GENERAL PRESENTATION
COMPANY PROFILE

CVS TURKEY

FROM CONCEPT TO COMMISSIONING

Design
Manufacturing
Erection
Training

Consultancy
Innovation
Process Development

info@cvs.com.tr
www.cvs.com.tr
CVS provides plants & equipments for minimills (Meltshops & Rolling Mills), as well as “turn-key” solutions in this regard.

CVS covers the complete design and manufacturing activities for green-field projects as well as revamping/upgrading of existing plants and equipments.

CVS manufactures spare parts & components for Meltshops & Rolling Mills & Off-Gas Systems.

CVS provides technical assistance and consulting service to steel production.
CVS headquarter is located in the most sophisticated industrial region of Turkey; Gebze (50 km to Istanbul city center), close to many major ports.

Our modern facilities consist of three integrated major-sized workshops equipped with post-modern machinery parks and three engineering buildings summing up approx. 100,000 sqm.

CVS workforce is formed by over than 750 specialized staff with a modern machinery park to undertake even the most challenging projects.

More than 270 engineers and administrative employees are involved in the design and management of the projects.
OUR VISION

To achieve a company status that sets the standards for iron and steel industry globally, to invent new technologies and become the industry leader by 2020 in terms of quality, cost effectiveness, pace and customer satisfaction integrated with human force, technology and processes.

OUR MISSION

To achieve a company status that sets the standards for iron and steel industry globally, to invent new technologies and become the industry leader by 2020 in terms of quality, cost effectiveness, pace and customer satisfaction integrated with human force, technology and processes.
COMPANY PROFILE

INNOVATION & CREATIVITY

Modern business largely depends on creativity and innovation which play major roles in the development of business. A close look at the strategies which are employed in today’s business would reveal how creativity and innovation concept help the companies in winning the competition games.

Today, innovation takes on a whole new meaning. Looking back at the history of management for the last 50 years you’ll quickly realize that “management” was designed to solve a very specific problem from today-how to perform certain things in a repetitive fashion and controlled manager as they increase the scale both locally and internationally. It is about building a giant ship with is bigger and more efficient than others. It also carries a lot of sailors and passengers and everyone need to be on board and stay there throughout the journey.
INNOVATION & CREATIVITY

Our success in maintaining competitiveness in fast changing markets is due to our strongest point to be innovative. We are fully committed to R&D meeting effectively the most pressing requirements of today’s steelmaking. We are looking at confronting the challenge of innovation when decades or management practices and system were designed to improve efficiency and building scale and scope as well as maintaining control.

Our explanation for innovation is that creativity and connectivity is making it possible to amplify and aggregate human imaginations and capabilities in ways never possible before. Our discipline of managing processes in innovation, is related with our Innovation Management. Our designers and engineers are highly motivated to cooperate with a common understanding of goals and processes Innovation Management.
# ACTIVITIES

## TECHNOLOGICAL UNITS

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## AUXILIARIES - MELTSHOP

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MELTSHOPS

From Water Cooled Panels to complete Electric Arc Furnaces, from Ladles to complete Ladle Furnaces, from Tundishes to complete Continuous Casting Machines, from Ducts to complete Fume Treatment Systems and from Engineering Services to Turn-Key Plants, CVS offers economically viable solutions at European standards.
ELECTRIC ARC FURNACES (EAF)

Conventional

MAIN ADVANTAGES

- Low production costs
- Higher process flexibility
- Increasing productivity while improving energy efficiency
- Meet environmental requirements at a minimum cost
- Better coordination of process / environmental requirements
- Processing fine materials and dusts
- High metal recoveries
- Extended sidewall life with high-intensity copper cooling panels
ELECTRIC ARC FURNACES (EAF) Conventional

GENERAL FEATURES
- AC-Type UHP design
- State-of-the-art electrode control system
- EBT slag-free tapping
- Energy efficient low refractory consumption
- Direct Reduced Iron/HBI feeding system up to 90%
In comparison with other companies’ systems it is smaller, more dynamic and has more elegant design than their design.
In the EAF melting process the chemical energy is playing an important role since production costs and productivity have to be always improved.

