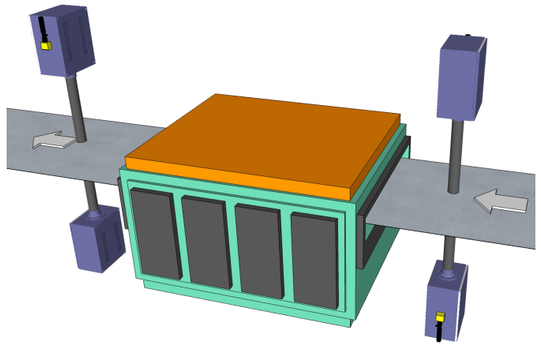
Operational Configuration

Permanent Installations: The **TST.1** system is available in three configurations: 1, 2, or 4 heads. Four head system (*in diagram below*) enables measurement of both sides of sheet, before and after cleaning section.

The **TST.1** heads are protected with filtered air in stainless steel cabinets. They may be traversed across the sheet, measuring variability across the sheet.



Temporary Installations: When operating as a remote system the **TST.1** is extremely simple to use as a quick measuring or auditing configuration (*as shown in the photos below*). The basic **TST.1** system can be set-up and taking measurements in less than five minutes if electrical power and a mounting location are readily available.

Prove Before Purchase

Interested to evaluate this cutting-edge system on your process line? Want to see the capability of your cleaning section equipment? There are many options to evaluate your process and equipment with the **TST.1**, including online demonstrations, auditing plans, and rental packages. We are extremely confident you'll be impressed with the **TST.1** — and impressed with the savings it will provide. Please contact us to discuss tailored proposals for your evaluation of the revolutionary **TST.1**.

The TST.1 delivers surface cleanliness from guess-work to know-how.

Good Data, Good Decisions

TST1 by TolketStarTool

For more information or to arrange an visit to your facility thank you for contacting

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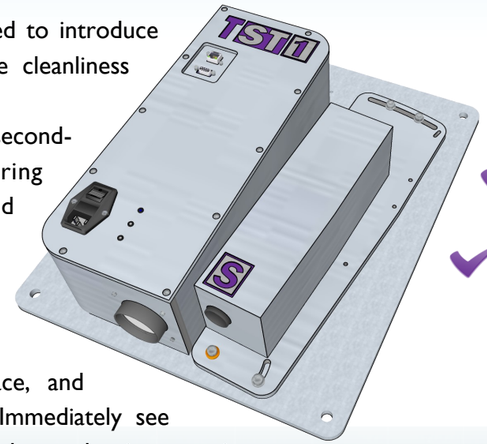
TST1 Metal Surface Cleanliness: Analyzed & Quantified

TolketStarTool is pleased to introduce the redesigned **TST.1**. surface cleanliness analysis system.



- ✔ Online
- ✔ Real—Time
- ✔ Non—Contact

The all-new **TST.1** is a second-generation iteration featuring enhanced laser technologies and field serviceability.

The **TST.1** quantifies surface contamination (organic or inorganic) on-line, without contacting the surface, and continuously in-production. Immediately see and measure cleanliness when cleaning section parameters change. Use statistical process control (SPC) to optimize cleaning section performance, cost-per-ton, and quality.

Improve Quality Yield

Confirm surfaces are adequately clean to accept coatings and emerge from annealing furnaces free of stain — alarm when not. Obtain a record of cleanliness for each coil.

Optimize Cleaning

Instantly monitor, trouble-shoot, and optimize cleaning section performance using the pertinent metric: surface cleanliness. Save money by throttling the cleaning section to meet requirements instead of wasting money running unnecessary cleaner sections or components — particularly when some equipment does not contribute. Obtain immediate feedback on cleaning section changes. Optimize maintenance scheduling. Hold upstream providers accountable. Verify sub-section performance. Collect digital data at precise locations on the coil's surface or aggregate of entire coil's surface.

TOLKET

Manage your cleaning section using data, not guesses.

