Rockwerx GymRock Climbing Walls

Rockwerx' GymRock Wall System is the best in the climbing wall industry, providing more flexible route setting options, unmatched durability, and a great looking, superior climbing surface. GymRock walls use mesh seaming and texture process to create a more fluid, unified look and feel emulating natural rock surfaces.

GymRock curved climbing surfaces are formed by geometrically shaped steel panels fabricated and installed much like a 3D jigsaw puzzle. These panels are placed on a steel superstructure independently engineered for each project. Each panel section connects to the adjacent section unify the climbing wall design. Simple triangles, rectangles, and trapezoidal shapes are transformed into dramatic arches, caves, arêtes, dihedrals, spires, cracks and stalactites. GymRock's substantive concrete texture forms rounded edges and an aesthetically pleasing seamless design.

The basis of a GymRock Wall System is the free-standing and self-supporting steel frame consisting of custom designed square tube and angle steel components. This framing system allows the climbing wall to take on almost any shape, at any angle, at any height. GymRock wall panels are supported every two feet. The inter-bracing strengthens the overall structure, and adds to the rock-solid feel of the wall, reducing flexing and climbing surface cracking. The structural grade plywood sheathing that serves as a base for the cement surfacing material also reduces wall flex and provides a superior anchor for Rockwerx' high performance X-Nut modular hold anchors.

Rockwerx's climbing wall designers work with architects to detail and customize artificial climbing wall features through their turnkey 3-D design services, creating both virtual and physical models of proposed installations. Rockwerx brings over 15 years of combined wall building experience and over 1000 completed walls in various facility types. Their designs and engineering methods have stood the test of time, maintaining a reputation for revolutionary and reliable builds. Their projects range from some of the largest competition climbing venues in the world to recreational or multi-use facility climbing walls, and to unique climbing adventures in residential backyards.

Rockwerx provides complete design, engineering, fabrication, and installation services to help customers create next generation climbing walls. Their post-construction services include staff and operational trainings and comprehensive route setting packages, along with continuing consulting for climbing wall operators.

For more information, contact Rockwerx at (877)595-4155, info@Rockwerxstone.com, www.Rockwerxstone.com.

SECTION 11 67 33.02 – CLIMBING WALLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Panel-formed interior climbing wall systems with internal structural support system, including design, engineering, fabrication, and installation based upon schematic system design indicated.

Specifier: If retaining Related Requirements article, edit to suit project requirements.

1.2 RELATED REQUIREMENTS

A. Section 01 10 00 "Summary" for loose climbing equipment provided by Owner.

B. Section 01 12 00 "Allowances" for description of Work in this Section affected by allowances.

C. Section 32 18 16 "Playground Protective Surfacing" for protective surfacing materials located at base of artificial climbing walls.

1.3 DEFINITIONS

A. Artificial Climbing Wall: Sports equipment exclusively designed and originally built for climbing. Artificial climbing walls may be designed and used for lead climbing, top rope climbing, and bouldering.

B. Route: Climbable surface approximately five feet (m) wide that extends vertically from the base of the wall. The number of potential routes on a climbing wall is normally determined by the width of the wall at a height of five feet (m) from its base.

C. Anchor Point: Used to belay climbers during their ascent or to lower them during their descent.

D. Top Rope Climbing: A style of climbing where the climber is safeguarded by a rope that passes through a belay anchor at the top of the climb. The climber always remains below the anchor as they climb.

E. Lead Climbing: A style of climbing where the climber is safeguarded by a rope that is passed through an anchor point as the climber progresses up the artificial climbing wall. The climber must clip the rope into each anchor point as they progress up the artificial climbing wall so that they are safeguarded from ground falls while ascending to the final anchor points at the top. Typically lead climbing anchor points are placed at spacing of 4 to 5 feet (to m) to prevent a long fall.

