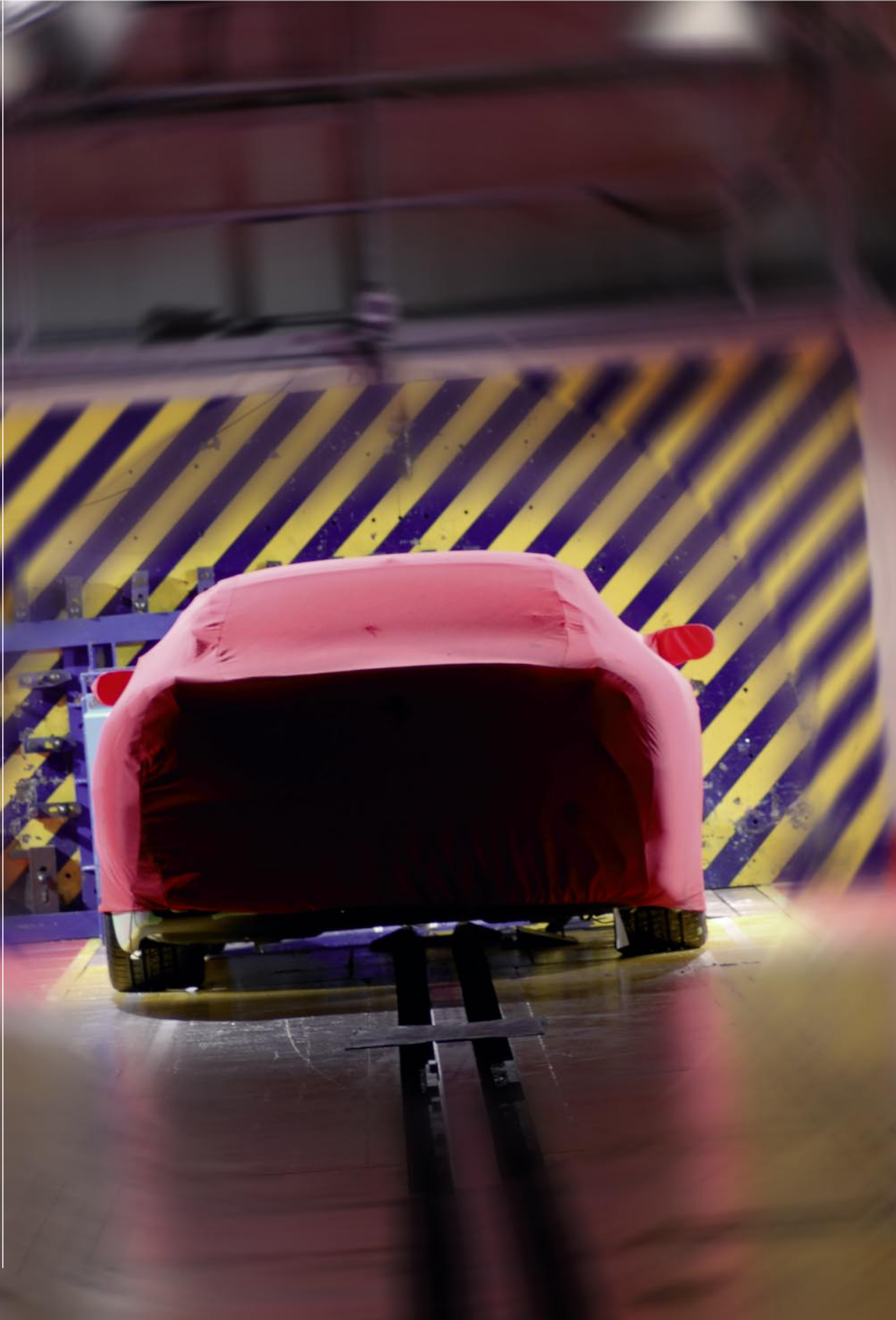




CSI
CERTIFICAZIONE E TESTING

CSI SpA
VEHICLE SAFETY AND DEVELOPMENT CENTER



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CSI SpA

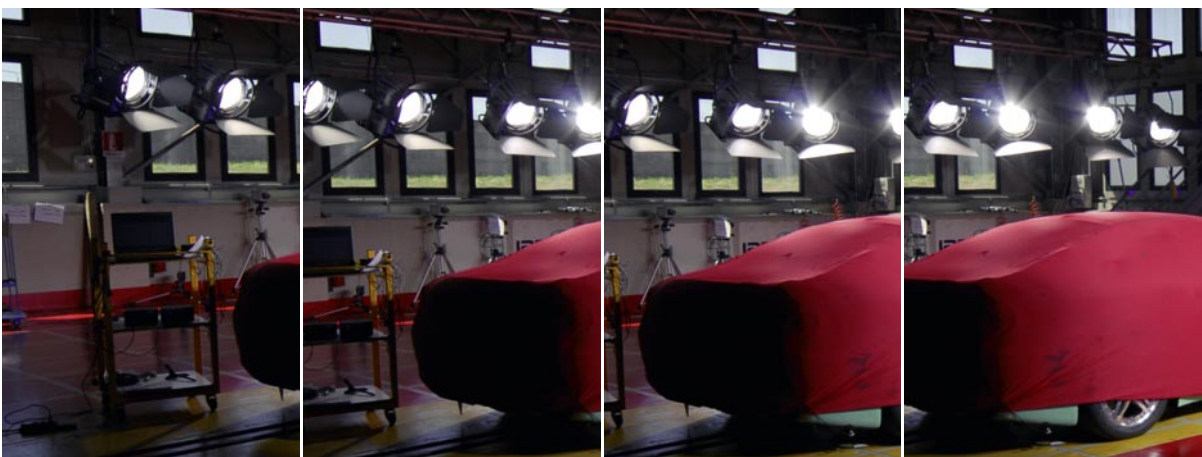
Vehicle Safety and Development Center

Vehicle Safety and Development Center equipped with facilities and capabilities that permit to carry out globally all the car safety related tasks. Tests in the laboratories, on the road and proving grounds, virtual engineering and phenomenon modeling, and homologation processes are CSI activities carried out in close collaboration with car, car components and subsystem manufacturers. Project Lead Engineering, Test Engineering, Performance Engineering, Design Engineering, Homologation Procedure Engineering, car restoring engineering are all part of the company organization, very flexible, capable to run efficiently work reports with the Client and to satisfy Client's quality, time and schedule, and economical competitiveness necessities.

The strict management & control system of work area accesses and project information flow assures the absolute confidentiality.

The CSI reliability has been acknowledged by major car manufacturers that have selected CSI as a reference Laboratory for the development, testing and homologation.

CSI certifies and homologates the cars for the Europe, USA, Australia, and other Asian markets like China, Japan and Taiwan.





The market segment in which CSI operates is extremely vast and diversified, and the reference standards to which it adheres have been prepared and established by the most developed international markets of Europe (EC directives and ECE regulations), USA (FMVSS certification), Australia (ADR regulations), and other Asian markets like China (CMVDR regulations), Japan (TRIAS regulations) and Taiwan.

The CSI automotive test laboratories have been equipped with highly sophisticated rigs and instrumentation to cope with the considerable reliability and precision levels required for the measurements performed.

The laboratories personnel, over 70% college graduated, is endowed with excellent know-how and collaborates with technicians and specialists world-wide. The main activities of the laboratories concern passive safety, active safety, noise

