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List of Codes and Standards

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1- GENERAL

“Nominal” and “Design” capacity of the project is equal to 2340 dtph and 2700 dtph fresh ore feed conditions respectively. The plant is “Designed” to accommodate the “Maximum” conditions.

2- SCOPE

This document covers the minimum technical requirements and criteria for design of Copper-Moly concentrate plant project. In addition to requirements of this criteria, work shall be done in accordance with recognized and accepted theories, methods, codes, standards and good engineering practice. It should be noted that all Engineering (Detail Design), Procurement and Construction activities must be done by Contractor, based on Project Design Criteria, Specifications and engineering documents approved by Employer. The latest revision and edition of the following codes and standards shall constitute minimum requirements of this specification, where applicable. In any case of discrepancy between the codes and standards and specifications, the requirements shall be considered according to CLIENT written approval.

3- MECHANICAL CODES & STANDARDS

Mechanical equipment shall be designed, manufactured, erected and installed according to ISO, DIN, ASME, ASTM, CEMA, AWS, API, FEM and CMAA, regarding to the equipment. Minimum requirements shall also follow local codes and norms. In case of conflict between standards, the more stringent specification/requirement shall be followed and EMPLOYER’s decision shall be considered as final. If EMPLOYER’s standards exist, EMPLOYER’s standards shall also be followed. These codes and standards are the minimum

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requirements. All codes and standards not specifically herein shall be adhered to, where applicable.

FEM Standard should be performed for loads and combinations of loads which must be taken into account when designing handling appliances, and also to establish the strength and stability conditions to be observed for the various load combinations.

In design, manufacturing and installation of equipment and material following standards shall be followed:

- **Atmospheric storage tanks**

- API 650 -"welded steel tanks for oil storage"
- API RP 2000-"venting atmospheric and low-pressure storage tanks"
- ASTM specification for materials

- **Pressure Vessels**

- ASME BPVC, sec. VIII (Div.1 &2)
- ASTM specification for materials
- AWS and ASTM for joint specifications and welding electrodes
- ASME B16.5 and B16.47 for steel pipe flanges and flanged fittings
- ASME BPVC, sec. IX qualification for welding procedure and welders

- **Heat Exchangers**

- TEMA for shell and tube types
- API 661 for air cooled types
- ASTM specification for materials
- ASME BPVC, sec. II, V, VIII, IX

- **Reciprocating Pumps**

- ASTM material specifications
- ANSI standards, as applicable for connections

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- ASME BPVC sec. VIII, Divisions 1 & 2, and sec. IX.
- API 674 Positive displacement pumps- reciprocating
- **Centrifugal Pumps**
 - ISO 5199-2002 Technical specifications for centrifugal pumps
 - ANSI HI 12.1-12.6-2005 Rotodynamic(centrifugal) Slurry Pumps
 - It shall be in accordance with the manufacturer standards too.
- **Belt Conveyors**
 - CEMA 7th Edition or DIN 22101
 - ISO 5048
 - All equipment shall, where applicable, comply with recognized international standards and codes of practice.
 - The conveyor belt tensions and absorbed powers shall be calculated utilizing the methods and formulae derived from the latest CEMA or DIN standard
 - The following codes are applicable for conveyor equipment detail design:
 - DIN 22102-Part 1 for dimensions, specifications, marking of bulk goods textile plies belts
 - DIN 15207- Part 1 and for idler dimensions
 - DIN 22107 for idler arrangement
 - DIN 22131 for steel core belts
 - Any other standard could be applicable for designer under giving client permission
- **Reducers**
 - AGMA
- **Bins**

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- DIN 1055
- EUROCODE
- **Fire Pump**
 - NFPA 20
- **Air Compressors**
 - ISO 5388
 - ISO 2372
 - VDI 2056
- **Pipework**
 - ASME B 31.3 & B 31.11
 - ASME B31.4
- **Crane and Hoist**
 - BS 2573 Rules for the design of cranes
 - CMAA-70 specification for E.O.T cranes
 - ISO 4301 Crane Classifications
 - ASME B30 safety standard for cableways, cranes, derricks, hoists, Hooks, jacks, and slings
 - BS 3037 Tyers for crane Rail Wheels
 - Eurocodes
- **General**
 - FEM determine the loads and combinations of loads which must be taken into
 - account when designing handling appliances
 - DIN 7168 for dimensions tolerances
 - ISO 2768 Tolerances for linear and angular dimensions without individual
 - tolerance indications

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4- ARCHITECTURAL/ STRUCTURAL/ CIVIL CODES & STANDARDS

All work shall be completed in accordance with engineering codes and standards listed in this document unless otherwise stipulated, the International Standards referenced as applicable or their version of these documents, including relevant appendices and supplements.

