

FALL CLEARANCE CALCULATIONS

Free fall distance (FFD) and minimum clearance required (MCR) are two important components of the hazard assessment and fall protection plan when performing work at height. FFD is the distance from the point where a person falls until the energy absorber begins to slow their fall. MCR is the minimum distance required to safely arrest a person's fall, preventing a fallen worker from coming into contact with obstructions below.

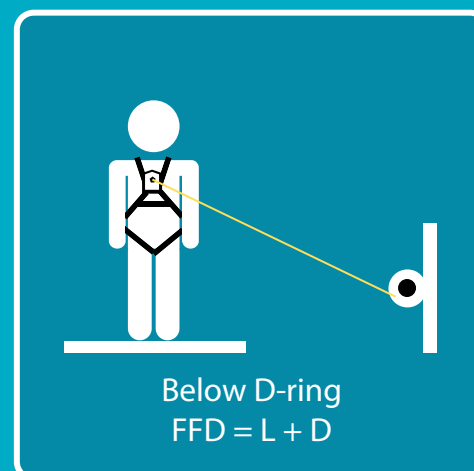
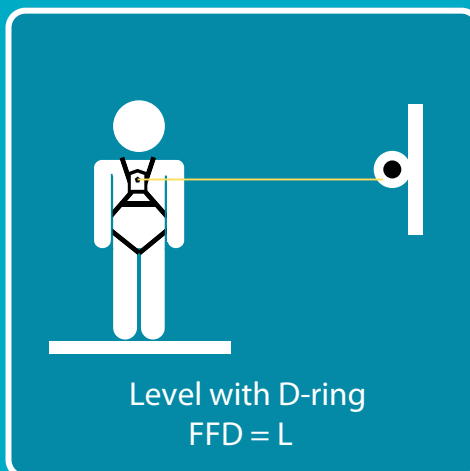
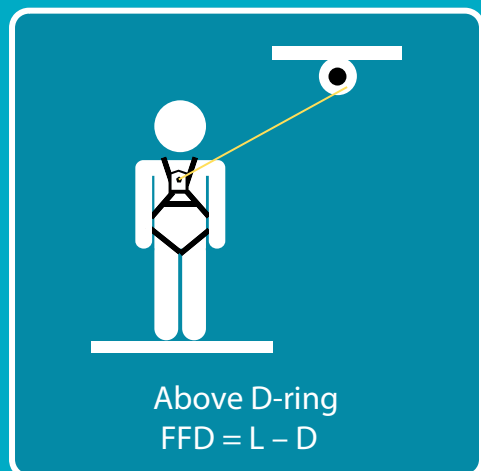
Calculating Free Fall Distance

FFD = Free fall distance

L = Lanyard length

D = Distance from D-ring to anchor point

When calculating FFD, the location of the anchor point is important whether above the D-ring, level with the D-ring, or below the D-ring.



Example: 6ft lanyard anchored 2ft above the D-ring, level with the D-ring, or 2ft below the D-ring.

$$\begin{aligned} \text{FFD} &= L - D \\ \text{FFD} &= 6\text{ft} - 2\text{ft} \\ \text{FFD} &= 4\text{ft} \end{aligned}$$

$$\begin{aligned} \text{FFD} &= L \\ \text{FFD} &= 6\text{ft} \end{aligned}$$

$$\begin{aligned} \text{FFD} &= L + D \\ \text{FFD} &= 6\text{ft} + 2\text{ft} \\ \text{FFD} &= 8\text{ft} \end{aligned}$$

If the manufacturer's maximum FFD is exceeded, work must not proceed as the equipment is being used outside of its specifications and limitations. MCR should only be calculated if FFD is safe and within manufacturer's specifications.

Calculating Minimum Clearance Required

$$\text{MCR} = L + E + D + H + S$$

MCR = Minimum clearance required
D = D-ring slide

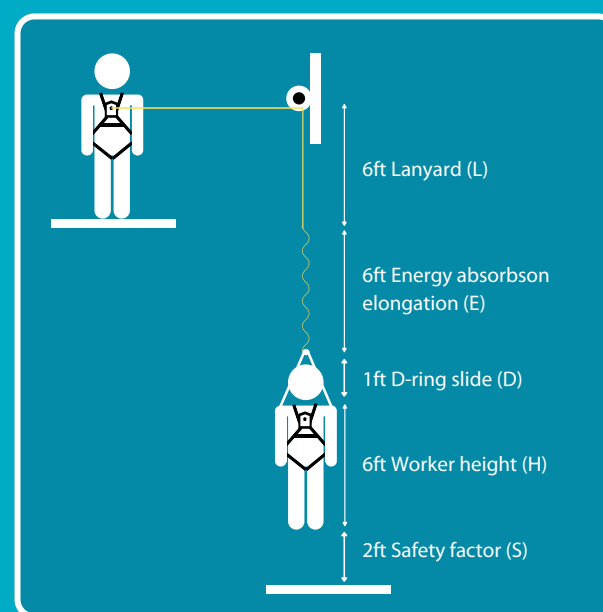
L = Lanyard length
H = Height of worker

E = Energy absorber elongation
S = Safety factor

$$\begin{aligned} \text{MCR} &= L + E + D + H + S \\ \text{MCR} &= 6\text{ft} + 6\text{ft} + 1\text{ft} + 6\text{ft} + 2\text{ft} \\ \text{MCR} &= 21\text{ft} \end{aligned}$$

Note: While a 6ft energy absorber elongation is used in this example, when calculating MCR, use the maximum energy absorber elongation as specified by the manufacturer.

If there is insufficient minimum clearance, work must not proceed until adjustments are made to allow work to be completed safely. Without sufficient clearance, a fallen worker may come into contact with obstructions below and incur serious or fatal injuries.



Disclaimer:

General calculations were completed using the upper limits of the scale for safety.

Where the exact minimum clearance is required, an employer may use manufacturer's instructions and a subject matter expert to determine the calculation.

This must be completed by a trained professional who understands the associated forces, the equipment, and limitations of the equipment.

This information is for a standard lanyard. The calculations for use with self-retracting lifelines, rope/rail grabs, lifelines, etc. will vary and carry their own risks.

Always consult and follow the manufacturer's instructions when using equipment. Do not assume what is presented will be acceptable for all equipment.

This calculation is not to be used to determine swing fall.