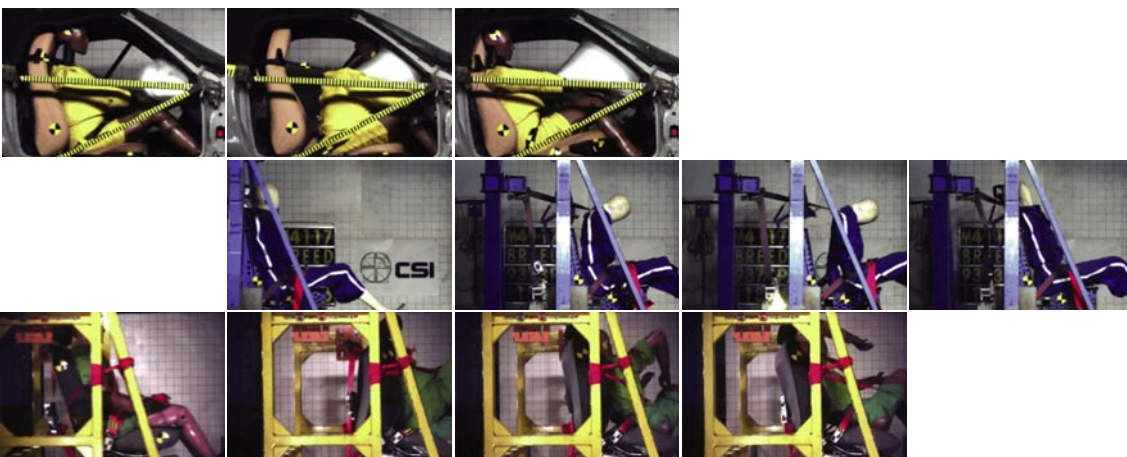




investigations, vibration and harshness analysis, fatigue and climate stress study. Both, product development and validation and final Type Approval tests are presently being carried out by CSI.

CSI hence, equipped specialised test laboratories, specific test rigs, the state-of-art measurements systems and data acquisition and post processing systems, all run by experienced test engineers, is able to perform the development and type approval tests in accordance with the following:

- ECE UN regulation
- EEC Directives
- FMVSS Standards
- JIS Standards
- Chinese CMVDR regulation
- Australian ADR standards



LABORATORIES

All the car sub-systems and components are tested and certified for the **mechanical Resistance** and capacity for impact energy dissipation, starting with dashboard systems, chassis, belt anchorages up to fuel tanks and steering wheels.

The laboratories carry out a very thorough investigation of the component behaviour taking into consideration also the influence of the temperature, humidity and solar irradiation.

The **sled facility** is equipped with state-of-the-art digital fast motion recording, data acquisition systems and the complete P dummy family, Q dummies, T10 and ECE12 dummies for the development and final certification tests. It responds to all the necessities for certification of products like safety belts, sport seats, safety seats for children and others.

While on the other hand, the laboratory has become the reference development center for the FIA related certifications, in particular Formula 1. CSI is the leader in this field and the teams like Ferrari, McLaren and BMW find a precious experimental support for their R&D efforts.

With a particular attention CSI has addressed the Pedestrian Protection aspects creating a dedicated laboratory equipped with the state-of-the-art testing facility and data acquisition and recording systems. The experienced technicians provide the a specialized support to the client in the development phase of the project as well as in the final stage, the homologation effort.





A good robust design guarantees the car satisfactory behaviour on road. This is developed and verified in the **CSI road simulation facility**. The facility permits to run the tests on the **4-poster rig** reproducing any road profile and verify the vehicle endurance capability and reliability simulating the 100.000 km car run on different road surfaces. These investigations are further supported with the climate simulations (temperature – humidity – solar irradiation) loads to guarantee the product quality even after years of employment.

