**PRINCETON MODEL**

**POLYURETHANE INJECTED**

**GARAGE DOOR**

**Galvanized steel,** 26-gauge, door thickness 1 3/4" (45 mm)

**OVERHEAD RETRACTABLE DOORS**

**WITH METAL PANELS ON HINGES**

**PART 1: OVERVIEW**

**1.1 RELATED WORK**

*The author must give all the necessary references.*

**1.1.1** Electrical connections, water tightness of openings, and so on. Note that all electrical connections and installations must be done by a qualified electrician as recommended by the manufacturer of the electric garage door operators.

**1.2 MAINTENANCE RECORDS**

**1.2.1** Provide the necessary instructions to ensure proper operation and maintenance of all the hardware components for the doors as well as the electric garage door operators, included in the manual of the garage door and door operator.

**1.3 Qualifications**

**1.3.1** The maker of the specified products must be a sectional garage door manufacturer with at least 5 years of experience.

* + 1. The installation must be executed by a company approved by the garage door manufacturer as an installer, using skilled installers experienced in this work.

**PART 2: GARAGE DOOR**

**2.1 CALCULATION CRITERIA**

* + 1. The doors and the hardware system must be designed to meet standard ANSI/DASMA 102 (American National Standard Specifications for Sectional Overhead-Type Doors; DASMA: Door & Access Systems Manufacturer Association).

*(Note: for doors wider than 18’ (5.5 m), or high wind situations, consult our engineering department).*

* + 1. The doors must have a thermal resistance factor RSI 2.8 (k = 0.357 W/m2K).
		2. The doors, the tracks, and the springs must be made to withstand at least 10,000 total operation cycles over their lifespan.

**2.2 MATERIALS**

**2.2.1 Coating**

 **Enameled steel (26-gauge on both sides)**

26-gauge galvanized steel sheet in accordance with ASTM A653-97 & ASTM 653M-97, has G.60 coating, in manufacturers standard color. The galvanized steel sheet has a zinc coating with a minimum thickness of 0.04 lb. /in2 (180 g/m2). The polyester paint finish, 2 coats, conforms to standard ASTM A653-97 & ASTM A653M-97 and has a thickness of 1.0 mil. The interior steel sheet metal surface is woodgrain, with horizontal grooves. The surface of the exterior steel sheet is woodgrain.

**Decorative PVC Overlays**

Overlays are made in cellular PVC (thermoplastic) and are White, Desert Sand, Claystone, Chocolate Walnut and Black. They are affixed on the steel panel by LasercraftTM System (precision manufacturing process) and fused by the PermafixTM fusion process (adhesive). Overlays are guaranteed for ten (10) years against discoloration and five (5) years against delamination.

The door has one of the following designs *(to select):*

🞎 P-11 🞎 P-12 🞎 P-13

🞎 P-21 🞎 P-22 🞎 P-23

**2.2.2 Insulation**

High-pressure, CFC-free, polyurethane foam has been injected between the walls of each section. Its density is 2.5 lb./ft3 (40.4 Kg/m3) with a thermal resistance factor of RSI 1.6 per 1" (25 mm) of thickness. The total insulation factor is R-16, RSI 2.8 (k = 0.357 W/m2K).

**2.2.3 Reinforcements**

14-gauge, steel reinforcement plates will be installed inside sections for properly attaching hardware such as handles, hinges and electric opener plate.

**2.2.4 Section ends**

A block of grade 4 dry pine, guaranteed against cracking and rot, is inserted at both ends of each insulated garage door section for superior strength in the fastening of the lateral hinges. These wood end blocks ensure a thermal break with the door’s exterior.

**2.2.5 Panoramic 30" (762 mm) window**

Clear, double thermopane windows must have a total thickness of 7/8” (22 mm). The 1/8" (3 mm) panes are sealed in stainless steel extrusions using the InterceptTM system with 5/8" (16 mm) air space. The panoramic section is white inside. The windows are inserted in a rigid PVC frame and factory installed by the manufacturer.

**2.3 DOORS**

**2.3.1** The garage doors must be the Princeton model made by Garaga Inc. The sections are shaped with 26-gauge steel and electronically injected with high pressure polyurethane foam for a total thickness of 2 3/8" (60 mm) including overlays.

