Natareâ Hybrid Movable Bulkhead

Typical Specification

The following pages include a typical specification (in the Construction Specification Institute, CSI format) for a moving bulkhead system. This specification is intended to be used as part of a project or as a stand-alone specification for the purchase of a moving bulkhead system.

This specification is not proprietary or intended to limit competition. The purpose of this specification is to establish the minimum performance and quality standards for a moving bulkhead. The use of this specification does not preclude other manufacturers or suppliers from bidding. In fact, the use of a comprehensive and detailed specification ensures that the purchaser or Owner actually receives the expected quality and performance required in a moving bulkhead system.

There is a wide range of differences in moving bulkhead specifications. Seemingly minor changes in tolerance, strength, or materials of construction can result in major differences in performance, durability, and life expectancy. Less expensive bulkhead construction generally results in a less satisfactory bulkhead, possibly causing slower competition times, difficulty in moving or extensive maintenance. Natare recommends that purchasers understand their needs, specify the bulkhead that meets their requirements, and demand that all potential suppliers meet those minimum requirements.

Bulkhead purchases are generally a once-in-a-lifetime purchase (if done correctly). Select the bulkhead your facility deserves—don't settle for something less.

Please contact Natare for assistance in selecting and specifying your bulkhead system.

Natare encourages the use of these specifications and grants permission for modification, reproduction, change, or distribution. These specifications are also available on request as word processing documents in most common file formats.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provision of the Notice to Bidders, Instructions to Bidders, Proposals, General Conditions, Supplementary Conditions, General Requirements, related Sections and other Divisions of these documents, if used as part of this project, are included as a part of this Section as though bound herein.

1.2 SUMMARY

A. It is the intent of this Specification to describe a swimming pool bulkhead designed to move within a pool to provide varying course lengths within the swimming pool facility to accommodate competitive swimming and related aquatics programs requiring different course lengths. The bulkhead shall be a bilateral symmetrical dyadic truss type bridge that spans the width of the pool. It shall be engineered to sustain the required loads to maintain the particular tolerances of the course length while providing a safe and stable platform for participants and officials. This Specification includes, but is not limited to, the following components**:**

1. Structure
2. Grating
3. Targets
4. Rope anchors
5. Carriage assembly
6. Buoyancy system
7. Starting platforms
8. Stainless steel handholds
9. Stainless steel nosing and bulkhead support
10. Timing system accessories
11. Alignment and locking systems

B. Refer to Section _____ for alternates that may affect the Work of this Section.

C. This Specification describes a bulkhead system that meets the project requirements. Should the requirements of this specification contradict any other section of the project specifications, this section shall govern.

D. Where items of the architectural, mechanical, or electrical general conditions, special conditions, and specifications are repeated in this Section of the Specifications, it is intended to call particular attention or qualify these items. It is not intended that any other parts of the documents shall be assumed to be omitted if not repeated herein.

E. The complete and operable bulkhead system specified herein and shown on the detailed drawings is intended as the basis for receiving bids and is the preference of the Owner. It is assumed that unless otherwise stated, the bidder is offering the equipment in literal compliance with these Specifications.

1.3 SUBSTITUTIONS

A. The bulkhead system has been the subject of a detailed investigation and the design and operation of adjoining equipment and system is based upon the specified equipment. All base bids shall include only that equipment and systems listed herein or subsequently approved by addendum. The Owner reserves the right to reject any and all substitutions without cause and for any reason whatsoever, and the bidder is obligated to provide only the products, equipment, or systems as described by the specified manufacturer.

1.4 TRADE NAMES

A. When a particular manufacturer's product, system, or brand name is designated in the project documents, either in the drawings, specifications or addenda thereto, only such designated products or systems by the named manufacturer may be provided.

1. When reference is made in the project documents to trade names, brand names or the products of a particular manufacturer, such references are made solely to indicate what products or systems may be furnished under the base bid and are not intended to restrict competition. Should any bidder desire to use products, systems, trade names or brand names that are different from those mentioned in the project documents, application for the approval of such different products, systems, trade names or brand names must be provided to the Architect in writing a minimum of 10 days prior to the date set for the opening of bids.

