 27001
BUREAU VERITAS
Certification





Fuel Integrity

Fuel Marking for Traceability and Supply Chain Assurance



Global Challenge of Counterfeit Products

1

Market: \$3 T+

VALUE OF COUNTERFEIT GOODS 2022 ¹.
ACCOUNTS FOR 2.5% OF WORLD TRADE ²

2

Customer Value: \$ B+ Revenue & Tax

BRANDS: COUNTERFEITS CAUSING **BRAND EROSION AND REVENUE LOSS**.
GOVERNMENT: SMUGGLING OF EXCISABLE GOODS **STEALING TAX REVENUE**.

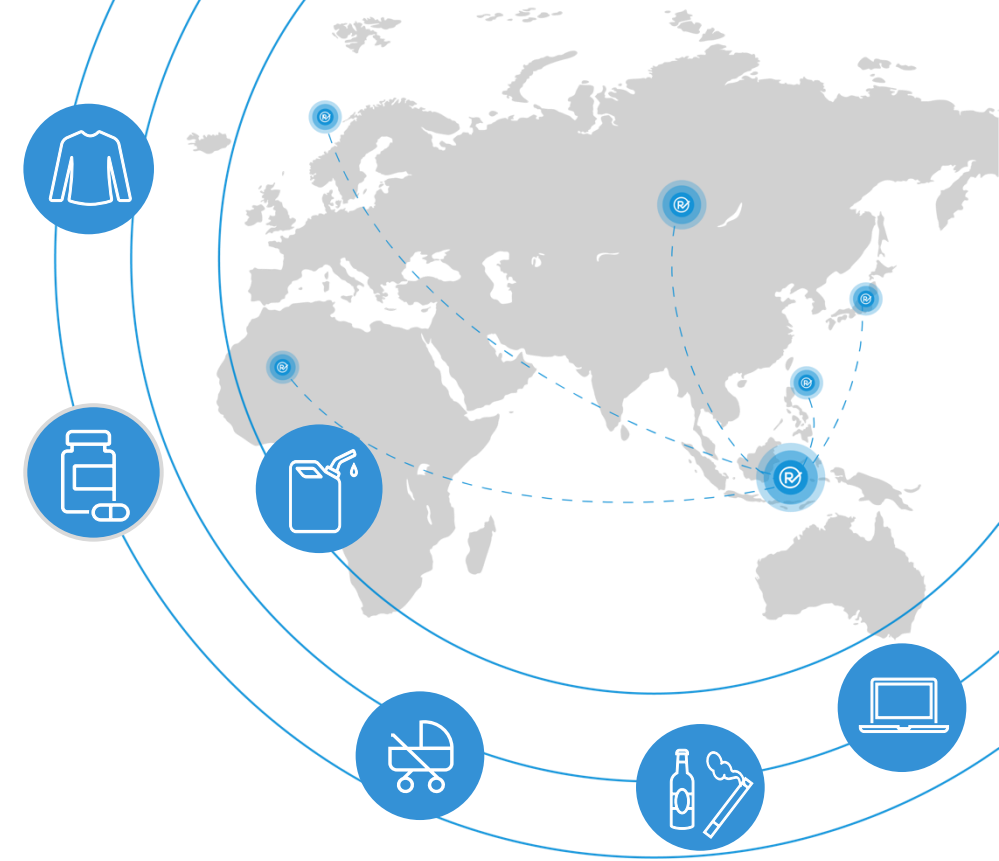
3

Urgency: Ineffective solutions

INCUMBENT SOLUTIONS EITHER EASY TO BREAK OR
HIGHLY COMPLICATED TO IMPLEMENT & ENFORCE.



*Need for **highly secure** and **effective** solution
suitable for full range of problem application.*



OUR SOLUTION

Reyal™ Platform

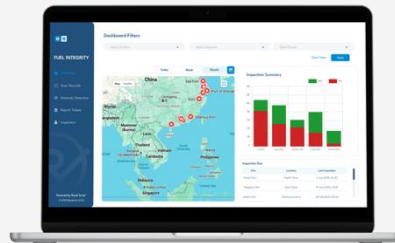
Reyal™ is a complete product authentication & assurance platform. Built for brands and governments who want **unquestionable physical confidence in their products and supply chains.**