Good Data, Good Decisions

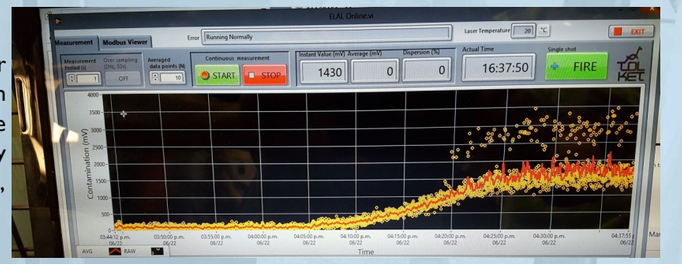
Chicago Heights Star Tool & Die Works, Inc.

Technical Features Summary:

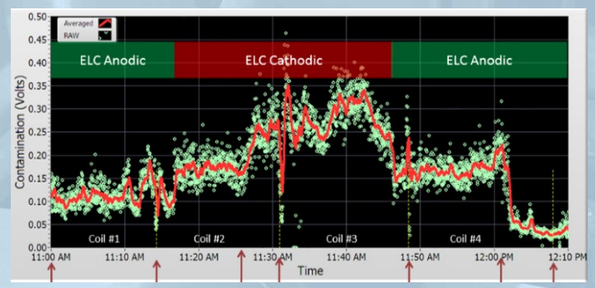
No Risk of Metal Surface Damage
Measures Aggregate of Soil Film Layers & Particulates, including Iron Fines
Resolution Exceeds Capability of Premium Cleaning Sections
Measures Emissive Signal: Not Affected by Optical Properties of the Metal's Surface
No Line Speed Limit
Large Stand-Off Distance Keeps Equipment Safe [0.8m | 31" nominal - acceptable range 0.4~1.2m | 16"~47"]
Deep Depth of Field [+/-5cm | +/-2" typical; greater requires discussion]
Compact, Solid-State, Semi-Portable
Permanent or Temporary Installations — Set-up in <10 minutes for temporary installation
Instrument Head Protected Within Cabinet for Permanent Installation
Simple Maintenance: Infrequent and Easy Laser Module, Lens, and Air Filter Changes
Able to Interface with Line Automation, PLC, PC, Analog or Digital
Compatible with Sheet, Longs, Pipe, Plate, Blanks, or Piece Parts
System Scalable: Before & After Cleaner; One Side of Sheet, or Both Sides
Optional: Sheet Width Scanning Capability

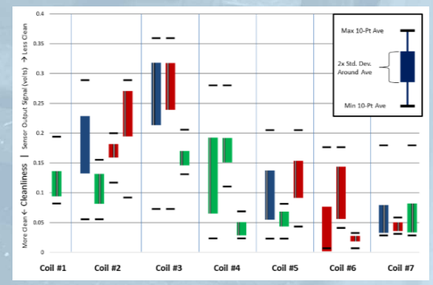
Graphical Interface and The Data:

The **TST.1** can operate from any PC or PLC using any industrial communication protocol. For stand-alone, remote configurations the interface is simple. Key controls include detector gain, measurement period, and start/stop .



Introducing Statistical Process Control (SPC) for Cleaning Sections; optimize settings, products, and costs-per-ton, trouble-shoot, understand and predict mean time to failure (MTTF). The **TST.1** has shown cleaner performance details never seen before. For example: Differences in cleaning as a function of electrolytic cleaner polarity and current density – Cleanliness variability induced by an imbalanced brushes – Essential or useless brush locations – Influence of wringer rolls – Huge variability of incoming contamination from cold mill; even coils from the same cold mill – Variability across the sheet width – … etc. ...



