



SANEZOO Unity

For Visual Quality Control



Excels in All Surface Types



Integrates Easily In One Day



Error-free Defect Detection



Adaptive AI & Machine Vision



Minimizes False Alarms



Various Industries

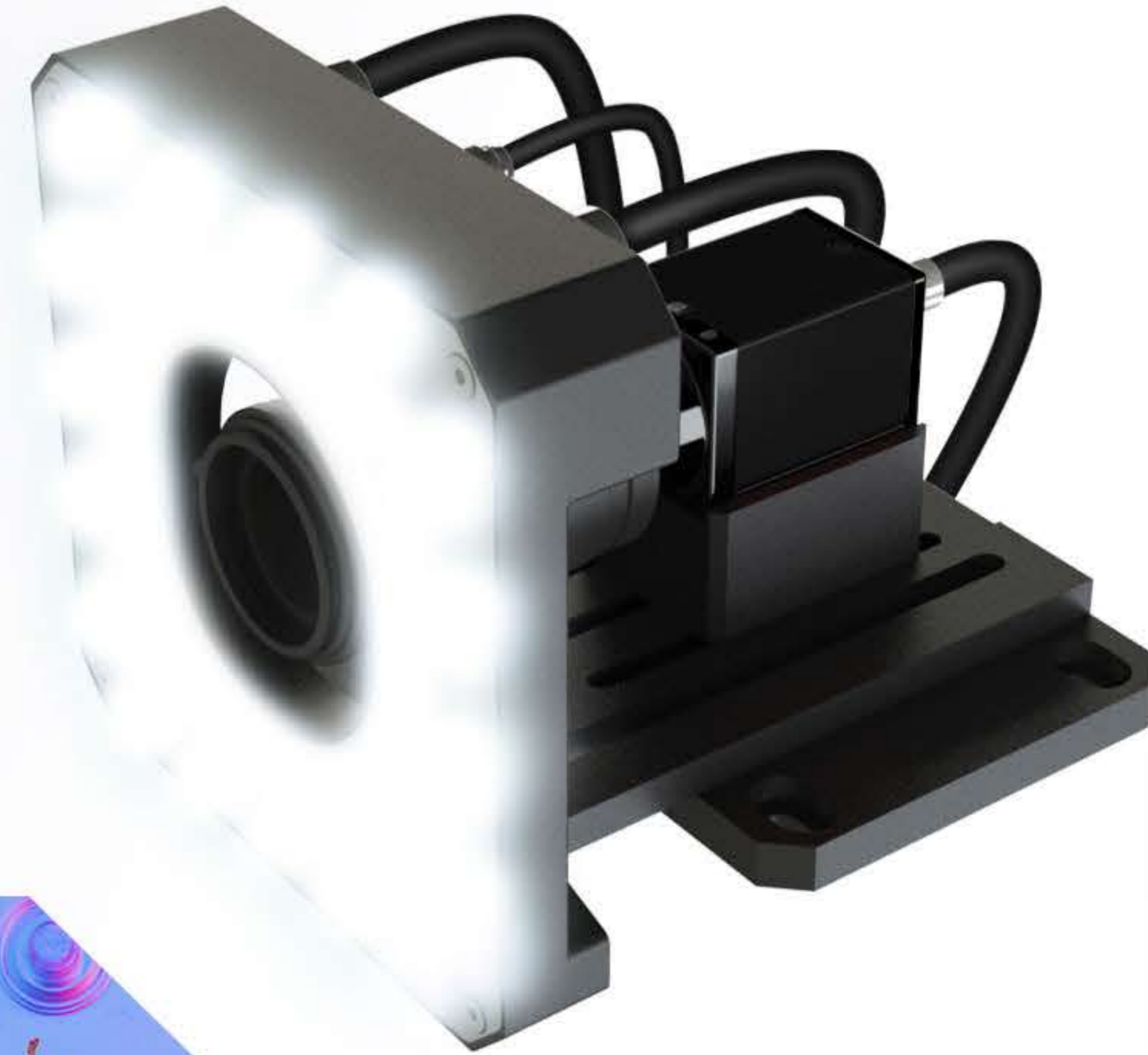


WE SEE MORE

Master All Surfaces. Find All Defects. Minimize False Alarms.




One Vision System to Meet All Your Needs

We manage all adjustments ourselves, aligning the UNITY machine vision system precisely with your specifications. Express your needs, and we take care of the rest, providing you with the ideal and complete vision system without the need for additional components.






UNITY, the in-line visual quality control system engineered to redefine machine vision.

Most systems have problems with:

-  Evaluation accuracy.
-  Imperfect part positioning.
-  Highly reflective surfaces.

UNITY is your solution to:

-  Master all surfaces.
-  Find all defects.
-  Minimize false alarms.

Whether reflective, matte, or anything in-between, our advanced system excels.

Resolution up to **25 MPix**

Equipped with a high-resolution camera to perfectly interpret every detail, even on the tiniest parts.

Detected defects **> 99.998 %**

Prepared to automatically detect numerous defects with exceptional accuracy on various surfaces.

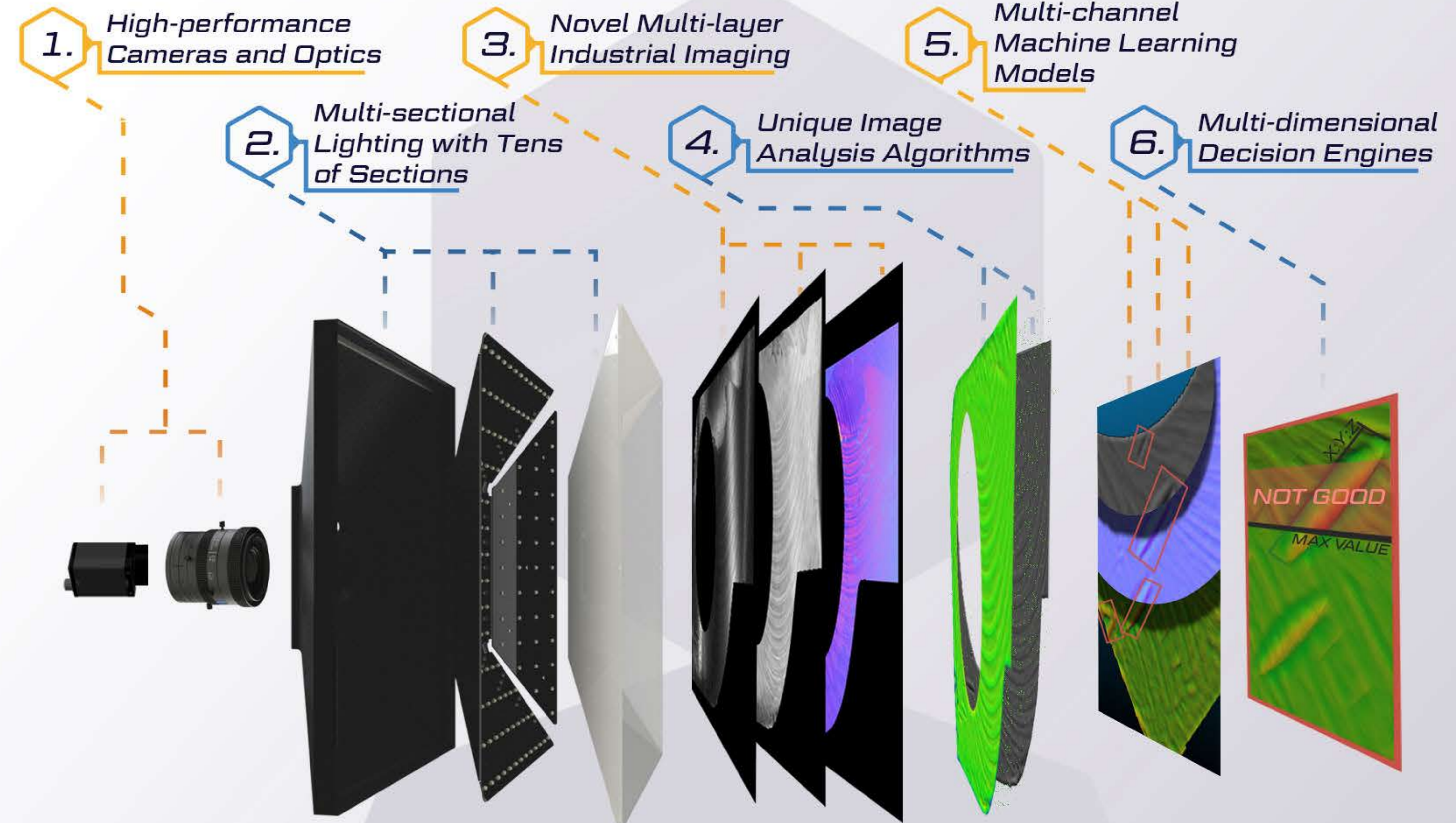
False alarm rate **< 1 %**

Smart decision engine guarantees a fast response while maintaining a low false alarm rate.

ALL-IN-ONE

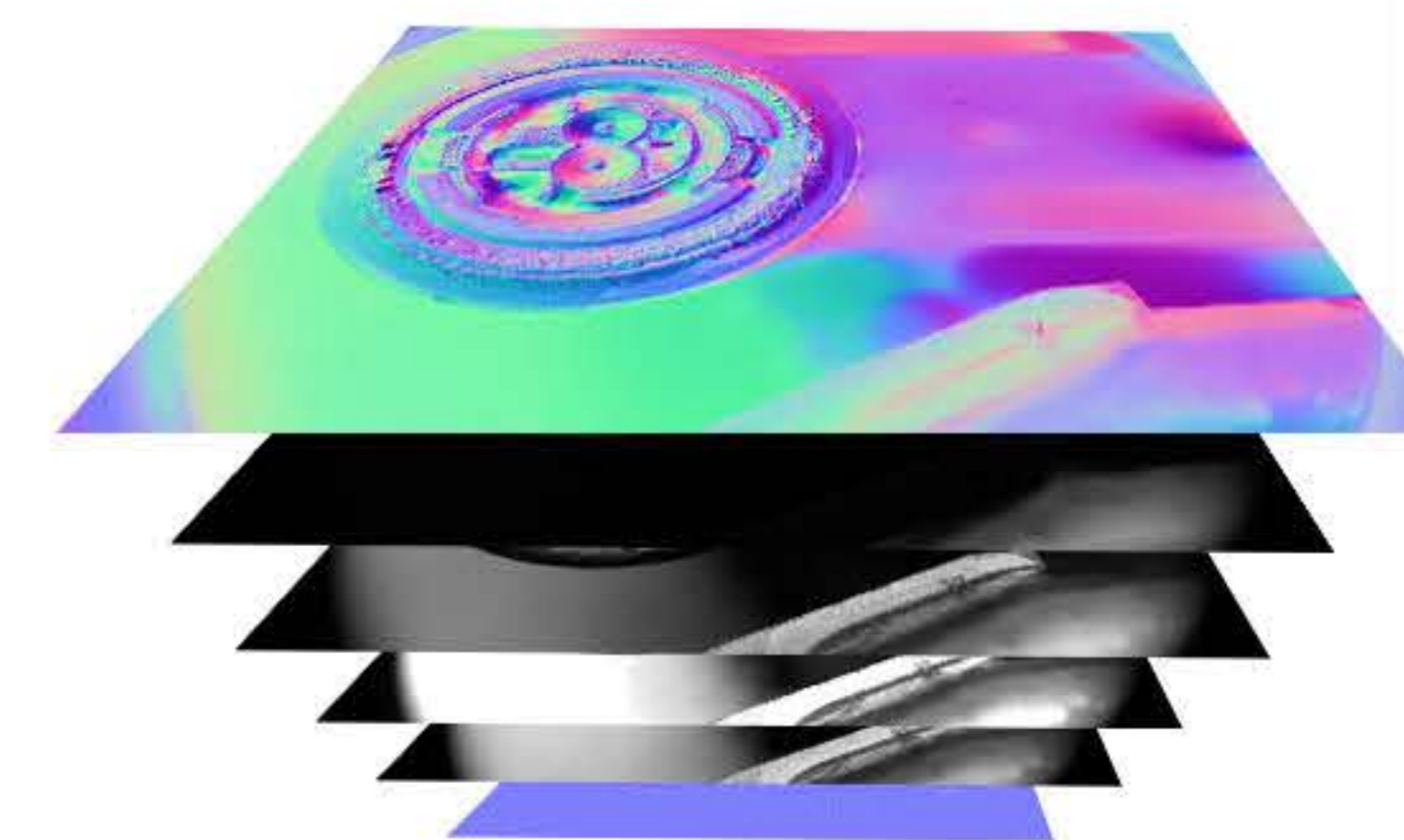
Works Perfectly Together Thanks to Perfectly Matching Components

UNITY Integrates Six Key Elements into One Coherent System



By creating multiple image layers, SANEZOO UNITY achieves unparalleled accuracy and minimizes false alarms, even on reflective surfaces.

UNITY Creates Multiple Image Layers For Each Zone

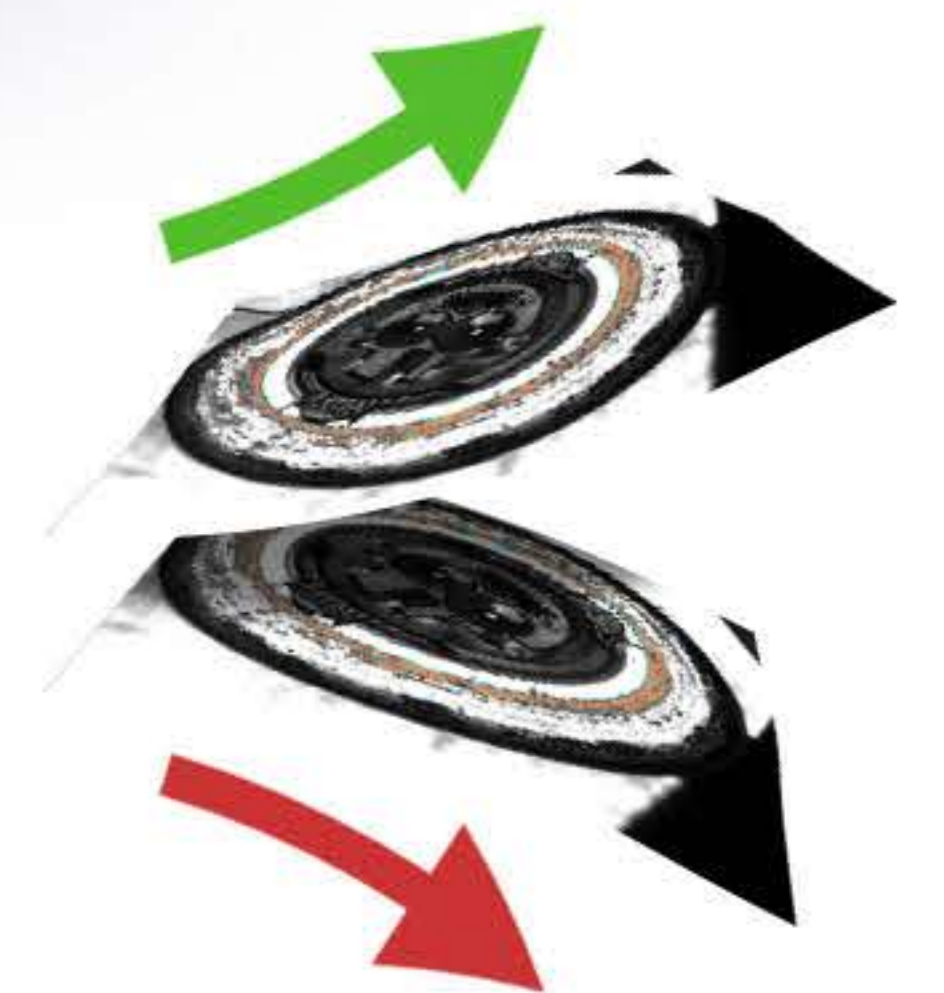


- 2D images without reflections
- Images with amplified imperfections
- 3D surface structures.

Simultaneously Analyzes All Findings and Potential Defects



Reliable OK/NG Conclusion



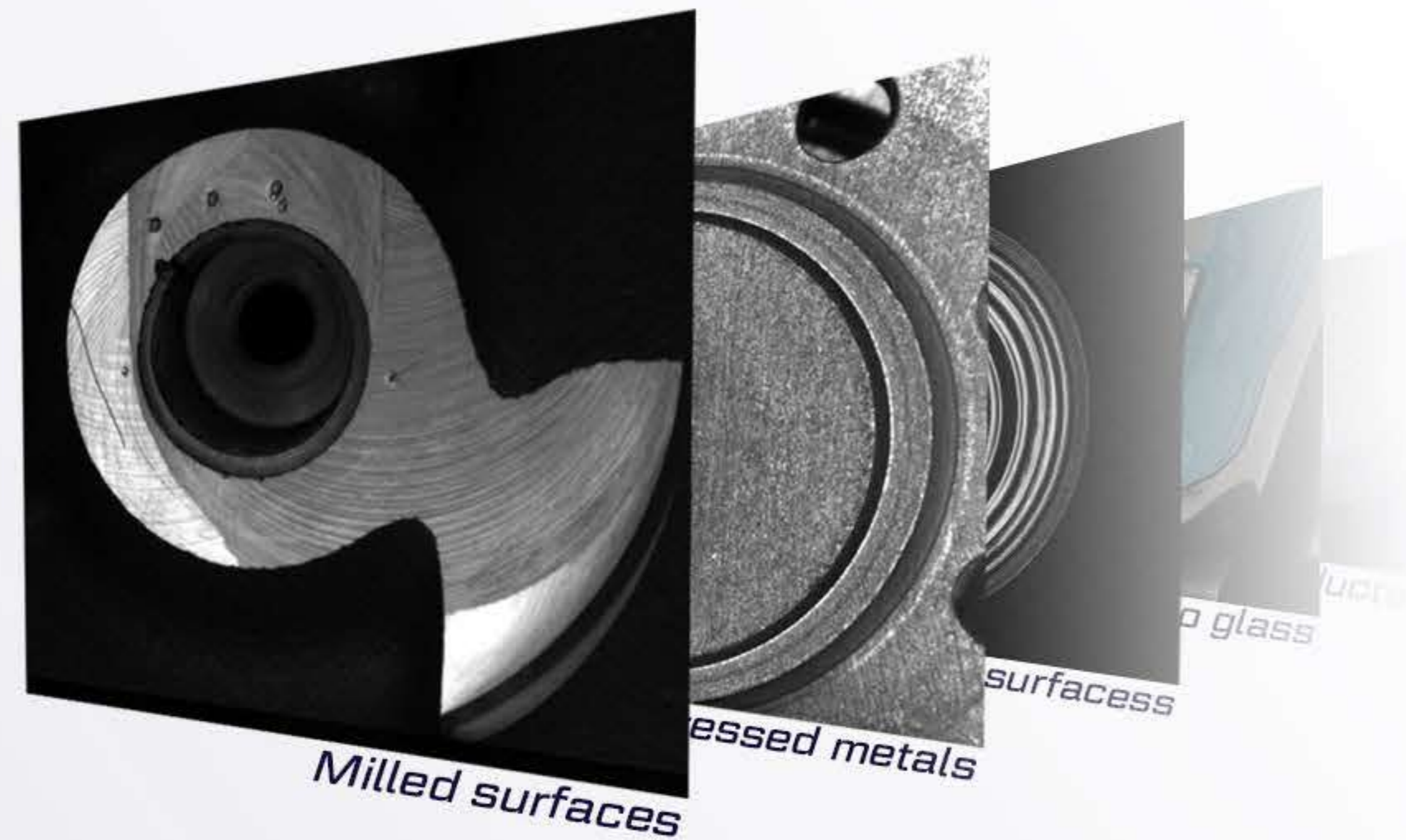
Not distracted by non-defects, marks, or other anomalies.

