MARSDEN

A Complete Guide to Body Composition Scales

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Body composition scales: Weighing scales with fancy features - or an essential tool for monitoring health and wellbeing?

By far the most common way of monitoring weight - and weight loss - has traditionally been using weighing scales. Slimming and fitness groups use weighing scales and weekly weigh-ins as a guide to how members are progressing on their journey towards a healthier, slimmer and fitter body.

Body composition scales, however, offer more information and can be used to more closely monitor body health.

They do this by using bioelectric impedance analysis - a very small, harmless electric current is delivered through the body; then, the resistance that the current comes up against allows a calculation for body composition readings. For example, electricity travels more easily through water, and this is how the scale determines Total Body Water. Less resistance - a higher Total Body Water reading.

Apart from weight and height, the common readings you can obtain from a body composition scale include Body Fat Percentage, Total Body Water, BMI, Basal Metabolic Rate and Fat Mass/Fat Free Mass. In this document, we take a look at each of the readings in detail - explaining what they mean and why they're good to know if you want to fully understand the health of your body.

Body Mass Index (BMI)

BMI is the most commonly used method of determining overall body health and whether a person is overweight or not. BMI is calculated by taking into account a person's weight in kilograms divided by the square of their height in metres - it means national (and international) figures can be compared and the overall body health of a nation can be determined.

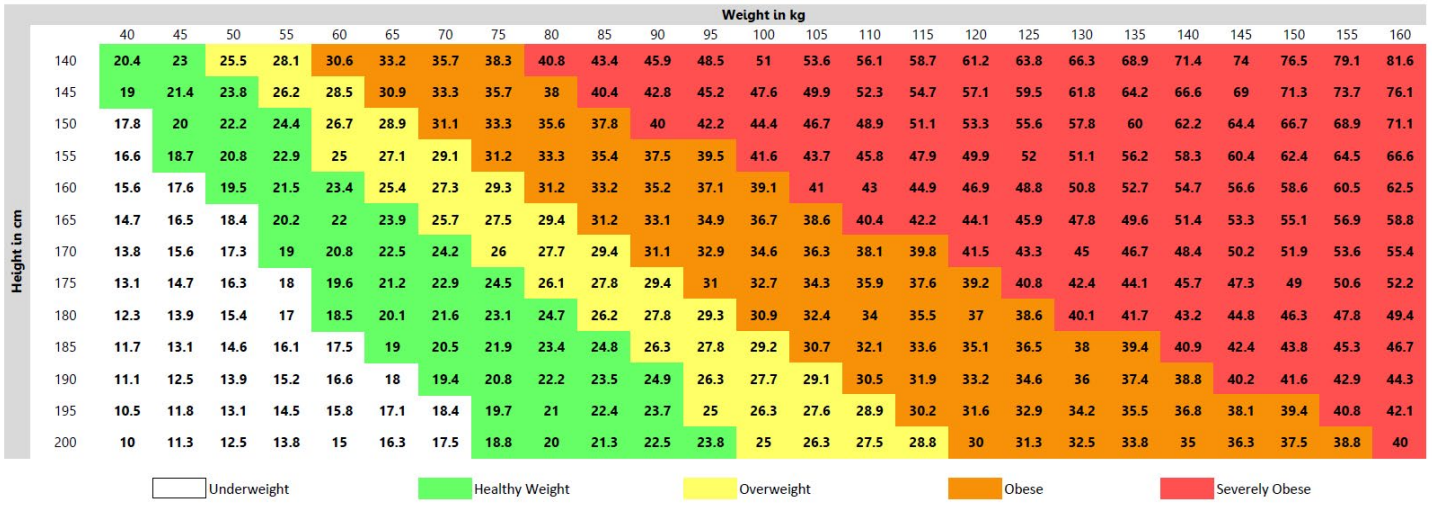
BMI is easy to measure because it's a non-invasive way of assessing excess body weight, and research studies have demonstrated a relationship between raised BMI and an increased risk of illness or death. It's important to remember that BMI does not take into account muscle, so it is best to use these readings in the context of other results that body composition scales provide.

It's also just one number which aids tracking, helping you to stay focused on your weight loss/gain goals.

What is healthy?

