LTL Freight Class Density Guide

Based on the NMFC 13-Tier Density Scale

Version 2026.10 | Last reviewed: October 2026 | ltlclasscalculator.com

Use this guide to work out your shipment's density and find its estimated freight class. For an instant answer, use the free calculator at **ltlclasscalculator.com**.

1. How to Calculate Density

Density is how much your shipment weighs for the space it takes up. It is measured in pounds per cubic foot (PCF).

Density (PCF) = Total weight in pounds ÷ Cubic feet

Cubic feet = (Length × Width × Height in inches) ÷ 1,728

- **Step 1:** Measure the packed shipment in inches: length, width, and height.
- **Step 2:** Multiply length × width × height, then divide by 1,728 to get cubic feet.
- **Step 3:** Divide the total weight in pounds by the cubic feet. The result is your density.
- **Step 4:** Find that density in the chart on the next page to see the estimated class.

Worked example

A pallet measures 48 × 40 × 48 inches and weighs 500 pounds.

- Cubic inches: 48 × 40 × 48 = 92,160
- Cubic feet: 92,160 ÷ 1,728 = 53.33
- Density: 500 ÷ 53.33 = about **9.38 PCF**
- On the chart, 8 to under 10 PCF is **class 100**.

Same weight, shorter load: if the same pallet were packed 40 inches tall (and still safe), it would be 44.44 cubic feet, or 11.25 PCF. That falls in 10 to under 12 PCF, which is **class 92.5**. Only change your packing if the freight stays safe and protected.

2. Density-to-Class Chart (NMFC 13-Tier Scale)

Find your density in the left column. The number beside it is the estimated freight class.

Density (pounds per cubic foot)	Freight Class
50 and above	**50**
35 to under 50	**55**
30 to under 35	**60**
22.5 to under 30	**65**
15 to under 22.5	**70**
12 to under 15	**85**
10 to under 12	**92.5**
8 to under 10	**100**
6 to under 8	**125**
4 to under 6	**175**
2 to under 4	**250**
1 to under 2	**300**
Under 1	**400**

This chart follows NMFC Docket 2025-1, which took effect on July 19, 2025. It applies to items that are classified by density alone.

All 18 freight class numbers

The 18 class numbers in the NMFC are 50, 55, 60, 65, 70, 77.5, 85, 92.5, 100, 110, 125, 150, 175, 200, 250, 300, 400, and 500. The density chart above uses 13 of them. The other five (77.5, 110, 150, 200, and 500) are not part of this density chart, but they still appear in the NMFC for other items.

Important: Many products are not classified by density alone. Handling, stowability, and liability rules in the NMFC item for your goods can set a fixed class. Always confirm the class with your carrier before you book.

3. How to Measure and Weigh Your Shipment

- **Measure the packed shipment,** not the product box. Include the pallet, wrap, and anything that sticks out.
- **Use the outermost points.** Measure the longest, widest, and tallest parts.
- **Round fractions up** to the next whole inch, as many carriers do. Ask your carrier how it rounds.
- **Weigh the finished pallet.** The weight should include the pallet, shrink wrap, straps, and all packaging.
- **Several pallets?** If the pallets differ in size or weight, calculate each one on its own.

4. The Four Factors Behind Freight Class

Density is the most common factor, but the NMFC looks at four things when it assigns a class:

Factor	What it means
Density	How much the shipment weighs for the space it takes up.
Handling	How hard the freight is to move, load, or unload.
Stowability	How well the freight fits with other cargo, including whether it can be stacked.
Liability	How likely the freight is to be damaged, stolen, or to damage other freight.

5. Common Mistakes to Avoid

- **Measuring the product, not the packed load.** A product may be 42 inches tall, but the packed pallet may be 48 inches.
- **Leaving out pallet or packaging weight.** This makes your density look lower than it is.
- **Using smaller numbers to get a cheaper class.** Carriers inspect and re-weigh freight, and corrections can bring extra charges.
- **Treating an estimate as final.** Only the carrier assigns the class that is billed.
- **Skipping the NMFC item.** Density alone does not identify your product.

6. Before You Book: Checklist

- I measured the packed shipment at its outermost points, in inches.
- I weighed the whole shipment, including the pallet and packaging.
- I calculated density and checked it against the chart.
- I know the NMFC item number or commodity description for my goods.
- I confirmed the class with my carrier.
- I compared quotes from more than one carrier or broker.

7. Tips for Saving Money

- **Remove empty space.** A tighter load is denser, and denser freight usually gets a lower class.
- **Use the smallest pallet that fits** and avoid unnecessary height, as long as the freight stays safe.
- **Ask for quotes at two classes** if your load is close to a lower class, so you can see the real difference in price.
- **Compare carriers.** Prices for the same class can differ a lot from one carrier to another.
- **Check cargo insurance.** Carrier liability is often limited, so see whether extra cover makes sense for your freight.

Disclaimer

This guide provides density-based estimates using the NMFC 13-tier density scale (NMFC Docket 2025-1, effective July 19, 2025). Final freight classification, inspection, and billing are determined by the carrier based on the full NMFC rules. Shipments are subject to carrier re-weigh and re-measurement. Verify your NMFC item number with your carrier or at nmfta.org before booking. Last reviewed: October 2026.

About Freight Class Calculator

Freight Class Calculator is a free online tool that helps shippers, small businesses, and logistics professionals estimate freight class, density, and volume in seconds. Our goal is to make freight calculations fast, clear, and easy to understand, so you can avoid shipping mistakes and unexpected costs.

Free calculator: ltlclasscalculator.com
Questions or feedback: contact@ltlclasscalculator.com