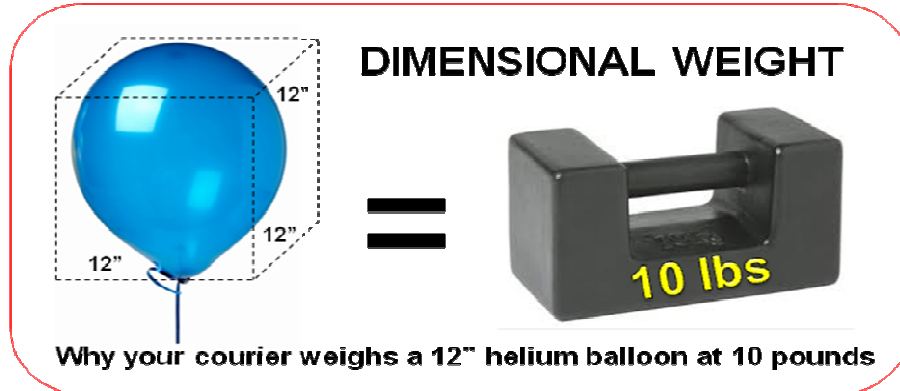


What Is Dimensional Weight & DIM FACTOR ?



The Importance of Volume and Weight of Cargo for Transportation

All cargo space involved in transporting goods has physical limits based on the volume of the cargo and the total weight. Once a cargo container (trailer, train, plane or shipping container) has reached its capacity in either volume or weight, the container is transported. Weight had traditionally been the measurement that the transportation costs of individual packaged freight were calculated for charging.

The reason that weight and volume charges are evaluated can be illustrated if one considers the cost of transporting a large volume with little weight (e.g. a box containing Styrofoam cups). A truck could be quickly filled to capacity with very little actual weight. Transportation companies have recognized these variables and most have allocated a minimum weight/volume standard in their billing to capture appropriate charges for a cargo of light density.

Dimensional (Volume) Weight

The dimensional weight (also known as volume weight) is the minimum allowable weight that a package of a particular size is allowed. A carrier may state that any package of one cubic foot (12"x12"x12") will have a minimum weight allowance of 10 pounds. If the cubic foot package actually weighs 8 pounds – it will be invoiced for 10 pounds. This is a minimum weight allowance – if the cubic foot package weighs 12 pounds – the charges will be based on 12 pounds.

 ***There are not any domestic or international standards for using dimensional weight that cover all modes of transport. A significant number of courier companies use the dimensional weight standard set by the International Air Transport Association (IATA) but many regional couriers define their own dimensional weights for ground delivery.***

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DIM Factor (Dimensional Weight Factor)

The DIM Factor is a mathematical value used to calculate the dimensional weight of an object. The DIM Factor represents the volume of a package allowed per unit of weight. Although mathematically related, the DIM Factor is different for measurements in units of inches/pounds and for measurements in centimeters/kilograms.

All major courier companies now apply the DIM Factor to virtually every rectangular parcel that they handle to determine the dimensional weight. They then adjust customer invoicing to reflect charges based on the greater weight between actual weight and dimensional weight.

Finding a DIM Factor using in/lb

Find the DIM factor if each cubic foot (12"x12"x12") has a minimum weight allowance of 10 pounds:

$$\frac{1 \text{ cu ft}}{10 \text{ lbs}} \quad \frac{12" \times 12" \times 12"}{10 \text{ lbs}} \quad \frac{1728 \text{ in}^3}{10 \text{ lbs}} \quad \boxed{172.8 \text{ in}^3/\text{lb}}$$

Finding a DIM Factor using cm/kg

Find DIM factor if each cubic meter (100cm x 100cm x 100cm) has a minimum weight allowance of 200 kg:

$$\frac{1 \text{ m}^3}{200 \text{ kg}} \quad \frac{100\text{cm} \times 100\text{cm} \times 100\text{cm}}{200 \text{ kg}} \quad \frac{1000000 \text{ cm}^3}{200 \text{ kg}} \quad \boxed{5000 \text{ cm}^3/\text{kg}}$$

IATA Dim Factors

Currently used by most large North American couriers:

- Domestic = Dim Factor [in³/lb] = 166 ; [cm³/kg] =6000
- International = Dim Factor [in³/lb] = 139 ; [cm³/kg] =5000

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Your cubing and reweighing solution.


