

PAUL JAKUBICEK



BIG TRUCK GUIDE

**UNDERSTANDING
SEMI TRUCK
WEIGHT & DIMENSION
REGULATIONS**

TRUCK DRIVER TRAINING TEXTBOOK

Understanding Semi Truck Weight and Dimension Regulations: Truck Driver Training Textbook

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1 Introduction

Trucking regulations are complicated, and the cost of operating a truck not in compliance is high for both truck drivers and trucking companies. This book is meant to help in training classes, orientation classes, and for general reference by drivers on the road. It is accompanied by a series of 4 quizzes that test the knowledge of the student so they fully understand the complicated world of trucking regulations.

Working through the four chapters gives an overview of trucking regulations in the United States and Canada. The first chapter explains the concepts of gross weight, tare weight, tire weights, axle weights and manufacturers' weights. The following two chapters explain US Federal regulations, and importantly, where these regulations apply and where they do not. The final chapter concentrates on a topic that is confusing and that many drivers find difficult, the distance that a set of tandem axles on a standard 5 axle truck can be from the kingpin of the trailer.

1.1 Learning Objectives

After working through this book you will be able to:

- Distinguish between gross weights, tare weights, and payloads
- Identify the different types of weight limits that apply to vehicles
 - Gross Weights
 - Axle weights
 - Tire Weights
 - Manufacturers' Weights
- Learn where US Federal Laws apply
- Understand how the Federal government controls truck dimensions
- Understand how the Federal government regulates weights including bridge weights
- Learn why kingpin to rear axle restrictions are in place
- Find out how to adjust your axles, and in what direction
- Find out what the maximum and minimum limits are for kingpin to rear axle measurements

2 Weight Restrictions on Semi Trucks

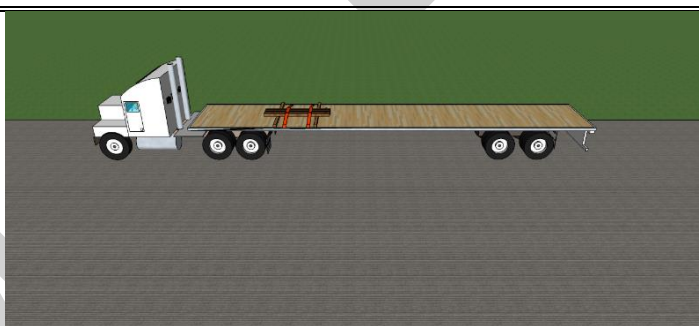
2.1 Gross Weights

The gross weight is the total weight of a semi truck. Governments make regulations that are concerned with the total weight of the truck, because this is the weight that can be easily measured, and is the weight that impacts roadways and bridges. In addition to paying attention to gross weights, drivers, trucking companies and shippers also have to be concerned about the weight of the truck without a load. This is because the empty weight of a truck changes the amount of weight there is left on a truck for a load. The pictures below explain these differences.

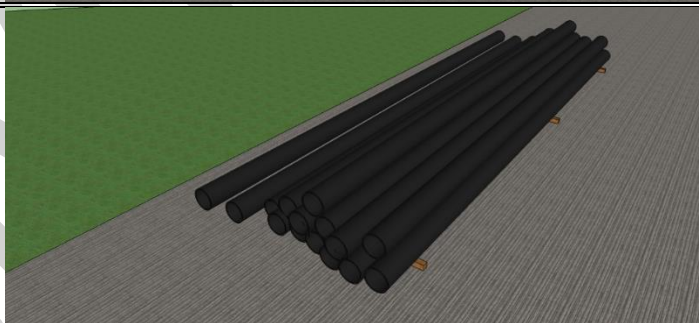
Comparing Payload, Gross Weight, and Tare Weight

$$\text{Gross Weight} = \text{Tare Weight} + \text{Payload}$$

Tare weight is the weight of the truck, trailer, driver, fuel and all equipment.



Payload is the amount of weight you can load on the truck.



Gross Weight is the total weight of the truck, all its contents, and its load.



Drivers have to know how much weight they can load on their truck. This is something that the driver has to measure, especially when operating a flatbed truck with a lot of equipment. The weight of the truck will always be different depending on what the driver puts into the truck.

Dunnage is extra material brought along on a truck (or ship) that is used to secure freight. It is not revenue generating.

If a driver wants to carry more weight as payload, an easy way to do this is by putting the truck on a “weight diet” and getting rid of unnecessary dunnage and truck decorations that add up in weight. Some companies reduce the size and weight of sleepers for trucks that routinely haul heavier goods.

