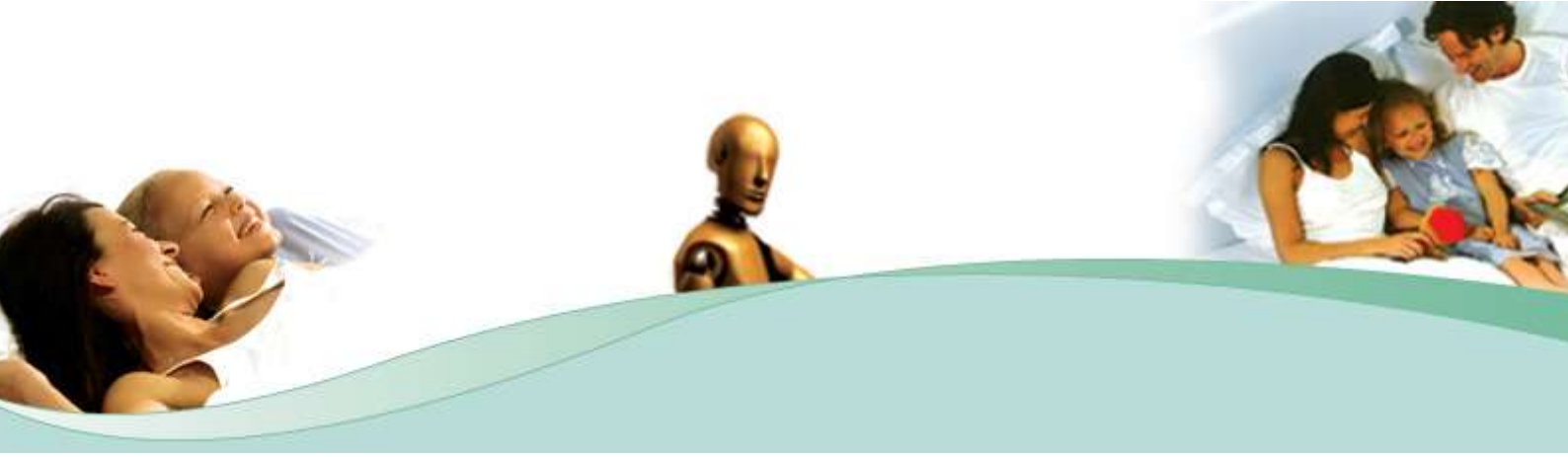

EBIA's Sales Manual

A practical guide for the bedding sales force

EBIA
european bedding industries' association

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I. Importance of Sleep

Sleep is a natural stage of the mind and body in which the body is at rest and the mind is oblivious of the outside world. It is characterized by a reduction in voluntary body movement, decreased reaction to external stimuli, an increased rate of anabolism (the synthesis of cell structures), and a decreased rate of catabolism (the breakdown of cell structures). Sleep is a time for the body's renewal that helps meet the demands of the waking hours. About one-third of our life is spent sleeping. Scientists do not know entirely what sleep is really for, or completely how it works. They have only discovered the faint edges of a mysterious outline.

Sleep is a natural state of rest for the body's renewal

"Sleep is the golden chain that ties health and our bodies together."

Thomas Dekker (1572-1632)

Quantity of sleep

Different people sleep for different lengths of time. For some, 4 hours a night is adequate to function normally. Others require as much as 10 hours each night. The average is somewhere around 7 and a half hours.

Functions of sleep

While we sleep our pituitary gland releases large amounts of growth hormone. This amount peaks at about one hour after falling asleep and gradually decreases towards dawn. So, sleep seems to be a state marked by physiological processes of growth and rejuvenation of the organism's immune, nervous, muscular and skeletal systems. During sleep, muscles relax, blood vessels in the skin widen and body temperature drops. Heart function slows, as does breathing. The body rests and rejuvenates while sleeping. Each cell is regenerated. During sleep, the body's metabolic rate

decreases which allows it to preserve energy to support our busy lifestyle and overall health.

There is also evidence that sleep restores mental alertness and memory. When you sleep, portions of your brain shutdown or lower their activity rates. This is advantageous because your brain uses chemical neurotransmitters to send messages along neurons. Sleep allows these neurotransmitters to be replenished so you can think clearly and quickly. A comparison might be to pouring new oil in a car to keep it running smoothly.

It is obvious that there is not one single 'function'of sleep, but rather a heterogeneous nature of sleep. All-in-all sleep is necessary for physiological and mental health. That is why the problems and damages of deprivation of sleep or the missing relaxation in sleep are numerous and have far-reaching consequences.

Sleep is necessary for physiological and mental health.

Sleep disorders

Suffering from sleep disorder or a non-restorative sleep can bring about multiple negative consequences: affected concentration and working capacities, limited perception, indisposition, nervousness and fractiousness. In the long-term sleep disorder can even lead to e.g. depression and hallucinations. Being well rested and relaxed not only affects the subjective sense of well being but also the social capacity and strength, in the family, with friends and in professional life.

Sleep and beds

It is understood, that the bed plays an essential role in the quality of sleep. Sleeping on a mattress, which does not fit personal needs and consequently does not give the necessary support to the body for a long time, cannot only lead to the listed sleep disorders but e.g. also to various ailments of the spine.

Sleep disorder can lead to heterogeneous diseases.

There are four basic requirements for a good mattress to enhance a healthy sleep. In order of importance: maintain spinal alignment, reduce surface pressure, regulate body temperature, and resist nasty allergens.

- Maintaining spinal alignment. Mattresses and bed bases that do not support your spine produce backaches. The ideal position of your spine while lying is the same as it while standing. A mattress that is too hard will tend to put pressure on your shoulders and hips while not supporting your lower back or side. Soft mattresses often sag, causing your spine to follow the curve of the mattress. Only a mattress that can conform to your body without sagging will give adequate support. This support should be felt evenly along the length of your body, especially at your waist and lower back.

A mattress should conform to your body.

- Reducing surface pressure. High pressure on your shoulders and hips causes tossing and turning because it restricts blood flow and eventually will cause these joints to ache. A mattress that conforms to the shape of your body will distribute your weight evenly and

The mattress should distribute the weight of the whole body evenly

eliminate high-pressure areas. This will allow your body to relax and reach the deeper levels of sleep, which ensure the highest lever of body recovery. This pressure can be measured scientifically to assure proper circulation.
One can also test this by lying on the side and feeling the pressure on shoulders and hips.

- Regulating body temperature. Sleeping too hot or too cold will also cause tossing and turning. While we sleep, our bodies give off moisture, which gets trapped in our bedding. This dampness interferes with our body's ability to regulate its own temperature. The best cure for this is wool, either as the top layer of the mattress or in a separate mattress pad. Wool can absorb up to one third of its weight in moisture without feeling damp. It also dissipates moisture much faster than down, cotton, or polyester. Since you are drier, you are warmer in the winter and cooler in the summer. Your heartbeat actually slows down, and you fall into a deeper sleep.

Body temperature should be regulated by the mattress

- Reduce harmful allergens. Waking up with sinus troubles in the morning may indicate dust mites, mould or mildew causing allergies. Some mattress materials are anti-microbial (such as latex), so that dust mites will not reside in these mattresses as easily as in others and these mattresses offer a certain protection for those who struggle with allergies. The cover of the mattress is also key to overcome the allergy problem.

A good mattress should be as resistant against allergens as possible.

II. Sleep and the Human Body

A. Phases of Sleep

The cycle between sleep and wakefulness involves five different stages of sleep, some of which are more restful than others. These stages progress in a cycle from stage 1 to rapid-eye-movement (REM) sleep, then the cycle starts over again.

Scientists differentiate five stages of sleep

We spend almost 50 percent of our total sleep time in stage 2 sleep, about 20 percent in REM sleep, and the remaining 30 percent in the other stages. Infants, by contrast, spend about half of their sleep time in REM sleep.

During stage 1, which is light sleep, we drift in and out of sleep and can be awakened easily. Our eyes move very slowly and muscle activity slows. People awakened from stage 1 often remember fragmented visual images. A lot also experience sudden muscle contractions called hypnic myoclonia, often preceded by a sensation of starting to fall. These sudden movements are similar to the "jump" we make when startled. During this period, the subject loses conscious awareness of the external environment: Stage 1 can be thought of as a transitional state between wake and sleep.

Stage 1 is the transitional state between wake and sleep

When we enter stage 2, our eye movements stop and our brain waves (fluctuations of electrical activity that can be measured by electrodes) become slower, with occasional bursts of rapid waves called sleep spindles. In stage 3, extremely slow brain waves called delta waves begin to appear, interspersed with smaller, faster waves.

