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PROCUREMENT SPECIFICATION
MODEL DSC720 1M HYDRAULIC BOLLARD BARRICADE SYSTEM

SYNOPSIS

- Over 20,000 Delta bollards have been installed in the past 24 years with hydraulic systems operating in areas as cold as Alaska and as hot as El Paso, Texas, the Middle East and all continents.

- Hydraulic powered bollards have the highest lifting capacity and performance of all of the power versions Delta Scientific manufacturers. They are the most widely used and most reliable. Fork lifts and brake systems are common examples of long established and powerful applications of hydraulic power.

- Delta Scientific offers a wide range of access control logic options, and controls such as Delta's state of the art touch screen panels with ether net, fiber optics and data logging to traditional up-down push buttons or key switches found in master and slave panels in NEMA4 or NEMA1 rack mounted panels.

This specification defines a CRASH TESTED - CRASH CERTIFIED - HIGH SECURITY – BOLLARD BARRICADE SYSTEM – DELTA Model DSC720 1M Hydraulic.

- The basic system can consists of one or more vertical lift BOLLARDS together with a HYDRAULIC POWER UNIT, OPERATING CONTROLS, POWER CIRCUITS, OPERATING LOGIC, SAFETY AND ENVIRONMENTAL OPTIONS.

- The BOLLARD(S) may be specified with Standard or Custom Cast Outer Shells to match existing ARCHITECTURAL TREATMENTS or STYLES.

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- SAFETY AND ENVIRONMENTAL OPTIONS include signal lights, gate arm barriers; safety loops; IR beams, heaters and sump pumps.

- TOUCH SCREEN CONTROL PANELS or PUSH BUTTON CONTROL PANELS. Remotes and Masters.

1.0 PATENT LICENSE.

The CRASH CERTIFIED HYDRAULIC BOLLARD SYSTEM shall be fully licensed for manufacture under U.S. Patent Numbers: 4,576,508 and 4,715,742

2.0 SYSTEM CONFIGURATION

2.1 BOLLARD(S) STANDARD CONFIGURATION

2.1 BOLLARD ARRANGEMENT. The system shall have a total of ____ Bollards arrayed in accordance with either 2.1.1 or 2.1.2. (specify the total number of Bollards in the system whether operated independently or in combination).

Select either 2.1.1 or 2.1.2 to define the operating pattern of the Bollards within the system.

2.1.1 Single Bollards Individual Operated. Each individual Bollard shall be operated independently from any other Bollard within the system. Each Bollard shall have its own controls.

2.1.2 Multi Bollards Operating in Sets. Bollard system shall have ____ sets (specify the number of sets). Each set shall consist of ___ Bollards (specify the number of Bollards per set). Each set of Bollards shall have its own controls and operate independently from each other set within the system.

2.1.3 Construction. Bollard shall be a below grade assembly containing a heavy steel cylindrical weldment capable of being raised to an above grade position. The guard position shall present a formidable obstacle to approaching vehicles. Upon impact, forces shall be first absorbed by the weldment and then transmitted to the foundation of the unit.

2.1.4 Bollard Height. Height of the Bollard shall be 39.3 inches (1000 mm) as measured from the top of the foundation frame to the top of the Bollard assembly.

2.1.5 Bollard Dimensions. Bollard shall be 12.75 inch [324 mm] in diameter (w/o casting) (w/casting 15.25 inch [387 mm] diameter).

2.1.6 Finish. The entire Bollard assembly shall be coated with industrial enamel for corrosion protection. The visible portion of the Bollard shall be white and have yellow/black diagonal stripes (or alternately specified colors).

2.2 BOLLARDS(S) WITH ARCHITECTURAL ENHANCEMENTS

2.2.1 BOLLARD ARRANGEMENT. The system shall have a total of ____ Bollards arrayed in accordance with either 2.2.1 or 2.2.2. (specify the total number of Bollards in the system whether operated independently or in combination).

Select either 2.2.1 or 2.2.2 to define the operating pattern of the Bollards within the system.

2.2.2 Single Bollards Individual Operated. Each individual Bollard shall be operated independently from any other Bollard within the system. Each Bollard shall have its own controls.

2.2.3 Multi Bollards Operating in Sets. Bollard system shall have ____ sets (specify the number of sets). Each set shall consist of ___ Bollards (specify the number of Bollards per set). Each set of Bollards shall have its own controls and operate independently from each other set within the system.

2.2.4 Construction. Bollard shall be a below grade assembly containing a heavy steel cylindrical weldment capable of being raised to an above grade position. The guard position shall present a formidable obstacle to approaching vehicles. Upon impact, forces shall be first absorbed by the weldment and then transmitted to the foundation of the unit.

