



TEST FACILITIES

for Customer's use



New business unit for customer's use

Two test benches running 24h/day

- 1 **Dynamometer TC 180 EL-Plus** for **passenger car pads** and linings.
- 1 **Dynamometer TT-R-2500 EL-Plus** for **truck and railway pads** and linings (dry and wet test).
- 1 **FQT Friction Quality Test machine FQT 15**
- 1 **SST Shear Strenght Test machine SST 10**

New test bench – 2006 / 2007

- 1 **Dynamometer TC 150 FV-Clima Static Plus** – (full version) for passenger car pads and linings – which allows:
 - Comfort tests
 - Noise tests
 - Climate tests

TECSA

TECSA

Passenger Car Dyno main features:

TC180EL-Plus

- maximum braking moment **5000 Nm**
- maximum speed **2000 rpm**
- total inertia **220 Kg*m²**
- electronic braking actuation system
 - The brushless system used to manage the braking actuation allows an accurate pedal regulation (the space movement and the pressure are controlled due to the motor/encoder feedback loop)
- modulated brake ventilation and suction **4000 m³/h**
- load cells with different scales can be used

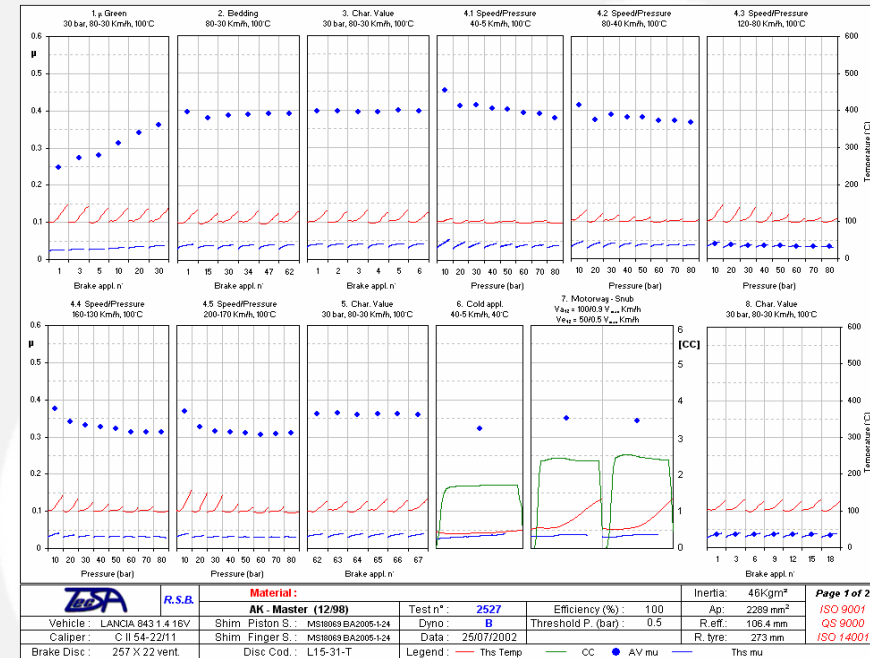
Truck and Railways Dyno main features :

TT-R-2500EL-Plus

- maximum braking moment **40000 Nm**
- maximum speed **1500 rpm**
- total inertia **2500 Kg*m²**
- hydraulic braking actuation system
 - Hydraulic pressure transducer feedback
- pneumatic braking actuation system
 - Pneumatic pressure transducer feedback
- modulated brake ventilation and suction **12000 m³/h**
- load cells with different scales can be used

- **AK Master – AK1 – AK 2**
- **ECE R-90**
- **WEAR test**
 - **7-H2000 - Fiat procedure** (partial and/or total)
 - **TSR 5151G procedure Wear Test**
 - **Bosch** (partial and/or total)
 - **Other procedures** (supplied and agreed according to the Customer)
- **Auto Moto Sport**
- **FADE** (fading service offered to the Customer)

- DTV
- EFFICIENCY
- THERMAL DEFLECTION
- GREEN
- DISCK CRACKING
- THERMAL SHOCK
- Standard FFSS (Dry & Wet test)



Other tests are available upon demand. The referring procedures and the international rules must be showed by the Customer (according to the maximum bench performances)

In case the vehicle speed is higher than the simulated bench speed, the inertia is calculated considering the kinetic energy to be dissipated and the bench performances as the following mathematical formula:

$$I_{\text{simulated}_{inertia}} \left[\text{Kgm}^2 \right] = I_{\text{calculated}_{inertia}} \times \left[\left(\text{Vel}^2_{\text{starting}} - \text{Vel}^2_{\text{final}} \right) / \left(\text{Vel}^2_{\text{MaxBench}} - \text{Vel}^2_{\text{final}} \right) \right]$$

