Guide to Visco Memory Foam Mattress Firmness

By Liz Hoffman and Daniel Burrows

Special thanks to Michael Breus, Ph.D for his contribution to this special report.
“Firmness is the second most important criteria for people shopping for a new memory foam mattress (density being the most important). Unfortunately, firmness is often misunderstood by consumers and misused by retailers. Avoid falling into the ILD trap by reading these revealing findings first.”

Table of Contents

- How Does Mattress Firmness Work
- Five Memory Foam Firmness Myths
- Common ILD Ratings Chart
- Investigation Results
- Conclusions & Recommendations (not included in this PDF. Click here to read them at their original location).
How Does Mattress Firmness Work?

A prime myth of foam mattress firmness is that density is what makes a visco mattress soft or firm. This is not true. You can have very soft or very firm high density viscoelastic foam. This is emphasized by the Polyurethane Foam Association (PFA) themselves on their website in the Density Standards and Guidelines section.

Firmness is, in fact, determined by the ILD rating (Indentation Load Deflection), a property all foams have. Industry experts actually use IFD (Indentation Force Deflection) to measure firmness, which is about the same thing. Here's how it works.

**IFD/ILD measures the amount of force**, in pounds, required to indent a 50" inch disc into a 15"x15"x4" viscoelastic foam sample and make a 1" indentation. For example, 14 ILD means it would take 14 pounds to make a 1" indentation in the foam. That doesn't seem like a lot, does it?

After all, the human body weighs significantly more than that. Does that mean you will sink 2-3 inches deep in a memory foam mattress with 14-15 ILD? No, and here's why.

Memory Foam Firmness Versus Conventional Foam

In order to be considered supporting and firm, **ILD numbers for conventional foam mattresses range between 24-31 (medium firm)**. So how come ILD ratings for most viscoelastic foam mattresses on the market range between 10-16? Wouldn't that be too soft?

This significant difference between ILD ratings for memory foam versus other types of foams made us curious and eager to learn more. After some reading, here's what we can tell you. **Visco memory foam ILD readings are lower**, we believe, because the cell structure in memory foam is different than that of other types of foam:

- Conventional, closed-cell foam pushes back when you sit on it (unlike viscoelastic memory foam which has no spring-back force). This opposing force
means the force required to make a 1" indentation is much higher (up to 3 times as high). It's much easier to push someone away if they don't push back, isn't it?

- Visco foam mattresses also distribute weight much better than other foams do by spreading it on an wider area. This means your body weight is not concentrated in any certain place (usually the buttocks and shoulders) to push down and make a deep indentation.

Viscoelastic foam ranges between super soft 10 and semi rigid 120. The higher the rating, the firmer the feel, the lower the rating, the softer the feel. Thanks to improved weight distribution and lack of springiness, memory foam mattresses can have ILD values very close to the bottom threshold without being too soft. In fact, softer viscoelastic foam contours and relieves pressure much better than the firmer type (17 and over).

Having said that, it's important to remember that the above applies to the memory foam comfort layer laid on top of the mattress core. Viscoelastic memory foam is too soft (doesn't have enough support) to make a mattress entirely of it which is why it's mainly used as a comfort layer. The bulk of the support comes from the firm mattress core but the comfort layer does add to it to some extent. While visco foam ILD doesn't reflect mattress firmness, here's why it's important.

If the visco foam is too soft (ILD/IFD ratings of 10 and below), the mattress may no longer provide adequate support and comfort. Coupled with lack of proper density and thickness, the mattress's viscoelastic foam layer may bottom out. In other words, a poor quality comfort layer may ruin a perfectly good mattress.
Five Memory Foam Firmness Myths

Expert Opinion

We asked doctor Michael Breus, Ph.D, renowned expert in sleep disorders, featured expert on WebMD and AOL and author of Good Night: The Sleep Doctor's Guide to Better Sleep and Better Health? what he thinks of memory foam firmness. Here's what he said:

“I agree that most memory foam mattresses have an ILD of 12 to 15. However, none of this helps determine the functionality / quality of visco foam. It's important to remember that there is really no such thing as a supportive visco foam. Visco-elastic foam is a cushioning foam not a support foam.”

We've come across several misleading statements in our research and we're eager to explain them to our readers.

Myth 1. Memory Foam Has No ILD

All polyurethane foams, including viscoelastic foams have this physical property. To say that a visco foam mattress has no ILD would be like saying that water is not wet. We've only come across this statement twice during our research but it's important that consumers are aware of it.

Myth 2. ILD Measures The Ability To Push Back

Some websites say that ILD reflects the ability of viscoelastic foam to push back against the force pressing down on it. This is not true. Unlike other types of foams, visco foam does not push back. In fact, its open-cell structure absorbs shock and relieves pressure. What it does measure is how much weight it takes to make an indentation.

