



ROLTA - Engineering Design Services

Statement of Capability

This document details Rolta's Engineering Design Services capability for EPC and Owner Operator companies for the Energy, Petro-Chemical and Water industries

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Company Overview

Rolta, 5000 employees strong, is a leading provider of engineering and design services and automation tools to EPC and Owner-Operator companies worldwide. The Engineering and Design Business Group provides services for engineering, procurement, and construction management for both grassroots and revamp projects. It has executed over 600 projects in the energy, refining, petrochemical and shipbuilding industries.

Rolta offers a portfolio of services that encompasses all of the engineering disciplines. Our engineering professionals have first-hand industry experience in all aspects of the EPC work process, including conceptual studies, Front End Process Engineering and Design (FEED), plant layout, civil and structural, pipe routing and stress analysis, HVAC, instrumentation and controls, electrical and utilities. Rolta also has domain experts in a number of vertical segments notably; oil and gas, petro-chemicals and conventional and nuclear power.

Rolta's long-standing partnerships with global IT vendors give it access to standard commercial and leading edge technologies. Our offerings for process and plant design, materials planning, construction management, operations and maintenance cover a range of engineering software tools. As an example; Rolta has harnessed lasergrammetry to capture 'as-built' data to create 3D plant models at affordable prices to achieve compliance with plant safety regulations. Also, Rolta is executing detailed engineering for a world scale ethylene plant for a super major integrated oil company.

Rolta is a multinational organization headquartered in India with worldwide offices in the USA, UK, Europe, Australia and Middle East that has executed projects in over 35 countries. Rolta is a leading provider and developer of Information Technology based GeoSpatial Information Systems (GIS), Engineering Design Services, Software Development, Advanced Security, Network Management, and Data Base management and implementation.

Rolta's services business is based in state-of-the-art facilities occupying over 700,000 square feet in Mumbai. It has the latest communications infrastructure and security enabling it to deploy global workshare Plant Design software technology. Rolta is also an ISO9000 certified company that utilises robust project management procedures to manage large international projects.

Onshore and Offshore Project Interaction

Rolta International offices have two main functions.

- Client Relationship Management
- Project Setup and Management

Client Relationship Management:

The Client Manager looks after the commercial content of a project arrangement. They are responsible for the project's ultimate success, the contract, invoicing, attending project meetings as required, management reporting and issue ownership and escalation.

Project Setup and Management:

Robust project management controls and procedures are vital to ensuring successful execution and delivery. Rolta manages project execution with a comprehensive methodology and has a history of managing complex projects across multiple locations and stakeholders.

Projects are executed using a mix of onshore and offshore resources blended to match the requirements of the project. The project team is likely to consist of a:

- Local Project Manager – to interface with the client team.
- Project Execution Manager – to manage the offshore team
- Engineering Team – staffed with appropriate levels of skill and experience in the disciplines required to fulfil the contract.

The Project Execution Manager and the technical team are located at the Technology Centre in Mumbai, with technical team members being deployed to client site as required.

The Local Project Manager is responsible for:

- Working with the client to define the detailed scope of work and technical specifications
- Execution of the project plan
- Management of the deliverables to meet the project schedule
- Preparing the quality plan
- Resolution of technical issues with the client
- Attending project meetings
- Liaison and communication between Rolta and the client

Project Execution Manager is responsible for:

