TOLLAND BUILDING DEPARTMENT

CALCULATING THE CORRECT PIER DIAMETER

(The following is for informational purposes only and is not a substitute for proper engineering)

Concrete piers are used to transfer the deck's weight to the ground. To be effective, they need to be sized and spaced according to the deck's design load and the soil's bearing capacity. The bottom of the pier needs to be at least 42 inches below finished grade.

How many and what size?

Three things affect the number and the size of piers you use:

1. The way you frame the deck.
2. The weight the deck is designed to carry. In Connecticut decks must be designed to carry 50 lb. per sq. ft. (psf); (40 psf live load, 10 psf dead load). Hot tubs or roofs that may be added in the future may require a different design.
3. The load-bearing capacity of the soil (assume 3,000 pounds for most areas in Tolland). If soil is very sandy or clayey, contact the Building Department.

How to calculate the load?

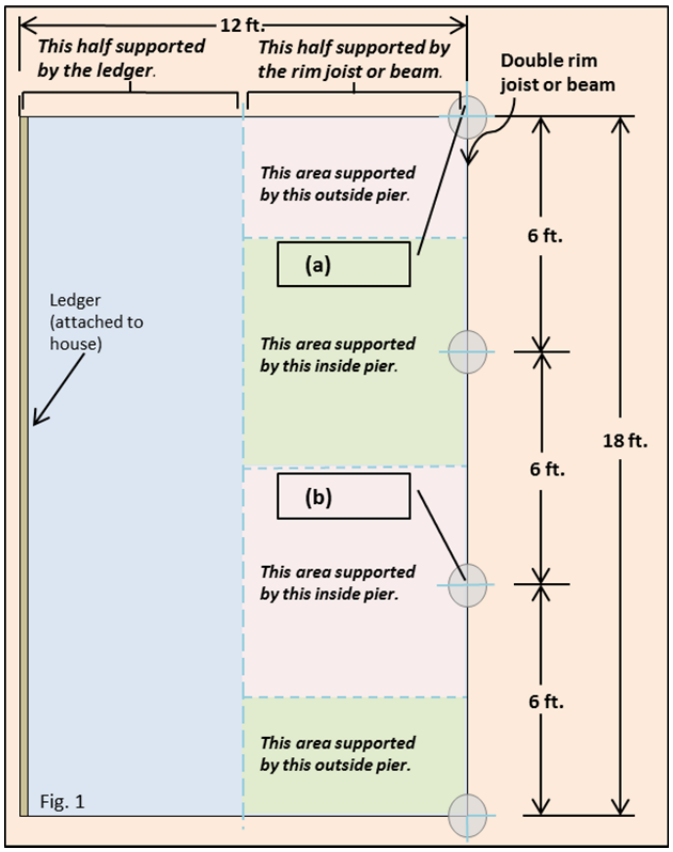


Fig. 1

Square foot diameter equivalent of a pier				
Diameter In Inches	Square Foot Multiplier		Soil Capacity In Pounds	Total Load In Pounds
6	.20	X	3,000	600
8	.35	X	3,000	1050
10	.55	X	3,000	1650
12	.79	X	3,000	2370
14	1.1	X	3,000	3300

Fig. 2

As indicated in the deck design shown in fig.1, using 4 piers allows a span of roughly 6 ft. The maximum weight each pier must carry is based on its location of the deck. To determine the load of a deck pier, you must take half the length of the joist span multiplied by half the length of the beam span (measured from pier to pier). This number is then multiplied by 50, which is the 40 psf live load, 10 psf dead load mentioned earlier. This is the amount of weight that must be supported by the pier.

Using figure 1 and location **(a)**, half the joist span is 6 feet (*12 feet divided by 2*) and half the beam span is 3 (*6 feet divided by 2*). Now multiply by 50 (*total load*). The total load needed to be carried by pier **(a)**, equals 900 pounds. The same calculation can be used to figure the weight for pier **(b)**, however instead of using 3 feet for the beam span you must use 6 feet to adjust for half the span in both directions. Therefore the length of the joist 12 divided by 2 =6, multiplied by the length of the beam 6 = 36. Multiply 36 by the total load 50 = 1800 pounds. Using the examples, pier **(a)** is holding a total load of 900 pounds while pier **(b)** is carrying a total load of 1,800 pounds. Once the total load of each pier has been calculated, it is time to determine what size pier is needed. Using the chart in figure 2, determine the diameter of the pier needed to carry the load. In the example pier **(a)** was carrying a total load of 900 pounds, therefore an 8 inch diameter pier (.35 X 3000) would be sufficient. In the second example pier **(b)** was carrying an 1800 pound load, therefore a 12 inch pier (.79 X 3000) would be needed. If poor soil conditions are found in your area adjust the soil capacity accordingly.