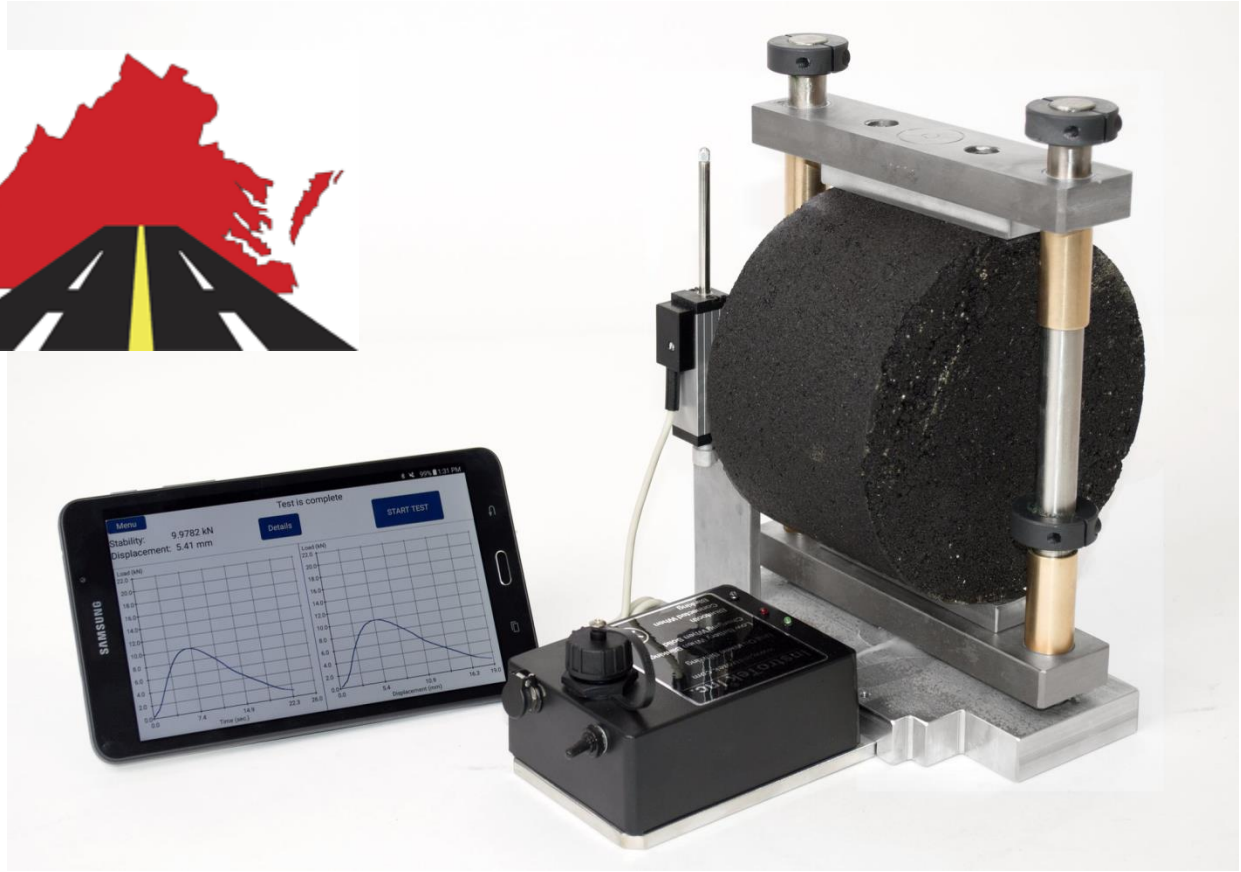
Virginia Pavement Research & Innovation Symposium



IDEAL/TSR and SCB Smart Jigs

Bluetooth Enabled Asphalt Jigs

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INSTROTEK® COMPANIES

INSTROTEK • CPN • HMA • RAINHART

Overview

- Smart-Jigs (SCB & IDEAL-CT/TSR)
- Asphalt Compatibility Tester (ACT)
- HWT-Pro – Hamburg Verification/Calibration
- AutoRice Controller

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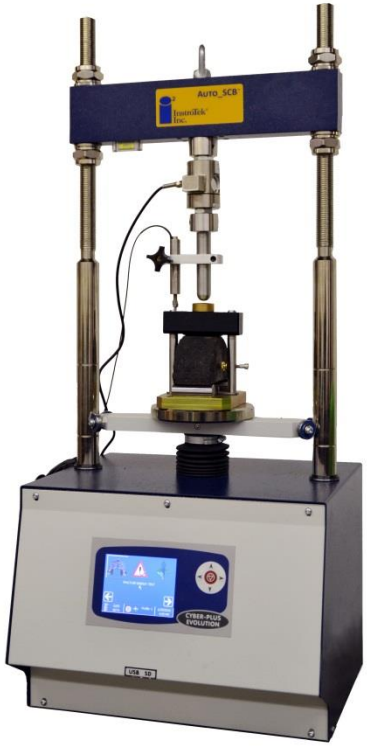
The Balanced Mix Design



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BMD

Balanced Mixes!