It is now common practice to use between 30% and 40% of the total energy input to the EAF being supplied through oxy-fuel burners and oxygen lancing.

Exothermic reactions are provided very important energy input.

At EAF, while the energy inputs are calculated; Total oxygen which blows from burners (burner mode & jet mode) and lance manipulator, total NG which blows from burners, total C which is coming from with charge, injection and scrap, total removal elements are going into the calculations.
**SLAG DOOR LANCE MANIPULATOR & COMBINED JET BURNER SYSTEMS**

**Burner oxygen;**
- Burner fuel (Natural Gas, LPG, CH4, etc.);
- Lance oxygen;
- Carbon injection.

Slag foaming is extremely important if an aggressive arc is to be maintained throughout the heat. As the scrap level reduces in the furnace and flat bath conditions are approached the height of the foaming slag must be increased to completely submerge the arc and prevent damage to the water cooled panels.

The location and the direction of the burners are determined to reduce the cold spots effect generated by the three-phase arc of the furnace, thus obtaining an even and faster melting.

- Higher burner efficiency (cleaner walls, reduction of electric energy consumption)
- Higher supersonic oxygen efficiency (reduction of electrode consumption and increase of refractory delta life)
- Higher burner power (up to 8 MW burner and 4000 Nm3/h of supersonic oxygen)
- Carbon injection in the slag (CH4 + N2 cooled) or above the slag (air cooled)
ELECTRIC ARC FURNACES (EAF) EPC System

Environmental Pre-Heating & Continuous Charging System

ADVANTAGES

✓ 100kwh/t Energy Saving
✓ 20% Increasing Productivity
✓ Independent Scrap Charging
✓ Minimum Dust Emission
✓ Higher Return On Investment

CVS MAKINA has a cooperation with KR Tec GmbH which develops a New Generation Concept in Arc Furnace Steelmaking

FEATURES

✓ Flat Bath Operation
✓ Controlled Scrap Feeding Rate
✓ Charging During Power On
✓ Controlled Preheating Temperature
✓ Complete Airtight System
Idea behind the challenge is to recover the heat lost to FTP system by the application of Scrap Preheating.

The EPC System combines the advantages of the preheating efficiency of the chamber and the continuous scrap feeding.

The EPC System is a new generation of economical arc furnace.

EPC system overcomes all the missing items of the existing Preheating system.

Furthermore, the design has been considerably simplified to increase the reliability and the profitability of the investment, reducing the ROI by less than 12 months.
Our invention makes possible the continuous melting of ferrous materials such as sponge iron, scrap iron or iron ore in an electric arc furnace so that the electric arc is never turned off nor is the power ever reduced.

This invention assures the continuous melting of ferrous materials, the simultaneous and continuous refining of molten steel by a means that prevents contamination from the metal charge and eliminates the danger of clogging the tapping hole, and the semi-continuous tapping of molten steel when it is adequately refined.

Most operations aim for 2 to 3 buckets of scrap per heat and will attempt to blend their scrap to meet this requirement. Our invention achieve a single bucket charge.
ELECTRIC ARC FURNACES (EAF)
One Charge

Constant flat bath allows for high electrical efficiency if a good foamy slag is maintained!
Otherwise - damage to refractory, accelerated delta wear, increased electrode consumption, decreased yield, increased power consumption, increased wear on oxygen lance.

Specific Objectives of New Process

- Lower specific capital costs
- Lower primary energy consumption
- High productivity/low conversion cost
- Flexibility in choice of feed materials
- Lower T-T-T closer
- Maintain maximum process flexibility
- Increase product quality while maintaining cost competitiveness
- More environmentally friendly and meet environmental requirements at minimum cost
- Maximizing power input to the EAF by using a combination of energy sources
- Optimized energy use and electrical power supply optimized to minimize losses
The operation executed at the ladle furnace is an essential part of the secondary metallurgy treatment, such as refining, adjustment of liquid steel temperature and chemical composition with the target to increase quality of steel.
SECONDARY METALLURGY
Ladle Furnaces (LF)