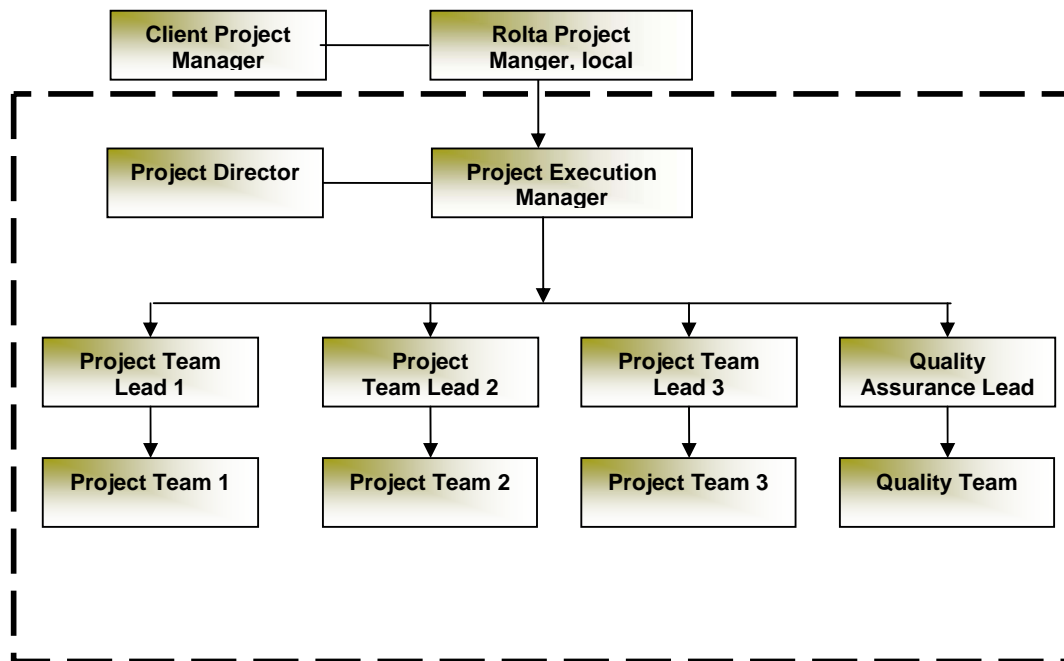
- Managing the project delivery schedule
- Assuring and approving the quality of the deliverables
- Ownership and resolution of technical issues
- Managing the technical team

The Engineering Team is responsible for

- Performing the projects tasks

Progress meetings are held on an agreed schedule with the client or ad-hoc, as-needed basis. These will be used to monitor project progress, carry out project reviews and resolve any technical issues.

Project Organisation Chart



Project Team Role Summary

Role	Responsibility
Project Director	<ul style="list-style-type: none"> • Strategic planning • Provide guidance & direction to Project manager
Local Project Manager	<ul style="list-style-type: none"> • Overall Project management • Planning and change • Schedule • Quality • Communication & Liaison
Project Execution Manager - India	<ul style="list-style-type: none"> • Project Management at India • Coordinate with Department. • Timely Delivery • Quality

Role	Responsibility
	<ul style="list-style-type: none"> • Human resource management • Regular feedback to the department on the progress and issues • Provide guidance & direction to Technical team • Coordination with on-site people
Technical Team Lead	<ul style="list-style-type: none"> • Generally most knowledgeable people responsible for Technical guidance and support • Quality and timely delivery
Quality Team Lead	<ul style="list-style-type: none"> • Responsible for identifying all the checking and approval requirements • Necessary to ensure Client satisfaction with the output delivered. • Responsible to implement techniques to provide in-built quality control at all appropriate stages of production
Team	<ul style="list-style-type: none"> • Carries out actual Design, Detailed Engineering, Modelling and Drafting, etc • Ownership of assigned tasks • Maintaining Engineering standards

Rolta Engineering, Procurement and Construction Management Services

Integrated Project Services

- Feasibility Study
- Project Management
- Detail Engineering Design
- Procurement Support Services
- Construction Management

Grassroot Services

- Geospatial/GIS systems
- Land parcel management
- Land surveys
- Terrain modelling
- Pipeline modelling
- Stress analysis
- Conceptual modelling for initial cost estimates

Design & Detailed Engineering Services

- Process
- Piping
- Civil / Structural
- Electrical
- Instrumentation
- Mechanical

Procurement Services

- Purchasing
- Expediting
- Inspection Services
- Dispatch logistics

Construction Management Services

- Construction management
- Pre-Commissioning services
- Mechanical functional check of equipment
- Loop check and calibration
- Interlock checks and function testing

Revamp and Modernization Services

- Trouble shooting
- Process study
- Planning Study
- Instrumentation
- Electrical modernization
- Equipment / Piping modification

Brownfield As-built Services

- Laser scanning through partners
- 3D modelling from point cloud data
- Plant walk throughs
- Hazop studies
- Data cleansing and migration
- Virtual plant information model

Engineering Tool Suite

Rolta uses the following software tools for project execution:

- Process:
 - ASPEN HYSYS, PRO-II, SmartPlant P&IDs, PDS-2D, ASPEN Zyqad
- Civil & structural:
 - STAAD Pro, SDS2, Frameworks Plus, Dimensional Solution Package, ACES Frameworks
- Piping:
 - PDS, SP3D, PDMS, Caesar II, CAE pipe, PS+Caepipe, Pelican Forge, MARIAN.
- Instrumentation & control:
 - SmartPlant Instrumentation, PDS, Logsim, Flowell.
- Electrical:
 - SmartPlant Electrical, ETAP, Chalmite, PDS – EE Raceways, CEIDS
- Mechanical:
 - PVElite, B-Jac, HTRI, Disasu, GT pro
- Marine
 - SmartMarine 3D, Tribon, FORAN, Nupas Cadmatic
- Project management:
 - Primavera, MS Projects

Appendix 1: Technical Services and Deliverables Summary

Engineering Services Offered

1.1. Rolta Process Engineering Capabilities

Services	Deliverables
<ul style="list-style-type: none"> • Material & Energy Balance calculations • Process Design of Equipment & Piping • Development of Process Flow Diagrams • Conceptual Equipment Layout • Preparing Eqpt. & Inst. Process data sheets • Instrumentation logic control • Development of P&ID's for Main Plant and Utilities • Sizing of Piping, Mechanical & Instrument Items • Mechanical Design of Tanks, Pressure Vessels and Ducts • Preparing SOPs & HAZOP studies • Familiarity with API, ASME, TEMA, OISD, ISO, BIS, NFPA etc • Thermal Rating of Heat Exchangers • Water Balance Diagram, Plot Plan and GA Drawings • Hydraulic Calculations (Line sizing & Pressure Drop Calculations) • Pipe material Specifications • Procurement specifications, Bid Evaluation • Vendor Drawings Review - Plant & Balance of Plant • Utility Distributions Diagram 	<ul style="list-style-type: none"> • Process Flow Diagram • Conceptual Equipment Layout • Piping & Instrumentation Diagram • Process Datasheets and Specifications • Sizing and Specifications • Piping and Valve Specifications • Instrument Index, Line List, SM - List, Valve List • Utilities Summary • Insulation Selection and Summary • Standard Operating Procedures (SOPs) and Hazardous and Operability (HAZOP) • Hazardous area classification drawing
Input Required	
<ul style="list-style-type: none"> • Feed documents / drawings and Process Licensor's drawings / documents • Basic Flow Diagram • Material Balancing • Process Description • Conceptual GA Drawings 	

1.2. Rolta Instrumentation & Controls Engineering Capabilities

Services	Deliverables
<ul style="list-style-type: none"> • Study of Control Power Supply • Control Room Architecture • Technical Data Verification • Sizing & Selection of Process Instruments 	<ul style="list-style-type: none"> • Scheme for Control Power Supply • Control Room Layout • Technical Data Sheets • G.A. Drawings

<ul style="list-style-type: none"> • Instrument Layouts • Instrument Index Creation • Specification datasheets • Flow sensor & Control valve sizing • Instrument / JB location plot plans • Cable tray routing and Cable schedule • Loop drawings • Hook up drawings • Gas Analyzer Sample conditioning System • Design of System using PLC/DCS • DCS/SCADA I/O assignments • Selection of Cables and Formulation of Specifications • Material Take Off list for Erection Hardware • Plant Network and Communication System • Instrument data migration from MS Access / Excel / Paper into SmartPlant Instrumentation • Familiarity with ANSI, ISA, IS and BS standards • Formulation of Specifications for Instrumentation Control Panels, JBs • Design of Control Panels 	<ul style="list-style-type: none"> • Specifications • Hook Up drawings • As built Drawings • Design Calculation • Material take-off list • Termination list and I/O List • Instrument Index • MRs of Field Instruments and cables • Loop diagram and control schematics • Interconnection and control schematic • Cause and effect diagram • Logic diagrams • Cable tray lay outs and cable schedule • Installation procedure and check list for testing and commissioning
Input Required	
<ul style="list-style-type: none"> • Feed documents / drawings and Process Licensor's drawings / documents • Project Specifications • Details of Instruments • Control Equipment List • Process Data, Process Parameter Range and Details • P&IDs, Process Flow Diagrams • G.A. Drawings, Plot Plans, Plant Layout • Design Codes, Standards & References • Piping and Process Details • Area Classification • Vendor Data, Catalogs & Specifications, Vendor Drawings • Design Basis, Specifications & Project Guidelines 	

