TTM LASER

TTM LASER IS A COMPANY SPECIALIZED IN DESIGNING, PRODUCING AND INSTALLING PLANTS AND CUSTOM-MADE LASER CUTTING AND LASER WELDING MACHINES.

Our approach is to be partners to our clients and to create with them long-term collaborations, made stronger by custom-made plants and technological solutions born from experience in many application areas, assistance service and support in new processes development.

TTM Laser offers resources and skills to fulfil all the plant development phases: design, realization, assembly and installation.

Our strength is the R&D Department, with its lab for the validation of new processes and new technology packages.

The After Sales department completes the service range as it ensures all the support a customer might need during the production activity.

A team of mechanical designers and software designers, an engineering workshop for manufacturing and assembly, a unit devoted to installations and service and the R&D Department are strategic assets on which TTM counts on to ensure reliability, flexibility and speed of response.
TTM LASER SOLUTIONS FOR THE RAILWAY INDUSTRY

TTM LASER SOLUTIONS REALIZES MACHINES AND COMPLETE PLANTS FOR THE PRODUCTION OF SIDEWALLS, ROOFS, UNDERFRAMES AND LONG BEAMS FOR RAILWAY CARS OR URBAN TRANSPORT SYSTEMS.

In the following pages you will find a collection of the most significant systems installed all over the world. The product range is divided into three main categories:

>> **RVP**: turnkeys that cover the entire production process: from the storage to the inspection of the finished products;

>> **TSL**: welding and cutting systems for producing sidewall and roofs from metal sheet;

>> **TS**: systems to realize tailored plates from sheet metal;

Our plants are used by OEM and its sub-vendors. According to the client specific production needs, different technological solutions are used:

>> **CO2** laser or fiber;

>> gas-welding technology, cold wire or laser-hybrid+MIG;

>> gantry systems or automated systems.

Software and equipment are integrated with technology packages developed by TTM, like:

>> online seam tracking system measuring joint geometrical and online adjustment of the process standards’ properties;

>> process monitoring systems with images’ analysis;

>> offline programming using 3D or 2D;

>> non-destructive testing systems.
COMMISSIONED BY BOMBARDIER TRANSPORTATION CESKA LIPA, CONCEIVED FOR THE SPECIFIC REGIO 2 MANUFACTURING PROCESS, IT’S A TURNKEY PLANT FOR SIDEWALLS, ROOFS, UNDERFRAMES AND LONG BEAMS FOR RAILWAY CARS.

The supply includes everything from the storage of semi-finished products, to the inspection of finished pieces, all the material handling systems, the multifunctional welding cell and three different tools for mobile welding. This plant implements organically different technologies and technical solutions so that it can be considered a benchmark for the carbon steel car bodies production.
CUSTOMER: BOMBARDIER TRANSPORTATION

FOR SIDEWALLS, ROOFS, UNDERFRAMES AND LONG BEAMS

PRODUCT MATERIAL: CARBON STEEL, HSS

FINAL PRODUCT SIZE: 3.5 X 16 M

TECHNICAL FEATURES:

- WELDING TECHNOLOGY:
  - AUTOGENOUS LASER WELDING
  - COLD WIRE LASER WELDING
  - LASER+MIG HYBRID WELDING
  - LASER CUTTING
  - ONLINE SEAM TRACKING
  - AUTOMATIC LASER HEAD CHANGE
  - ALGORITHM WITH AUTOMATIC ADJUSTMENT OF WELDING PROCESS PARAMETERS
  - NOMINAL WELDING AREA: 3.5 X 16 M (MAX 3.5 X 20 M)
  - MAGNETIC WELDING JIG FOR SIDEWALL, UNDERFRAME AND ROOF
  - WELDING REPORT WITH VIDEO OF EACH WELDED JOINT
  - OFFLINE PROGRAMMING ON DELMIA PLATFORM
The technological core of the plant is an automated system equipped with 4 laser heads connected to a fiber laser source. The maximum operating area is 3.5 x 20 m. Depending on the welding joint type, the system uses different technologies: gas-welding, cold wire or hybrid. A laser cutting head completes the package.

To protect the operators, all the laser processes are contained in a cabin equipped with three automated access doors: everything happens without operators on site through remote vision systems, both for the machine movements supervision and the welding joint monitoring.

The semi-finished parts are stored in an automated warehouse where the retrieval system can be interfaced with the daily production software. The stocks are always monitored and the materials are ready to use as soon as the manufacturing cycle starts.

3 overhead bridge cranes, 2 handling vacuum devices for big dimensions metal sheets, 1 positioning system with vacuum manipulator, 1 transfer crane for the finished products. Everything needed for the parts handlings within the stages of the manufacturing process.
To complete the plant there is a visual and X-ray inspection of the finished pieces: four inspection stations for metal sheets as long as 16 m and all the necessary handling tools.