2. The burden of proving acceptability rests with the applicant and any application for approval must be accompanied with adequate and sufficient technical data, engineering calculations, drawings, and details to clearly and convincingly establish beyond all doubt that the proposed product or system meets or exceeds all express requirements of the project documents. **Any such submissions must include structural calculations prepared by a structural engineer registered in the state of Indiana attesting to and certifying compliance with all requirements of these specifications. The certifying engineer shall provide evidence of having designed and specified no less than five (5) moving bulkhead systems of similar size and function.**

3. Unless requests for approval of other products, systems, trade names, or brand names have been received and approvals have been published by addendum at least ten (10), only such designated products or systems by the named manufacturer may be provided.

1.5 DEFINITIONS

A. Reference Standards: Certain applicable reference standards are incorporated herein to the extent such references are relevant, with the latest revision applicable including, but not limited to:

1. Fabrication and Manufacturing standards:
   a. AISI - American Iron and Steel Institute
   b. ANSI - American National Standards Institute
   c. AWS - American Welding Society
   d. ASTM - American Society for Testing Materials
   e. ASM International

2. The following are utilized as applicable:
   a. NCAA - National Collegiate Athletic Association
   b. FINA - Federation Internationale de Natation Amateur
   c. USA - United States of America Swimming Incorporated

B. The term “Bidder”, “Contractor” or “Supplier” are used interchangeably to describe the party or parties contractually obligated to provide the equipment, services and systems described herein.

C. The intent of these Specifications is not to establish specific quantities, amounts, or dimensions. Thus, the reference to “one”, “each”, “an”, “a”, or like wording is for semantic purposes only. Unless specifically stipulated otherwise, provide materials, equipment and items provide materials, equipment and items as reasonably required for a complete, operational pool bulkhead system

1.6 SYSTEM PERFORMANCE REQUIREMENTS

A. System Description**:** The system hereinafter specified consists of a complete movable bulkhead system of the type and configuration detailed on the drawings, including all necessary equipment within this specification. The movable bulkhead shall have no opening that could constitute a tripping or entrapment hazard. It shall consist of a stainless steel structure with a high density polymer grating that completely covers the top and side surfaces. The exterior of the unit shall completely encase the structure in a manner that prevents the possibility of swimmer entrapment. The bulkhead shall firmly lock into each pre-designated position. Once in position, it shall not move under the force of swimmers diving off its side. The bulkhead shall be designed to move freely by utilizing a stainless steel carriage assembly, variable buoyancy and guiding and aligning devices as required. This assembly shall provide total support for the bulkhead as well as its mobility and anchoring. The assembly shall include a carriage support and an integral bearing plate.

1. The carriage assembly shall be covered with a high-density stabilized polymer grating with stainless steel trim that provides access to the locking devices, movement controls, buoyancy system and carriage assembly.
2. The bulkhead shall be designed to move freely by utilizing a stainless steel carriage assembly, polymer bearing pads and a variable buoyancy floatation system. This assembly shall provide total support for the bulkhead as well as its mobility and anchoring. Bulkheads requiring wheels or rollers for movement are not acceptable.
3. The bulkhead is intended for positioning at designated locations along the course length and at alternate positions if capable of dividing into separately moved bulkhead sections.

B. Sectional Construction and Delivery: If required for installation, the bulkhead systems is to be designed and delivered in individual sections and moved individual to designated areas in the pool to provide multiple course dimensions within the pool. Individual sections must have the ability to be easily positioned at selected pre-determined positions and locked securely together. The bulkhead shall have an integral locking system that securely joins the individual sections into a continuous rigid bulkhead structure suitable for competition.

1. Each bulkhead section shall be provided with machined male/female high density polymer centering and alignment blocks that allow the individual sections to be precisely aligned and permanently joined together at the project site without excessive effort.

2. The bulkhead locking system that joins individual sections together shall be self-centering and include positioning. Individual bulkhead sections shall be provided with an alignment system and guiding pins to locate and align individual bulkhead sections to ensure a stable functional system with the appropriate position and anchor in the pool structure. The bulkhead joining system shall allow for permanent joining of the bulkhead.

C. Performance**:** The swimming pool bulkhead shall be designed for regular daily movement between various locations. Ease of movement is necessary and critical for the satisfactory performance of the bulkhead, and the bulkhead shall be capable of being moved manually by two attendants of normal build and strength at a speed of at least 3 meters a minute.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate all work activities and installation of the bulkhead with other building components.

B. Coordinate appropriate openings in building structure during progress of construction to allow for bulkhead installation utilizing sectional bulkhead fabrication and delivery.

C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.