F. Top Rope Belay Anchor: Located just above the top of the wall, this anchor system consists of two fixed ring type anchors mounted to a plate extending 4 to 6 inches (to mm) out from the face of the climbing surface. Climbing rope is secured by running through both rings. Used almost exclusively to belay climbers using the Top Rope method and lower them back to the ground.

G. Floor Anchor: Floor attachments placed at the base of the artificial climbing wall, used to secure that belayer while either belaying or lowering a climber. The attachments can either be fixed or moveable.

H. Belay Station: Usually placed part way up a larger artificial climbing wall or at a ledge used for teaching or rappelling. Used to stop and belay a partner up so that they continue climbing from that point. A belay station usually consists of at least two distinct anchor points, linked by a chain (or webbing) in a "V" with a ring (or locking carabineer) in its interior part.

I. Automatic Belay: The Automatic Belay is a controlled descent device designed specifically for the climbing wall and climbing gym industry. The Auto Belay provides a hands free belay for the climber, thereby eliminating the need for an additional climber or attendant to serve as belayer. As the climber ascends, the slack rope is pulled taut. Once at the top, or whenever the climber lets go of the wall, the device gently lowers them to the ground.

Specifier: If retaining Reference Standards article, edit to reflect standards that remain once section has been edited.

1.4 REFERENCE STANDARDS

A. American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI):

1. ASCE/SEI 7: Minimum Design Loads for Buildings and Other Structures.

B. American Welding Society (AWS):

1. AWS D1.1/D1/1M – Structural Welding Code – Steel.

C. ASTM International (ASTM):

1. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.
2. ASTM A 123/A 123M - Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A 153/A 153M - Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
4. ASTM A 500 - Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
5. ASTM A 513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
6. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
7. ASTM E 662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.

D. Climbing Wall Association (CWA):

1. General Specification for Design and Engineering of Artificial Climbing Structures.
2. Specification for the Structural Inspection of Artificial Climbing Structures.

E. European Standards Commission (CEN)/International Competitive Climbing Commission (ICCC):

1. EN 12572 - Artificial Climbing Structures.

F. Forest Stewardship Council (FSC):

1. FSC-STD-01-001 – FSC Principles and Criteria for Forest Stewardship.

G. U.S. Department of Commerce, National Institute of Standards and Technology (NIST):

1. DOC PS-1 – Construction and Industrial Plywood.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate artificial climbing walls with related Work specified in other Sections.

Specifier: Retain below for larger or more complex projects. Edit options for type of conference required. On site conferences add to project cost. Consult with Rockwerx representative.

B. Preinstallation Conference: Conduct preinstallation[teleconference] [conference at Project site].

1.6 ACTION SUBMITTALS

A. Product Data: For each type of artificial climbing wall product, including anchors, fasteners, and other hardware.

B. LEED Submittals:

Specifier: Credit MR 4 may apply for steel items utilized for structural supports.

1. Credit MR 4: Documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include cost statement for each product.

Specifier: Credit MR 7 may apply to wood plywood products.

2. Credit MR 7: Chain-of-custody certificates for products indicated as FSC-certified wood. Include cost statement for each product.

Specifier: Credits IEQ 4.1 and IEQ 4.4 may apply to LEED-NC, LEED-CI, and LEED-CS projects.

3. Credit IEQ 4.1: Product data for adhesives including printed statement of VOC content.
4. Credit IEQ 4.4: Product data for composite wood products indicating product contains no urea formaldehyde.

Specifier: LEED 2009 for Schools Credit IEQ 4 may apply to adhesives and composite wood products.

5. Credit IEQ 4: Laboratory Test Reports for [adhesives] [and] [composite wood products] indicating products comply with California Department of Health Care Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Shop Drawings:

1. Include[three-dimensional model,] plans, elevations, sections, and attachment details.
2. Include details of climbing wall surface panels including the following:

    a. Number and location of climbing routes.
    b. Wall surface climbing features.
    c. Belay anchor system components and locations.
    d. Modular hold attachments.
    e. Access hatch locations.
    f. Rappell ledge locations.