Not too Brittle that can cause cracking:

Not too Flexible that can cause rutting:

A Balanced Mix Design!

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Cracking Tests

- **University of Illinois – Urbana Champaign Illinois Flexibility Index Test (I-FIT)**
  - Cumbersome Sample Preparation
  - Analysis software
  - 1 notch depth, difficult to cut
- **Louisiana State University-SCB**
  - Cumbersome Sample Preparation
  - 3 Notch Depths
- **IDEAL–CT**
  - Texas A&M – College Station, TX
  - Gaining most popularity
  - Least sample preparation
  - Uses AASHTO T283-style (TSR) Jig

Older Loading Frames

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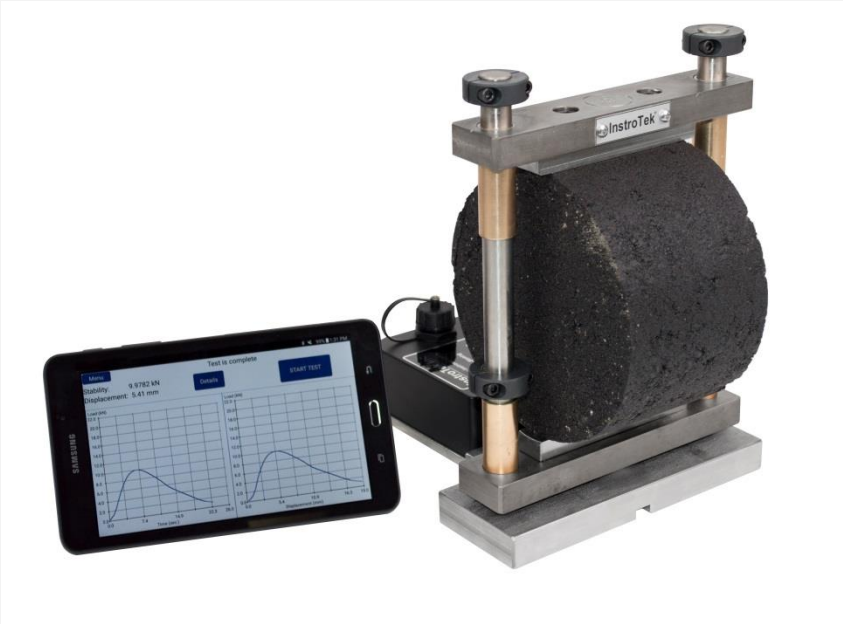
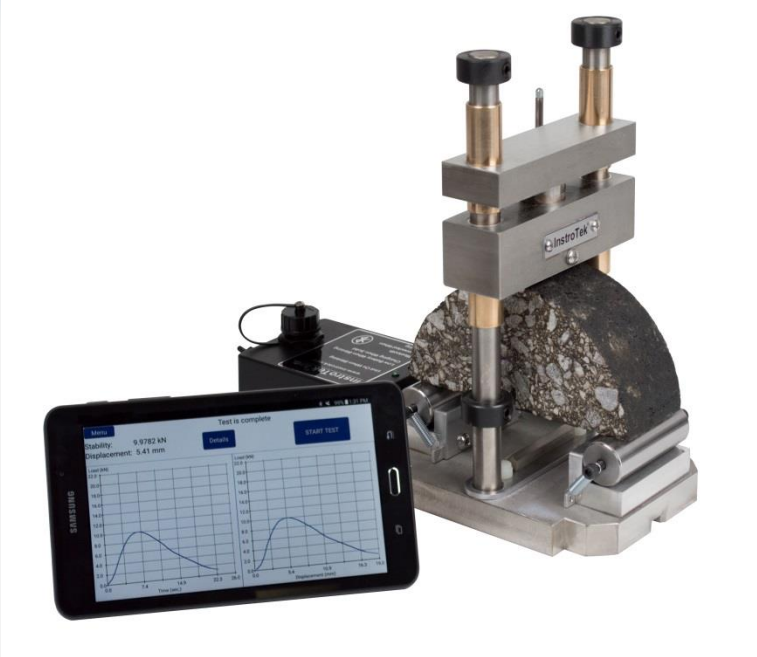
InstroTek Smart Jigs



