



1. GENERAL DESCRIPTION

This specification defines supply of Hydraulic Retractable Bollard with Self-Storage, Hydraulic Power Unit, Control Circuit, Features and Options intended for use at entrance and exit points pedestrianisation projects.

2. SYSTEM CONFIGURATION

2.1. Rising Bollard

- 2.1.1. Rising bollard is composed of an external housing that contacts the earth, a fixed body and mobile upper body wherein steel components are used. Unauthorised access is denied to approaching vehicles when the road is closed. The rising bollard should be capable of standing to the initial energy in case of an impact, and subsequently transmitting it to the units and to the base therefrom.
- 2.1.2. Mobile body of the rising bollards should be ST37 quality steel pipe, and the wall thickness should be minimum 7 mm (+1 mm).
- 2.1.3. Rising bollard height from its upper point of mobile body to the road surface should be minimum 600 mm (+5 mm).
- 2.1.4. The rising part of the bollard should in a cylindrical form and of 273 mm (+1 mm) diameter.
- 2.1.5. To resist corrosion, the surfaces of the rising bollard below the ground shall be coated with hot-dip galvanizing coated. The parts that remain above the ground and are in contact with the vehicles' tires should be cathodisation-coated. Exposed part of the mobile body shall be painted with RAL7016 hard-coal electrostatic powder paint, and supported with yellow reflector tapes to attract drivers' attention. Optionally, the external surface may be clad with 316 quality stainless steel (TBS at the time of the proposal).
- 2.1.6. Upper covers of the rising bollard and rectangular beds will be exposed to acid residuals from tires and road salting in winter, so they should not be made of plastic or iron steel materials due to rust, corrosion and impacts. Instead, they should be made of aluminium metal 150 with load resistance in high injection, and be cathodisation-coated.
- 2.1.7. The rectangle is not to contact the concrete bed. There will be a sheet metal external bed of S235JR quality, where the rectangular bed will be seated, resisting any incoming impacts, it will be seated in concrete and prevent the rectangular bed from contacting the concrete.
- 2.1.8. The rising bollard that faces the road should be rectangle so that it has a nice and aesthetic appearance when stones are laid. No round or other geometrical forms are to be used.
- 2.1.9. The retracting speed of the product should range between 4 and 8 seconds.

- 2.1.10. It should allow access to heavy duty trucks of medium to small size of 30 tons that are compatible with technical parameters.
- 2.1.11. Rising bollards that operate in combination over 1 pcs should be capable of operating as a whole in synchronization.
- 2.1.12. Delay difference at the operating range of 600 mm stroke bollards should be no more than +/-10%.
- 2.1.13. Mobile part of the rising bollard shall be equipped with solar-powered LED warning lights. These lights will be embedded in the rising bollard cap, and designed in a way that, by no means, jams in the tires.
- 2.1.14. Rising bollard will be equipped with a magnetic switch system of IP69 standards. When the bollard rises up and the switch is exposed, the system will stop. The same switch mechanism will operate when the bollard lowers down as well.

2.2. HYDRAULIC POWER UNIT (HPU)

- 2.2.1. Hydraulic unit is composed of a high-pressure pump driven by an electric engine that triggers pistons.
- 2.2.2. Hydraulic power unit should be a Turkish brand.
- 2.2.3. Hydraulic power unit that moves the rising bollard should be fed by 220-240 V 50-60Hz in compliance with the mains.
- 2.2.4. Hydraulic power unit engine should be minimum 0,25 KW.
- 2.2.5. In case of prolonged power cuts, there should be a separate manual hand-held switch to move the product downwards.
- 2.2.6. Hydraulic power unit is in IP67 standards and it should not be adversely affected by water and dust.
- 2.2.7. Bollard barrier system should be capable of operating between -30 and +80 degrees.
- 2.2.8. Hydraulic power unit should be fixed on the rising bollard body. There will be no hydraulic unit outside of it, and it will be integrated with the rising bollard.

2.3. Control Unit and Logic Circuit

- 2.3.1. Control circuit should be equipped with a structure together with any other necessary equipment needed for controlling hydraulic power unit and all necessary accessories; and it should ensure smooth operation of the system.
- 2.3.2. Control card should have a high-performance RISC processor, which should be supported by NanoWatt XLP, and capable of controlling extremely low power.
- 2.3.3. A 32 V Ampere 24 V AC transformer integrated with the control card should be on it.
- 2.3.4. A loop detector socket integrated with the control card should be on it. The loop detector should go in directly to the socket without requiring a cable connection.
- 2.3.5. Control circuit should operate at 220-240V 50-60Hz. should be an internal supply outlet of 12V +- / 24V +- DC for accessories and equipment. Both of these outlets should allow individual connections simultaneously.
- 2.3.6. It should enable setting automatic closing time, setting blocker synchronization closing time, and setting raising bollard synchronization closing time.