Architectural Enhanced Outer Shells shall be cast from a free machining aluminum alloy and be free of cracks, uneven surface texture, excessive parting line offset or particle inclusions. Optionally they shall be supplied in fiberglass.

2.2.5 Bollard Diameter, with Architectural Enhancement in place shall not be greater than 15.25 inches (387 mm) in diameter. (Refer to Delta drawing 9163 for design envelope for enhancement).

2.2.7 Bollard Height: shall be 39.3 inches (1000 mm) as measured from the top of the foundation frame to the top of the Bollard assembly.

2.2.8 Finish.

2.2.8.1 Steel Structure. The entire Bollard assembly shall be coated with industrial enamel for corrosion protection. The roadway plates shall have a non-skid surface.

2.2.8.2 Architectural Enhancement. Standard Aluminum Cast Outer Shells shall be oven cured powder coated, color specified from Delta furnished color charts. Brushed Stainless Steel Sleeves may be specified.

2.2.8.3 Custom Architectural Enhancement Outer Shells shall be finished in accordance with customer instructions.

2.3 HYDRAULIC POWER UNIT (HPU)

2.3.1 Hydraulic Circuit. Circuit shall incorporate the design concepts as described by U. S. Patent # 4,490,068 – Re. 33,201. Unit shall consist of an electrically driven hydraulic pump which shall pressurize a high pressure manifold connected to a hydraulic type accumulator. Electrically actuated valves shall be installed on the manifold to allow oil to be driven to the up and/or down side of a double acting hydraulic cylinder to raise and lower the Bollard. The hydraulic circuit shall include all necessary control logic, interconnect lines and valves to override and lock out the normal speed control valve(s) for emergency fast operation of the Bollard(s).

2.3.2 Main Power. The electric motor driving the hydraulic pump shall be fed from (specify actual site voltage, phase and frequency, i.e. 230/3/60). Motor shall be sufficiently sized for the expected number of barricade operations.

2.3.3 Power Off Operation. The accumulator shall be sized to allow three full cycle operations of a single Bollard in the event of a power outage. Enhanced power off capability can be selected as an option. The bi-directional control valves shall be manually operable in the event of a power outage.

2.3.4 Manual Operation. A hand pump shall be furnished to allow the Bollards to be raised manually in the event of a prolonged power interruption.

2.3.5 Construction. The hydraulic power unit and accessories shall be mounted and wired on an integral steel skid. The HPU shall fit in an envelope 60 inches W x 36 inches D x 60 inches H (1524 mm W x 914 mm D x 1524 mm H). The HPU shall be mounted indoors or in an optional weather resistant enclosure.

2.3.6 Standard Control and Logic Circuits

The following circuits and control stations shall be furnished:

2.3.7 A control circuit shall be provided to interface between all Bollard control stations and the PPS. This circuit shall contain logic components, relays, timers and other devices necessary for the Bollard operation.

2.3.8 Voltage. The control circuit shall operate from a 120/240 volt, 50/60 Hz supply (optionally 24 VDC). An internally mounted transformer shall reduce this to 24 VDC for all external control stations.

2.3.9 Power Consumption. The control circuit power consumption shall not exceed 250 watts basic load, plus 200 watts for each Bollard in the system.

2.3.10 Construction. The control circuit shall be mounted in a general purpose enclosure. All device interconnect lines shall be run to terminal strips.

2.4 Touch Screen Control Panels

Touch Screen Panels. As an option Touch Panel controls can be provided. Touch Screens are available in standard sizes from 8 to 15 inches in a rack mount or table top console.

2.4.1 Configurations. The master and slave Touch Screens have all the standard functionality of the Remote Control panels in sections 2.5 and these additional features:

2.4.2 Data Logging – Records and maintains a time stamped record of all command signals issued from the Touch Panel and any Auxiliary Controls. This record log can be easily exported into a spreadsheet on computers.

2.4.3 Layering – Locations with multiple barriers can be presented in a Layered fashion allowing control from one convenient panel opposed to multiple panels or one large pushbutton panel.

2.4.4 Customizable – Each location allows the end user to change the name of the location and barrier to correspond with the site's naming.

2.4.5 Cycle Count and Alarms – The Touch Screens monitor the number of cycles a barrier completes and will alert the operator when maintenance is due (based on cycles or days depending on site).

2.4.6 Passwords – The Touch Screens offer passwords that can be set up at different operating levels allowing access to differing functional configurations per user.

2.4.7 Video – Video Touch Screen models are available for control. Having a live feed of the barriers allows the operator to safely monitor and control the area from a distant remote location.

2.4.8 Ethernet and Fiber Optic communications available

2.4.9 Display screens with location names, maps, moving barricade graphics all available.

2.5 Remote Control Panels, Push Button. Specify Remote Control Master and the number of slave control panels or EFO push buttons required.