IDEAL-CT/TSR Jig



Smart-SCB

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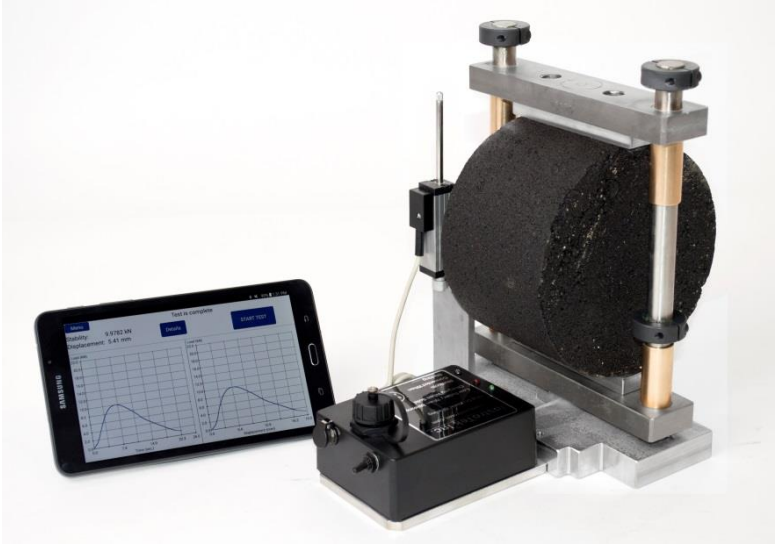
IDEAL-CT



- 2 Test in 1
  - IDEAL CT
  - Tensile Strength Test
- Self contained system
- No need to replace old frames
- Digital results

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Smart-SCB

- Performs both IFIT and LSU Test* Protocols
- Self contained system
- No need to replace old load frames
- Digital test results

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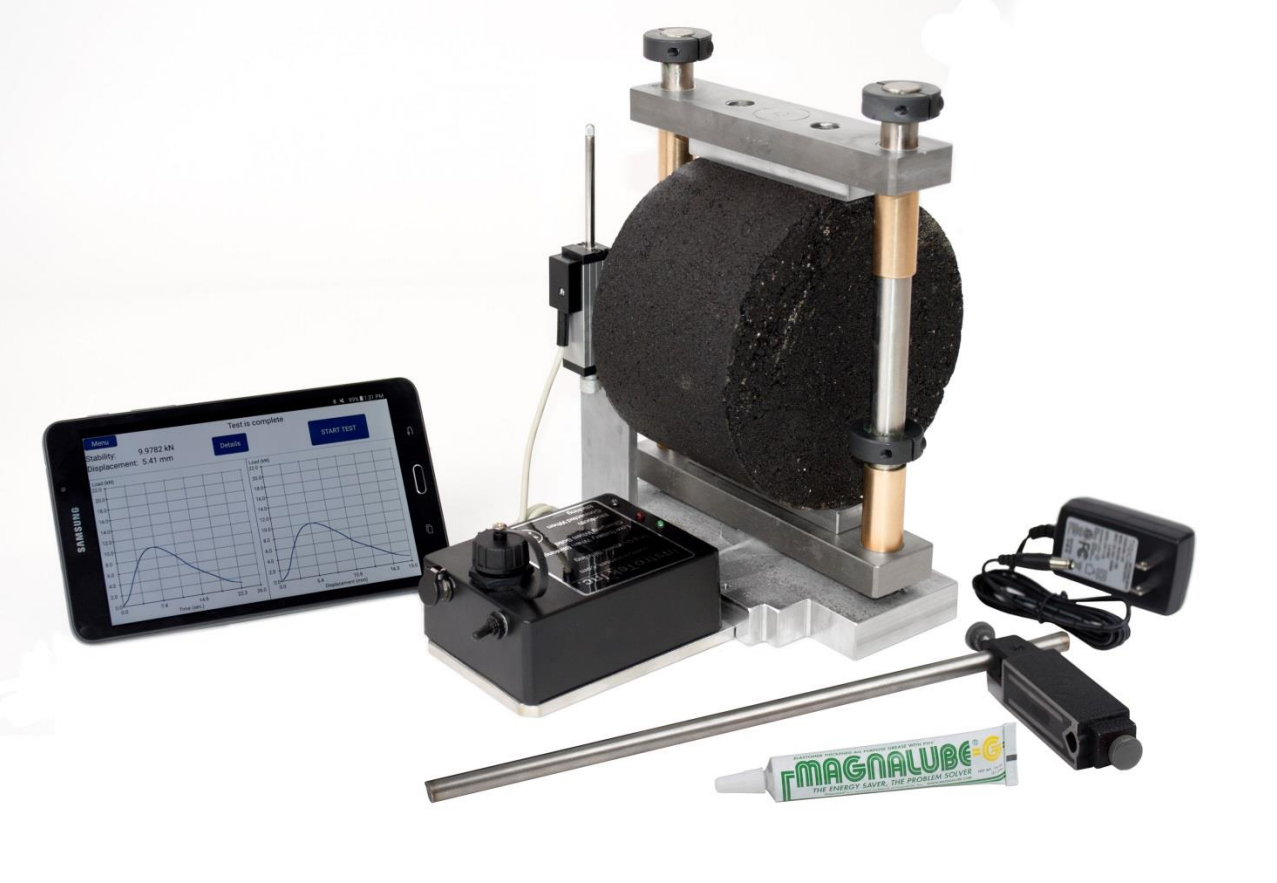
IDEAL-CT/TSR Jig Accessories