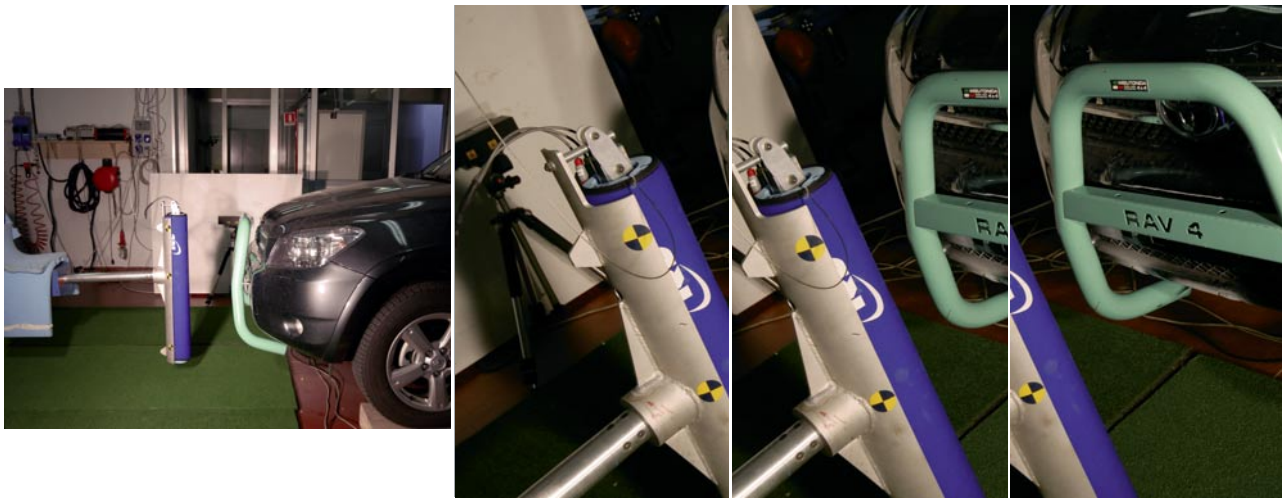
There are also run the **noise investigations** of the vehicle with particular attention for the fastening solutions adopted and quality of the interior trim.

This laboratory is also equipped with the **8 channel** test rig and performs a complete investigation and validation of the suspension and suspension-chassis anchorage design solution adopted running the fatigue tests in the x – y –z directions, and reproducing car braking effect.

The **full-scale crash test** laboratory employs the most recent and advanced propulsion system and closed loop control technologies that guarantee excellent test performance. The laboratory carries out a vast type of vehicle full-scale crash tests, front, side, rear and against different obstacles at different velocities.

The facility is equipped with a complete family of the fully instrumented dummies like Euro-SID, US SID, hybrid HIII's CRABI and others.





It is state-of-the-art facility and capable to provide a complete status of the car behaviour in the crash event with the acceleration data, digital fast motion recording, forces and other technical data that permits the technicians to develop a target vehicle.

A particular attention is dedicated by CSI for the activity of frontal restraint development. The laboratory is equipped with the braking system that permits to reproduce different crash pulses and carry out the effort of the development work for the client. The tests are run with the on-board and off-board digital recording systems, full investigation of the dummy behaviour during the dynamic event and provide the indispensable technical data for successful design development. This activity area includes also the capabilities for the airbag deployment analysis and relative crucial component performance behaviour analysis.

The **NVH laboratory** is equipped with four wheel drive dyno, coupled with a hemi-anechoic chamber that permits to simulate pass by noise measurements, power train induced vibration and noise generation and carry out the relevant noise analysis. The lab runs the tests in different custom imposed specification with the test velocities up to 250 Km/h. Different test tracks, from different paves up to hard obstacles, together with official pass by noise approval test track, permits to acquire vehicle data in order to reproduce them on the test benches.

The **EMC laboratory** is a state-of-art facility that implements all the most up-to-date-technologies. The facility handles the tests for all the road vehicles, starting from motorcycles up to small trucks. The tests are run in compliance with the EC directives, ECE regulations and customer specifications.

PROVING GROUND

CSI is equipped with its own vehicle proving ground. This permits to further enrich the laboratory car development effort by validating the tests with the actual road car behaviour. A complete comparative investigation scenario is created that permits in depth investigation on the noise generation and vehicle fatigue endurance.

The tests like vehicle handling, braking, pass-by-noise and harshness are run by the CSI technicians. Another aspect of the vehicle performance is addressed on the proving ground, and it concerns the dynamic mis-use. A vehicle is subjected to the mis-use tests against a full set of road obstacles, defined by major car manufacturers.