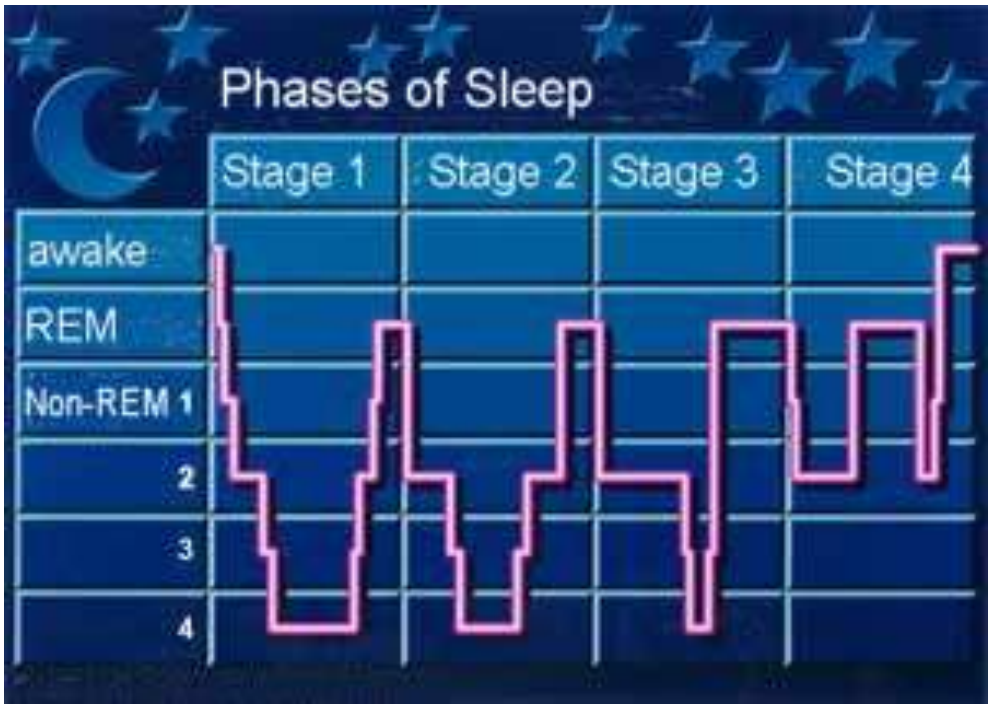
In stage 2, the brainwaves become slower

By stage 4, the brain produces delta waves almost exclusively. It is very difficult to wake someone during stages 3 and 4, which together are called deep sleep. There is no eye movement or muscle activity. People awakened during deep sleep do not adjust immediately and often feel groggy and disoriented for several minutes after they wake up. This is the stage in which night terrors, bedwetting, or sleepwalking occur.

Stages 3 and 4 are marked by extremely low brain waves, called delta waves

When we switch into REM sleep, our breathing becomes more rapid, irregular, and shallow, our eyes jerk rapidly in various directions, and our limb muscles become temporarily paralysed. Our heart rate increases and our blood pressure rises. When people awaken during REM sleep, they often describe bizarre and illogical tales – dreams. However, dreams can also occur during all stages of non-REM sleep. The first REM sleep period usually occurs about 70 to 90 minutes after we fall asleep. A complete sleep cycle takes 90 to 110 minutes on average. The first sleep cycles each night contain relatively short REM periods and long periods of deep sleep. As the night progresses, REM sleep periods increase in length while deep sleep decreases. By morning, people spend nearly all their sleep time in stages 1, 2, and REM.

Stages of sleep can also be divided into REM-sleep and non-REM-sleep



People awakened after sleeping more than a few minutes are usually unable to recall the last few minutes before they fell asleep. This sleep-related form of amnesia is the reason people often forget telephone calls or conversations they have had in the middle of the night. It also explains why we often do not remember our alarms ringing in the morning if we go right back to sleep after turning them off.

B. The Backbone

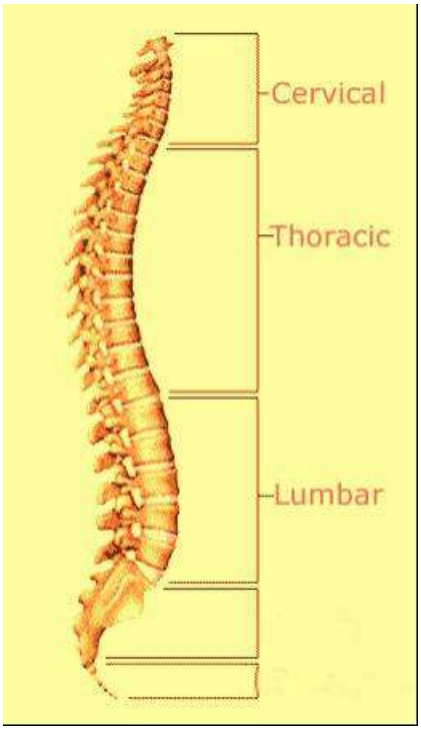
It is important we look after our teeth and feet but it is equally important for us to look after our spines. By doing so, one can contribute to preventing back damage. The back is the main support of the body and the whole skeleton. The location of the backbone is behind each organ in the body, including the heart. It surrounds and protects the delicate spinal cord.

The backbone is the main support of the body and the whole skeleton

The normal anatomy of the spine is usually described by dividing the spine into 3 major sections: the cervical, the thoracic, and the lumbar spine. Each section is made up of individual bones called vertebrae. There are 7 cervical vertebrae, 12 thoracic vertebrae, and 5 lumbar vertebrae. The top two vertebrae differ in appearance from the others and work as a pair: the first, called the atlas, rotates around a stout vertical peg on the second, called the axis.

The spine can be divided into the cervical, the thoracic, and the lumbar spine

This arrangement allows the skull to move freely up and down, and from side to side. Muscles and ligaments attach to the sections. The muscles support the spine. Between each pair of vertebrae is a disk of cartilage that cushions the bones during movement. Cartilage makes up 25% of the spine's length. The spinal cord is the centre of the nervous system, which is the feeling system. "Your spine is not meant to be straight," says Scott D. Boden, M.D., director of the Emory Spine Center in Atlanta. "It has three natural curves: one in your lower back, one in the middle of your back, and one near your neck."
These 3 front-to-back curves give the spine an "S" shape. If one wakes up sore and achy each morning although your mattress is new, one may need re-evaluating how one is sleeping.



The spine has three natural curves, which give it an "S" shape

C. Sleeping Positions

To get the best out of your daily rest, one should not only ensure that the 'S'-shape of the spine is properly supported, but also have good blood circulation during the sleep.

The sleeping position should support the "S" shape of the spine

There are three main sleep positions — back, stomach and side.

During a night's sleep, most people use more than one position. There may be several sleeping positions that one might find comfortable and at the same time ensure proper blood flow. Having a correct sleeping position prevents stiffness and soreness one might experience in the morning. A proper sleeping position can effectively relieve any back strains, as the sleeping position determines which part of the body will interface with the mattress. This in turn determines the amount of the body's stress. If one is frequently experiencing headaches when waking up, changing the sleeping position might just do the trick. Use of a pillow can also help provide additional support and take pressure off certain parts of the body.

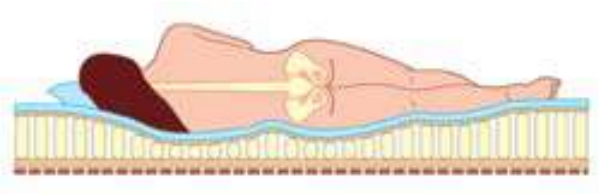
- Sleeping on one's side is one of the most common positions. This is done in the foetal position with the knees bent and a pillow tucked between the legs and will take away most of the back stress. Neck and spine should be properly aligned. Some say it is best to always sleep on the right side, as sleeping on the left would cause stress on the vital organs (liver, stomach, lungs). Sleeping on one's side can

Side sleeping is very common

help people with osteo-arthritis, spinal stenosis or those suffering from spinal and hip problems. Side sleepers usually put the biggest amount of weight on the smallest areas of the body thereby creating pressure points, which reduce circulation and can be a cause of the tossing and turning during sleep

A side sleeper will probably require a softer mattress, as it will support the body's curves to minimize pressure points, especially if they have a more round figure.

Side sleeping requires a softer mattress



- Sleeping on your back is yet another position you can try. This is done with a big, fluffy pillow placed beneath your knees to help maintain the natural curve of your lower back and to reduce the pressure on the sciatic nerve. The pillow should have just the right thickness to fit the space between the surface of your bed and your limbs. This position is best for people with low back pains. It also allows internal organs to rest well. This can also be achieved by a bed base that can be adapted to the body shape. Use a small pillow or a rolled-up towel under your neck as long as it does not push your chin too far forward. In order to support the neck, the pillow must accept the weight of the back of the head.
  Back sleepers need a mattress offering enough support to fill in the gaps in the contour of the back, while at the same time providing enough comfort (according to the user's preference).

Back sleepers should use a pillow beneath their knees to support the natural curve of the spine

- One can also sleep on the abdomen. Although some health experts attest that this sleeping position could exaggerate the arch at the base of the spine and would strain the neck, head and lower back, it is advisable for people suffering from degenerative disc disease. One can minimize the strain by tucking a pillow underneath the lower abdomen and/or pelvis. One can either use a pillow under the head or do without one.
  Stomach sleepers probably need a firmer mattress to keep the spine aligned and to prevent spinal distortion that can result in back pain when waking up.

Some experts warn that belly sleeping could strain the neck

Belly sleeping requires a firmer mattress

Mattresses, pillows and recliners also play a big role in promoting a good sleep. If changing your sleeping positions did not improve your backache and muscle pains, then invest in a quality bedding system and feel the improvement.

To rise from bed:

- Roll onto your side and bend both knees.
- Drop your feet over the side of the bed as you push with both arms to sit up.
- Scoot to the edge of the bed and position your feet under your buttocks.
- Stand up, keeping your back in the neutral position.

D. Sleeping Tips

You cannot force yourself to sleep, but you can help the body by trying some of these tips. Keep in mind that not everything works for everybody, but hopefully you will find something that works for you.

Sleep Schedule: Maintaining a fairly regular bedtime can help stabilize the body's sleep-wake cycle. The time that you wake up each day also affects your internal "clock." When you awaken much later, it shifts your body rhythm toward going to sleep later the following night and this can be problematic. Therefore, it is best to get up at approximately the same time every day. On weekends, you may want more sleep but be careful not to overdo, as this might upset your sleep-wake cycle. Use your bed only for sleeping. Do not watch TV, talk on the phone or eat in it.

A sleep schedule can help to stabilise the body's sleep wake cycle

Keep your room dark and at a comfortable temperature (circa 18°C).