1. Jig w/ Bluetooth
2. USB Cable
3. Load Cell
4. Android Tablet
5. * LVDT
6. * Rod and Magnet
7. Power Cord
8. Lubricant
9. Analysis Software
10. * Marshal Hardware

*Optional IDEAL-CT / Marshall Upgrades

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IDEAL/TSR & Smart SCB Advantages

- Easy to use
- Give new life to older load frames
- Digital test results
- No clerical errors
- Easy test set-up
- Automatically displays peak strength
- Perform multiple tests

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ACT

Asphalt Compatibility Tester

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What is ACT?

- Quantifies binder to aggregate adhesion strength
- Uses LED Light scattering off the surface of asphalt to determine color change after boil test
- High degree of correlation to TSR Test

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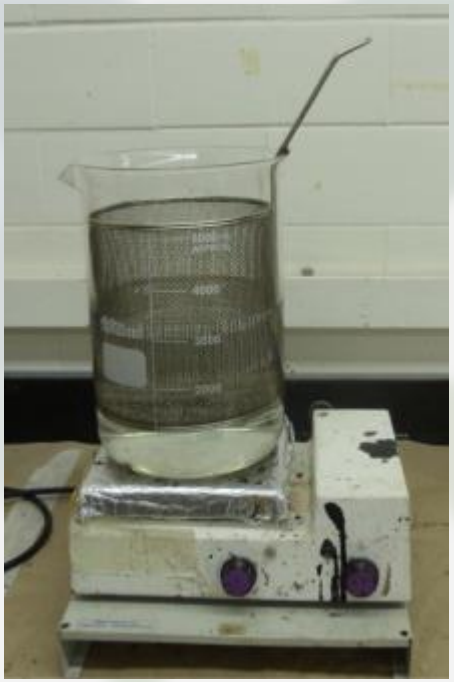
Boil Test (ASTM 3625)

- Been in practice since 1970s
- Quick determination of adhesive strength
- Visual Inspection of color change
- Excellent correlation to asphalt moisture susceptibility tests (TSR Test)



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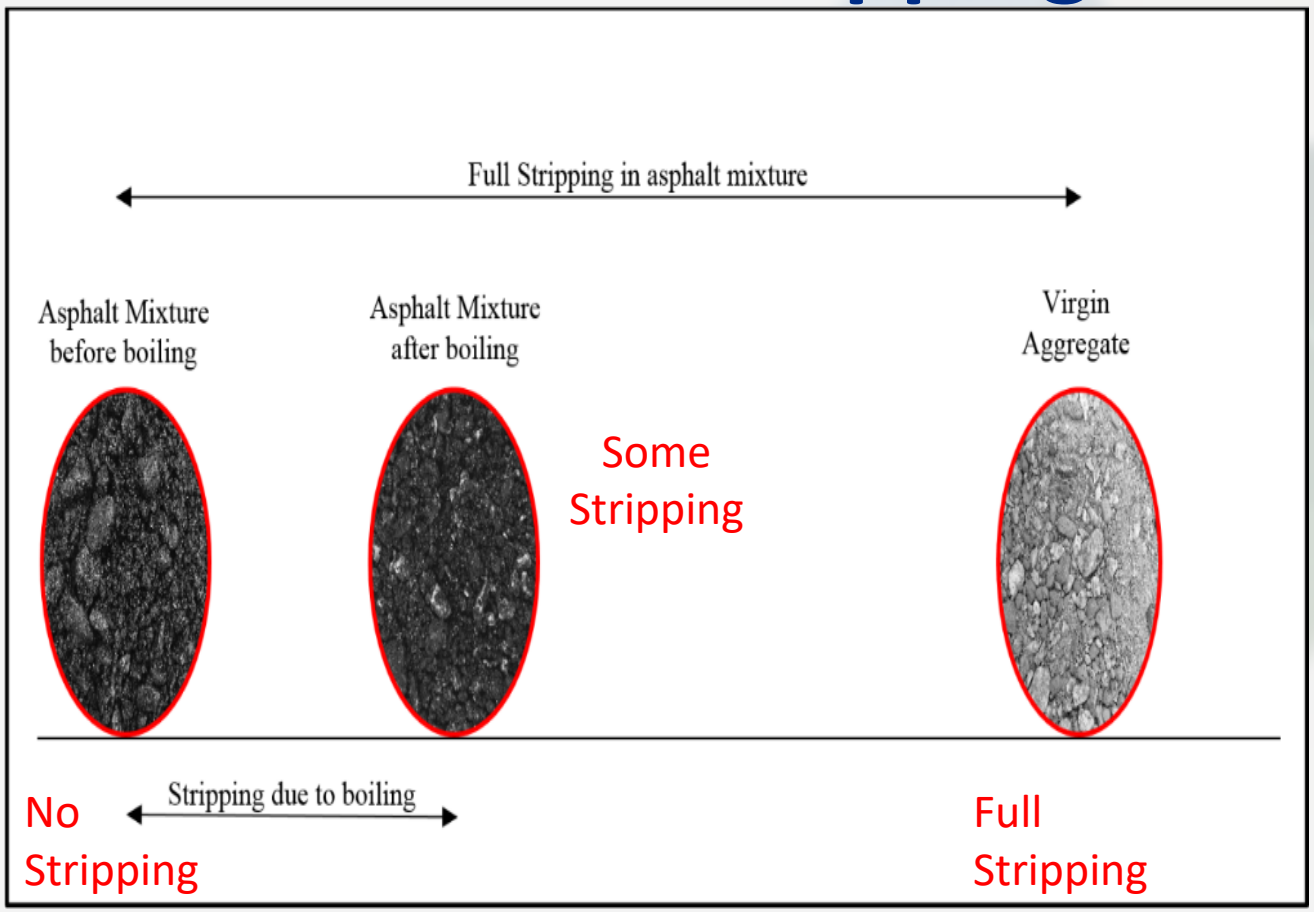
Boil Test – Color Change due to Stripping



