



Calculation based on ISO 15099

| Product name: <b>Universal Outswing Casement Window</b> |   |  |              | Center-of-glass properties                                    |              |   |
|---|---|--|--------------|---|--------------|---|
| ASHRAE/IECC<br>/DOE North<br>American<br>Climate Zone   | North,<br>East,<br>South-<br>facing<br>West -<br>facing |  |              | Cardinal E180/ Arg/ Clear/ Arg/ E180<br>(6mm) 44,0mm No Grids |              |   |
| Climate specific recommendations:                       |   | Whole-window installed U-value   |              | Ucog-Value  |              |   |
|   |   | W/m2K  | BTU/hr.ft2.F | SHGC  | W/m2K        | BTU/hr.ft2.F                                    |
|   |   |  |              |   |              |   |
| 8   |   | 0.97   | 0.17         | 0.514   | 0.743        | 0.131   |
| 7   |   | 0.96   | 0.17         | 0.514   | 0.730        | 0.129   |
| 6   |   | 0.95   | 0.17         | 0.514   | 0.723        | 0.127   |
| 5   |   | 0.95   | 0.17         | 0.514   | 0.723        | 0.127   |
| 4   |   | 0.95   | 0.17         | 0.514   | 0.724        | 0.127   |
| Marine North  |   | 0.95   | 0.17         | 0.514   | 0.725        | 0.128   |
| Marine South  |   | 0.96   | 0.17         | 0.514   | 0.729        | 0.128   |
| 3   |   | 0.95   | 0.17         | 0.514   | 0.726        | 0.128   |
| 2 West  |   | 0.96   | 0.17         | 0.514   | 0.736        | 0.130   |
| 2 East  |   | 0.96   | 0.17         | 0.514   | 0.736        | 0.130   |
| Universal Outswing Casement<br>Cardinal Endur           |   | FRAME  |              | Psi-spacer  |              | Psi-opaque                                      |
|   |   | Frame height   |              | U-frame   |              | W/mK<br><br>BTU/hr.ft.F<br><br>0.083<br>Grade B |
|   |   | mm   | in           | W/m2K   | BTU/hr.ft2.F |   |
|   |   |  |              |   |              |   |
|   | Head  | 105  | 4.13         | 1.08  | 0.19         | 0.019   |
|   | Sill  | 105  | 4.13         | 1.09  | 0.19         | 0.019   |
|   | left jamb   | 105  | 4.13         | 1.07  | 0.19         | 0.020   |
|   | right jamb  | 105  | 4.13         | 1.07  | 0.19         | 0.020   |


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| Product name: <b>Universal Outswing Casement Window</b> |   |  |              | Center-of-glass properties   |              |              |
|---|---|--|--------------|--|--------------|--------------|
| ASHRAE/IECC<br>/DOE North<br>American<br>Climate Zone   | North,<br>East,<br>South-<br>facing<br>West -<br>facing |  |              | Cardinal E180/ Arg/ Clear/ Arg/ E180<br>(6mm) 44,0mm SDL/no Internal grids<br>< 25.4mm |              |              |
| Climate specific recommendations:                       |   | Whole-window installed U-value   |              | Ucog-Value   |              |              |
|   |   | W/m2K  | BTU/hr.ft2.F | SHGC   | W/m2K        | BTU/hr.ft2.F |
|   |   |  |              |  |              |              |
| 8   |   | 0.97   | 0.17         | 0.447  | 0.743        | 0.131        |
| 7   |   | 0.96   | 0.17         | 0.447  | 0.730        | 0.129        |
| 6   |   | 0.95   | 0.17         | 0.447  | 0.723        | 0.127        |
| 5   |   | 0.95   | 0.17         | 0.447  | 0.723        | 0.127        |
| 4   |   | 0.95   | 0.17         | 0.447  | 0.724        | 0.127        |
| Marine North  |   | 0.95   | 0.17         | 0.447  | 0.725        | 0.128        |
| Marine South  | ✓   | 0.96   | 0.17         | 0.447  | 0.729        | 0.128        |
| 3   | ✓   | 0.95   | 0.17         | 0.447  | 0.726        | 0.128        |
| 2 West  |   | 0.96   | 0.17         | 0.447  | 0.736        | 0.130        |
| 2 East  |   | 0.96   | 0.17         | 0.447  | 0.736        | 0.130        |
|   |   |  |              |  |              |              |
| Universal Outswing Casement                             |   | FRAME  |              | Psi-spacer   |              | Psi-opaque   |
| Cardinal Endur  |   | Frame height   |              | Ψ  |              | W/mK         |
|   |   | mm   | in           | W/m2K  | BTU/hr.ft2.F |              |
| Head  |   | 105  | 4.13         | 1.08   | 0.19         | 0.019        |
| Sill  |   | 105  | 4.13         | 1.09   | 0.19         | 0.011        |
| left jamb   |   | 105  | 4.13         | 1.07   | 0.19         | 0.020        |
| right jamb  |   | 105  | 4.13         | 1.07   | 0.19         | 0.012        |