3. Indicate dimensions, methods of field assembly, and components.
4. Detail fabrication and assembly of concealed structure, including sizes, dimensions, locations, and connections for structural members, base plates, and bracing.
5. Extent of surface systems and use zones for artificial climbing walls.
6. Indicate [dead loads] [superimposed loads] [and] [live loads] for artificial climbing walls.
7. Demonstrate compliance with artificial climbing wall design standard.

D. Samples: For each exposed artificial climbing wall product and for each color and texture specified.

E. Delegated-Design Submittal: Analysis data signed and sealed by qualified professional engineer responsible for preparation of calculations and shop drawings. Indicate direction and magnitude of reactions resulting from installation of artificial climbing walls. Analyze building structural system to verify loading resulting from artificial climbing walls will be adequately supported by building structural elements.

1. Certificate: Submit certificate indicating design complies with specified design standard.
2. Compliance Review: Review and approve submittals and field quality-control reports for compliance with design.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For manufacturer and installer.

Specifier: Retain requirements below if fire-retardant-treated plywood is required for project.

B. Evaluation Reports: ICC-ES reports for the following:

1. Fire-retardant-treated plywood.

C. Welding certificates.

D. Sample warranty.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance data for artificial climbing walls.

1.9 QUALITY ASSURANCE

Specifier: Paragraph below provides specific requirements for requests for approval or substitution of products for this section.

A. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum **[**5**]** years experience in the manufacture and assembly of artificial climbing walls used in similar applications. Manufacturers seeking approval must submit the following in accordance with Instructions to Bidders and Division 01 General Requirements:

1. Product data, including descriptive information and test data from qualified independent testing agency indicating compliance with requirements.
2. Samples of each product specified.
3. List of successful installations of similar products available for evaluation by Architect.

B. Professional Engineer's Qualifications: Qualified professional engineer, experienced in design of artificial climbing walls similar to those required for Project, and licensed in the Project state.

C. Installer Qualifications: Manufacturer of products.

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code – Steel."

1.10 PRODUCT STORAGE AND HANDLING

A. Provide wall panels, frames, and related materials properly packaged and protected during shipping, handling, and storage to prevent damage.

B. Store materials indoors under cover on raised platforms, fully protected from dirt and moisture.

1.11 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard form in which manufacturer agrees to repair or replace components of artificial climbing walls that fail in materials or workmanship within specified warranty period.

1. Failure includes delamination or excessive surface cracking, wear of artificial climbing wall finish.
2. Warranty Period: **[**5**]** year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide **GymRock Wall System by Rockwerx,** Barre MA, (877)595-4155, info@rockwerx.com, www.rockwerxclimbing.com.

2.2 PERFORMANCE AND DESIGN CRITERIA

A. Delegated Design: Design artificial climbing walls, including comprehensive engineering analysis of structural framework, supports, and connections by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Artificial climbing walls shall withstand the effects of gravity loads, wind loads, and live loads determined according to ASCE/SEI 7 and requirements of authorities having jurisdiction.

Specifier: Retain and edit requirement in paragraph below if project site is subject to seismic design requirements.

C. Seismic Performance: Artificial climbing walls shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and requirements indicated.

D. Design Standard: Design artificial climbing walls in compliance with **[**CWA Standard**]** **[**and**]** **[**EN 12572**]** and requirements of authorities having jurisdiction.

E. Surface-Burning Characteristics:

1. Flame-Spread Index, ASTM E 84: 25 or less.
2. Smoke-Developed Index, ASTM E 84: **[**450**]** or less.

2.3 ARTIFICIAL CLIMBING WALLS

A. Artificial Climbing Walls, General: Seamless, climbing wall consisting of cement surfacing applied to lath and plywood-covered steel panels supported by steel substructure. Climbing wall shall match approved submittals developed in collaboration with Owner and Architect, and be erected as permanent site installation.