4.1 ARCHITECTURAL CODES AND STANDARDS

The latest revision and edition of the following codes and standards shall constitute minimum requirements of this specification, where applicable. In any case of discrepancy between the codes and standards and specifications, the requirements shall be considered according to EMPLOYER's written approval.

ASTM	Issued by "American Society for Testing & Materials
- ASTM A786/A786M	Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates
- ASTM C1048	Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
- ASTM E283/E283M	Standard Test Method for Determining Rate of Air Leakage Through. Exterior Windows, Curtain Walls, and Doors under Specified Pressure
- ASTM E330/E330M	Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- ASTM E331	Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

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Uniform Fire Code (UFC)

National Fire Protection Association (NFPA)

4.2 STRUCTURAL CODES AND STANDARDS

The latest revision and edition of the following codes and standards shall constitute minimum requirements of this specification, where applicable. In any case of discrepancy between the codes and standards and specifications, the requirements shall be considered according to EMPLOYER written approval.

- AISC Issued by “American Institute of Steel Construction”
- ACI Issued by “American Concrete Institute”
- AISE Issued by “American Institute of Structural Engineers”
- ASCE Issued by “American Society of Civil Engineers”
- ASTM Issued by “American Society for Testing & Materials”
- AWS Issued by “American Welding Society”
- BS Issued by “British Standard Institution”
- DIN Issued by “German institute for standardization”
- ASME Issued by “American Society of Mechanical Engineers”
- AISC DESIGN GUIDES
- AISE Technical Report No.13
- Guide for the Design and Construction of Mill Buildings
- RCSC Specification Specification for Structural Joints Using High-Strength Bolts
- EN 14399 High-Strength Structural Bolting Assemblies for Preloading
- EN 14399 High-Strength Structural Bolting Assemblies for Preloading

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- ISO 898 Mechanical properties of fasteners made of carbon steel and alloy steel
- AASHTO Issued by “American Association of State Highway and Transportation Officials”
- AASHTO LRFD Bridge Construction Specifications
- AASHTO LRFD Bridge Design Specifications
- AASHTO M80 Standard Specification for Coarse Aggregate for Hydraulic Cement Concrete
- AASHTO M6 Standard Specification for Fine Aggregate for Hydraulic Cement Concrete
- ISIRI-3132 Hot Rolled Steel Bars for Reinforcement of Concrete– Specifications and Test Method
- ANSI/AISC 360 Specification for Structural Steel Building
- ANSI/AISC 341 Seismic Provisions for Structural Steel Buildings
- ANSI/AISC 358 Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications
- ANSI/AISC 303 Code of Standard Practice for Steel Buildings and Bridges
- ASCE 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures
- DIN 488 Steel Rebar Specification of Germany Standard
- DIN 1045 Concrete, Reinforced and Pre-stressed Concrete Structures
- DIN 4024-1 Machine Foundations, Flexible Structures that Support Machines with Rotating Elements
- DIN 4024-2 Machine Foundations, Rigid Foundations for Machinery with Periodic Excitation