Advantages of CVS Ladle Furnaces

- Saving of ferroalloy
- Saving of energy
- Increasing productivity
- Decreasing refining time of EAF
- Decreasing tapping temperature at EAF
- Precise temperature control
- Improving cleanliness of the steel and removal of inclusions
- To achieve strict tolerances for chemical analysis
The Ladle Furnace is conceived for reheating the steel in the ladle placed on a ladle car and will be designed and built according to the most modern techniques in the field and will be in particular provided with:

- Water-cooled secondary circuit and water-cooled flexible cables
- Water-cooled ladle roof equipped with indirect fume collecting hood to reduce steel oxidation
- Roof lifting mechanism via hydraulic cylinder
- Electrode arms with reduced electrode pitch diameter
- Water-cooled secondary circuit and water-cooled flexible cables
- Electro-hydraulic electrode regulation
SECONDARY METALLURGY
Vacuum Degassing (VD)

During the VD process, the metallurgical work takes place in the steel ladle. The liquid steel ladle is placed in a vacuum tank, which is connected to a vacuum pump system. The ladle is equipped with porous plugs through which inert gas is injected into the melt in order to promote stirring. Depending on the metallurgical reactions during the process ladle freeboards of 800 - 1200 mm are required. If equipped with an additional oxygen lance further benefits such as forced decarburization or chemical heating can be obtained, as known under VD-OB.

Metallurgical and operational tasks:
- Hydrogen and Nitrogen degassing
- Decarburization and forced decarburization with oxygen lance
- Desulfurization by slag metallurgy
- Deoxidation by the addition of aluminium
- Inclusion shape control
- Adjustment of temperature and analysis
The VOD plant is mainly used for the production of stainless steel. The plant is basically designed as a tank degassing plant which is additionally equipped with an oxygen blowing lance and other related equipment. Due to the reduced CO partial pressure under vacuum conditions, decarburisation of high-alloyed steel grades to very low carbon contents is possible. VOD plant sare operated directly in combination with an EAF as a DUPLEX process or in combination with an EAF and AOD as TRIPLEX process.

**Metallurgical and operational tasks:**
- Vacuum operation possible with varying initial carbon contents
- High flexibility to use lower cost high carbon alloying materials
- Low chromium oxidation losses
- High rate of chromium recovery by slag metallurgy
- Chemical heating of liquid steel
- Low final dissolved gas contents
- Improved steel cleanliness with
- Achievement of exact compositional values within narrow tolerances
SECONDARY METALLURGY
Vacuum Circulation Process (RH)

The RH (Ruhrstahl Hereaus) Process is carried out in a refractory lined vessel equipped with two snorkels which are immersed in the steel bath. By reducing the system pressure and by injecting inert gas into the upleg snorkel the melt rises into the vacuum vessel where decarburization and other reactions take place. The RH Plant is the best suitable system for the production of Ultra Low Carbon Steel grades.

Metallurgical and operational tasks:
- Fast decarburization down to 15 ppm
- Hydrogen and Nitrogen degassing
- Operation possible with varying initial carbon contents (with top oxygen blowing)
- Flexibility to use lower cost HC alloying materials
- Chemical heating of killed and un killed heats
- Improved steel cleanliness with regard to nonmetallic inclusions
- Exact compositional values within narrow tolerances of liquid steel
REFRACTORY MELTING FURNACES

The Magnesite (Fused Mg) which is mostly produced in China around the world, was started to be produced in Turkey by means OXYGEN PLANT of the furnace that manufactured by CVS.
CONTINUOUS CASTING MACHINES (CCM)

CCM can be designed to produce square billets in the sections between 100 to 200 mm², and blooms between 180 to 260 mm². Special designs for beam blank and round sections between 160 to 440 mm can be done. Radius of 5-12 meter and mould length of 750-1000 mm can be designed according to project requirement.
CONTINUOUS CASTING MACHINES (CCM)

According to customer request, CCM can be equipped with the necessary modern equipment to produce high quality casted products, such as tundish of delta type to reduce inclusions in the mould, long copper tube to improve primary cooling on the billet surface, automatic mould level control system, high casting radius to reduce stress during unbending, secondary spray cooling divided in three zone for a better cooling effect and control, walking beam cooling bed for the straightening of the long billets.
## CONTINUOUS CASTING MACHINES (CCM)