B. Climbing Wall Surface: Through-colored cement surfacing trowel applied and sculpted to emulate natural granite in appearance and climbing friction, formed to provide a seamless, realistic climbing wall system. Surface shall include multiple sculpted micro features usable for foot placements in addition to modular hold anchors.

Specifier's Note: Below is optional feature available with GymRock.

1. Wall Surface Climbing Features: Cast embedded climbing hand features, including edges, pockets, and cracks in climbing wall surface, located at approximately one macro feature per 50 square feet (sq. m) per approved submittals.
2. Color: Natural stone colors consisting of base color, accent colors and tints emulating natural rock appearance.

C. Belay Anchor System: Place belay anchor system components in locations and number indicated or scheduled:

1. Automatic Belay: 41 foot (12.5 m) descent capacity, fall-safe design with self-regulating, non-wearing magnetic braking mechanism, self-adjusting for user weight, with webbing suspension, equipped with internal automatic backup braking**[** and wall mounting bracket and hardware**]**. Unit to provide sound indication to alert for descending climber. Include manufacturer re-certification at end of first year of service. **Rockwerx, TRUBLUE Auto Belay**.
2. Top Rope Belay Bars: 3 inch (mm) steel belay bar, configured to prevent rope jump, with wall mounting plate and hardware. **Rockwerx, Top Rope Bar**.
3. Lead Anchors:

a. Wedge Bolts: Grade VIII, designed for rock climbing, formed from [zinc plated steel] [A304 stainless steel] rod with stamped threads, 3/8 inch (9.5 mm) diameter, with matching nut and washer and rubber washer. **Fixe Hardware, www.fixeusa.com, #140**.

b. Bolt Hangers: Accommodate two carabiners, formed to prevent spinning; 4-mm-thick [zinc plated steel] [A304 stainless steel]; 40 kN capacity; 4 mm hole; located as indicated on approved submittals. **Fixe Hardware, #038**.

c. Top Anchors: Designed for installation in pairs at top of climbing route, 11 kN rating, [zinc plated steel] [A304 stainless steel] , 3/8 inch (mm); **Fixe Hardware, Super Shut #166**.

d. Belay Stations: Double bolt hangers connected with climbing industry standard quality chain and rappel ring apparatus, 35 kN rating, [zinc plated steel] [A304 stainless steel]; 10 mm bolt hole. **Fixe Hardware, V-Anchor and DRACO Carabiner #363**.

D. Access Hatches: Construct access hatches from material matching climbing wall components, capable of supporting weight of functional climbing including attachment of modular holds. Provide complete access to each climbing wall utilizing lockable, hinged access hatches located to coordinate with design of supporting structure.

Specifier: Rappell Ledge and Top of Bouldering Wall are optional features available for climbing walls.

E. Rappell Ledge: Provide functional rappel ledge and belay ledge designed for teaching purposes at location indicated. Finish outer ledge with smooth texture.

F. Top of Bouldering Wall: Construct and finish to match climbing wall, free of climbing features and modular holds.

G. Climbing Equipment: Provided by Owner.

Specifier: Rockwerx' X-Nuts are a specialized evolution of T-Nuts designed specifically for the rigors of artificial rock wall climbing over the past 10 years: http://www.rockwerxclimbing.com/4962.xml

H. Modular Hold Anchors: T-nut-type threaded sleeves, 3/8 by 1 inch (9.5 by 25 mm) No. 16 [zinc plated steel] [A304 stainless steel], designed for hydraulic press installation into climbing wall surface, at 2.0 placements per square foot. **Rockwerx, X-Nuts**.

I. Modular Climbing Hold Package: Removable climbing holds with internal threading, at 15 placements per 32 square foot [color to match rock surface] [colors as selected from manufacturer's full range].

