

Roto Application Hardware Matrix



INTRODUCTION:

Roto X-Drive operators and Roto hinges were designed to meet all the feature and performance requirements of today's demanding commercial Casement and Awning window markets. These products were designed to be installed together as a system to achieve optimum performance levels.

IMPORTANT NOTES:

The Hardware Application Matrix (Table 1.0) below should be used as a guide to select hardware for different window applications. This information is based on extensive load testing of all the various hardware combinations using protocol defined by the AAMA/WDMA/CSA101/I.S.2/A440-17 Hardware Load Test. It is important to note that there are many factors that affect the maximum size window that can be safely manufactured as well as its level of performance. These include:

- Sash and frame rigidity
- Sash and frame strength
- Fastener holding strength
- Window tolerances
- Sash sag
- Weather tightness
- Weather-strip interference and drag

Due to the reasons highlighted above, Roto recommends evaluating the entire window system before producing the largest frame listed in Table 1.0 below. Structural & application testing must be thoroughly conducted by the window manufacturer, in accordance with their requirements prior to implementation of these recommendations.

The size recommendations listed in Table 1.0 are based on standard mounting locations that are specified by Roto's Sales Engineering Department. The ease of operation, service life, load capacity, and hence the maximum window size that can be produced, are strongly influenced by the mounting location of the hardware. The information provided in the table assumes that these mounting specifications have been adhered to although different mounting locations and hardware combinations are possible. Please contact a member of Roto's experienced Sales Engineering Group to review your specific window requirements.

Table 1.0 Operator Hardware Application Matrix for Casement Window Hardware Load Test
(AAMA/WDMA/CSA101/I.S.2/A440-17, section 9.3.6.5)

Performance Class R: The Maximum Frame Size and Sash Weight are listed in Table 1.0

Performance Classes LC, C, HC, AW: The Frame Area (width x height) listed in the Table 1.0 must be **reduced by 20%**

ROTO OPERATOR		ROTO HINGE								Approx. Minimum Frame Width
X-Drive OP10 Operators	X-Drive & Evolve OP06 & OP08 Operators	8" - 26" Sizes 4 Bar Hinges (Kempton style)	Designo Hinges	14" Supreme Hinges (HG06)	14" HD Hinges (HG06 Heavy Duty)	13" & 14" Washability Hinges (HG05, HG06, HG09)	10" Washability Hinges (HG05, HG06)	14" Egress Hinges (HG06)	10" Egress Hinges (HG05, HG06)	
X	HD Dual Arm (see note 9)	Customer Specific Testing Required	Customer Specific Testing Required	40" W x 90" H	40" W x 84" H	40" W x 84" H	Not Recommended	Customer Specific Testing Required	Customer Specific Testing Required	27"
	Dual Arm			40" W x 84" H	40" W x 84" H	32" W x 66" H	24"			
	Narrow Dual Arm			32" W x 76" H	32" W x 76" H	30" W x 66" H	22"			
	Split Arm & Inverted Split Arm (see notes 3 & 4)			32" W x 72" H	32" W x 72" H	24" W x 64" H	16"			
Split Arm (see notes 3 & 4)	Evolve Split Arm & Inverted Split Arm (see notes 3 & 4)			Not Tested	32" W x 72" H	32" W x 72" H	24" W x 64" H			28" W x 64" H
Single Arm 13.5" & Jogged Single Arm 13.5"		30" W x 90" H	Customer Specific Testing Required	Not Tested	Not Recommended	Not Recommended	Not Recommended	30" W x 80" H	30" W x 66" H	24"
Single Arm 9.5" & Jogged Single Arm 9.5"		26" W x 90" H						26" W x 76" H	26" W x 66" H	20"
Single Arm 7.5" & Jogged Single Arm 7.5"		24" W x 84" H						24" W x 72" H	24" W x 60" H	16"
X		Not Recommended						Not Recommended	16" W x 60" H	12"
Awning		Customer Specific Testing Required (see notes 5 & 6)								18"

Notes:

- 1) Maximum frame size is shown for each operator and hinge combination.
- 2) To ensure ease of operation, the specific application mounting locations identified on the following pages must be followed.
- 3) It is recommended that a hinge stop be used on any casement window which uses a Split Arm Operator unless a limit device is already being used.
- 4) For optimum performance of Split Arm Operators, applications should not exceed sash widths over 28", sash heights over 60", or sash weights over 50 lbs.
- 5) The Hardware Load Test is not directly applicable to Awning window sizing, therefore Awning Operator window applications are not listed in Table 1.0.
- 6) For Awning windows less than 18" high, the use of a restricted Awning Operator may be required. Other restricted opening Awning variants are available for various code requirements.
- 7) It is recommended that the sash width does not exceed 66% of the sash height for proper performance.
- 8) To ensure optimum hardware function and longevity, Roto recommends that the handle torque to open or close a sash does not exceed 35 in-lb.
- 9) HD Dual Arm Operators require a limit device to limit opening to 60 degrees or less; contact the Roto Sales Engineering Group for further assistance.
- 10) Contact the Roto Sales Engineering Group for further assistance regarding your specific application for all Operator variants.
- 11) Table 1.0 assumes the maximum sash weight of 200 lbs. (HD Dual Arm Operator with 14" Supreme Hinges) is used only on largest window size of 40" x 90" and that the sash weight decreases uniformly as the sash height decreases.

Maximum weight of casement sash per hinge pair:

HG05 13" Washability and HG06 14" Washability = 125 lbs.

HG06 14" Heavy Duty = 150 lbs.

HG06 14" Supreme hinge = 200 lbs.

HG06 10" Egress Hinge = 88 lbs.

Weight ratings of HG05 and HG06 Washability hinges may exceed 200 lbs. in an awning configuration; customer testing recommended.