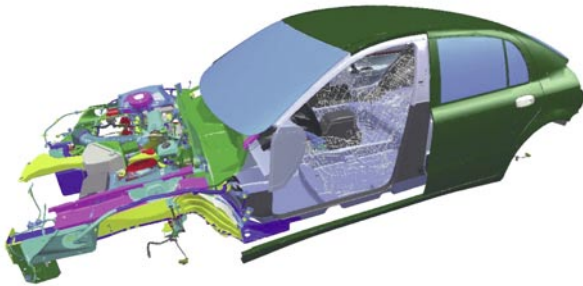
Finally, the development effort is concluded with the homologation tests in accordance with the specific directives and/or regulations.

PERFORMANCE ENGINEERING

CSI assists the clients in the project development with the performance engineering activity. The laboratory and design highly trained personnel is assigned to the specific project and through a thorough test analysis is able to find the right design solutions that bring the vehicle to satisfy the performance targets.

The assigned Performance Engineer follows closely the design and testing process, verifying the target performance of the relevant components, car sub-systems and finally, of the full vehicle. This effort carried out in close collaboration with the engineering and design teams and providing the indispensable support for the virtual simulation and the test activity to find the "right" design solution.





VIRTUAL ENGINEERING AND PHENOMENON MODELING

This activity is carried out making also certain that the virtual objects correspond to the real state behaviour. The teams employ state-of-the-art tools and collaborating closely with the laboratory are able to reproduce the actual behaviour of the sub-system or a full vehicle.

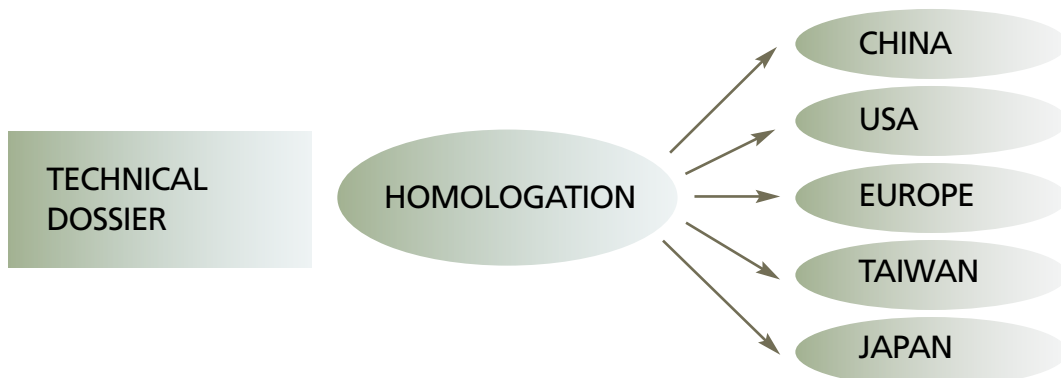
The team gets assigned to the projects that may cover specific isolated cases that refer to only portions of the vehicle or a vehicle sub-system, and starting with the initial design solution work through to improve its performance. The team operates with the systems that are well “calibrated” through the laboratory real-scale tests and hence, are able to reproduce virtually the development laboratory tests.

This engineering service becomes a crucial tool for the client in car design improvement effort and with timely and cost effective design solution gets to satisfy the client objectives.

HOMOLOGATION PROCESSES

This is the service that permits the client to get his product on the market. CSI assists the clients with the initial homologation dossier preparation, follows through the testing process and makes sure that the certification is delivered within the target timetable. Today, CSI provides the vehicle homologation service in Europe and the certification for the USA, Canada, Australia, Taiwan, China and Japan markets.

The CSI laboratories are acknowledged by the listed below countries and it permits to furnish the clients with the homologation certificates.