D. Sequence, coordinate, and integrate installations of materials and equipment for efficient flow of the Work. Coordinate installation of bulkhead requiring positioning before closing in any buildings or structures.

1.8 DRAWINGS:

A. The drawings are generally diagrammatic and are intended to convey the scope of work and indicate general arrangement. The drawings are intended for bidders, contractors, and manufacturers having experience, skill, and discretion in the execution of the work implied by the drawings.

B. If directed by the Consultant, the bulkhead Supplier shall, without extra charge, make reasonable modifications in the layout, configuration or design of the bulkhead system as needed to prevent conflict with the intent of the design, surrounding work, work of other trades or for proper execution of the work. Under no circumstances shall any dimensions or member sizes be decreased or increased. No Significant changes shall be made in any part of the design, configuration, or installation, without the written consent of the Owner or Consultant.

1.9 SUBMITTALS

A. Upon notice to proceed under this Contract, installation details and submittal documents will be provided fully illustrating the materials and procedures to be utilized. These details and submittal documents, once accepted by the Owner or Consultant, shall be the basis for the fabrication, installation, and installation inspection.

B. Product Data: Submit manufacturer's technical information and product data including basic materials, analysis, and installation instructions for the bulkhead, including the following:

1. List each material finish and application, cross-reference to the shop drawing, and identify by manufacturer's name.
2. Provide certified dimensional shop drawings showing all pertinent dimensions in plan, section, and elevation.
3. Submit a schedule of manufacturer’s certified test reports showing compliance with requirements of Performance Criteria.

C. Program and Procedures: Prepare a comprehensive summary of the installation program, which involves scheduling, preparation and installation procedures, quality control, and project close-out. Submit to architect for approval.

D. Submit manufacturer’s written recommendations for scheduling of maintenance, installation, and inspection procedures. Include recommendations for corrective action in typical situations that may be encountered.

1. Submit comprehensive operation and maintenance manuals covering all aspects of operating and maintaining the bulkhead systems.

E. Maintenance Instructions and Maintenance Program: The Manufacturer shall provide complete descriptive information detailing proper care, maintenance and cleaning of the system. A five- (5) year Maintenance, Service, and Inspection Agreement shall be available for a specified sum per year. This Maintenance, Service and Inspection Agreement will include required parts, equipment, and labor for the proper maintenance and operation of the bulkheads for a period of five (5) years after acceptance by the Owner or Consultant and may be renewed for additional periods of five (5) years at the end of each five-year period.

1.10 QUALITY ASSURANCE

A. The swimming pool bulkhead shall be the product of a Manufacturer having at least ten (10) years’ experience in the fabrication of bulkheads and at least ten (10) installations of similar sized bulkheads currently in satisfactory operation. Substitute system(s) must be approved by the Project Architect/Engineer a minimum of ten (10) days prior to the bid opening and must have at least ten (10) bulkheads of similar size, fabrication, and construction in satisfactory operation for at least five (5) years to be considered. For any substitutions, a sample copy of the warranty statement, dimensional drawings of adequate detail to allow review and a structural certification by a Registered Professional Structural Engineer in the State of Indiana attesting and certifying compliance with these specifications must be provided prior to the bid opening for consideration or approval.

1. In the event an alternate manufacturer’s system is approved, all contractors will be so advised per addendum prior to bid opening to allow for inclusion of such a system or equipment in their bids. In the absence of approval for an alternate manufacturer, only the specified manufacturer’s system may be incorporated in the project.

2. All bidders must include the specified system from the originally specified manufacturer in their base bid. If an alternate manufacturer is approved, Bidders may also submit a bid alternate for the deduction to utilize the alternate manufacturer's bulkhead. In the absence of approval for an alternate manufacturer prior to the bid date, only the originally specified manufacturer's system may be incorporated in the project.

3. Unless requests for approval of other products, systems, trade names, or brand names have been received and approvals have been published by addendum at least ten (10), only such designated products or systems by the named manufacturer may be provided.

4. If alternate or substitute manufacturer's systems are offered for approval prior to bidding, the manufacturer shall submit a complete set of calculations and drawings certified by a registered Professional Engineer licensed to practice in the state where the bulkhead is to be installed, and such certification shall state that this engineer assumes full responsibility for all aspects of the bulkhead installation. The structural calculations shall demonstrate that the loading deflection and structural requirements of this specification are met. Swimming pool bulkhead systems shall be in compliance with specific code requirements of these Specifications. Requests for approval not in compliance with these requirements will not be considered.