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- ASME B18.2.6M Metric Fasteners for Use in Structural Applications
- ASME B1.13M Metric Screw Threads: M Profile
- AWS D1.1/D1.1M Structural Welding Code- Steel
- AWS D1.4/D1.4M Structural Welding Code-Reinforcing Steel
- AWS A5.1/A5.1M Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding
- AWS A5.5/A5.5M Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding
- AWS A5.17/A5.17M Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc Welding
- BS 4592-1 Industrial Type Flooring and Stair Treads. Metal Open Bar Gratings.
- BS EN 1008 Mixing Water for Concrete
- BS EN 206 Concrete Specification
- BS 1881 Testing Concrete
- BS 1881 Part 122 Method for determination of water absorption
- BS 1881 Part 124 Methods for analysis of hardened concrete
- BS 4483 Steel Fabric for the Reinforcement of Concrete
- BS 5328 Methods for Specifying Concrete
- BS 8110 Structural Use of Concrete
- BS 812 Method for Sampling and Testing of Aggregates, Sands and Fillers
- BS 1377-3 Methods of Test for Soils for Civil Engineering Purposes, Chemical and Electro-Chemical Testing
- BS 3148 Methods of Test for Water for Making Concrete (Including Notes on the Suitability of Water)
- BS EN 10025-2 Hot Rolled Products of Structural Steels

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- DIN EN 10210-1 Hot Finished Structural Hollow Sections of Non-Alloy and Fine Grain Steels
- DIN 17100 Steel for General Structural Purposes
- DIN 1025 Hot Rolled I and H Sections
- DIN 1026 Hot rolled steel channels
- DIN 7990 Hexagon Head Bolts for Steel Structures
- DIN 555 Hexagon Nuts
- DIN 7989 Washers for Steel Structures
- DIN 125 Washers
- DIN 6914 High-Strength Hexagon Head Bolts with Large Widths across Flats for Structural Steel Bolting
- DIN 6915 Hexagon Nuts with Large Widths across Flats for High-Strength structural Steel Bolting
- DIN 6916 Round Washers for High-Strength Structural Steel Bolting

4.3 ACI (AMERICAN CONCRETE INSTITUTE)

- ACI 211 Proportioning concrete mixes
- ACI 301 Specifications for Structural Concrete
- ACI 302.1R Guide for Concrete Floor and Slab Construction
- ACI 313 Standard Practice for Design and Construction of Concrete Silos and Stacking Tubes for Storage of Granular Materials
- ACI 315 Details and Detailing of Concrete Reinforcement
- ACI 318 Building Code Requirements for Structural Concrete and Commentary
- ACI 350 Code Requirements for Environmental Engineering Concrete Structures and Commentary

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- ACI 351.1R Grouting between Foundations and Bases for Support of Equipment and Machinery
- ACI 351.3R Foundation for Dynamic Equipment
- ACI 352 Recommendations for Design of Beam-Column Connections in Monolithic Reinforced Concrete Structures
- ACI 408 R Suggested Development, Splice and Standard Hook Provisions for Deformed Bars in Tension
- ACI 442R Response of Concrete Buildings to Lateral Forces
- ACI 504R Guide to Sealing Joints in Concrete Structures
- ACI 543R Guide to Design, Manufacture and Installation of Concrete Piles
- ACI 351 Foundations for Dynamic Equipment
- ACI 117 Specification for Tolerances for Concrete Construction and Materials
- ACI 201.2R Guide to Durable Concrete
- ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavy Weight and Mass Concrete
- ACI 212.3R Chemical Admixtures for Concrete
- ACI 221R Guide for Use of Normal Weight and Heavy Weight Aggregates in Concrete
- ACI 222R Protection of Metals in Concrete against Corrosion
- ACI 224R Control of Cracking in Concrete Structures
- ACI 225R Guide to the Selection and Use of Hydraulic Cements
- ACI 301 Specifications for Structural Concrete
- ACI 302 Concrete Floor and Slab Construction
- ACI 304R Guide for Measuring, Mixing, Transporting and Placing concrete

