



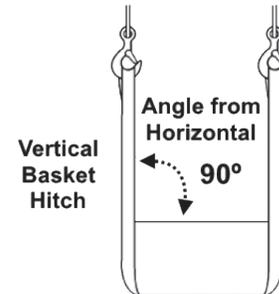
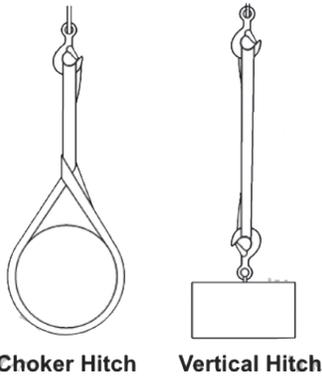
## Calculating Sling Angles

Always consider the sling angle when making a lift. The angle of the sling can reduce the capacity of all the rigging due to sling tension. As an example, a horizontal sling angle of 30° will increase the tension factor by 2 times therefore doubling the weight felt by the sling and all related rigging. You can use the chart below to calculate tension factors. If appropriate overhead clearance is available, most riggers use a 60° equilateral triangle as a benchmark angle. A 60° equilateral triangle has three equal sides making it a quick and easy reference point for estimating your sling angle. If a more critical assessment of the sling angle is necessary, the information below can assist in more precise angle calculations. Calculations should always be verified by a qualified person.

### Steps Of Consider When Calculating Sling Angles:

1. Calculate the Reduction Factor (RF)
  - Using the angle from horizontal, read across the Angle Chart to the corresponding number of the Reduction Factor column.
  - OR -
  - Divide sling height\* (H) by sling Length\* (L).
2. Reduction Factor (RF) x the sling's rated capacity for the type hitch that will be used = Sling's Reduced Rating.

\*Measured from a common horizontal plane to the hoisting hook.

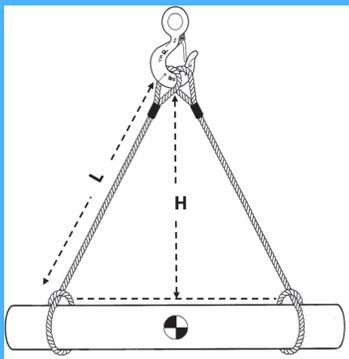


### Steps to determine necessary sling capacity:

1. Determine the weight that the sling will be lifting (LW)
2. Calculate the Tension Factor (TF)
  - Using the angle from horizontal, read across the Angle Chart to the corresponding number of the Reduction Factor column.
  - Divide sling length\* (L) by sling height\* (H).
- OR-
3. Lifting Weight (LW) x the Tension Factor (TF) = Minimum Sling Rating for the type of hitch that will be used.

### Reduction Capacity Example:

Vertical Choker rating of each sling = 8,000lbs  
 Measured Length (L) = 8 ft.  
 Measured Height (H) = 7 ft.  
 Reduction Factor (RF) = 7 (H) ÷ 8 (L) = .875  
 Reduction Sling rating in this configuration = .875  
 (RF) x 8,000 lbs. = 7,000 lbs. of lifting capacity per sling.



Reduction Factor	Angle From	Tension Factor
1	90	1
.996	85	1.004
.985	80	1.015
.966	75	1.035
.940	70	1.064
.906	65	1.104
.866	60	1.155
.819	55	1.221
.766	50	1.305
.707	45	1.414
.643	40	1.555
.574	35	1.742
.500	30	2

### Increasing Tension Example:

Load weight = 2,400 lbs.  
 Rigging - 2 slings in vertical hitch  
 Lifting weight (LW) per sling - 1,200 lbs.  
 Measured Length (L) = 10 ft.  
 Measured Height (H) = 8 ft.  
 Tension Factor (TF) = 10 (L) ÷ 8 (H) = 1.25  
 Minimum Vertical Rated Capacity required  
 For this lift = 1,200 (LW) x 1.25 (TF) = 1,500 lbs. per sling.