Visual Depiction of the loss of adhesion between asphalt and aggregate in Boil Test

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ACT

- Quantifies the results of the Boil Test in seconds

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ACT Advantages

- Quantify Boil Test (**ASTM D3625**) test results
- Predicts passing **AASHTO T283** test results within an hour instead of days
- Evaluates different anti-strip additives for optimum additive content
- Ensures production changes do not result in adhesion failure in the mixtures or poor pavement quality
- Eliminates technical judgment calls for consistent test results
- Straight-forward, easy to use system

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HWT-Pro

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Purpose of HWT-Pro

- Verify Requirements of AASHTO T324 for Hamburg Wheel Trackers (HWT)
  - Rut Depth (Height)
  - Weight
  - Waveform
  - Temperature
- Allow calibration of HWTs

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Designed Uses

- Designed to work with SmarTracker, PMW, Cox and Sons, PTI units
- Can be used to adjust dead load on wheels
- Calibrate LVDTs
  - InstroTek SmarTracker
  - Troxler(PMW)/Cox and Sons

AASHTO T 324 Requirements

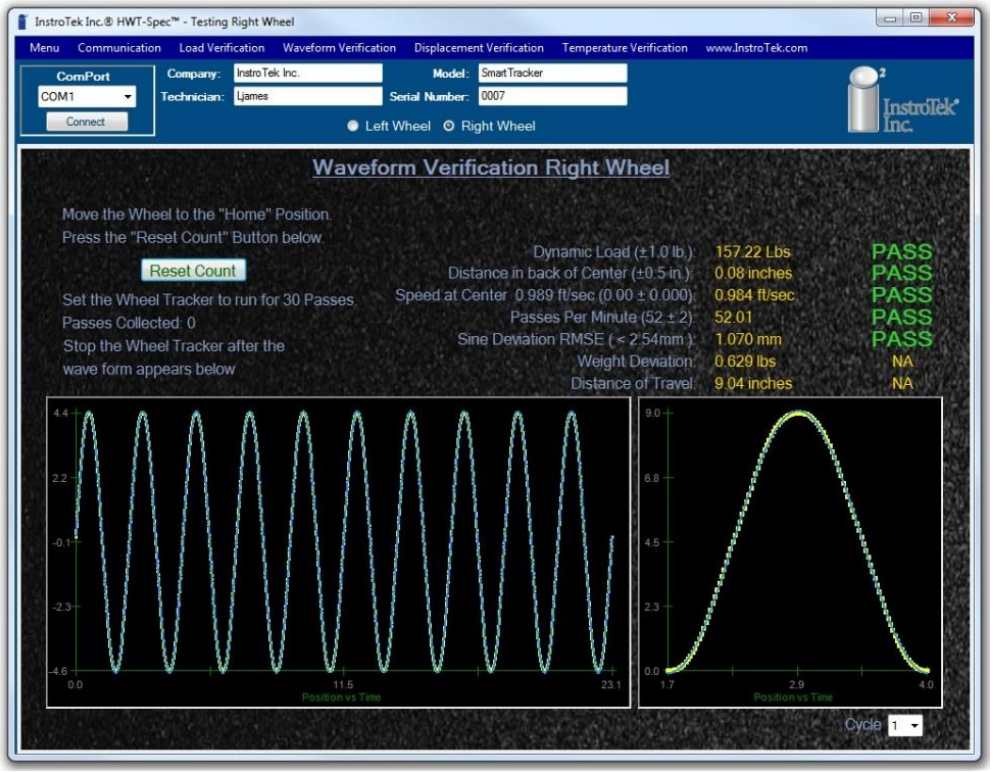
Description	Requirement
Load (lbf)	158 ± 1.0
Speed (ft/s)	1.00 ± 0.066
Center of Waveform	± 0.5 inch of center of specimens
Rut depth error	0.15 mm / 20 mm
Temperature	± 1.0 C