Reyal™ Signature



Reyal™ Reader & App



Reyal™ Suite

KILO+ TONS

Plastics Tagged Yearly

Billion+

Products Secured Yearly

Billion+ litres

Fuel secured Yearly



The Reyal™ Signature

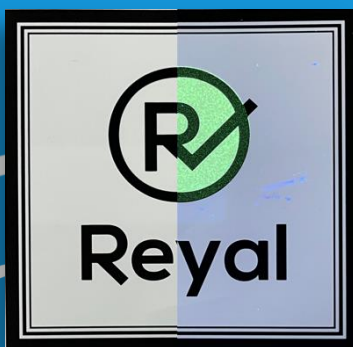


Customized for each customer,
creating unique spectra signatures

Compatible with mass production and
printing technologies across a broad
range of materials



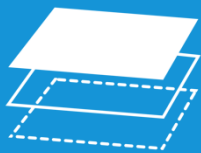
Under UV light



Without
Signature

With
Signature

In-product and on-product as a
standalone or multi-layered
solution



Covert solution which does
not compromise product
aesthetics



Multi-layer Security

Reyal value-adds to existing counterfeits technologies.



Combine Reyal™ solution with
existing technologies to achieve
a more secured multi-layer
security.



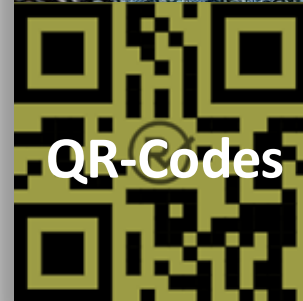
Holograms



Microtexts



QR-Codes



REYAL™ OFFERING

Products

Reyal™ Signature

Reyal™ Inks

On-Product

For printing, coating directly on-product / on-packaging

Reyal™ Gravure Ink

Reyal™ UV Flexo Ink



Reyal™ UV Screen Ink

Reyal™ UV Offset Ink



Reyal™ Masterbatches

In-Product (Plastics)

For plastics injection molding / blown film / casting

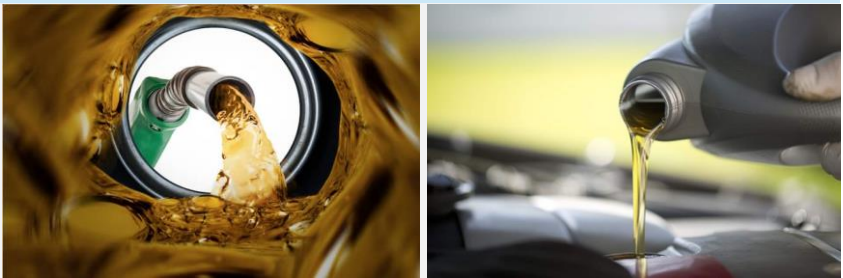


Ready-to-use masterbatch, in low ppm levels

Reyal™ Liquid Marker

In-Product (Bulk Liquid)

For petroleum, fuel additives, biofuels



Drop-in solution, in low ppm levels

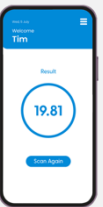
Reyal™ Reader & App

Reader & App

Hardware & Software

Portable tools for precise yes/no analysis or quantification of Reyal™ Signature

R1 For physical products



R1F For bulk liquid products



Reyal™ Suite

Reyal™ Dashboard

- For data analytics with insights like geotagging, geolocation, timestamp, inspector ID



* Recommended loading varies depending on desired thickness, quantification level and colour of end-product

QUICK, EASY & RELIABLE

How It Works



Connect

Reyal® Reader to built-in smartphone
via Bluetooth



Take a Sample

Place sample in the Reader, and
press "Scan"