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| Product name: <b>Universal Outswing Casement Window</b> |                                     |                  |  | Center-of-glass properties |                   |   |
|---|-------------------------------------|------------------|--|----------------------------|-------------------|---|
| ASHRAE/IECC<br>/DOE North<br>American<br>Climate Zone   | North,<br>East,<br>West -<br>facing | South-<br>facing |  |                            |                   | Cardinal E180/ Arg/ Clear/ Arg/ E180<br>(6mm) 44,0mm Internal grids And SDL<br>with Internal grids < 25.4mm maintain<br>3mm clearance |
|   |                                     |                  | Whole-window installed U-value   |                            | <b>Ucog-Value</b> |   |
|   |                                     |                  | W/m2K  | BTU/hr.ft2.F               | SHGC              | W/m2K BTU/hr.ft2.F  |
| <b>Climate specific recommendations:</b>                |                                     |                  |  |                            |                   |   |
| 8   |                                     |                  | 0.97   | 0.17                       | 0.447             | 0.743 0.131   |
| 7   |                                     |                  | 0.96   | 0.17                       | 0.447             | 0.730 0.129   |
| 6   |                                     |                  | 0.95   | 0.17                       | 0.447             | 0.723 0.127   |
| 5   |                                     |                  | 0.95   | 0.17                       | 0.447             | 0.723 0.127   |
| 4   |                                     |                  | 0.95   | 0.17                       | 0.447             | 0.724 0.127   |
| Marine North  |                                     |                  | 0.95   | 0.17                       | 0.447             | 0.725 0.128   |
| Marine South  | ✓                                   |                  | 0.96   | 0.17                       | 0.447             | 0.729 0.128   |
| 3   | ✓                                   |                  | 0.95   | 0.17                       | 0.447             | 0.726 0.128   |
| 2 West  |                                     |                  | 0.96   | 0.17                       | 0.447             | 0.736 0.130   |
| 2 East  |                                     |                  | 0.96   | 0.17                       | 0.447             | 0.736 0.130   |
|   |                                     |                  |  |                            |                   |   |
| <b>Universal Outswing Casement<br/>Cardinal Endur</b>   |                                     | FRAME            |  |                            | Psi-spacer        |   |
|   |                                     | Frame height     |  | U-frame                    |                   | Psi   |
|   |                                     | mm               | in   | W/m2K                      | BTU/hr.ft2.F      |   |
|   | Head                                | 105              | 4.13   | 1.08                       | 0.19              | 0.019 0.011   |
|   | Sill                                | 105              | 4.13   | 1.09                       | 0.19              | 0.019 0.011   |
|   | left jamb                           | 105              | 4.13   | 1.07                       | 0.19              | 0.020 0.012   |
|   | right jamb                          | 105              | 4.13   | 1.07                       | 0.19              | 0.020 0.012   |
|   |                                     |                  |  |                            | Psi-opaque        |   |
|   |                                     |                  |  |                            | W/mK              |   |
|   |                                     |                  |  |                            | BTU/hr.ft.F       |   |
|   |                                     |                  |  |                            | Grade B           |   |


