



MICRO / MACRO SCRATCH TESTER

QSCRATCH 20 GO

The Qscratch 20 GO is a semi-automatic macro/micro scratch tester for standardized quality control of coatings and surfaces. It is designed for laboratories that require defined scratch tests, reliable operation, and traceable results – especially for single measurements with progressive or constant load.

The system combines a dynamically automated Z-axis, motorized Y-axis, electronic force control, and intuitive QpixControl2 software into a practical workflow for routine surface and coating testing. Scratch tests can be performed under controlled conditions, optically evaluated, and documented in structured test reports. The Qscratch 20 GO supports relevant standards including DIN EN ISO 20502, ASTM C1624, ISO 27307, and ASTM G171, making it a compact solution for production-oriented monitoring, routine testing, and reproducible scratch test results.



MICRO / MACRO SCRATCH TESTER QSCRATCH 20 GO

VANTAGGI PRODOTTO

- | Semi-automatic macro/micro scratch tester for defined quality check workflows
- | Compact solution for routine testing and production-oriented
- | Electronic force control with a test force range of 0.5–200 N
- | Constant and progressive load for standards compliant scratch testing
- | 8-position automatic tool changer for test modules and lenses
- | Dynamically automated Z-axis and motorized Y-axis
- | QpixControl2 software with guided scratch workflow
- | Structured evaluation and reporting for traceable results

MICRO / MACRO SCRATCH TESTER QSCRATCH 20 GO

VIVI L'ESPERIENZA DEL MODELLO 3D NEL MONDO REALE!



FEDAR

SHARE



CHOOSE PRODUCT:

AR-Model - Visita la pagina con il tuo smartphone oppure scansiona il QR code sotto la voce "Visualizza nella realtà aumentata" per vedere il modello 3D nel mondo reale!

Qscratch 20 GO

MICRO / MACRO SCRATCH TESTER QSCRATCH 20 GO

METODI DI PROVA E INTERVALLO DI FORZA



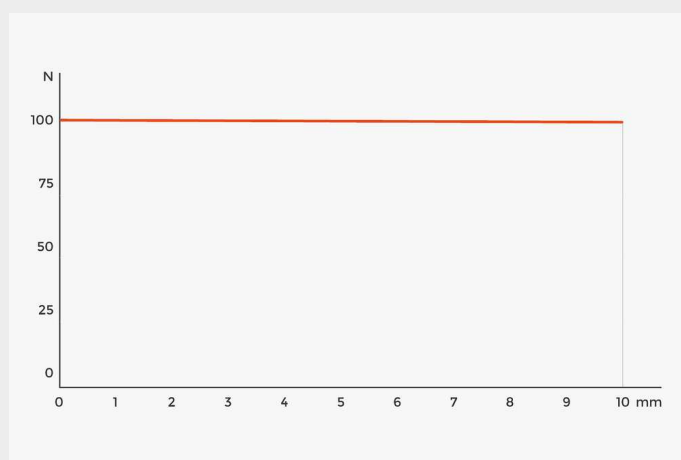
METHOD: PROGRESSIVE LOAD

The initial and final loads, as well as the load rate, are defined. The load increases along the scratch length; visible events can be assigned as Lc points at their respective positions.

ISO: PFST - progressive force scratch test

ASTM: PL - progressive load

Lc: Load critical



METHOD: CONSTANT LOAD

The normal force remains constant over the scratch length. This method is suitable for individual measurements, series comparisons, and recurring test conditions in a quality control setting.

ISO: CFST - constant force scratch test

ASTM: CL - constant load

Lc: Load critical

TEST METHODS

PROGRESSIVE OR CONSTANT
LOAD -
TAILORED TO THE TEST
REQUIREMENTS



STANDARDS & PROCEDURES

DIN EN ISO 20502 /

ASTM C1624 -

Determination of adhesion and mechanical failure modes of hard ceramic coatings using a scratch test.

ISO 27307 - Evaluation of the adhesion and cohesion of thermally sprayed ceramic layers on a cross-section using a transverse scratch test.

ASTM G171 -

Determination of the scratch hardness of material surfaces using a defined diamond stylus, a constant normal force, and evaluation of the remaining scratch width.

FOR LABORATORIES THAT MAKE CRITICAL DECISION EVERY DAY

Qscratch 20 is a automated macro/ micro scratch tester for coatings and functional surfaces. The system combines controlled force application, integrated optical evaluation, and guided software operation and a report generation. It was developed specifically for laboratories that make critical surface-related decisions on a daily basis.

PRACTICAL QUALITY ASSURANCE & INTEGRATED WORKFLOWS

Designed for quality assurance: The system combines standardized scratch tests with high repeatability, efficient documentation, and intuitive operation. QpixControl2, the integrated workflow, flexible export options, and optional inspection functions turn it into a powerful, all-in-one solution rather than a simple stand-alone tester.

LONG-TERM INVESTMENT SECURITY THROUGH QATM EXPERTISE

QATM brings many years of experience in hardness testing, metallography, and global service to its scratch testing portfolio, thereby safeguarding your investment in the long term.

TEST PRINCIPLE DIN EN ISO 20502 | ASTM C1624

A DEFINED SCRATCH. A CONTROLLED LOAD. A CLEAR

EVALUATION.

The principle

In the scratch test, a diamond stylus is moved across the coated surface under a defined normal force. Visible events such as cracking, spalling, or penetration of the coating are localized along the scratch mark and assigned to the corresponding critical load. Thus, the scratch mark not only indicates that a failure is occurring; it also shows where it is occurring—and makes the load at the critical point traceable.



DEFINING AND ASSIGNING FAILURE EVENTS

Lc1 - Initial cracking / plastic deformation

Lc2 - Spalling

Lc3 - Penetration of the coating down to the substrate

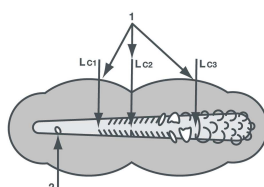


Figure: Failure Events

FROM SCRATCH TRACK TO TRACEABLE RESULT

CERAMIC COATINGS. EVALUATION OF ADHESION AND FAILURE MODES.

The following interactive section shows how typical failure events along the scratch track are analyzed. Click on the LC points to see how cracking, spalling, and coating penetration are associated with specific positions and loads.

SELECT A MATERIAL AND EXPLORE THE LC POINTS



**THIN, HARD CERAMIC
COATINGS (TYPICALLY 0.1 - 30
MM)**

- | Carbide, TiC, CrC
- | Nitride TiN, CrN, TiAlN
- | Oxide Al_2O_3
- | Diamond Diamond coating
- | Diamond-like carbon DLC

**THIN, HARD CERAMIC AND
TECHNICAL COATINGS
(TYPICALLY ≤ 20 MM)**

- | PVD TiN
- | PACVD DLC
- | Arc-discharge DLC
- | PVD/PACVD Cr-C
- | PVD Al_2O_3
- | Hard chrome

