Recommended Weight for lifting and lowering

The NIOSH* Lifting Equation

*National Institute of Occupational Safety and Health (USA)

The National Institute for Occupational Safety and Health (NIOSH) in the USA identified factors that affected the amount of weight that could be safely lifted. The NIOSH Lifting Equation was created to help workplaces design and assess lifting and lowering tasks.

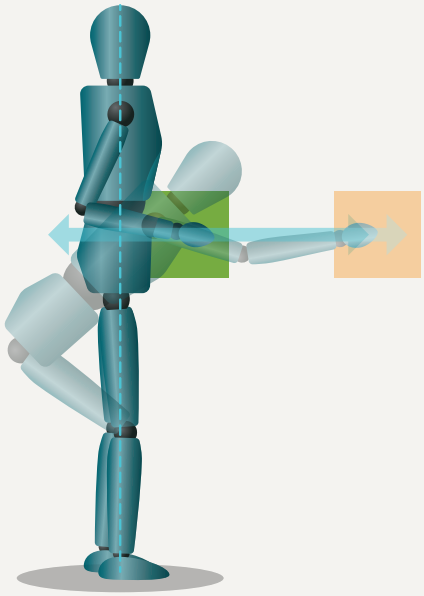
This tool recommends workplace lifting conditions under which it is believed nearly all workers may be repeatedly exposed, day after day, without developing work-related low back and shoulder disorders associated with repetitive lifting tasks.

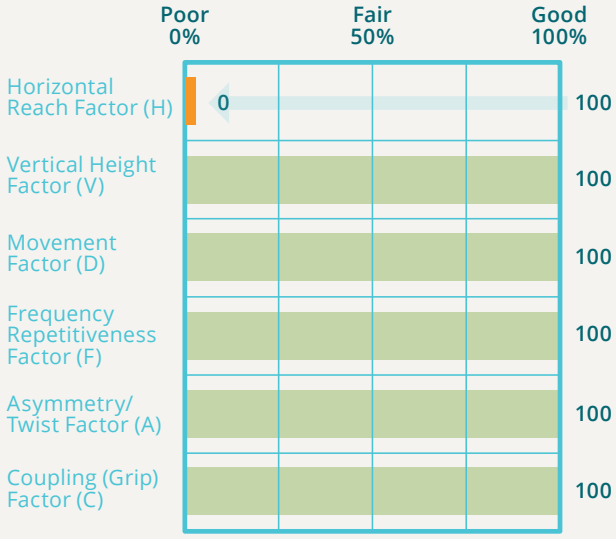
It is not possible to recommend a single maximum recommended weight for safe lifting, because it depends on many factors.

The NIOSH Lifting Equation combines the effect of six important factors.

In a perfect lifting situation the load is:

- Close in to the body,
- At waist height,
- Not moved much,
- Infrequently lifted,
- Moved with no twist, and
- Moved with a good grip on the object.





As the lifting situation deviates from perfect, the recommended weight decreases.

Let's look in more detail at how to put numbers to these effects. In the ideal case, the numbers for each lifting Factor – called multipliers – are at 100%. They can decrease to zero under some lifting conditions; for example, reaching too far forward.

The next idea is that of the "Load Constant" or the weight that could be lifted in an ideal situation.

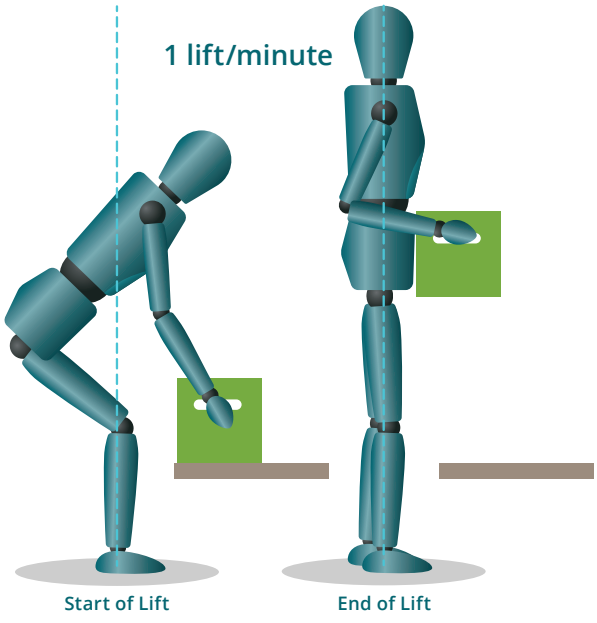
This is set at 23kg or 50lbs.