In case the vehicle inertia is higher than the bench inertia, the starting speed is calculated considering the kinetic energy to be dissipated and the bench performances as the following mathematical formula:

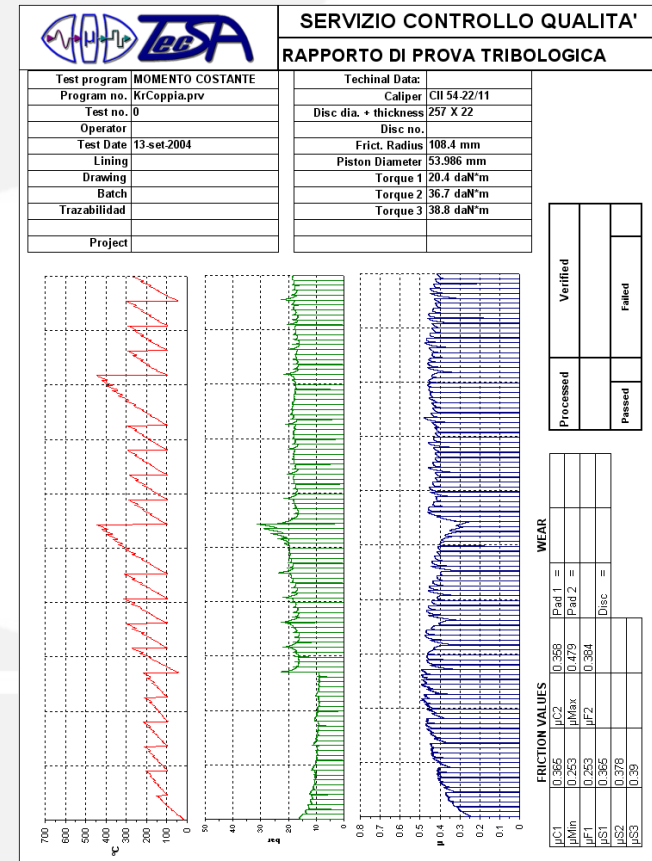
$$\text{Spd}_{\text{simulated}_{starting}} = \sqrt{\text{Spd}^2_{\text{starting}} \times \frac{I_{\text{calculated}_{inertia}}}{I_{\text{MaxBench}_{inertia}}} + \text{Spd}^2_{\text{final}} \left(1 - \frac{I_{\text{calculated}_{inertia}}}{I_{\text{MaxBench}_{inertia}}} \right)}$$

The quality control test is executed on our Friction Quality Test Machine model **FQT 15** which fulfills following standards:

- **EUROSPEC 1**
 - Ph constant (*constant pressure*)
- **EUROSPEC 2**
 - Md constant (*constant torque*)

Other tests are available upon demand.

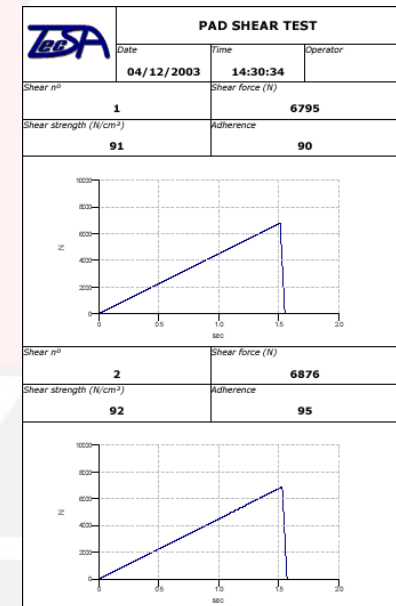
The referring procedures and the international rules must be showed by the Customer (according to the maximum FQT bench performances)



The physical and mechanical tests are made by the machine model **SST 10 - Standard** and other laboratory instruments

- **SHEAR STRENGTH**
 - ISO 6312
- **COMPRESSIBILITY**
 - COLD
 - WARM
- **HARDENESS H_{rr}**
 - ISO 6508

PAD SHEAR TEST			
Date	Time	Operator	
04/12/2003	14:30:34		
Pad code	Material code		
P1	M1		
Underlayer code	Batch code		
U1	B1		
Pad area (cm ²)	Number of repetitions		
75	3		
Shear force (N)	Minimum	6795	
	Maximum	7200	
	Mean	6957	
Shear strength (N/cm ²)	Minimum	91	
	Maximum	96	
	Mean	93	
Adherence	Minimum	90	
	Maximum	98	
	Mean	94.3	
Comment			



Other tests are available upon demand.

The referring procedures and the international rules must be showed by the Customer (according to the maximum SST machine performances and the other laboratory instruments)