

High Speed Linear Friction Tester (HSLFT)

Measuring the real μ

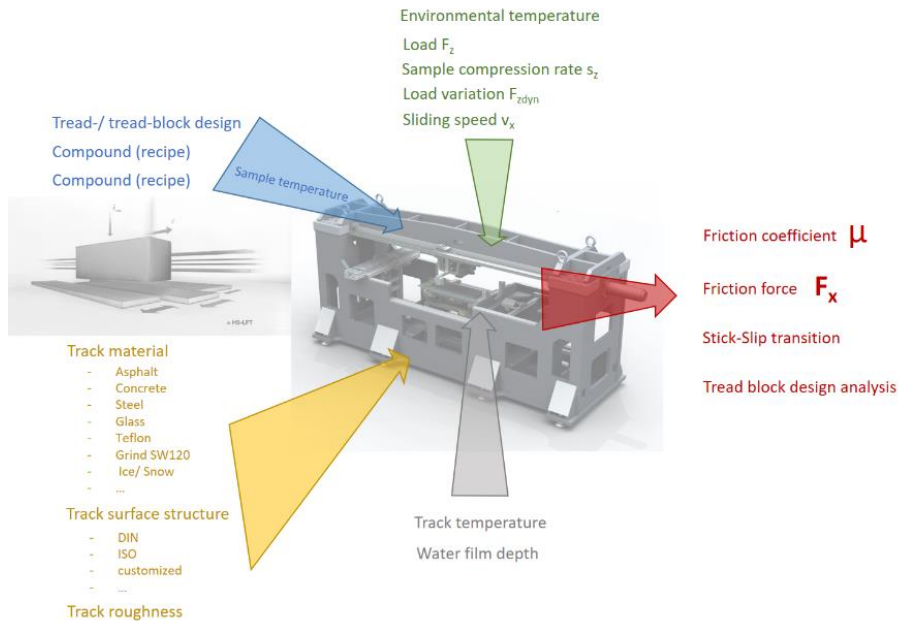
- Determination of friction coefficients of rubber samples
- Any road type/ track surface
- Any operating condition for MC/ PC/ LT/ T&B/ OTR/ Aircraft tire compounds
- Any environmental condition -25°C (-13°F) to +50°C (122°F)
- Full environmental and conditions control
- Top sliding performance F_x 2.500 N (8.000 N peak) / 8 m/s / 100 m/s²
- Fully controlled hybrid (hydraulic/ pneumatic) high performance loading system F_z max 5.500 N
- Prediction of compound and pattern influences on grip and traction performance
- Tread block analyses with synchronized high Speed camera system
- New developed linear induction motor
- Special technologies to produce ice- and snow tracks
- Hot road track temperatures up to 200°C
- Upgradable for future needs
- Modules automated conditioning and cleaning
- Scanner for tracks and samples for wear (standalone systems)
- Highly cost efficient
- Reference Measurement System for tire industry



A key solution for development engineers

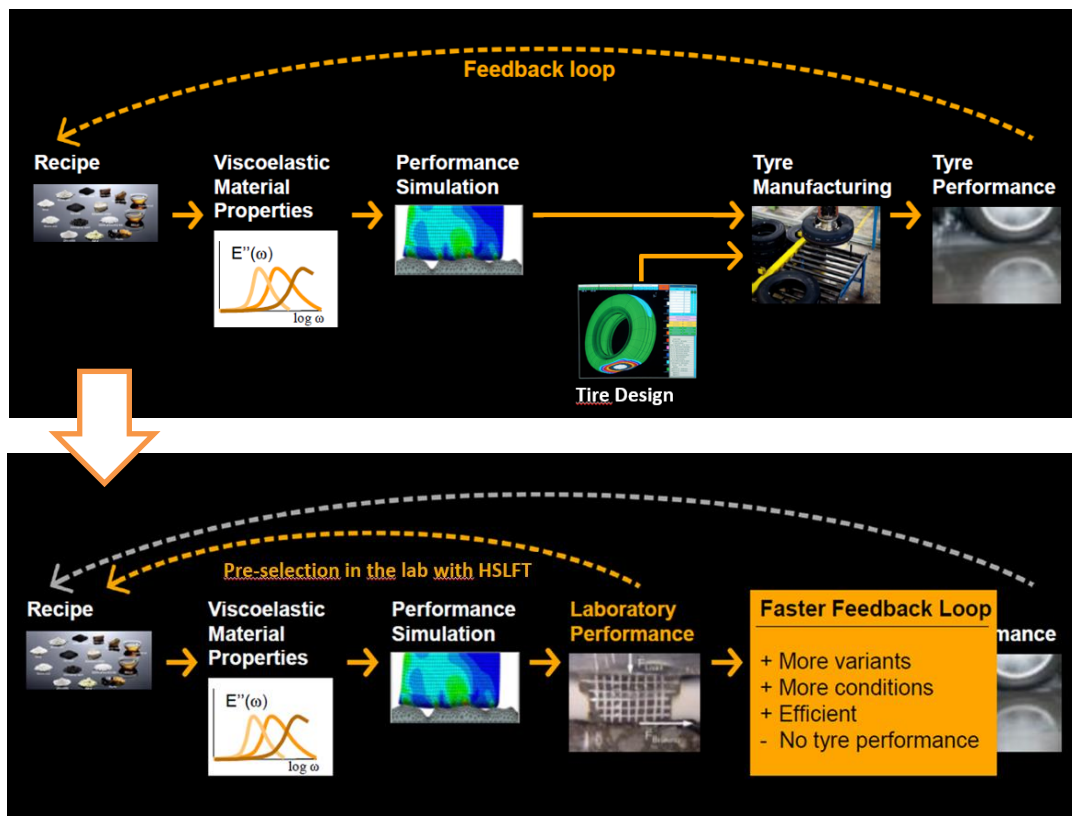
HSLFT is a friction tester, neither for measurement of wear nor abrasion. Friction testing with the HSLFT is a huge step forward in the process of tire development. It reduces development time and cuts the cost by shortening the feedback loop time for friction characteristics measurement and by reducing the number of road tests. HSLFT creates an indoor all-season test environment.