PLUG-AND-PLAY

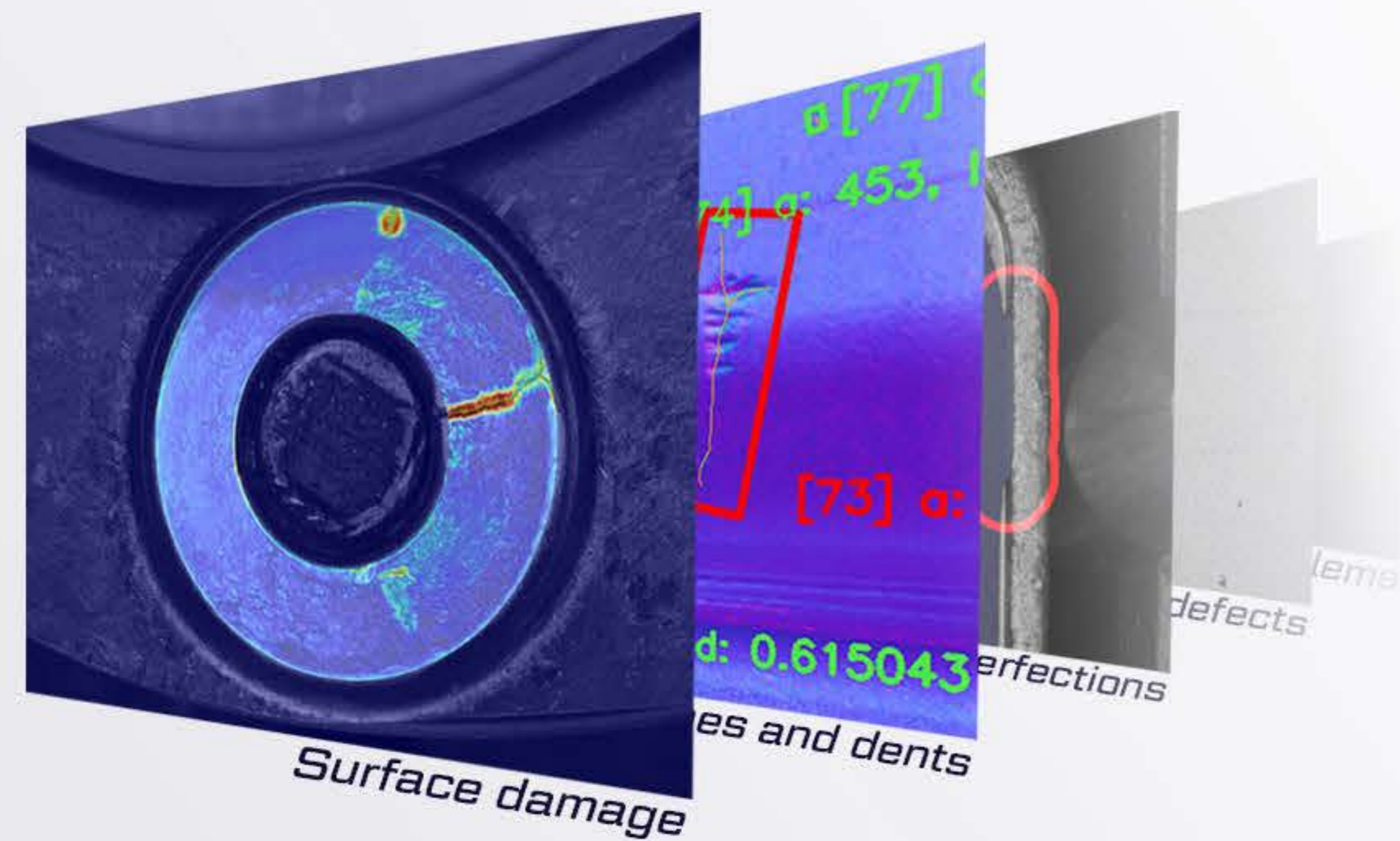
Enables Fast and Easy Setup for Any Integrator

 **SANEZOO UNITY**
is ready to deploy.

— Copes with Many Common Surface Types



— Automatically Recognizes Many Defect Types



— Various Machine Vision Applications

Fully prepared and capable of being used in a range of different tasks. SANEZOO UNITY has been developed, tested, and configured in a way that makes it versatile in the field of machine vision, such as quality control, object recognition, or automated inspections. It's prepared and adaptable for a variety of tasks without the need for extensive customization or development.



ADAPTIVE

AI & Machine Vision Without Lengthy Annotation and AI Training

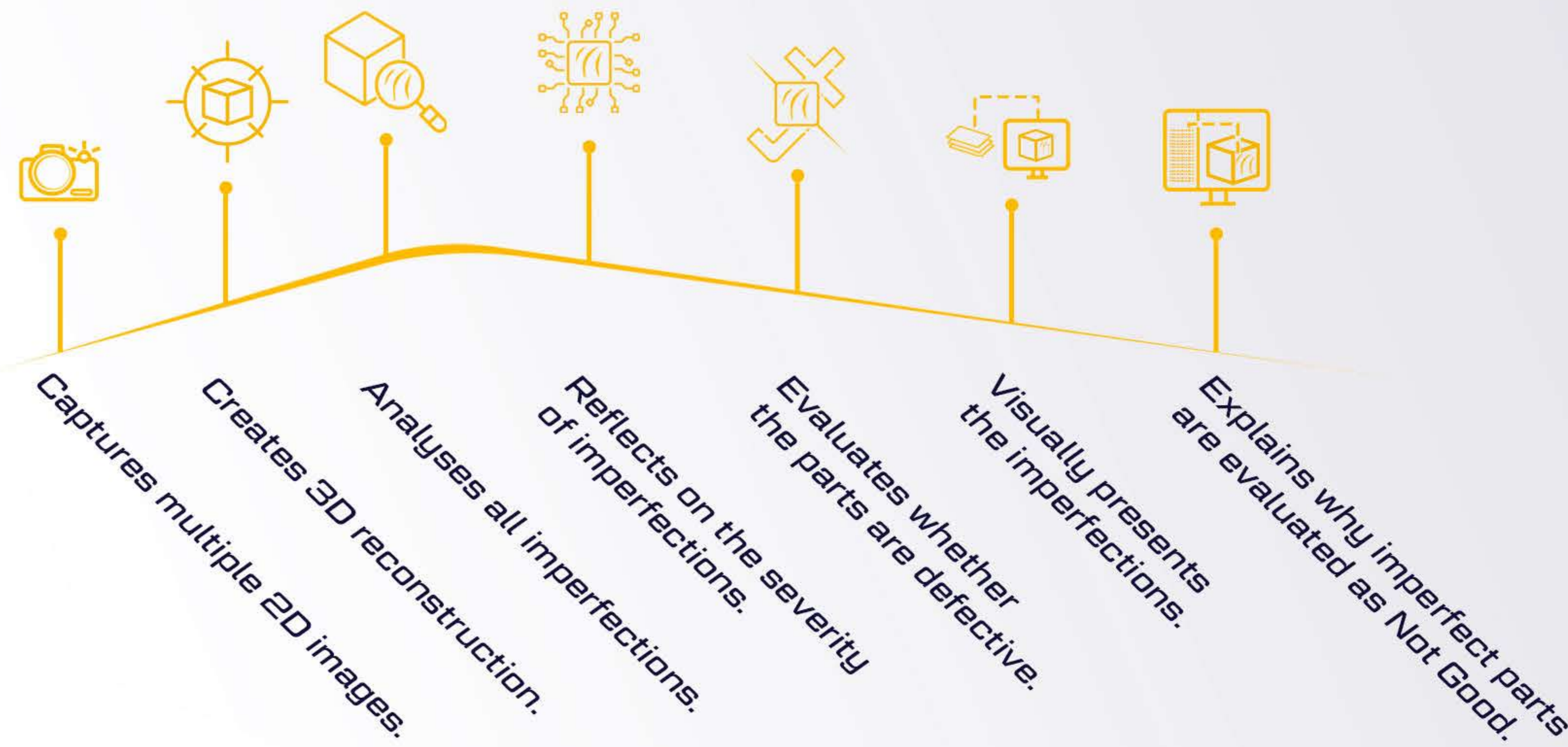
Fine tuned before product deployment.

Mastering many surface types.

Tailored to many applications.

Prepared for all possible defects.

Smart decision making process.



Integration comes with:

- Full application support.
- Pre-production validation.
- Application fine-tuning.



False alarm rate < 1 %

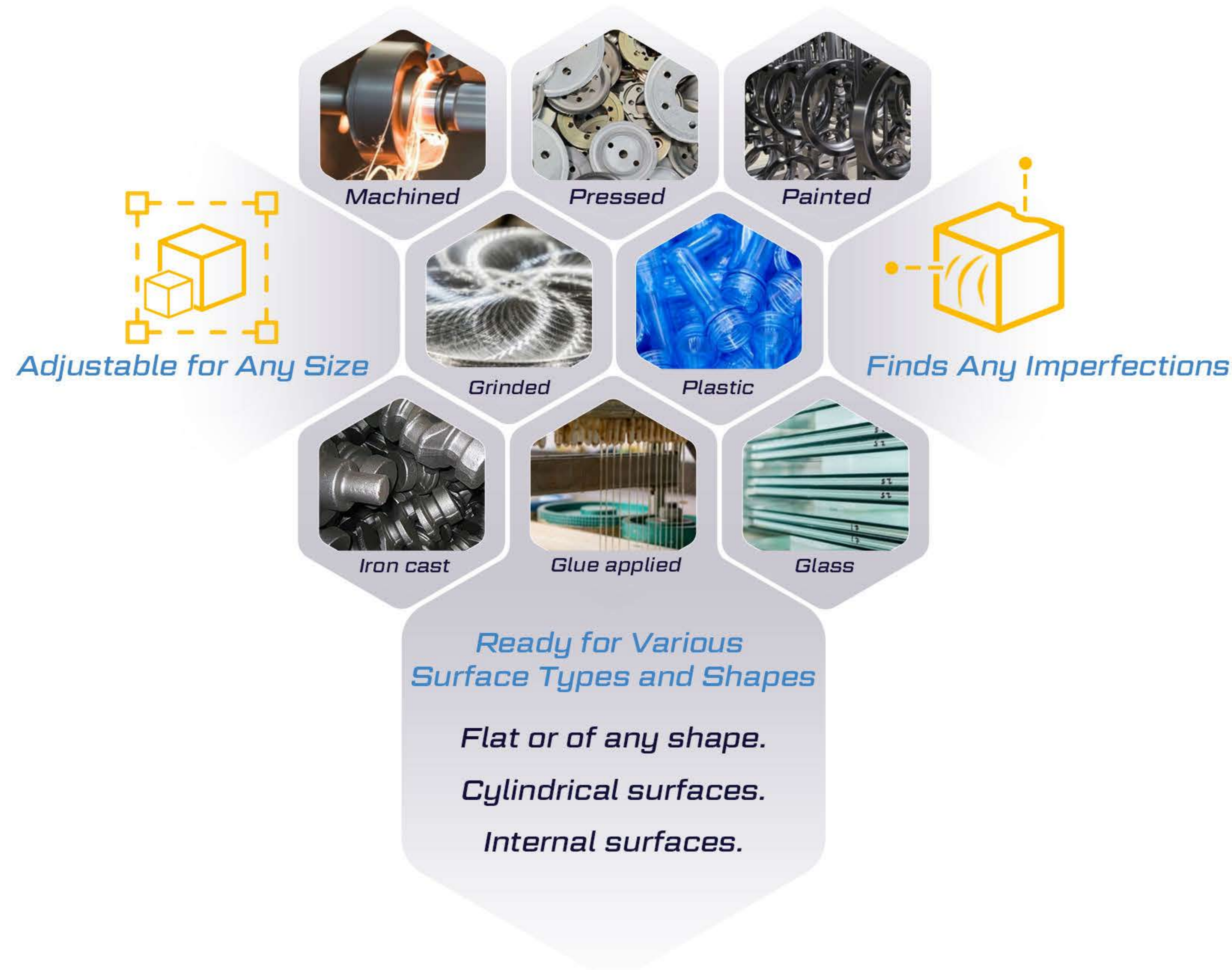
Regarding the primary issue with current visual quality control methods, 56% of manufacturing plant respondents highlighted false alarms, also known as pseudo-defects. These incidents involve mislabeling a good part as defective and vice versa.

ANY PART

Allows for Many Different Sizes and Surfaces

SANEZOO UNITY is a versatile solution for quality control on various surfaces, including shiny or matte materials, highly reflective surfaces like metal sheets, glass, and plastics, and it can detect imperfections of different shapes in random positions.

Suitable for Any Surface, Shiny or Matte

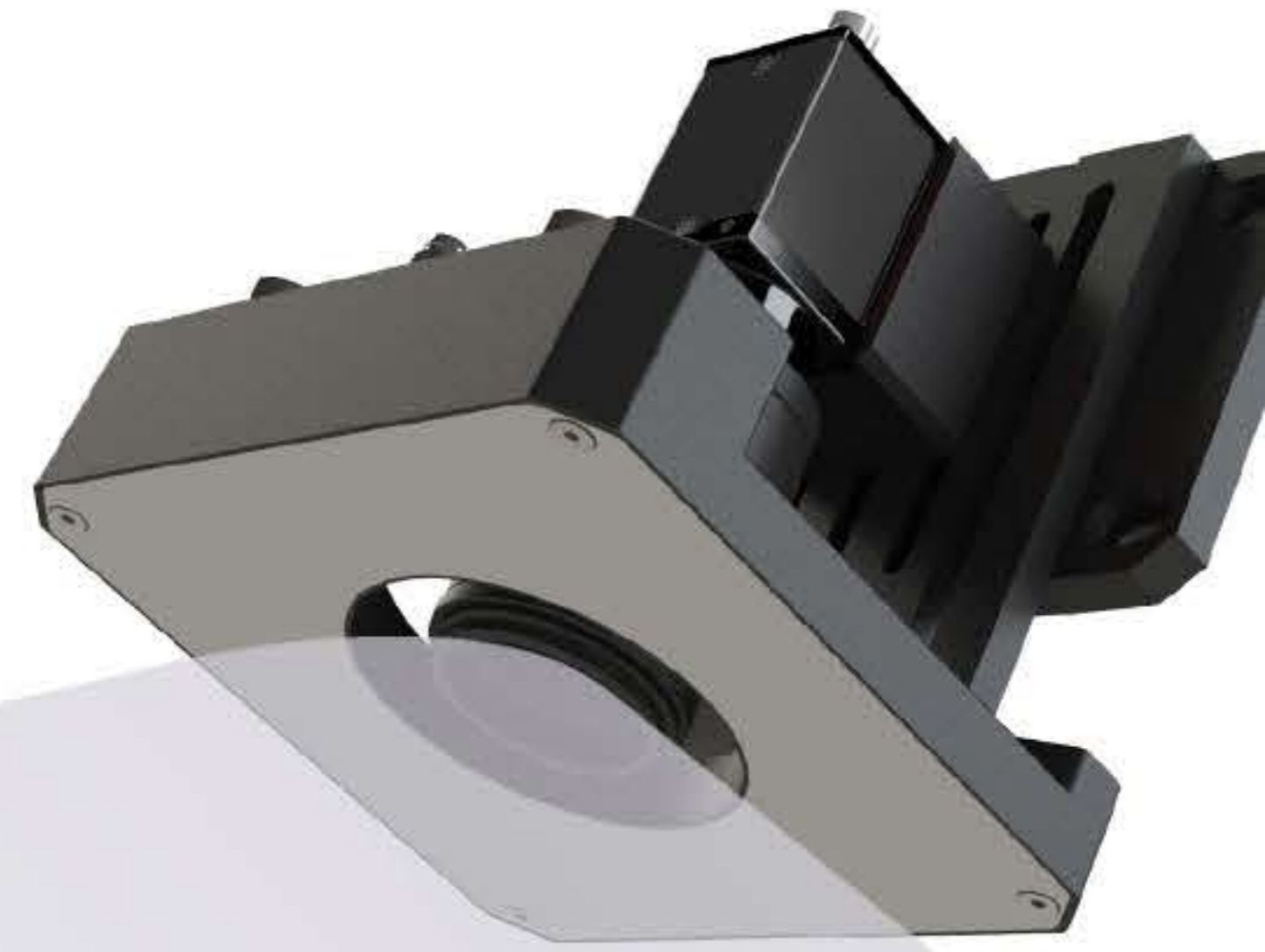


SANEZOO UNITY is adjustable for different sizes, from tiny pins to entire cars, and it accommodates various surface types and shapes, such as flat, cylindrical, and internal surfaces using borescopic vision. The adaptable technology and hardware designs of SANEZOO UNITY cater to a wide range of shapes and requirements.

MANY DEFECTS

SANEZOO UNITY is Already Trained for a Wide Variety of Defects

The SANEZOO UNITY system is pre-trained to efficiently identify and classify an extensive range of defects. This includes the precise detection and classification of minor imperfections such as scratches, dents and inclusions, as well as the identification of material issues like porosity and paint defects, ensuring comprehensive quality control.



Minor Imperfections and Surface Damage
scratches, dents, inclusions,...

Linear marks resulting from abrasion. Depressions or indentations. Foreign particles or contaminants embedded within the material.

Material Problems
porosity, warping,...

Presence of tiny voids or air pockets within the material, which can weaken its structure. Deformation or curvature in the material, often rendering it unfit for its intended purpose.

Paint Defects
bubbles, drops,...

Trapped air or moisture during the application, leading to raised circular deformities. Uneven paint distribution, creating irregular protrusions.

Robust and Ruggedized for Manufacturing

Resistant to imperfect positioning
by manipulators, robots
and automation mechanisms.

Resistant to ambient lighting.
No problem with changing light.

Resistant to vibrations.

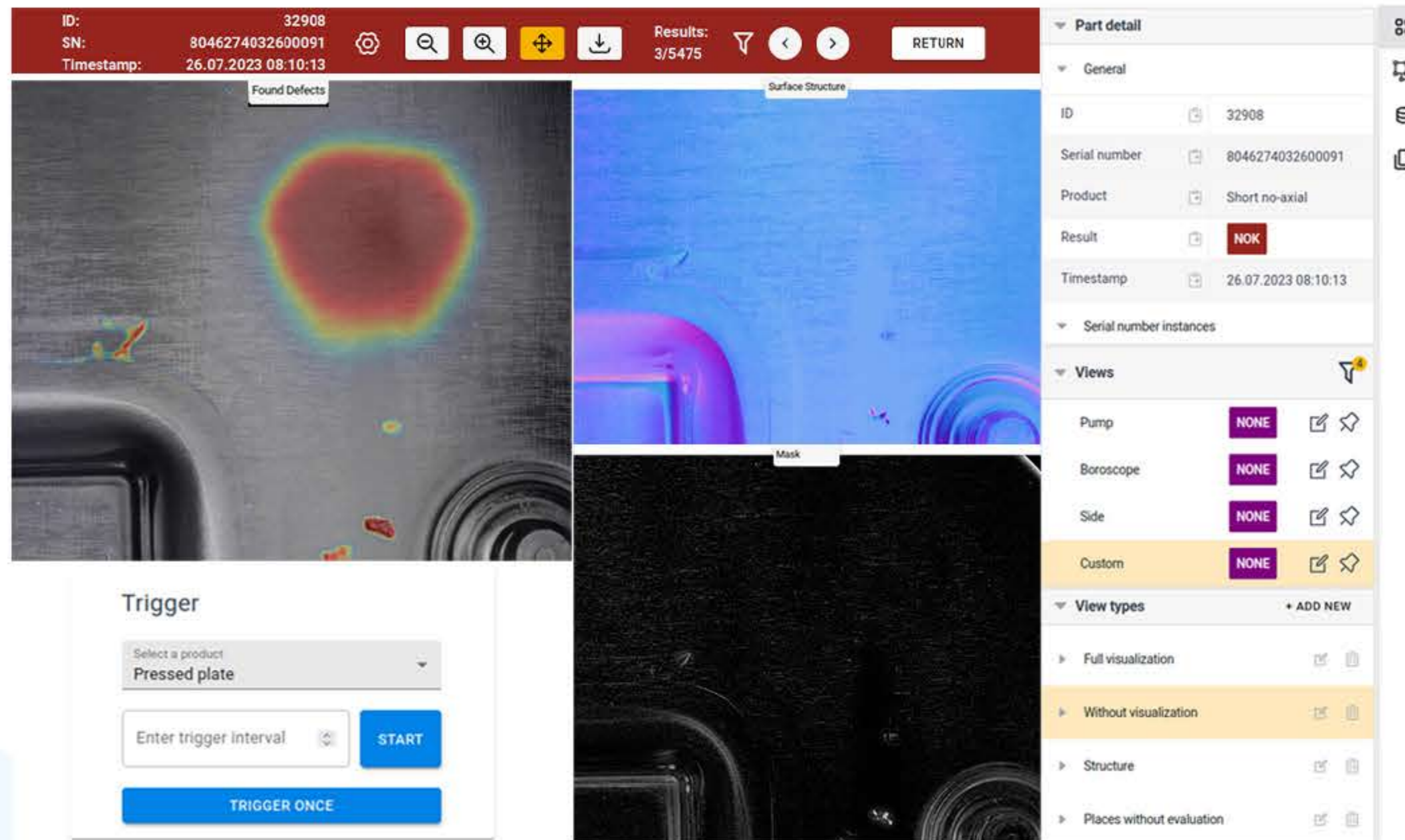
STUDIO FOR EASY SETUP

Define Custom Quality Evaluation Strictness and Decision Criteria

SANEZOO UNITY system allows for flexible and customizable quality evaluation criteria. It deduces these criteria based on limit and boundary specifications for different parts, or users can manually input cutoff criteria, such as defect size limits.