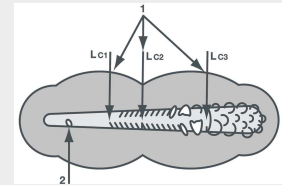


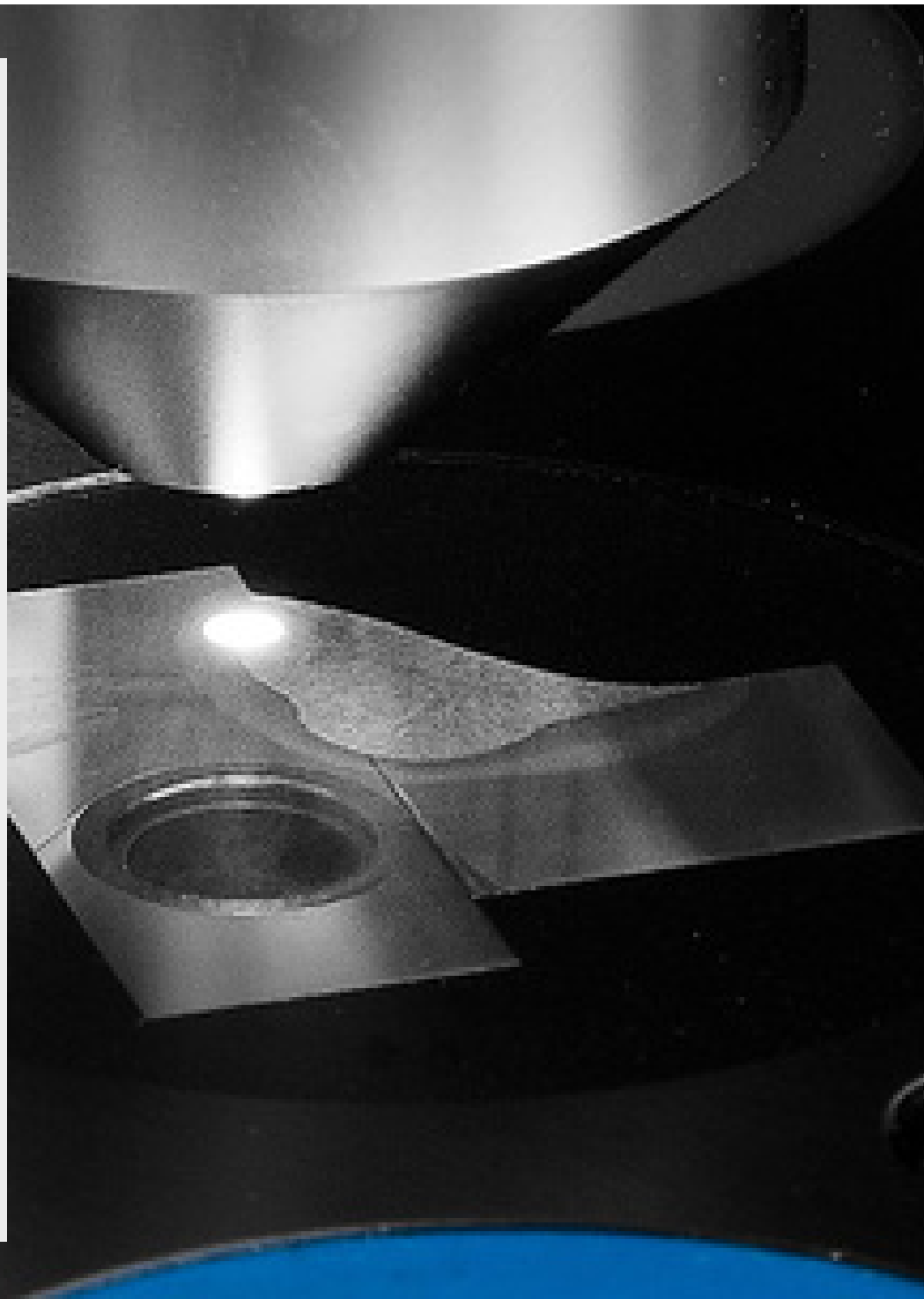
Figure: Failure
Events

MICRO / MACRO SCRATCH
TESTER QSCRATCH 20 GO

SISTEMA OTTICO RIVOLUZIONARIO

The QATM-developed, in-house manufactured lens system sets new standards. As well as providing crystal clear image quality for hardness testing, Koehler illumination uses white LED light and motor-operated aperture shuttering to produce ideal contrast, even for high magnification images.

Experienced metallurgists agree the image quality provided by the Qscratch is comparable in all aspects with that of established sophisticated microscopes. The up-to-date concept and new lenses in the optic system enable the device to completely meet even the strictest physical 'test system definition' requirements in compliance with DIN EN ISO6507-1/2:2018.



MICRO / MACRO SCRATCH TESTER QSCRATCH 20 GO

INNOVATIVE OPERATION



ILLUMINAZIONE DELL'AREA DI PROVA

Tutti i dispositivi sono dotati della nuova illuminazione a LED dell'area di lavoro: Posizionamento semplificato dei campioni per i test su pezzi singoli.

DISPLAY DI STATO
ILLUMINATO

PORTA LA LUCE NEL BUIO

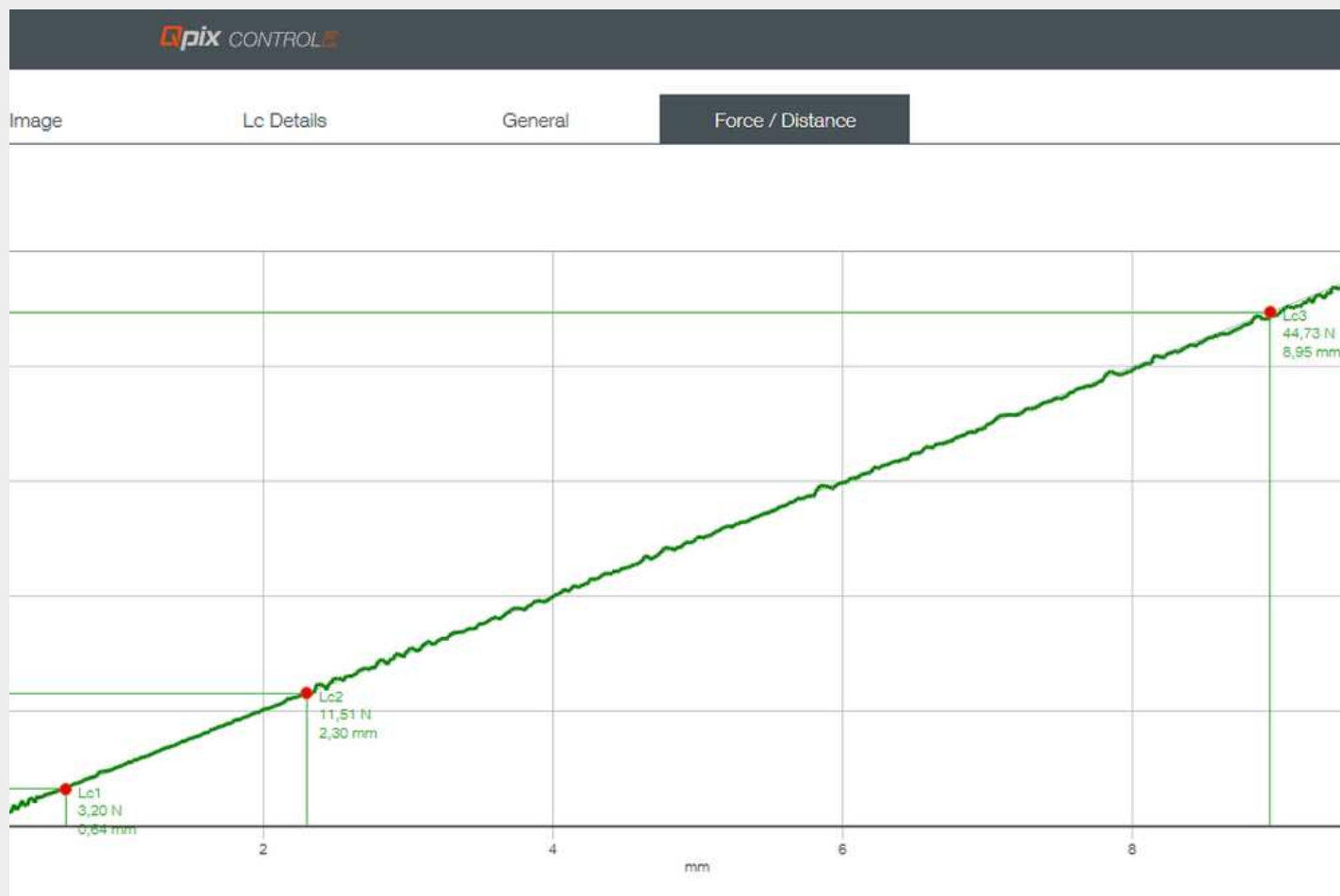
The illuminated QATM logo displays the current device status at a glance. The range of flash intervals indicates whether the device is operating automatically or is free to be used for new tasks for staff all around the lab. In addition, the LED test space lighting, installed as standard, ensures that samples and sample holders are positioned correctly.

On the Qscratch 20, it also ensures uniform light intensity for sample imaging.