The most common gross weight restriction in the United States is an 80,000 lbs truck. This weight restriction applies on the Interstate and National Network system of highways. Some states, through grandfathering clauses, allow higher weights than 80,000 lbs.

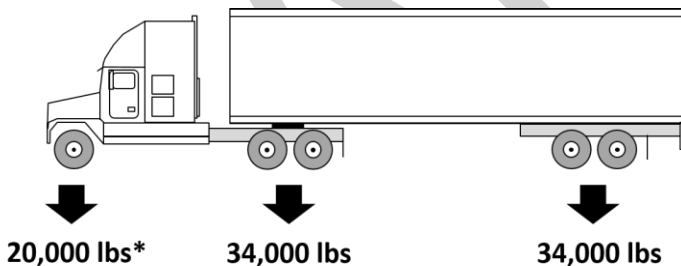
80,000 lbs is the legal weight on all Interstate and National Network Highways

2.2 Axle Weights

This section is an introduction to axle weights. These weight restrictions will be covered in more detail in Section 5.2 - Axle Weights.

Axle weights are a cap on the weight of one axle, or a group of axles by the government. Federal laws in the US set a maximum weight limit for a single axle to 20,000 lbs, and a group of tandem axles to 34,000 lbs. Steer axles are counted as single axles, but are subject to other weight restrictions like tire weight restrictions and manufacturers’ weight restrictions, so most steer axles are not allowed to carry 20,000 lbs.

In the same way as the gross weight restrictions described above, these axle weights are valid on interstates and the national network system of highways.



US Federal Law:

- Single Axle: 20,000 lbs*
- Tandem Axles: 34,000 lbs

* Steer axle weight is usually restricted to 12,000 lbs by the manufacturer

2.3 Tire Weight Limits

Tire weight limits are put into place to make sure that the individual tires on a truck are not overloaded. This is controlled by establishing a maximum weight per inch of tire width.

US Federal Regulations specify:

- 500 lbs per inch of tire width
- Steer tires do not have to comply

How to calculate tire width:

To calculate the tire width, a tape measure can be used, or the width is shown on the numbers that are printed on the side of the tire. The first number in the code on the tire is the width, and can be used for your calculation. In the picture at right, the tire shown has a width of 295 millimeters, which must be converted to inches. Looking on the internet, we can have this conversion done or we can convert using the following information:

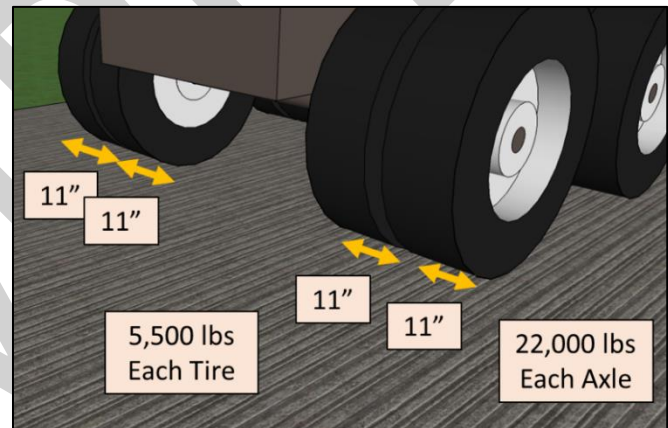


- 1 millimeter = 0.0393701 inches

This equals about 11.6 inches. After working through the math, see that in this case, we can cap the applicable tire weight limit to each tire at 5,500 lbs, and for an axle of tandem tires to 22,000 lbs.

How to calculate tire weights:

- $295 \text{ mm} \times 0.0393701 = 11.6 \text{ inches}$
- Round down to 11 inches to make the math easier (you don't have to)
- $11" \times 500 \text{ lbs} = 5,500 \text{ lbs per tire}$
- 4 tires per axle
- $5,500 \text{ lbs} \times 4 \text{ tires} = 22,000 \text{ lbs per axle}$
- $22,000 \text{ lbs} \times 2 \text{ axles} = 44,000 \text{ lbs}$



2.4 Manufacturer's Weight Limits

Manufacturers rate the equipment that they build for a certain weight. This makes sense, as the equipment itself must be able to carry the weight that you put on it, regardless of where you are driving the truck.

If a truck is operated off of public roads, for instance, if someone operates a dump truck on their own property, then this person would want to check the amount of weight recommended by the manufacturer so that the equipment isn't overloaded and damaged.