We strive to work with customers around the world to meet all of their requirements with total solution.

**Plant Engineering & Construction Division**

Based on the technologies and experiences obtained from integrated Steel Mill projects in Pohang and Gwangyang Works of POSCO, POSCO E&C is now expanding its business domain to the world market. We have the advantage of accomplishing numerous projects successfully on time by providing “Total Engineering Solution” throughout 45 years of accumulated commissioning know-how, systematic technology development, strategic collaboration with suppliers. POSCO E&C enjoys high company credit ratings by adhering to ethical management.
POSCO E&C has demonstrated its own ability to provide all kinds of steel plants for more than four decades. As per clients’ demand, POSCO E&C has provided Project planning, Engineering, Procurement, Construction and Operation and Maintenance services within schedule and budget. With its enriched background rooted from numerous projects managed both in and outside of Korea and its extensive expertise in providing and modernizing steel plants and ensuring lifelong competitiveness, POSCO E&C is the best partner for your global steel plant projects, which you can rely on.

The key to POSCO E&C’s remarkable track record is its engineers equipped with full-spectrum of EPC capabilities. Plant Engineering & Construction Division secures more than a thousand of engineers in steel business. Approximately 50 percent of engineers have fully serviced to POSCO E&C for over 20 years.

POSCO E&C’s competence in basic engineering has evolved based on its rich experience developed from manufacturing, installation and commissioning tasks conducted in both domestic and overseas sites. Combined with advantages in operation records of POSCO, these form POSCO E&C’s key competitiveness.

GLOBAL STANDARD FOR Q&HSE

- Quality: ISO 9001 (LRQA)
- Environment: ISO 14001 (LRQA)
- Safety: OHSAS 18001 (LRQA) KOSHA 18001 (KOSHA)
Total Solution Provider for Steel Business

Endeavouring to become a global Total Solution Provider that carries out projects in a comprehensive manner, POSCO E&C has established the Project Planning, Engineering, Procurement, Construction, and Operation & Maintenance (PEPCOM) system. It also continues to secure essential capabilities for each process, including the development of independent designing ability. In addition, it will provide greater satisfaction and services to its customers around the world by further strengthening its core technologies and expertise.

**PEPCOM strategy of POSCO Group**

**Optimized Project Planning**
- Provide customized proposal
- Assist in Client’s Feasibility Study as Technology Provider

**On Demand, On Schedule, On Budget**
- Innovative Engineering and State-of-the-Art Equipment
- Steel Business-oriented Engineers
- Competitive Procurement through Global Networks of POSCO Group
- On-time Project Completion
- Effective Cost Control
- Global Standard For Quality & HSE (Health, Safety & Environment)
- Single Accountability for EPC Project

**Early Production Stabilization**
- Over 20 years of experienced Manpower in POSCO
- On & Off Job Training
- Early Involvement of Experts from Commissioning stage
- Supply of Operation & Maintenance Manual

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Iron Making

POSCO E&C has been stepping forward to be one of the world’s leading companies in the area of iron making technology based on its own engineering and know-how.

Blast Furnace & Sinter Plant

Specialized in technology of large-scale Blast Furnace & Sinter Plant, which provides high productivity & availability with low operating cost to the clients.

Raw Material Handling Facilities

Raw material handling facilities including Ore handling and Coal handling with material treatment capacity of 68 and 35 million tons respectively are in operation in POSCO steel works. Recently, POSCO E&C has supplied 15 silos, each of 50 thousand tons of capacity in Gwangyang additionally.

Gwangyang works

No.1 Blast Furnace

The World’s Largest Blast Furnace 6,000m³

No.5 Sinter Plant

The World’s Largest Sinter Plant 600m²

Value Improvement by POSCO E&C’s Technologies

Effect of LBR & Off line methodology

One million dollars can be saved by reducing the construction period for one day by using LBR (Large Block Ring) & Off Line (Skid way system) methodology.