Setting Thresholds to Differentiate Critical Factors

The system's ability to distinguish between various factors can be achieved by setting specific thresholds for all relevant layers.



AUTOMATIC SYSTEM VALIDATION

Consistent MSA-Backed Validation Ensures Precise Quality Control

The SANEZOO validation tool relies on the robust measurement systems analysis (MSA) process to validate the accuracy, precision (including repeatability and reproducibility), stability, and linearity of the SANEZOO UNITY system's evaluation.

This comprehensive validation procedure guarantees that the system consistently delivers on its promise of precision and reliability in line with customer expectations.

1. Measurement System Analysis (MSA):

This step assesses the measurement equipment and methods involved in data collection. MSA determines the measurement system's accuracy, precision, linearity, and repeatability.

3. Data Collection:

During the validation process, data is collected using the validated measurement system. This data can relate to product quality, system performance, or other relevant factors.



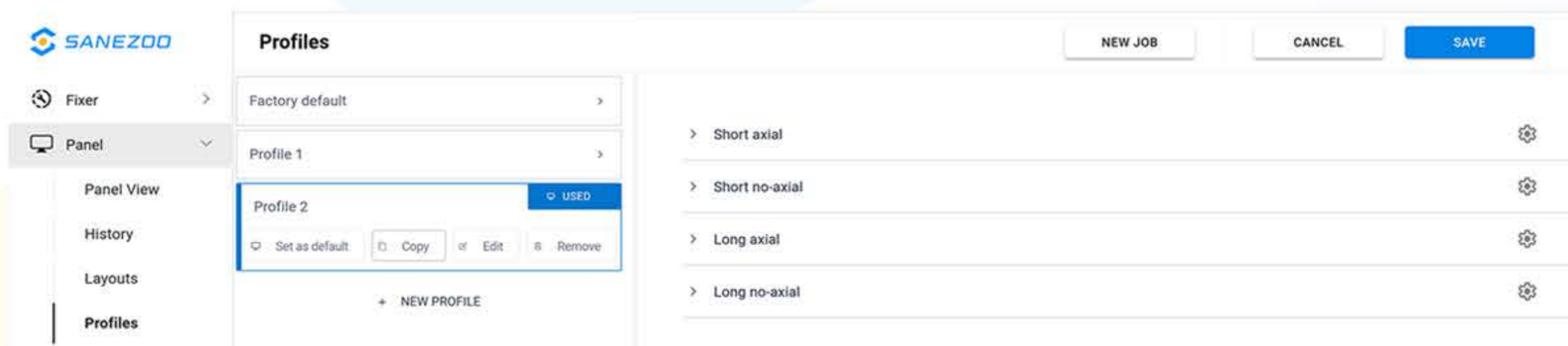
2. Validation Protocol Development:

Once the measurement system is deemed reliable through MSA, a validation protocol is created. This protocol outlines the specific criteria, procedures, and acceptance criteria for the validation process.

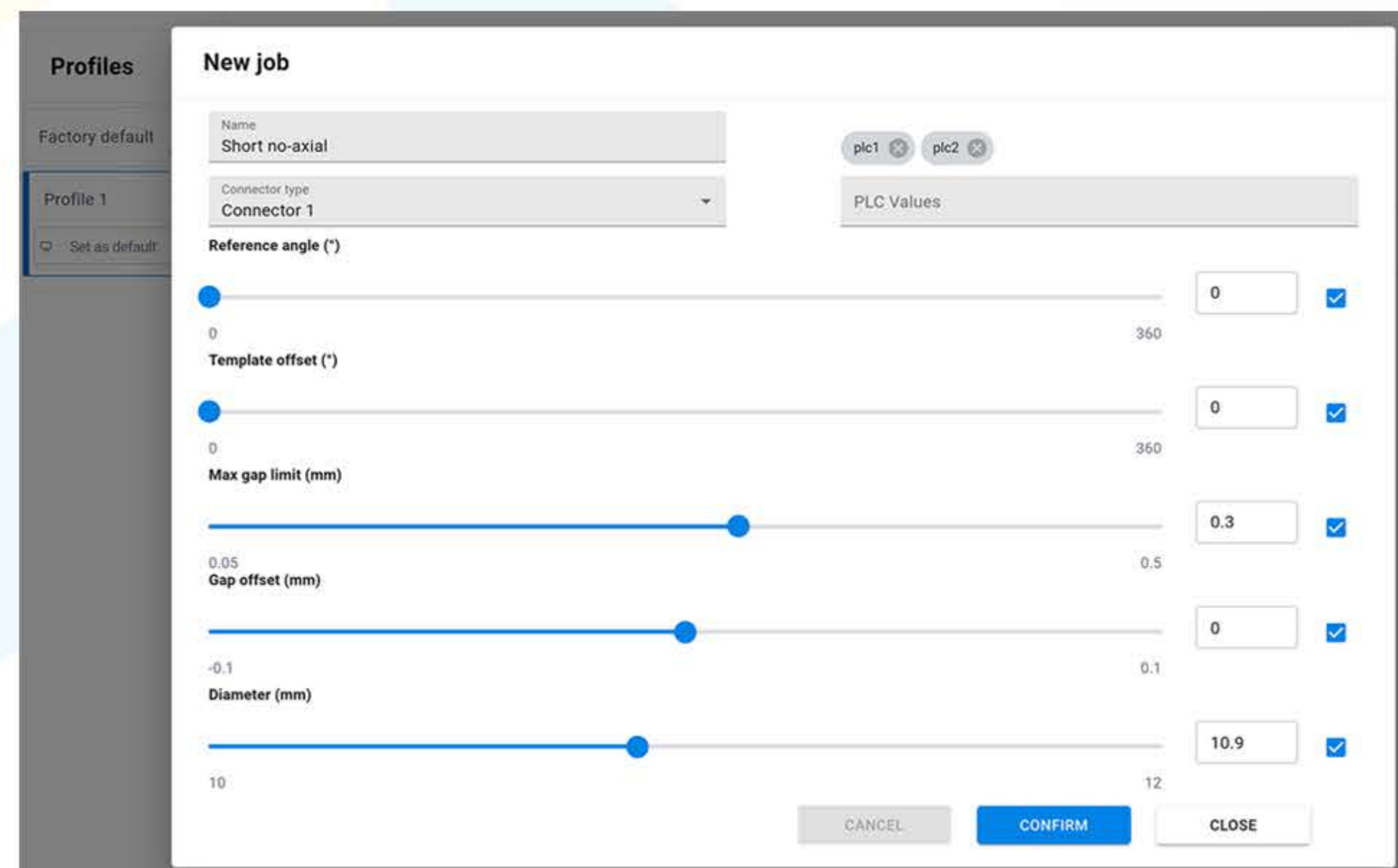
4. Data Analysis:

The collected data is then analyzed against the predetermined criteria to determine whether the system or process being validated meets the performance and quality standards.

Customizing Quality Control with Versatile Evaluation Criteria



Customers have the autonomy to define the strictness of quality evaluation and decision criteria by either entering numerical values or specifying categories like 'OK,' 'NG' (Not Good), and border defects, offering a versatile and user-friendly approach to quality control customization.



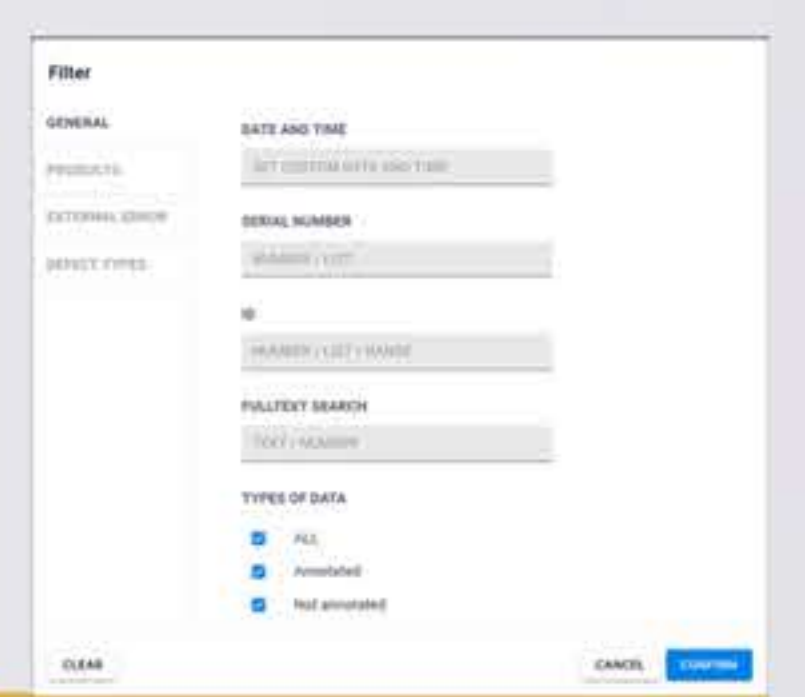
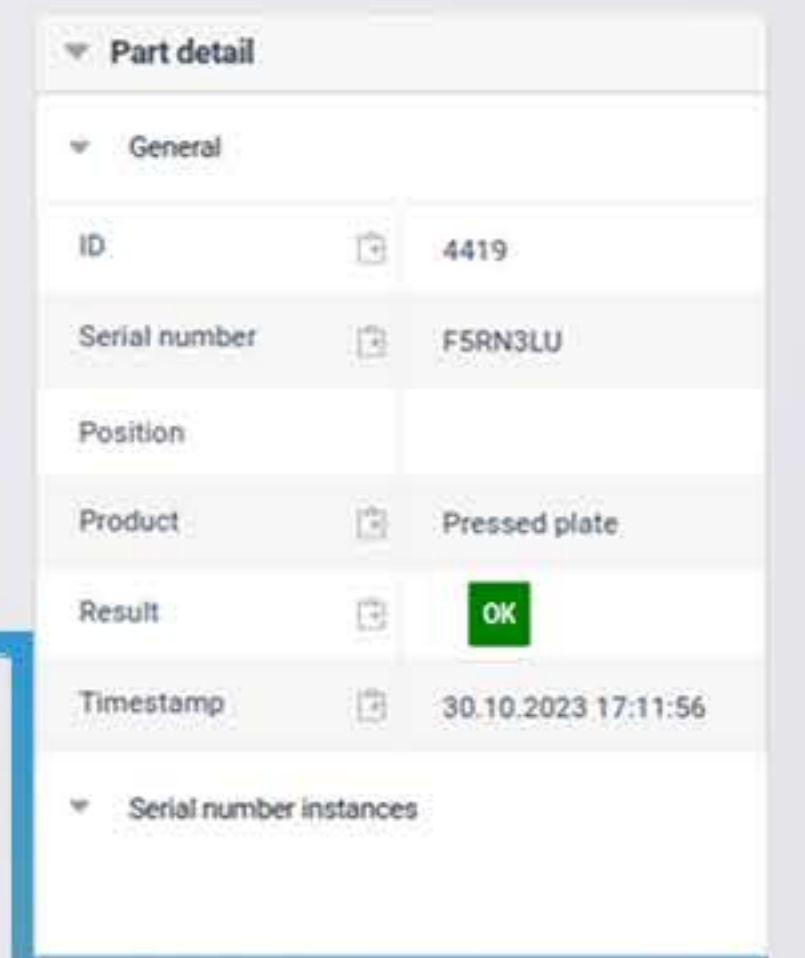
Automatic Defect Catalog Export

ID	Serial number	Timestamp	Product	Result	Actions
4434	YHDZWN0	31.10.2023 11:08:04	Pressed plate	OK	Detail, Layout
4433	H0FPZAE	31.10.2023 11:06:15	Pressed plate	NG	Detail, Layout
4432	YNPG19	31.10.2023 10:40:06	Pressed plate	OK	Detail, Layout
4431	1Q3M4BP	31.10.2023 10:39:24	Pressed plate	OK	Detail, Layout
4430	4HM67AT	31.10.2023 10:38:01	Pressed plate	OK	Detail, Layout
4429	13LF002	31.10.2023 10:36:46	Pressed plate	OK	Detail, Layout
4428	TGKDQ4U	31.10.2023 10:36:31	Pressed plate	OK	Detail, Layout
4427	H0PSEAY	31.10.2023 10:34:55	Pressed plate	OK	Detail, Layout
4426	08NSHR9	31.10.2023 10:34:18	Pressed plate	NG	Detail, Layout
4425	L04ZBR5	31.10.2023 09:56:41	Pressed plate	OK	Detail, Layout
4424	S2OCHY7	31.10.2023 09:56:13	Pressed plate	NG	Detail, Layout
4423	0205R6Z	31.10.2023 09:55:56	Pressed plate	OK	Detail, Layout
4422	Y1WP2HB	31.10.2023 09:54:37	Pressed plate	OK	Detail, Layout
4421	Z90B166	31.10.2023 09:54:15	Pressed plate	OK	Detail, Layout
4420	V99ZCES	30.10.2023 17:12:15	Pressed plate	OK	Detail, Layout
4419	FSRN3LU	30.10.2023 17:11:56	Pressed plate	OK	Detail, Layout
4418	J6H74NN	30.10.2023 17:11:17	Pressed plate	OK	Detail, Layout
4417	6EMRACA	30.10.2023 17:10:46	Pressed plate	OK	Detail, Layout
4416	Y1AAMAS	30.10.2023 17:09:51	Pressed plate	NG	Detail, Layout
4415	3NYHMNM	30.10.2023 17:05:01	Pressed plate	OK	Detail, Layout
4414	3MLPOLV	30.10.2023 16:54:19	Pressed plate	OK	Detail, Layout

Real customer parts serve as a reference for marking defects, ensuring accuracy and relevance.

The SANEZOO UNITY system simplifies defect catalog management by automatically exporting a comprehensive catalog that includes all defect categories.

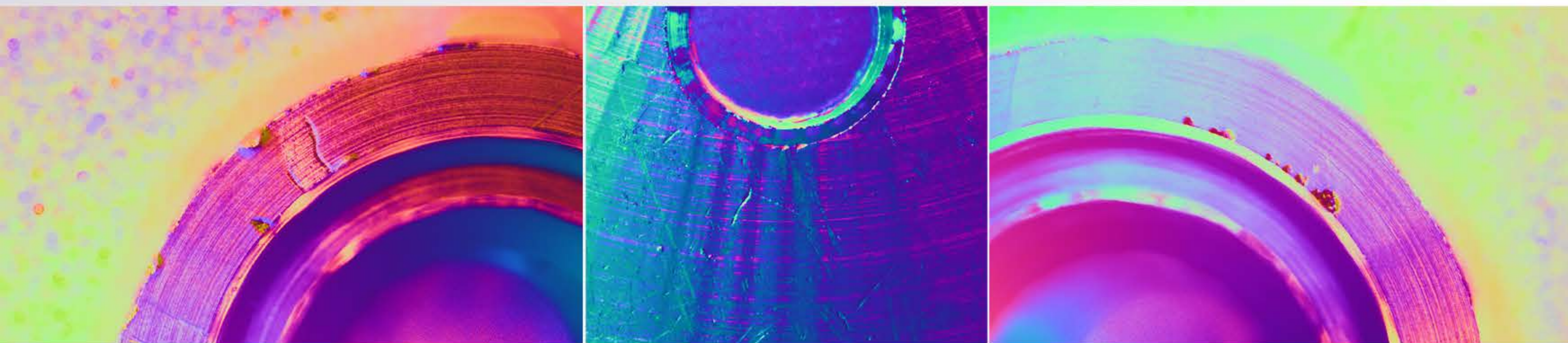
The system's automation capabilities further extend to the seamless creation of a defect catalog, streamlining the quality control process for maximum efficiency and precision.



MILLED SURFACE INSPECTION

Easily Distinguishes Milling Marks from Surface Defects

Inspecting milled surfaces presents a critical quality control challenge in manufacturing. The intricacies of this process make it challenging to ensure precision and adherence to specifications.



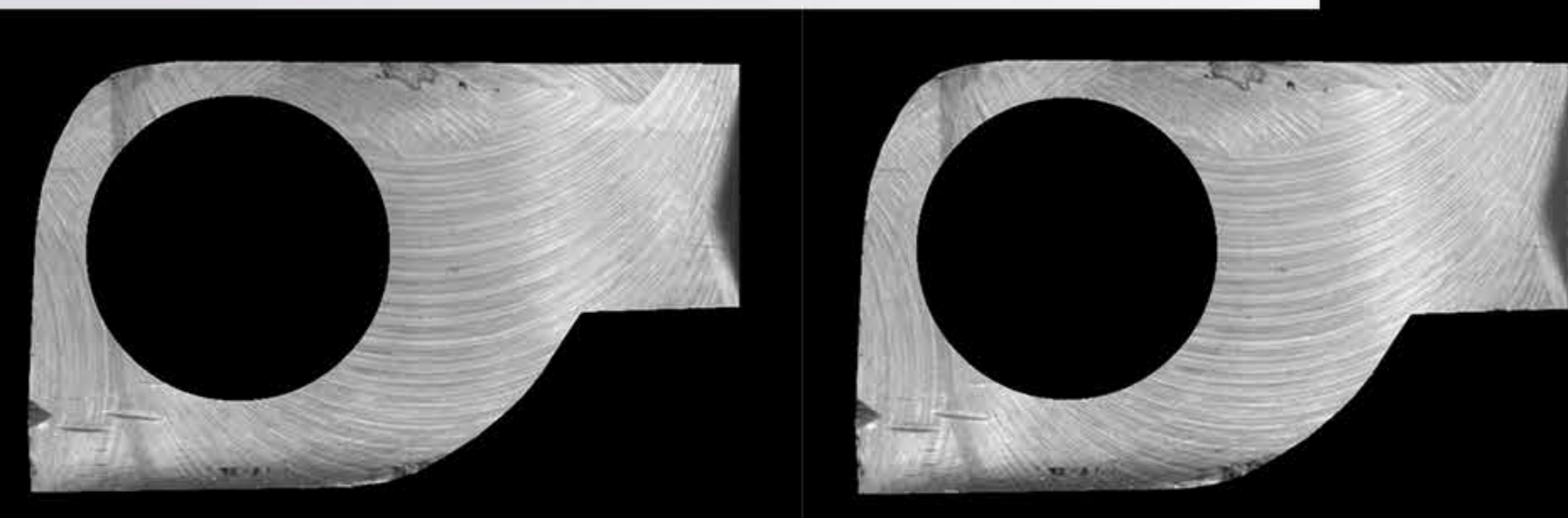
Enhancing Inspection Precision with Multi-Layer Analysis

This technique involves capturing multiple layers of images of milled components from various angles and lighting conditions. Each layer provides a distinct perspective of the part's surface. These images are then subjected to in-depth analysis, including 2D and 3D examination.