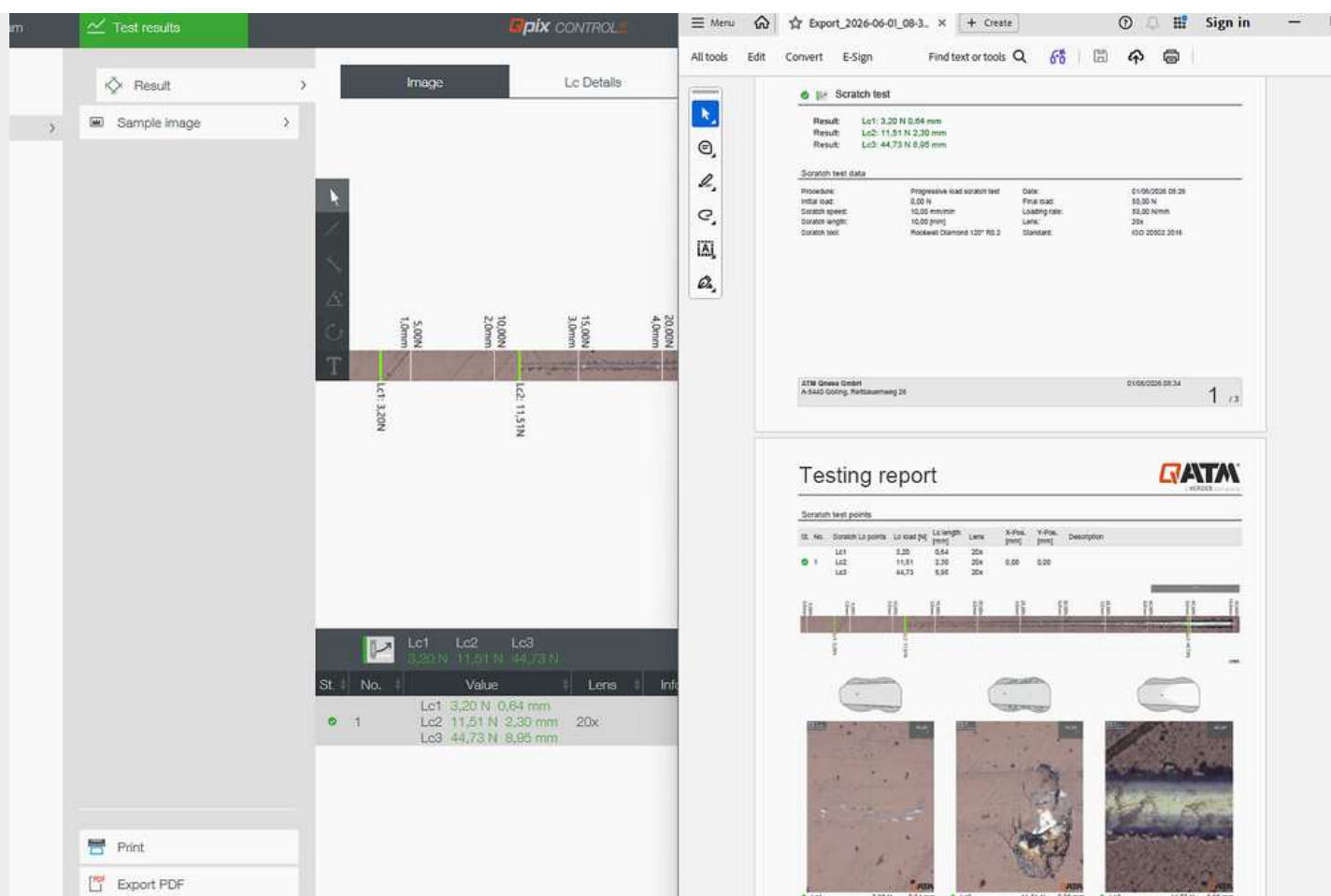
MICRO / MACRO SCRATCH TESTER QSCRATCH 20 GO

TECNOLOGIA PIONIERISTICA - IMPLEMENTAZIONE UNICA



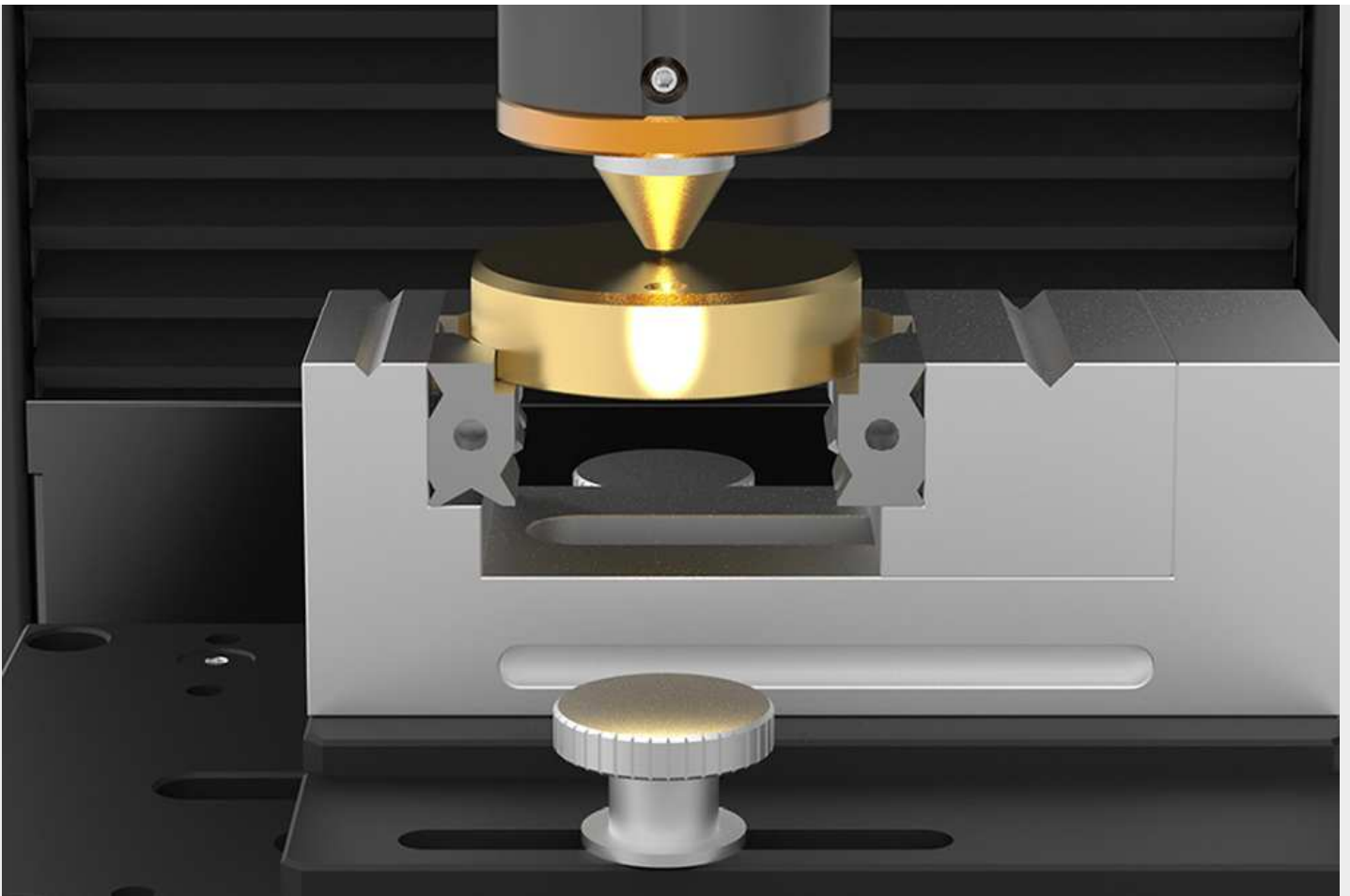
PRECISE DISTANCE / FORCE APPLICATION

Precise electronic load control ensures that the test load—as a critical test parameter—remains controlled, reproducible, and traceable at all times.