Try to eliminate any kind of stress (worries, fears, etc.) that accumulates during the day. Stress makes your mind active and keeps away sleep. It may be helpful to try some methods to manage stress, such as meditation, deep breathing, prayer, counting your blessings, quiet music, etc.
Relaxing sleep ritual can help.

Stress managing methods may be helpful

Taking a warm bath before bedtime will increase blood circulation and promote muscle relaxation. You can add some baking soda or a few drops of essential oil, such as pine needles or lavender, as this will help you to relax even more.

A warm bath can promote relaxation

Some people find that naps reduce tension and make it easier for them to fall asleep at bedtime. If you choose to nap, try to not do so within six hours of bedtime, and limit your nap to 45 minutes, setting an alarm if needed. Longer naps can interfere with the natural rhythms of your sleep cycle and make it more difficult to sleep later on.

Naps can interfere with the natural rhythms of your sleep cycle

Most doctors agree that moderate exercise at least three times a week can help reduce stress. If you have concerns about your ability to exercise, first seek medical guidance. Exercise that increases your heart rate also increases your body temperature. Afterwards your body responds by gradually lowering its temperature, which can help you sleep. But there are many ways to increase physical activity throughout the day, such as climbing steps rather than using the elevator, walking instead of driving, and gardening. Do not exercise vigorously within four hours of bedtime because that might leave you stimulated when you try to fall asleep.

Exercises can help reduce stress

Sometimes watching your diet can help you sleep better: eat at regular times whenever possible. Enjoy high quality fresh food and eat slowly. Food that is too spicy, sugary, fatty, or has artificial preservatives, artificial colouring, or MSG (= monosodium glutamate, a food additive) can make the heart and mind race, making it difficult to sleep. Do not eat big meals before bedtime because the digestive system will keep you up while it works hard breaking down the food. If you would like to have a snack before bed, make it small

A snack before bed should be small and consist of foods that are higher in carbohydrates

and choose food that is higher in carbohydrates, such as a piece of whole grain bread. This will keep your digestive system relatively calm while sleeping. Avoid caffeine filled food and drink. This means no coffee, tea or chocolate at least four hours before going to sleep as it stimulates your body.

It may help to take a protein-rich snack, such as yoghurt or a glass of warm milk before going to bed. This will supplement the body with calcium, which has a mild sedative effect on the body. One can also supplement a diet with extra nutrients such as calcium, magnesium and vitamin B, or just simply eat more food containing these nutrients.

A protein-rich snack may also be helpful

Some herbs may also prove helpful. Chamomile tea or "Sleepy time" tea (easily found in supermarkets) will usually bring a good night's sleep. Another herb you can try is valerian root (capsule or extract), found in your local natural food store. Remember to use it in accordance with the label!

Having a cup of herbal tea will usually bring a good night's sleep

Try to reduce or eliminate the use of nicotine. Although nicotine can create sensations of relaxation, it can also act as a stimulant that makes the heart beat faster, making it more difficult to sleep. At the very least, do not smoke at bedtime or in bed!

Do not take sleeping pills without first consulting your doctor.

A. Bed Bases

1. General

Is it really necessary to use a bed base underneath the mattress? Is it really important to buy the mattress and bed base together? Yes, it is!

You need a base on which to put a mattress because it is flexible. That base might be a slat base, base with pads or it might be a matching set of box springs. There are a lot of different types of bed bases on the market.

The depth of the bed base determines the overall height of the mattress from the floor, and hence the aesthetic appearance of the bed. But the bed's base also makes a difference to how the mattress supports the person, not just how it looks in the bedroom.

It is important to bear in mind that the comfort level of any mattress is affected by the choice of base. Mattress and base should complement each other to give a comfortable night's sleep. If a new mattress is put on an old box spring, one may very quickly discover that the annoying sag in the old mattress was actually in the box spring! And, it might take a few months to realize this, creating a weaker spot in the new mattress.

The mattress and bed base should be chosen together. It is the combination of both which provides the full comfort of the bed. Mattress and bed base are engineered to work together as a set, and the base takes a lot of the nightly wear and tear and contributes to the overall comfort and support of the bed. Putting a new mattress on an old bed base, pairing it with a base, which was not designed to work with or adding a board between the mattress and bed base will impede comfort and reduce the useful life of your new mattress. The problem of using an old bed base is that the mattress will last only a third as long as compared with a new one. Most brand name mattresses these days will last about 7-10 years on a new bed base while the lasting is only 3-4 years on an old one. Because it does not make financial sense to purchase just the mattress *or* the bed base, responsible buying guide information should be offered for entire sets. And in fact, buying the mattress without its matching bed base may affect the terms of warranty.

There are 3 main types of bed bases, a slatted base, a firm edge sprung, and a solid top. Traditional designs allow the air circulation around the bed and ventilate the mattress, which is especially important for those suffering from allergies.

2. Materials

2.1. Wood

The traditional material of bed foundations is wood. For the curved slats of slat bases, soft and flexible types of wood, such as birch or beech, are needed. The natural bounce of the material means that the slats are able to adjust to the body where it exerts the most pressure.

Since the slat base has different zones of loading, different kinds of wood are being used for wooden frames. Cross beam made of beech and/or birch massive wood are produced for the loading of the width through sitting or lying. Due to the structure of the wood (direction and structure of grains) the massive wood gets a strong cross breaking strength and resists the loading pressures.

On the other hand, the longitudinal beams have got other loading points view to the cross beams since those parts are the starting point for all mechanics and functions of the frame. All supports of the caps, the fixing of the cross beams, the metal fittings for motors and other comfort elements are being fixed to these beams. For that reason layer wood made of beech and/or birch is used for achieving high elasticity and best pressure and tension.

2.2. Metal / Aluminium

All metal parts such as screens, screws, clamps, nuts and others are completely refined (galvanised and/or powder coated) in order to exclude a decrease of quality due to corrosion.

High carbon – the strongest steel available – reduces movement of foundations.

2.3. Plastics

With regard to the lying comfort, the kind of plastic material being used has an important function.
Apart from the elasticity of the slat it is also important in which kind of plastic cap the ends of the slat are bedded and how they manage the pressure towards outside to fulfil the best possible lying comfort. Therefore, mainly materials (synthetic rubber TBS/SEBS and SBS) are used to obtain following advantages:

With the help of so-called Shore-hardness, the caps are able to get a different resilience, depending on the arrangement in the frame. The shoulder part usually is a little bit softer than in the loin part, the head and feet part is a little bit harder. This rank of different lying harnesses can be completed with the help of extra application of comfort elements such as swings or extremely soft shoulder moulds. Special adjustments (Flex control system with the Modia cap) within the cap contribute to this effect and can be individually adjusted.

2.4. Fibreglass

Alternatives to the wooden slats are the GFK-profiles (fibreglass profiles). Their features are high mechanic firmness, low weight, heat, cold, and corrosion resistance. The core of the profile consists of fibreglass, which has an axial direction, the so-called roving. The fibres are covered by mats, arranged in longitudinal and cross directions, which enforce the profile, which is covered with a fleece, a resinous surface.
In combination with the plastic pads, the GFK-profile enables a long lasting functionality and stability of the bed base.

3. Types

3.1. Slat Bases

This is a very common mattress support system used with bed frames. It features a frame with wooden slats, which are arranged from side to side. This system has the benefit of allowing air to move below the mattress and therefore letting it breathe. A larger bed will also have a support bar down the middle of the bed, which gives extra stability to the bedstead and mattress. It is important that the slats are not too far apart – about 5 cm is good. Slat bases often provide some extra space underneath the bed.

Slats must support and simultaneously be flexible. To achieve that, the wood of beech and birch is cut into thin veneer layers and glued together under high pressure in a form-press. The slat thus obtains a high elasticity, a cross breaking strength and corresponds to the demands of a comfortable, body-conforming day-bed-feeling.
Another body-just adaptation of the bed base is obtained with the help of slats situated in the shoulder part having a special construction like slits or a swung border mill making them more flexible than other slats.

In order to guarantee a non-slipping position of the mattress, slats with a structured surface are advisable.

There are two types of slats, namely fixed and flexible ones. Fixed slats attach straight to the frame and offer little or no give to the mattress. Latex and foam mattresses work best on a flexible slat base; fixed slats are fine for innerspring mattresses.

Solid slat bases provide a solid wooden base for the mattress. These bases require higher profile mattresses to provide similar levels of comfort to flexible slat bases.

Flexible slat bases move with the mattress to fit the body‘s shape and weight. This utilizes multi directional shoes that fit into the frame and flexible slats that fit into them. This allows the slats to pivot side to side to conform to the body and up and down in reaction to the weight. In essence the base and the mattress work together to provide the sleeper with the correct support.

Flexible slat bases are the ideal base type if one suffers from partner disturbance because they have individual sides. When one partner is turning, only the slats below him will move, the other side remains unmoved. Also if partners have different preferences in feel or are different weights or shapes the sides can be personalized for feel and support.

Most manufacturers of flexible slat bases provide systems to achieve correct support.
Flexible slats have a useful life of between 5 to 10 years, after which they can be replaced easily and reasonably inexpensively.

3.2. Box Springs

A box spring is similar to the spring unit inside the mattress – featuring a complete spring unit to provide an extra bit of "shock absorption" to the feel of the bed and still provide plenty of support for the flexible mattress. A true box spring features extra-heavy-duty springs. Sometimes these springs will match the mattress, in which case it is called a “coil upon coil” box spring. A box spring generally increases the give in the mattress, leading to a softer or bouncier feel and extra conformance to the shape of the body.