5. The burden of proving acceptability rests with the applicant and any application for approval must be accompanied with adequate and sufficient technical data, engineering calculations, drawings, and details to clearly and convincingly establish beyond all doubt that the proposed product or system meets or exceeds all express requirements of the project documents.

6. **Listing or subsequent approval of a particular manufacturer as an approved manufacturer does not constitute acceptance of the manufacturer's standard configuration, materials, or equipment, except as they specifically meet or can be made to conform to the requirements defined in this specification. Any bid shall be assumed to include any and all costs to change, modify, or otherwise comply fully with the requirements of this specification.**

7. Claims for additional compensation to comply with these specifications after bid for any reason whatsoever will not be considered. Only materials, equipment, or systems that absolutely comply with these specifications in all regards will be accepted. Any approved substitute systems from alternate manufacturers shall be in absolute compliance with all requirements of these Specifications.

B. The bulkhead shall be guaranteed by the Manufacturer for workmanship, materials, and performance for a period of ten (10) years. This warranty shall not include or cover abusive or improper treatment to the bulkhead by others either during construction or when operational. The truss structure shall be warranted for 15 years

1.11 EXTRA MATERIALS

A. Furnish all required materials for the complete installation of the bulkhead systems.

1.12 DELIVERY, STORAGE AND HANDLING:

A. The bulkhead shall be shipped to the job site as a complete section unit designed for assembly at the project site. Site assembly of any part of the bulkhead structure without the complete coordination and supervision of the manufacturer is strictly prohibited. Unloading and storage shall be coordinated between the Contractor and bulkhead manufacturer. The materials shall not be stored or handled in any manner that could cause damage or deformity.

1.13 PROJECT SITE CONDITIONS:

A. The project site shall be in accordance with the Manufacturers' technical bulletins. Access for the installation of the bulkheads will be provided by others, but current access conditions are believed to be adequate to delivery of a sectional bulkhead structure.

1.14 COORDINATION**:**

A. The manufacturer shall provide complete descriptive information detailing the design, construction, and installation. The offer shall include all costs for coordinating visits to the project site to coordinate various aspects of design, construction, and installation. Coordination shall include the cost for all negotiations and arrangements to provide access to the site and to the building and to coordinate manufacturing, testing and commissioning programs with other Contractor(s), timing system and other suppliers. Such visits shall take place immediately upon notice to proceed to enable all contractors to be briefed, and a complete production and installation program to be established.

B. The contractor (or Owner if the bulkhead is supplied as a prime contract) shall require the manufacturer to review all adjoining work, including perimeter gutter systems, pool structure or pool related construction, to ensure that such work is compatible with and appropriate for the installation and use of the moving bulkhead. The manufacturer shall, immediately and before proceeding, advise the Consultant or Owner of any constraints, conflicts, inadequacies, or incompatibilities related to any aspect of the installation or use of the bulkhead and await instruction or clarification before proceeding. The absence of any such advice shall constitute acceptance of full and complete responsibility for all aspects of the bulkhead delivery, installation, and performance.

1.15 DIMENSIONAL TOLERANCES:

A. The vertical sides of the bulkhead must be uniform in plane without unanticipated projections or sudden changes of more than 2 mm (.079 inch). Bulkhead sides and top surfaces shall be inspected and certified to be uniform to within 3 mm (.125 inch) over a 6 meter (19.6 foot) span in any direction both in-factory, after fabrication and on-site prior to installation. No part of the bulkhead shall exceed 5 mm (3/16 inch) from the perfect vertical plane.

1. When the bulkhead is in position in the pool with lane ropes connected and tensioned, the bulkhead sides shall provide a vertical plane surface that is uniform to within the specified tolerance without unanticipated projections or sudden changes of more than 2 mm (.079 inch).
2. When the bulkhead is in position in the pool with lane ropes connected and properly tensioned, the bulkhead sides shall provide a vertical plane surface that is uniform to within ±6 mm (1/4 inch) horizontally.
3. These dimensional standards shall be achieved without the need to stabilize the bulkhead through attachment of the bulkhead to the pool walls to resist the forces.