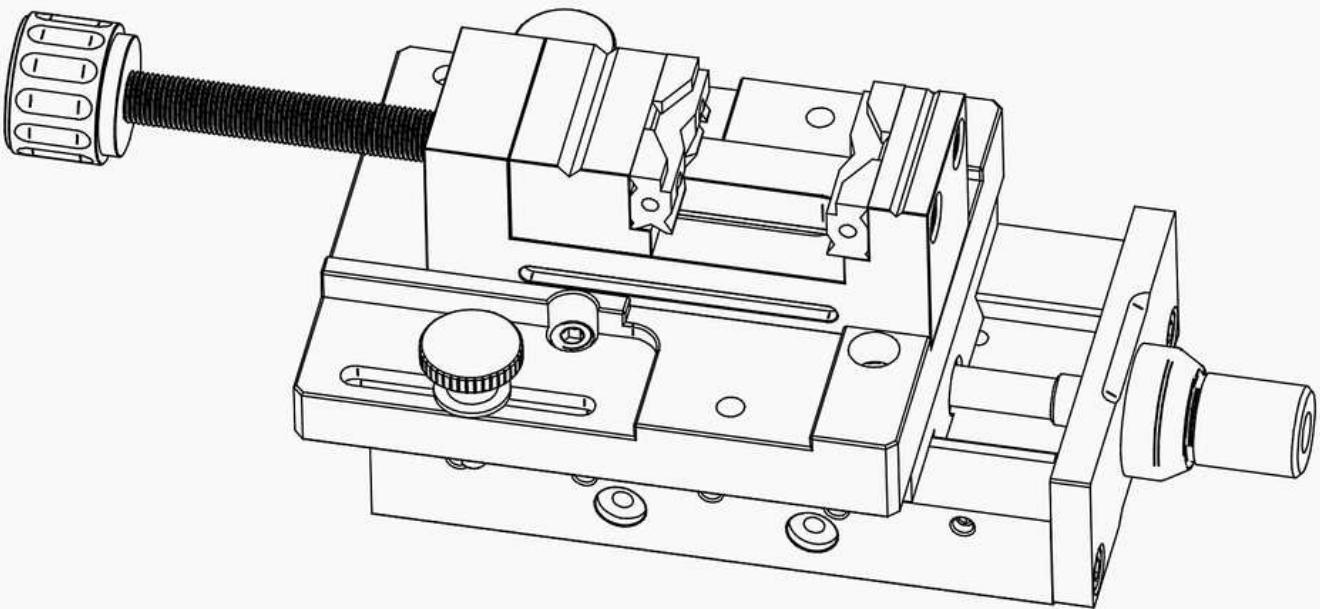
EVALUABLE AND COMPARABLE

The selected loading logic is linked to the scratch mark, position, and result. Methods can be applied to sample series, coating variants, and process comparisons.



UNIVERSAL SAMPLE HOLDER

Adjustable clamping jaws allow for the secure holding of various specimen geometries - from flat and angular test pieces to round or very small specimens.



OPTION

MULTI MEASUREMENT

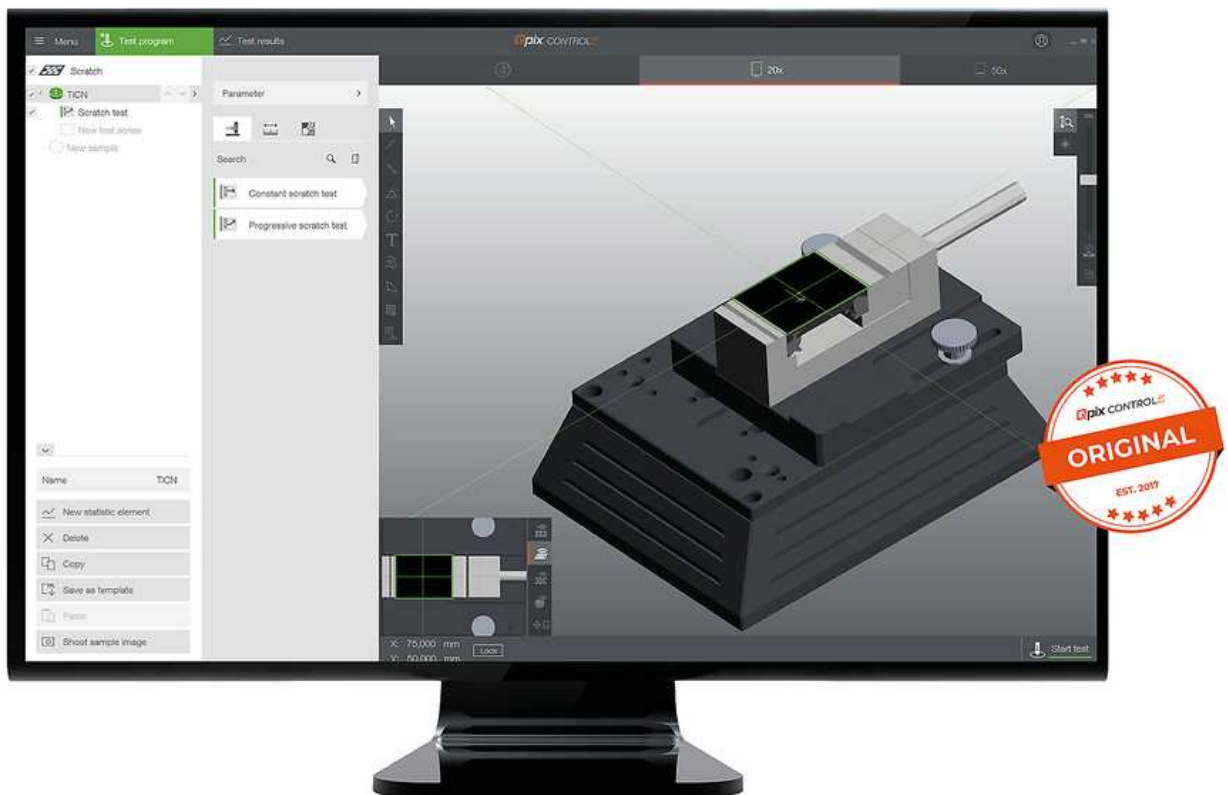
The optional manual X-axis slide shifts the sample laterally, enabling multiple scratch tracks on one specimen – ideal for comparisons and small test series.

Qpix CONTROL²

SCRATCH WORKFLOW

EASY TESTING, EFFICIENT ANALYSIS

QpixControl2 is more than just a user interface: The software combines a patented 3D user concept with a seamless scratch workflow. Tests can be easily created, scratch marks visually positioned, single measurements processed automatically, and relevant Lc events evaluated in a structured manner. From test definition through image capture and evaluation to data management, export, and standardized reporting, all steps remain integrated within an intuitive software environment. This reduces operational effort, supports reproducible processes, and enables the efficient use of scratch testing in production-oriented quality assurance.



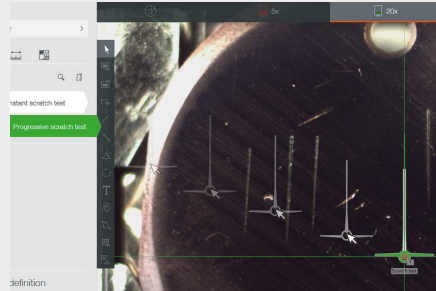
FROM SETUP TO REPORT

3 PASSI PER IL RISULTATO



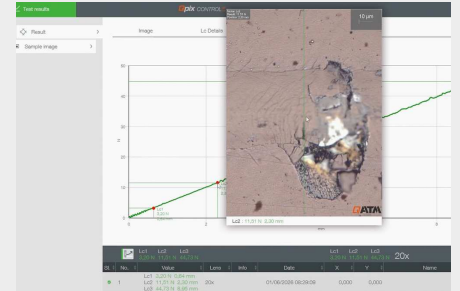
1. LOAD SAMPLE

The sample holder is automatically moved to the correct height, and the sample image is automatically captured.



2. POSITIONING

Drag and drop the starting point of the scratch test directly to the desired position.

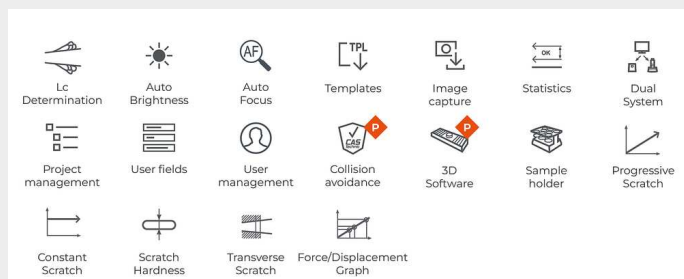


3. AVVIARE LA SEQUENZA DI TEST

The test sequence is fully automatically and in accordance with the Scratch test standards. Subsequently, the failure events can be evaluated and assigned to the respective Lc points.