### CCM Main Equipments

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<td>- Spray bending sectors</td>
<td>- Cooling Beds</td>
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</table>
FUME TREATMENT PLANTS (FTP)

Design Characteristics

• Water Cooled Ducts and Elbows
• Combustion Chamber
• Canopy Hood for Secondary Emissions
• Spark Arrester
• Natural Cooler (Trombone)
• Pulse-Jet Bag Filter
• Dust Handling Pelletizers
• High Efficiency Main Boosters Fans

Minimum dust and noise emissions

Main idea of environmental protection means concern about people’s health, CVS offers the most respectful solution for steelmaking.
FTP design of CVS has the following advantageous:

- Reliability
- Reduced maintenance requirements and costs
- Reduced operating cost
  (electrical energy, compressed air)
- Low residual dust content at stack
- Low noise emission technology
- Environment Friendly
- Automatic operation, “hands-off” type
Fully automated reliable systems

MATERIAL HANDLING SYSTEMS (MHS)

MHS Main Equipments
- Receiving hoppers
- All type conveyors
- Main storage bins
- Vibrating feeders
- Weighing systems
- Pneumatic deviators
- Batch hoppers
- Bar gates & Shell valves
- Swivelling chutes

CVS Material Handling System; considers reduced manual work and avoids time loss. CVS designs and manufactures material handling systems with the most effective and fully automatic operation.
The plant is generally designed for the storage into bins, extraction, weighing, transport and charging of ferroalloy, additives and fluxes into scrap bucket, into the ladle in tapping position and to the ladle refining station.

All plant functions, specifically from storage bins up to loading to the final users, are controlled automatically.

The dosage is carried out with high accuracy to obtain maximum technical results and, at the same time, to use additives and fluxes in the best possible way to minimize expenses.

Suitable interlocks will guarantee the right positioning of the devices. Maximum and minimum level gauges in storage bins will warn operators.
**AUXILIARIES & SPARE PARTS for MELTSHOPS**

**SCRAP PRE-HEATING SYSTEMS**

15 – 20 % of contained energy as 100 - 150kwh/t in EAF during the operation, is gone out via duct emissions.

CVS scrap pre-heater is a system which utilizes this heat energy to heat scrap in a bucket before charged into the EAF and thus contributes towards to energy saving.

Evacuated gas from the EAF is flowed to the combustion chamber, and via the second out way with another duct pipes, hot gas is flowed to the scrap buckets, gone into bucket to heat scraps and after that gone out from bottom of scrap bucket and via duct pipes, mentioned gases are gone to the FTP after gives existing heats to the scraps.

**Main Profit:**

Preheated scrap average temperature is between 150°C-200°C. The amount of energy saving is 20 – 30 kwh/ton in practice.
SCRAP BUCKET PRESS SYSTEMS

System is designed maintenance friendly and it also has platforms for maintenance. Via one main hydraulic cylinder, the system is pressing to scrap in the scrap bucket for high scrap density requested. And via four support hydraulic cylinders, bucket car is protected and fixed.

The system is working very simple, only scrap bucket rail ways and bucket cars need just a little revisions. During the system is pressing, to fix the car and to protect the car wheels, there will be a hydraulic locking mechanism in the concrete.
AUXILIARIES & SPARE PARTS for MELTSHOPS

SCRAP SHEAR

CVS SCRAP SHEAR are applied in steel mills, recycling plants, ferrous & non-ferrous smelting industry to press scrap metal (steel, copper, aluminum, stainless steel, discarded automobiles, etc.) into acceptable furnace charges in shapes of cuboids.

- Special hydraulic design of CVS SHEAR allows fast cycle time.
- Loading bucket for saving scrap charging time.
- Both ferrous and non-ferrous bales are possible.
The Scrap Shredder is designed to shred steel turnings, shavings, borings...etc into **20-50 mm chips**.

Shredder has a robust structure and machines to shred scraps between two strong rolls. System is designed for working light and heavy demolition scrap. One of the biggest advantage is **quick process** time.