1.3. Rolta Electrical Engineering Capabilities

Services	Deliverables
<ul style="list-style-type: none"> • Preparation of electrical system architecture • Load analysis along with load management system • Design of Power distribution system • Power system study that includes load flow, short circuit, stability, motor starting study etc • Design of PCC and MCC 	<ul style="list-style-type: none"> • Load List • Equipments Layouts • Electrical user Layouts • Single Line Diagrams • Electrical Power Layouts • Functional Diagrams • Schematic Diagrams • Earthing Layouts • Lighting Layouts

<ul style="list-style-type: none"> • Equipment layouts • Earthing system design • Lighting system design • Cable sizing • Cable Schedule • Cable tray layouts • Preparation of equipment specifications • Tender specification of all equipments • Summary of Material Take Off • Fire detection and Fire alarm system • Public address system • Substation and switchyard design • Input/Output coordination details for C & I • Termination details of power & control cables • Input/Output coordination details for C & I • Inter panel wiring details of Medium & Low Voltage Switchgears • Single Line Diagram of Electrical Distribution System • Relay settings • Familiarity with BIS, BS, NEC, IEEE, NFPA, NEMA, IEC and DIN standards • UPS and back up supply system design • Captive and co-generation system design • Design of Battery system • Power factor improvement system • Protection system design (Relay coordination) • Proposal bidding • Area Classification Drawings 	<ul style="list-style-type: none"> • Cable Schedules • Cable Tray Layouts • Heat Tracing Layouts • Logic Diagrams • DC Control Systems • Equipment Specifications • Relay Coordination • Material Take off (Bill of Material) • Electrical Power layout
Input Required	
<ul style="list-style-type: none"> • Feed documents / drawings • Soil resistivity, load details, P&IDs • Utility company voltage level, fault level • GAD, plot layout, equipment layouts • All the necessary FEED documents pertaining to Electrical Engineering depending on scope of work • HAZOP Reports • 	

1.4. Rolta Piping Engineering Capabilities

Services	Deliverables
<ul style="list-style-type: none"> • Piping Material Specification • Preparing Conceptual and Detailed Equipment & Piping Layouts • Preparing Piping Isometric 	<ul style="list-style-type: none"> • 3D Model with archival and database • Piping Plans and Sections extracted from PDS / Orthogen • Equipment GA & layout Drawings

<ul style="list-style-type: none"> • Preparing Valves & Specialties datasheet • Preparing Material Take off • Performing Flexibility Analysis • Dynamic Design of Pipe Supports & Spring supports • Design of Expansion Joints • Vendor drawings review • Preparing technical enquiry specification • Techno Commercial Bid Analysis • 3D Modeling • Familiarity with ASME, WRC, EJMA, API, NEMA, IBR, OISD and ANSI standards 	<p>(Process units, Utility Blocks and other Offsite facilities)</p> <ul style="list-style-type: none"> • Equipment Nozzle Report • Pipe support drawings • Plot plan • Equipment Specifications (Datasheets) • Piping plans and sections • Isometric Drawings • Stress analysis report & Stress Isometrics (CAESAR II) • Piping Class Specification • Civil Information Drawings (Including Primary, secondary and Auxiliary structures with Load data and other details) • Under ground Composite drawing • Piping Study Drawings • Support Schedules & Special Pipe support details • Springs & Bellow Specification • Enquiry MTO, Bulk MTO, Intermediate MTO and Final MTO • Preparation of MR, TBA, Vendor Drawing Approval • As built Model, Drawings and Documents
Input Required	
<ul style="list-style-type: none"> • Feed documents / drawings and Process Licensor's drawings / documents • P&ID, and Line list • Piping Study layout drawings (Basic Engineering Phase) • Piping specifications • Equipment datasheets • Equipment detail drawings • Piping / Instrument specialty items list • Block diagram • Process flow sheet with stream details • Plant Design Basis • Statutory requirements • List of Equipments • Proposed site layout Drawing • Topology of Land for proposed plant • Material selection criteria for piping • Instrument Hook up diagrams • Utility Requirements / availability • Overall plot plan drawings, Preliminary equipment layout, Specific requirements • Site data, Licensors Process unit Layout, Statutory requirements, Offsite & Utility block requirements, and Client requirements • Licensor's equipment layout (proposed) • Licensor's Piping specs, Utility requirements, Stream list etc. • List of U/G services • Piping dimensional standards, Piping Design Standards etc • Piping support specifications 	