SOFTWARE

INCLUDED FEATURES

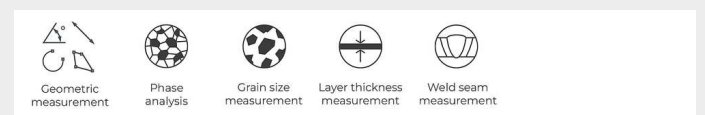


SOFTWARE

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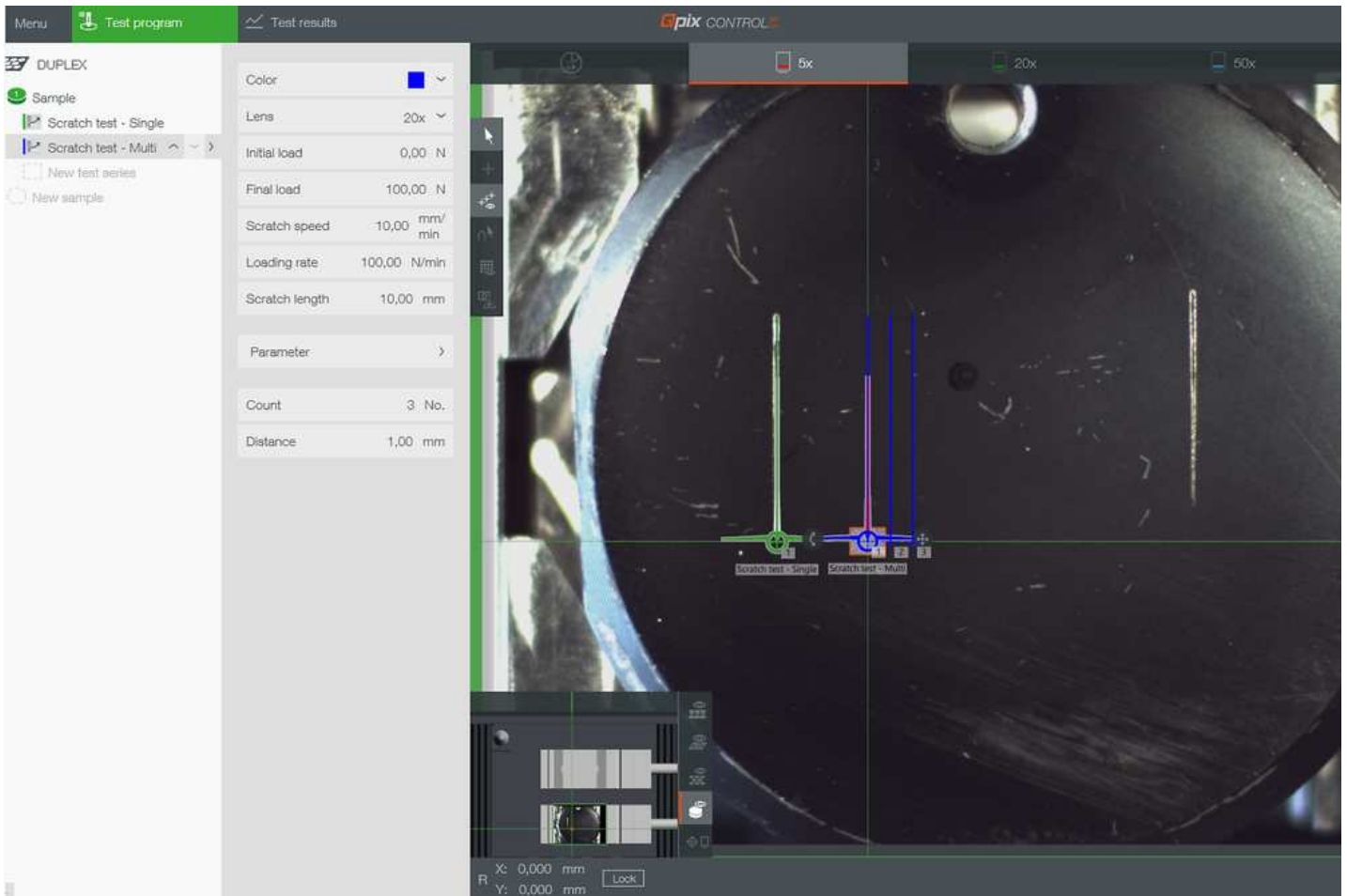