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- ACI 305.1 Specification for Hot Weather Concreting
- ACI 306.1 Standard Specification for Cold Weather Concreting
- ACI 308.1 Specification for Curing Concrete
- ACI 309R Guide for Consolidation of Concrete
- ACI 315 Details and Detailing of Concrete Reinforcement
- ACI 318 Building Code Requirements for Structural Concrete and Commentary
- ACI 347 Guide to Formwork for Concrete
- ACI 350 Code Requirements for Environmental Engineering Concrete Structures and Commentary
- ACI 504R Guide to Sealing Joints in Concrete Structures
- ACI 530 Building Code Requirements for Masonry Structures
- ACI 543R Guide to Design, Manufacture and Installation of Concrete Piles
- ACI 214.3R Simplified Version of the Recommended Practice for Evaluation of Strength Test Results of Concrete
- ACI 224.1R Causes, Evaluation and Repair of Cracks in Concrete Structure
- ACI 301 Specifications for Structural Concrete
- ACI 309.2R Identification and Control of Visible Effects of Consolidation on Formed Concrete Surfaces
- ACI 209.R Predication of Creep, Shrinkage and Temperature Effects in Concrete Structures
- ACI 212.1R Admixtures for Concrete
- ACI 212.2R Guide for Use of Admixtures in Concrete

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- ACI 215. R Considerations for Design of Concrete Structures Subjected to Fatigue Loading
- ACI 216.R Guide for Use of Aggregates for Concrete
- ACI 224.3R Joints in Concrete Construction
- ACI 316.2R Recommended Practice for Concrete Formwork
- ACI 336.2R Foundations
- ACI 408.1R Suggested Development, Splice and Standard Hook Provisions for Deformed Bars in Tension

4.4 AISC (AMERICAN INSTITUTE OF STEEL CONSTRUCTION)

- AISC Specification for the Design, Fabrication and Erection of Steel Structures, American Institute of Steel Construction.
- AISC Design Guide 1 Base Plate and Anchor Rod Design
- AISC Design Guide 3 Serviceability Design Considerations for Steel Buildings
- AISC Design Guide 7 Industrial Building Design

4.5 ASTM (AMERICAN SOCIETY OF TESTING AND MATERIALS)

- ASTM A 36 Standard specification for structural steel
- ASTM C39/39M Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- ASTM A185/A185M Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
- ASTM A497/A497M Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.

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- ASTM A616/A615M Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- ASTM C31/C31M Standard Practice for Making and Curing Concrete Test Specimens in the Field
- ASTM C33/33M Standard Specification for Concrete Aggregates
- ASTM C39/39M Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- ASTM C40/40M Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
- ASTM C88/88M Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate
- ASTM C94/94M Standard Specification for Ready-Mixed Concrete
- ASTM C109/109M Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
- ASTM C114 Standard Test Methods for Chemical Analysis of Hydraulic Cement
- ASTM C117 Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
- ASTM C127 Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
- ASTM C128 Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate
- ASTM C131/131M Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- ASTM C136/136M Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

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- ASTM C138/138M Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
- ASTM C142/142M Standard Test Method for Clay Lumps and Friable Particles in Aggregates
- ASTM C143/143M Standard Test Method for Slump of Hydraulic-Cement Concrete
- ASTM C150/150M Standard Specification for Portland Cement
- ASTM C171 Standard Specification for Sheet Materials for Curing Concrete
- ASTM C172/C172M Standard Practice for Sampling Freshly Mixed Concrete
- ASTM C173/C173M Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
- ASTM C216 Standard Specification for Facing Brick
- ASTM C227 Standard Test Method for Potential Alkali Reactivity of Cement- Aggregate Combinations (Mortar-Bar Method)
- ASTM C231/C231M Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
- ASTM C260/260M Standard Specification for Air-Entraining Admixtures for Concrete
- ASTM C289 Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)
- ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- ASTM C494/494M Standard Specification for Chemical Admixtures for Concrete

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- ASTM C535 Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- ASTM C566 Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
- ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- ASTM C652 Standard Specification for Hollow Brick
- ASTM C873/873M Standard Test Method for Compressive Strength of Concrete Cylinders Cast in Place in Cylindrical Moulds
- ASTM C1064/1064M Standard Test Method for Temperature of Freshly Mixed Hydraulic- Cement Concrete
- ASTM C1602/C1602M Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
- ASTM D512 Standard Test Methods for Chloride Ion in Water
- ASTM D516 Standard Test Method for Sulphate Ion in Water
- AASHTO M80 Standard Specification for Coarse Aggregate for Hydraulic Cement Concrete
- AASHTO M6 Standard Specification for Fine Aggregate for Hydraulic Cement Concrete
- ASTM A6/A6M Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling
- ASTM A36/A36M Standard Specification for Carbon Structural Steel
- ASTM A53/A53M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc- Coated, Welded and Seamless
- ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