The productivity is guaranteed by using two magnetic welding jigs. The magnetization of 160 parts is operated through an easy-to-use tablet which controls the electropermanent magnets' matrix.

The TTM software package includes: a machine software, an offline programming system with a simulation of the production time and clash detection, a multilayer HMI, a programme reporting each weld line.

Online seam tracking system measuring joint geometrical and automated adjustment of the process standards' properties.

The welding process validation is essential for the realization of the plant. All the records of production cases (materials, thicknesses, joint types) have already been tested in the preliminary stages through samplings and they have been validated accordingly to ISO 15614, ISO 13919 and ISO 5817.
TSL 2.5-25
LASER WELDING AND CUTTING SYSTEM FOR PRODUCING SIDEWALL AND ROOFS (WITH 2D CUTTING HEAD)
COMMISSIONED BY INDIAN RAILWAYS, TSL 2,5 – 25 IS THE MOST ADVANCED WELDING MACHINE INSTALLED IN THE KAPURTHALA PLANT. BY WELDING TOGETHER METAL SHEETS OF COMMERCIAL SIZES IT PRODUCES COMPLETE SIDEWALLS AND ROOFS, INCLUDING OPENINGS FOR DOORS AND WINDOWS.

CUSTOMER: INDIAN RAILWAYS

FOR SIDEWALLS, FLOORS AND ROOFS

PRODUCT MATERIAL: CARBON STEEL, STAINLESS STEEL, HSS

FINAL PRODUCT SIZE: 2,5 X 25 M
BY WELDING TOGETHER SHEETS OF COMMERCIAL SIZES, THE TSL SYSTEM MAKES SHEETS OF SIZES NOT AVAILABLE ON THE MARKET AND COMPLETES THE PROCESSING BY CUTTING THE PERIMETER AND ALL THE OPENINGS FOR DOORS AND WINDOWS TO OBTAIN ROOFS, FLOORS AND SIDE WALLS FOR RAILWAY CARS.
TSL MEANS AN INTEGRATED AND TOTALLY AUTOMATED SYSTEM WHICH REALISES IN A SINGLE PLANT ALL THE CUTTING AND WELDING PHASES REQUIRED FOR THE SIDEWALLS AND ROOFS RAILWAY CARS PRODUCTION.
TSL 3.3-26.5

LASER WELDING AND CUTTING SYSTEM
FOR PRODUCING SIDEWALL AND ROOFS
(WITH 3D CUTTING HEAD)
CUSTOMER:
TVER
TRANSMASHOLDING

FOR SIDEWALLS, FLOORS AND ROOFS

PRODUCT MATERIAL: CARBON STEEL, STAINLESS STEEL, HSS
FINAL PRODUCT SIZE: 3.3 X 26.5 M

THE TSL 3.3-26.5 SYSTEM HAS BEEN DESIGNED AND MANUFACTURED FOR RAILWAY CARS BUILDING WORK TVER JSC, TO MANUFACTURE STAINLESS STEEL SIDEWALLS FOR RAILWAY CARS. THIS SYSTEM ALLOWS TO PROCESS SPECIAL NON-FLAT PROFILES, SUCH AS CORRUGATED SHEETS, AND TO PERFORM CRIMPED CUTS.
THE TSL SYSTEM PROVIDES FOR THE USE OF A GANTRY TO AUTOMATICALLY DISCHARGE THE OFFCUTS REMOVED BY SUCTION CUPS AND PLACED ON CONVEYOR BELTS. THESE OPERATIONS OCCUR IN A FULLY MASKED TIME UPON WELDING THE NEXT SIDE WALL.
THE MODULARITY OF THE SAFETY SYSTEMS ALLOWS FOR SAFE
INTERVENTION IN THE LOADING/UNLOADING AREAS BY OPERATORS
WITHOUT HAVING TO INTERRUPT CUTTING AND WELDING OPERATIONS.