Acknowledgement

SINAL

Test Laboratory

SINCERT

Certification of quality and environmental management systems and of products

Ministry of Interior

Certification of Fire Reaction
Certification of Fire Resistance
Certification of portable Fire Extinguishers
Certification of wheeled Fire Extinguishers
Certification of smoke and heat exhaust ventilators

Ministry of Transport

Certification of Motorcycle-Helmets
Certification of Child's Car Seats
Certification of Cars and Car Components
Certification of whole Car Crash
Certification of isothermal Trucks (ATP)
CE Certification of transportable pressure Equipments (T-PED)

Ministry of Industry

CE Certification of personal protective Equipments
CE Certification of Machinery
CE Certification of Construction Products (CPD)
CE Certification of Pressure Equipments (PED)
CE Certification of Ambient Acoustics

State of California

Certification of Fire Reaction of upholstered Furniture

French Ministry of Industry

Certification of Bicycles

Ministry of Transports of Ireland

Certification of cars and car components
Certification of Motorcycle Helmets
Certification of Safety Seats for Children

Luxembourg Ministry of Transport

Certification of Packagings for hazardous Goods (ATP)
Certification of LPG/CNG Systems for Automobile
Certification of Car and Car Components

SASO (Saudi Arabia Standard)

Certification for Export to Saudi Arabia

UNI

Certification of Bicycles and Mountain Bikes
Certification of Closures for Containers
Certification of Garbage Containers
Certification of industrial Helmets
Cert. of protective Gloves against Chemicals and Microorganisms
Certification of Flexible Packaging for Foodstuffs
Certification of Mattresses
Certification of Construction Products
Certification of Doors and other shutting Elements
Certification of Jet Regulators
Certification of sanitary Tapware
Certification of metallic windows and pedestrian Doorsteps
Certification of laminated Glasses
Certification of insulating Glasses
Certification of thermally treated Glasses (tempered and hardened)

FF.SS – Italian State Railways

Certification of Resistance and Reaction to Fire and Smoke

FISI – Italian Winter Sports Federation

Certification of Ski Helmets

ANCMA

Certification of Bicycles

U.U.I.AA. – International Mountaineering Federation

Certification of Helmets for Mountaineering

FIA – International Automobile Federation

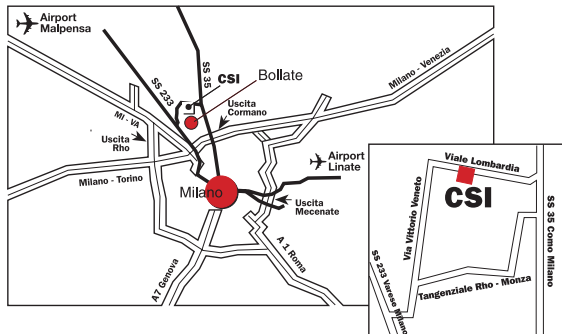
Certification of F1/Sport Car Components
Certification of Cardriver's Suits and fireproof Accessories

FIFA – International Football Federation

Certification of Football Balls



CSI SpA - VEHICLE SAFETY AND DEVELOPMENT CENTER



Approaches to CSI

CSI is situated approximately 10 Km north west of Milano, in Bollate.

It can be reached from Milano:

- Piazza Maciachini, Nuova Comasina Highway (exit Cormano), S.S. 35 (State Road) Vecchia Comasina
- West Belt Parkway: Rho Exit, S.S. n. 233 (State Road) Varesina
- Autostrada Milano-Venezia: exit Cormano, S.S. 35 (State Road) Vecchia Comasina.

CSI can be also reached by train "Ferrovie Nord Milano", Milano-Saronno section (station Bollate Nord).

Headquarters

CSI S.p.A. - Viale Lombardia 20 -20021 Bollate (MI)
Tel. +39 02383301- Fax +39 023503940
e-mail: info@csi-spa.com

For further information, please contact

Automotive Marketing Manager
Henry GUTMAN
henrygutman@csi-spa.com
phone +39 02 38330259

Automotive Manager
Paolo FUMAGALLI
paolofumagalli@csi-spa.com
phone +39 02 38330267