Considered one of the most luxurious of bases, they provide even support along the whole mattress, with no hard edges, which helps creating a softer feel and works with the mattress to 'take the strain'. The result makes the whole bed feeling softer and will increase the life of the mattress. But when preferring something slightly firmer, a 'platform top' option may be more suitable.

3.3. Bases with Pads

This type of base has a solid top without springs. Bases with pads are usually constructed with a wooden frame that is upholstered with a layer of padding on top. That means the mattress can be placed upon it directly without using a second layer. This is also a cheaper option, as it uses less material and causes fewer efforts. Solid slat bases with pads will make the whole bed feel firmer and therefore they are often used in combination with orthopaedic mattresses.

They fit for mattresses, which are high profiled and designed especially for this base type.

3.4. Grid

A grid base is a grid of wires over wooden slats, which can move to allow some of the shock and weight to be taken away from the mattress. This technology relates to mattress and base sets. Grid bases occur in a lot of different configurations. Grid systems use a heavy gauge support wire and distribute weight over the entire bed base surface. A high quality grid base has no sway movement or edge sag. This base type can increase airflow around the mattress.

3.5. Mesh base

A meshbase is a bedbase that is made of a double-twisted steel wire, that is woven into a network. Under high pressure this network is spanned across the width of the base, ensuring a good support.
A mesh bases can be installed in a bed surround or can stand independently on its own legs.
Most mesh bases are available in various widths and lengths.
The mesh base has an open structure. It is also available as an adjustable base.

3.6. Motors

Electrically adjustable beds allow sleepers to adjust the head and foot of the bed to the most comfortable position, some of them providing countless positions. Typical conditions that are improved by the use of adjustable beds with motors include water retention sufferers, hiatus hernia and many more.
However, bed bases with motors are not just for seniors, but for anyone who desires a healthy sleep experience.

Modern electronically adjustable beds eliminate the unsightly plywood base seen with former models, but look like regular flat beds. Disturbing cables, linkage and visible motors belong to the past as all of them disappear underneath the frame.

Whisper quiet motors and engineered steel frame constructions make it possible to adjust for precision comfort and a restful sleep.
Some motorized adjustable beds include a luxurious programmable massage technology, which aids a variety of conditions including cramps and poor circulation sufferers.
On the high quality end one can find infra red wireless remote systems that allow simultaneous raising and lowering of both the head and foot of the bed – it becomes possible to silently elevate

your back and legs to over 1001 positions at the touch of a button. This facilitates passive exercise for the spine that may be administered by the user.

For the application of bed motors the mattress and bed base must be specially built for the flexing motion and can be innerspring, foam or a combination. Since the flexing causes extra wear on the mattress, quality construction is very important. Mattresses not built for this purpose should not be used with a motorised adjustable bed frame.

B. Mattresses

1. General

If one compares various types of mattresses they very much look alike from outside, but inside they may be quite different due to the materials and techniques used. First of all you can differentiate between two main mattress constructions – those with and those without springs. Innerspring mattresses are very common around the world, this technology has a long product history and a lot of modern mattresses are built around a spring core.

There are two main mattress constructions, namely with and without springs

Other major mattress technologies are primarily foam materials such as polyurethane foam, visco-elastic foam or latex: each of the foam materials has special qualities, which have to be considered when choosing the ideal mattress for individual use. Technically, mattresses can be constructed to use almost any support system such as air, foam, water or springs. Experts agree that any of these types can provide proper support, and choosing between them comes down to what the consumer's needs are and which technique fulfils those best.

Mattresses without springs are usually made of foam materials, such as polyurethane foam or latex

It is a common misconception that „firmer is better", and that a "firm" or hard mattress provides better support. Studies have shown that various sleeping positions require different levels of firmness. It is easier to soften up a firm mattress with the proper padding or bedding, than it is to firm up an overly soft one that is causing a backache.

It is a common misconception that "firmer is better"

All mattress cores are covered by fabrics, which are an expensive element of mattress construction. The quality of the different fabrics used such as wool, silk, or cotton – pure or in combination - all make the cost of the mattress vary.

A new mattress as well as the bed base should be designed in accordance with the spine's natural curves and to keep the spine in alignment when lying down. It should be designed to distribute pressure evenly across the

A new mattress should offer both support and comfort

body to help circulation, and enhance sleep quality. For those who prefer it, there are mattresses with extra support at the head, centre or ends, or even with "zoned" support offering specific support levels for different parts of the body. The mattress should minimize the transfer of movement from one sleeping partner to the other.

A prospective buyer should spend at least 15 minutes on a mattress in the store

The prospective buyer should spend at least 15 minutes on a mattress in the store. Spending five minutes on one's back and both sides should help determine if the mattress is the right choice.

Lying on the back: if a user slides his/her hand under the small of the back, and it is very easy and his/her shoulders and hips are uncomfortable, the mattress is too hard.

Rolling over: if it takes a lot of effort, the bed is too soft. If it is uncomfortable for the user's hips and shoulders, it is too hard. The user should test the mattress on the type of base it will be used on. If the double mattress is for two people, both users should try it at the same time.

Do not forget: a good bedding system consists of a good mattress and an appropriate bed base.

Most mattresses should be rotated and flipped regularly

A new mattress should be put on a reactive base, never on a saggy one. Most mattress manufacturers suggest the consumer to regularly rotate and flip the mattress. Otherwise, they caution the mattress will fail. It is usually recommended to rotate the mattress (180 degrees, so the head of the mattress becomes the foot) every three months and to turn the mattress at least twice a year. Some manufacturers recommend to alternately turn and flip the mattress once every two weeks for the first three months and then twice per year after that. Mattresses should be rotated to reduce wear patterns over time.

Mattresses should not get wet. A mattress pad or a mattress protector can be used to keep it clean. If stained, mild soap with cold water should be used to rub lightly. Mattresses or bases should not be soaked. A vacuum cleaner can be used for regular cleaning. If a mattress has handles, they are usually only for positioning it, not for carrying it. The advices given in the producer's manual should be followed. Sitting on the same spot of the mattress edge can permanently depress it.

2. Cores

2.1. Polyurethane (PU)

2.1.1 General

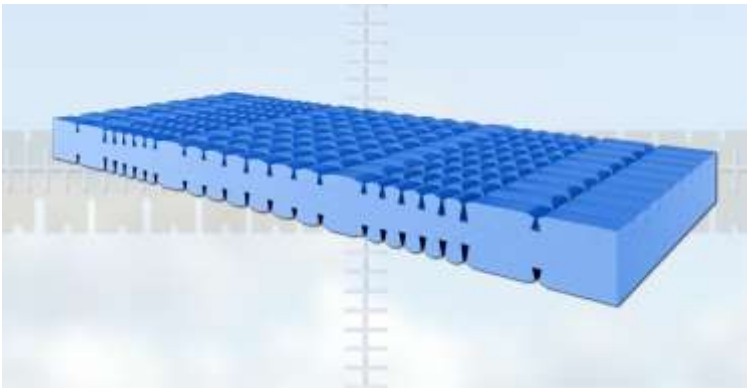
Polyurethane foam in mattresses features comfort and affordability

Polyurethane foam is a synthetic, petroleum based material that was engineered in the 1940s to replace more expensive natural resources such as rubber. Rapidly expanding beyond the war uses it was initially designed for, polyurethane foam today is one of the most widely used materials around. The diversity of applications is impressive – polyurethane foam can be found in everything from medical research labs to the cushions in couches or chairs. Polyurethane foam is used in mattresses because of its good comfort and affordability.

PU foam mattresses surround the body and conform to its shape

The advantages of a polyurethane foam mattress are obvious for people who are looking for quality and comfort from affordable materials. Polyurethane foam mattresses have increased in popularity over the past few years because of their ability to provide total body support during sleep. Upon initially resting on the polyurethane foam mattress, the components of the mattress are designed to surround the body and conform to its shape. The total support distributed to the body by a polyurethane mattress is seen in the way the foam mattress will adjust to distribute the weight of anyone who reclines on it. A polyurethane foam mattress will evenly spread out the force delivered to it by the body‘s weight, to keep neck and spine straight and as comfortable as possible.

PU foam mattresses covered with the right textile fabric regulate temperature and control moisture. They also include ventilation channels that expel moisture and absorb fresh air, allowing the mattress to breathe throughout the night. They dry quicker than regular beds and will not be susceptible to mould and mildew like regular mattresses.



Profile of a PU mattress with ventilation channels

As European made PU-mattresses are manufactured using strict quality controls, which also comply with all current European Union and Swiss environmental and health standards, there is no danger of toxicity being set free by the material.

It is important to select the right levels of thickness, density

When purchasing a new foam mattress, selecting the right level of thickness may mean the difference between a comfortable sleep and a restless night in bed. It is crucial to first consider how thick the mattress should be.