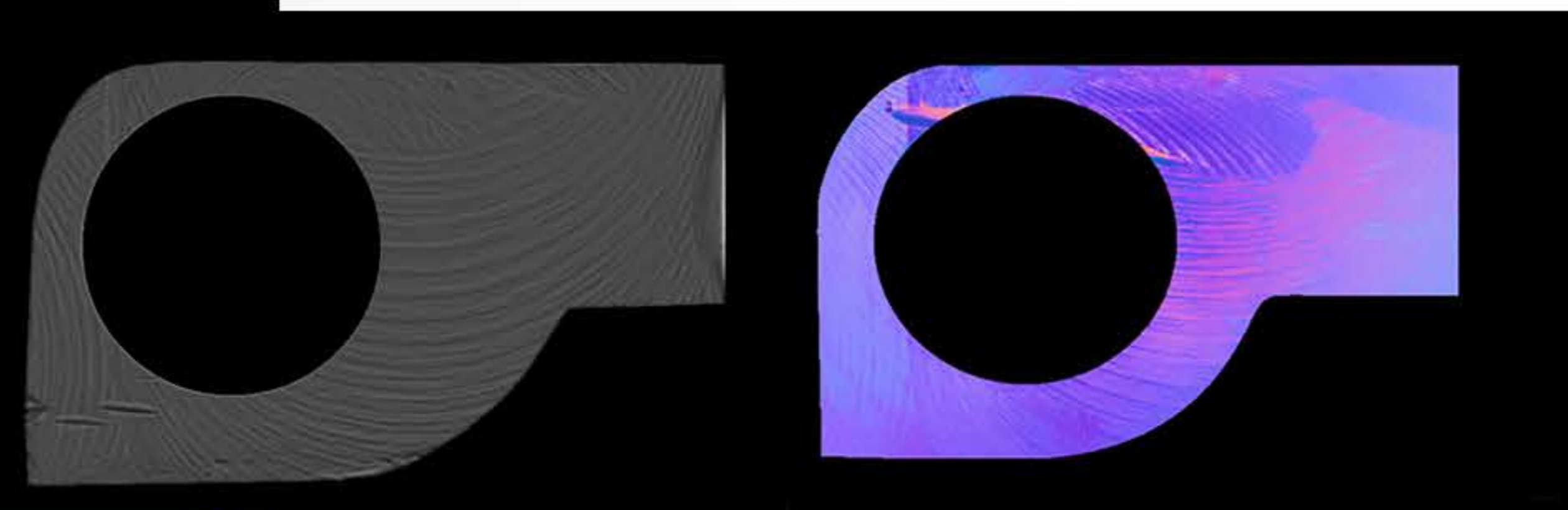
Creates raw input images with different lighting settings.



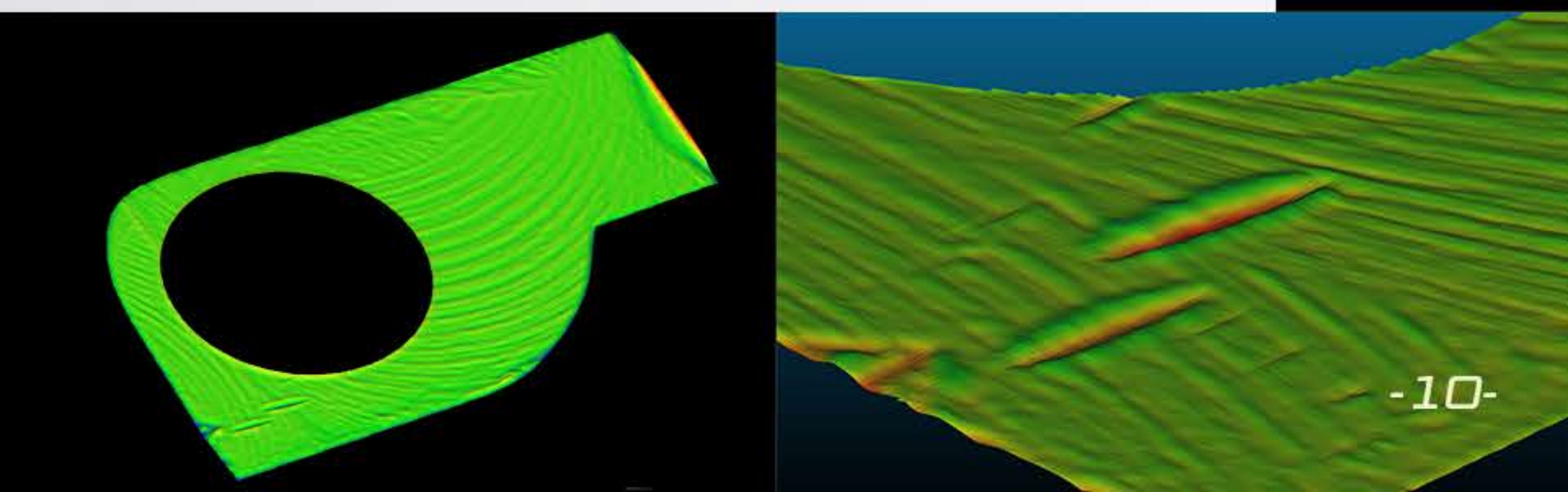
Enhances the quality of input images to remove glare and light differences.



Gains a map of the surface structure.



Re-builds the surface of your part in 3D to precisely evaluate the imperfections.



Milled Surface Defect Detection: Possibilities and Process

Surface Roughness:

Uneven or rough surface finish after milling.

Chatter Marks:

Periodic patterns or grooves on the milled surface due to vibration or tool instability.

Tool Marks:

Marks left by the milling tool on the surface.

Scalloping:

Wavy or scalloped surface texture.

Edge Burrs:

Small metal flakes or protrusions along the milled edge.

Undercuts:

Over-milling causing indentations or recesses in the workpiece.

Milling marks often exhibit intricate patterns that may resemble surface irregularities, making it difficult to distinguish them from actual defects. It is essential to capture high-resolution images of the components, utilizing proper lighting, creating multiple layers of photos, and subjecting them to 2D and 3D analysis.

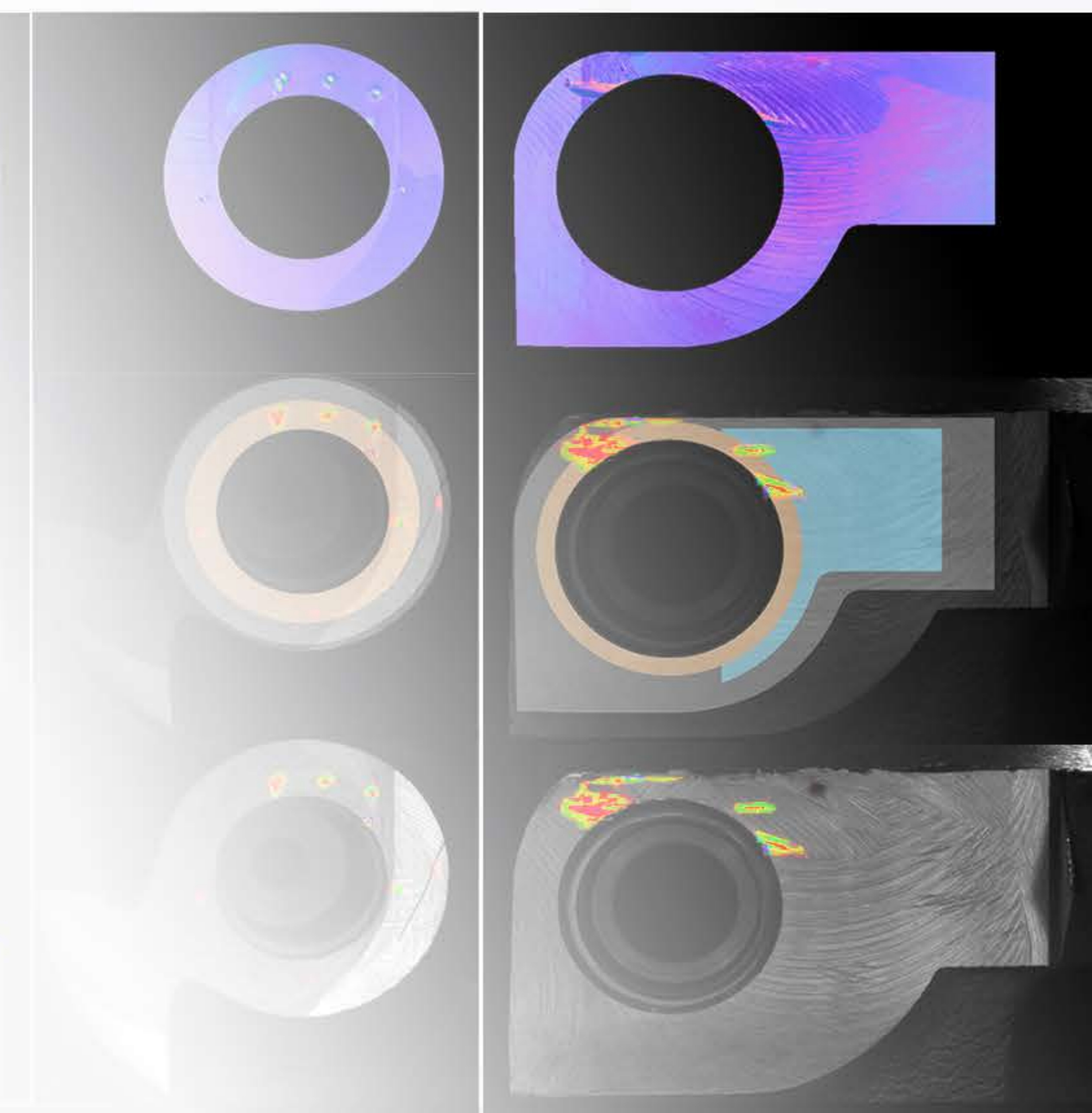
This approach distinguishes machining marks from defects like dents, scratches, edge burrs, and undercuts by varying lighting and creating a 3D surface representation for meticulous scrutiny.

This advanced analysis helps ensure that genuine defects are accurately identified, while false alarms stemming from machining marks are minimized, contributing to a more reliable and efficient quality control process in manufacturing.

Influence of the Process

Multi-layer analysis enables a comprehensive understanding of the part's geometry, aiding in the accurate identification of defects and their precise location on the component.

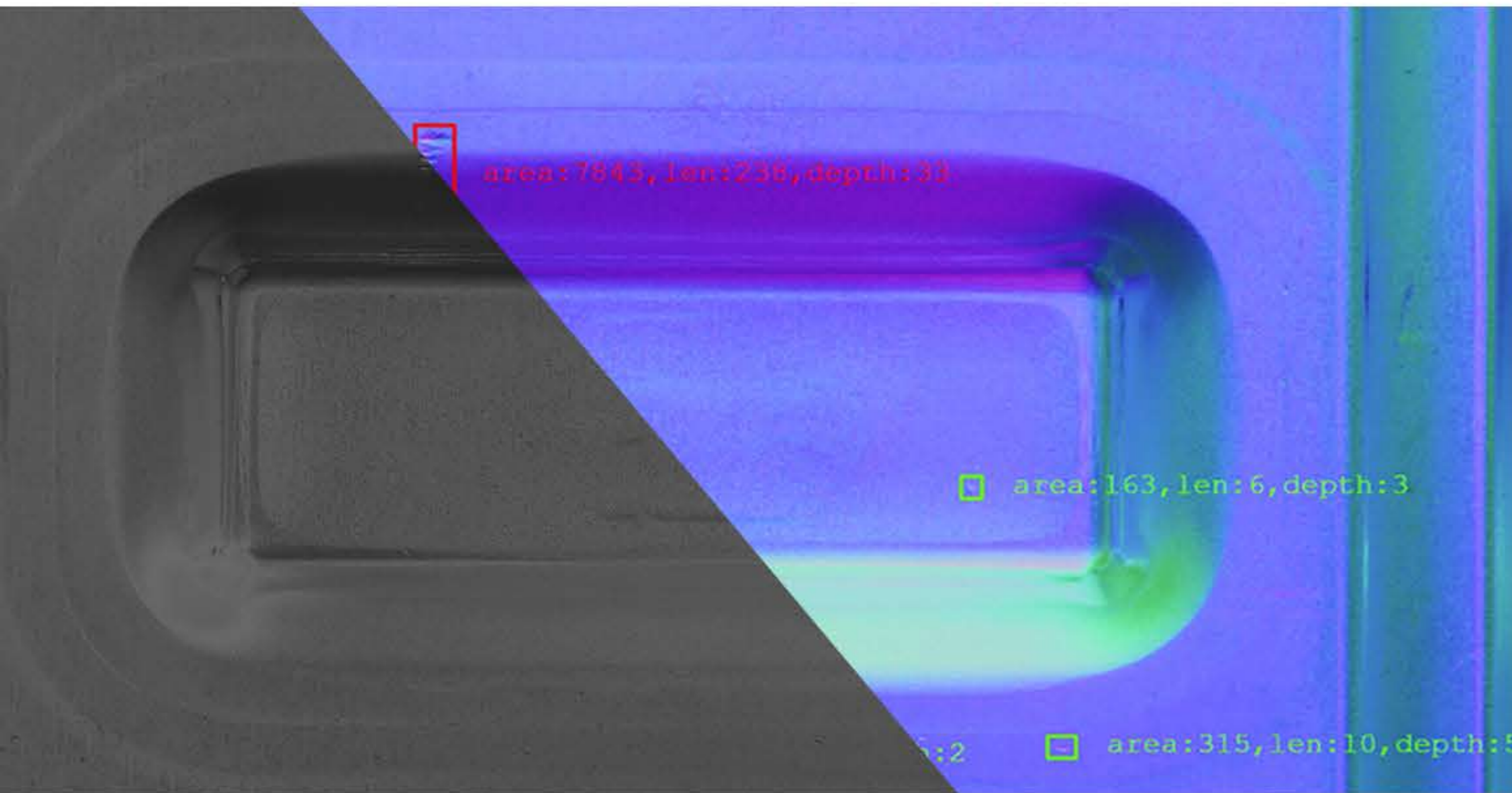
This contributes to a more reliable and efficient quality control process in manufacturing, ensuring that only parts meeting stringent quality standards are delivered to customers.



PRESSED METAL INSPECTION

Solution for Complex and Shiny Pressed Metal Components

The intricacies of pressed metal parts, which often feature complex shapes and fine details, pose challenges in terms of consistent quality control.

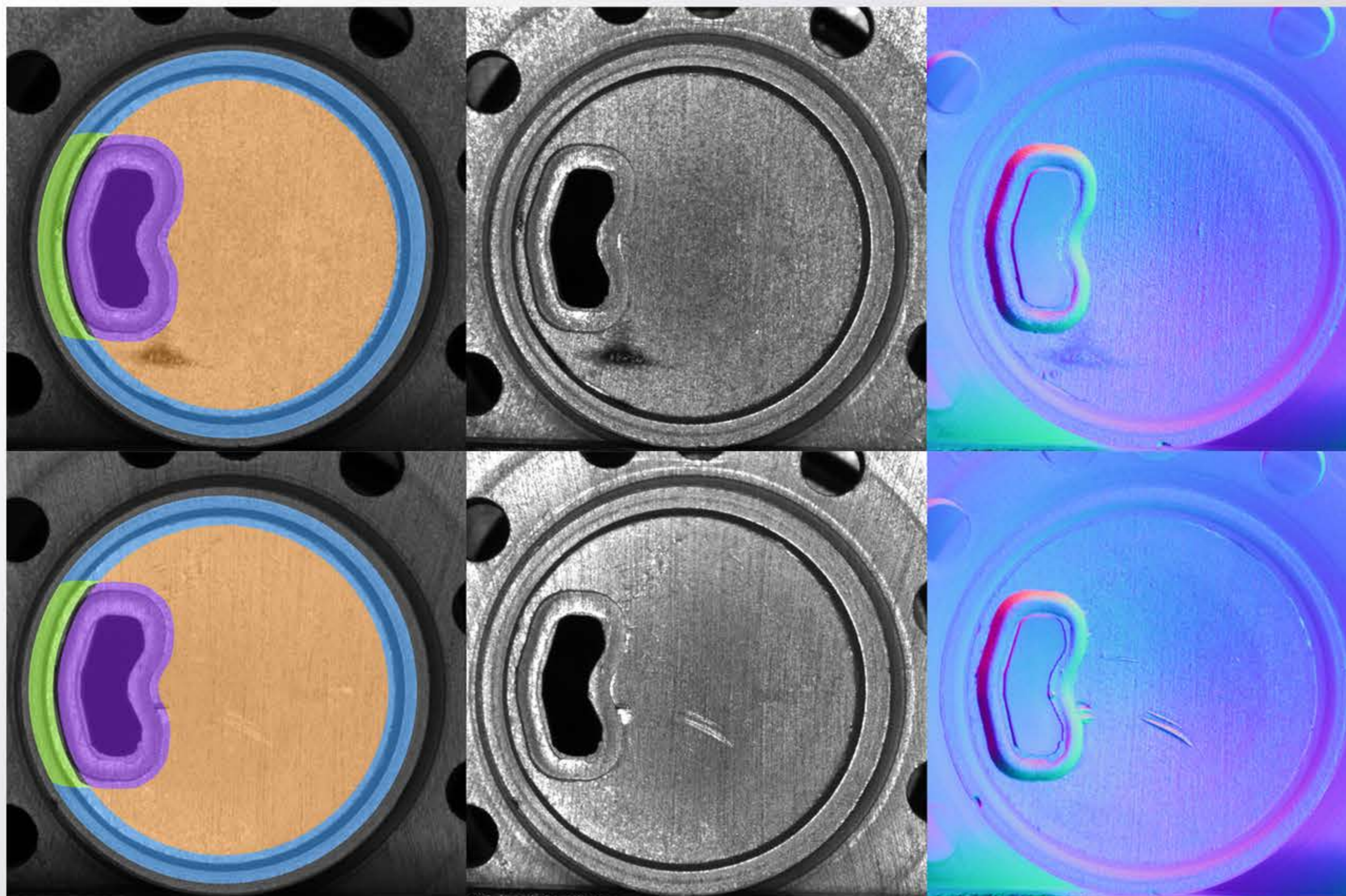


Sanezoo UNITY employs cutting-edge imaging technology and algorithms to identify a range of defects that might otherwise go unnoticed. Whether it's imperfections like scratches, dents, inclusions, or more subtle issues, SANEZOO UNITY ensures that even the smallest defects are pinpointed with exceptional precision.

3D Surface Analysis for Precise Inspection of Pressed Metals

When inspecting pressed metals, it is important not only to look for surface imperfections but also to accurately consider the desired size and shape of the selected part due to possible warping.

Using 3D surface analysis, we go beyond traditional inspection, creating a detailed three-dimensional representation of the metal part's surface to identify even the tiniest defects.