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- ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- ASTM A193/A193M Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
- ASTM A194/A194M Standard Specification for Carbon Steel, Alloy Steel, and Stainless-Steel Nuts for Bolts for High Pressure or High Temperature Service
- ASTM A307/A307M Standard Specification for Carbon Steel Bolts, Studs and Threaded Rod
- ASTM A501/A501M Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
- ASTM A563/A563M Standard Specification for Carbon and Alloy Steel Nuts
- ASTM F436/F436M Standard Specification for Hardened Steel Washers
- ASTM F844/F844M Steel Washers for General Use
- ASTM F959/F959M Standard Specification for Compressible-Washer-Type Direct Tension Indicators
- ASTM F1136/F1136M Standard Specification for Zinc/Aluminum Corrosion Protective Coatings for Fasteners
- ASTM F2329/F2329M Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners
- ASTM F3125/F3125M Standard Specification for High Strength Structural Bolts and Assemblies
- ASTM F1554 Standard Specification for Straight and Bent, Headed and Headless Anchor Bolts with Specific Yield Strengths

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- ASTM A 49 Standard specification for steel wire, deformed, for concrete reinforcement
- ASTM A 496 Standard specification for steel wire, deformed, for concrete reinforcement
- ASTM A 497 Standard specification for welded deformed steel wire fabric for concrete reinforcement
- ASTM A 615 Standard specification for deformed and plain billet-steel bars for concrete reinforcement (metric), including supplementary requirements
- ASTM C 150 Standard specification for Portland cement
- ASTM A53 Specification for Steel Black and Hot-Dipped Zinc-Coated Welded and Seamless Pipe
- ASTM A123 Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- ASTM A307 Specification for Carbon Steel Bolts and Studs
- ASTM A325 Specification for High-Strength Bolts for Structural Steel Joints
- ASTM A435 Straight - Beam Ultrasonic Examination of Steel Plates
- ASTM A653 Specification for Steel Sheet , Zinc-Coated (Galvanized) or Zinc-Iron Alloyed Coated (Galvannealed) by the Hot-Dip Process
- ASTM A501 Specification for Hot Formed Welded and Seamless Carbon Steel Structural Tubing
- ASTM A563 Specification for Carbon and Alloy Steel Nuts
- ASTM E190 Method for Guided Bend Test for Ductility of Welds
- ASTM E709 Practice for Magnetic Particle Examination
- ASTM F436 Specification for Hardened Steel Washers
- ASTM F1941 Specification for Electrodeposited Coatings on Threaded Fasteners

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- ASTM C31 Standard Practice for Making and Curing Concrete Test Specimens in the Field
- ASTM C33 Standard Specification for Concrete Aggregate
- ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- ASTM C94 Standard Specification for Ready – Mixed Concrete
- ASTM 138 Standard Test Method for Unit Weight, Yield and Air Content of Concrete in Field
- ASTM 143 Standard Test Method for Slump of Hydraulic Cement Concrete
- ASTM 150 Standard Specification for Portland Cement
- ASTM C172 Standard Test Method for Sampling Fresh Concrete
- ASTM 494 Standard Specification for Steel Welded Wire Fabric, Plain for Concrete Reinforcement
- ASTM 615 Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- ASTM C33 Standard Specification for Concrete Aggregates
- ASTM C144 Specification for Aggregate for Masonry Mortar
- ASTM C191 Test Method for Time of Setting Of Hydraulic Cement by Vicat Needle
- ASTM C230 Specification for Flow Table for Use in Tests of Hydraulic Cement
- ASTM C305 Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars Of Plastic Consistency
- ASTM C307 Test Method for Tensile Strength of Chemical Resistant Resin

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- ASTM C531 Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concrete
- ASTM C579 Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes
- ASTM C827 Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures
- ASTM C940 Test Method for Expansion and Bleeding of Freshly Mixed Grout for Preplaced-Aggregate Concrete in the laboratory
- ASTM C1090 Test Method for Measuring Changes in Height of Cylindrical Specimens of Hydraulic-Cement Grout
- ASTM C1107 Specification for Packaged Dry, Hydraulic Cement Grout (Non-shrink)
- ASTM C1181 Test Methods for Compressive Creep of Chemical-Resistant Polymer Machinery Grouts

4.6 VIBRATING MACHINERY

- ACI 351.3R-04 Foundations for Dynamic Equipment
- VDI 2056 Evaluating the Mechanical Vibrations of Machines.
- VDI 2060 Evaluating the Balanced Condition of Vibrating Rigid bodies.