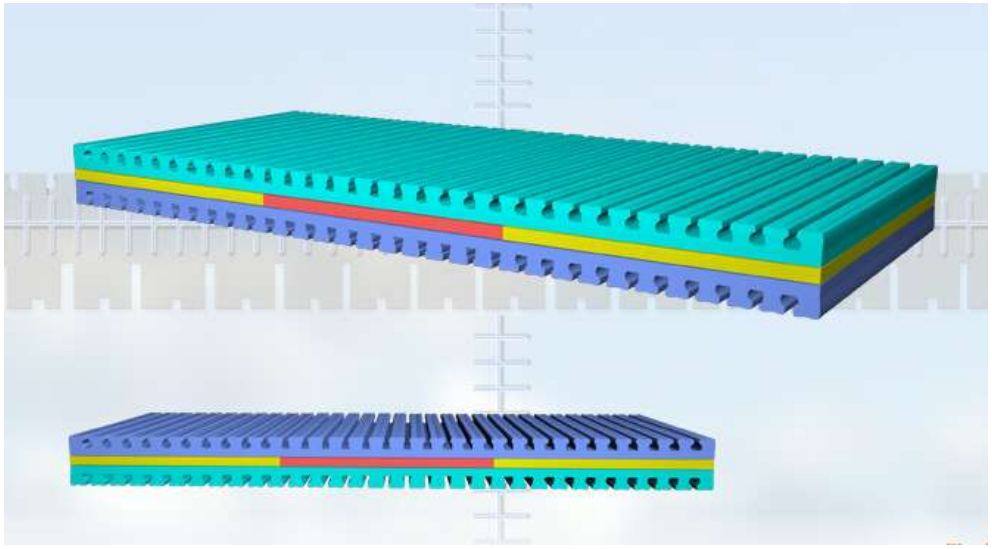
Thickness below 12 cm bears the danger of feeling the bed frame, and results into restless nights. Thickness above 18 cm makes it difficult to put fresh bed sheets on the mattress or to turn it.

and firmness when purchasing a new foam mattress

A useful tip for selecting foam mattresses is to opt for those with a well-defined density level. The density means the weight of the material per volume. Usually, a foam mattress with a density of 35 to 45 kg/m³ is considered the average density to ensure quality.

The firmness is also an important criterion. It is crucial to feel the hardness of the mattress before purchasing it. Usually people lighter in weight prefer softer mattresses and people exceeding 80 kg should choose firmer mattresses. Most high quality mattresses offer different zones showing different firmnesses according to the body zones. For example, a softer shoulder zone being created by cutting techniques or implementing softer materials will help side sleepers..

Furthermore some PU-mattresses are reinforced at the midsection, where the body's weight is concentrated and where the mattress is used most. These measures prevent the product from caving in. But it is also important to take proper care of a mattress by turning it over at least once a month, flipping it from side to side one month and from end to end the next.



Profile of a PU-mattress with visibly reinforced midsection

2.1.2 Types

PE

As polyether PU foam has a semi-closed cell structure and does not enhance comfort it is seldom used for the manufacture of mattresses. So-called polyether PU foam with its open cell structure is used in mattresses in the medium/low quality range. It is also commonly known ass "standard PU foam" or "polyether foam".

Polyether PU foam is used for mattresses in the medium/low quality range only.

High Resilient

High resilient foam, or shorter HR foam, is characterized by an irregular cell structure showing high flexibility and elasticity. HR foam is one of the most commonly used mattress core materials, especially in mattresses of the medium/medium and medium/high range.

HR foam has an irregular cell structure providing high flexibility and elasticity.

High resilient foam has anti-microbial properties, which offer additional protection to people suffering from allergies. It is also flame retardant. High resilient foam is recyclable and its production technology eliminates CFCs, methylene chloride and other blowing agents that can destroy the ozone and contribute to global warming.

Visco-Elastic

Visco-elastic or memory foam is made from polyurethane with additional chemicals that add to its viscosity level, thereby increasing the density of the foam and providing a cell structure different from other foams, which makes it less 'springy' and slower to recover.

Depending on the chemicals used and the overall density of the foam, it can be firmer in cooler temperatures and softer in warmer environments. Higher density memory foam will react with body heat and allow it to mould itself to the shape of a warm body within a few minutes – and slowly it will recover its original shape when the heat and pressure is removed.

Higher density memory foam reacts with body heat, moulding itself to the shape of a warm body

However, lower density memory foam is pressure-sensitive and will mould more quickly to the shape of the body. The example often used for a demonstration of its properties, is a hand pressed into the foam and then removed, leaving a clear impression of the hand in the foam.

Memory foam was originally developed for use in the space programme about 30 years ago. The hope was that, because of its ability to distribute pressure across the entire surface, it could ease the pressure of extreme G-forces. While memory foam was never used in the space program, it found subsequent use in

Memory foam is able to distribute pressure across the entire surface

medical applications, for example in hospitals and nursing homes to help prevent pressure ulcers caused by lying in one position for a long period. It was initially too expensive for general use. In recent years visco-elastic memory foam has become cheaper to produce and is now widely available for the home.

A memory foam bed will absorb the heat from the body, and as the material stretches, these particular areas of the mattress will be much softer.

Memory foam is hypoallergenic because of the material it is constructed from, and the way the material is rearranged.

Memory foam is hypoallergenic

Some say that the softness of a visco-elastic mattress makes it hard to move while sleeping, therefore requiring more physical effort. Heavy people in particular might find it difficult. Small movements (as opposed to full-scale tossing and turning, which is caused by blood-flow restriction at pressure points) are important for spine health. For trying out one of these mattresses in a shop, it is important for the customer to see how easily he can move - if he feels bogged, he should try a thinner layer of visco-elastic.

The mattress can also seem to be very hard at low temperatures, although it will warm up with body contact.

A memory foam mattress is usually denser than an ordinary foam mattress. This makes it heavier. It is often a good compromise between the comfort of a soft mattress and the supportiveness of a firm one. Usually memory foam mattresses just contain a layer of this foam on either standard polyether foam or on HR foam. This allows better support and better handling.

Most memory foam mattresses only contain a layer of this foam on a PU core

When new, memory foam often gives off a distinct chemical odour, which a lot of people find unpleasant. This fades with airing, but some people, however, remain sensitive to it.

The cell structure of visco-elastic foams has to be closer than the cells of other foams allowing the lazy recovery. It is important to know that the air permeability and therefore the bed climate are different when using a visco-elastic foam layer for gaining comfort.

When selecting a memory foam bed frame, it is important to buy a frame specifically designed for these types of beds. Even though a wire frame can support regular coil mattresses, the same is not true for memory foam beds. A proper frame is definitely necessary!

Bed frames for memory foam mattresses have to be specifically designed for this purpose

2.2. Latex

2.2.1. General

Latex is a premium quality material derived either naturally from the sap of the rubber tree or synthetically produced. When vulcanised, the previously unstable sticky substance latex becomes stable, durable, and very elastic. A latex mattress would be very dense, if it were not always made as a foam containing holes (pincore holes), causing its independent cell structure. These holes soften the latex and make it comfortable. The larger the holes, the softer the latex core. Most latex mattresses just have one size of holes through the whole mattress, so that it has a uniform feel throughout. Some cores though are made with different sections of latex with different sized holes. This allows the bed to have different zones - softer under the shoulders and feet and firmer under the hips.

Latex mattresses are manufactured either from natural or from synthetic latex

The independent cell structure of latex prevents partner disturbance

Also mattresses with his and her side are easily to produce.

Latex is the only material that brings both comfort and support without any upholstery (inherent qualities).

One main advantage of latex: is its dynamic conformity to the body

Latex Benefits

- **Proper support**
  - Elasticity - can withstand extreme stretching (up to 170%) without breaking due to molecular structure.
  - The firmness of latex can vary over a wide range of comforts.
  - Unique feel (it is not visco-elastic, it performs like a spring)
- **Healthy product**
  - Breathability: Moisture resistant due to ventilating structure. It dries quickly. Latex cells are open cells.
  - Anti-bacteria: Wisconsin Alumni Research Foundation tests have proved that latex has anti-bacterial properties
  - Anti-dust: Pasteur Institute tests have proved that dust develops difficultly in latex environment

Latex mattresses are naturally hypoallergenic

The hardness and the density of a latex foam mattress core are interrelated. When the density increases the hardness value also does. There are standards for density and firmness of different foams (a.o. ISO 2439 and ISO 3386) measuring for example which force is needed to compress a latex core to 25 % of its original height. The higher the value, the firmer the surface will feel.

Hardness and density of latex mattresses are interrelated

2.2.2. Types

Natural

Latex is a resin obtained by cutting the bark of a tree. About 99% of all natural rubber comes from the latex of the Hevea-brasilienis tree, commonly known the rubber tree. Narrow grooves are cut into the tree's bark. The latex oozes out of the cut in the tree, goes through the spout and into the cup. Each tree gives about a teacupful of latex per day. The rubber tree is cultivated on plantations in South Asia, South America, Africa, Indonesia and Sri Lanka.

Environmentally friendly natural latex biodegrades completely

Latex foam is an environmentally friendly natural product that biodegrades completely in the environment.

Dictionary definition of latex: aqueous emulsion of synthetic substances, obtained by polymerisation.

All natural materials have a typical natural odour. Unless very sensitive to smells, one will probably not notice them in a natural latex mattress because they are out-gassed over time. The outgasses of natural materials are all natural, and do not consist of any chemicals. All of these materials result in a bed without any irritants such as sulphur or boric acid. And there are no plastics or polyesters that emit toxic gases.

Main ingredients in the manufacturing of 100% pure natural latex: at least 85% natural rubber, 2-3% zinc oxide, 1-2% fatty acid soaps, 1-2% sulphur, and 1-2% sodium. The last 4 items are necessary in the vulcanisation, foaming, and curing process. Most of these are baked out. The finished core is then washed at least 3 times.

A finished natural latex mattress core consists of at least 85% natural rubber

Synthetic

The synthetic rubber industry was developed due to lack of availability of natural rubber during World Wars I and II. Petrochemical synthetic latex is claimed to have the same properties as natural latex, and nowadays, most latex mattresses tend to be either made of synthetic latex or more typically a combination of synthetic and natural latex. The combination latex core is more resilient. Synthetic latex is cheaper and as such more cost effective for the production of mattresses.

A combination latex core (synthetic/natural) is more resilient

2.2.3. Production Process

Latex was first discovered by Indians in South America and was called caoutchouc. The natives used this type of rubber to make sport balls. Early rubber had a tendency to react to temperature. In heat, rubber would soften and become sticky. In colder temperatures, rubber would become hard and brittle.

