

CCE (www.cceintl.com) a Farmington Hills, MI based company established in 1989 offers an integrated design and manufacturing service called **Design to Doorstep (D2D)**. Services are delivered leveraging **co-located engineering and manufacturing** resources based out of CCE's offices in Chennai, India. Customers are supported by local engineering services managers based out of CCE's offices in the US and UK. CCE's proprietary Internet-based tool PowerLink is made available to document and share all work communications, and provide customers with visibility and control over the offshore work. CCE's offshore project managers coordinate all the manufacturing logistics and quality control including finding and certifying suppliers, quoting, manufacturing and quality processes, regulations, packaging and shipping.

MI Office



NJ Office



UK Office



India Office

Services Offered

Manufacturing Processes

- **Casting**
 - a. Sand, Shell and Investment Casting
 - b. Gravity Die and Pressure Die Casting
- **Forging**
Hot or Cold Forging of steel, copper and aluminum alloy parts
- **Machining**
Capable of machining complex metal parts with high level of dimensional accuracy, consistency and finish
- **Heat Treatment**
Hardening of metal parts
- **Surface finishing**
Plating, painting, enamel and powder coating
- **Sheet Metal Fabrication**
Laser cutting, turret punching, bending, welding, brazing, riveting and fastening (using bolts and nuts)

Engineering Design

- Value Engineering
- Engineering Change Orders
- Material Substitution
- Engineering Documentation
- Process Substitution
- Engineering Analysis
- Design Simplification
- Tooling / Prototyping
- Reverse Engineering

Industries Served

- Industrial Equipment & Manufacturing
- Aerospace & Defense
- Consumer Goods
- Automotive & Transportation
- Energy & Utilities
- High Tech/Electronics
- Healthcare Equipment
- Construction Materials

Industrial Associations



Manufacturing Process Management

ISO 9001: 2008 Certified



Manufacturing Process Management

- Process FMEA
- Process Flow Chart
- Production Control Plan
- Operation Layout
- Quality Plan

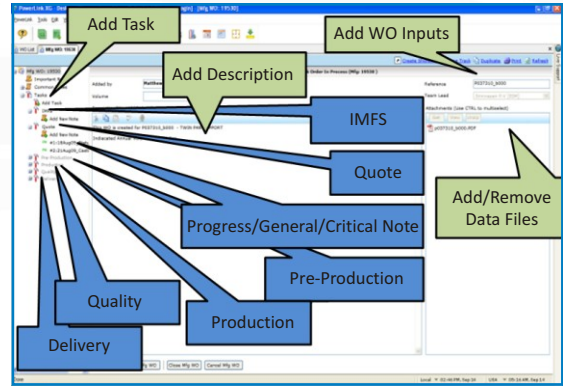
The collage displays four key manufacturing documents:

- Process FMEA:** A table with columns for 'Failure Mode', 'Cause', 'Effect', 'Severity', 'Occurrence', and 'Detection'. It includes a risk assessment matrix and a list of corrective actions.
- Process Flow Chart:** A flow diagram showing the sequence of manufacturing steps, including operations like 'Drill', 'Turn', 'Grind', and 'Polish', with associated process parameters and control points.
- Quality Plan and Acceptance:** A table detailing inspection points, methods, and acceptance criteria for various dimensions and materials. It includes a section for 'Inspection Points' and 'Acceptance Criteria'.
- Operation Layout:** A technical drawing showing the layout of a part, including dimensions, tolerances, and material specifications. It includes a section for 'Operation Layout' and 'Material Specifications'.

Work Order Management System

PowerLink is a proprietary web-based tool designed for communication and management of your offshore engineering and/or manufacturing outsourcing program. Using PowerLink, you can **securely initiate, organize, prioritize and execute engineering & manufacturing services globally, 24X7**. PowerLink provides control, visibility, traceability and accountability of your outsourcing team, mitigating the risk associated with working offshore.

PowerLink Workflow



- Add New Task
- Add Work Order Inputs – added by, required date, output type, volume, ref#, other info etc.
- Add Work Order Description/Notes
- Add/Remove Data Files
- India Manufacturability Feasibility Study (IMFS)
- Quote Process
- Progress/General/Critical Note
- Pre-production Process (tooling, fixtures and production preparation)
- Production Process
- Quality Process
- Delivery Process

Casting Capabilities

Sand Casting

Material	Process	Max.Weight	Min. Wall Thickness
Grey Iron	Co2 Molding	250 Kg	4.5 mm
	Green Sand Molding	250 Kg	5.0 mm
Ductile Iron	No Bake Molding	250 Kg	4.5 mm
Alloy Steel	Permanent Mold Casting	75 Kg	3.5 mm
	Investment Casting	100 kg	2.0 mm
Stainless Steel	Shell Molding	10 kg	3.0 mm

