

SCRATCHM 5.5

ADVANCED SURFACE TESTING SYSTEM



SCRATCH 5.5 MACHINE

[SM5.5]

The only fully-instrumented ISO and ASTM compliant scratch testing instrument is available for immediate purchase. The SMS Scratch 5.5 Machine meets ASTM D7027-05 and ISO 19252 Scratch testing standards, and can also replicate other industry standards including Ford 5 Finger, Erichsen cross-hatch, pencil-hardness, and constant-load tests.

The Scratch 5 Machine runs to higher loads (750 N), higher velocities (400 mm/s), and is more consistent (as little as 0.25 N variance) than other instruments. The profile-calibrated rising-load test is the state-of-the-art in scratch property analysis and competitive performance analysis. No other instrument provides repeatable, quantifiable scratch data, and only the SMS Scratch 5.5 Machine implements this test in the load ranges required by the ASTM and ISO standards.

The Scratch 5 Machine is modular, and can be configured to work in lower, higher-resolution loads, or at higher loads for harder materials. The Scratch 5 Machine supports a variety of replaceable styli (from 1mm to 10mm ball in various materials, as well as mar-styli, abrasive styli, and cutting/sharp styli to support a variety of research and test standards). It is also designed to work with our Automatic Scratch Visualization Software.

The Scratch 5 Machine ships with everything you need to get started with ASTM and ISO standard tests, including the machine, the controller PC and data capture card, styli, clamps, and operating software.

SCRATCH TESTING

Scratch tests with the Scratch 5.5 Machine feature reliable data acquisition, repeatable results, and the security of an industrial standard. Capabilities include rising-load tests to meet ASTM and ISO standards using a variety of styli geometry, and constant-load tests to replicate Ford 5-Finger, Erichsen, and pencil-hardness (ASTM D3363) tests.

The Scratch 5 Machine performs consistent and repeatable tests. Older testing methods lack quantitative, auditable testing data, and cannot reliably reproduce tests between material formulations, or even on the same material with different samples. Only the the Scratch 5.5 Machine gives you the confidence that you are working with good science and known physical testing parameters.

MAR TESTING

The Scratch 5.5 Machine is the only instrument to meet the testing standards necessary for use with Texas A&M's industry-leading Mar testing standard with the TAMU "Black Box". Mar testing can be performed with the high loads the machine is capable of producing (1000+ Newtons), and with variable geometry, to meet the testing requirements particular to each research environment or client requirements.

OTHER TESTS & CAPABILITIES

Because the Scratch 5.5 Machine is a programmable, research-grade instrument, it is capable of replicating several other tests and test standards. Of note, it can replicate an Erichsen crosshatch test, the Ford 5-finger test, and pencil hardness test. Additionally it can perform thin-film tests, and thin-film puncture tests, indentation tests, thermally-controlled tests, reciprocation and wear tests, and test coatings and multi-layer systems.

INSTRUMENTED DESIGN

Every major axis of Scratch 5.5 Machine is instrumented, and gathers data at up to 1000 points per second, with 0.25% accuracy per data channel. Data is precisely correlated in time, and can be correlated to captured visual information for each test. The machine captures data on normal Load (vertical load), tangential load (opposing the direction of traversal), depth and distance. Precise, high-performance data capture is a key element of reliable, quantifiable testing and systems comparison during research and validation. No other instrument is capable of producing the high quality, reliable data that the Scratch 5 Machine is capable of producing, test after test.

EASE OF USE

The Scratch 5.5 Machine ships with everything you need to meet ASTM and ISO scratch tests. Installation and basic training takes a few hours. After setup, no additional tools are needed to begin scratch testing. Our intuitive and integrated operating software makes performing and analyzing tests easier than ever. Tests can be run in seconds, and data can be reviewed and saved in industry-standard formats, including Microsoft Excel. Many

customers are produce research-quality testing information on the same day as installation.