Full parameter control



Cost and efficiency of testing

The High Speed Linear Friction Tester (HSLFT) is the tool to improve the efficiency of the tire development process to keep development cost and effort on a payable level. Reliable material performance data measured in the lab will shorten the feedback-loop to the development specialists and will allow to respond to the multiple development and testing demands which face the tire industries by powerful material pre-selection.



The development process optimization from compound recipe to tire performance

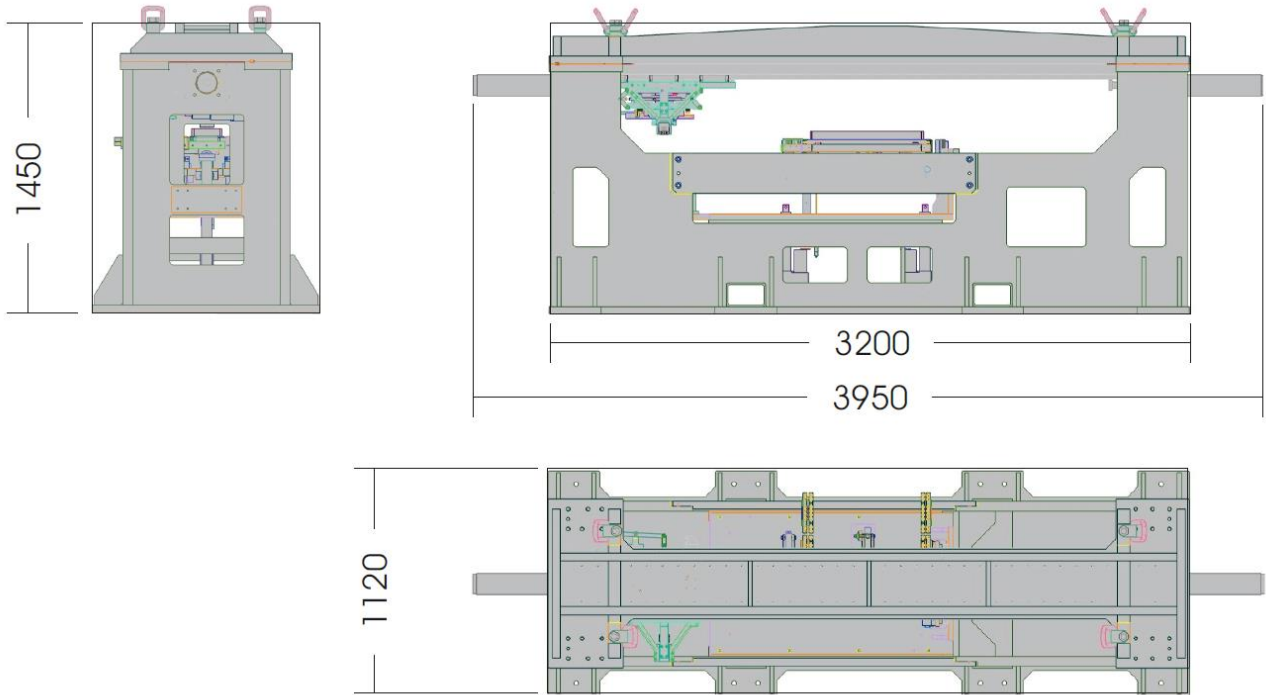
HSLFT Technical Specification

The High Speed Linear Friction Tester is a modular system. These offer different performances for different application areas. Customization with various options is possible. However, performance limits are shown in the table below.