In 1839, Charles Goodyear discovered vulcanisation whereby rubber and sulphur are combined at high temperatures to yield a product with mechanical and other physical properties far superior to those of raw caoutchouc.

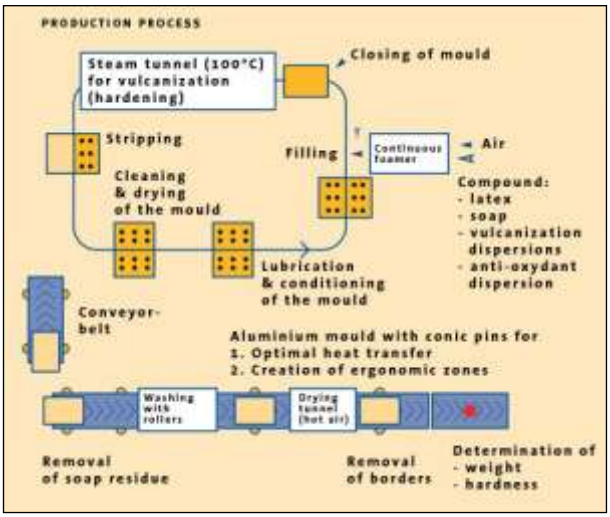
The treatment with heat and sulphur compounds gives the rubber strength, hardness and elasticity.

Today there are two methods in which latex is synthesized into the foam used in latex mattresses: Dunlop and Talalay.

Dunlop

In the 1920s E.A. Murphy, a scientist for the Dunlop company was accredited for producing the first latex foam and opening the door for the first latex mattress. Murphy discovered how to produce the necessary bubbles to create the desired product by using his wife's cake mixer to whip the latex with air before using a gelling agent and vulcanising it in a steam oven. The newly created latex foam was a big success, rapidly growing in popularity as seating cushions. In 1931 Dunlopillo marketed the first latex mattress and promoted it as being a time saver, as it did not require flipping or fluffing to maintain its incredible level of comfort.

Whipped latex with various process additives is being vulcanised



The foam once made, is washed a number of times to get rid of soaps and proteins excesses that can make the foam degrade early and also reduces the rubbery smell of latex. The Dunlop process creates a firmer, denser product that is used as a latex mattress core.

Features of the Dunlop process

- Continuous manufacturing process
- High level of capacity
- Product consistency - controlled process
- Rapid design of customized pieces
- Immediate adjustment to density and dimension requirements (it is not necessary to make a new mould because sizing is done at the end of the cycle)
- Cost effective

The Dunlop process creates a firmer denser product

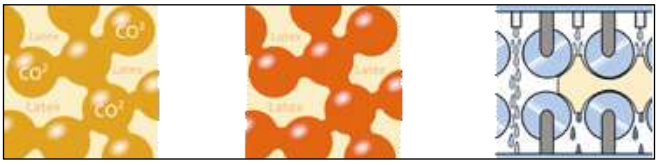
Talalay

The Talalay process (after Leon Talalay) was introduced to the industry in 1965. It is similar to the Dunlop process, but some production steps were added.

First, the raw liquid latex is whipped with curing agents and additives into a froth. Next, the appropriate amount of latex froth is injected into the mold. All of the air is then vacuumed out causing the latex to expand and perfectly distribute itself throughout the mould. The latex is then flash frozen to -30°C to prevent any settling that may occur. In addition, this causes the cell membranes to retain their round structure, whilst cell membranes partly break open. Carbon dioxide (CO_2) is then introduced to cause the mixture to gel. Finally, the latex is vulcanised at a temperature of 115°C until it has cured through and washed.

The Talalay process consists of six stages: filling of the mould, vacuum extraction, freezing, gelling, vulcanisation, and washing

Filling the mould Vacuum extraction Freezing



Gelling Vulcanisation Washing

Talalay latex mostly contains a blend of synthetic and natural latex. As it produces foam that has a more even and more consistent cell structure than others, the Talalay method is considered the premium process used for making latex mattresses today.

Talalay latex has a more even and consistent cell structure

<u>Features of the Talalay process</u>

- High degree of variability within each batch and between batches
- Can be more costly
- Size limitations

2.3. Springs

2.3.1. General

Spring interior mattresses are very common around the world, they have a long and well-experienced product history and a lot of modern mattresses contain any kind of springs. As there is a high demand for spring mattresses all around the world, there are various kinds, e.g. constructed with multiple layers of foams, natural and/or synthetic fibres, and there are three main types of springs, namely Bonnell, LFK and pocket springs.

The three main types of spring mattresses are Bonnell, LFK and pocket springs

The spring unit is the main source of support for the body. Five factors can influence the degree of comfort, support and durability of an innerspring mattress: the number of springs or coils, their shape, the gauge of wire used, the number of turns in each spring and the distribution of the springs. The final effect will depend on interplay of all these factors. So, for instance, more springs are not necessarily better if they are lower in quality. The most comfortable spring system comes down to personal preference and depends, amongst others on one's size and weight, and on sleeping alone or with a partner.

Beneath the shape and number of springs, gauge of wire, active turns and distribution of springs are decisive for the quality of a spring mattress

So the comfort, rather than statistics, should be the deciding factor.

The number of springs
The following coil counts should be at least manufactured to reach a reasonable quality:

- Bonnell: 200 - single size, 300 - full size, 400 - queen size, 475 – king size
- LFK: 300 - single size, 525 - full size, 600 - queen size, 775 - king size
- Pocket: 435 - single size, 640 - full size, 720 - queen size, 900 - king size

Source: Agro, Germany

Spring shape
There are several shapes of spring, and it may be a good idea for a consumer to try lying on the different kinds to see which type suits best.

- Bonnell: double cone or hourglass shaped springs
- LFK: cylindrical springs
- Pocket: cylindrical or barrel shaped springs – assembled either by centrally gluing or surface bonding between two sheets of non woven fibre material

Wire gauge
Not all spring systems are made from wire with the same gauge. Bonnell

springs will be made of 2,0 mm to 2,5 mm wire (14 gauge to 12 ½ gauge), LFK and pocket springs of 1,6 mm to 2,0 mm wire (16 gauge to 14 gauge). Special versions may be made of either thinner or thicker wire gauges.

The durability of the springs is related to the quality of the wire and the production process of the springs, but not to the wire gauge.

Active turns

A further variation is the number of active turns in the spring or coil that is the number of turns that are absorbing and supporting the weight of the body. The more turns, the softer the spring and the longer the springs will last because there is more material taking over the pressure.

The more turns a coil has, the softer and the longer the springs will last

Distribution of springs

Some mattresses have differentiated support zones. Spring units with 3, 5, and 7 zones are available. These zoning concepts are based on different philosophies of the mattress manufacturers. Generally the zoning should improve the contouring of the mattress to the body's shape. Head, waist and legs should be supported with firmer zones while hips and shoulders should sink more deeply into the mattress without loosing support. Some special spring units also include side or edge support springs, which provide more strength and support at the edge of the mattress. It does not mean any improvement of the sleeping comfort during the night, but it may prevent the sleeper from rolling off the bed. Some consumers also like the firm edge because it gives more support while sitting on the edge of mattress.

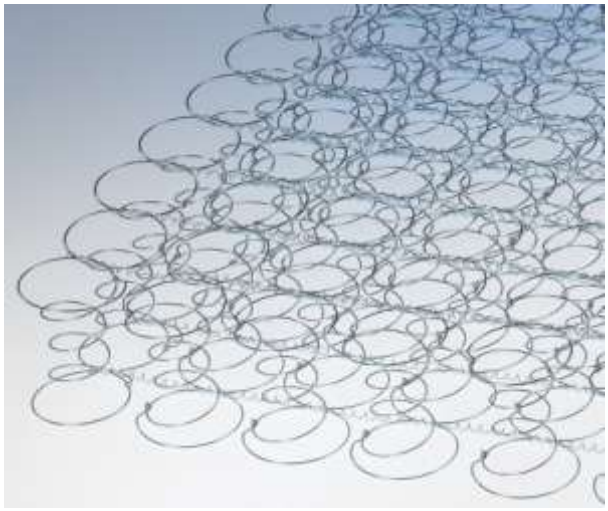
Spring units with 3, 5 and 7 zones are available

2.3.2. Types

Bonnell

The modern revolution in the creation of the innerspring came to the market in the 1890's when the first coiled bedspring was produced. The credit for the invention was given to Mr. Bonnell as his 'hour glass' bedspring is still referred to today as the 'Bonnell' spring.

Hourglass-shaped springs are used in the original and most widely used innerspring system, called the Bonnell system. The unit is formed by springs arranged in rows and connected to one another, top and bottom, by a spiral helical wire. Border wires, either flat or round, can be attached to the spring unit for strengthening the perimeter.



Bonnell spring units provide a progressive spring support

Today Bonnell springs are produced completely automatically from special wire drawn to exacting standards for greater uniformity and performance. High-speed computer controlled manufacture ensures unit stability, constant quality and efficiency.

Bonnell springs provide a progressive spring support. They can be compressed quite easily at first, but offering more support as the pressure to the coils increases. They come in a choice of different wire gauges, starting from soft 2,0 mm (14 gauge) to firm 2,5 mm (12,5 gauge). Priced from budget to mid range.

Bonnell spring mattresses can also be offered in several multi-zone versions with 3, 5 or 7 zones.