- 2.3.7. Voltage inlet terminal of the control board will be a rocker button of PCB type, and should be supporting CAGE CLAMP connection technology. The terminal should be accredited by CCA EN 60947-7-4 and ENEC 15 EN 60998 electrical safety certificates.
 - 2.3.8. There should be 4 engine outlet terminals on the control board.
 - 2.3.9. There should be 8 ascending and 8 descending switch connection terminals on the control board.
 - 2.3.10. Control circuit should not exceed 100W power consumption under normal operating conditions.
 - 2.3.11. An insert socket receiver should be connectable to the control board.
 - 2.3.12. Control circuit should be seated on a board where all connections are settings will be made.
 - 2.3.13. A fire exit protocol connection terminal should be present on the control board.
 - 2.3.14. Control card will be a PCB print. The control card should have a relay and adjustable switch guard circuit, an optional 24VDC or 220VAC outlet to guide the traffic signalization light, status info output, EFO inlet, and fire function inlet. Optionally, an LCD display should be connectable to the card. The card should enable setting the turning on and off time, automatic closing time, and synchronised operation time. The card should have deep switches to select different operation modes. Deep switch modes should have automatic turn-off enabled -disabled mode, single turn on mode, turn on-stop-turn off mode/turn on-turn-off-control mode, LED operating mode.
 - 2.3.15. Rising bollard control board should be similar to that of a PLC system, should block the road at the time set in the morning and undo blocking at the time set for the evening through a display on the control card. Setting the time to let the road accessible on non-working days should be possible. (Optional)
- 2.4. Accessory Equipment** (One or all selectable)
- 2.4.1. Rising bollard should be equipped with an optimal-size armed barrier system to enhance visibility. Armed barrier system should operate in synchronisation with the product. (Optional)
 - 2.4.2. System should be PLC circuit controllable. It should be equipped with whatever is necessary for PLC unit system operation. (Optional)
 - 2.4.3. PLC circuit systems should be equipped with a Colour Touch Panel to allow setting and display all related product data. Position of the product should be displayed in a visual mode of operation. It should enable that all past operation data are recorded and monitored. (Optional)
 - 2.4.4. The system should be equipped with a uniform traffic signalisation light of 200V to warn vehicles and regulate vehicle traffic. High quality LEDs should be used for the traffic lights. Traffic light will be red when the road is blocked, otherwise it will be green when the road is clear. (Optional)
 - 2.4.5. A LOOP detector system should be available for safe operation of the system. Loop detectors should be placed in front of and behind the product.
 - 2.4.6. There should be a buzzer system to warn the user when turning on and off the product. (Optional)

3. PERFORMANCE

3.1. Collision Details

- 3.1.1. Rising bollard should pose a nearly impassable obstacle against soft-skinned and pallet-free vehicles for safety and control of regular traffic. 600 mm high off the ground, the rising bollard's design should be capable of limiting the projected damage to 30% assuming when a 4-ton vehicle at 40 km speed crashes to it.
- 3.1.2. 1 finite element analysis test report and a video will be provided for the rising bollard system.

3.2. Opening Speed

- 3.2.1. Under normal operating conditions, the product should turn on and off in 4 to 8 seconds. System should be stoppable at the time of operation and operation direction should be reversible quickly when desired.

3.3. Operation Sustainability and Life

- 3.3.1. The product should be capable of moving fully upwards and downward 100 times an hour.
- 3.3.2. Rising bollard should be guaranteed for 2 (two) years by the manufacturer.

4. MANUFACTURER EXPERIENCE

- 4.1.1. Rising bollard manufacturer should have minimum 14 years of experience. Experience in manufacturing should be proven with official registration documents of the company.
- 4.1.2. Rising bollard product should have a CE, and a Turkish Goods Certificate.
- 4.1.3. Manufacturer should have TUV CERT ISO 9001-2015, TUV CERT ISO 14001 and TUV CERT OHSAS 18001 quality management certificates and Service Area Compliance Certificate.
- 4.1.4. Manufacturer should have TS 21 HYB, TS 12540 HYB, TS 12870 HYB and TS 13406 HYB certificates so as to be eligible for providing service to safety products.
- 4.1.5. Manufacturer should have at least 1 in house mechanical engineer, 1 electronic engineer, 1 mechatronics engineer, which should be verified by official documents.

5. QUALITY CONTROL TERMS

- 5.1.1. Once the road blocker system is complete, it will be fully tested before installing. In addition to all tests, the following checks will also be performed in order to verify function and processing speed.
- 5.1.2. After production but before dispatch to the site, the rising bollard should be subject to FA tests, a certified FAT certificate should be presented to the institution at the time of delivery of the product.
- 5.1.3. Assembling manual, user's manual and maintenance manual should be delivered at the time of final control along with the product.
- 5.1.4. Control board will have a tag that contains manufacturer name, product model, serial number, engine power, operating voltage and manufacture date.
- 5.1.5. Rising bollard and its sub systems should be skilfully and carefully made.
- 5.1.6. Master dimensions should be compared with drawings and order dimensions.