STANDARDS COMPLIANT

Scratch 5.5 Machine is the only scratch system known to meet ASTM D7027-05 and ISO 19252:2008 standards for polymeric coatings and plastics scratch testing. It can also be leveraged to meet a variety of other ASTM, ISO, and industry standards. Scratch machines developed by the Polymer Technology Center's SCRATCH Consortium were instrumental in the design and acceptance of these industry standards, and the Scratch 5 Machine is the latest commercial iteration of that work.

ANALYTICAL SOFTWARE

The ASV software automatically performs visual analysis of scratch and mar samples for flat, piano-black, and textured surfaces across a range of colors. Developed in conjunction with the Texas A&M University PTC SCRATCH consortium, this software reliably and consistently identifies the critical load at which scratch phenomena occurs. It integrates seamlessly with the data files produced by the Scratch 5.5 Machine, giving you "heads up" inspection of visible phenomena and data in real-time. The software works with samples produced by the Scratch 5 Machine, as well as Ford 5-Finger, and Erichsen equipment. The same software is compatible with both the SMS ASV Kit and the SMS Blackbox Mar Visualization Instrument.

OPTIONAL STYLI (INDENTER) GEOMETRIES

SMS produces a wide variety of styli, including custom styli for various tests. Standards styli include: 1mm, 2mm, 4mm, 5mm, 7mm, and 10mm ball tips in stainless steel;

1mm, 2mm, 5mm ball tips in carbide;

6mm and 12mm tilting barrel tips;

10x10mm and 5x5mm square tips;



OPTIONAL & SAFETY FEATURES

Puncture Detection

Add puncture detection for thin-films and conductive-base coatings applications. Puncture detection capabilities of the Scratch 5.5 Machine can be used to detect in situ puncture during test, as well as automatically halt-and-record capabilities of wear and reciprocation tests for bulk polymers and thin films.

Y-Axis

Availability in 4Q2019

An optional Y-axis allows for test automation. The Y-axis can be programmed to perform multiple tests of a sample, or automatic crosshatch testing (Erichsen-style testing).

Integrated Work Stand

An integrated work stand, built to our specifications for noise and vibration reduction, ensures that your instrument is properly sited and isolated for use in the lab.

Light Curtain

A digital “light curtain” prevents users from exposing themselves to moving-parts risk by detecting when hands, arms or other objects have intruded into the working envelope of the machine.

Attachments & External Options

Hot Plate

This temperature-controlled hot plate sits on the work surface of the machine, and can hold samples to specified temperatures in situ, up to 250 °C. The hot plate can be mounted to one side of the work surface, and the adjustable head position of the Scratch 5 Machine allows an operator to conduct tests directly over the hot plate attachment, without moving or transferring the sample.



Pneumatic Film Chuck

A pneumatic-vacuum film chuck, this attachment allows an operator to hold thin films and other flexible samples to a variety of sacrificial backings during test. It can also be used with standard, flat, bulk samples for simple and quick testing.