* + 1. The doors must have the following sizes and specifications:

 **DOOR SIZES # OF SECTIONS # OF PANES**

**LOCATIONS (W. by H.) WITH PANES PER SECTION**

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**2.4 WEATHER TIGHTNESS**

**2.4.1** Provide and install continuous weatherstripping at the bottom of the lower section. The weatherstripping shall be made of a U-shaped PVC extrusion as well as a semi-circular TPE (thermoplastic elastomer) rubber tubing.

**2.4.2** Inset weatherstripping of flexible and rigid PVC using the triple-contact InterlokTM system shall be found at the intersection of each section. This type of weatherstripping will ensure an efficient thermal barrier as well as double weather tightness in accordance with the following standards: when submitted to a pressure of 0.075 kPa, which is equivalent to winds of 25 mph (40 km/h), the air infiltration rating as measured using the ASTM E-283 standard is 0.033 liter/second per meter of joint between the door sections.

**2.4.3** Provide and install, on the exterior side of the door jambs and lintel, weatherstripping that includes a double-edged strip of arctic vinyl. White, Desert Sand and Claystone weatherstripping will have rigid PVC screw covers. Dark Sand, Brown, Charcoal and Black weatherstripping will be composed of a painted aluminum profile and a double edge arctic vinyl strip.

**PART 3: RESIDENTIAL TYPE HARDWARE**

**3.1 PRODUCTS**

**3.1.1 Tracks**

The tracks are made of 14-gauge, 2" (50 mm) thick galvanized steel. The horizontal track is reinforced with a 2” x 2” (50 x 50 mm) steel angle for doors 12'4" (3.7 m) wide and over.

**3.1.2 Hardware**

The hinges are made of 14-gauge galvanized steel. The rollers are 2" (50 mm) residential-type in nylon, with 11 ball bearings.

The hardware includes an interior side lock as well.

**3.1.3 Struts for large doors *(if applicable)***

Doors measuring **12'4" (3759 mm)** and more in width will come with 22-gauge galvanized steel horizontal struts.

**3.1.4 Type of movement**

The movement of the hardware will allow for the most space possible available underneath the door when it is in the open position.

 **NUMBER OF TYPE OF AVAILABLE SPACE**

 **DOOR MOVEMENT (FLOOR / CEILING)**

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**3.1.5 Torsion-type springs**

The torsion spring lifting system will consist of all the parts and accessories needed for its installation.

**3.2 OPTION *(TO CHOOSE)***

**3.2.1 Double hinges**

Doors 12'4" (3759 mm) and wider must be provided with 14-gauge double hinges at each end.

**PART 4: RESIDENTIAL ELECTRIC OPERATOR**

**4.1 PRODUCTS**

**4.1.1** These are trolley-type electric operators that come equipped with a quick-release device which disconnects the door from the operator to enable manual operation in the event of a power failure. The one-piece T system consists of a carriage that slides between dual galvanized steel angle tracks.

 *Note: 2" (50 mm) of free space is required between the highest point of the door and the ceiling.*

 *Note: A residential Jackshaft type operator is available for high-lift movement.*

**4.1.2** The electric motors, control mechanisms, relays, and electrical devices of the operator shall be approved according to CSA and UL standards.

**4.1.3** The electrical power supply is 115 volts and 60 Hz.

**LOCATION OF DOOR(S) \*TYPE OF OPERATION**

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\* *Standard lift or low headroom only.*

**4.1.4** The operators come equipped with a reversible motor, which has a built-in thermal protection mechanism.

**4.1.5** The control panel for the door operator must be of the push-button type and surface mounted on the inside wall, close to the door to the house.

**4.1.6** A safety mechanism with photocells will be included with each operator to stop and reverse the movement of the door in the event an object cuts off the light beam.

* + 1. The operator must be equipped with a remote control (*specify: or more, if necessary*).
		2. A wireless keypad entry system must be installed outside the building *(optional).*

**PART 5: INSTALLATION**

**5.1** Before starting, make sure that the frames and the fixtures prepared by the general contractor are square.

**5.2** Install the doors and the related hardware.

**5.3** Apply some touch-up paint to areas where the finish might have been damaged during the mounting.

**5.4** Install the electric operators, control devices, push-button control stations, relays, and other electrical equipment needed for operating the door.

**5.5** All electrical connections must be done by a certified electrician.

**5.6** Adjust all movable parts and weatherstripping with the exterior jambs in order to get proper weather tightness for all conditions

**5.7** Make sure all the mechanisms that have been installed and work properly.

**5.8** Clean doors as recommended by the manufacturer and get rid of all leftover materials and debris found near the openings and the hardware.