POSCO E&C possesses world-class technology which is represented by its accuracy, cost efficiency and fast paced completion.

Steel Making

POSCO E&C has considerable experiences in EPC turn-key projects for new steel making plants and has been expanding Steel making business to overseas markets based on the project executed in Pohang and Gwangyang.

Whether it is BOF or EAF process, POSCO E&C will provide the clients with cost-effective solution as per their needs.

Virtual training system for Converter operation

- Virtual operation with 3D modeling “VR(Virtual Reality) Simulator”
- Virtual system, HMI, panel, controller

BOF (Basic Oxygen Furnace)

- Anti Deflagration Design for off gas system
- CO2 Breakthrough technology development
  - Eco-friendly operation & Flexible operation

EAF (Electric Arc Furnace)

- 3D Simulation Engineering
  - Low Project Cost
  - Easy Maintenance
  - Standardized Operation

Continuous Casting

POSCO E&C recently designed No.4 Continuous Casting in Gwangyang steel works with its accumulated know-how and technology inherited from POSCO. This, as a result, reduced costs and enabled POSCO E&C to successfully enter into the Continuous Casting Market.

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Continuous Casting

TeCHNOLOGY

• High Productivity
  - High Speed Casting
  - Optimized Roll Geometry

• CAE Simulation Engineering
  - Heat transfer analysis
  - Structural analysis

• High Quality
  - High Manganese Steel
  - Advanced High Strength Steel
INTRODUCTION : NO. 4 HOT ROLLING MILL EXPANSION PROJECT, KWANGYANG WORKS OF POSCO

POSCO E&C demonstrates its own technology by performing No.4 Hot Rolling Mill project with capacity of 3.3 million tons per annum in Gwangyang steel works including Roughing Mill and 4Hi-7stands work roll shifting type Finishing Mill. Furthermore, POSCO E&C has reduced construction and operating cost by applying new technologies such as Evaporation Cooling system of Reheating Furnace and Coil Pallet conveyor.

Key Technologies

- Converter Process Design
  - Analysis of the reaction in converter
  - Off gas control system
  - Steel, Dynamic control model

- Converter and Tilting device
  - Converter profile design
  - Technology to prolong a converter long lifetime
  - Converter tilting device (Outsourcing)

- Off gas cooling system
  - Calculation of Heat surface and cooling capacity
  - Basic design for Hood and Radiation part
  - Boiler system using circulation water

- Oxygen supply system
  - Main Lance Design
  - O2 blowing pattern including height
  - Main lance tip (Laval nozzle) for de-C and de-P operation

- Off gas cleaning system
  - Evaporation cooler Design
  - Anti deflagration system in off gas duct
  - ESP Design

- Converter Process design
  - Analysis of the reaction in converter
  - Off gas control system
  - Steel, Dynamic control model

Steel Plate

Accelerated cooling and heat treatment are core technologies applied to the plate mills engineered by POSCO E&C. This will guarantee high-quality steel plate from Shipbuilding to API.

Hot Rolling
Cold Rolling & Process Line

Successful experience from Cold Rolling Mill complex project in Korea as well as Vietnam and India has enhanced the reliability of its stable operation through POSCO E&C's optimized layout engineering, high speed jet picking technology reaching 260mpm, state-of-the art mill technologies.

TECHNOLOGY

High Speed Jet Picking
- Process speed up to 260 mpm
- Shallow high turbulent type
- High Automation

Cold Rolling Mill
- Rolling Process & Pass Schedule Program
- 3D Modeling
- Control Function & Interfacing AGC
- Design Standard & Formula

Continuous Annealing Line
- POSRIO-Furnace Engineering Software for Heat Balance & Speed Map

CGL
- Air Wiping System
  - Air Knives
  - Baffle Unit
  - Auto Lip Cleaner
  - Blower System
  - Positioner
  - HIM & Local Control
  - Electric