4.7 CIVIL CODES AND STANDARDS

- Management and Planning Organization Shall Govern as Minimum Project Requirements.
- ACI Issued by "American Concrete Institute"
- ASCE Issued by "American Society of Civil Engineers"
- ASTM Issued by "American Society for Testing & Materials"

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- AASHTO Issued by “American Association of State Highway and Transportation Officials”
- AISC DESIGN GUIDES
- TR-55 Urban Hydrology for Small Watersheds
- Publication No.101 General Technical Specifications for Roads (Latest Revision)
- Publication No.139 Standard Loads for Bridges (First Revision)
- Publication No.234 Technical Specifications of Asphaltic Pavement
- Publication No.303 General Technical Specification for Urban Water Pipelines and Sewage Systems
- Publication No.415 Geometric Design of Roads (Chapter 6 to 10)
- Publication No.145 Urban intersections
- Publication No.139 Standard Loads for Bridges
- Publication No.519 Guide Lines for Estimating Runoff for Design of Irrigation and Drainage Networks
- Publication No.104, 106, 107 Design Criteria of Irrigation and Drainage Networks
- Publication No.118 r1 Bases and Design Criteria for Sewage and Storm Water Collection Systems
- Publication No.123 r1 Design and Analysis of Ground Concrete Water Reservoirs
- Publication No.166 Hydraulic Design Criteria for Irrigation Canals and Open Drains
- AASHTO T 27 Method of Test for Sieve Analysis of Fine and Coarse Aggregates
- AASHTO M 145 Specification for Classification of Soils and Soil–Aggregate Mixtures for Highway Construction Purposes

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- AASHTO T 180 Method of Test for Moisture–Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- ASTM D421 Practice for Dry preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constant
- ASTM D422 Test Method for Particle-Size Analysis of Soils
- ASTM D854 Test Method for Specific Gravity of Soil Solids by Water Pycnometer
- ASTM D977 Standard Specification for Emulsified Asphalt
- ASTM D1556 Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
- ASTM D1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56000 ft-lbf/ft³ (2700 KN-m/m³))
- ASTM D1559 Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
- ASTM D1883 Test Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils
- ASTM D2027/D2027M Standard Specification for Cutback Asphalt (Medium-Curing Type)
- ASTM D2167 Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
- ASTM D2216 Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D2487 Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- ASTM D2922 Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

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- ASTM D2937 Test Method for Density of Soil in Place by the Drive-Cylinder Method
- ASTM D3017 Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
- ASTM D3282 Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes highways
- ASTM D4253 Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
- ASTM D4254 Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
- ASTM D4318 Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils
- ACI 301 Specifications for Structural Concrete
- ACI 302.1R Guide for Concrete Floor and Slab Construction
- ACI 315 Details and Detailing of Concrete Reinforcement
- ACI 318 Building Code Requirements for Structural Concrete and Commentary
- ACI 350 Code Requirements for Environmental Engineering Concrete Structures and Commentary
- ACI 504R Guide to Sealing Joints in Concrete Structures
- BS 1924 Methods of Test for Stabilized Soils
- BS 5607 Code of Practice for Safe Use of Explosives in the Construction Industry
- BS 5930 Code of Practice for Ground Investigations
- BS 6031 Code of Practice for Earthworks
- BS 8004 Code of Practice for Foundations

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- BS 1377 Methods of Tests for Soils for Civil Engineering Purposes-
Chemical and Electrochemical Tests

5- GENERAL PURPOSE STANDARDS

- STEELS FOR GENERAL PURPOSES DIN 17100
- Uniform Fire Code (UFC)
- National Electrical Code (NEC)
- National Fire Protection Association (NFPA)
- Noifert architectural reference

6- LOCAL CODES AND STANDARDS

7- ELECTRICAL CODES & STANDARDS

Electrical equipment shall be designed, manufactured, erected, and installed according to the latest editions of the IEC (International Electro technical Commission) standards.