MICROSCOPY & ANALYSIS



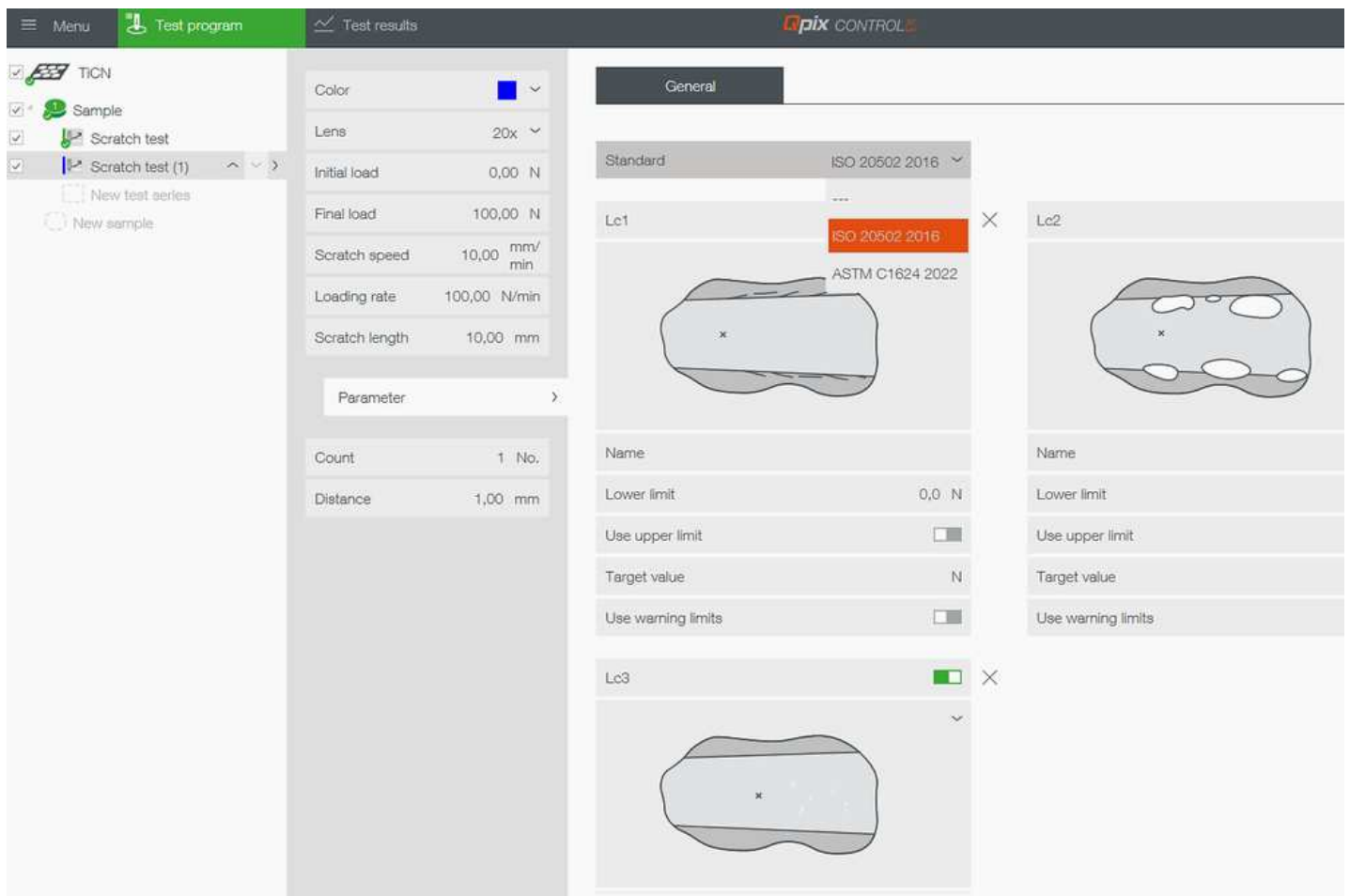
QPIX CONTROL2

INNOVATIVE SOFTWARE FUNCTIONS



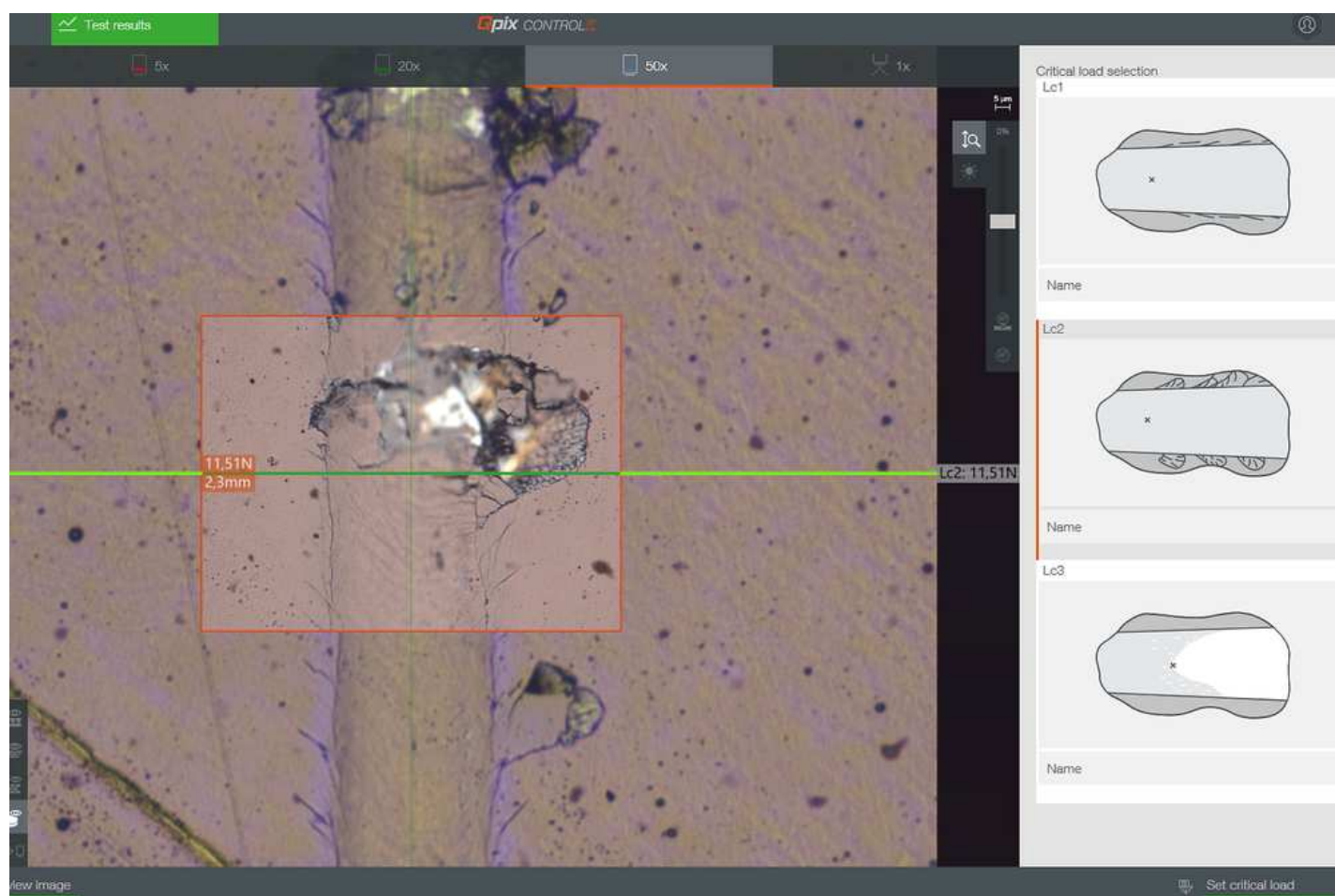
SINGLE AND MULTIPLE INSPECTIONS

Single or multiple measurements: Scratch marks can be positioned directly in the software, created with a defined offset, and processed automatically. The Lc results are evaluated for each test as well as as a series mean.



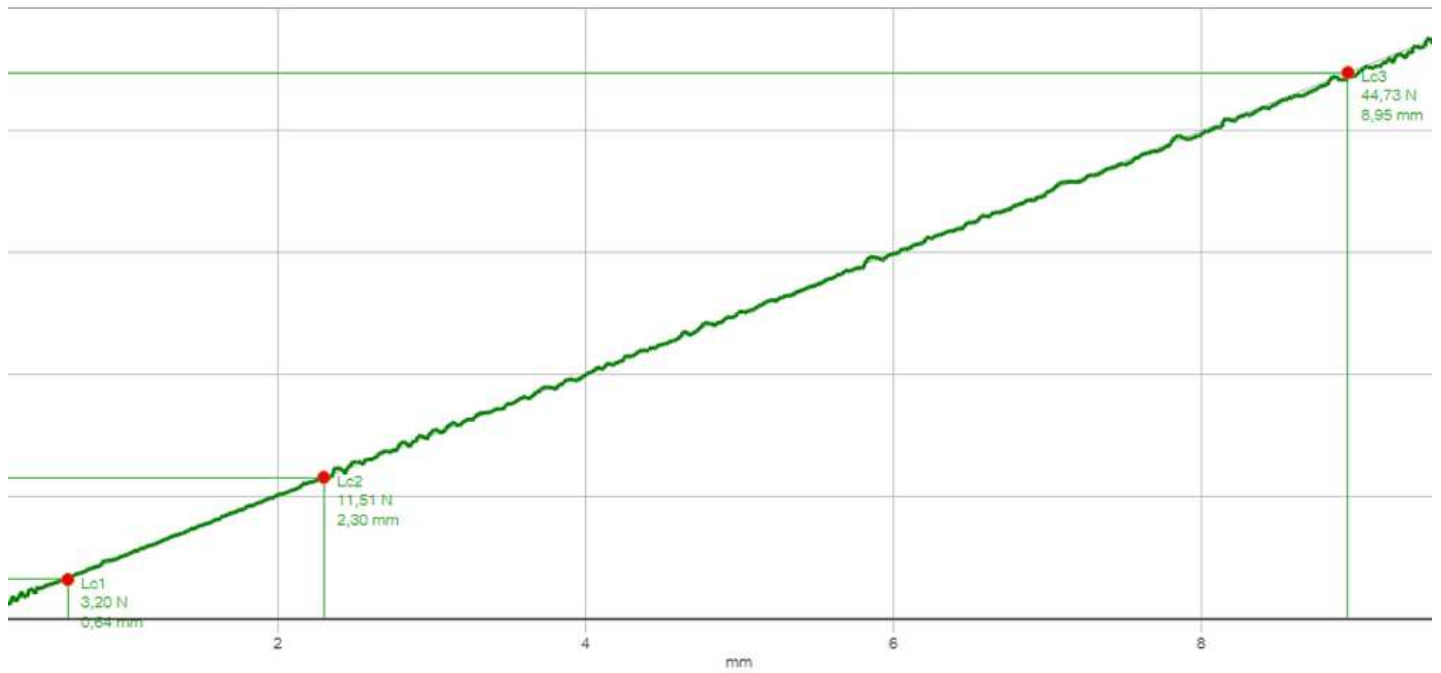
A WIDE RANGE OF SETTING OPTIONS

Load definition, crack length, load rate, speed, and lens selection are managed directly within the method. For evaluation, standardbased templates or custom templates can be used and supplemented with limit and target values.



GUIDED LC DETERMINATION

Graphical templates support the consistent classification of typical failure events. This facilitates standard-based procedures and reduces room for interpretation.



FORCE/DISTANCE GRAPH

The force-distance curve documents the applied load along the scratch track. Anomalies in the curve can be compared with visible failure events and used for Lc evaluation

results

pix CONTROL

Image

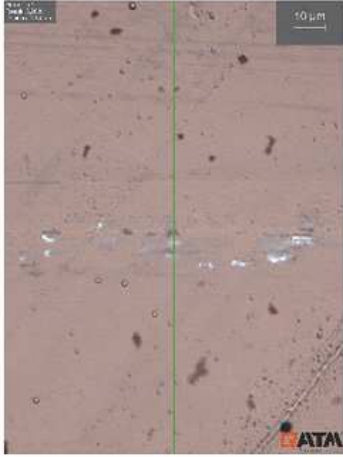
Lc Details

General

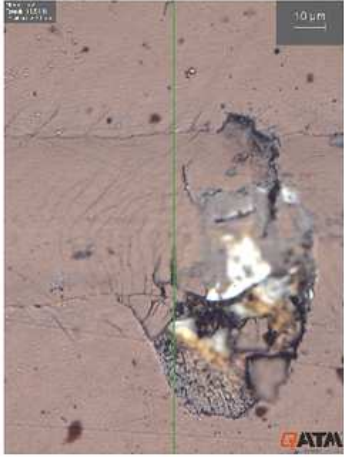
Force / Distance

esult

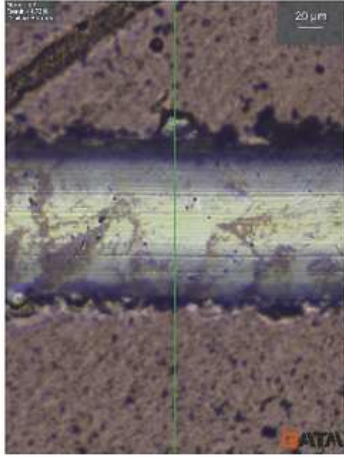
ple image



Lc1 : 3,20 N 0,64 mm
Longitudinal cracks at the edges of the scratch track



Lc2 : 11,51 N 2,30 mm
Cohesive spallation along the edge of the scratch track



Lc3 : 44,73 N 8,95 mm
Continuous ductile coating perforation

Lc1

Lc2

Lc3

3,20 N 11,51 N 44,73 N

Lc1

Lc2

Lc3

3,20 N 11,51 N 44,73 N

20x

LC DETAILS

Relevant failure events along the scratch track can be viewed in detail in the image and assigned to the corresponding Lc details. This transforms the visual assessment into a verifiable test result