- Piping stress specifications, Preliminary routing, Earthquake Coefficient etc.
- Formats of the MTO
- Insulation and painting Specification
- Manufacturing, Inspection Standards
- Scope, Responsibility, Coordination Procedure

1.5. Civil / Structural / Architectural Engineering

Services	Deliverables
<ul style="list-style-type: none"> • Preparation of Design Basis • Analysis & Design Calculation • Equipment Foundations & Vibration Analysis • Plant Road & Drainage system • Vendor/Shop Drawings Review • Pipe racks & Flare racks • RCC layout & details – foundation, column, beam, slab etc for Utility & Off-site building /structures such as Blast Proof control Room, Sub Station Bldg, Ware Houses, Administrative Bldgs, Waste Water Treatment Plant, Storage Tank, Flare Structures • 3 D modeling of Civil & Structural for Refineries, Pipelines, Chemical Plants, Power Plants • Familiarity with BIS, BS, AISC, ACI, UBC and DIN standards • Column/Vessel Platforms including Circular • Superstructure -Steel & RCC • Structures for Material Handling systems such as Conveyor Galleries, Trestles, Storage Bunkers, Silos • Tall structures such as Chimneys, Towers, Silos • Foundation of Static Equipment such as heat exchangers, columns, vessels, pumps 	<ul style="list-style-type: none"> • I/O file and Analysis Reports, Design Calculations • Drawings • Models • Fabrication Drawings • General Arrangement Drawing • Design Reports • Structural layout & details – truss etc • Rebar Schedules • Bulk MTO for Structural Steel, Rebars etc, • Material Takeoffs (MTO) / Bill of Materials
Input Required	
<ul style="list-style-type: none"> • Feed documents / drawings • Plan & Elevation Drawings (Basic Engineering Phase) • Soil Investigation Report • Loading Data, Seismic Reports & Details • Wind Intensity Data • Special considerations If any • GA drawings, Legends, Details of Stairs Ladders, Handrails, Details of Slab, Details of existing structures, Special considerations If any 	

1.6. HVAC Engineering

Services	Deliverables
<ul style="list-style-type: none"> • Basic as well as detail engineering for HVAC system • Modelling • Heat Load Calculation • Equipment Sizing & Calculation • Piping Sizing & Calculation • Ducting Sizing & Calculation • Tender Evaluation • Vendor Analysis • Intradepartmental co-ordination 	<ul style="list-style-type: none"> • HVAC room design data sheet • Calculation & Reports • Design basis report/ Design memorandum • Specification • Equipment data sheet • Flow diagram • P&ID • Bill of quantities • Estimation • Vendor drawing/ document checking • Co-ordination with Client, vendor, consultant, site contractor • Ducting Layouts • Equipment Layout
Input Required	
<ul style="list-style-type: none"> • Feed documents / drawings • Requirement document • Site data • Plant utility conditions • Hazardous area classification drawing • Relevant civil/ architectural drawing, civil specification 	

1.7. Planning & Project Controls

Services	Deliverables
<ul style="list-style-type: none"> • Time & Manpower Management • Project Progress Tracking & Control • Estimating resources & Allocation of resources • Finalize Design Basis / Coordination Procedure/ Quality Plan • Planning / Scheduling (using tools like Primavera P3 / MS Project) • Resource Planning • Project Monitoring & Progress review • Contract Change Management • Vendor Data Monitoring • Review Drawings and Specifications • Document Control & Transmittals • Billing • Project Records management • Project Archival • Engineering Library • Analysis & Forecasting RISK management & Issue Logs • Project Coordination Procedure 	<ul style="list-style-type: none"> • Project Schedule • Progress Reports • Transmittals • Project Reports • Manpower Allocation Charts • Productivity reports • Project Coordination Procedures • Quality Plan & Startup Checklists

Appendix 2: Rolta's Experience by Vertical Industry and Type of Engineering Service