PART 2 - PRODUCTS

2.1 Manufacturers:

A. The system specified and shown on the drawings is the product of a manufacturer with at least 10 years' experience in the construction of custom fabricated variable buoyancy bulkhead systems and with at least at least 5 bulkheads of comparable weight, size and design in satisfactory service for at least 5 years. The movable bulkhead shall be constructed to the dimensions shown in the Project Documents (subject to site conditions, course and design requirements).

B. The movable bulkhead(s) shall be constructed to the dimensions and characteristics as required by site conditions, course and design requirements. Specific requirements include, but are not limited to the following considerations:

1. NOMINAL LENGTH: (inside pool dim.)
2. WIDTH: (across bulkhead)
3. OVERALL HEIGHT
4. HEIGHT ABOVE WATER: 11.8-in.; 300.00 mm, as required by FINA
5. DEPTH BELOW WATER
6. RACING LANE TARGET MARKINGS
7. RACING LANE ANCHORS
8. STARTING PLATFORM ANCHORS
9. WATER POLO GOAL ANCHORS
10. STANCHION SOCKET ANCHORS

C. The bulkhead described in these specifications and shown on any accompanying drawings is the basis of design and is the Owner's preference. It is a proprietary product and the exclusive design of Natare Corporation. There are no known equals, equivalents, or acceptable substitutions.

D. The bulkhead shall be the Natare Moveable Bulkhead System as manufactured by Natare Corporation of Indianapolis, Indiana, and is the system that shall be included and furnished under the base bid. Alternate or substitute bulkhead systems from other approved manufacturers shall be listed as a deductive alternate to the base bid.

2.2 Materials:

A. All materials are to be compatible with the swimming pool environment. Carbon steel, aluminum, magnesium, wood, and fiberglass in any form are not acceptable. Mill Certifications and documentation of stainless steel grade, finish, and metallurgical content are to be provided for approval during the submittal phase and shall be reviewed by the Consultant prior to fabrication. All stainless steel utilized in the bulkhead shall be a 300 series stainless, intended specifically for use in a swimming pool environment.

1. Components & Equipment:
   a. Structure:
      1) The bulkhead bridge structure shall consist of dyadic vertical truss sections, constructed entirely of stainless steel, which span the width of the pool. Bulkheads utilizing a single truss structure or fiberglass construction are not acceptable. The structure shall be stable whether the pool is full or empty and shall not require additional shoring or support at any time.
      2) All stainless steel shall be low carbon (carbon-controlled to no greater than .05% carbon) AISI Type 316L stainless steel that includes molybdenum and nitrogen in the chemical composition (as verified by mill certificates to be furnished and approved as part of product submittals).
      3) All vertical and horizontal cords, main structural members and any supporting elements shall be structural stainless profiles (hot rolled or extruded, then annealed and pickled angles, channels, beams and tubing

complying with ASTM A276, ASTM A479, and ASME 479). Bent plate or sheet sections or members are unacceptable.

4) The dyadic structure shall be designed to safely sustain a uniform live load of 100 pounds per square foot (488-kg/m²) across the top face. Vertical deflection under 50 pounds per square foot (244-kg/m²) live load shall not exceed the lesser of 3/4 inch (19-mm) or the span length in inches divided by 1000. The bulkhead shall be designed to resist lateral loads from swimmers and tensioned lane lines without the use of stabilizing bars or lane lines affixed to the opposite side of the structure. **The use of camber or a bow in the horizontal plane of the truss to achieve the rigidity and deflection criteria under load is not acceptable.** The structure shall be constructed in the manner as detailed by the Engineer certifying the bulkhead to assure compliance with these requirements.

5) Each lower, opposing bulkhead end plate terminus and the adjoining trim sections shall be chamfered as required to accommodate any rectilinear or radius configuration or curvature of the pool wall-to-bottom transition.

b. Grating, Cladding and Trim Sections:

1) The top and sides of the moveable bulkhead shall be covered by a high density stabilized polymer grating that shall never require refinishing. The grating shall be machined from a solid block of material, and no fasteners, joining or other assembly methods shall be used to fabricate or assemble the grating sections. The grating shall be colorfast and easy to clean with a permanent integral slip-resistant surface having lateral grooves to ensure adequate slip-resistant and a firm turning surface of suitable for high level competition. The grating surface shall be machined to provide a series of openings no greater than .315-inch (8-mm) opening and shall have a minimum cross-sectional thickness of 1 inch (25.4 mm).