High quality cutting blades are located on the rollers for longer service time.
The top stirring lance shall consist of facility for lancing of inert gas into the molten steel bath from top through a ceramic mono-block lance. The equipment basically comprising the lance supporting structure, its carriage and drive, along with hoses and fittings, shall be suitably installed on the working platform so that the lance can pass through the corresponding opening on the water-cooled roof. The lance stroke and swinging motion shall be through electro-mechanical system. Inert gas will connected from the common valve rack for the bottom stirring system. Switch-over from bottom purging to emergency lancing shall be from control room.
CVS offers world-class quality and economically viable solutions.

**ORANGE PEEL & CLAM SHELL GRABS**

**SCRAP BUCKETS & BUCKET CARS**

**CRANES FOR MILLS**

**EAF UPPER & LOWER SHELLS**
AUXILIARIES & SPARE PARTS for MELTSHOPS

EAF ROOFS

LF ROOFS

WATER COOLED PANELS

WATER COOLED ELBOWS
AUXILIARIES & SPARE PARTS
for MELTSHOPS

WATER COOLED DUCTS

COMBUSTION CHAMBERS

COPPER CONDUCTIVE SYSTEMS

COPPER CLADDED ELECTRODE ARMS
AUXILIARIES & SPARE PARTS for MELTSHOPS

EAF SLAG DOOR MANIPULATORS

LADLE & TUNDISH PRE-HEATERS / DRIERS

LADLES & LADLE CARS

TUNDISH & TUNDISH CARS
CVS provides tailor-made solutions for all meltshop auxiliaries and spare parts.
CONVERTER OFF-GAS SYSTEMS

CVS uses its technological manufacturing capabilities and experience, to produce and install off gas systems of integrated facility all over the world. Their high internal pressures, high gas temperatures, corrosive gases, complex piping geometries, requirement of special processes make off gas systems so difficult that only a few companies can produce.

Off-gas systems differ from ordinary water cooled ducts in the way that they produce steam with high pressures up to 60 bars and high temperatures up to 200°C. Steam generation requires accurate flow control and well balanced piping geometry. Special precautions like cladding, special material selection etc. have to be taken to prevent corrosive effects of off-gases.
Applications
The waste heat from any kind of off-gas is utilized by the steam, generated in the stacks. CVS produces main parts of especially steel producing facilities like BOF, AOD, such as:
- Stationary Hoods
- Mobile Hoods
- Skirts
- Transfer Car Mechanisms
- Cooling stack

Inspection Techniques
- Radiography
- Ultrasonography
- Magnetic Particle Test
- DYE Penetrant Test
- Hydrostatic Test
- Visual Test
- Flashing
CVS offers a full range of solutions for increasing capacity and quality. CVS uses its experience and proficiency to supply engineering services and components of Rolling Mills.
ROLLING MILLS

REHEATING FURNACES

CLASSICAL / HOUSINGLESS TYPE STANDS

FLYING SHEARS & CROP SHEARS

RECUERATORS
ROLLING MILLS

WATER QUENCHING SYSTEMS

COOLING BEDS

COLD SHEARS

BINDING MACHINES
Fully automation system and from engineering services to turn-key plants, CVS offers economically viable solutions at European Standards.
CVS with its own experience can supply engineering, manufacturing and erection services for water treatment plants, according to water needs of meltshops and rolling mills.

In a wide range of the applications water treatment systems, CVS provides solutions for needed flowrate, pressure and temperature for water systems, direct or indirect cooling circulation for machines, scale pits, make-up water basins, utility water and fire-protection water systems.
CVS is in need of oxygen, argon and nitrogen in steel mills to produce cryogenic and gas production facilities on a turnkey basis along with solution partner.
ELECTRIC & AUTOMATION

CVS Automation creates the smartest electrical and automation solutions for optimal plant performance and optimal product quality according to specific project conditions. CVS does not only make its standard application, but also creates solutions to satisfy the customer for their special conditions.