Die Casting - Pressure Die Casting / Gravity Die Casting

Material	Max. Weight
Aluminum Alloy	0.075 kg - 45 kg / Piece
Zinc Alloy	
Copper Alloy	

Machining Capabilities

Metal Cutting	Tolerance Range	Surface Finish
Turning, Boring, Milling, Threading, Tapping, Broaching	+/- 0.001"max	32 micro inch max
Gear Cutting	AGMA Class 9*	
Surface Finishing		
Grinding	0.0005"max	16 micro inch max
Honing	0.0005"max	8 micro inch max
Lapping	0.0005"max	1 micro inch max

*Higher rating specifications require supplier consultation

Forging Capabilities

Material Processed and Capacity

Closed Die Forging

Weight / Piece	Material
150 gm to 60 kg Max.	Carbon Steels, Alloy Steels, Stainless Steels
10 kg Max.	Copper and Copper Alloys / Bronze
3 kg Max.	Aluminum Alloy

Process Capability

Process	Capability / Limits
Forging	In any configuration based on customer drawing for parts like Blanks, Bush Forging, Cross Forging, Lever Forgings, Crank Shaft, Connecting Rod...etc in a weight range up to 60 kg

Material Processed and Capacity

Open Die Forging

Process	Capability / Limits
Machining	CNC Lathe, M/c Center, VMC
Heat Treatment	Normalizing, Hardening and Tempering

Process Capability

Equipments	Capability / Limits
Forging	Blank / Disc : Dia. 50 mm to Dia. 850 mm Max.
	Hollow Bush : Dia. 50 mm to Dia. 800 mm Max.
	Shafts / Step Shaft : In any configuration weight 250 kg Max.
	Std. Flanges: 4" to Max 16" in size
Ring Rolling	Ring : Dia. 100 mm to 1500 mm and weight 450 kg Max.

Sheet Metal Capabilities

Punching	
Sheet Thickness	MS: 8.0 mm max, SS: 4.0 mm max
Punching Accuracy	+/- 0.10 mm
Positioning Accuracy	+/- 0.08 mm
Bending	
Length	5000 mm max
Bending Accuracy	+/- 1 degree for 1000 mm
Shearing	
Cutting Accuracy	+/- 0.5 mm for 1500 mm

Metal Treatment Capabilities

Heat Treatment Processes	
Normalizing, Hardening and Tempering, Annealing, Stress Relieving	
Furnace Hardening, Induction Hardening	

Heat Treatment Processes	
Hard Anodizing	Coating thickness: 10 – 50 microns
Zinc Plating	
Hard Chrome Plating	
Powder Coating	
Electrostatic Painting	

Quality Systems

Inspection Equipment / Instruments

Coordinate Measuring Machine	Bench Center
	
Height Master	Profile Projector
	
Hardness Tester	Basic Inspection Instruments
	

Inspection and Testing

Inspection and Testing

- ❑ CCE has facilities with calibrated and controlled instruments and equipments for inspection of mechanical parts
- ❑ CCE has tie up with leading NABL approved metallurgical lab for material testing and certifications

- 1. Basic Inspection (Dimensional and Geometrical Parameters)**
Inspection facilities available for all basic Inspection of dimensions
- 2. Destructive Testing**
Mechanical Testing includes
 1. Hardness Testing
 2. Tensile Testing
 3. Impact Testing
 4. Metallographic Testing
 5. Corrosion Testing
- 3. Non - Destructive Testing**
 1. Ultrasonic Inspection
 2. Radiography Inspection
 3. Magnetic Particle Inspection
 4. Liquid Penetrating Inspection
 5. Chemical Properties - Spectrometer

Shipping/Logistics

Container Sizes

Two container sizes are available for shipping:

- ❑ A 20 foot general purpose container will carry 17.5 tons of parts (23-25 Cu. m)
- ❑ A 40 foot general purpose container will carry 19.5 tons of parts (53-55 Cu. m)

Shipping Lead Time

Shipping lead time varies based on the destination of the shipment. Shipping times will also vary based on the selection of Transshipment ports, arrival and departure schedules of the feeder and mother vessels all the while ensuring that your cargo is shipped in the most cost effective and time efficient manner. Typical lead times are as follows:

US East coast: 35-40 days

US West coast: 30-35 days

Europe/UK: 25-30 days

These times however do not include inland transport. But we work with our logistics partner to support moving your products through different borders using carefully selected and approved premium road carriers.

Customs Formalities

With the current emphasis on complex free trade agreements and global sourcing, customs issues have assumed an increasingly important role in the supply chain. We work with global logistics companies who satisfy the increasingly sophisticated needs of international trade through a worldwide network of responsive, highly-trained professionals and integrated information systems. Our shipping/logistics partners focus on compliance, release and reporting needs of the marketplace and ensure correctness of paperwork and required approvals for seamless clearance at customs.

A commercial invoice for the parts being shipped along with the packing list is a start point for initiating customs formalities.