**Job#: 2015-016**

**Deck Calculator: Lateral Loads**

| | | | | | |
|---|---|---|---|---|---|
| Wind Analysis Method | | Design Wind Loads - Other Structures | | ASCE 7-10 Sec. 29.5 | |
| Basic Wind Speed (ultimate) | | 155.00 | MPH | | |
| Topography Factor | Kzt = | 1.00 | | ASCE 7-10 Fig. 26.8-1 | |
| Directionality Factor | Kd = | 0.85 | | ASCE 7-10 Fig. 26.6-1 | |
| Gust Effect Factor | G = | 0.85 | | ASCE 7-10 Sec. 26.9.1 | |
| Deck Height | h = | 11.50 | ft | | |
| Terrain Exp. Category | | D | | α = | 11.5 |
| Velocity Pressure Exp. Coefficient | Kz = | 1.030 | | zg = | 700 |
| **Velocity Pressure** | qz = | **53.86** | psf | $q_z = .00256 K_z K_{zt} K_d V^2$ | |
| Deck Gross Area (normal to wind) | Agross = | 72.00 | $ft^2$ | | |
| Deck Solid Area (normal to wind) | Af = | 68.40 | $ft^2$ | | |
| Ratio of Solid Area to Gross Area | ϵ = | 0.95 | | | |
| Force Coefficient for Deck | Cf,deck = | 1.60 | | ASCE 7-10 Fig. 29.5-2 | |
| Wind Load on Deck | Fdeck = | 5,010 | lbs | $F = q_z G C_f A_f$ | |
| ASD Wind Load on Deck | FASD,deck = | 3,006 | lbs | | |
| Post Height | hpost = | 8.75 | ft | Post Section: | ROUND |
| Post Width or Dia. | D = | 6.00 | in | D√qz = | 3.67 |
| Deck Post Area | Af = | 4.38 | $ft^2$ | (assumed mod. smooth posts) | |
| Post Aspect Ratio | h/D = | 17.50 | | | |
| Force Coefficient for Post | Cf,post = | 0.66 | | ASCE 7-10 Fig. 29.5-1 | |
| Wind Load on Post | Fpost = | 132 | lbs | $F = q_z G C_f A_f$ | |
| ASD Wind Load on Post | FASD,post = | 79 | lbs | | |
| Total ASD Wind Load | FASD,WIND = | **3,046** | lbs | (governs) | |
| Deck Width (perpendicular to ledger) | B = | 12.00 | ft | Deck Ratio: | 0.75 |
| Deck Length (parallel to ledger) | L = | 16.00 | ft | Deck Area: | 192 $ft^2$ |
| Deck Moments (wind) | | 18,511 | ft-lbs | | |
| Deck Holdown Force (wind) | Fh,WIND = | **1,157** | lbs | (governs) | |
| Unit Shear @ Ledger (wind) | $v_w$ = | **190** | plf | (governs) | |
| Deck Live Load | LL = | 50.00 | psf | ρ = | 1.3 (SDC D) |
| Deck Dead Load | DL = | 20.00 | psf | | |
| Other Loads | | 3,000 | lbs | (Conservatively include live loads in Effective Seismic Weight) | |
| Effective Seismic Weight | W = | 16,440 | lbs | | |
| Seismic Response Coefficient | Cs = | 0.150 | | (from Seismic Worksheet) $E_h = 0.7 \rho C_s W$ | |
| Total ASD Seismic Load | FASD,SEISMIC = | **2,244** | lbs | | |
| Deck Moments (seismic) | | 13,464 | ft-lbs | | |
| Deck Holdown Force (seismic) | Fh,SEISMIC = | **842** | lbs | | |
| Unit Shear @ Ledger (seismic) | $v_s$ = | **140** | plf | | |
| Deck Area | Adeck = | 192 | $ft^2$ | | |
| Occupant Lateral Load per Plan Area | OL = | 12.00 | psf | (Deck and Porch Lateral Loading by Occupants, Donald A. Bender, 2013) | |
| Total ASD Occupant Load | FASD,OCC= | **2,304** | lbs | | |
| Deck Moments (occupants) | | 13,824 | ft-lbs | | |
| Deck Holdown Force (occupants) | Fh,OCC = | **864** | lbs | | |
| Unit Shear @ Ledger (occupants) | $v_o$ = | **144** | plf | | |

Location: Hot Tub Deck
Specification: **Use (4) DTT1Z or (2) DTT2Z between house and hot tub deck.**


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