Pressed Metal Defect Detection: Possibilities and Process

- Scratches:**
Linear marks on the metal surface caused by abrasive contact.
 - Dents:**
Depressions or small indentations in the metal surface.
 - Dimensional Inaccuracy:**
Parts not meeting specified dimensions or having deviations.
 - Surface Contamination:**
Foreign particles or substances adhering to the metal surface.
 - Polishing Defects:**
Irregularities or uneven polishing on the surface.
- Detecting defects on a shiny pressed metal part often involves capturing multiple layers of photos. This approach allows for comprehensive defect inspection by revealing subtle irregularities that may be obscured in a single image due to reflections and glare.
- By combining and analyzing these different layers of photos, quality control processes can effectively identify imperfections like scratches, dents, or surface contamination.
- This method enhances the precision and reliability of defect detection on shiny pressed metal surfaces, ensuring that the final product meets stringent quality standards.

Examples of defects detected on pressed metal parts.

Scratches



Dents



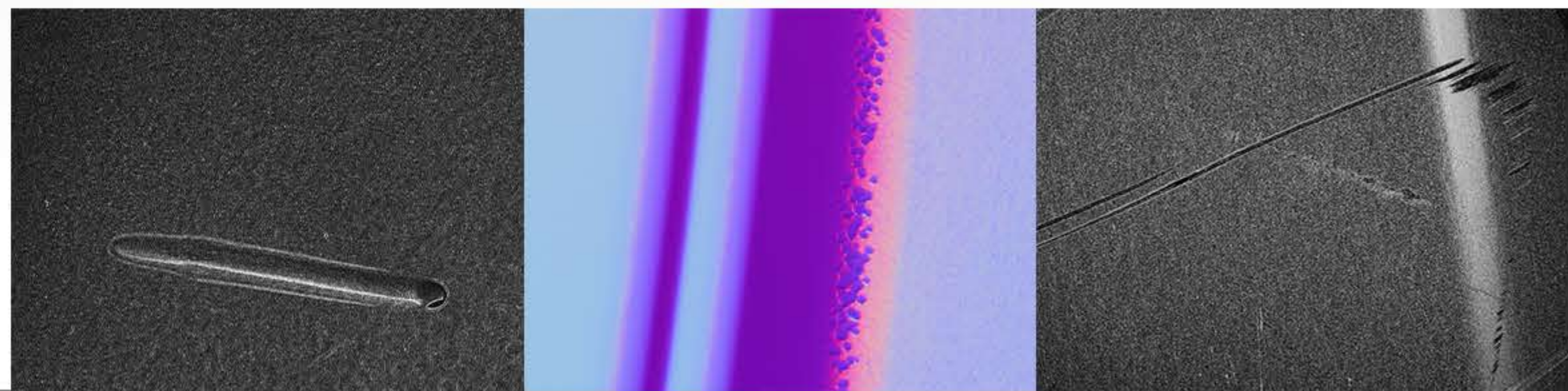
PAINT & COATING INSPECTION

*Different Colors. Metallic or Matte.
Reliably Identifies All Common Defects.*

Inspections of painted, wet, or powder-coated materials are critical to guaranteeing the final product's quality, appearance, and performance. Product inspection is complex due to coating concealing defects, variations in coating quality, and the need for specialized inspection methods. Environmental factors can also impact results, making precision and adaptability crucial.

Visual Inspection

This is the most common method for inspecting painted materials. SANEZOO UNITY visually examines the surface for defects like scratches, bubbles, uneven coverage, streaks, runs, or imperfections in the coating.



Surface Contamination

SANEZOO UNITY looks for contaminants on the surface, such as dust, dirt, or other foreign particles, which can affect the quality of the coating.

Surface Defect Detection

SANEZOO UNITY can identify common defects such as orange peel, blistering, sagging, or dry spray. The system uses advanced imaging technology and algorithms to detect defects that may be hard to spot with the human eye.



Examples of other possible imperfections.



Uneven Coverage Grinding Scratches Paint peeling Smudges Water drops

Coated Product Defect Detection: Possibilities and Process

Blisters:

Raised, bubble-like deformities on the coating surface caused by trapped air or moisture.

Color Variations:

Inconsistent or uneven color across the coated surface.

Cracking or Flaking:

Fine or coarse cracks or paint layers peeling away from the substrate.

Orange Peel:

Surface texture resembling the texture of an orange peel, caused by improper paint application.

Sagging or Dripping:

Runs, sags, or drips in the paint due to excessive application.

Fish Eyes:

Small craters or circular imperfections in the coating caused by contaminants.

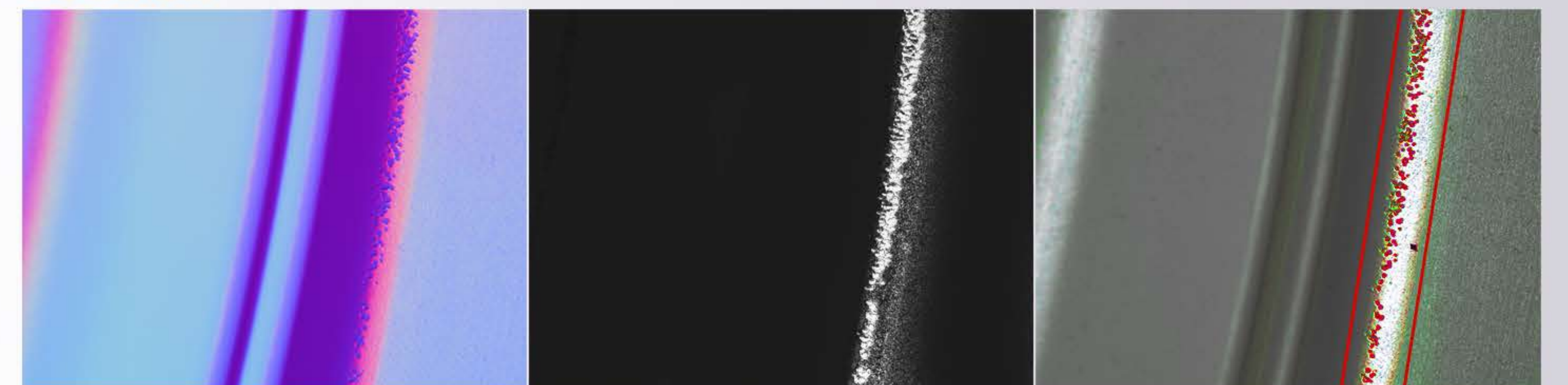
Detecting defects on differently colored painted parts involves capturing multiple layers of photos to mitigate color variations. This method enhances defect detection precision, ensuring that imperfections like scratches, cracks, or irregularities are reliably identified, even on parts with varying paint colors.

Varying textures can create irregular reflections and shadowing, further complicating defect identification. By capturing different layers of images, these complexities are addressed, enhancing defect detection of blisters or surface irregularities.

This approach enhances the precision of defect detection, ensuring that the texture, as well as color, is carefully considered for a more reliable assessment of painted parts.

Examples of defects detected on coated products.

Bubbles

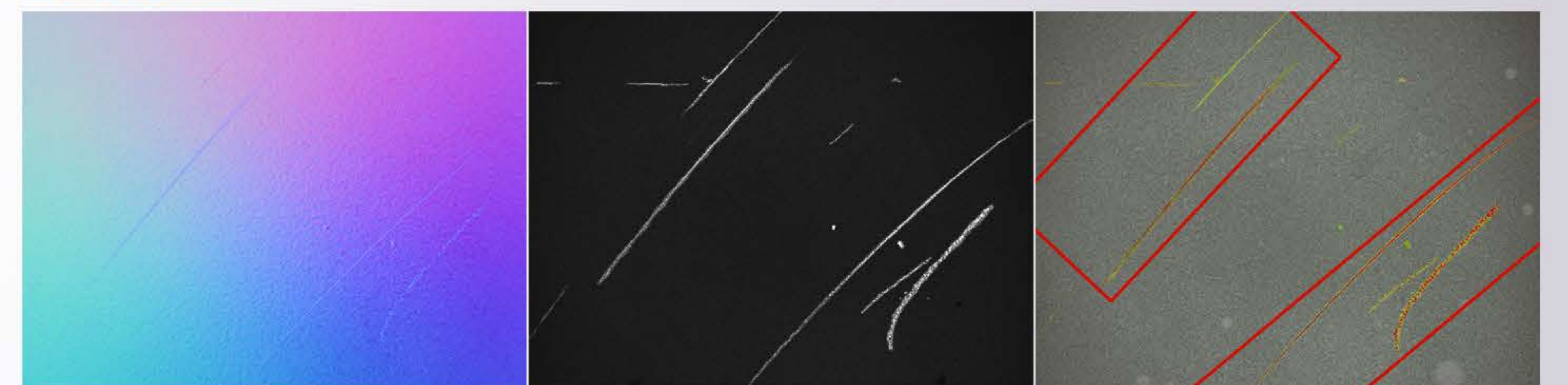


Surface structure

Findings

Final decision

Scratches



Surface structure

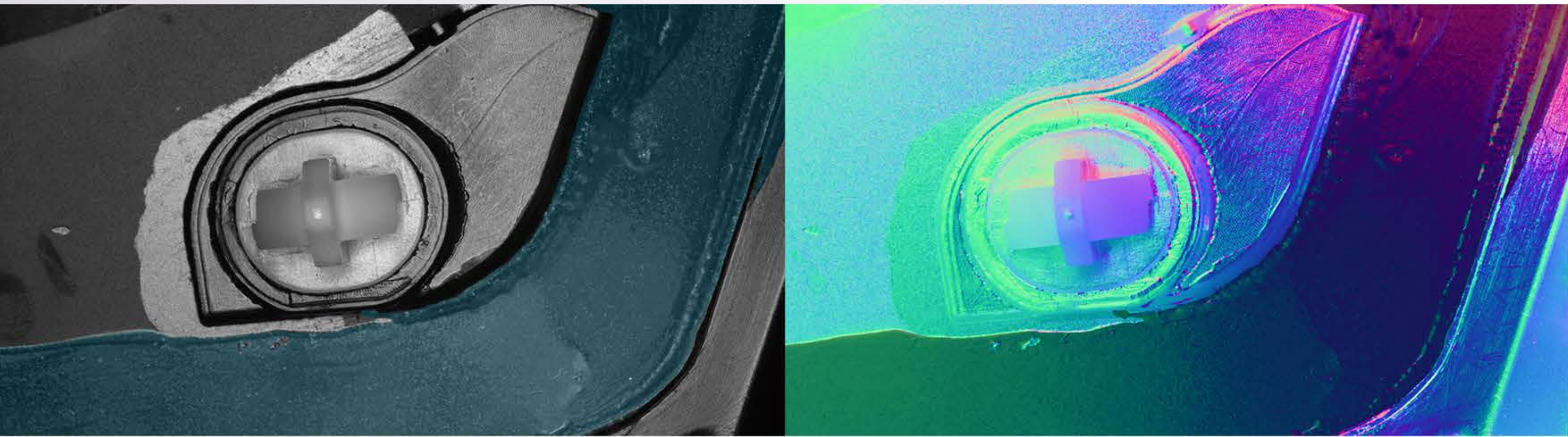
Findings

Final decision

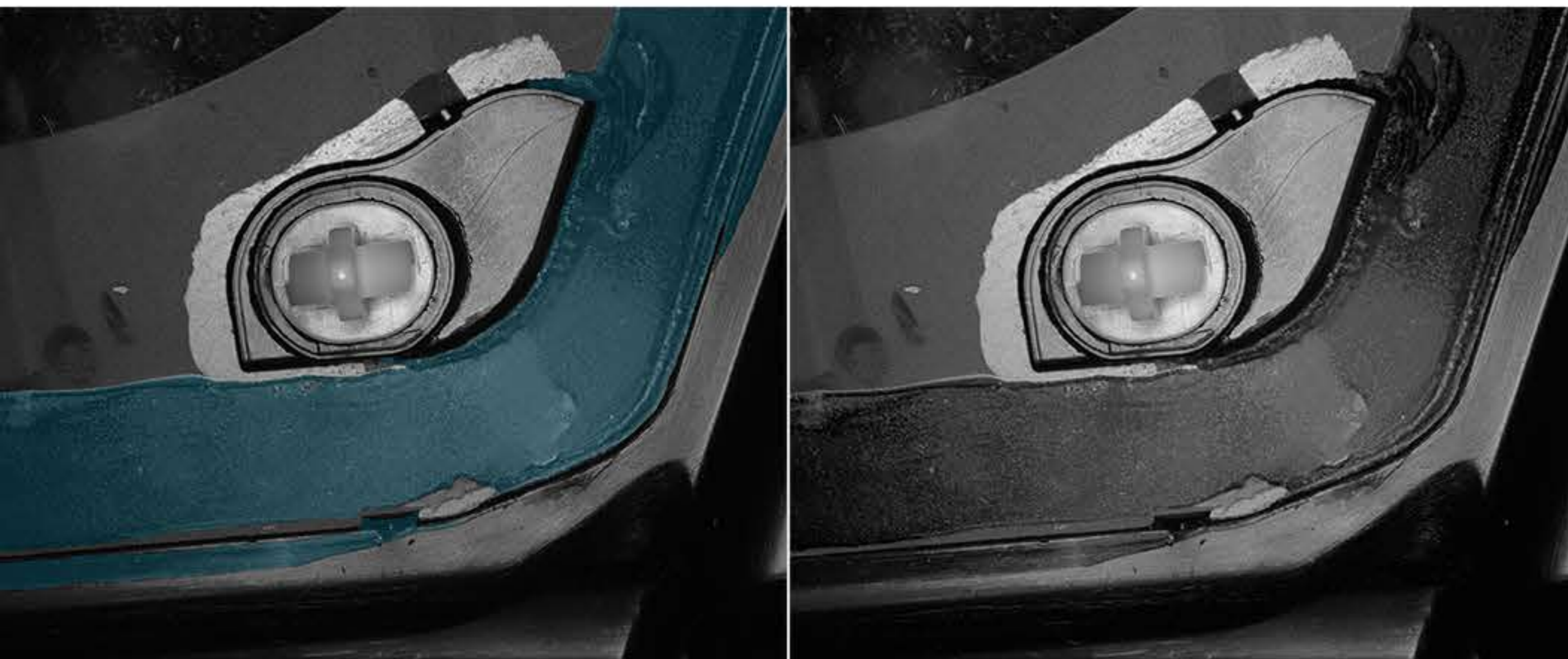
MATERIAL APPLIED TO GLASS INSPECTION

Flawless Defect Detection on Transparent Surfaces

Challenges in defect detection on glass and materials applied to glass primarily stem from their transparency, which can make defects less visible.



Employing our camera technology equipped with advanced techniques to enhance color representation offers a solution to this challenge. By manipulating the color spectrum, the camera can highlight imperfections on transparent surfaces that might be otherwise difficult to discern.

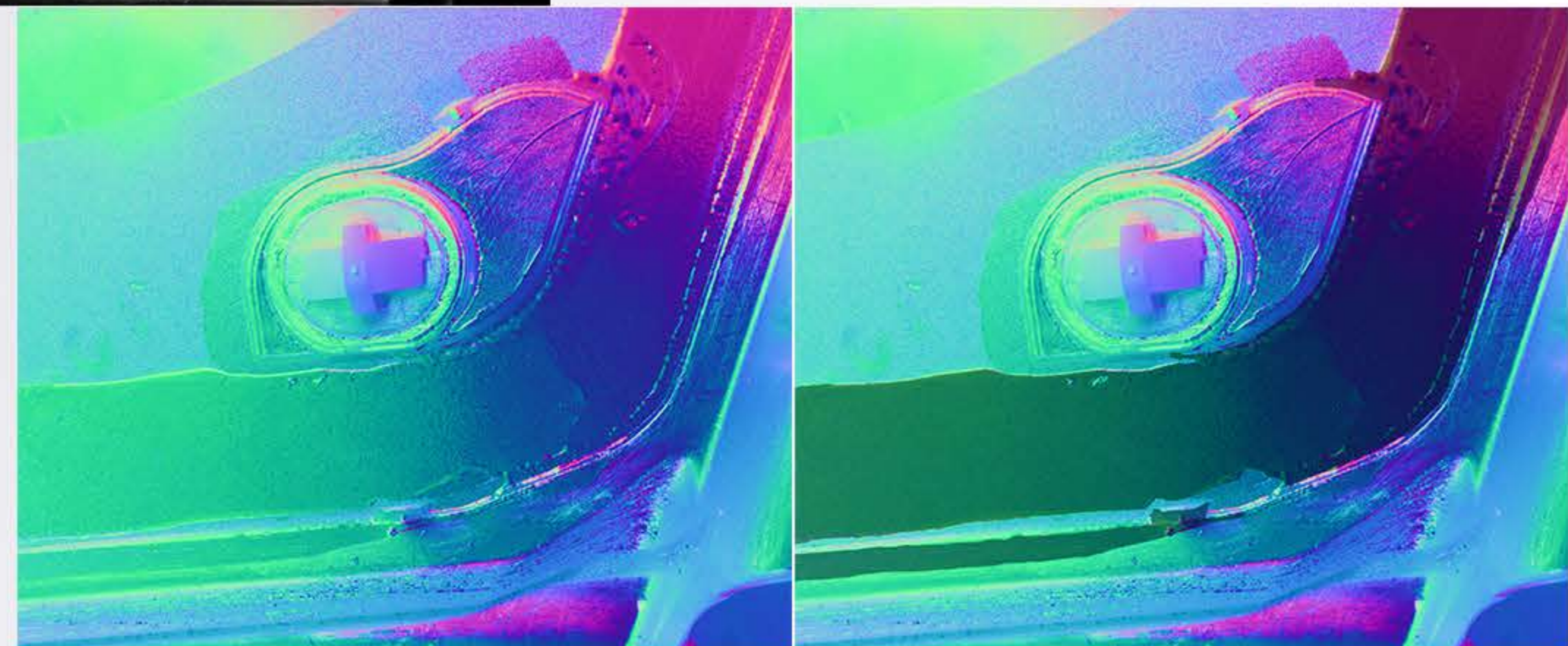


Eliminate Unnecessities

By carefully adjusting the color balance and contrast, these enhanced images effectively mitigate the impact of unwanted reflections and glare, while improving the visibility of possible defects.

Locate the Material

Creating a surface map of applied glass material involves capturing and combining multiple layers of images, enhancing the representation of the inspected material.



Material Applied to Glass Defect Detection: Possibilities and Process

Uneven Coating:
Irregularities in the thickness of the applied material.

The inspection of materials applied to glass, such as paste or glue, is a crucial quality control process in various industries.

Peeling:
Delamination or detachment of the applied material.

Inspecting materials applied to glass presents unique challenges due to their transparent nature. Detecting imperfections like bubbles, wrinkles, scratches, uneven coating, and other defects requires advanced techniques.

Inclusions:
Foreign particles embedded in the material.

A camera is employed to capture high-resolution images, overcoming transparency issues. The images are then processed using specialized algorithms to color the material appropriately, eliminating glare and reflections. Multiple layers of images are combined to create a detailed surface map, enhancing the visibility of defects.

Wrinkles:
Uneven and folded sections on the surface.

Bubbles:
Air pockets trapped within the applied material.

By ensuring that the materials are uniformly and flawlessly applied to glass surfaces, these inspection processes help maintain high standards of quality and reliability in end products.

Streaks:
Long, thin lines affecting the material's appearance.

Examples of defects detected on materials applied to glass.