Underweight is a BMI less than 18.5
Normal weight is a BMI between 18.5 and 24.9
Overweight is a BMI of 25 to 29.9
Obesity is a BMI of 30 or greater

TOP TIP: Since BMI is an indicator of how much fat mass you're likely to have, focus on reducing Fat Mass first. Simple steps like eating more healthily and exercising more will make a big difference, and many sources state that even just losing 5-10% of your body weight (which, if you're overweight, will have a positive knock-on effect on your BMI) can produce big health benefits.



Height in cm	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
140	20.4	23	25.5	28.1	30.6	33.2	35.7	38.3	40.8	43.4	45.9	48.5	51	53.6	56.1	58.7	61.2	63.8	66.3	68.9	71.4	74	76.5	79.1	81.6
145	19	21.4	23.8	26.2	28.5	30.9	33.3	35.7	38	40.4	42.8	45.2	47.6	49.9	52.3	54.7	57.1	59.5	61.8	64.2	66.6	69	71.3	73.7	76.1
150	17.8	20	22.2	24.4	26.7	28.9	31.1	33.3	35.6	37.8	40	42.2	44.4	46.7	48.9	51.1	53.3	55.6	57.8	60	62.2	64.4	66.7	68.9	71.1
155	16.6	18.7	20.8	22.9	25	27.1	29.1	31.2	33.3	35.4	37.5	39.5	41.6	43.7	45.8	47.9	49.9	52	51.1	56.2	58.3	60.4	62.4	64.5	66.6
160	15.6	17.6	19.5	21.5	23.4	25.4	27.3	29.3	31.2	33.2	35.2	37.1	39.1	41	43	44.9	46.9	48.8	50.8	52.7	54.7	56.6	58.6	60.5	62.5
165	14.7	16.5	18.4	20.2	22	23.9	25.7	27.5	29.4	31.2	33.1	34.9	36.7	38.6	40.4	42.2	44.1	45.9	47.8	49.6	51.4	53.3	55.1	56.9	58.8
170	13.8	15.6	17.3	19	20.8	22.5	24.2	26	27.7	29.4	31.1	32.9	34.6	36.3	38.1	39.8	41.5	43.3	45	46.7	48.4	50.2	51.9	53.6	55.4
175	13.1	14.7	16.3	18	19.6	21.2	22.9	24.5	26.1	27.8	29.4	31	32.7	34.3	35.9	37.6	39.2	40.8	42.4	44.1	45.7	47.3	49	50.6	52.2
180	12.3	13.9	15.4	17	18.5	20.1	21.6	23.1	24.7	26.2	27.8	29.3	30.9	32.4	34	35.5	37	38.6	40.1	41.7	43.2	44.8	46.3	47.8	49.4
185	11.7	13.1	14.6	16.1	17.5	19	20.5	21.9	23.4	24.8	26.3	27.8	29.2	30.7	32.1	33.6	35.1	36.5	38	39.4	40.9	42.4	43.8	45.3	46.7
190	11.1	12.5	13.9	15.2	16.6	18	19.4	20.8	22.2	23.5	24.9	26.3	27.7	29.1	30.5	31.9	33.2	34.6	36	37.4	38.8	40.2	41.6	42.9	44.3
195	10.5	11.8	13.1	14.5	15.8	17.1	18.4	19.7	21	22.4	23.7	25	26.3	27.6	28.9	30.2	31.6	32.9	34.2	35.5	36.8	38.1	39.4	40.8	42.1
200	10	11.3	12.5	13.8	15	16.3	17.5	18.8	20	21.3	22.5	23.8	25	26.3	27.5	28.8	30	31.3	32.5	33.8	35	36.3	37.5	38.8	40

Metabolic Measurements Explained

Basal Metabolic Rate (BMR)

Basal Metabolic Rate allows you to set an accurate, realistic calorie goal. Think a healthy diet is consuming as few calories as possible? Wrong. Calories mean energy, and your body needs a minimum number of calories just to function.

Basal Metabolic Rate is a calculation of the minimum amount of calories your body needs to function. It is based on the number of calories the body would need if resting for 24 hours. This allows you to work out an accurate calorie intake target for your body - far more accurate than a generic calculation which might be found online - enabling you to create a diet programme.

A person with a high BMR burns more calories than a person with a low rate. Around 70% of calories consumed every day are used for your basal metabolism. It fits hand in hand with muscle mass, as the greater the muscle mass, the higher the BMR and the more calories are burned.

Metabolic Age (AGEM)

AGEM is worked out by comparing the Basal Metabolic Rate to the average BMR of your age group. If the Metabolic Age is higher than your actual age, it is a sign that you need to improve your metabolic rate.

