

Newsletter – September 18, 2015

To Tread or Not To Tread (a tribometer test foot)

Should “tread” (grooves) be added to the English XL VIT standard test foot? **No!** Not if the measurement is intended to evaluate the **risk** for human slip and fall **injury** events.

Below are several examples of real-world, **foreseeable footwear**. Note the diminishing tread depths from wear in the heel contact area of the samples from left to right.



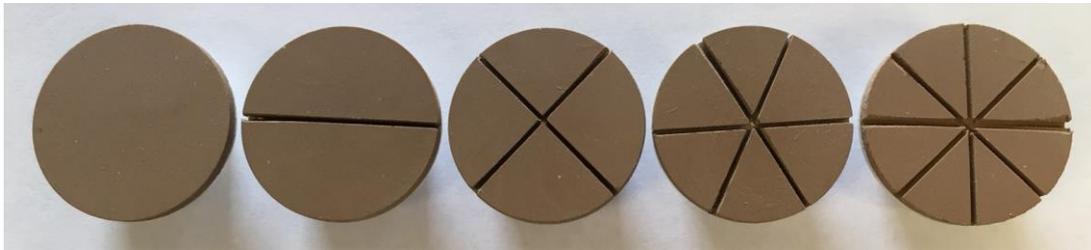
When using a tribometer to evaluate the relative safety of walkway surfaces, the test foot needs to be representative of the foreseeable footwear in a slip injury event. As can be seen from the photo, it is highly likely that the **heel contact area** of foreseeable footwear will have **little or no tread**. This is particularly evident with footwear involved in slip and fall injury events, even when there may be prominent tread on the balance of the bottom of worn footwear.

Keep in mind that one of the most important aspects of a meaningful slip meter is how the test foot of that walkway tribometer manipulates a **hydrodynamic squeeze film**. Slip and fall injury events most frequently occur in contaminated

or lubricated conditions where a prominent tread at the heel contact area would drastically affect the potential for slip injury events.

To demonstrate the effects of grooving on altering the measured slip resistance, EXCEL TRIBOMETERS, LLC tested several modified English XL test feet.

The photo below shows the English XL standard test foot and progressively increasing grooved specimens.



A standard English XL test foot that measures 0.20 on a calibrated calibration tile measures 0.30 with one slot across the width of the face, 0.33 with two orthogonal slots, and 0.36 and 0.38 with three and four full diameter equally spaced slots, respectfully.

That means that a smooth, hard surface wet with water that previously metered about 0.20 (as slippery as ice), would then ***inappropriately*** measure much safer with the same slip meter with a grooved test foot.

Grooving the test foot significantly increases the slip resistance readings on the same surface with the same tribometer under the same conditions.

Grooving the test foot changes the distance the lubricating liquid has to travel, and thus reduces the time to dissipate the squeeze film and restore contact of the test foot material with the test surface. Grooving also reduces the surface area of the test foot and increases the pressure on the hydrodynamic squeeze film. The combined effect of grooving dissipates the hydrodynamic squeeze film more rapidly the more the grooving. More rapid dissipation of the squeeze film ***increases the measured value*** of the slip resistance on a lubricated surface. The effect is more significant the more tenuous the lubricant, particularly water, the most common contaminant in a slip and fall injury event.

As related to the ASTM F2508 Standard Practice for Validation, Calibration, and Certification of Walkway Tribometers Using Reference Surfaces, a tribometer can ***more easily differentiate*** between the three low slip resistance surfaces with ***more grooves*** added to the test foot.

When following the current User Guide, a standard test foot on an English XL tribometer measures the A, B, and C reference surfaces in a particular F2508 set of adjunct tiles, as 0.12, 0.16, and 0.23, respectively. Properly following the

instructions as specified in the User Guide requires **calibrating the test foot** on a calibrated calibration tile before and after each testing episode.

The requirement for calibration both before and after testing is required to assure that test foot preparation, which is the **only significant variable** in the use of the English XL VIT, remains sufficiently precise throughout the testing. This precision is needed to differentiate between the three slippery surfaces to the degree necessary to satisfy the extraordinarily stringent requirements of the F2508 procedures. The required F2508 accuracy is not and has never been needed to properly rank the relative slip resistance of walkway surfaces for the purposes of real-world walkway safety.

Grooving the test foot would spread the measured values to assist in differentiating the surfaces, but **destroys the significance** of the tribometer for assessing the risk for human slip and fall injury events. As can be seen above, the at-risk population wearing **foreseeable footwear** (with a worn heel contact area) is **not represented by a prominently grooved test foot**.

EXCEL TRIBOMETERS, LLC has been provided with the results of testing performed with samples of heel contact area of **actual footwear** involved in an **actual slip and fall injury event** tested on the **actual walkway** surface. Those tests demonstrated that the **actual footwear had a lower measured slip resistance** on the wet-with-water vinyl tile walkway surface than did the standard English XL test foot. The results of that testing were used to describe the **relative slip resistance** of the actual footwear, the foreseeable footwear, on the subject walkway surface, as compared to the standardized value measured with the standard test foot.

Extensive **prior research and findings** contained in published peer-reviewed articles (identified on the EXCEL TRIBOMETERS, LLC website and in the EXCEL TRIBOMETERS, LLC newsletters) **correlate the English XL VIT's output** with the standard test foot to forceplate readings, with the traction demand of actual humans, and with the **relative risk for human slip**.

Altering the standard English XL test foot to make it easier to pass the F2508 tests would negate all the valuable knowledge established thus far.

Much more importantly, any **grooving** of the test foot, particularly the more the grooving (number and width/depth), the **less meaningful** the slip resistance readings are with respect to the risk for human slip and fall injury events.

