



CODE APPLICATIONS AND INTERPRETATIONS

<u>DATE:</u>	March 27, 2018
<u>SUBJECT:</u>	Spa installations on exterior decks
<u>CODE CYCLE:</u>	2016 California Building Codes Standards
<u>APPLICABLE CODES:</u>	2016 California Building Code; ASCE 7-10

Section 1604.2 of the 2016 California Building Code (CBC) states, in part: "...buildings and other structures, and parts thereof, shall be designed and constructed to support safely the nominal loads in load combinations defined in this code without exceeding the appropriate specified allowable stresses for the materials of construction. Loads and forces for occupancies or uses not covered in this chapter shall be subject to the approval of the Building Official."

Section 1.3.1 of the American Society of Civil Engineers (ASCE) standard 7-10 states, in part: "Buildings and other structures, and all parts thereof, shall be designed and constructed with adequate strength and stiffness to provide structural stability..."

Table 7-3 in ASCE 7-10 prescribes a minimum thermal factor, C_t , for unheated and open air structures of 1.2.

DISCUSSION

The above code sections require that structures be designed to safely support the anticipated loads that will be imposed on those structures or portions thereof. ASCE 7-10 also goes into detail about addressing snow loads on structures. However, there appears to be no code or standard that specifically addresses how to evaluate the load of a spa on an exterior deck. It is common in the Town that spas are installed on exterior decks in residential occupancies, and direction must be provided as to how to go about addressing these installations.

Various methods have been used to ascertain the loading conditions of a spa. Some designers have evaluated the spa load with the dead load of the spa, with or without water and/or no occupants or some occupants, with a certain anticipated snow load on the spa cover (usually 50 psf, which is approximately two feet of snow on the top of the spa cover) or none at all. Other designers have used the dry weight of the spa with no occupants, with a snow load on the spa top. Various combinations of the above criteria have also been used. Whatever method is used, it can yield different values for the spa's total load.

Since there is no single code prescribed method to determine the total load for a spa, it appears that the appropriate maximum threshold for the spa's load on a deck is the calculated value for the flat roof snow load (P_f) that the deck will experience. In determining the flat roof snow load for a deck, a variable of 1.2 for the thermal factor, C_t , must be used in equation 7.3-1 in ASCE 7-10. In the most common conditions in Town, a ground snow load (P_g) of 230 psf, an exposure factor (C_e) of 1.0 (partially exposed), and a snow importance factor (I_s) of 1.0 are typically used to determine the flat roof snow load. Given this, the flat roof snow load (P_f) for an exterior, open unheated deck would be 193.2 psf. All observed methods to establish the total load for a spa relative to the spa proposed to be installed have yielded values less than this calculated flat roof snow load.

POLICY AND PROCEDURE FOR ADDRESSING SPAS ON EXTERIOR DECKS

All newly constructed decks, and alterations or modifications to existing decks, shall have an accurate determination for the flat roof snow load (P_f) as required by ASCE 7-10. All newly constructed decks shall have the entire deck designed for the calculated flat roof snow load. The addition of a spa on an existing deck shall be considered an alteration to the existing deck. For existing decks, at a minimum, the area of the deck that will receive the spa must be able to withstand the calculated flat roof snow load or the spa's total load, whichever is greater, and that area shall be strengthened or supplemented as needed with additional reinforcing members if that area of the deck does not meet the greater of the flat roof snow load or the spa's total load.

Submitted plans and specifications for the the addition of a spa on a deck must be detailed with regard to an engineered design. Structural plans and calculations, along with the spa manufacturers' technical specification data, in addition to other supporting documents, must be provided with a building permit application. Building Division staff may be contacted at the contact information provided at the top of this document or at: (760) 965-3635 or tperry@townofmammothlakes.ca.gov.