2) Grating systems utilizing applied slip-resistant grit, sand, paint, or coatings shall not be considered equal or embossed dimpling are no acceptable. The grating must be guaranteed not to crack, flake, separate, rot, swell, splinter, discolor, or delaminate, regardless of pool water chemistry. Repeated blows from a heavy hammer shall not cause the grating to crack, chip, or shatter. Grating shall be made entirely from FDA- and USDA-approved materials. Color to be permanent white or as selected by Owner or Consultant from eight standard colors. Grating samples shall be provided to the Consultant or client and approved prior to contract award.

3) Cycolac, ABS, fiberglass or molded plastic or PVC grating of any kind will not be acceptable. The required exterior cladding is Natare GPM polymer grating. **There are no known substitutes for this grating system, and no substitutions are allowed**.

4) The grating shall incorporate internal structural members adequate to sustain the forces applied during use. In order to facilitate practice turns along the entire length of the bulkhead, grating must be continuous at lane targets and along the entire length of the bulkhead sides without interruption. Vertical stainless steel sections or dividers that break or interrupt the continuous run of the grating other that at joining points are not acceptable.

5) Bulkhead grating shall be certified as a slip-resistant, non-hazardous walk surface under ASTM 1028 and shall have the capacity to sustain a uniform load of 100 pounds per square foot. It shall be attached to the movable bulkhead by means of a tamper-proof, non-corrosive anchoring system to prevent vandalism or removal without the use of special tools. The grating shall provide adequate open area to assure easy movement of the bulkhead as well as adequate circulation of the pool water. Grating openings shall conform to the requirements of the DIN standard for such openings. The bottom of the bulkhead shall be covered with a tamper-proof, perforated stainless steel sheet.

c. The bulkhead shall have a stainless steel profile at the bottom edge and a non-metallic polymer profile at the top edge as detailed on the drawings. The upper profile and handhold assembly shall be comprised of a high density stabilized polymer material that shall never require refinishing. Any brackets or components required to attach or support the polymer upper profile shall be fabricated from low carbon (carbon-controlled to no greater than .05% carbon) Type 316L stainless steel. The surfaces and intersections of polymer upper profiles shall have openings no greater than .315-inch (8-mm). Lower profiles and edges shall also be fabricated from low carbon (carbon-controlled to no greater than .05% carbon) Type 316L stainless steel. All welding is to be performed as specified herein with welds blended to match the surrounding surface. Refer to fabrication requirements in this specification.

1) Handholds:

a) A continuous handhold shall be incorporated at the water level of the pool on both sides of the bulkhead in accordance with the appropriate sections of applicable swimming pool code. Specific attention is directed to the relevant sections of the current NCAA and FINA requirements. Systems providing intermittent handholds will not be considered equal. The continuous handholds shall be recessed into the bulkhead. The back of the handhold recess shall have energy dissipating orifices designed to absorb waves and prevent access to the interior of the bulkhead. Energy dissipating orifices shall be machined directly into the material so that the handhold profile is comprised of (1) single continuous piece. For safety and performance reasons, intermittent openings or sectional handholds are unacceptable.

d. Targets:

1) The bulkhead shall have swimming lane racing targets located as required and shall conform to the applicable rules as designated by United States Swimming Inc. (USS), National Collegiate Athletic Association (NCAA) or the Federation Internationale de Natation Amateur (FINA) as designated by the Architect. The targets shall consist of a permanent black slip-resistant profile machined from the same polymer composition as the surrounding cladding that shall be incorporated into the grating surface at the specified locations. Paints or coating systems shall not be used for target markings

e. Rope Hooks and/or Racing Lane Anchors:

1) Rope hooks and racing lane anchors in the required quantities and as located on the plans shall be provided at the locations detailed on the drawings.

2) Hooks/Anchors shall be constructed of low-carbon 316 stainless steel and shall be recessed on the face of the bulkhead in a manner that presents no danger of injury to the swimmers. The racing lane anchors shall equally divide the lanes coinciding with the lane lines in the pool. Both the rope hooks and/or the racing lane anchors shall be capable of withstanding the tension supplied by the racing lane dividers. All rope hooks shall be a minimum of 1" inside diameter. Holes located in the stainless steel trim shall not be considered equal. Systems requiring tiebacks or bracing to the pool walls are not acceptable.

f. Carriage Assembly:

1) A stainless steel carriage assembly shall be attached to each end of the bulkhead. The carriage assembly will provide total support for the bulkhead, to facilitate its mobility and serve as an anchoring device. The carriage assembly shall incorporate UHMW linear polyethylene bearing pads, knurled adjustable dimensional pads and retaining bolts.