CCL
- Roll coater
  - Automatic roll gap control and nip pressure control
  - Stable coating thickness control
  - Increased productivity by eliminating time loss
  - Reduction of paint consumption
  - Easy operation and maintenance

Long Products Plant

Keeping in mind the ever increasing demand of long products in the construction and infrastructure industries, POSCO E&C has carved a niche for themselves in the long product category. Customized EPC management services as per the client's requirement along with the tailored made planning & execution; makes POSCO E&C one of the most capable, efficient and economic contractor globally. POSCO E&C offers a single window solution from planning, engineering, procurement, construction, operation & maintenance of Mini-Mill process consisting of EAF, casting machine and rolling mills keeping the project cost under budget while fulfilling the objectives of the project under secured and environment friendly surroundings.

TECHNOLOGY

Round Bar Mills

With our extensive experience and know how in the bar mill area, we can provide you with total solutions from reinforced bars to customized special round bars to suit your every need.

Section Mills

Our section mills have been proven to offer high quality and high performance at optimal costs. We bring you the customized combination of technology and operational costs to provide you with a competitive edge over your competitors.

Wire Rod Mills

Equipped with the high quality wire rod mill solution, we are ready to provide from conceptual engineering to final installation and commissioning. We are there to assist you with every step to finally achieve your goals.
In pursuit of eco-friendly and slim steelworks, POSCO has developed CEM (Compact Endless cast - rolling Mill) process, a new downstream in the plant following successful development of FINEX, an innovative iron-making process replacing conventional heavy mills. Large portion among CR products can be replaced by thin HR products utilizing the benefits of CEM coming from the direct linking of the caster to the rolling mill. Operational records of CEM will demonstrate the superiority to conventional processes.

**FINEX (Fine Ore Reduction Process)**

Open a new era of Iron-making technology

FINEX, one of the most successful alternative iron-making technologies jointly developed with Siemens-VAI, is based on the direct use of ore fines and non-coking coal. The key technologies of FINEX are fluidized bed reduction of ore fines, hot DRI fines compaction to HCI (Hot Compacted Iron), briquetting of coal fines, and melting of HCI into hot metal. POSCO has been operating the world’s first commercial FINEX plant, with 1.0 Mt of annual capacity, since April 2007 and has added up a new 2.0 million tons per annual capacity in January 2014. It is truly remarkable that a plant produces 2.0 million tons of hot metal by smelting reduction processes since other similar technologies have never achieved this capacity level other than blast furnace process before.

**CEM (Compact Endless casting and rolling Mill)**

- High speed casting
- Endless rolling
- Lowered OPEX & CAPEX

In pursuit of eco-friendly and slim steelworks, POSCO has developed CEM (Compact Endless cast - rolling Mill) process, a new downstream in the plant following successful development of FINEX, an innovative iron-making process replacing conventional heavy mills. Large portion among CR products can be replaced by thin HR products utilizing the benefits of CEM coming from the direct linking of the caster to the rolling mill. Operational records of CEM will demonstrate the superiority to conventional processes.

With the expertise in Steel Plants, POSCO E&C has diversified its approach towards industrial plants catering to the Cement industry, Oil & Gas plants as well as Natural Resources projects in order to offer a well-packaged engineering and construction solution to the wide range of customers benefitting from its capabilities and value engineering solutions.

**Cement Plants**

With the recent win of a cement project in East Timor, POSCO E&C has not only stepped in the cement plant projects but has also proved its metal among global contractors. The East Timor’s TL Cement (Timor-Leste Cement is a special purpose corporation wholly owned by BGC the largest construction company in Western Australia) project worth 350 million dollars for the construction of cement plant with the annual capacity of 1.5 million tons in Baucau. In addition to the precise planning based on the client’s requirement what most worked in POSCO E&C’s favor was the trust that the company has created with the client.