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|   |                                     |                  |   |                    |              |
|---|-------------------------------------|------------------|---|--------------------|--------------|
| Product name: <b>Universal Outswing Casement Window</b> |                                     |                  | Center-of-glass properties  |                    |              |
| ASHRAE/IECC<br>/DOE North<br>American<br>Climate Zone   | North,<br>East,<br>West -<br>facing | South-<br>facing |                           |                    |              |
|   |                                     |                  | Cardinal E180/ Arg/ Clear/ Arg/ E180<br>(6mm) 44,0mm Internal grids And SDL<br>with Internal grids < 25.4mm |                    |              |
|   |                                     |                  | Whole-window installed U-value  |                    | Ucog-Value   |
| Climate specific recommendations:                       |                                     |                  | W/m2K   | BTU/hr.ft2.F       | SHGC         |
|   |                                     |                  |   |                    | W/m2K        |
|   |                                     |                  |   |                    | BTU/hr.ft2.F |
| 8   |                                     |                  | 1.02  | 0.18               | 0.447        |
| 7   |                                     |                  | 1.01  | 0.18               | 0.447        |
| 6   |                                     |                  | 1.01  | 0.18               | 0.447        |
| 5   |                                     |                  | 1.01  | 0.18               | 0.447        |
| 4   |                                     |                  | 1.01  | 0.18               | 0.447        |
| Marine North  |                                     |                  | 1.01  | 0.18               | 0.447        |
| Marine South  | ✓                                   |                  | 1.01  | 0.18               | 0.447        |
| 3   | ✓                                   |                  | 1.01  | 0.18               | 0.447        |
| 2 West  |                                     |                  | 1.02  | 0.18               | 0.447        |
| 2 East  |                                     |                  | 1.02  | 0.18               | 0.447        |
|   |                                     |                  |   |                    |              |
| Universal Outswing Casement                             |                                     | FRAME            |   | Psi-spacer         |              |
| Cardinal Endur  |                                     | Psi-opaque       |   |                    |              |
|   |                                     | Frame height     |   | U-frame            |              |
|   |                                     | mm in            |   | W/m2K BTU/hr.ft2.F |              |
|   |                                     |                  |   | Ψ                  |              |
|   |                                     |                  |   | W/mK               | BTU/hr.ft.F  |
|   |                                     |                  |   | W/mK               |              |
|   |                                     |                  |   | BTU/hr.ft.F        |              |
|   |                                     |                  |   | 0.143              |              |
|   |                                     |                  |   | 0.083              |              |
|   |                                     |                  |   | Grade B            |              |


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|   |                            |  |              |   |              |              |
|---|----------------------------|--|--------------|---|--------------|--------------|
| Product name: <b>Universal Outswing Casement Window</b> |                            |  |              | Center-of-glass properties  |              |              |
| ASHRAE/IECC /DOE North American Climate Zone            | North, East, West - facing |  |              | Cardinal E180/ Arg/ Clear/ Arg/ E180 (6mm) 44,0mm SDL/no Internal grids >= 25.4mm |              |              |
| Climate specific recommendations:                       |                            | Whole-window installed U-value   |              | Ucog-Value  |              |              |
|   |                            | W/m2K  | BTU/hr.ft2.F | SHGC  | W/m2K        | BTU/hr.ft2.F |
|   |                            |  |              |   |              |              |
| 8   |                            | 0.97   | 0.17         | 0.385   | 0.743        | 0.131        |
| 7   |                            | 0.96   | 0.17         | 0.385   | 0.730        | 0.129        |
| 6   |                            | 0.95   | 0.17         | 0.385   | 0.723        | 0.127        |
| 5   |                            | 0.95   | 0.17         | 0.385   | 0.723        | 0.127        |
| 4   |                            | 0.95   | 0.17         | 0.385   | 0.724        | 0.127        |
| Marine North  |                            | 0.95   | 0.17         | 0.385   | 0.725        | 0.128        |
| Marine South  | ✓                          | 0.96   | 0.17         | 0.385   | 0.729        | 0.128        |
| 3   | ✓                          | 0.95   | 0.17         | 0.385   | 0.726        | 0.128        |
| 2 West  |                            | 0.96   | 0.17         | 0.385   | 0.736        | 0.130        |
| 2 East  |                            | 0.96   | 0.17         | 0.385   | 0.736        | 0.130        |
|   |                            |  |              |   |              |              |
| Universal Outswing Casement                             |                            | FRAME  |              | Psi-spacer  |              | Psi-opaque   |
| Cardinal Endur  |                            | Frame height   |              | Ψ   |              | W/mK         |
|   |                            | mm   | in           | W/m2K   | BTU/hr.ft2.F |              |
| Head  |                            | 105  | 4.13         | 1.08  | 0.19         | 0.019        |
| Sill  |                            | 105  | 4.13         | 1.09  | 0.19         | 0.011        |
| left jamb   |                            | 105  | 4.13         | 1.07  | 0.19         | 0.020        |
| right jamb  |                            | 105  | 4.13         | 1.07  | 0.19         | 0.012        |