TOP TIP: You can improve your AGEM by making changes to your diet and exercising regularly. Eating more protein, sleeping more and resistance training also help.

Fat Measurements Explained

In the US, the National Center for Biotechnology Information says: "Research has been focusing on the need to maintain Fat Free Mass during weight loss because of its integral role in metabolic rate regulation, preservation of skeletal integrity and maintenance of functional capacity. It has been suggested that Fat Free Mass loss should compose no more than 30% of total weight loss.

Where weight and BMI provide an idea of body health, body fat measurements provide a much more definite result. This is because these readings tell you what your body comprises of. For example, muscle weighs more than fat, and BMI and weight readings alone will not take this into account.

Marsden body composition scales measure body fat in a number of ways, and provide measurements for Fat Mass, Fat Free Mass, Visceral Fat Area Level and Body Fat Percentage.

Fat Free Mass (FFM) + Fat Mass (FM)

Fat Mass is the total mass of the fat in the body and Fat Free Mass is everything else: including bones, muscle and water. Fat Mass and Fat Free Mass are your Body Fat Percentage expressed in the form of a weight reading.

Some body fat is classified 'essential fat' - which the body needs to function, and keep organs warm. Therefore a Fat Mass reading that's too low can be dangerous.

Calories or energy in the body come from what we eat and drink. Energy is burned from physical activity, but if you consume more than you burn excess calories are stored in fat cells, culminating in excess body fat. Too much body fat can damage long-term health.

Additionally, when tracking weight loss, it's important that Fat Free Mass reduces as little as possible.

Body Fat Percentage

Body fat percentage is the proportion of fat mass compared to everything else (bones, muscles and water).

Body Fat Percentage gives a good indication of body health, because it measures body fat and excludes other elements such as water and muscle. Unlike Fat Mass, where a healthy reading will be different for everyone – because everyone has a different body weight – it is much easier to set yourself goals with Body Fat Percentage.

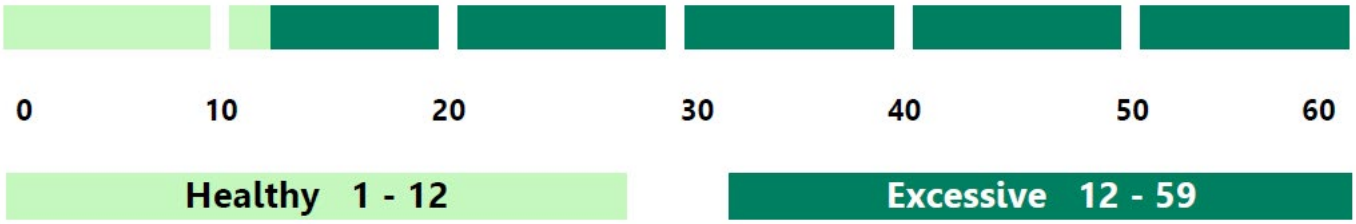
The Royal College of Nursing says the healthy target for body fat percentage changes with age. For men aged 20-39, for example, target body fat percentage is 8-20%; after 60 years of age this increases to up to 25%.

TOP TIP: The key to losing fat is to consume less calories than you burn. If you're female, try consuming 1500 calories a day. If you're male, consume 2000 calories a day.

Visceral Fat Area Level (VFA)

Visceral Fat is the fat which protects vital organs. Ensuring you have a healthy level of visceral fat directly reduces the risk of diseases such as heart disease and high blood pressure.

VFA is used to determine the risk of diabetes, alongside BMI. VFA is shown as a level out of 60, with 1-12 being healthy.



Indicates you have a healthy level of visceral fat. Continue monitoring your rating to ensure it stays within the healthy range.

Indicates you have an excess level of visceral fat. Consider making changes in your diet and/or increasing the amount of exercise you do.

Muscle Measurements Explained

Muscle Mass (MM)

This consists of skeletal muscles, smooth muscles and the water which is contained within them. As muscle mass increases, the rate at which energy is burned increases, accelerating the basal metabolic rate.

An increase in muscle mass may increase total body weight, and muscle weighs more than fat. Therefore, it is important to monitor each aspect of the body separately using body composition measurements.

Muscle Mass is not the same for everyone and will vary depending on age and fitness level. The amount of muscle in your body decreases drastically after the age of 45 according to a 2000 study in the Journal of Applied Physiology.