Minimum requirement for installation shall be follow local codes and norms. In lack of them normal European industrial practice is followed. Other standards that can use in reference, but shall be equivalent with IEC standard, are as below:

BS-IEEE-ANSI-VDE-DIN-EN-ISO-NEMA-NFPA-NACE-API-ISA-NACE-TIA

In case of conflict between IEC standard and other standards, the more stringent specification/requirement shall be applicable and Owner's decision shall be considered as final. In the case that Owner's standard exists, but there is no IEC recommendation, Owner's standard shall be followed.

8- INSTRUMENTATION CODES & STANDARDS

Latest edition of below standards shall be used:

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BS, DIN, IEC, ISA, ISO, ANSI, NEMA, VDE, API, ASTM, IEEE, NACE, NEC, NFPA, UL, CENELEC, OIML.

9- PIPING CODES & STANDARDS

Latest edition of below standards shall be used:

ASME, ANSI

- ASME B1.1 Unified Inch Screw Threads
- ASME B1.20.1 Pipe Threads, General Purpose
- ASME B16.1 Cast iron pipe flanges and flanged fittings
- ASME B16.5 Pipe flanges and flanged fitting
- ASME B16.9 Factory made wrought steel butt welding fittings
- ASME B16.10 Face to face an end to end dimension of valve
- ASME B16.11 Forged steel fittings, socket welding and threaded
- ASME B16.20 Metallic gasket for pipe flanges, ring joint, spiral wound And Jacketed
- ASME B16.21 Non metallic flat gaskets for pipe flanges
- ASME B16.25 Butt welding ends
- ASME B16.34 Valves – flanged, threaded, and welding end
- ASME B16.36 Orifice flanges
- ASME B16.47 Large diameter steel flanges NPS 26" through NPS 60"
- ASME B16.48 Line blanks
- ASME B18.2.1 Square and hex bolts and screws (Inch series)
- ASME B18.2.2 Square and hexagonal nuts (Inch series)
- ASME B31.3 Chemical Plant and Petroleum Refinery Process piping
- ASME B31.4 Pipeline transportation systems for liquid hydrocarbons and other liquids
- ASME B31.8 Gas transmission and distribution piping system

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- ASME B36.10M Welded and seamless wrought steel pipe
- ASME B36.19M Stainless steel pipe
- For ASME B31.3- shall be used.
- BS, DIN, ISO will be also accepted provided that equivalent tables be presented.

BS, DIN, ISO will be also accepted provided that equivalent tables be presented.

10- HVAC CODES & STANDARDS:

HVAC Standards: latest edition of below standards shall be used.

- American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Hand books and Standards. Fundamentals–Application–Equipment and System.
- Hand Book of Air Conditioning System Design (CARRIER).
- National Fire Protection Association (NFPA)
- NFPA 90A, Air Conditioning and Ventilation Systems.
- NFPA 90B, Warm Air Heating and Air Conditioning Systems
- NFPA 96, Removal of Smoke and Grease Laden Vapors from commercial cooking equipment.
- Sheet Metal and Air Conditioning National Association, Inc. (SMACNA), HVAC systems Duct Design.
- American National Standard Institute (ANSI)
- American Society of Testing and Materials (ASTM)
- American Society of Mechanical Engineers (ASME)
- Air Moving and Conditioning Association (AMCA)
- National Plumbing Code (NPC)
- American Water Work Association (AWWA)
- National Electrical Manufacturer's Association (NEMA)

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- International Electro technical Commission (IEC)
- ISIRI standards
- ASHRAE 33-1978: Refrigerant
- ASME/ANSIB36.10M 1995: Fans
- NPC (National Plumbing Code): piping
- ASHRAE duct system design guide

11- SAFETY CODES & STANDARDS:

Safety Standards: latest edition of below standards shall be used

- BS 5423: Portable Fire Extinguisher
- BS 336: Fire Hose Couplings & Ancillary Equipment
- NFPA 1-2018