**Oil & Gas**

Energy requirement is growing all over the world and so does the requirement of Oil & Gas Projects for which POSCO E&C has developed in-house capabilities to handle EPC projects. Expertise in process engineering and project management capabilities gained from other EPC projects handled over several decades enables POSCO E&C to take up new challenges and overcoming them through continued innovation, engineering flexibility and ingenuity.

**Mining Plants**

Further expanding its shores of industrial plant projects; POSCO E&C offers EPC services for the Iron ore, copper & coal mining projects. Innovative engineering in addition to the highly experienced mining and metals professionals has the capabilities to make every job doable irrespective of challenges. The synergy among other affiliates of POSCO Group and strategic alliance with advanced technological providers always serve as our competitive advantages because it makes our jobs more efficient and productive by combining capacities of them.
POSCO E&C is currently building Integrated Steel Mill with a capacity of 3 million tons per annum in Cilegon, Indonesia. More than ten thousand people are involved in its construction and our first overseas Integrated Steel Mill project scheduled to be completed by the end of 2013. This project has made a great contribution to the development of related industries.

In addition, Integrated Steel Mill with a capacity of 3 million tons per annum is currently under construction in Brazil by POSCO E&C. This is the biggest single EPC contract since the foundation of the company which amounts to approximately 4.4 billion US dollars.

POSCO E&C is the only company in the world capable of constructing two Integrated Steel Mills at the same time providing Total Solution from Feasibility Study to Operation & Maintenance of the plant.

**EPC MANAGEMENT CAPABILITIES**

**Engineering, Procurement & Construction**

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**Project Lists**

**Iron Making**

<table>
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<th>Location</th>
<th>Notes</th>
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<td>Gwangyang, Korea</td>
<td>No. 1 Blast Furnace (Revamping)</td>
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<tr>
<td>IISCO</td>
<td>Bumpy, India</td>
<td>Blast Furnace</td>
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<td>ESICO</td>
<td>Esfahan, Iran</td>
<td>No. 3 Blast Furnace</td>
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<td>POSCO</td>
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<td>POSCO</td>
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<td>POSCO</td>
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<td>ESICO</td>
<td>Esfahan, Iran</td>
<td>No.4 Sinter Plant</td>
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<tr>
<td>POSCO</td>
<td>Gwangyang, Korea</td>
<td>No.5 Sinter Plant</td>
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<td>BSL</td>
<td>Port Kembla, Australia</td>
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**Steel Making & Continuous Casting**

<table>
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<tr>
<td>POSCO</td>
<td>Gwangyang, Korea</td>
<td>No.3 CCM</td>
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<td>POSCO</td>
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<td>POSCO</td>
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**Hot Rolling**

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<td>POSCO</td>
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<td>No.1 Plate Mill</td>
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<td>POSCO</td>
<td>Gwangyang, Korea</td>
<td>No.4 HRM</td>
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<td>ZPSS</td>
<td>Zhangjiagang, China</td>
<td>Stainless Steel Mill</td>
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<td>ARAB Special Steel</td>
<td>Suez, Egypt</td>
<td>Bar &amp; Wire-Rod Mill</td>
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<td>VPS</td>
<td>Haiphong, Vietnam</td>
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**Cold Rolling & Process Line**

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<thead>
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<th>Company</th>
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<td>POSCO-Vietnam</td>
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<td>POSCO-Maharashtra</td>
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<td>CGL</td>
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<tr>
<td>Urun Steel</td>
<td>Busan, Korea</td>
<td>No.8 CGL</td>
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<tr>
<td>Assan Galvaniz</td>
<td>Istanbul, Turkey</td>
<td>CCL</td>
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<td>HADEED</td>
<td>Jeddah, Saudi Arabia</td>
<td>CCL</td>
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<tr>
<td>Hieer</td>
<td>Heyo, China</td>
<td>CCL</td>
</tr>
<tr>
<td>CHS</td>
<td>Kaohsiung, Taiwan</td>
<td>No.2 RCL</td>
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PT.KP Integrated Steelworks in Indonesia

CSP Integrated Steelworks in Brazil