

## PROCUREMENT SPECIFICATION

### MODEL DSC720PE 1MPNEUMATIC BOLLARD SYSTEM

#### SYNOPSIS

- Pneumatic bollards are economical and effective as counter-terrorist control systems that are used at federal buildings, corporate headquarters, universities, military bases, facilities and complexes, from airports to seaports, wherever the need is to protect people and property from vehicle attack.
- Delta Scientific's All Weather Electro-Pneumatic Systems are aesthetic, durable, flood-resistant and green, featuring low power consumption and able to run at 300 cycles per hour.
- Over 20,000 Delta bollards have been installed in the past 24 years with pneumatic systems operating in areas as cold as Alaska and as hot as El Paso, Texas.
- Electro-Pneumatic systems offer significant cost savings over electro-mechanical systems, due to their simplicity, reliability and the ability to operate multiple bollards from a common power source. Delta systems have built-in power off capacity and will operate submerged when necessary.
- 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.

#### SYSTEM

- A system consists of one or more vertical lift BOLLARDS powered by a PNEUMATIC POWER UNIT (PPS). A PPS consists of the pneumatic power unit, control logic and control panel(s) a separate box containing, pneumatic logic switches, flow controls and compressed air treatment system and interconnect hose(s).
- The BOLLARD(S) may be specified with Standard or Custom Cast Outer Shells to match existing ARCHITECTURAL TREATMENTS or STYLES.
- 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.

- ACCESS CONTROL LOGIC, including traffic options for single and multiple lane access control, "Sally Port", single lane bi-directional, presence detection, synchronized bollards activation with swing or slide gate Direct activation from Card reader, key switch interface or remote identification systems.

## MODEL DSC720PE 1M PNEUMATIC BOLLARD SYSTEM

### 1.0 PATENT LICENSES.

The CRASH CERTIFIED Pneumatic BOLLARD SYSTEM shall be fully licensed for manufacture under various U.S. and Foreign Patents.

### CONFIGURATION

#### 2.0 BOLLARD(S)

**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). A typical arrangement is three bollards per lane operated together as a set. Multiple lanes can be controlled from common PPS's.

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 Individually Operated. Bollard system shall have a total of \_\_\_\_bollards. 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 maximum).
- 2.1.6 Finish. The entire Bollard assembly shall be coated with industrial enamel for corrosion protection. The roadway plates shall have a non-skid surface. The visible portion of the Bollard shall be white and have yellow/black diagonal stripes (or alternately specified colors).

## **2.2 Pneumatic Power System (PPS)**

The PPS shall include the compressor and air conditioning and treated air, command and control station(s), control logic, interconnecting pneumatic elements, valves, electric and pneumatic logic switches, compressed air treatment stations.

Main Power. The electric motor driving the compressor shall be fed from \_\_\_\_\_ (specify actual site voltage, phase and frequency, i.e. 230/3/60 as an example). Motor shall be sufficiently sized for the expected number of bollard operations.

- 2.2.1 Power Off Operation. The tank reservoir shall be sized to allow \_\_\_\_\_ operations of the Bollards as defined in 2.1.1 or 2.1.2 in a power off situation.
- 2.2.2 The bi-directional control valves shall be manually operable in the event of a power outage.
- 2.2.3 Hourly Through Put Rate, The compressor and accessories shall be sized to maintain a through put rate of \_\_\_\_\_ per hour of the Bollards as defined in 2.1.1 or 2.1.2.
- 2.2.4 Peak Operating Rate, The compressor and accessories shall be sized to maintain a through put rate of \_\_\_\_\_ per hour of the Bollards as defined in 2.1.1 or 2.1.2 for a period of \_\_\_\_\_ minutes.
- 2.2.5 Construction. The pneumatic power system compressor and accessories shall be mounted and wired on an integral steel skid. The (PPS) fit in an envelope 80 inches W x 36 inches D x 56 inches H (2,032 mm W x 914 mm D x 1,422 mm H). The PPS shall be mounted indoors or in an optional weather resistant enclosure.

### **2.3 Standard Control and Logic Circuits**

The following circuits and control stations shall be furnished:

- 2.3.1 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.
- 2.3.2 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.
- 2.3.3 Power Consumption. The control circuit power consumption shall not exceed 250 watts basic load, plus 200 watts for each Bollard in the system.
- 2.3.4 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 **Electro-Mechanical Signal Gate.** An 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 yellow/black tape. The gate assembly shall be mountable directly to the roadway surface.
- 3.2 **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 maximum.
- 3.3 **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).
- 3.4 **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.
- 3.5 **Weather Resistant PPS Enclosure.** A lockable weather resistant enclosure shall be provided for the PPS. The design shall provide for easy access to the PPS for maintenance and emergency operation of the system. Enclosure shall be provided with a corrosion resistant coating and shall be 80 inches W x 36 inches D x 56 inches H (2,032 mm W x 914 mm D x 1,422 mm H).

## 4.0 PERFORMANCE

- 4.1.1 **Experience.** Bollard and auxiliary equipment shall be of proven design. Manufacturer shall have over 20,000 Bollard type vehicle barriers in field operation for a minimum of ten years with documented field experience for all major components and design features.
- 4.1.2 **Qualification Tests.** Bollard design shall have successfully passed actual full scale crash tests conducted by a qualified independent agency.
- 4.1.3 **Performance Evaluation.** The Bollard shall have passed the ASTM Standard F 2656-07 P1 zero penetration for M50.

### 4.2 Stopping Capacity

- 4.2.1 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.
- 4.2.2 The Bollard system shall be designed to stop a vehicle attacking from either direction.
- 4.2.3 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.
- 4.2.3.1 A three Bollard Array 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)

- 4.2.3.2 A single Bollard shall be shall be capable of stopping and destroying a vehicle(s) weighing:
- 15,000 pounds at 53 mph (1.380E6 LB-FT)

## 4.3 SPEED OF OPERATION

- 4.3.1 Normal Operation. Each Bollard (or set) shall be capable of being raised or lowered in 4 to 10 seconds (customer adjustable). Bollard direction shall be instantly reversible at any point in its cycle from the control stations.

4.3.2 **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. Bollard shall remain in the up and locked position (normal up/down buttons inoperable) until the EFO condition is reset.

**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:

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

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

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

6.5 **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 DSC720PE 1M** Pneumatic Bollard System shall be purchased from:

**DELTA SCIENTIFIC CORPORATION**  
40355 Delta Lane  
Palmdale, California, 93551, USA  
Phone (661)575-1100  
FAX (661)575-1109  
email [info@deltascientific.com](mailto:info@deltascientific.com)  
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