Using DIM Factor (Dimensional Weight Factor)

The DIM Factor provides a quick determination of the dimensional weight of any rectangular package. The best way to demonstrate the use of DIM Factor is to describe an example application by a courier company:

What is the billing rate of a 10"x 12"x 14" package that weighs 8 lbs by a courier that has a minimum dimensional weight of 10 lbs per cubic foot (i.e.: DIM Factor = 172.8 in³/lb) ?

$$\frac{\text{Volume}}{\text{DIM Factor}} = \frac{\text{Volume}}{\text{Volume / lb}} = \frac{10 \times 12 \times 14 \text{ in}^3}{172.8 \text{ in}^3/\text{lb}} = \frac{1680 \text{ in}^3 \text{ lb}}{172.8 \text{ in}^3} = \mathbf{9.7 \text{ lb}}$$

The courier company will invoice based on 9.7 lbs – the dimensional weight.

 ***This is an example. Some courier companies always round dimensional weight up to the next pound, which would make the billing weight 10 lbs.***

Dim Factor Conversion Between in³/lb and cm³/kg

The ExpressCube Countertop will automatically adjust the selected DIM Factor to correspond to the units selected by the user. The mathematical relationship between DIM Factors can be expressed as follows:

$$\text{Dim Factor [cm}^3/\text{kg]} = \text{Dim Factor [in}^3/\text{lb]} \times 36.12728079$$

$$\text{Dim Factor [in}^3/\text{lb]} = \text{Dim Factor [cm}^3/\text{kg]} \times 0.027679913$$

Examples of Dim Factor Effect on Dimensional Weight Charges

The chart below illustrates the possible weight charges based on different Dim Factors. All dim factors used below are presently in use by couriers. [Box :20" x 10" x 12.5" = 10lbs]

Dim Factor	Actual Weight	Dimensional Weight	% Increase from Actual
250	10 lbs	10.0 lbs	0 %
194	10 lbs	12.9 lbs	+ 29 %
172.8	10 lbs	14.5 lbs	+ 45 %
166	10 lbs	15.1 lbs	+ 51 %
139	10 lbs	18.1 lbs	+ 81 %
115.2	10 lbs	21.7 lbs	+ 122 %

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How Comparative Shipping Knowledge and ExpressCube Can Save You Money

As technology has advanced, international and national courier companies have invested millions of dollars on machines that perform dimensional weight measurements on virtually every package² that they handle. This has resulted in dramatically increased revenue based on dimensional weight charges. For many shippers, dimensional weight results in additional charges to shipping invoices. This can be extremely frustrating, particularly because these costs can be very difficult to manually calculate prior to shipment.

You can accurately predetermine shipping costs by using ExpressCube to dimension and weigh your package² before shipment. The DIM Factor used by different courier companies will help you determine how each courier will treat the size of your package² when it is shipped. National couriers are currently following IATA standards but look to regional couriers for local deliveries to minimize penalty charges. Regional couriers can be better or worse than the national courier but substantial differences are there. The author of this report found ranges of Dim Factor 250 to 115.2 with just a cursory Internet search of courier rates.

Use the DIM Factor published by your courier company to establish the dimensional weight. The ExpressCube countertop unit will indicate which weight (actual weight or dimensional weight) you should use to determine shipping cost. You can preprogram different Dim Factors and then step through them at the press of a button to predetermine the dimensional weight for a given DIM Factor. The computer ExpressCube control software Sizelt II will calculate up to four different dimensional weights and display them simultaneously.

If your shipping department handles different priorities of shipments such as emergency repair parts, small orders, inventory spares, etc.; *all parcels should have a form filled out that clearly identifies when delivery is expected.* This allows the shipper to find significantly reduced cost alternatives for packages with longer delivery allowances.

There are rapidly emerging software solutions now that will quickly find the least cost routing of a package given the destination, weight, dimensional weight and delivery requirements. If you are researching to purchase this type of software, inquire if they can interface directly to an ExpressCube countertop unit. A shipper only has to place the package on the ExpressCube countertop unit and fill in the delivery information directly into the computer program to determine the most economical shipping route.

²Note: Packages are measured as rectangular objects. In the event that an object is irregular in shape, many couriers calculate the minimum dimensions of a rectangular box that could contain the object and use this figure for dimensional weight. The ExpressCube countertop unit directly measures rectangular packages. Dimensional guides are provided to determine the dimensions of irregular objects.

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