Get Results

Within seconds. YES/NO analysis and
Quantification

Reyal™ Suite

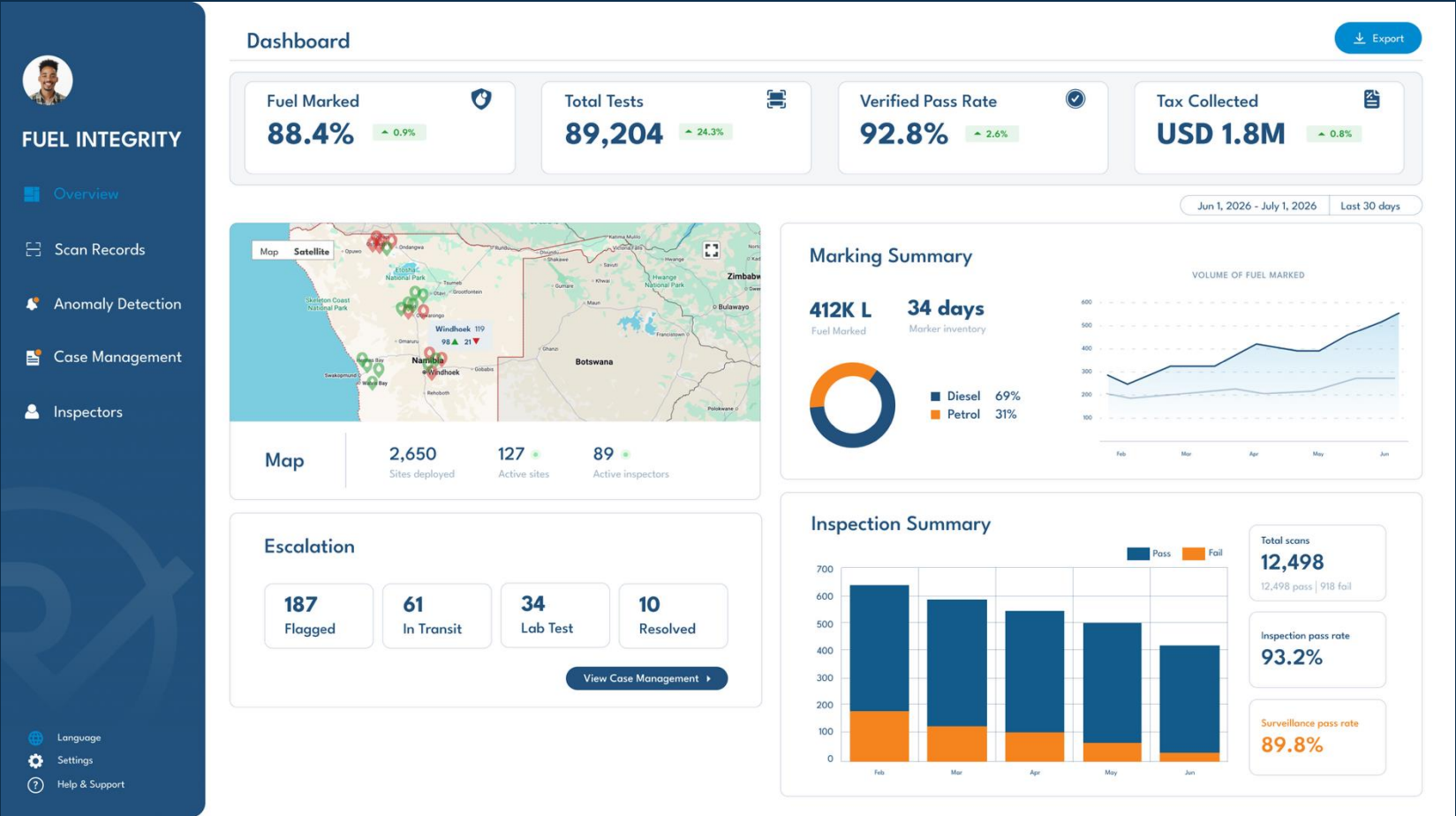
Reyal™ R1F Reader
Collects data from samples



Reyal™ Dashboard Suite
The data is uploaded to a secure cloud database for centralized management



Generate actionable data analytics and
make informed decisions to ensure supply
chain integrity



Reyal™ Solution

Bulk Liquids & Fuel Marking



Reyal™ Marker

Resistant

Stable for a long product life. Resistant to alteration and removal techniques.

Invisible & Harmless

No change to product appearance or performance. Compatible with emerging fuels — **CHNO compliant and free of halogens.**

*Compliant with ASTM D975
(standard specification for diesel fuel oils)*



Reyal™ Reader

Quick verification

Compact reader for field deployment — carry and store wherever needed. No limitation of mobile or central labs.

Powerful

Reyal™ Reader uses high-definition optics to detect markers. The only solution on the market that quantifies emerging fuel blends.