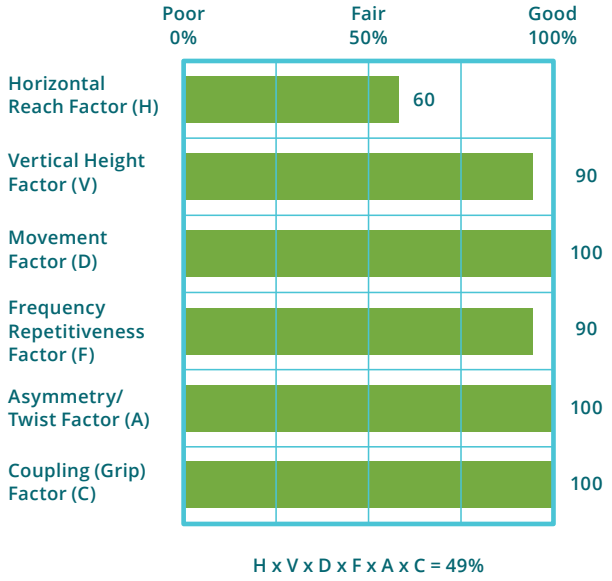
If one of the Factors drops to 50%, the recommended weight drops to 25lbs (0.5 x 50lbs).

In real-world lifts, many of the Factors may decrease from 100% at once. To account for their combined effects, all the Factors are multiplied together to estimate their overall effect.

Both the starting and ending position of the lift should be assessed and the lower recommended weight should be used.

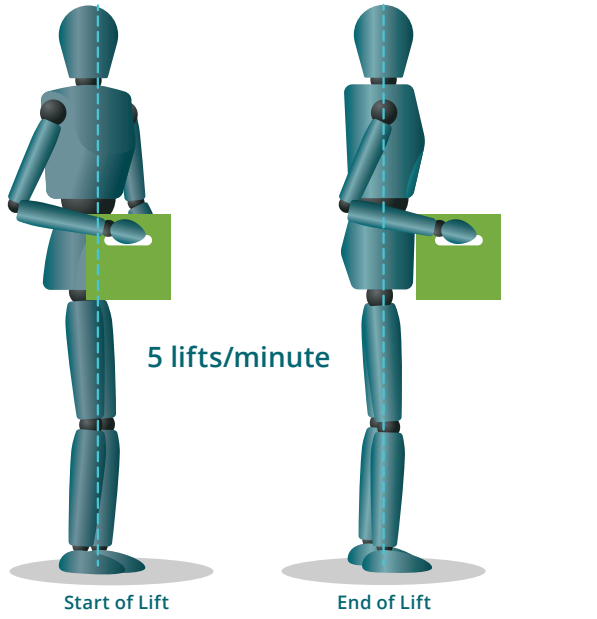
In the examples to follow, the end of the lift is perfect so the maximum recommended weight value at the start of the lift would be used.

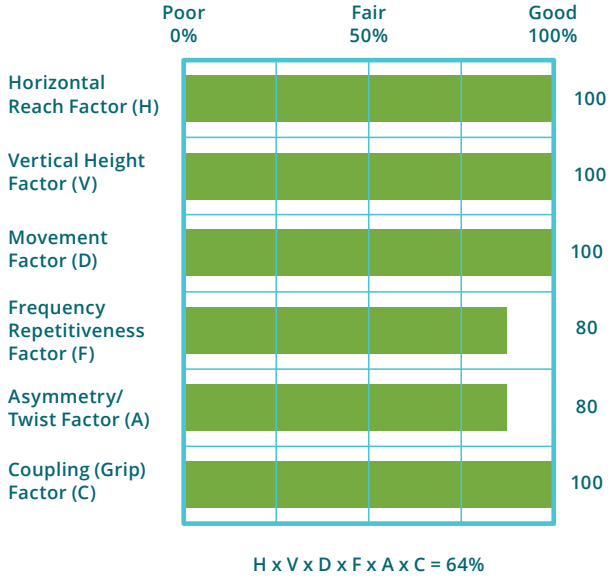




At the start of the lift, the first example deviates from the ideal situation as the Reach Factor is 60%, the Vertical Height Factor is 90%, and at 1 lift per minute, the Frequency Factor is 90%. When all the Factors are multiplied together, the result is 49%.

Multiplying this by the Load Constant gives a recommended weight of 49% x 50lb = 25 lbs or 49% x 23kg = 11.5kg.





At the start of the lift, the second example deviates from a perfect lifting situation as the Frequency Factor is 80%, and the Asymmetry/Twist Factor is 80%. If all the Factors are multiplied together, the result is 64%.

Multiplying this by the Load Constant gives a recommended weight of 64% x 50lb = 32lbs or 64% x 23kg = 14.7kg.

As with every tool, The NIOSH Lifting Equation only gives reliable values under specific conditions. If lifting takes place under conditions not accounted for by the equation's six factors, the recommended weight will be reduced.

Such conditions include one-handed lifting, more than 8hrs lifting or lifting whilst sitting or kneeling.

If conditions like these are present, a person with specialist knowledge, such as an ergonomist, should be consulted.

There are many resources that describe The NIOSH Lifting Equation in more detail available here, in your public Library or on-line.