Wrinkles

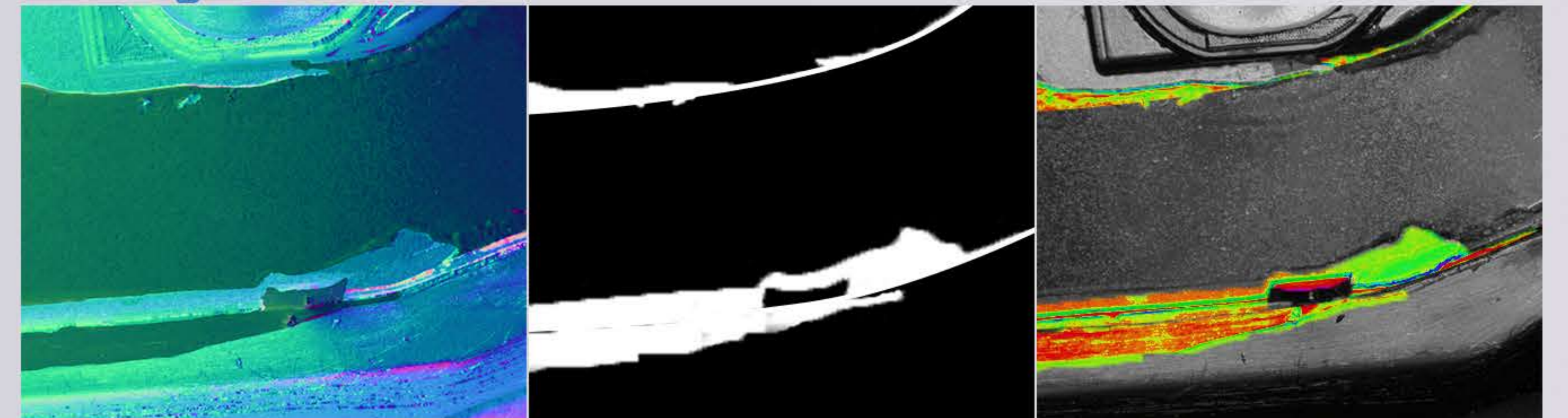


Surface structure

Findings

Final decision

Peeling



Surface structure

Findings

Final decision

CNC TURNING INSPECTION

Manages Mirror-Like Surfaces of Comprehensive Rotary Parts

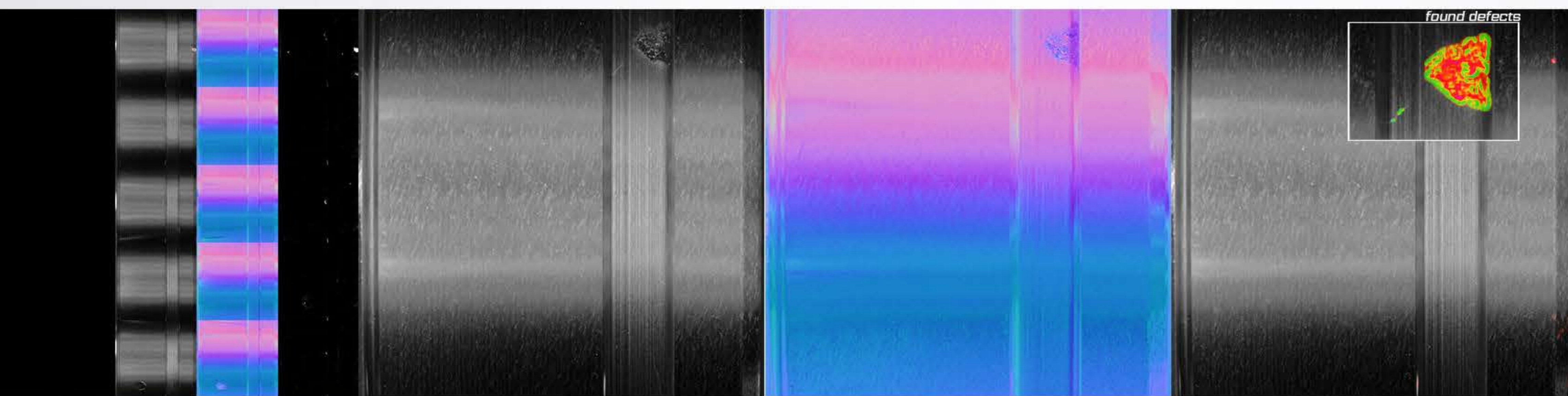
Ensuring the quality control of rotary surfaces, especially those with highly reflective cylindrical exteriors, demands a sophisticated approach. The exceptional shine of these surfaces can create challenging reflections, making defect detection a complex task.

Multiple Images from Different Angles

Picks Every Image for Evaluation

Converts Images to a Surface Map

Locates Defects

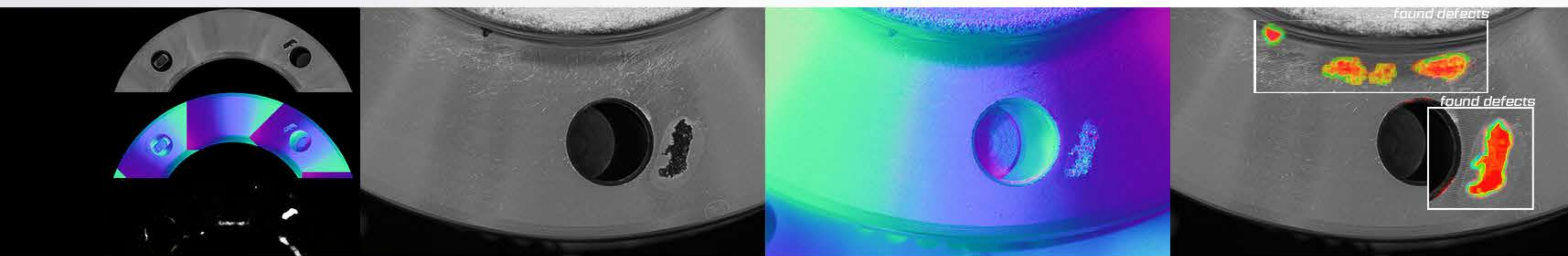


Due to the complex shape of rotary parts, it's essential to capture images from inside, outside, top, and bottom.

Every single image undergoes a process in order to evaluate the entire part.

Each image is modified and adjusted to eliminate external influences.

Defects are detected and addressed in every image, resulting in a complete part evaluation.



By capturing images from all sides and angles the system covers the whole surface.

Multiple images are quickly taken and evaluated across the entire part's surface.

The modified image is glare-free, ensuring that every defect is perfectly visible.

By the severity of imperfections, the classification of the entire part is determined as OK or NG.



CNC Turning Defect Detection: Possibilities and Process

Scratches:
Linear marks on the shiny surface caused by abrasive contact.

Dents:
Depressions or small indentations in the surface.

Polishing Defects:
Irregularities or uneven polishing on the surface.

Surface Contamination:
Foreign particles or substances adhering to the shiny surface.

Dimensional Inaccuracy:
Parts not meeting specified dimensions or having deviations.

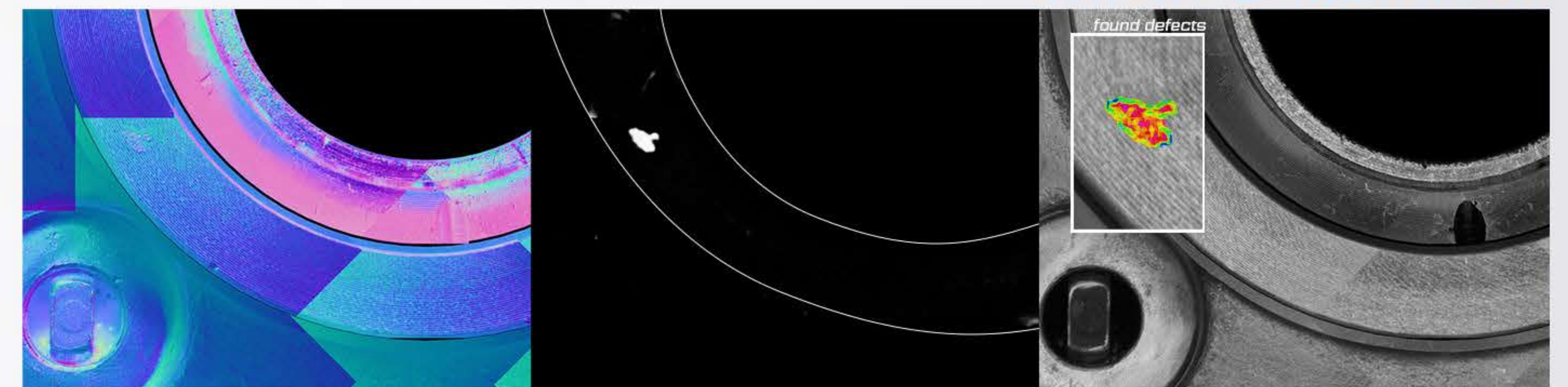
Inspecting rotary surfaces, particularly very shiny inner and outer cylindrical surfaces, presents a unique set of challenges. The reflective properties of these surfaces can create intense glare, making defect detection difficult.

To overcome these challenges, advanced camera systems are programmed to capture images from all sides of the part, effectively creating a comprehensive map of its entire surface. These images are then processed in multiple layers to remove glare, ensuring a clear and accurate view of the part. This multi-layer approach eliminates the influence of reflections and shadows, allowing for precise and reliable defect detection.

By thoroughly examining every aspect of the cylindrical component, this innovative technology ensures that even the subtlest imperfections, such as porosity, burrs, scratches, or dents, are detected with the utmost precision, contributing to a more rigorous and efficient quality control process in manufacturing.

Examples of defects detected on CNC turning surfaces.

Surface contamination

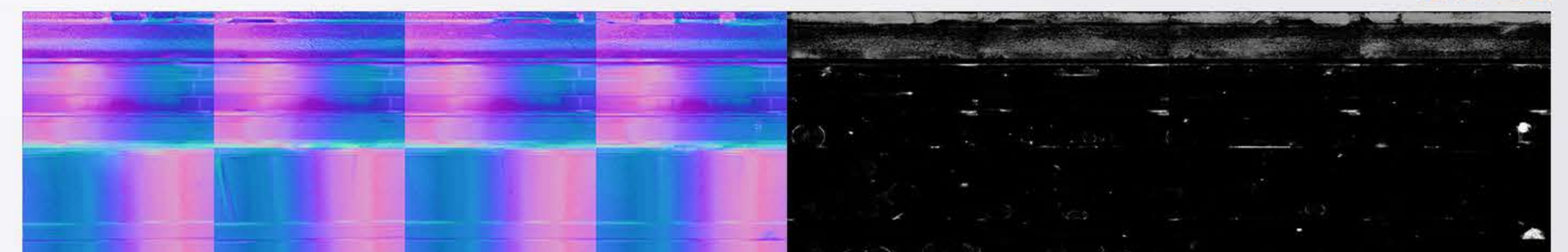


Surface structure

Findings

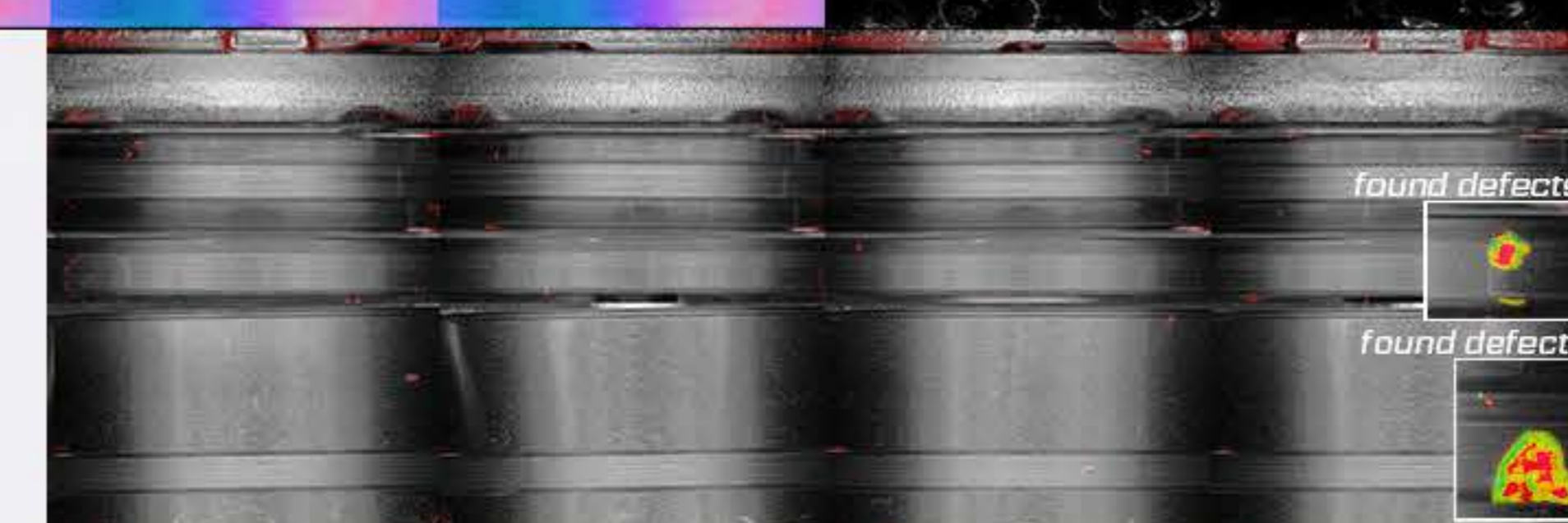
Final decision

Dents



Surface structure

Findings



Final decision

INTERNAL SURFACE INSPECTION

Detecting Defects on the Insides of the Smallest Parts

The main challenge in using cameras for internal inspections is ensuring access to confined spaces, appropriate lighting, and focus on the target area. Miniaturized borescope is used to address these challenges.

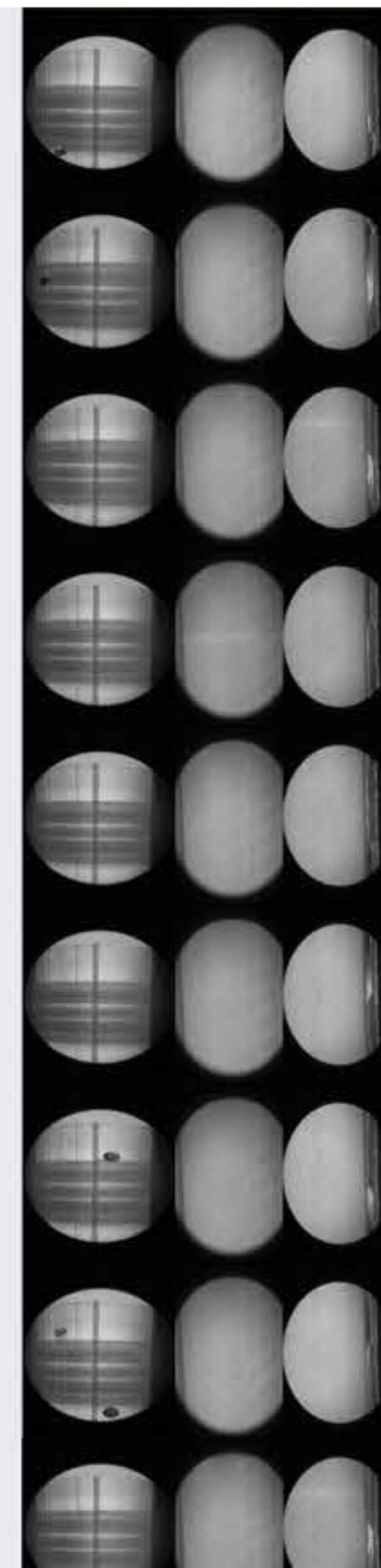


Sanezoo UNITY allows for real-time visualization and documentation of defects on internal surfaces.

Capturing the Entire Internal Structure of the Part

The inspection process delves into the intricate details of the part's internal structure. The borescope is carefully maneuvered to capture multiple images from various angles, providing a comprehensive view of the entire inside of the part.

Enhanced Image



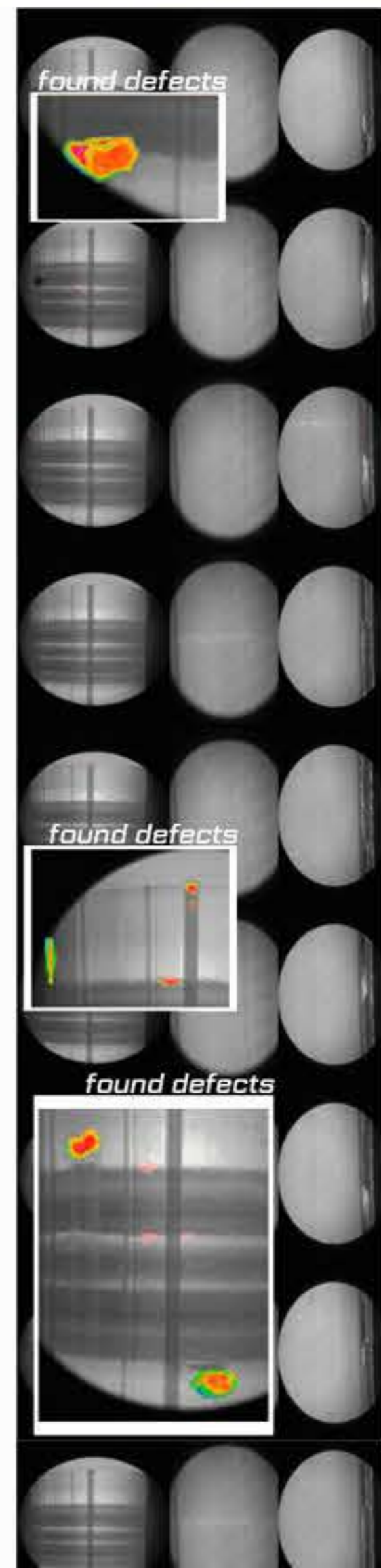
Surface Structure



Findings



Final Decision



Internal Surface Defect Detection: Possibilities and Process

Surface Scratches or Scuffs:

Superficial marks on internal surfaces.

Corrosion:

Deterioration or damage to the internal surface due to chemical reactions.

Erosion or Wear:

Material loss or surface degradation over time.

Cracks or Fractures:

Internal structural damage, including fissures.

Debris or Contaminants:

Foreign particles or materials inside the part.

The borescope is carefully maneuvered to capture multiple high-resolution images from various angles, enabling a detailed exploration of the entire inside of the part.

This method is particularly effective in identifying defects such as irregularities, scratches, and imperfections that may be hidden within the intricate geometry of the part. By piecing together these images, a comprehensive map of the internal surface is created, aiding in the precise detection of any anomalies.

The strategic use of borescope technology enhances the accuracy of defect identification, contributing to a thorough and effective quality control process in manufacturing.

Examples of dents detected on internal surfaces.