2.5.1 Remote Control Master Panel. A remote control master panel shall be supplied to control Bollard function. This panel shall have a key lockable main switch with "main power on" and "panel on" lights. Buttons to raise and lower each Bollard (or set) shall be provided. Bollard "up" and "down" indicator lights shall be included for each Bollard (or set). The emergency fast operate circuit (EFO) feature shall be operated from a covered toggle switch (optionally a push button larger than the normal controls). The EFO shall be furnished with EFO active light and reset button. The remote control master panel shall have a key lockable switch to arm or disarm the remote slave panel(s). An indicator light shall show if the slave panel is armed.

2.5.2 Remote Control Slave Panel. A remote control slave panel shall also be supplied to control the Bollard operation. This panel shall have a "panel on" light that is lit when enabled by a switch on the remote control master panel. Buttons to raise or lower each Bollard (or set) shall be provided. Bollard "up" and "down" indicator lights shall be included for each Bollard (or set). The emergency fast operate (EFO) feature shall be operated from a push button larger than the normal controls (optionally a covered toggle switch). When the slave panel EFO is pushed, an EFO "active" lamp will light and operation of the Bollard(s) will not be possible until reset at the master panel.

2.5.3 Voltage. The remote control panel(s) shall operate on 24 VDC.

2.5.4 Construction. The remote control panel(s) shall be a standard 19 inch electronics rack type surface mount panel with all devices wired to a terminal strip on the back.

2.5.5 (Option) Panel(s) shall be equipped with a timer circuit to notify the operator via an annunciator "squealer" that the Bollard has been left in the down position for too long a time period. The time interval shall be customer selectable.

3.0 **ACCESSORY EQUIPMENT** Any or all of the following may be selected:

3.1 Auxiliary Emergency Fast Operate Circuit. A separate hydraulic circuit consisting of a pressure reserve source, operating control logic and interconnect lines and valves shall be supplied. This circuit shall provide an available source of power to operate the Bollard(s) at emergency fast speed (as specified in 4.4.2), even after power off or manual operation or high frequency operation has depleted the normal reserve capacity. This system will operate in conjunction with and from normal EFO controls.

3.2 Electro-Mechanical Signal Gate. A electrically operated wood arm signal gate shall be supplied to alert vehicle drivers of the Bollard position. The gate operate shall interface with the Bollard at the control circuit. The control circuit shall close the gate at the Bollard "up" command and remain closed until the Bollard is fully lowered. The wood arm shall be ___ foot (6, 8, 10 or 12 foot can be specified) long and be striped with reflective yellow/black tape. The gate assembly shall be mountable directly to the roadway surface.

3.3 Stop/Go Traffic Lights. Red/Green 8 inch traffic lights shall be supplied to alert vehicle drivers of the Bollard position. The green light shall indicate that the Bollard is fully down. All other positions shall cause the light to show red. Brackets shall be supplied to allow light(s) to be located on a (3.5 inch OD post) (wall) (3.5 inch OD post - back to back). The light operating voltage shall be 120 volts (alternately 240 volts), power consumption 40 watts per light.

3.4 Sump Pump. A self priming sump pump shall be supplied to drain water collected in the Bollard foundation. The pump shall have the capacity to remove ____ inches per minute of rainfall a distance of _____ feet to customer supplied discharge drain. Pump operating voltage shall be 120/1/50-60 (alternately 240/1/50-60).

3.5 Safety Interlock Detector. A Bollard vehicle detector safety loop shall be supplied to prevent the Bollard from being accidentally raised under an authorized vehicle. The detector shall utilize digital logic have fully automatic tuning for stable and accurate long term reliability. The output of the detector shall delay any Bollard rise signal (except for EFO command) when a vehicle is over the loop.

3.6 Enhanced Power Off Capability. The hydraulic accumulator shall be sized to provide ____ full cycle operations of a single Bollard (or sets of Bollards).

3.7 Weather Resistant HPU Enclosure. A lockable weather resistant enclosure shall be provided for the HPU. The design shall provide for easy access to the HPU for maintenance and emergency operation of the hydraulic system. Enclosure shall be provided with a corrosion resistant coating and shall be 60 inches W x 36 inches D x 60 inches H (1524 mm W x 914 mm D x 1524 mm H).

4.0 PERFORMANCE

4.1 EXPERIENCE. Bollard and auxiliary equipment shall be of proven design. Manufacturer shall have over 20,00 Bollard type vehicle barriers in field operation for a minimum of ten years with documented field experience for all major components and design features.

4.2 QUALIFICATION TESTS. Bollard design shall have successfully passed actual full scale crash tests conducted by a qualified independent agency.