Load Verification

- Dead Load ± 0.1 lbf accuracy
- Uses load cells calibrated with dead weights
- Dynamic load and variation along wheel path

Waveform Verification

- Relative location of center of waveform in tray
- Speed of wheel at center
- Length of wheel path
- Passes/minute
- RMSE of waveform compared to sine wave



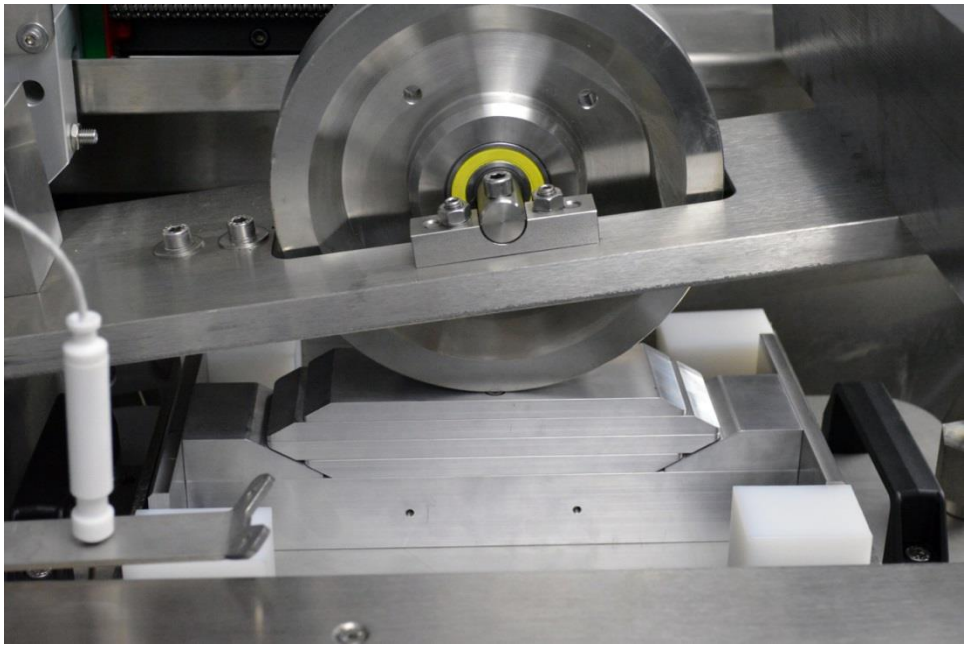
Rut Depth Verification

- How You Calibrate LVDT
  - SmarTracker – under the wheel
  - Troxler(PMW)/Cox & Sons – LVDT outside machine
- T324 Requirement