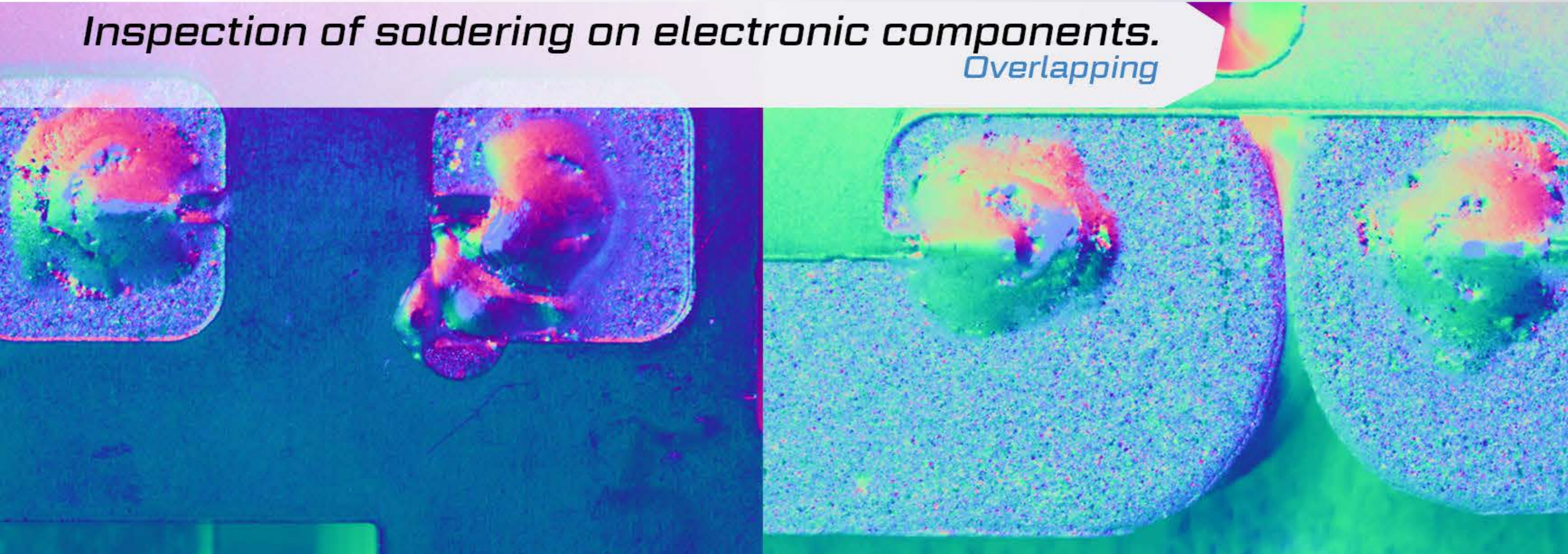
USE CASES

Various Industry Sectors and Applications

ELECTRONICS INDUSTRY



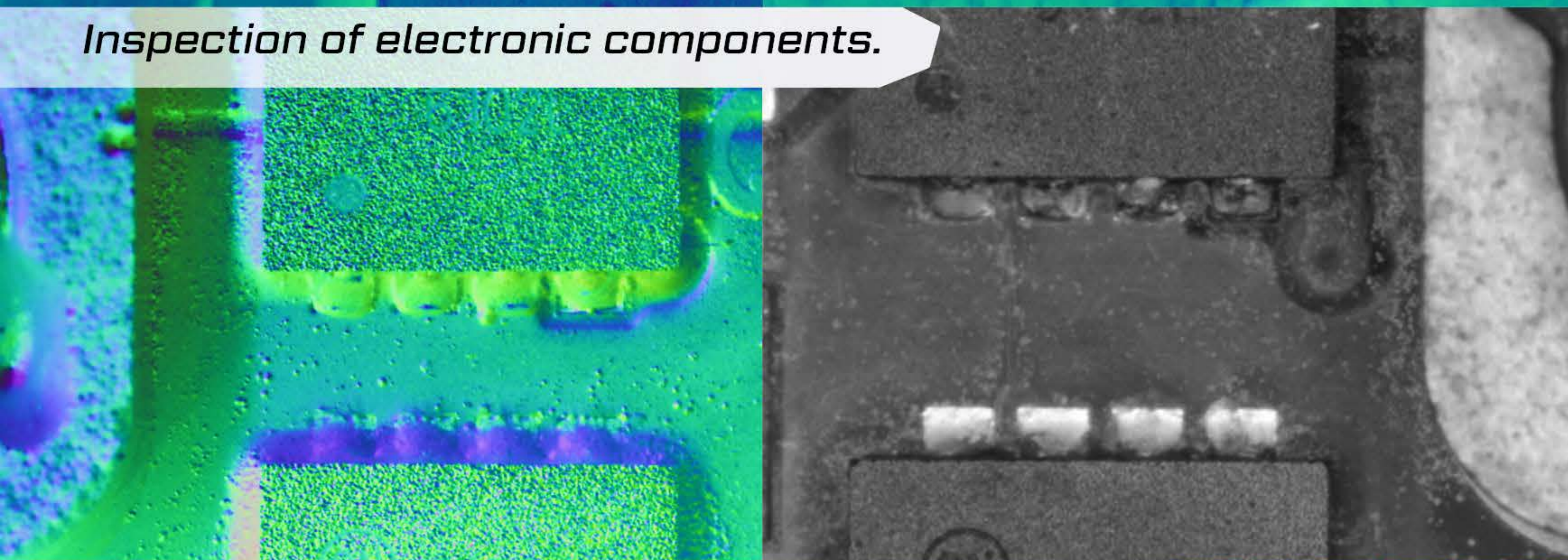
Inspection of electronic metal components.
Scratches/Dents



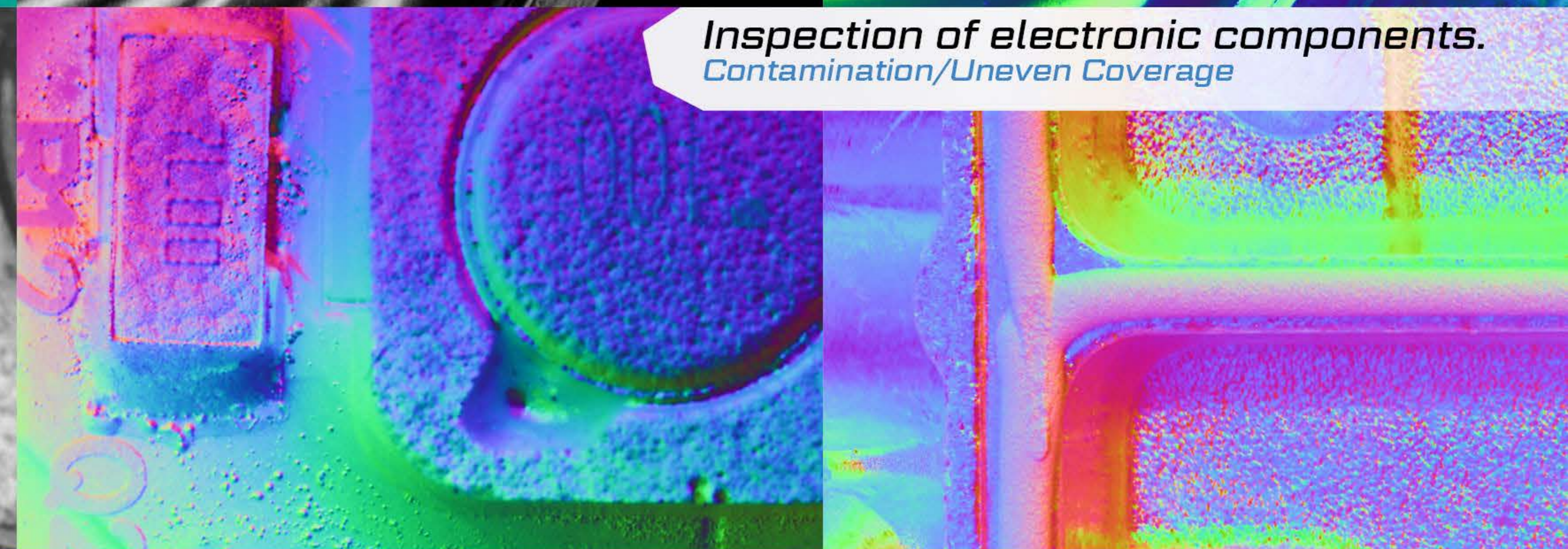
Inspection of soldering on electronic components.
Overlapping



Inspection of electronic metal components.



Inspection of electronic components.



Inspection of electronic components.
Contamination/Uneven Coverage



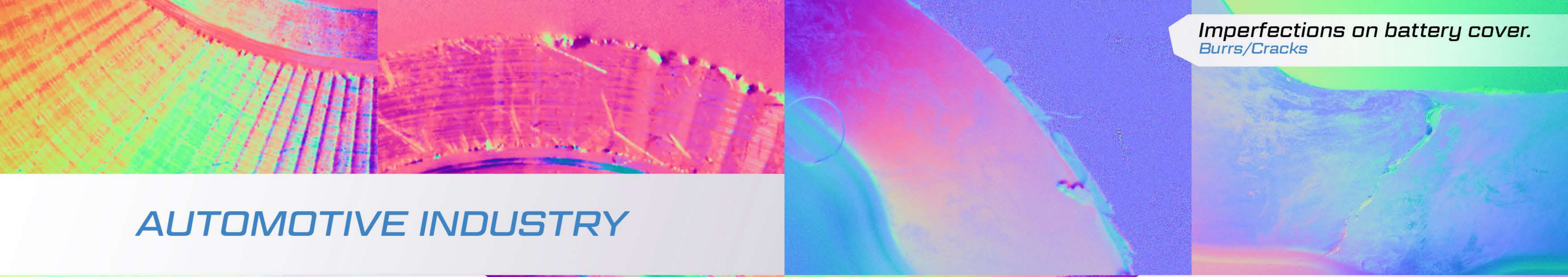
Inspection of soldering on electronic components.
Uneven Coverage



Inspection of a smartphone.
Scratches

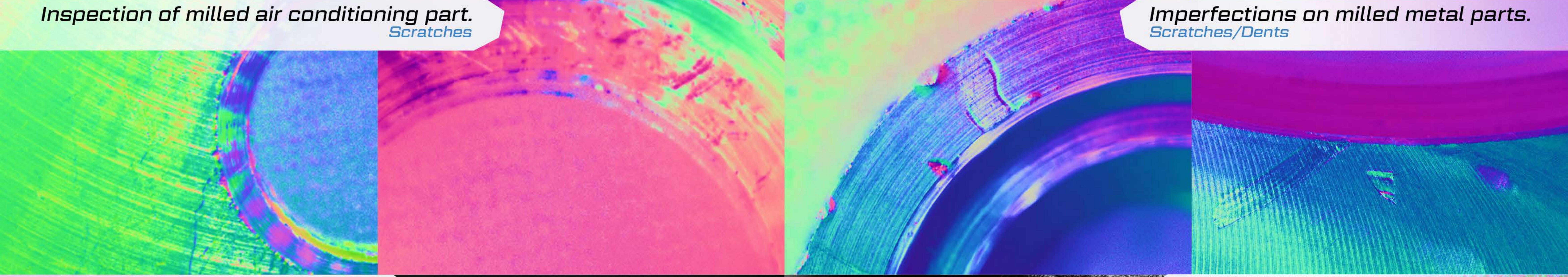
AUTOMOTIVE INDUSTRY

Imperfections on battery cover.
Burrs/Cracks



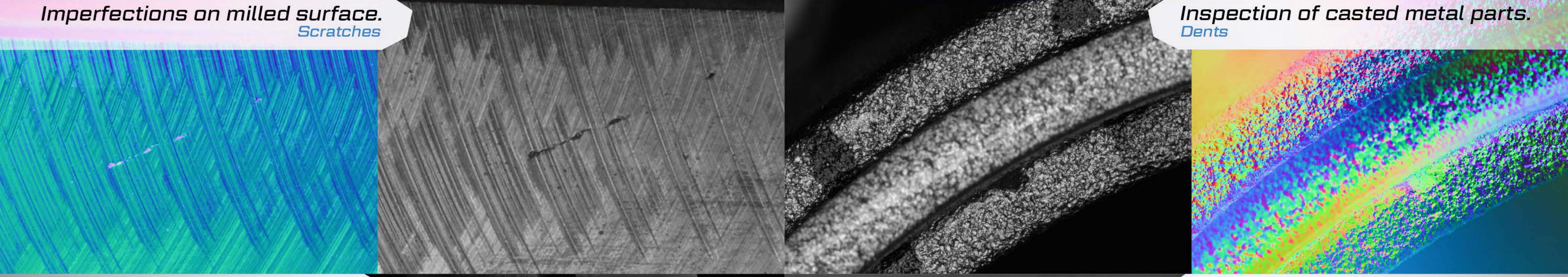
Inspection of milled air conditioning part.
Scratches

Imperfections on milled metal parts.
Scratches/Dents



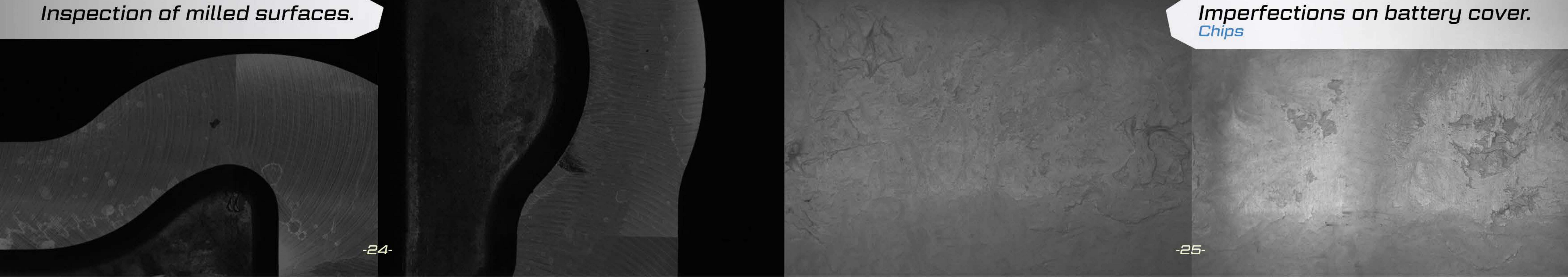
Imperfections on milled surface.
Scratches

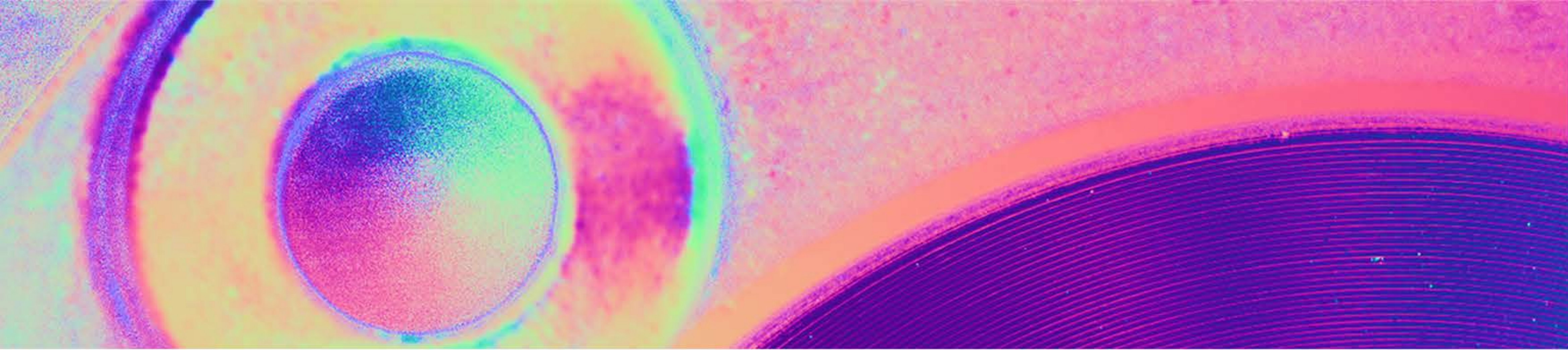
Inspection of casted metal parts.
Dents



Inspection of milled surfaces.

Imperfections on battery cover.
Chips





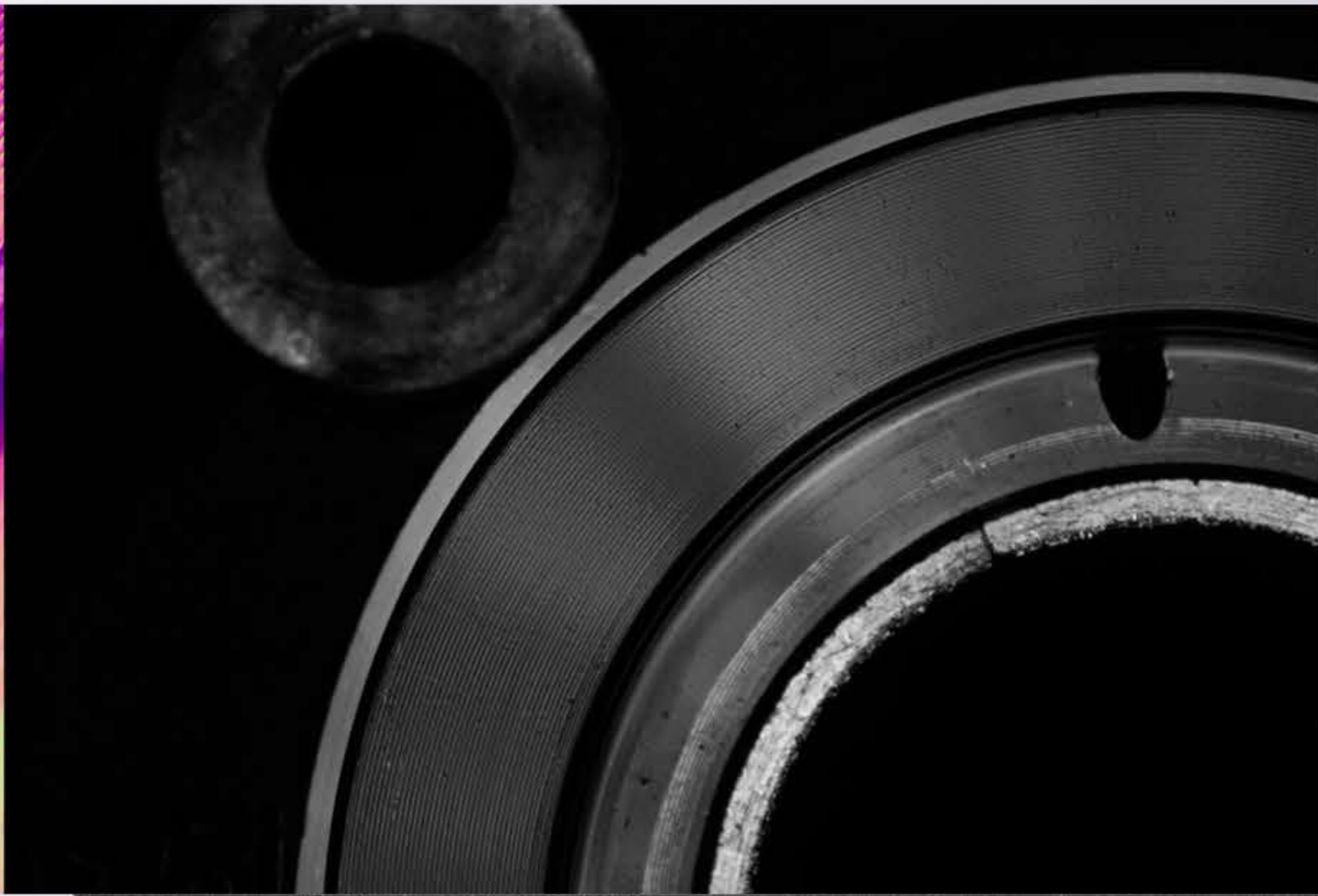
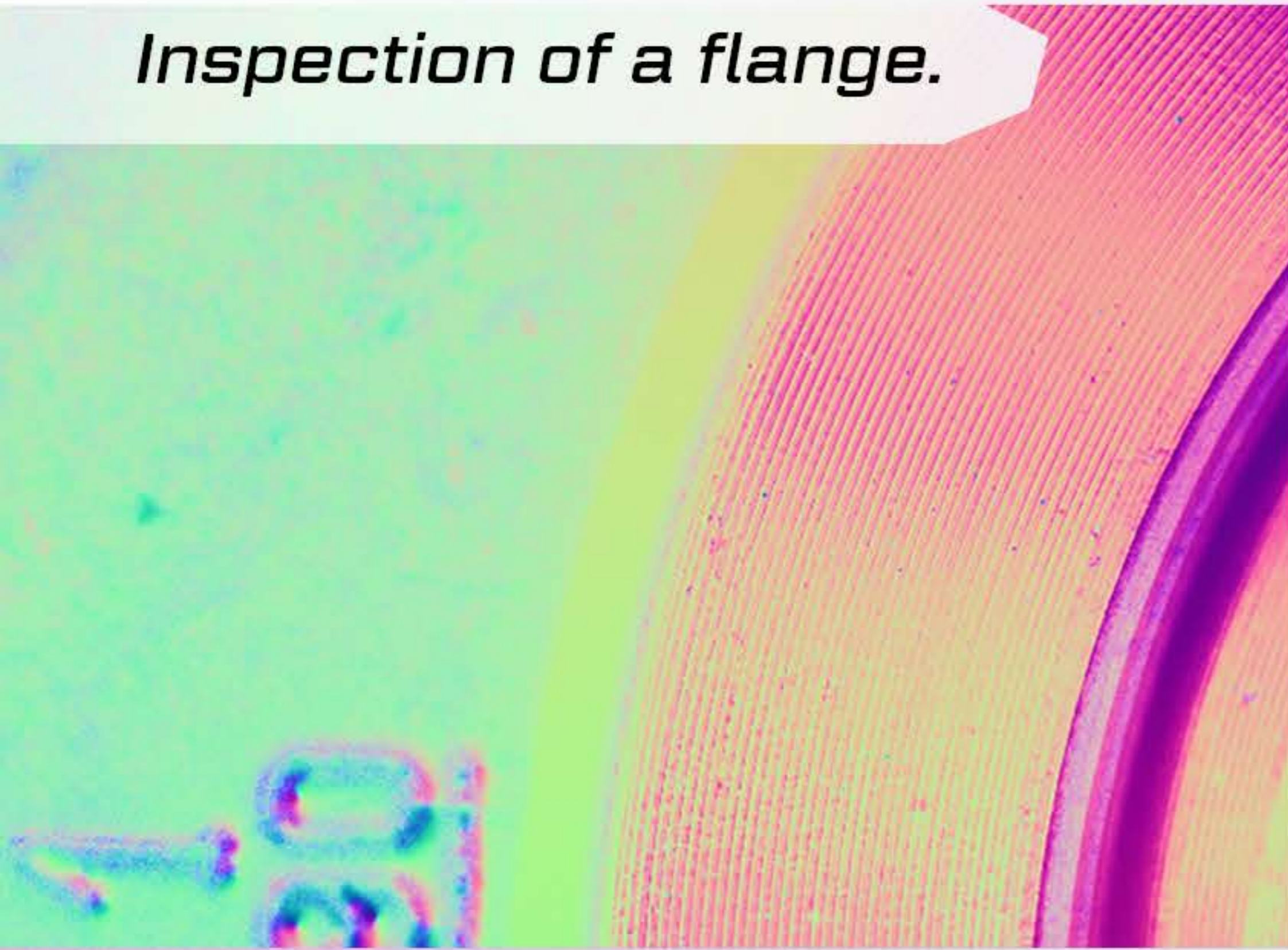
Inspection of cylindrical surface.
Inspection of artificial ankle with mirror-like surface.