4.2.1 Performance Evaluation. The Bollard shall have passed the ASTM Standard F 2656-07 P1 zero penetration for M50.

4.2.2 United Kingdom Crash Test The DSC720 has been tested to the United Kingdom BSI Standard PAS:68 2007 Crash Test. 7.5 Tonne EU truck at 80 kph. Three tests were conducted: three bollard array, Two bollard array. Stop and destroy vehicle with penetration. Second attack readiness demonstrated. Passed Test.

4.3 STOPPING CAPACITY.

4.3.1 Normal Operation. Bollard(s) shall provide excellent security and positive control of normal traffic in both directions by providing an almost insurmountable obstacle to non-armored or non-tracked vehicles.

4.3.1.1 The Bollard system shall be designed to stop a vehicle attacking from either direction.

4.3.2 High Energy Attack. Bollard(s) shall have been shown by certified dynamic non-linear analysis to be capable of stopping and immobilizing non-armored or non-tracked vehicles with weight and velocity characteristics as defined in paragraph 4.3.2.1. The Bollard system shall be designed to destroy the front suspension system, steering linkage, engine crankcase and portions of the drive train.

4.3.2.1 The Bollard shall be capable of stopping and destroying a vehicle(s) weighing:

15,000 pounds at 81 mph (3.280E6 LB-FT)
30,000 pounds at 68 mph (4.623E6 LB-FT)

4.4 SPEED OF OPERATION.

4.4.1 Normal Operation. Each Bollard (or set) shall be capable of being raised or lowered in 3 to 15 seconds (customer adjustable) when operated at a repetition rate not greater than specified in paragraph 4.5. Bollard direction shall be instantly reversible at any point in its cycle from the control stations.

4.4.2 Emergency Fast Operation. Bollard shall rise to the guard position from fully down in 2.0 seconds maximum when the emergency fast operate button is pushed provided the system has not previously been exhausted by power off or manual operation or high speed cycle rates exceeding that specified in paragraph 4.5. Bollard shall remain in the up and locked position (normal up/down buttons inoperable) until the EFO condition is reset. (See 3.1 for auxiliary emergency fast operate system option.)

4.5 FREQUENCY OF OPERATION. Bollard shall be capable of ____ (specify up to 200 cycles per hour) complete up/down cycles per hour.

5.0 ENVIRONMENTAL DATA (Please supply the following):
Bollard shall operate satisfactorily under the following environmental conditions:

5.1 Extremes in temperature
Yearly maximum drybulb temp _____f/c
Yearly minimum drybulb temp _____f/c

5.2 Rainfall
Yearly average _____inches
Maximum expected hourly rate_____inches/hour

5.3 Snowfall
Maximum expected hourly rate_____ inches/hour
Roadway will be (mechanically/manually/chemically) cleared _____.

6.0 QUALITY ASSURANCE PROVISIONS

6.1 Testing. Upon completion, the Bollard system will be fully tested in the manufacturer's shop. In addition to complete cycle testing to verify function and operating speeds, the following checks shall be made:

6.1.1 Identification. A nameplate with manufacturer's name, model number, serial number and year built shall be located within the maintenance access area.

6.1.2 Workmanship. The Bollard and subsystems shall have a neat and workmanlike appearance.

6.1.3 Dimensions. Principal dimensions shall be checked against drawings and ordering information.

6.1.4 Finish. Coatings shall be checked against ordering information and shall be workmanlike in appearance.

7.0 PREPARATION FOR SHIPMENT

7.1 The Bollard system shall be crated or mounted on skids as necessary to prevent damage from handling. The shipping container(s) shall be of sufficient structural integrity to enable the assembly to be lifted and transported by overhead crane or forklift without failure.

8.0 MANUFACTURER'S DATA

8.1 Drawings and installation data. The Bollard system drawings and installation, maintenance and operating manuals shall be sent to purchaser within 4 weeks of order. ___ additional copies shall be supplied (1 copy supplied at no cost).

9.0 DISCLAIMER

Please note - careful consideration must be devoted to the selection, placement and design of a Bollard installation. Just as in the case of any Barricade system, perimeter security device or security gate that blocks a roadway or drive, care must be taken to ensure that approaching vehicles as well as pedestrians are fully aware of the Bollards and their operation. Proper illumination, clearly worded warning signs, auxiliary devices such as semaphore gates, stop-go signal lights, audible warning devices, speed bumps, flashing lights, beacons, etc. should be considered. Delta has information available on many such auxiliary safety equipment not specifically listed herein. It is strongly recommended that an architect and or a traffic and or safety engineer be consulted prior to installation of a Bollard system. Delta will offer all possible assistance in designing the operating equipment, controls and the overall system but we are not qualified nor do we purport to offer either traffic or safety engineering information.

10.0 PROCUREMENT SOURCE

The **Model DSC720 1M** Hydraulic Bollard Barricade System shall be purchased from:

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