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|  |              |                            |  |              |  |            |              |             |
|--|--------------|----------------------------|--|--------------|--|------------|--------------|-------------|
| Product name: Universal Outswing Casement Window |              |                            | Center-of-glass properties   |              |  |            |              |             |
| ASHRAE/IECC /DOE North American Climate Zone     | South-facing | North, East, West - facing |  |              | Cardinal E180/ Arg/ Clear/ Arg/ E180 (6mm) 44,0mm Internal grids And SDL/Internal grids >= 25.4mm maintain 3mm clearance |            |              |             |
| Climate specific recommendations:                |              |                            | Whole-window installed U-value   |              | Ucog-Value   |            |              |             |
|  |              |                            | W/m2K  | BTU/hr.ft2.F | SHGC   | W/m2K      | BTU/hr.ft2.F |             |
| 8  |              |                            | 0.97   | 0.17         | 0.385  | 0.743      | 0.131        |             |
| 7  |              |                            | 0.96   | 0.17         | 0.385  | 0.730      | 0.129        |             |
| 6  |              |                            | 0.95   | 0.17         | 0.385  | 0.723      | 0.127        |             |
| 5  |              |                            | 0.95   | 0.17         | 0.385  | 0.723      | 0.127        |             |
| 4  |              |                            | 0.95   | 0.17         | 0.385  | 0.724      | 0.127        |             |
| Marine North                                     |              |                            | 0.95   | 0.17         | 0.385  | 0.725      | 0.128        |             |
| Marine South                                     | ✓            |                            | 0.96   | 0.17         | 0.385  | 0.729      | 0.128        |             |
| 3  | ✓            |                            | 0.95   | 0.17         | 0.385  | 0.726      | 0.128        |             |
| 2 West   |              |                            | 0.96   | 0.17         | 0.385  | 0.736      | 0.130        |             |
| 2 East   |              |                            | 0.96   | 0.17         | 0.385  | 0.736      | 0.130        |             |
|  |              |                            |  |              |  |            |              |             |
| Universal Outswing Casement                      |              | FRAME                      |  |              |  | Psi-spacer |              | Psi-opaque  |
| Cardinal Endur                                   |              | Frame height               |  | U-frame      |  | Ψ          |              | W/mK        |
|  |              | mm                         | in   | W/m2K        | BTU/hr.ft2.F   | W/mK       | BTU/hr.ft.F  |             |
| Head   |              | 105                        | 4.13   | 1.08         | 0.19   | 0.019      | 0.011        | 0.143       |
| Sill   |              | 105                        | 4.13   | 1.09         | 0.19   | 0.019      | 0.011        | BTU/hr.ft.F |
| left jamb  |              | 105                        | 4.13   | 1.07         | 0.19   | 0.020      | 0.012        | 0.083       |
| right jamb                                       |              | 105                        | 4.13   | 1.07         | 0.19   | 0.020      | 0.012        | Grade B     |

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| Product name: <b>Universal Outswing Casement Window</b> |   |  |              | Center-of-glass properties  |              |                   |
|---|---|--|--------------|---|--------------|-------------------|
| ASHRAE/IECC<br>/DOE North<br>American<br>Climate Zone   | North,<br>East,<br>South-<br>facing<br>West -<br>facing |  |              | Cardinal E180/ Arg/ Clear/ Arg/ E180<br>(6mm) 44,0mm Internal grids And<br>SDL/Internal grids >= 25.4mm |              |                   |
|   |   | Whole-window installed U-value   |              | <b>Ucog-Value</b>   |              |                   |
|   |   | W/m2K  | BTU/hr.ft2.F | SHGC  | W/m2K        | BTU/hr.ft2.F      |
| <b>Climate specific recommendations:</b>                |   |  |              |   |              |                   |
| 8   |   | 1.02   | 0.18         | 0.385   | 0.743        | 0.131             |
| 7   |   | 1.01   | 0.18         | 0.385   | 0.730        | 0.129             |
| 6   |   | 1.01   | 0.18         | 0.385   | 0.723        | 0.127             |
| 5   |   | 1.01   | 0.18         | 0.385   | 0.723        | 0.127             |
| 4   |   | 1.01   | 0.18         | 0.385   | 0.724        | 0.127             |
| Marine North  |   | 1.01   | 0.18         | 0.385   | 0.725        | 0.128             |
| Marine South  | ✓   | 1.01   | 0.18         | 0.385   | 0.729        | 0.128             |
| 3   | ✓   | 1.01   | 0.18         | 0.385   | 0.726        | 0.128             |
| 2 West  |   | 1.02   | 0.18         | 0.385   | 0.736        | 0.130             |
| 2 East  |   | 1.02   | 0.18         | 0.385   | 0.736        | 0.130             |
|   |   |  |              |   |              |                   |
| <b>Universal Outswing Casement</b>                      |   | <b>FRAME</b>   |              | <b>Psi-spacer</b>   |              | <b>Psi-opaque</b> |
| <b>Cardinal Endur</b>                                   |   | Frame height   |              | U-frame   |              | Ψ                 |
|   |   | mm   | in           | W/m2K   | BTU/hr.ft2.F | W/mK              |
| Head  |   | 105  | 4.13         | 1.08  | 0.19         | 0.019             |
| Sill  |   | 105  | 4.13         | 1.09  | 0.19         | 0.011             |
| left jamb   |   | 105  | 4.13         | 1.07  | 0.19         | 0.020             |
| right jamb  |   | 105  | 4.13         | 1.07  | 0.19         | 0.012             |

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