TSL 3.3-26.5
TS 4.20

TRANSVERSAL LASER CUTTING AND WELDING FOR MANUFACTURING METAL SHEETS WITH DIMENSIONS NOT AVAILABLE ON THE MARKET FOR THE RAILWAY INDUSTRY
CUSTOMER: Göcke  

FOR TAILORED PLATES FOR SIDEWALLS AND ROOFS  

PRODUCT MATERIAL: STAINLESS STEEL, CARBON STEEL, STAINLESS STEEL, HSS, DOCOL, DOMEX, HARDOX  

FINAL PRODUCT SIZE: 4 X 20 M  

TS 4.20, COMMISSIONED BY Göcke Umformtechnik GMBH (GERMANY), IT ALLOWS OBTAINING SEMIFINISHED LARGE SIZED SHEETS, USED IN THE TRANSPORTATION INDUSTRY. WITH THIS SYSTEM, THE COMPANY HAS GAINED THE TÜV NORD ISO 15085 CERTIFICATION IN 2010 FOR WELDING PROCESSES IN THE RAILWAY INDUSTRY.
THE SYSTEM INSTALLED AT GÖCKE MAKES USE OF A TRUMPF TLF5000 STATIONARY SOURCE, WHICH ALLOWS WELDING CARBON AND STAINLESS STEEL WITH THICKNESS UP TO 8 MM.
As for all the models of the TS and TSL series, the TS 4.20 system can be equipped with both CO\textsubscript{2} and high brightness laser resonator (fibre or disk).
TS 5.12

LONGITUDINAL CUTTING AND WELDING. THE FULLY AUTOMATED LINE FOR MANUFACTURING LARGE FORMATS EVEN WITH DIFFERENT THICKNESS AND MATERIALS
THE TS 5.12 SYSTEM HAS FULLY MET THE GÖCKE MFORMTECHNIK GMBH (GERMANY) MANUFACTURING REQUIREMENTS. TS 5.12 CAN LONGITUDINALLY JOIN SHEETS OF DIFFERENT MATERIALS AND THICKNESS UP TO 12 METRES IN LENGTH.

CUSTOMER: GÖCKE

PRODUCT MATERIAL: STAINLESS STEEL, CARBON STEEL, STAINLESS STEEL, HSS, DOCOL, DOMEX, HARDOX

FINAL PRODUCT SIZE: 5 X 12 M

FOR TAILORED PLATES FOR SIDEWALLS AND ROOFS
THE TYPICAL TS 5.12 SYSTEM APPLICATIONS INCLUDE LONGITUDINAL WELDING OF HIGH MECHANICAL PROPERTY SHEETS, SUCH AS HIGH-RESISTANCE STEEL SHEETS. THIS TYPE OF APPLICATION REQUIRES PRE AND POST-HEATING SYSTEMS WITH COOLING.
CURVE CONTROL TO LIMIT THE HARDNESS IN THE MOLTEN AREA AND IN THE THERMALLY ALTERED AREA. EVEN FOR THIS SYSTEM, THE ACCURATE MECHANICAL DESIGN HAS ALLOWED PLACING THE MAIN CARRIAGE OF THE TRUMPF TLF5000 CO₂ SOURCE ON BOARD.
TS 3.4
LONGITUDINAL CUTTING AND WELDING. THE FULLY AUTOMATED LINE FOR MANUFACTURING LARGE FORMATS EVEN WITH DIFFERENT THICKNESS AND MATERIALS
THIS MACHINE, REALIZED FOR THE INDIAN RAILWAY PLANT IN CHENNAY, ALLOWS THE SEMI-AUTOMATED CUTTING AND WELDING OF MEDIUM SIZE PLATES. THE MACHINE IS ENDOWED WITH METAL SHEET VACUUM HANDLING SYSTEMS.

CUSTOMER: INDIAN RAILWAYS

FOR TAILORED PLATES FOR SIDEWALLS AND ROOFS

PRODUCT MATERIAL: STAINLESS STEEL, CARBON STEEL, HSS

FINAL PRODUCT SIZE: 3 × 4 M
TTM LASER OPERATIONS

DESIGN:
>> Every design is custom made. Both mechanical and automation design are fully developed by the TTM technical office. Individual competencies, synergies and tight team working: this is our way to design and create excellent solutions.

MANUFACTURING & ASSEMBLY:
>> 18000 sq.m. of covered area equipped for machining and assembly.
   11 CNC Milling machine, 7 CNC Lathe Turning Machine, Welding Shop, Assembly Shop, Metrological Room.

ERECUTION & COMMISSIONING:
>> 15 years of experience in installation of special machines. A team of specialists always in action worldwide.

PROJECT MANAGEMENT:
>> Project supervision from signing to final approval; for single machines or turnkey plants.
**TTM LASER SERVICES**

**AFTER SALES SERVICE:**

>> Our commitment continues after commissioning. An assistance service is available for preventive and special maintenance, as well as online service assistance during daily production. Stock of critical spare parts are available for a quick solution to problems.

**R&D DEPARTMENT:**

>> Our R&D is working daily on new processes and applications, testing on in house testing facility. Collaboration with Universities and Research Centres for Laser applications.

**TRAINING:**

>> Training packages for technicians and operators dedicated to machine use and maintenance, welding process, applied technologies. From knowledge: the highest efficiency and productivity.