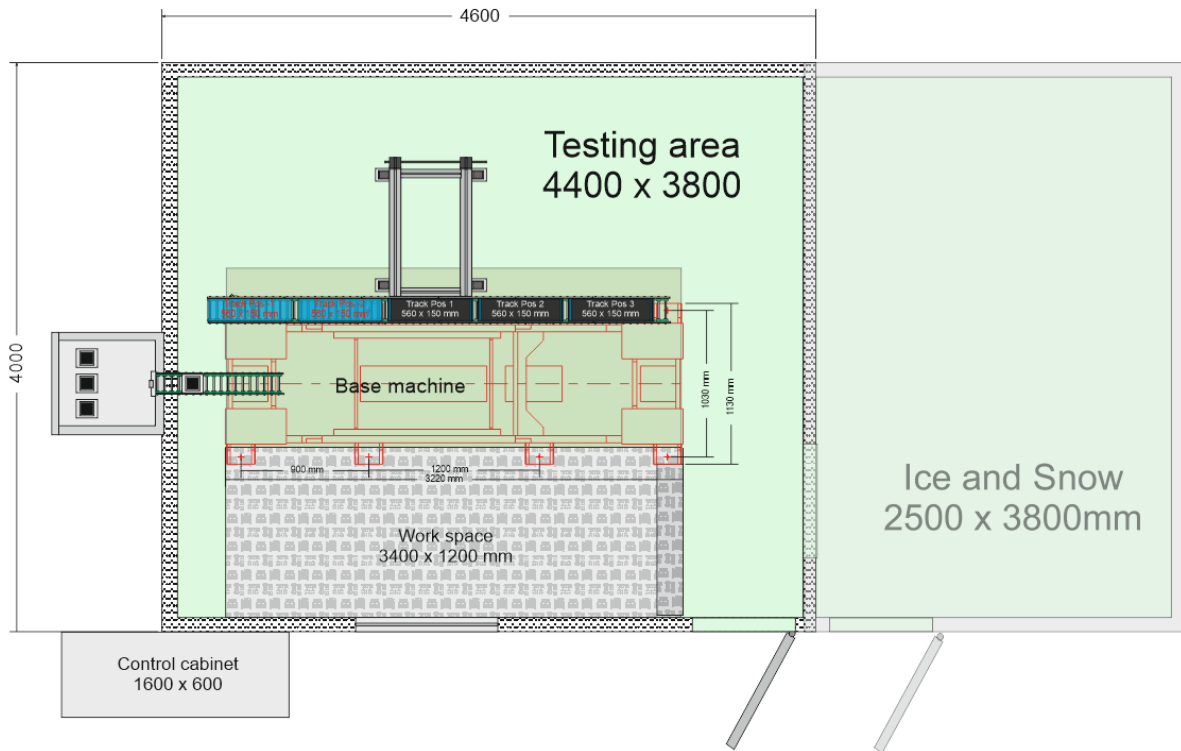
PARAMETER	MEASURING RANGE	ACCURACY
	<i>HSLFT HIGH PERF. hybrid load control</i>	
Longitudinal force F_x	0 ... 8000 N peak 0 ... 2500 N continuous	$\pm 0.5\%$ of set range (1000 / 10000 N)
Lateral force F_y	0 ... 500 N	$\pm 0.5\%$ of set range (100 / 1000 N)
Vertical force (load) F_z	0 ... 5500 N	$\pm 0.5\%$ of set range (1000 / 10000 N)
Sliding distance/ positioning s_x	0 ... 2500 mm total 0 ... 550 mm testing	10 μm
Vertical travel/ positioning s_z	0 ... 18 mm	1 μm
Sliding velocity v_x	0,001 ... 8 m/s	± 0.001 m/s
Loading-/ unloading time	≥ 20 ms	
Longitudinal acceleration a_x	0 ... 100 m/s^2	$\leq 1\%$ FS
Longitudinal track inclination $\alpha(y)$	-3 ... +3°	$\pm 0.001^\circ$
Lateral track inclination $\alpha(x)$	-3 ... +3°	$\pm 0,001^\circ$
Vertical track lifter	180 mm	$\pm 0,001$ mm
Lateral track positioning	± 200 mm	0,1 mm
Sample holder rotation angle $\alpha(z)$	0 ... 360°	1° (manual adjustment)
Sample temperature* T_{sample}	$\frac{5^\circ \dots 200^\circ\text{C}}{-25^\circ \dots 200^\circ\text{C}}$	$\pm 0.5^\circ\text{C}$
Track temperature* T_{track}	$\frac{5^\circ \dots 120^\circ\text{C}}{-25^\circ \dots 120^\circ\text{C}}$	$\pm 0.5^\circ\text{C}$
Temperature test room* T_{Test}	$\frac{5^\circ \dots 100^\circ\text{C}}{-25^\circ \dots 100^\circ\text{C}}$	$\pm 1^\circ\text{C}$
Temperature snow & ice room* $T_{\text{s\&ice}}$	-25° ... -5°C	$\pm 1^\circ\text{C}$
Sample rate	100 Hz ... 20 kHz	

- 1) Speed depending on test method
- 2) RT = Room Temperature

HSLFT Layout (only base machine)



Layout Example Climatic Chamber with HSLFT base machine and Ice & Snow Compartment



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