1. 10 percent footholds.
2. 30 percent small climbing holds.
3. 40 percent medium climbing holds.
4. 20 percent climbing holds.

2.4 MATERIALS

A. Steel Structural Tubing: ASTM A 500, Grade B, hot-dip galvanized according to ASTM A 123/A 123M.

B. Steel Mechanical Tubing: ASTM A 513, welded steel mechanical tubing, hot-dip galvanized according to ASTM A 123/A 123M.

C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

D. Plywood: DOC PS-1 and the following:

Specifier: Retain first subparagraph below for LEED for Schools or retain second paragraph for LEED-NC, LEED-CI, or LEED-CS.

1. Emissions: Meet testing and product requirements of California DHS.
2. Emissions: Plywood made without urea-formaldehyde.

Specifier: Retain first subparagraph below if required for LEED.

3. Certified Wood: Source material in compliance with FSC STD-01-001.

Specifier: Retain first subparagraph below if required by authorities having jurisdiction.

4. Fire-Retardant-Treated Plywood: AWPA C27, Interior Type A, labeled by agency acceptable to authorities having jurisdiction.
5. Nominal Thickness: Not less than 3/4 inch (19 mm).
6. Grade: CDX.

E. Cement Surfacing:

1. Polymer-modified, fiber-reinforced portland cement plaster ASTM C 150.
2. Expanded-metal lath, ASTM C 847 with ASTM A 653/A 653M G60 coating.
3. Metal lath and trim accessories.

Specifier: Verify stain product's compliance with VOC limitations on LEED projects.

F. Cement Surfacing Stain: Manufacturer's standard semi-transparent stain application recommended by stain manufacturer for application to new concrete surfaces[, meeting project VOC limitations].

G. Anchorages: Anchor bolts, hot-dip galvanized according to ASTM A 153/A 153M.

2.5 CLIMBING WALL FABRICATION

A. Fabrication, General: Fabricate artificial climbing wall components for field assembly. Use connections that maintain structural value of joined pieces.

B. Structural Supports: Fabricate structural supports with cross-section profile and dimensions indicated on approved Shop Drawings.

1. Fabricate frame members, bracing, and connections from steel materials specified.

a. Comply with AWS recommended practices for shop welding.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas where artificial climbing walls are to be installed, with Installer present. Verify compliance with requirements for installation tolerances and other conditions affecting installation and performance.

1. Verify conditions meet requirements for tolerances and other requirements of manufacturer.
2. Correct unsatisfactory conditions prior to proceeding with installation.

3.2 ERECTION OF ARTIFICIAL CLIMBING WALLS

A. General: Comply with manufacturer's written instructions and approved Shop Drawings. Support, anchor, and fasten components securely using anchors and fasteners indicated and recommended by manufacturer for application.

1. Comply with requirements of artificial climbing wall design standard.

B. Erection of Structural Supports: Erect structural supports in accordance with approved submittals. Anchor using fasteners indicated. Utilize structural components furnished by manufacturer; do not modify components in field without manufacturer approval.

1. Comply with AWS recommended practices for field welding.

C. Plywood Sheathing: Fasten to supports with manufacturer's recommended fasteners.

D. Cement Surfacing: Mix and apply according to manufacturer's recommended practices. Apply joint treatment at edges and seams of plywood sheathing.

E. Surface Staining: Apply surface stain to cement surfacing after it has achieved adequate curing. Apply in single or two-coat application as required to match approved samples.

1. Utilize stain manufacturer's recommended primer if required.
2. Utilize stain manufacturer's overcoat sealer if required, in sheen matching approved samples.

F. Belay Anchor System: Install belay anchor system fixed components in locations indicated in accordance with anchor system manufacturer's written recommendations.

3.3 CLEANING

A. Repair or replace defective work as directed by Architect upon inspection.

B. Clean installed unit surfaces. Touch up, refinish, or replace damaged components in a manner acceptable to Architect.

END OF SECTION