2) The carriage assembly shall be enclosed within hinged grating covers that provide access to the locking devices. The hatch cover shall provide easy access to the locking devices and carriage for operation and maintenance, and the cover shall lay flat upon the bulkhead when hinged open. The carriage assembly and locking device shall consist of a combination of easily removed daily-use anchor pins, manual push bar attachment and competition locking bolts. The competition locking bolts shall firmly anchor the bulkhead against movement from the loads imposed by swimmers during competition and the entire carriage assembly shall provide at least 2 ¾" adjustment to precisely establish the competition course.

3) Two (2) manual tow/push bars constructed from 316 L stainless steel shall be provided with the bulkhead. The bar shall lock firmly into the carriage and be suitable as a handhold for manual movement of the bulkhead. The manufacturer shall provide anchors for the day pin and competition locking bolts. Day pin anchor sockets shall be 304 stainless steel cylinders with integral foot flanges and slip-in closure plugs. Competition anchors shall be female threaded stainless steel inserts with threaded brass plugs.

4) There shall be a high-density polyethylene skid pad attached to the end plates of the bulkhead. This skid pad shall protect the sidewalls of the pool from damage when the bulkhead is being moved.

g. Buoyancy Chambers:

1) Buoyancy chambers shall be provided inside the bulkhead to lessen its effective weight when in place with water in the pool. The buoyancy chambers shall effectively eliminate no less than 75% of the gross weight of the bulkhead. The chambers shall be constructed of low-carbon 316L stainless steel. After fabrication, the buoyancy chambers shall be tested and shall be filled with low-density closed cell foam to prevent accidental flooding. **Systems utilizing PVC pipe for buoyancy are not acceptable.**

h. Barrier Railings:

1) The bulkhead shall be provided with removable stainless steel barrier railings at each end of the bulkhead.

2) **Optional**: The bulkhead shall be provided with removable stainless steel barrier railings along one side of the entire length of the bulkhead as designated on the drawings.

3) Barrier railings shall be fabricated from 1.9-in. (48.26-mm) x .109-in (2.77-mm) wall stainless tubing with a 600-grit polish finish

i. Starting Platforms:

1) Starting platforms and starting platform anchors shall be provided in the quantity, style, and location as shown on the drawings and/or specified herein. The starting platform anchors and support pads shall be a composite consisting of rectangular slip-resistant stainless steel horizontal anchoring plates recessed into the bulkhead surface with appropriately sized anchor sockets and tamper resistant drop-in cover plates for use when the platforms are removed. Each anchoring plate shall incorporate openings for timing system junction boxes or other necessary openings.

j. Accessories:

1) Equipment Anchors:

a) The walkway of the bulkhead shall be equipped with anchors, connections, and closure caps for water polo goals, stanchion posts, and railings as shown on the drawings and/or specified herein to accommodate the chosen equipment to be utilized. Escutcheons and closure caps shall be provided for all penetrations.

2) Provide all required markings and anchors in the walkway and on the vertical face of the bulkhead to accommodate the water polo course(s) as shown on the drawings.

k. Variable Buoyancy System:

1) Permanent variable buoyancy chambers shall have the capability to eliminate undesired, excessive force on the pool edge by displacing the bulkhead's weight during movement.

2) This system shall provide the capability of varying the buoyancy ratio from 75% to 110% of the dead load through the use of an air compressor, quick disconnect, shut-off valve and related equipment. Valves and connections shall be provided below the access hatch in the carriage/wheel compartment.

I. Timing System Trough and Timing Accessories:

1) The bulkhead shall incorporate an accessible stainless steel channel installed beneath the grating, for the placement of wiring for a timing system. The trough, which runs the length of the bulkhead, shall be available through an easily removable access panel located between the starting blocks and shall connect to access ports incorporated in the top plate of the starting platform anchor system. The access panel shall consist of grating sections with the bars parallel to other grating on the top of the bulkhead structure.

2) The bulkhead manufacturer shall provide appropriate junction boxes that shall be installed in the bulkhead during timing system installation, which shall connect to the access ports in the starting platform anchors. All wiring, conduit, accessories, and accommodations for the timing system shall be installed by the timing system manufacturer during the installation of the timing system.