Our difference is the flexibility and fast response of our young and dynamic group willing to find the best solution. CVS automation works as a member of customer not as only a solution provider. The point of our successful implementation is our workers who has experiments in operating of steel plants. CVS knows what to do to manage to create a proper project for every aspect, because all of them have gained the experience during living in steel producing environment. In addition to new systems, CVS offers revamping and renovation of existing automation system to the newest technological solutions.
Fully Automation System Controls

CCM Control System

FTP Control System
**Automation Level 2:**
Speed up the preparation of the furnace for the melting process, by providing the operator with parameters and work conditions that must be used to achieve the desired quality: melting strategy involving the transmission of optimum set points to the basic automation system. Tracking of the process according to the variables and events detected. Editing part of the casting process, indicating process disfunctions, quality of final products, production outputs, unproductive periods, stoppage and fault management, etc. Including also the prior laboratory report received via local network or from point-to-point.
CVS is proud of its know-how and experience. We invest in R&D and believe in our engineering prowess. From a simple piece of equipment to the most complicated turnkey project, CVS Design Team offers efficient and feasible solutions to our customers.

**Our engineering/design aims the following main objective:**
- Minimum operation and maintenance costs;
- Optimal utilization of spaces inside / outside the meltshop;
- Automatic operation, “hands-off” type;
- Environmental respectfulness;
- Maintenance friendly operation.
- Whenever CVS receives an order for steelmaking equipment, engineering services and know-how transfer are mutually agreed upon between both parties.
- Thanks to our experience, there is no question that we know that this is fundamental basis for successful production equipment.
- The second step of know-how transfer is an off-site training of customer’s engineers, technicians and skilled workers.
- The main target of training on the customer’s site is to familiarise their personnel with hands-on operation of the supplied machines and equipment.
- The operators and maintenance personnel are trained step by step to prepare them for successful operation of the equipment.
SITE MANAGEMENT

Erection & Civil Works

For erection engineering, site management and site monitoring, our professional handling of the site ensures the quality of the plant and guarantees adherence to both the budget and the schedule.

- Erection / Civil Works engineering & site management
- Cost estimation for site management and execution of Erection / Civil Works
- Preparation of time schedules for greenfield and brownfield projects
- Preparation of site organization, site regulations and safety rules
- Preparation of tender documents for the execution of Erection / Civil Works
- Final accounting of subcontractors
- Enforcing safety rules and site regulations
- Follow-up of progress and budget
- Assuring quality requirements
- Consistent coordination with customer
Energy Efficiency

Respect to Nature
The design considers latest technology in the field of steel plant machinery and equipment.

The layout takes full advantage of the rationality of material handling in the plant in order to obtain the following results:

- Minimum amount of areas occupied
- Optimization of personnel required
- Optimization of production times and costs.
- Best scrap handling
- Future Extension consideration of plant

The layout of the meltshop and the location of Auxiliary Plants have been carefully analyzed for best logistics inside the plant like raw materials, semi-products and waste material.
Design Focus
• Limited investment costs
• High quality products
• High productivity
• Maximum simplicity of operation
• Operation reliability
• Maximum flexibility to meet various market demands.
GREEN FIELD & TURN-KEY PROJECTS

We lay the foundation for optimized processes with proven, leading products worldwide, including mechanical and technological engineering for metal production and rolling as well as process control engineering, drive engineering and power supply.

Integrated online and offline process models reflect decades of practical experience and help to ensure reliable, reproducible quality.

Our process engineering expertise fuses these products into complete plant solutions that also accommodate the upstream and downstream processes.

These solutions are the basis for optimal resource use, minimized waiting times and reduced maintenance and spare parts costs, as well as wide flexibility with respect to raw materials and the resulting products.

A further factor for competitive production is the quality of information processing. Production data must be consolidated and compared with planning data to ensure optimal production flow.
QUALITY POLICY

We, at CVS, are dedicated to supply our local and international customers, operating in the iron and steel making sector, with the best service and with the best products, in order to establish a maximum customer satisfaction and on continuing basis. With this goal always in our minds we continuously strive for:

- Highest respect to our resources & much concern for the environment
- Strongest concentration in our customers and in the society
- Active listening our customers needs
- Professional and scientific approach
- Open mindfulness with improvement philosophy
- Total Quality Management
- Highest productivity with highest efficiency
- Participating and transparent management
- Team work based on friendship and mutual respect
- Dedicated work understanding, fair give and take approach
- Being a leader in cost effectiveness
- Practical and creative thinking with qualified knowledge and strong back ground
Your One-Stop Solution Provider for Meltshops & Rolling Mills

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