Reyal™ Suite

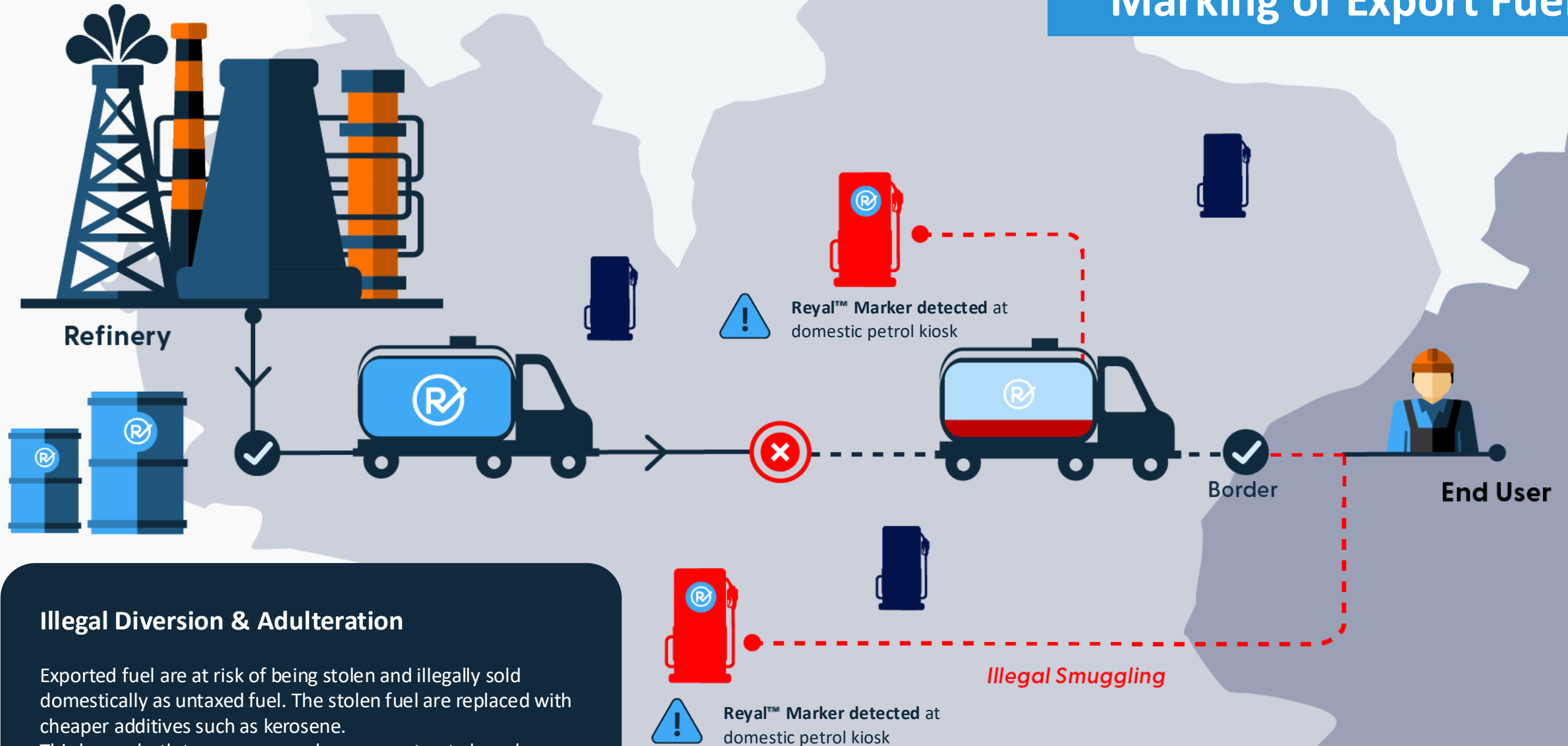
Real-time Data

Reyal™ Suite monitors live data from all registered readers, with no geographical limitations—track data across areas, regions, and even countries seamlessly.

Easily detect hotspots

Identify fuel-related hotspots instantly across different locations. Gain maximum supply chain assurance with real-time visibility and actionable insights.

Marking of Export Fuel



Illegal Diversion & Adulteration

Exported fuel are at risk of being stolen and illegally sold domestically as untaxed fuel. The stolen fuel are replaced with cheaper additives such as kerosene. This harms both tax revenue and consumer trust abroad.

Reyal™ Marker is added into export fuel.
Detection of the marker in the country indicates diverted fuel.

THE REYAL STANDARD

Tested and recognised in international and local standards

EXTENSIVELY TESTED

Reyal™ Marker has been tested and certified for use in broad range of fuel types, ensuring no change in fuel quality or performance.

ENVIRONMENTALLY FRIENDLY

Reyal™ Marker contains no halogens or metals that harm the environment, making it fit for sustainable fuels.