3) **Optional:** All wiring, conduit, accessories and accommodations for the timing system shall be factory-installed by the bulkhead manufacturer during the fabrication of the bulkhead, which shall include, but not be limited to the required bulkhead interface module(s), individual lane deck plates at each starting platform location, lane date/speaker deck plate, and interconnecting cable.

2.3 Fabrication:

A. The movable bulkhead shall be completely shop-fabricated in one section, then disassembled to provide individual sections suitable for easy permanent joining at the project site.. Field fabrication is not acceptable.

B. The bulkhead shall be fabricated in strict accordance with the Manufacturers' procedures in conformance with the criteria of the American Welding Society. All welding shall be performed in accordance with the procedures established by the American Welding Society, and those of the Manufacturer. All spatter, burns, and discoloration must be removed. Welds shall be cleaned and made non-corrosive.

1. All welding shall be completed by skilled and experienced welders in strict accordance with the requirements of **AWS D1.6 Structural Stainless Steel Welding Code** utilizing pre-qualified WELDING PROCEDURE SPECIFICATIONS (WPS's). Welders shall be certified in all positions.
2. All evidence of heat-tint, oxide, or welding process by-products shall be removed, and the weld shall be uniform, clean and smooth, free of crevices, pitting or inclusions. Structural welds shall be thoroughly cleaned using glass bead blasting prior to shipment. Stainless steel wire brushing shall be used only for preliminary cleaning.
3. All exposed welds that would be visible after fabrication shall be ground smooth and finished to match the surrounding surface. Visible signs of welding or any trace of welding shall be removed, and the surface blended through polishing to match the original finish.
4. The entire bulkhead structure and stainless steel trim profiles shall be chemically cleaned and passivated after fabrication.
5. The manufacturer shall provide welding samples consisting of welding coupons or weldments illustrating each type of weld to be used in the fabrication of the bulkhead. All welds shall be cleaned and finished to the standard as established herein. Once accepted by the Architect, the sample shall be the standard by which all similar welds in the bulkhead shall be judged.
6. The grain finish on the stainless steel handholds shall be parallel with the water's surface

2.4 Source Quality Control:

A. The entire system shall be inspected prior to shipment to verify compliance with the fabrication drawings and quality of workmanship requirements of this specification.

1. Prior to shipment, the Manufacturer shall provide to the Owner or Consultant certification of x-ray testing of selected structural welds (optional). The acceptance criteria for the welds shall be in compliance with American Welding Society standards and the Manufacturers' quality control procedure.

PART 3 - EXECUTION

A. Preparation:

1. At the time of installation, the swimming pool shall be completed and filled with water.

B. Examination:

1. The supervising representative or installer shall verify that the site conditions are in accordance with the Manufacturers' requirements, shop drawings, and/or technical bulletins.

C. Erection, Installation & Application:

1. All installation shall be performed in accordance with Manufacturer's technical bulletins and the requirements of this specification. Should the requirements of these bulletins contradict this or any other section of the Specifications, the procedures called for in the specifications shall govern. The work under this section shall be performed by the bulkhead manufacturer so that the complete system will operate in accordance with the intent of the Specifications.
2. Upon completion of manufacturing, the bulkhead(s) shall be transported to the project site substantially complete in appropriately sized sections to facilitate deliver to poolside. An adequate and easily accessible staging area is to be provided immediately

adjacent to the pool that shall be of suitable size to allow final assembly of the bulkhead without extreme measures. The bulkhead sections shall be hoisted through the portal and maneuvered in to the pool area to the appropriate poolside position using rubber tired fork trucks and/or air flotation dollies.

3. The bulkhead(s) shall then be assembled, lifted, rigged, and placed into the pool. The bulkhead shall be installed with water in the pool.
4. The bulkhead shall be anchored to the wall system, perimeter gutter, or floor in the manner shown on the drawings. Anchor locations shall be verified at the time of installation to provide a regulation racing course.

D. Field Quality Control:

1. Upon completion of installation, the bulkhead shall be moved to each anchor position to verify correct location and distances.

E. Demonstration:

1. The bulkhead manufacturer shall provide a full set of submittal and installation drawings that show all the features of the system construction and indicating proper sizing and locations along with complete dimensional details and operating manuals.
2. The bulkhead manufacturer or his representative shall supply the services of a competent and experienced field engineer to inspect the completed installation, make final adjustments, place the system in operation, and give operating instructions relative to its care and use.

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