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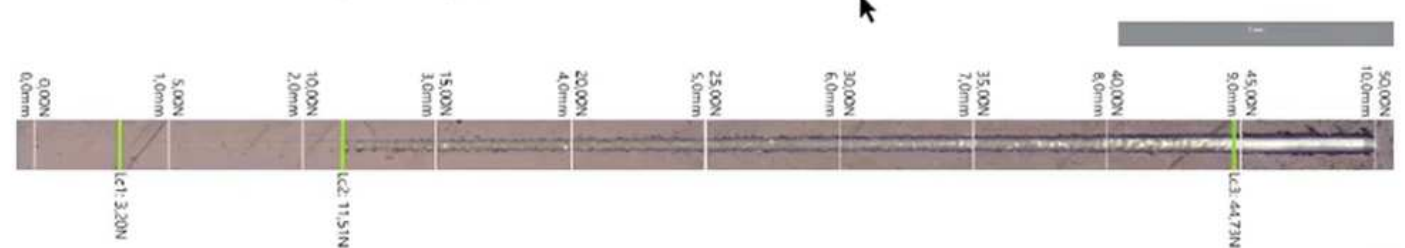
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Soggetto a modifiche tecniche ed errori

Scratch test data

Procedure:	Progressive load scratch test	Date:	01/06/2026 08:26
Initial load:	0,00 N	Final load:	50,00 N
Scratch speed:	10,00 mm/min	Loading rate:	50,00 N/min
Scratch length:	10,00 [mm]	Lens:	20x
Scratch tool:	Rockwell Diamond 120° R0.2	Standard:	ISO 20502 2016

Scratch test points

St.	No.	Scratch Lc points	Lc load [N]	Lc length [mm]	Lens	X-Pos. [mm]	Y-Pos. [mm]	Description
✓	1	Lc1	3,20	0,64	20x	0,00	0,00	
		Lc2	11,51	2,30	20x			
		Lc3	44,73	8,95	20x			



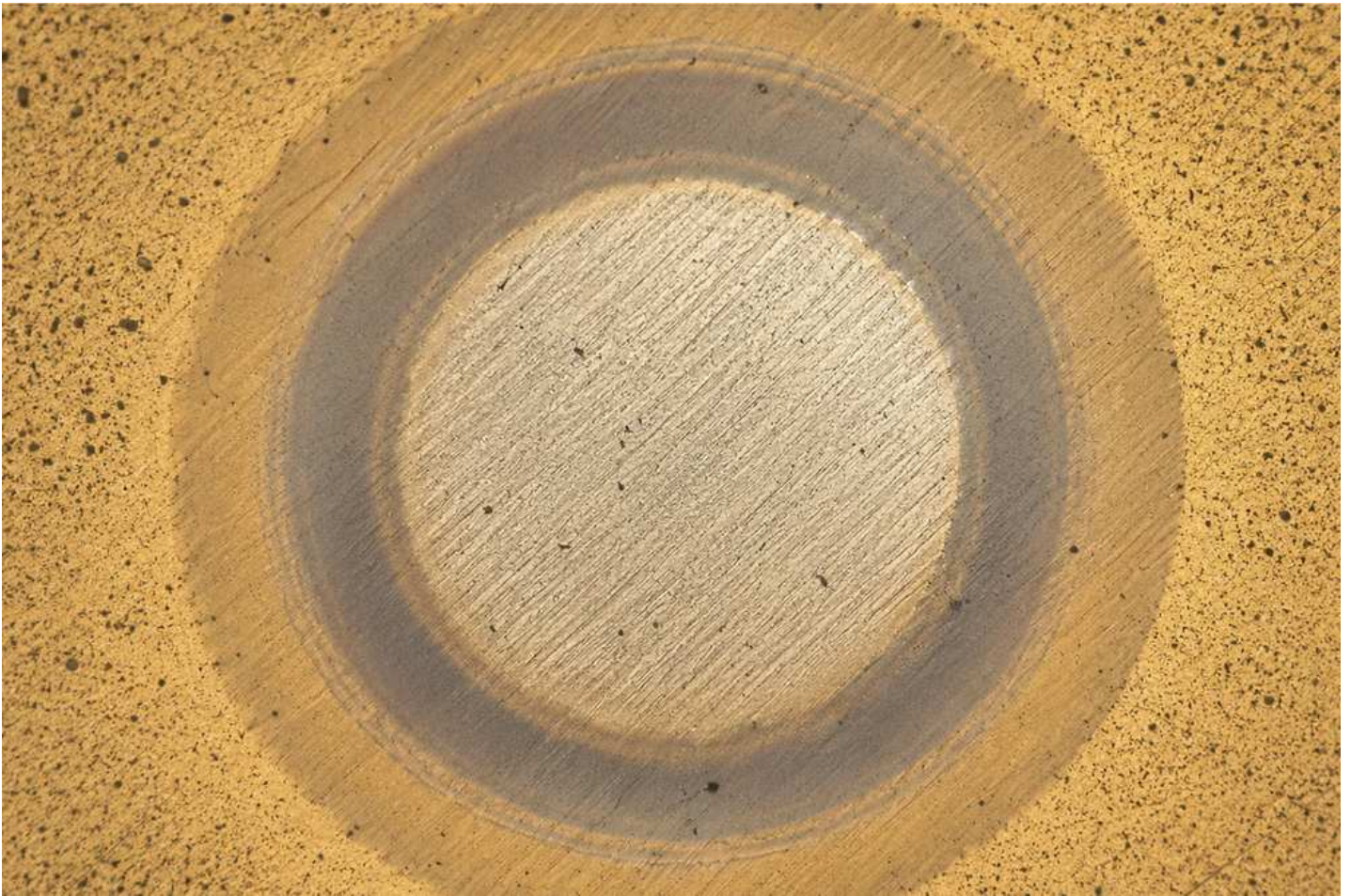
REPORT

Test parameters, scratch track, Lc values and evaluation results are compiled into a test report. This simplifies documentation, the comparison of test series, and the dissemination of results within the quality process.

COATING INSPECTION MADE EASY

QPIX INSPECT FOR CRATER-GRINDING AND ROCKWELL ADHESION TESTING

The optional Qpix Inspect modules expand the Qscratch 20 with practical functions for coating evaluation. Crater-grinding supports microscopic coating thickness measurement in accordance with DIN EN ISO 26423, while the Rockwell adhesion test enables qualitative adhesion evaluation of ceramic coatings in accordance with DIN EN ISO 26443. This allows additional information on coating quality to be captured, evaluated, and documented directly within the familiar QpixControl2 software environment.



CRATER-GRINDING COATING THICKNESS MEASUREMENT

Crater-grinding method for microscopic coating thickness determination as supplementary information for coating evaluation in accordance with DIN EN ISO 26423.



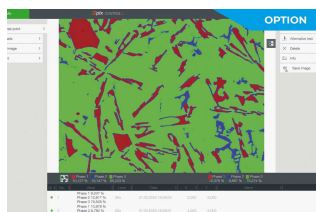
ROCKWELL INDENTATION TEST

Rockwell indentation test for qualitative adhesion evaluation of ceramic coatings in accordance with DIN EN ISO 26443.

ANALISI STRUTTURALE RESA FACILE

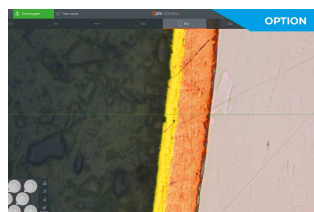
MODULI SOFTWARE QPIX INSPECT

The intuitive and user-friendly Qpix INSPECT software functionality provides a comprehensive toolbox for microscopic evaluations and result documentation. The multifunctional software can be customized for customer-specific measuring tasks and complemented with add-on modules.