Protein Mass (PM)

Protein Mass tracks the amount of protein in the body. A lack of protein can be linked to an increase in body fats: A study published in the Journal of the American Medical Association in 2012 showed that those on a low-protein diet gained roughly half as much weight during the experiment as those assigned to a standard or high-protein diet; however body fat accounted for a much higher percentage of their weight gain.

Those on the low-protein diet lost lean 500g of lean body mass - which includes muscle mass - whereas those on normal or high protein diets gained around 2.5kg and 3kg respectively.

As you get older you need more protein due to anabolic resistance, which lowers the body's ability to break down and synthesize protein. The Dietary Reference is 0.8g of protein per kg of body weight.

Skeletal Muscle (SM)

Skeletal Muscle is one of three major muscle types (alongside cardiac and smooth muscle). It is the most common of the three. These types of muscles are attached to bones by tendons and produce all the movements of body parts in relation to each other. 30 to 40 percent of a healthy person's body mass is made up of skeletal muscle, according to Steven Heymsfield, author of 'Human Body Composition'.

TOP TIP: Increase the amount of protein in your diet in order to gain muscle and protein mass. On average, around 78g of protein per day is required to avoid losing muscle mass. Exercise regularly but also monitor your readings regularly to understand the effect exercise is having on your muscle and protein mass.

Water measurements explained

Extracellular Water (ECW)

Water found outside of cells is called Extracellular water - which helps tissue to function well. Nutrients are served to membrane-bound cells via extracellular water, such as sodium, potassium, calcium, chlorides and bicarbonates.

An increase in extracellular water can cause excess weight and swelling in your limbs. Imbalances may cause symptoms such as decreased mental alertness, nausea and dizziness or result in high blood pressure. Typically, roughly one third of your body is extracellular water.

According to researchers, increased extracellular water is a key element in increased body fat. An increase in body fat is accompanied by an increase in extracellular water as well. In other words, body fat lacks adequate amounts of intracellular water.

A healthy ECW reading is between 0.36 and 0.39.

Intracellular Water (ICW)

Water that is located inside your cells is intracellular water - in healthy people it comprises two thirds of the water inside your body. This type of water plays an important role in allowing molecules to be transported to different organelles inside the cell.

Having an increased ICW can signal a positive change in your body composition. When muscle cells become larger, they require more ICW in order to power their cellular functions. Increased ICW contributing to an increased lean body mass can lead to an improved BMR, increased strength and a better immune system.

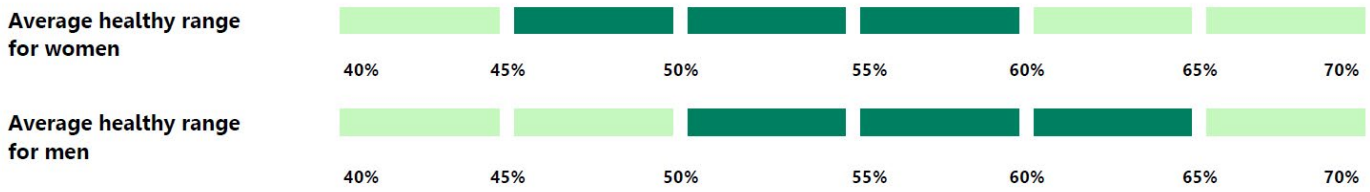
Healthy fluid distribution is estimated at around 3:2 ratio of ICW:ECW. If your body water becomes unbalanced, this can signal changes in your health and body composition.

Total Body Water (TBW)

Body water is a good indicator of good body-health, in that it shows how hydrated the body is. The body needs water for transporting waste, helping organs to function, regulating body temperature and digestion.

Age, size and gender will all affect your body water percentage, but body water percentage should generally be, for men, between 50 and 65%, and for women, between 45 and 60%.

TOP TIP: In order to stay hydrated, you should drink at least 2 litres of water every day.



Recommended Weighing Scales

Marsden MBF-6010

Body Composition Column Scale with Printer

- Provides all the readings covered in this guide
- Robust design
- Fitted with wheels for easy movement
- Comes with printer as standard
- Height measure available

Marsden MBF-6000

Body Composition Scale with Printer

- Provides all the readings covered in this guide
- Portable design
- Comes with printer as standard
- Carry case available

MARSDEN

Tel: 01709 364296 / 0800 169 2775
Fax: 01709 364293
E-mail: sales@marsdengroup.co.uk

www.marsden-weighing.co.uk

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