STANDARDS-COMPLIANT

Reyal™ Marker and R1F Reader are recognised and compliant in international and local standards, e.g., SANS 342:2016

intertek
Total Quality Assured.

standview laboratory
On Abchurch and Tumut Road
standview
Rue 2, St. Helier
South Africa

Tel: +27 31 400 3344
P: +27 31 400 3123
Email: info@standview.com
Web: standview.com

CERTIFICATE OF ANALYSIS

Client:
Client Address:
Product: Diesel 50ppm
Sample Description: Labblend Base Fuel & 0.1ml Reyal Marker Additive per Litre Base Fuel

Sample Condition: Acceptable

Sample Date/Time: 13 September 2024 10:00:00 AM
Order Number: -
Batch Number: -
Intertek Job Number: -

Twisted Date/Time: 16 September 2024 12:00:00 PM
Sample Number: 09/2024/2004
Certificate Number: K2024/C01123
Client Reference Number: -

TEST DESCRIPTION	METHOD	SPECIFICATION	RESULT
Appearance	*ASTM D4176	Bright & Clear	Bright & Clear
Water Test	*ASTM D155 (Procedure 2)	2 Max	0
Asph % w/w	*ASTM D482	0.01 Max	<0.01
Cetane Index	*ASTM D4737	48 Min	56.1
Copper Corrosion (3hrs @ 100°C)	*ASTM D180	No. 3	10
C.F.P. °C	*IP 309	-4 Max	-13
Density @ 20°C kg/m³	ASTM D4052	7.800-0.872	0.8274
DISTILLATION °C			
BP	*ASTM D186	Report	181
% Volume Recovery		Report	207
10% Volume Recovery		Report	215
15% Volume Recovery		Report	224
20% Volume Recovery		Report	232
30% Volume Recovery		Report	246
40% Volume Recovery		Report	261
50% Volume Recovery		Report	275
60% Volume Recovery		Report	289
70% Volume Recovery		Report	304
80% Volume Recovery		Report	321
90% Volume Recovery		Report	344
Flash Point °C	ASTM D93 (Procedure A)	62 Min	67.0
Kinematic Viscosity @ 40°C cSt	ASTM D445	2.2-5.3	2.772
Carbon Residue on 10% Evolume	*ASTM D4530	0.3 Max	0.02
Fraction Distillation residue, % w/w			
Sulphur mg/kg	*ASTM D5453	40 Max	3.9
Total Contamination mg/kg	*IP 442	12 Max	5
Water Content ppm	*ASTM D153	250 Max	48
Lubricity µm	*IP 131-1	400 Max	401
Conductivity @ 25°C µS/m	*ASTM D1524	130 Min	323

Key: * = NOT SANS ACCREDITED IN OUT OF SPECIFICATION TEST

intertek
Laboratory Manager - Environmental Signatory

Signed Date: 25 September 2024
Page 1 of 1

intertek
caleb brett

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Telok Ayer Street Tower A
Singapore 068562

Tel: +65 6805 4888
Fax: +65 6443 2551
intertek.com

CERTIFICATE OF VALIDATION

- Certification Object:**
To certify the validation on Reyal™ R1F Reader for Testing Reyal™ Marker in Fuel Marking Protection
- Test Date:**
The tests were done on 12 September 2024 in Intertek Testing Services (S) Pte Ltd (STC Lab) - Caleb Brett, 1 Seraya Avenue, Singapore, 628208.
- Test Method:**
Validation testing is conducted with Reyal™ R1F Reader (SN: HF51CEBC0001) as per Nanolumi document "QUAL-501 Reyal™ R1F Reader Validation Procedure".
- Certification Declaration:**
I have witnessed the validation testing conducted based on the Reyal™ R1F Reader (SN: HF51CEBC0001) and its validation procedure as described per Nanolumi's "QUAL-501 Reyal™ R1F Reader Validation Procedure" and also conducted demonstration testing with Nanolumi's standard samples myself, hereby declare the results contained in this document as a true and accurate records of the test carried out for validation. The results obtained were as expected and demonstrated the validity of the test protocol.