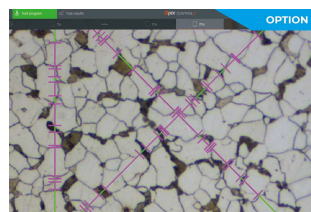
ANALISI DELLE FASI DI ISPEZIONE

- | Dimensionamento automatico dell'oggetto dell'immagine
- | Valutazione delle frazioni di fase secondo DIN 9042, ASTM E-562 e ASTM E-1245.
- | Fornisce risultati analitici come proporzioni percentuali di una superficie o come valori nominali della superficie sotto forma di tabelle o diagrammi



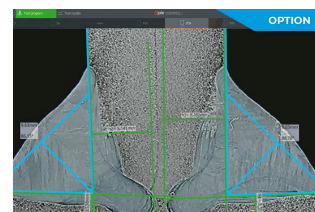
MISURAZIONE DELLO SPESSORE DELLO STRATO INSPECT

- | Determinazione dello spessore dello strato secondo DIN EN ISO 1463
- | Misurazione semiautomatica di strati orizzontali, verticali e radiali
- | Fornitura dello spessore dello strato come valori statistici per lunghezze sotto forma di tabelle o diagrammi



ISPEZIONE DELLA DETERMINAZIONE DELLA DIMENSIONE DELLE PARTICELLE

- | Determinazione della dimensione delle particelle secondo DIN EN ISO 643 e ASTM E112 con il metodo della sezione lineare o circolare
- | Risultati dell'analisi forniti come tabelle o diagrammi
- | Documentazione delle caratteristiche statistiche delle dimensioni delle particelle e delle lunghezze dei segmenti che tagliano le particelle



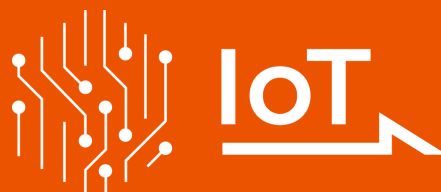
INSPECT WELD SEAM MEASUREMENT

- | Standardised measurement and evaluation of weld seams
- | Prefabricated templates with all relevant measuring tools such as throat thickness, weld reinforcement, penetration depth, etc.
- | Automatic good/bad evaluation and report generation.

IOT - INTERNET OF THINGS

THE PLATFORM FOR REMOTE ACCESS TO YOUR DEVICES

All QATM hardness testers with QpixControl2 and QpixT2 software seamlessly integrate into the Verder Scientific IoT platform, providing enhanced functionality and seamless connectivity.



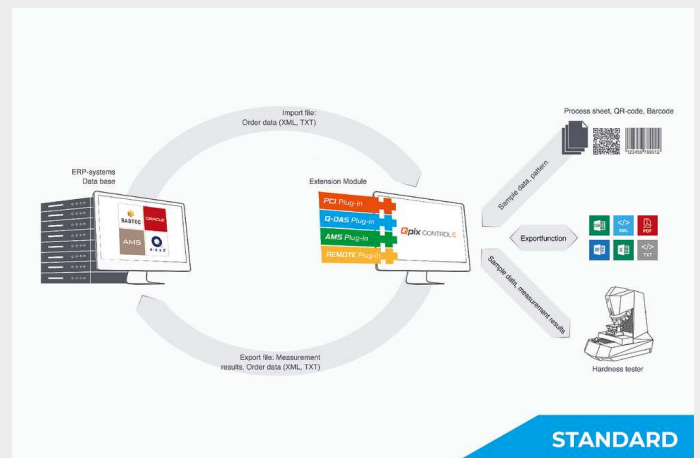
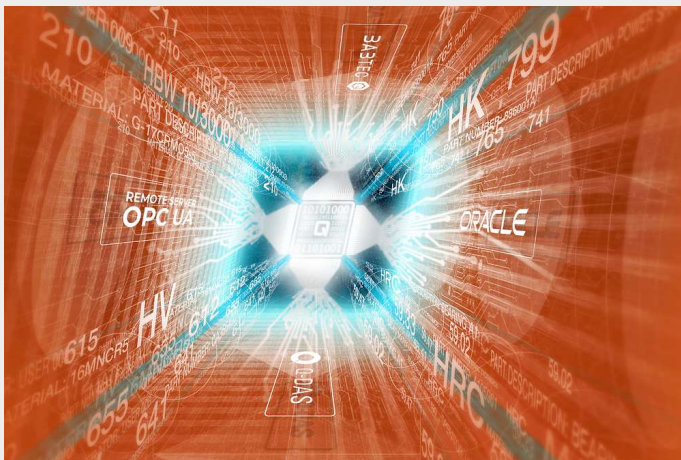
- | **Real-time Monitoring:** Monitor your machinery in real time, from anywhere in the world. This data-driven approach empowers you to make informed decisions with ease.
- | **Live Notifications:** Be ahead of the curve with immediate alerts and updates. Real-time notifications ensure you stay informed about your equipment's performance, leading to proactive maintenance.
- | **Effortless Backup:** Simplify your data protection. Whether you need to back up a single device or an entire fleet, our platform streamlines the process, minimizing downtime and data loss.
- | **Automatic & Free Software Updates:** Bid farewell to manual updates! Verder Scientific IoT ensures your customers' machines are consistently equipped with the latest software, optimizing performance and reliability.



INDUSTRIA 4.0

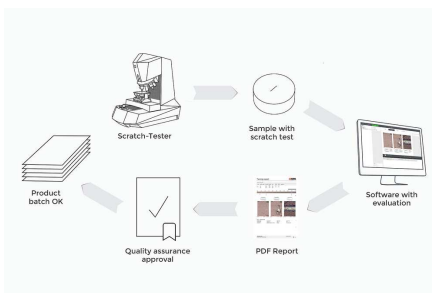
QCONNECT PER UN DOMANI CONNESSO

Qconnect è l'interfaccia del software QATM Qpix Control2, che fornisce ai clienti un portafoglio completo di connettività tra dispositivi - dalla produzione in serie, interfacce XML aperte (bidirezionali) e soluzioni plug-in pre-specificate, come il QDAS Plug-In+, fino a soluzioni di connettività specifiche del cliente implementate completamente da QATM. Abbiamo una soluzione professionale per ogni esigenza applicativa.



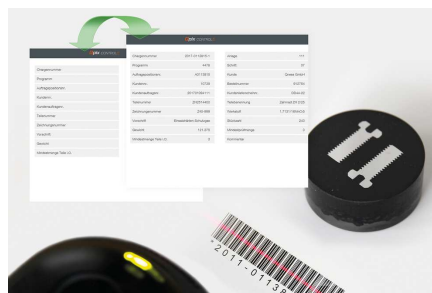
APPROVED QUALITY

DATA EXCHANGE & MONITORING



REPORT & AUTO-EXPORT

Test results, Lc results, scratch
track information, and test



**LETTORE DI CODICI A BARRE/
QR CODE/DMC**

Le piattaforme software Qpix



LOGIN VIA NFC

Il software Qpix Control 2
supporta l'accesso utente tramite

parameters can be documented in a structured format and exported. Standardized test reports and flexible export options facilitate the transfer of results to quality assurance, documentation, or higher-level systems.

supportano l'uso di lettori di codici a barre e QR code, semplificando i flussi di lavoro per gli ispettori e prevenendo gli errori degli operatori. Il caricamento dei dati di intestazione è semplice (standard), e i lettori possono essere completamente integrati per selezionare automaticamente i modelli o recuperare i dati da sistemi di livello superiore (opzionale).

lettore NFC esterno. A seconda del tipo di tag o card NFC, è possibile programmare anche le carte di accesso già in uso dal cliente, ad esempio.



Gamma di forza di prova	0.5* - 200 N
Constant load	Single measurements
Progressive load	Single measurements
Asse-Z	Dynamic, automated (CAS-Technic), Travelling distance Z 150 mm (5.91")
Posizioni dell'utensile	8-fold motorized tool changer (max. 3 testing modules, max. 7 lenses)
Attrezzatura di base inclusa	Rockwell diamond; 20x, 50x Lenses
Tipi di lenti	Standard (Achromat) and High Quality (Semi-apochromat) for hardness testing and microscopy
Telecamera per immagini campione	-
Cross slide	Motorized Y axis
Dimensione della tavola	150 x 120 mm (5.91 x 4.72")
Precisione di posizionamento	Y-axis +/- 0.2 µm

Percorso di traslazione	Y 150 mm (5.91")
Elementi di controllo	Emergency stop, Start button, Joystick Y/Z
Peso massimo del pezzo	50 kg (110 lbs)
Peso del dispositivo di base	58 kg (127.9 lbs)
Optional	Qpix Inspect Module

* 0.5 N and 1 N > 1% accuracy

www.qatm.com/qscratch-20-go

ARTICOLI