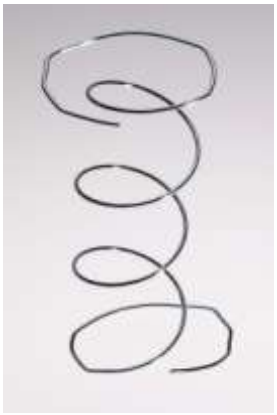
Characteristics, features and benefits include:

- Manufacturing consistency and unit uniformity
- Unbeatable stability, strength and durability
- Responsive and supportive
- Simple further processing
- Vastly differing versions and spring core sizes are possible
- Favourable price-performance ratio

LFK

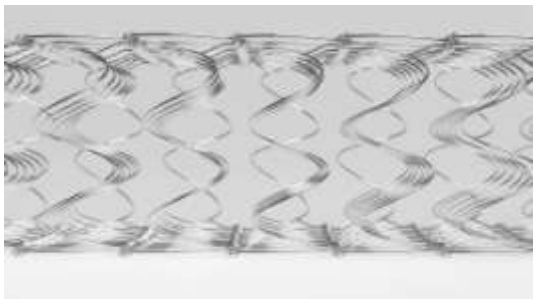
The LFK spring system was developed in the 1980s to introduce knotless, light weight spring units on the market to be used in mattresses in medium and medium high price range. The abbreviation 'LFK' stands for the German 'Leicht-Feder-Kern' (light weight innerspring). The shape of the individual coil is cylindrical with elliptically formed end rings. The assembling of the coils by helicals on each side is similar to the manufacture of the Bonnell.

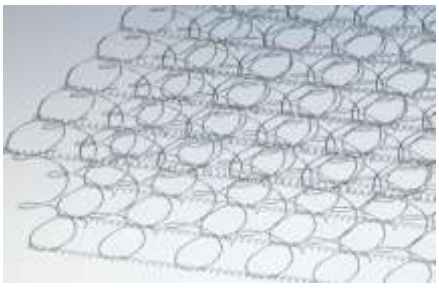
Light weight spring units are used in LFK spring systems



The special shape of the end rings provides greater flexibility to the entire spring unit. This is referred to as the "hinge effect". The fine wire gauges from 1,6 mm (16 gauge) to 2,0 mm (14 gauge) are responsible for the lower weight, although the coil count is approx. 50% higher than in a Bonnell spring system. Smaller coil diameters create greater surface coverage. This means excellent support to the sleepers. The increased flexibility and sensitivity to body contours make LFK innerspring systems more comfortable than

Bonnell or Offset-Springs. Since this system is produced on full automatic machines, all LFK interior types have the same high quality and can be manufactured quite inexpensive. LFK spring units are also available in 3, 5 or 7 zones.





LFK spring units feature a lower weight and, at the same time, an approx. 50 % higher coil count than Bonnell spring units

Characteristics, features and benefits include:

- Responsive, supportive and comfortable
- Particularly good contouring to the body's shape
- Quality, consistency and durability
- Greater surface coverage / edge-to-edge support
- High coil count / more working wire

Pocket

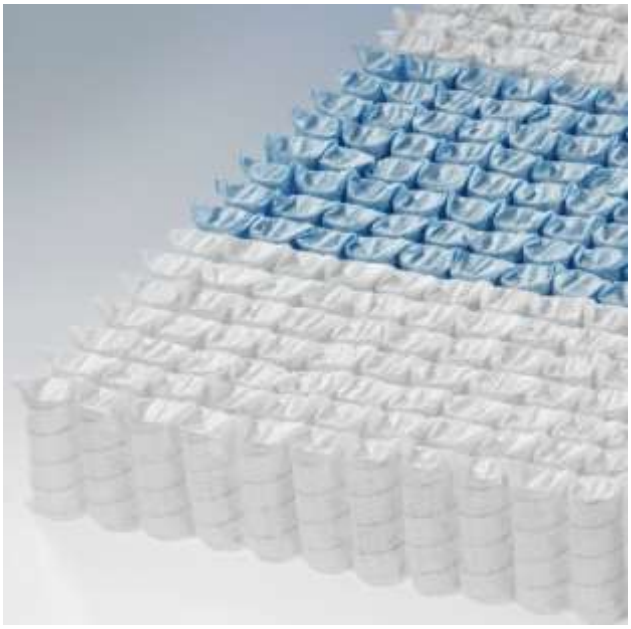
John Gail, an inventor and engineer, developed and patented pocket springs in the USA in 1925. His pocket spring consisted of an individual encased cylindrical coil. The coils were squeezed down (pre-compressed) and placed in a soft, durable cotton material. Hog rings assemble rows of these springs to form a full spring unit of very high coil count. They were very responsive to the movement of the body as they only reacted to the load applied to each spring, therefore not transferring motion across the bed, which can cause partner disturbance.

In pocket spring units, pre-compressed coils are placed in individual fabric pockets

Pocket springs work independently and profile to the body's shape preventing pressure points

Today, pocket springs are small, softer springs housed in individual fabric or nonwoven pockets. The shape has been changed to a barrel to be able to connect the rows of springs by central gluing on full automatic equipment. This barrel shape combined with the welding of each individual coil into its own fabric pocket allows them to work independently and profiling to the body's shape to prevent pressure points. Independent support means that there is little or no transfer of movement from one sleeping partner to another. Pocket springs are highly responsive to even the smallest changes in weight distribution, body shape and sleeping patterns, providing support where needed most without compromising on comfort. The encasement of the

individual coils also ensures a quiet sleep. Centrally glued barrel shaped pocket spring units are perfectly suitable for adjustable beds and can be used on motorised slat bases without any loss of comfort and quality.



Pocket spring is the most advanced spring system

The range of wire gauges starts from 1,4 mm (17 gauge) up to 2,0 mm (14 gauge). Versions with high coil counts need of course fine wire gauges like 1,0 mm (19.25 gauge). Like other types they are made in a range of different versions and there are still pocket springs available that are hand tied by hog rings. Multi-zone variations and different coil configurations are also available. Pocket spring is the most advanced type of spring with numerous variations in the spring industry and the increasing demand shows that is becoming more popular.

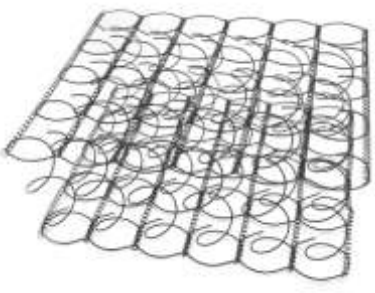
Pocket springs are generally more expensive than other types of spring units and are used mainly in higher quality products. Independent tests consistently rated pocket-spring mattresses the most comfortable type of innerspring mattress.

Characteristics, features and benefits include:

- Superb levels of comfort and support
- High coil counts and surface coverage
- Natural air flow
- Advanced production and assembly technology
- Great flexibility by exclusively central gluing
- Excellent body adjustment
- Noiseless sleep
- Suitable for adjustable beds

Others

Offset coil units: Bonnell coils evolved into Offset coils, which are currently popular, but happen to be very expensive. They are almost identical to the Bonnell coils, except that the top and bottom end rings of the coils have a shape similar to the LFK, which allows for better hinging action when they are placed together in a spring unit. An evolution of the offset



Offset coil units are an improved Bonnell springs

coils brought the elimination of the knot that tied the end of the wire to the coil. In other words, offset coils might be tied off or feature a loose end (sensory arm), called "open end offset coils". These improvements gave offset coils an extra turn of working wire for greater spring action on each end of the coil.

Continuous coil: The continuous coil system consists of coils formed from a single strand of steel wire strung through the system. They look like double wire spirals or loose ringlets, creating a network of wire running non-stop through the entire mattress. The idea is that with a continuous coil system, each coil is connected to the next so that it can draw strength from it. This means manufacturers can increase the density of coils, which they claim gives greater support. The unique V shape springs of the continuous coil systems imply that each point of the mattress is supported by 2 springs. Partner disturbance is reduced as the continuous coil transfers the weight down the length of the bed, held together horizontally by flexible helical wire. The number of springs or coils is similar to the LFK system

Continuous coils are formed from a single strand of wire

2.3.3. Insulators

Insulator pads are connected to some open coil spring systems to prevent top materials from sagging into the coils and breakdown of the padding.

Insulator pads protect the padding from being damaged by the coils

This insulator can be either a pad or a netting. Materials used as insulators are sisal, resin-bonded synthetic pad, rubberised curled hair, synthetic fibres, mesh type insulators and polypropylene netting.

2.3.4. Top Layers

The top layer is what lies between the human body and the springs — it determines how hard or soft the mattress feels against your body. It consists of the various layers of material on top of the insulator and beneath the quilt and it makes the mattress soft and comfortable. It also prevents the person sleeping on the bed from feeling the coils. Innerspring mattresses use a wide variety of fillings to create different properties and comfort options, which also affect the price. In fact, one single spring unit can be used for completely different mattresses, depending on the fillings applied

The top layer consists of various layers of different materials making the mattress soft and comfortable

for the top layers. A mattress becomes more expensive when better top layers are used in the fabrication process, which implies that a mattress made of better materials lasts longer. Fillings used are chosen for their resilience, durability, flexibility and ability to absorb body moisture. In cheaper mattresses, top layers usually come in compact pads; in better quality mattresses layers of loose fillings in great volume are often preferred. The way in which the padding is secured in place can also influence how well the bed maintains its comfort. In top-of-the-range mattresses, each layer is hand stitched into place to prevent the materials from shifting around. This is a specialist craft (called hand-tufting) and may take one person several days. Retailers should know which mattresses are hand-tufted to be able to explain the expensiveness.

High quality fillings include silk, wool, cashmere, foams, latex and down

In the high quality range, fillings include silk, wool, cashmere, premium foams (convoluted or egg crate), latex and goose down. At the lower end, materials include lower grades of foam, reclaimed cotton fibres and coconut fibre. These do not tend to last as long because they break apart more easily, forming lumps and pockets, and lose their ability to spring back more quickly.