Turntable

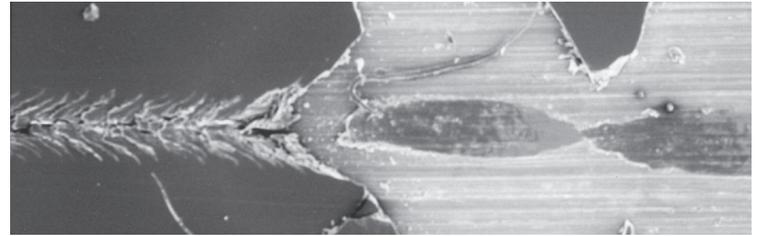
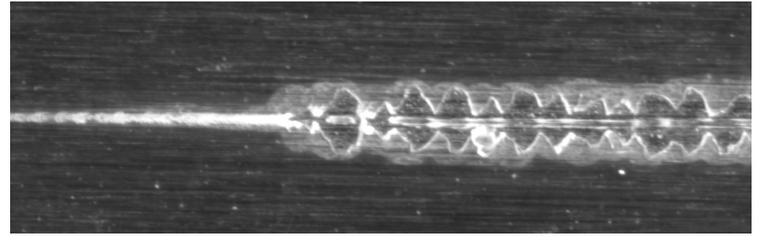
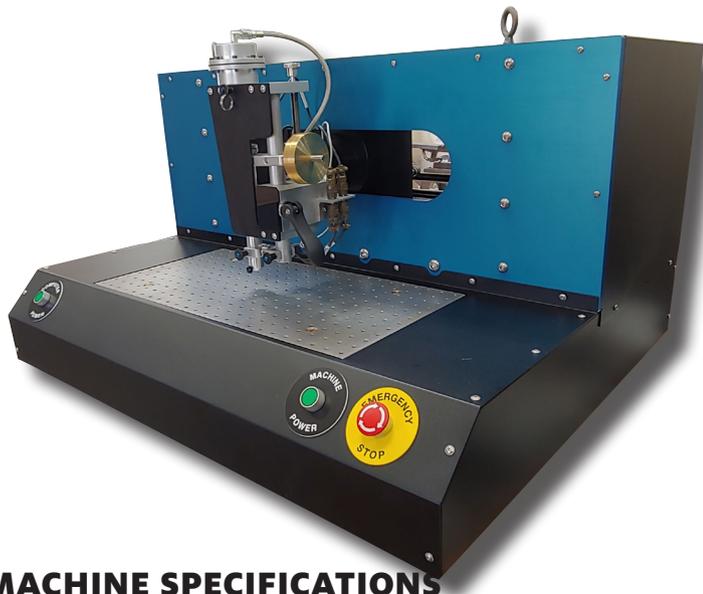
The Turntable attachment automates certain types of wear and crosshatch pattern testing, including turntable and Erichsen crosshatch tests.

TAMU “Black Box” Mar Visualization Instrument

The Black Box is the key analytical instrument in the assessment of Mar damage. Developed by the Texas A&M PTC SCRATCH laboratory, this device is critical in analyzing mar tests performed by the Scratch 5.5 Machine.

ASV Kit

The ASV Kit is the basic analytical toolkit for performing visual analysis of test samples from the Scratch 5.5 Machine, and from other devices. The ASV Kit includes a flatbed scanner, color calibration cards, and the software necessary to automatic scratch analysis. The software performs an objective analysis of the samples, without having to rely on extensive operator and technician training. It eliminates variables in the assessment phase of testing by normalizing for lighting conditions, viewer angle, and sample color.



MACHINE SPECIFICATIONS

Performance Capacity

Velocity: 400mm/s, 0.1mm/s increments

Normal Load: 1 – 600N

Accuracy: 0.05%

Sensors

Up to 1000 points per second, simultaneous capture

Normal Load: 1 – 600 N, 0.05% accuracy

Tangential Load: 1 – 225 N, 0.25% accuracy

Lateral Displacement: 200mm

Index Displacement (Available 4Q2017): 0-150mm, 0.25% accuracy

Depth: 50mm, 5 micron accuracy

Working Envelope

Lateral Free position: 200mm

Vertical displacement: 50mm

Index positioning: 150mm

Metric or standard work surface:

Standard: ¼-20 mounting holes on 1 inch grid

Metric: M6-1.0 mounting holes on 25mm grid

Output

CSV format, all digital sensors

Virtual sensors

Reciprocation count

Puncture detection

Raw voltage & diagnostics

Orientation

Test index

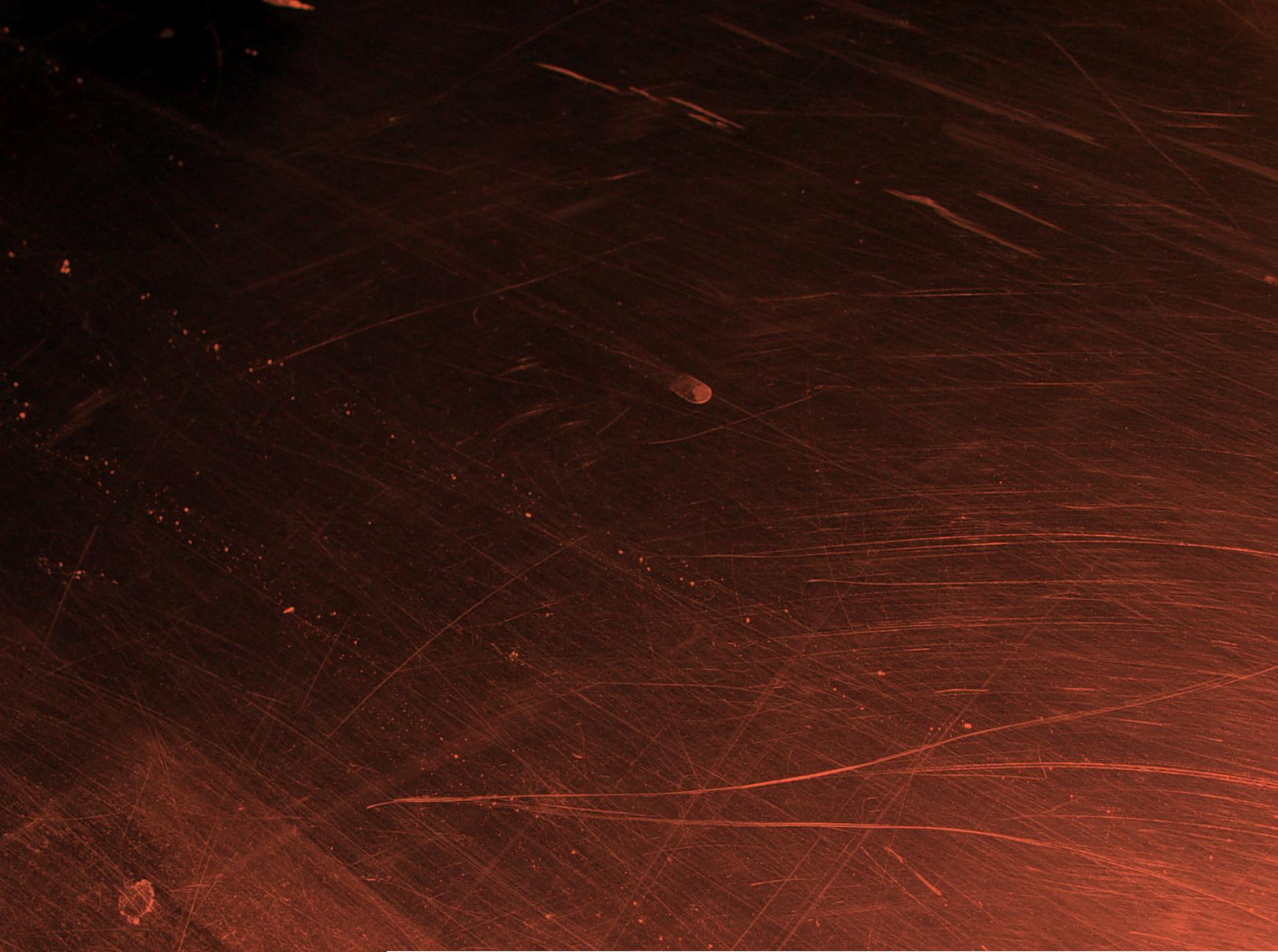
Test offset from 0

Scratch coefficient of friction

Up to 1,000,000 data points (up 24 hours of continuous records)

Styli Chuck

ASTM/ISO standard for 0.095" shank



**SURFACE
MACHINE
SYSTEMS**

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