



Industrial & Advanced Technology

Manufacturing Integration

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Manufacturing Integration

From R&D labs and start-up operations to well-established large scale manufacturing, our MI group provides expertise to help improve performance, plant utilization, output, and operating profit through:

- Comprehensive assessment of operations and manufacturing processes
- Define and design qualification protocols
- Tool source inspection
- Comprehensive financial modeling
- Develop and create User Requirement Specifications (URS), Functional Requirement Specifications (FRS), and completed Design Specifications (DS)
- Develop comprehensive business model, documentation and factory optimization protocols, including:
 - Equipment/systems—commissioning
 - Factory Acceptance/Site Acceptance Tests (FAT and SAT)
 - Equipment Integration—Qualifications (IQ), Operations Qualifications (OQ), and Process Qualifications (PQ) readiness guidelines
 - Facility qualification protocols
 - Process characterization and validation protocols

Selected Services

- Comprehensive Risk Assessment
- Business Risk Analysis—Detailed assessment studies to identify risks across the entire business process chain, from product development to volume production and manufacturing phases
- Comprehensive financial modeling including cash flow, net present value, and payback analysis of manufacturing investment alternatives
- Factory/line optimization model
- Line/equipment layout
- Static and dynamic modeling
- Production flow modeling



- Failure Mode and Effects Analysis (FMEA)
- Management and Execution System Validation
- Assess, refine, select, integrate proper/effective systems
- Manufacturing Execution System (MES)
- Controls systems (PLCs, AB, GE, Siemens, Mitsubishi, etc.)
- Motion controllers
- Vision systems
- SCADA systems (GE Proficy, RS View, Wonderware, etc.)
- SQL, Oracle and other database systems
- Ethernet networks
- Industrial PCs
- Automated Material Handling Systems (AMHS)
- Turnkey solutions
- Simulation modeling
- Conveyors (belts, links, rollers)
- Robots (SCADA, r- θ -z, Cartesian)
- Retrieval systems
- Pick and place systems
- Palletizing and various material transfer mechanisms