####  TOP TECH MODEL

**POLYURETHANE INJECTED**

**GARAGE DOOR**

**Galvanized steel,** 23-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 installation of the mentioned products must be executed by a company with a minimum of 5 years of experience in the specified products.

* + 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 of 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 (23-gauge on both sides)**

23-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 A924 & ASTM A924M and has a thickness of 1.0 mil. The interior steel sheet metal surface is textured, with horizontal 2 or 4 grooves.

The surface of the exterior steel sheet is textured with the following designs *(to select):*

🞎 2 grooves 🞎 4 grooves 🞎 Flush

**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 (0.07" or 1.8 mm) steel reinforcement plates will be installed inside sections for properly attaching hardware such as handles, hinges and electric trolley-type 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 Regular windows**

Clear double thermo pane windows must have a total thickness of 3/4” (19 mm). The 1/8" (3 mm) panes are sealed in stainless steel extrusions using the InterceptTM system with 1/2" (13 mm) air space. The windows are inserted in an expanded PVC frame and factory installed by the manufacturer.

**2.3 DOORS**

**2.3.1** The garage doors must be the Top Tech model made by Garaga Inc. The panels are shaped with 23-gauge steel and electronically injected with high pressure polyurethane foam for a total minimum thickness of 1 ¾" (45 mm).

**2.3.2** 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 panel. The weatherstripping shall be made of a U-shape 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.

* + 1. Provide and install, on the exterior side of the door jambs and lintel, weatherstripping with a double-edged strip of arctic vinyl. This weatherstripping must come with a rigid PVC screw cover.

 **2.4.4** At the head of the door (for doors wider than 10' (3.1 m)), provide the top of the panel with continuous weatherstripping made up of a reinforced aluminum profile and a strip of flexible PVC 2 ½" (65 mm) wide.

**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. Doors wider than 15' (4.6 m) will be equipped with 14-gauge 3" (76 mm) thick galvanized steel track.

**3.1.2 Hardware**

The hinges are made of 14-gauge galvanized steel. The rollers are in steel, residential type of 2" (50 mm) and with 10 ball bearings.

***Optional:*** white nylon rollers (10 ball-bearings) or black nylon rollers.

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 AVALABLE SPACE**

 **DOORS 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 wider than 12'4" (3759 mm) 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 light 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, ½ phase 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 built-in thermal protection mechanism. The electrical control circuit shall be 24 volts.

**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 must be added to each operator in order 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.
		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 motors, 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 of 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.