Myth 3. ILD Does Not Change In Contact With Body Heat

We've been one of the first to embrace the idea of heat-responsive memory foam that changes its ILD at body temperature. We're now able to explain this statement more clearly. Viscoelastic foam, by nature, responds to temperature. It is viscous in colder conditions and elastic when warmer.
The temperature range memory foam responds to can be closer to what your body can generate or much higher (150 F and over, for example). Visco foams that respond to the latter give the impression that they are NOT heat-responsive which is true, in a way (as consumers, we're only interested in visco mattresses that respond to what our body can generate).

We've had different retailers and manufacturers tell us that ILD ratings do not change with temperature. We have found proof to the contrary in the Temperature and Humidity Effects on IFD page from the Polyurethane Foam Association website.

In other words, if you measure the firmness of a memory foam mattress while you're sleeping on it, you will get a lower value. IFD readings do, in fact, change with body temperature.

**Myth 4. ILD Of Mattress Foam Core Is Less Important**

Viscoelastic memory foam is too soft and unsupportive to make a mattress entirely of it which is why it's mainly used as a comfort layer. For a memory mattress made of 2 or more layers, most of the support comes from the mattress core (the thicker and firmer of the two layers).

Memory foam does, of course, add to it, which is why its physical properties are important since you don't want to sink right through that layer. Memory foam, however, is useless without a firm, supportive core of 30 ILD and over.

**Myth 5. Firmness Is Less Important Than Density and Thickness**

Firmness cannot be ignored when shopping for a memory foam mattress. Consider this scenario. You buy a luxurious, 6" thick, 5.5 lb memory foam mattress with ILD of 10. This mattress will be so soft that you will sink right through all those 6 inches, despite its high density. Take this other example.

You buy a cheaper, 4", 3lb memory foam mattress with ILD of 15. This mattress will be firm but also, less supportive due to the lower density. It may appear to be supportive in the beginning, but over time, as the open cell structure begins to crumble, the remaining firmness will not be enough to keep you up.

Firmness, however, is not, on its own, a clear indicator of mattress quality. It is just one of the several quality indicators along with density, foam core properties, thickness, temperature-sensitivity, type of cell structure and resin quality. Memory foam ILD ratings are truly relevant only when considered along with all these factors and not judged independently.
Common ILD Ratings Chart

Most manufacturers and retailers fail to mention ILD ratings on their websites for 2 reasons:

- Because most customers seem to only be interested in density and unaware of ILD ratings.
- Because customers interested in ILD ratings misunderstand them and can misjudge the quality of a mattress as a result.

We've had many readers ask us about this specific property of memory foam so we've decided to investigate and clear things up once and for all.

We've contacted 31 manufacturers and retailers telling them about our special report on memory foam mattress firmness and asked them for ILD ratings. We've also had a friend posing as a potential customer contact the same manufacturers and retailers for the same information for comparison purposes. Click here to see the results sorted alphabetically by company name.
Investigation Results

Answers To Customer Questions

- Our customer friend received 15 answers from manufacturers/retailers regarding the firmness of their mattresses.
- Most (but not all) manufacturers have been prompt in answering the ILD question.
- Most (but not all) retailers and manufacturers were very knowledgeable on the subject of viscoelastic foam firmness and provided additional information which was helpful.
- Some companies, however, especially the larger and well-known ones, have made it difficult for our friend to get that information by asking for personal information beforehand while some failed to answer at all.

We felt that, overall, manufacturers and retailers have been open and honest about the firmness of their mattresses.

However, manufacturers and retailers are not readily open towards customers. In other words, if customers don't ask, they won't provide answers to this simple, but important question out of their own free will.

Answers To Our Questions

- We received 20 answers from manufacturers/retailers regarding the firmness of their mattresses.
- Some manufacturers/retailers who answered to our customer friend declined to take part in this study or failed to reply to our question.
- Some manufacturers have looked at our study with suspicion as if the information would be misused by the competition and/or accepted to take part only if their company would be presented in a favorable manner.
- A small handful of smaller retailers have been surprisingly up front and honest about their mattresses.

We felt that, overall, manufacturers and retailers who did answer us gave the same information as they did to our customer friend.

One can only wonder why manufacturers and retailers are afraid or unable to share such a basic feature of their products, one which should be as clearly displayed on their website as the density of the products.
Conclusions

Click here to read conclusions and recommendations on memory foam ILD ratings.

Useful Reading

- The Secret of Tempurpedic Mattress Quality
- How Long Does a Tempur-Pedic Swedish Mattress Last
- The Hidden Cost of Cheap Memory Foam Mattresses
- The Biggest Problem With Tempur-Pedic Swedish Mattresses
- Seven Secrets Behind Visco Memory Mattress Trials