  0.15 mm/20 mm

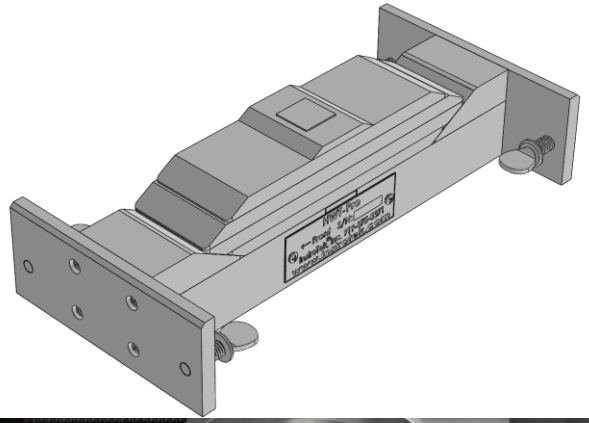
Rut Depth Verification - SmarTracker

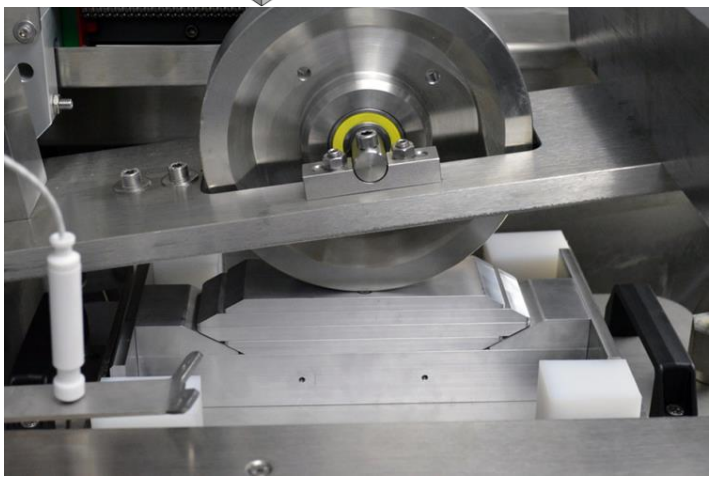
- Under Wheel
- Starts at 40 mm Height
- Use machine manual mode to move onto the slats



Rut Depth Calibration - SmarTracker

- Under Wheel
- Start at 40 mm (height of base)
- Use Machine Manual Mode to Move onto the Slats/Gage Blocks
- 10 Measurements (0 - 45mm by 5mm increments)





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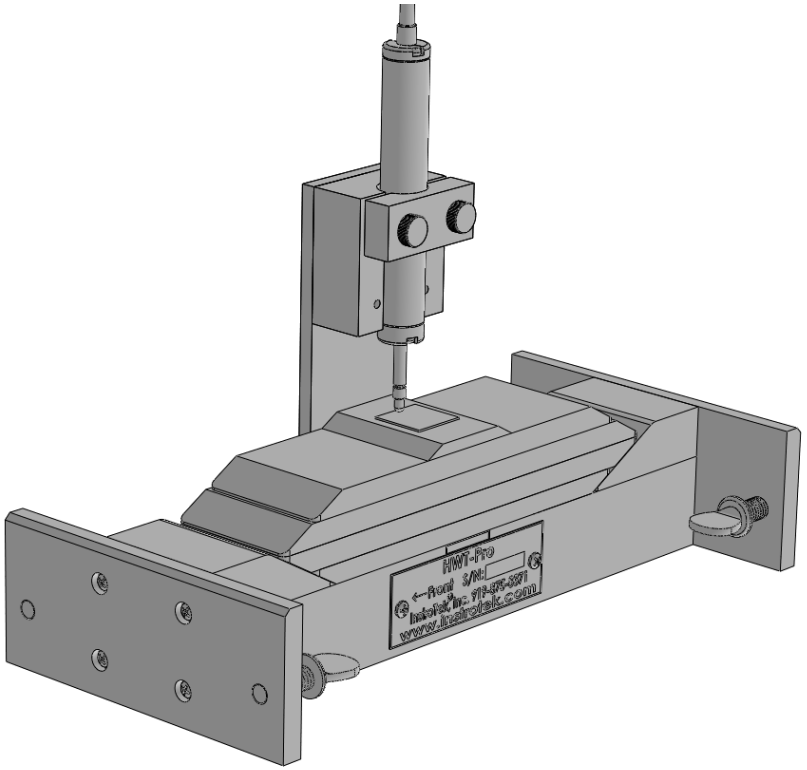
LVDT Verification/Calibration - Cox and Sons/PMW

- Outside of Machine
- Use HWT-Pro Height Base
- Insert Gage Blocks to Change Height
- Verify Linearity of LVDT