Witnessed by: Ngh Mei Heong

Signed by: 

Dated on: 12-Sep-2024

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1 Seraya Avenue
Singapore 628208
Tel: +65 6886 7428
Fax: +65 6886 7425
Intertek Testing Services (Singapore) Pte Ltd

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1 Centennial Lane #02-03
Singapore 139608
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Fax: +65 6443 2551





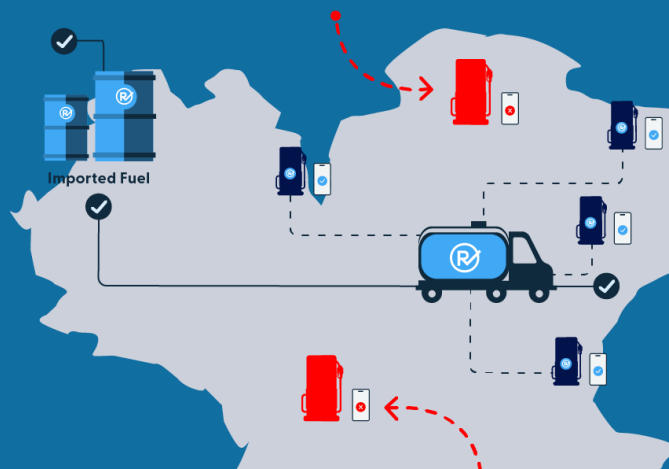
Reyal™ Addressable Markets

01 Fossil Fuels

Prevent damage

Smuggling & counterfeiting causing tax loss and brand damage.

 *Deployability & cost-effectiveness.*

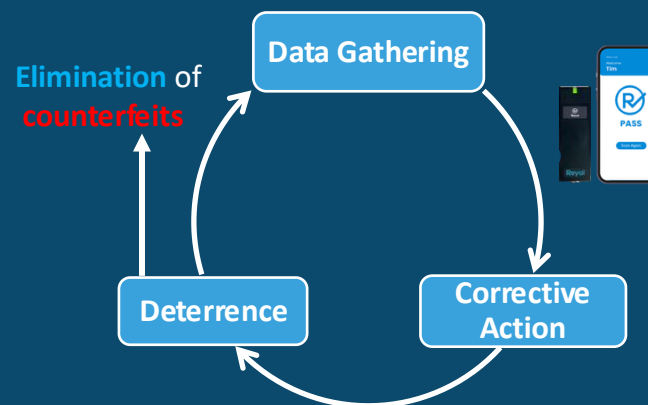


02 Protected Items

Ensure integrity

Falsification of documents, tax stamps and branded products.

 *Security & supply chain integration.*

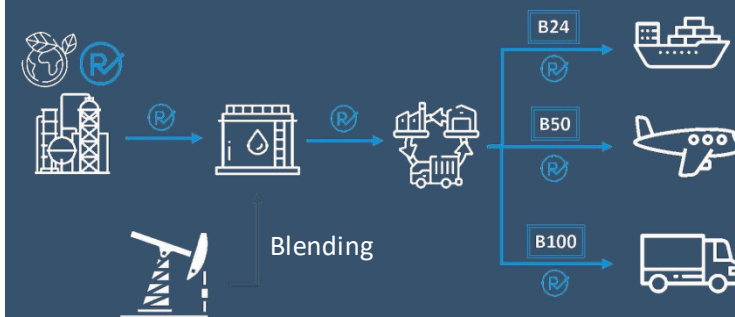


03 New Fuels

Achieve compliance

Global trend of emerging fuels. Mistrust in current proof of origin and blending records.

 *Quantification across all biofuels.* 



AT A GLANCE

Solution Benefits

Cost-effective, end-to-end solution which is scalable for mass production and brings forensic level security to the field.



HIGH SECURITY

Precise interaction of unique Reyal™ Signature, Reader & App create absolute confidence in the authentication process.



BUILDING BRAND TRUST

Reyal™ safeguards revenues and protects its customers from damaging reputation losses and costly disputes & liability claims.



CONVENIENT

One universal platform to protect all products across a broad range of materials



ACTIONABLE APPROACH

Time-stamped & geo-tagged forensic data uploaded to cloud storage in real-time enables companies to act against bad actors in the chain and allocate resources effectively.

AT A GLANCE

Summary

01

End-to-end Assurance Platform

Cloud-based tools to connect physical products with a digital identity for green fuel & brand protection

02

Forensic Level Authentication in the Field

Bringing typical central lab forensic level authentication into the field with rapid, large-scale deployment

03

Evidence based Carbon Network

Connects stakeholders across critical stages, delivering standardized, auditable data for accurate carbon tracking

THANK YOU

Let's Make A Visible Difference
Together

