

- Marking Stations:



Stand alone or in-line wheel Marking Station with all the different types of possible marking systems available (labeller, punching marker, inkjet marker, LASER marker, dot marker and others).



PT Win Thermal Solusindo

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- Manual Uniformity Test Machine – Model SL:



Uniformity test machine with manual loading/unloading of the wheels and manual movements. This machine is perfect also for laboratory purposes and it performs all the Intl. Standard measurements (Runouts, Harmonics and so on...).

- Semi-automatic Uniformity Test Machine – Model ML:



Uniformity test machine with manual loading/unloading of the wheels and automatic movements. This machine performs the International Standard measurements (Runouts, Harmonics and so on...).

- Automatic Uniformity Test Machine – Model AL:



Completely automatic Uniformity test machine with both automatic wheels loading/unloading and automatic movements. This machine performs all the Intl. Standard measurements (Runouts, Harmonics and so on...).

- Unbalance Control Machine – Model BL:



Automatic stand alone or in-line machine for the unbalance control of the wheels. This machine is perfect both for production and laboratory purposes.

- Automatic Runout & Unbalance Test Machine – Model AL2:



Automatic in-line test machine for dimensional controls as per the Intl. Standards (Runouts, Harmonics and more) and the unbalance control of the wheels. This test machine is completely automatic, so perfect for production purposes. It's modular with the possibility to add or remove parts, like the marking station and others.

- High-speed Automatic Runout & Unbalance Test Machine – Model 3-axis Galileo AL3:



Automatic in-line test machine for dimensional controls as per the Intl. Standards (Runouts, Harmonics and more) and the unbalance control of the wheels. This 3-axis test machine is modular, fully automatic and very fast, so perfect for high-capacity production purposes.

- High-speed Automatic Runout & Unbalance Test Machine – Model 4-axis Galileo AL3:



Automatic in-line test machine for dimensional controls as per the Intl. Standards (Runouts, Harmonics and more) and the unbalance control of the wheels. This 4-axis test machine is modular, fully automatic and very very fast, so perfect for high-capacity production purposes.

- High-speed Automatic Unbalance Test Machine – Model 3-axis Galileo BL3:



Automatic in-line test machine for the unbalance control of the wheels with 2 stations. This 3-axis test machine is modular, fully automatic and very fast, so perfect for high-capacity production purposes.

- Rims Dimensional Control Machine – Model CL1:



Manual or automatic machine for the dimensional control of the rims. This machine uses a special Leonardo patented algorithm referred to a Spatial Geometric System (SGS).

- Punching Machine with manual bushings loading – Model PKM:



Bushings planting machine with manual bushings loading. Control of the driving chart and measurement of the bushings position are both available.

- Punching Machine with automatic bushings loading – Model PKA:



Bushings planting machine with automatic bushings loading. Control of driving chart and measurement of the bushings position are both available. The machine is based on a rotating table and a robot can be integrated for the loading/unloading of the wheels.

- Discs Dimensional Control Machine – Model ALD:



Manual or automatic machine for the dimensional control of the discs. The main measurements performed are: thickness, diameter, height, external circumference and many others.

- Random Automatic Helium Leak Test Machine for alloy wheels – Model Alfin:



Automatic and random working leak test machine for light alloy wheels, using a 10% He mixture and vacuum technology. This machine is for production with the standard $3.2 \cdot 10^{-4}$ mbar* l /sec threshold leak, average cycle time around 20 seconds and He consumption of 1.0 Nliters/cycle with a 2nd level He recovery system.

- Leak Tester for steel rims (only for the butt welding area) – Model Crab:



Manual or automatic leak test machine for steel rims, This machine checks only the butt welding area and it can identify a hole with diameter lower than 10 microns. The cycle time of the machine with 2 test stations is lower than 9 seconds, while you can reach less than 4.5 sec with 4 test stations working together. Also the measurement precision is very high, lower than 0.1 mbar.

- Random Automatic Air Leak Test Machine for full steel rims – Model Cerbero:



Automatic and random working leak test machine for full steel rims. This machine is for production purposes with 1 mbar*/l/sec leakage found. The machine is modular with 2-3-4 test stations and best cycle time lower than 5 seconds with 4 stations.

- **Rotate Bending Machine (CFT) for fatigue test of wheels – Model FR:**



Laboratory test machine for rotate bending fatigue proof, also called cornering test. Different sizes are available between 5 and 140 KNm. Perfectly in agreement with German car makers AK-RAEDER Standard.

- **Rim Rolling (Radial Fatigue) Test Machine for wheels – Model RR:**

- **Endurance Test Machine (High Speed available) for tyres – Model RRT:**



Radial Fatigue test machine for car and truck wheels and Endurance test machine for PCR & LTR tyres. This is a laboratory test based on the application of Radial and Axial load with control of Slip and Camber angles. Loads between 50 KN to 250 KN. Machine with 1, 2, or 4 test stations with shared drums. Machine in agreement with SAE J328/1204 and ISO 3894 Standards. Special applications, like High Speed till 350 Km/h for tyres test, are available.

- Multiaxial Test Machine for pass-car wheels – Models Strada 50 and Strada 40:



2 different machines for ZWARP test of pass-car wheels are today available from Leonardo Srl: the traditional Inner Drum Strada 50 (on the left) and the new Outer Drum Strada 40 (below).



Both perfect road simulators, these machines are in agreement with the main International standards for Biaxial Testing: AK-RAEDER Standard followed by all the German car makers, the American SAE J2562 and many others. The new Outer Drum machine is at the same time ZWARP and a classic Radial Fatigue.

- ZWARP Test Machine for truck wheels – Model Biaxial:



The traditional ZWARP (Biaxial) test machine for truck wheels: Axial load and Radial load for this durability test facility. Perfectly in agreement with the well know LBF Standard and provided with LBF patent and homologation.

- Classic Impact Test Machine – Model Aries Standard:



The classic Impact Tester for Your Laboratory. This machine performs all the main Intl. Standards: SAE J175, ISO-7141, Ford S95BB-1007-AA, JASO C608, JIS D4103, Nissan, Toyota, Honda, GM, Renault and other car makers Standards.

- AK-RAEDER Radial Impact Test Machine – Model Aries Evolution:



The new concept Impact Tester for laboratory purposes. Perfectly in agreement with German car makers AK-RAEDER Standard (BMW, Audi, Mercedes Benz, Volkswagen and Porsche).