The heel contact area of **foreseeable footwear** involved in human slip and fall injury events does not have prominent, sharp grooves, but rather is generally **worn smooth** in most cases.

Even though the needed accuracy of a slip meter to assess real-world walkway safety is not the same as the precision required to differentiate between the three slippery surfaces in the F2508 procedures, the **English XL VIT routinely and reliably passes** the F2508 validation process over and over, without any grooving of the test foot.

All you have to do to get **precise, repeatable, meaningful** results with your English XL VIT is **follow the instructions** in the current User Guide. Grooving the test foot eliminates the meaningful part of your testing as related to walkway safety. Altering the slip meter to make passing F2508 easier may eliminate the whole purpose of the tribometer.

Next CXLT Program: November 9, 2015 – Denver, CO

The next CXLT Certification Program will be conducted by **EXCEL TRIBOMETERS, LLC** on Monday, November 9, 2015 in Denver, CO. The class will be held at the Courtyard Denver Airport. A block of rooms has been reserved at a special rate of \$139.00 per night for the night of November 8. Contact the hotel directly for room reservations at (303) 371-0300, or [reserve online](#).

Courtyard Denver Airport
6901 Tower Road
Denver, CO 80249-6338

The current program is constantly being improved with expanded sciences and extensive hands-on instruction with the instrument to maximize the value of your investment. First time CXLT program participants, experienced English XL users wanting a refresher, as well as CXLT's choosing to retake the course and test to maintain their current status, have all touted the program.

To read comments received, check out: [CXLT Program Testimonials](#)

All English XL VIT Owners Should Consider the CXLT Program

We encourage anyone who uses an English XL VIT but has never attended the CXLT Program to do so. Participation helps to ensure your competence and understanding of the sciences and principles of walkway safety and slip resistance metering. It also teaches and reinforces the proper and accurate use of the English XL VIT. Please consider the importance of your participation in this program.

Holding the CXLT certification assures your recognition and respect as an expert who is knowledgeable, competent, and proficient in walkway safety, meaningful tribometry, and in the use of the English XL VIT. Anyone needing to perform a

competent risk assessment of a walkway or evaluate flooring and footwear products, needs to establish a strong foundation in the principles of safety engineering, the sciences of walkway safety, the scientific and mechanical aspects of the available slipmeters, and the effects of reasonably foreseeable variables on the performance of walkways and slipmeters. The certification also shows that the CXLT had extensive hands-on instruction in the proper use of the English XL VIT and proved his or her proficiency with the most respected slipmeter.

Please be sure to review the updated and expanded [CXLT Certification Program](#) on the **EXCEL TRIBOMETERS, LLC** website. On-site programs are available for organizations with a large staff interested in tribometry and walkway safety.

What to Send for Instrument Calibration

Instrument Calibration ensures your English XL VIT slip resistance testing system is in optimal condition. Make sure you send all components of the system when it is time for annual Instrument Calibration: your English XL VIT, your certified test foot calibration tile, and your Sander (if you have one).

The Sander has been used for the past two years to certify all calibration tiles. If your tile was certified more than two years ago, ship it with your instrument at your next annual Instrument Calibration, and your tile will be recertified at no additional charge.

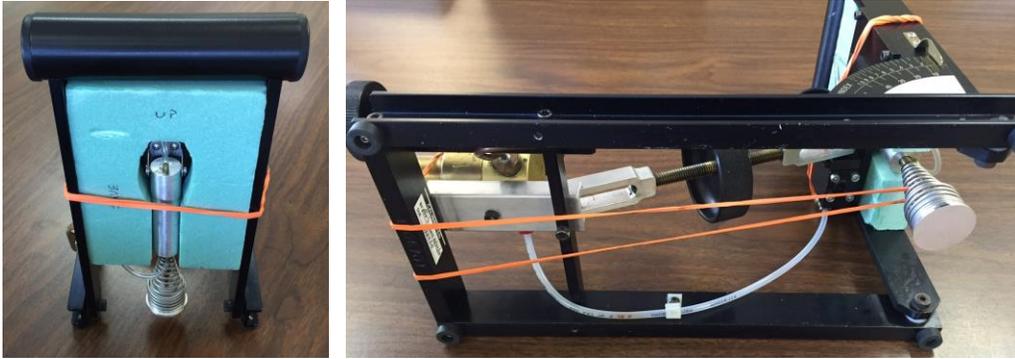
To order the Sander or a Certified Calibration Tile, call us or order online: [Sander](#) and [Tiles](#)

Storing, Packing and Shipping Your English XL VIT

The English XL VIT soft carrying case is designed to fit only the instrument in the center compartment and its necessary accessories in the outer pouches. If you put other objects in the case with the meter, you risk damaging your instrument during shipment.

When shipping your English XL VIT for annual Instrument Calibration, remove everything except the meter from the carrying case.

Install the foam piston bracket protector and stretch a thin rubber band around the ankle spring and attach the other end of the rubber band to the bolt under the pressure gauge to prevent damage to the test foot assembly.



Put the slipmeter in the soft case with the mast set to 0.05 slip resistance on the protractor (nearly vertical).



Fill the space in the soft case over the instrument with bubble wrap or air pillows to keep the meter seated at the bottom of the case. Your calibration tile and Sander should be bubble wrapped and placed in the same packing box, but not in the soft case compartment with the meter.



Snap the case closed and put it in a box with enough packing materials such that nothing moves when shaken.



We value your input and questions and look forward to hearing from you. All of your comments and concerns are welcome and will be thoroughly addressed. Your communications are treated with respect and kept in the strictest of confidence. You may contact Peter directly at (757) 897-2853 or by email at pwidas@exceltribometers.com

Thank you for your participation in the continuing efforts for advancements in the field of walkway safety and meaningful tribometry.

Peter Widas, BSMSE, CXLT
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