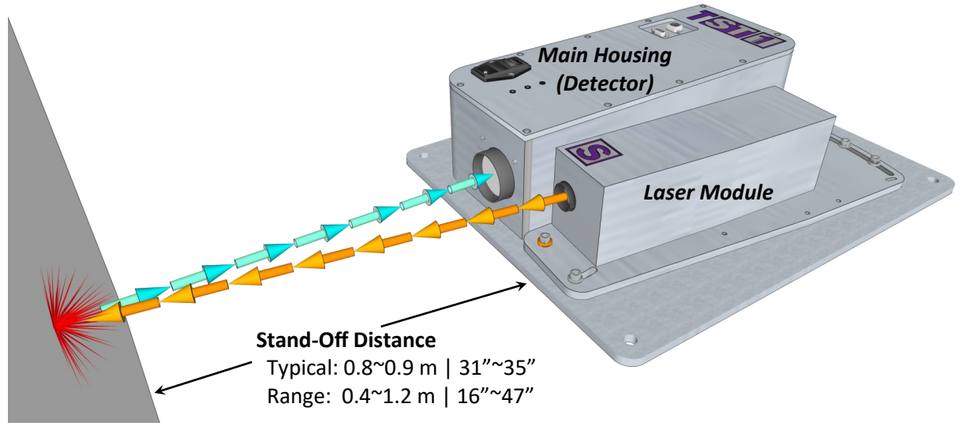


TST1

Functional Summary:

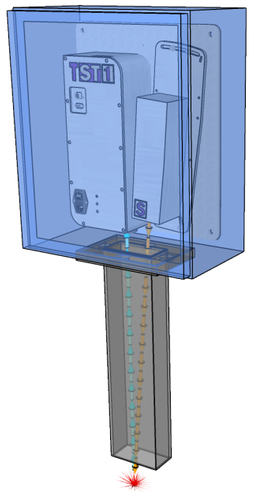
1) The **TST.1** emits an infrared **laser pulse** which impacts sheet's surface *(Orange Arrows)*.
2) Surface contamination absorbs the laser energy. Unable to dissipate the energy, the debris converts into a **plasma plume** (*Red Plume*). When metal surface perfectly clean no plasma occurs; the metal's surface absorbs the laser energy and dissipates heat energy via conduction into its thermal mass.
3) When contamination is converted to a plasma, the intensity of that **plasma light** (*Blue Arrows*) is measured by a photodetector within the **TST.1** head. The amount of contamination is proportional to the plasma's intensity: Perfectly clean surface generates no plasma. A full hard, cold rolled surface typically generates bright intense plasma.
4) The **plasma light intensity is processed** and transmitted to the client.

The **TST.1**, introduced October 2018, with launch with the Model **S** laser module. The Model **S** features a ~1.5 µm wavelength laser that allows safe use without significant eye protection. A different laser module, interchangeable with the Model **S** is scheduled for release Q3-2019.



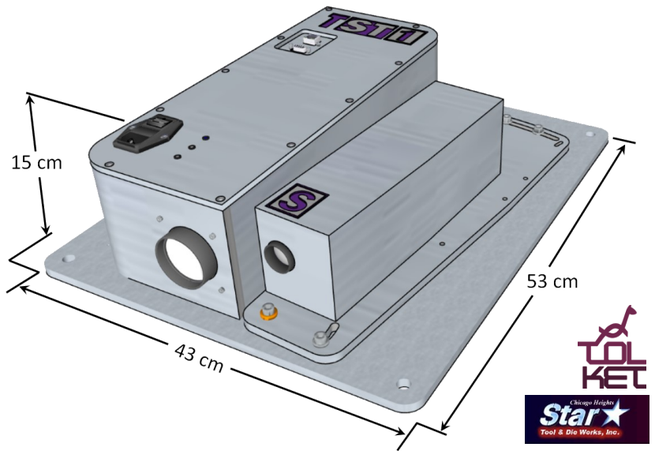
Head Cabinet for Permanent Installations:

NEMA-4X (304SS) 61x51x26 cm | 24"x20"x10" (HxWxD)
"Sight Tube" 15.2x76.2 cm | 6"x3" Cross-Section



Measuring Head Dimensions:

Length: 53 cm | 21" Width: 43 cm | 17"
Height: 15 cm | 5.9" Mass: 21 kg | 45 lbs



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