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Software – HWT-Spec

- Acquire Load
- Enter Heights
- Print Report
- Save Data

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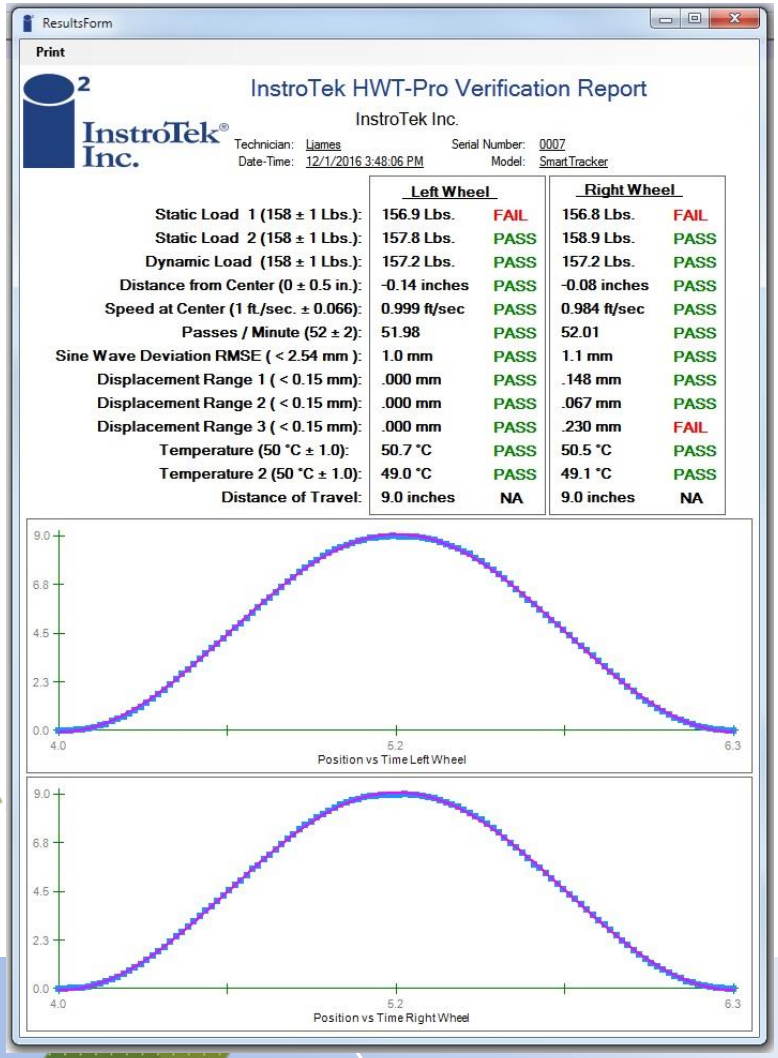
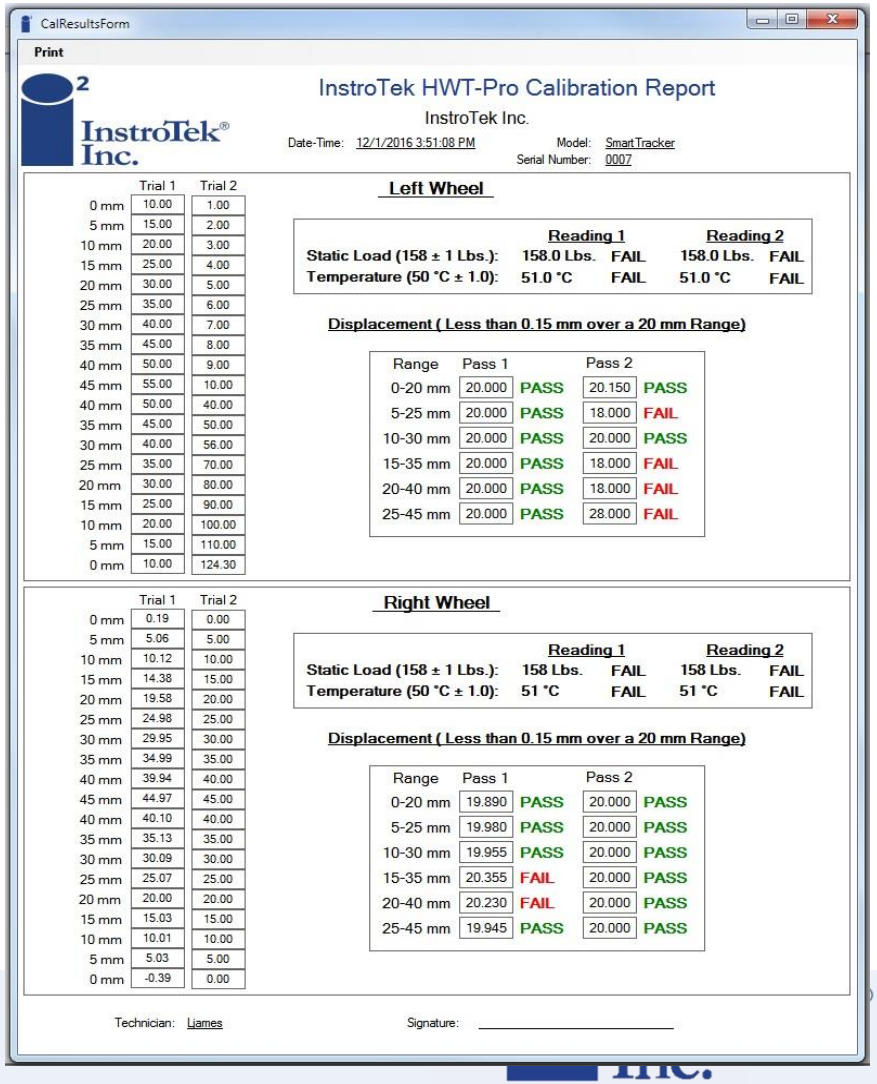
Reports

Verification



Calibration



Calibration Requirements

- Yearly calibration of HWT-Pro
  - Load Cell
  - Thickness of Height Slats
  - Temperature Probe
  - Sent to InstroTek for Calibration

InstroTek® Inc.

InstroTek AutoRice Controller

InstroTek® Inc.

Thank You…

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InstroTek® Inc.