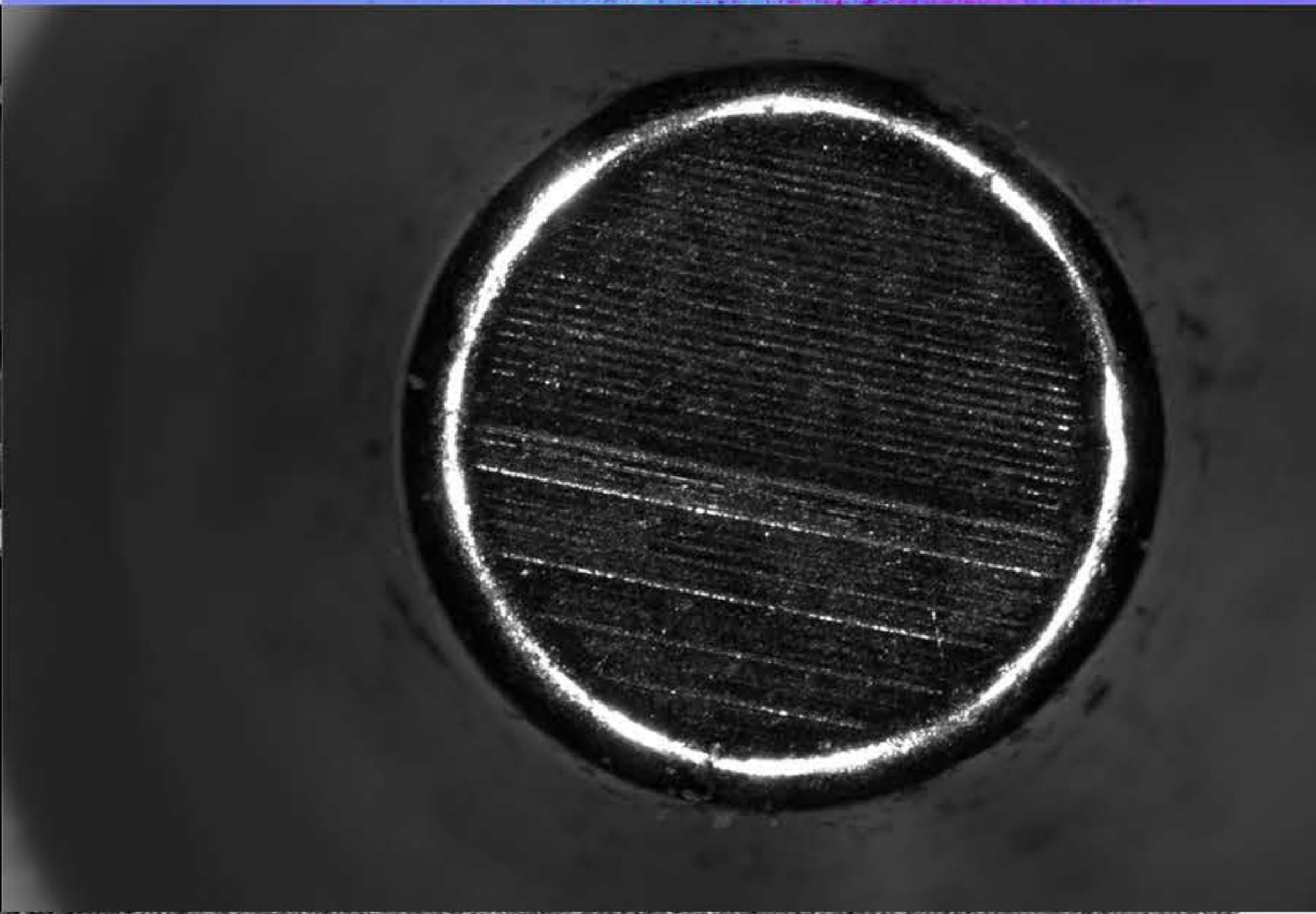
OTHER EXAMPLES

MEDICAL DEVICES, WELDING AND METAL WORKING INDUSTRY.

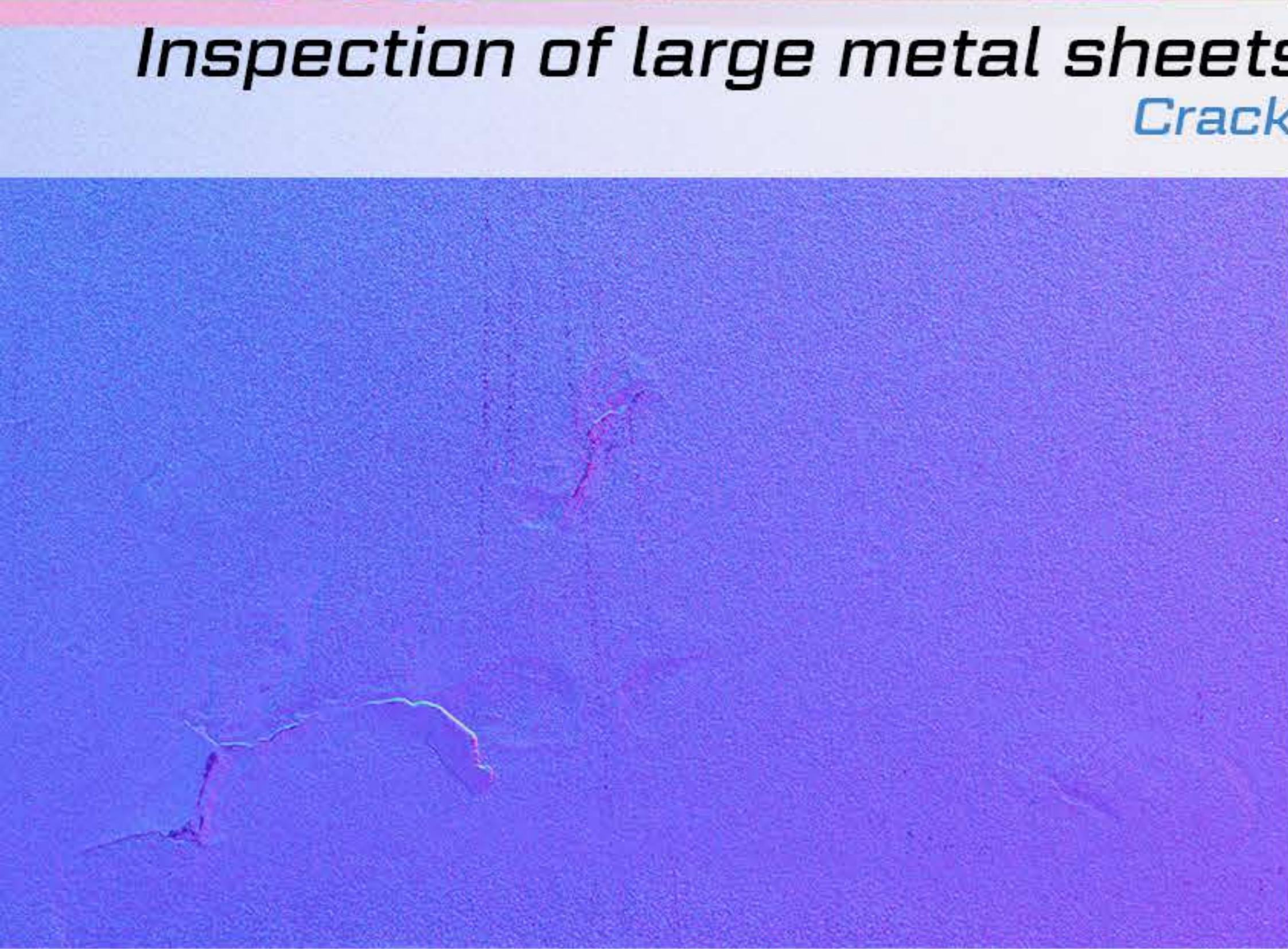
Inspection of a flange.



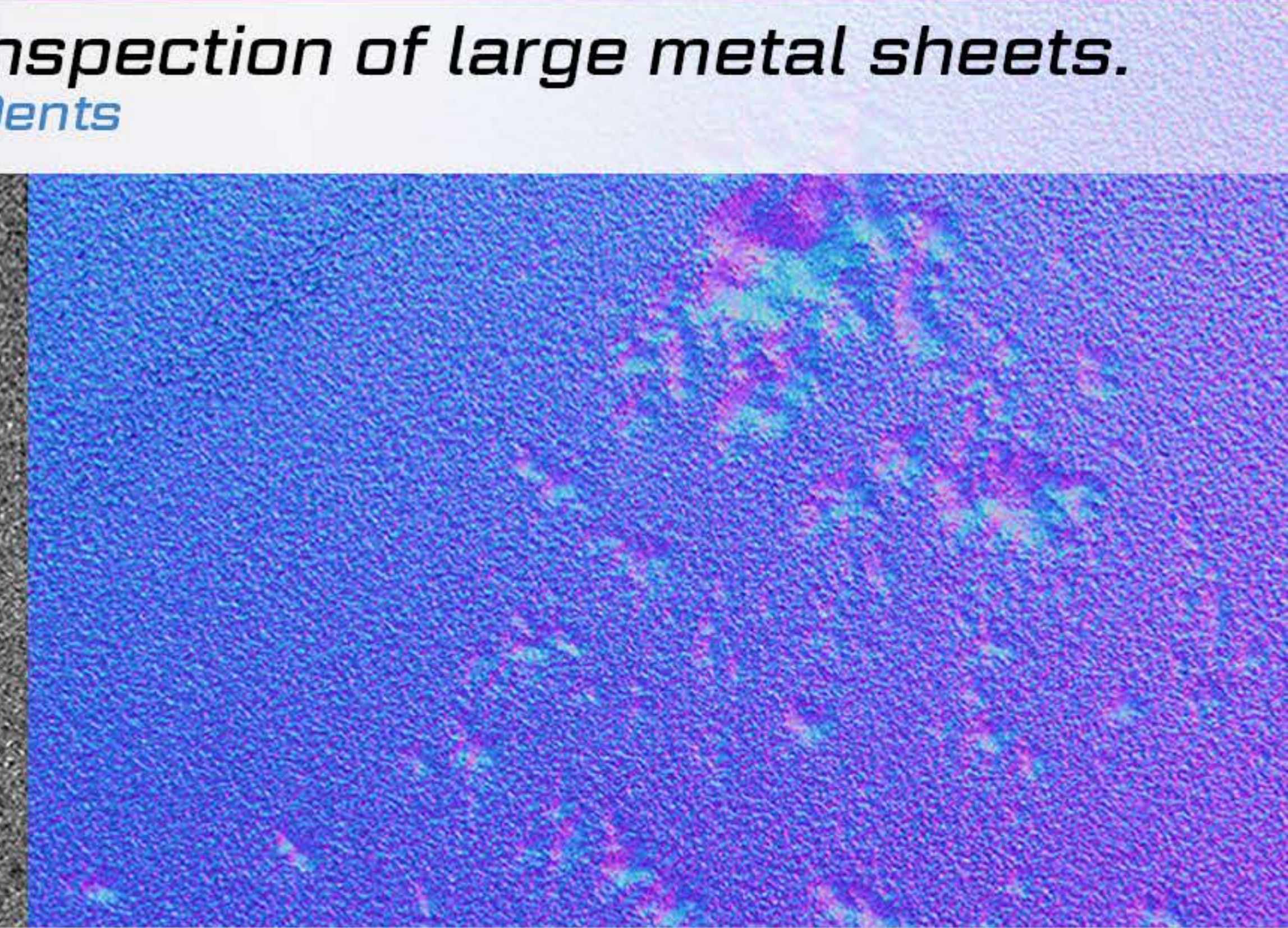
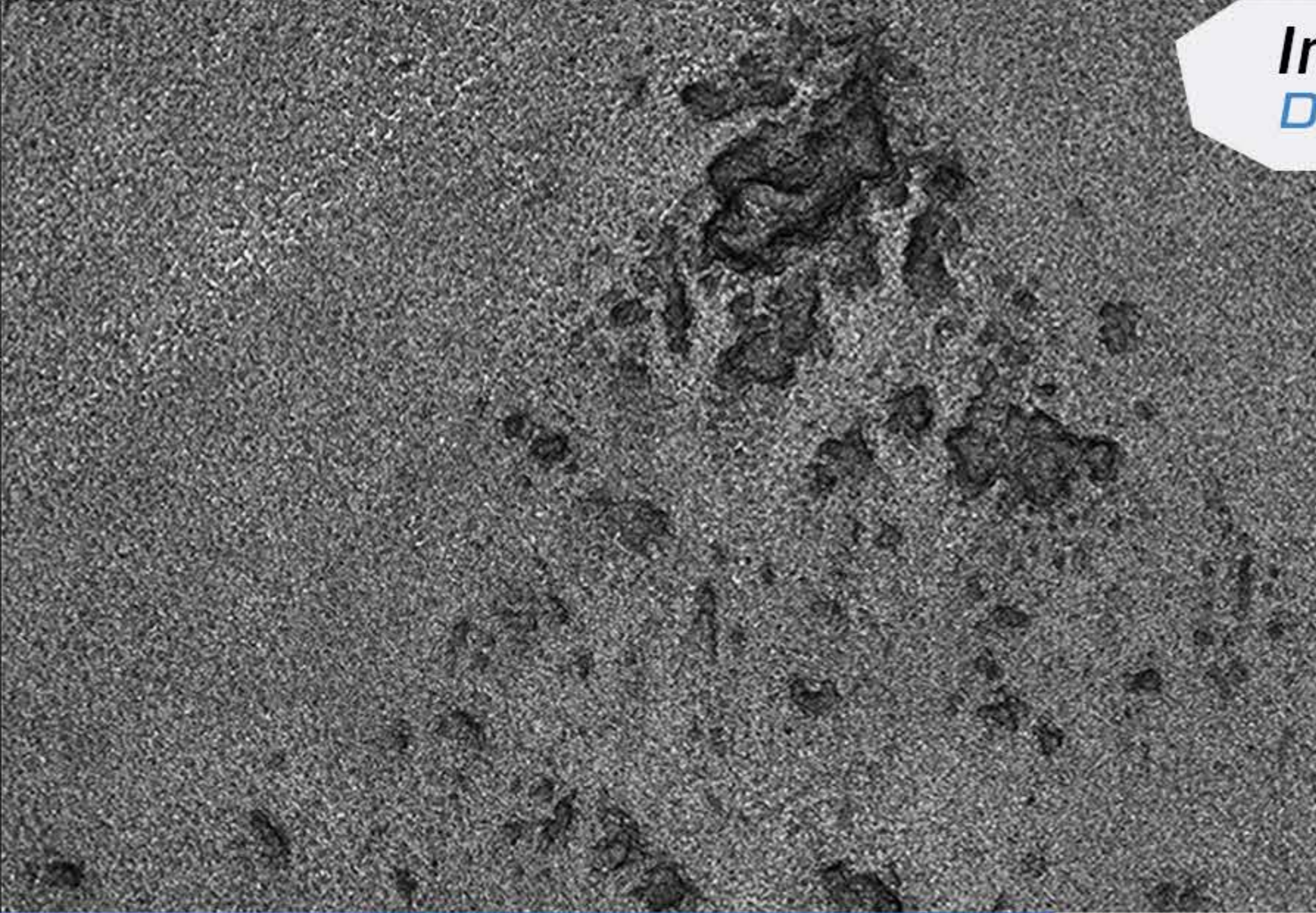
Inspection of pin head.
Scratches



Inspection of large metal sheets.
Cracks



Inspection of large metal sheets.
Dents

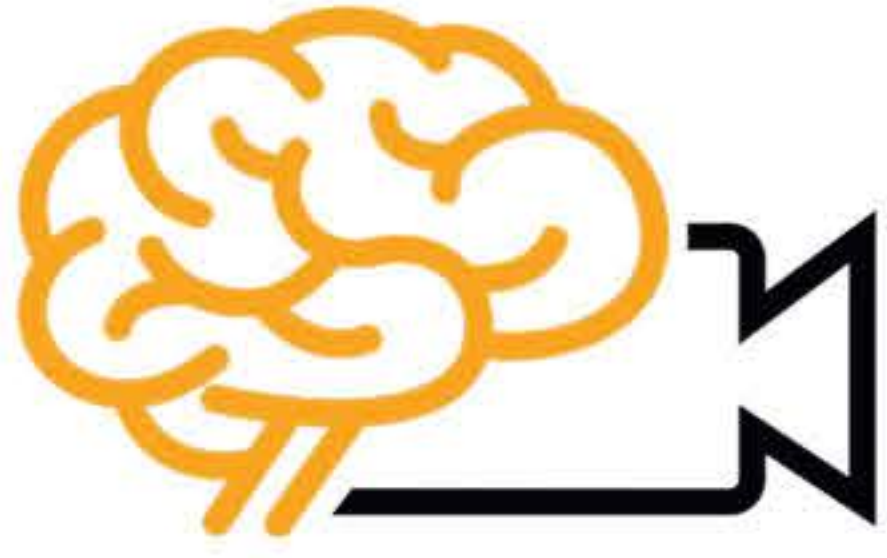


Inspection of welding on iron parts.



Inspection of welded aluminium parts.
Overlapping





TEACH
CAMERAS
TO THINK



Sane products — Insane performance



+420 721 966 366
europe@sanezoo.com
Vlněna 7
602 00 Brno, Czechia

Sane products — Insane performance



www.sanezoo.com