It is normal for the top layer to settle and compress over the first few months, which makes the mattress unique to the body's shape. This may be more pronounced in more expensive mattresses with more fillings. Turning the mattress regularly will help even out this settlement.

2.4. Waterbeds

The vinyl waterbed is not as popular as it used to be, but it still has a good reputation. The newest waterbed designs are built to look like the familiar mattress/base, with a water-filled core providing the support, and layers of upholstery for insulation and surface comfort. Quality construction is critical when water is involved, so it is crucial for the vinyl and seaming to be designed for maximum durability. Make sure the floor can accommodate a waterbed's weight.

One benefit of a waterbed is the lack of pressure points since the water forms to the body and offers excellent pressure distribution. The key is to ensure the mattress is sufficiently filled to assure enough support. When shopping for a waterbed, be sure to look for one that minimizes the amount of disturbance you may receive if you sleep with a partner.

As the water forms to the body it offers excellent pressure distribution

The remote controlled individually adjustable heat levels may have a feel-good, relaxing effect on the body to prevent problems for the back and spinal column. Waterbeds are very cosy in cool weather, and cool in warm weather, but it is recommended to put a fabric layer between the sheet and the bladder to absorb perspiration.

Individually adjustable heat levels have a relaxing effect and can help prevent backaches

Some waterbeds guarantee to be 85% or 95% waveless. There are extra-firm models with luxury touches like washable pillow tops or an added layer of memory foam. Some styles come with a waveless inner coil that offers additional support.

2.5. Air Mattresses

Today's air beds are designed to look like the familiar mattress/box spring combination, with an air-filled core providing the support instead of an innerspring unit or foam core.

The air chambers are completely enclosed and protected within layers of foam. Electronically controlled they pump and release air in and out of the mattress so that comfort and firmness can be adjusted individually for each person. The air chambers of an air mattress allow the mattress to distribute body weight evenly and can gently cushion the body, providing relief to pressure points, back pain, neck, shoulders, hips, etc.

Comfort and firmness of an air mattress can be adjusted individually

The manufacturers of air mattresses designed features such as a mattress pad for added cushioning and protection, one touch control for easy and convenient comfort adjustment, and a quadra-coil construction that ensures a new air mattress will not sag or bow.

As with all types of mattresses, a lot of users are very happy, but some complain that it is not as comfortable as they had hoped. Some say they cannot adjust the mattress's firmness. Again, the only way to tell if a bed is right is to give it an in-store trial.

Inflatable guest beds are not meant to replace a regular bed

Inflatable guest beds are not meant to replace a regular bed. Chiropractors say that inflatable beds do not offer enough support for long-term use.

3. Covers

3.1. Ticking

The first thing one will notice about a mattress is its cover – in the trade known as mattress ticking. It encases the mattress core. The cover is often made to match the bed's base, comes in a wide variety of colours and styles and is quilted to highlight how comfy the mattress is. While the core gives comfort and support for the spine, the ticking produces the look and feel of the mattress. That is why manufacturers spend a lot of time choosing attractive colours and designs so their mattresses will look good. But there is more to the ticking than only good looks as it needs to be tough and tear resistant. The overall quality of any mattress cover is not only contingent on the type of material used, but also the ticking - the way it is woven into a fabric.

The biggest concern with the ticking should be simply to make sure that the material is sturdy enough for its purposes. Some may want a sturdier cover – or an extra-sturdy mattress cover – for a toddler's first twin bed, at least sturdy enough to hold up under the inevitable episodes of jumping on the bed!

Fine quality cloths are woven in natural materials such as silk, cotton, viscose, wool or flax yarns or a blend of several of these. Basic cloths are made of synthetic fibres such as polyester, polypropylene or acrylic and are often printed. Colours can be chosen out of a wide palette to brighten up the textile.

There is a range of typical woven fabrics used for mattress covers, such as jacquard and damask.

Mattress manufacturers now increasingly use ticking with special qualities. Some of the options include anti-dust mite/anti-allergy, anti-bacterial, anti-fungal, anti-microbial, anti-static, breathable, water resistant, stain resistant, highly absorbent, naturally fire retardant etc. There are even some infused with aromatherapy oils – quite a choice!

3.2. Knitting

Mattress covers have an excellent fit if knitted stretch material is used as opposed to woven, especially if the bed is flexible. Knitted stretch textiles especially made for mattress tickings are more stretchy, strong and durable fabrics. Similar to the woven covers, there are innumerable possibilities regarding yarns, designs, finishing, wash-ability, colours etc.
Depending on the knitting process, there are different knitting products with different characteristics.

Terry cloth is a stretch terry fabric with a nice touch. Double jersey is a two or three-layered fabric, which looks like the knitted version of a woven ticking but with a much softer touch. This type of fabric is available in various weights and compositions and can be washable up to 60°C. Velour or nicky is a velvety soft velour with maximum stretch, available in a range of weights between 230gr/m² and 300 gr/m². Bonded textile names a heavyweight double jersey, quilted with filler fibres. Its stretch and filling makes it ready to apply directly on mattresses. This type of textile is perfect for people who have to wash their mattress ticking more often than others, for example as a result of allergies. Tailor made stretch is suitable for intensive use, is easy to remove and wash.
At the budget end of the market of mattress cover materials are bonded or stitch bond fabrics and some cheaper knits.

4. Quilting Material

Mattresses have a few layers of padding made of light foam or fibres stitched to the underside of the ticking – the quilting. Beyond the decorative effects, it provides the immediate soft texture the user feels when lying on a mattress and affects the feel of the mattress surface as well. A tightly quilted mattress will generally feel firmer, whereas a mattress with wide, generously spaced ticking will feel more cosy and cushioned.

In the common quilting process multiple needles are used to stitch the upholstery layers together. The stitching can be sewn into simple or complex patterns or have the common characteristic of the continuous stitching across the entire surface of the mattress.

In top-of-the-range mattresses, each layer is hand stitched into place to prevent the materials from shifting around. This is a specialist craft (called hand-tufting) and can take one person several days.

Mattress sides are also quilted – some higher quality mattresses are hand side stitched to keep the mattress in better shape for longer. Sturdy edge materials are a must. A mattress should give full support even on the edge. You should never roll off a bed because the edge is weak.

Simple quilting may consist of backing material, 2,5 cm of foam, and the fabric cover. Upper-end quality mattresses may have multiple layers of foam and various fibres, synthetic and/or natural.

Quilting materials include a range of different fabric types, foam, backing thread, cotton, felt, wool and coir pad. The materials are also used to differentiate the "qualities" of mattresses that manufacturers produce.

Different materials have specific functions:

- Cotton is often used near the surface for its soft feel next to the skin and its ability to breathe and to absorb moisture. But cotton also gets compressed by moisture and then takes body impressions and attracts dust mites.
- Wool is a naturally resilient fibre, creating a luxurious feel with good fire retardant properties. Wool is also a breathable and antimicrobial medium.
- The different types of foam are used for their cushioning effect. They include latex, polyurethane and visco-elastic memory foam, which create an excellent overall quality of padding.
- Polyester is a synthetic material with good recovery properties, which gives the mattress a softer and more uniform feel. However, the disadvantage is that polyester batting tends to deteriorate (lose its feel) faster.
- Hair, a highly resilient fibre is often described as "nature's spring". It is available in pads or loose for high luxury.
- Silk, cashmere, mohair and other fine, natural fibres are also used for added luxury in the top end mattress production.

Further important characteristics to determine the quality of the quilting are the weight and size of filling as well as the layer sequence.

5. Mattress Toppers

Mattress toppers or overlays are often used in addition to mattresses. Toppers are put over the mattress for hygienic reasons to keep it well protected. Some state of the art mattress toppers are said to provide it with new life. In this case think twice: if from an orthopaedic point of view the mattress is no longer any good, it will not help a lot to just buy a new topper to bring you back the comfort. Better change your mattress to benefit from all the advantages of latest sleep technology.

You can find toppers made of different materials to use them for various reasons. Hypoallergenic natural latex, organic cotton, or wool can provide extra cushioning, luxurious comfort, and additional pressure point relief to hips and shoulders. If you need toppers to reduce pressure or soften the feeling when lying on the mattress, you probably did not buy the correct mattress for your body.

A pure wool mattress topper provides excellent protection for the mattress, making it ideal for infirm sleepers as well as children. It is naturally water-repellent and dries naturally. Placing a barrier cloth cover over a pad or topper and mattress can protect the bedding from bacteria, moulds and dust mites. So out of a hygienic point of view, toppers are making sense.

Also memory foam has become very popular for mattress toppers lately, as it responds to your body's weight and shape and it can change and improve the quality of sleep.

6. Hardness / Durability

It is a common misconception that „firmer is better“, and that a "firm" or hard mattress generally provides better support. Physicians used to say this too when they were rather oblivious about people's sleep habits and thought that everybody slept on his back 100% of the time. Nowadays scientific research has revealed that a majority of people sleeps mostly on their side. Further studies tell us that various sleeping positions require different levels of firmness. For example, belly sleepers probably need a firmer mattress to prevent spinal distortion that can result in back pain when waking up. Side sleepers usually face the greatest amount of weight on the smallest areas of the body, thereby creating pressure points, which reduce blood circulation and can be a cause of the tossing and turning during sleep. A side sleeper will probably require a softer mattress to minimize pressure points, especially if he has a curved or rounded figure. Back sleepers need a mattress that offers enough support to fill in the gaps in the contour of the back, while at the same time providing enough comfort (according to the user's preference). In addition heavier persons generally need firmer mattresses than lighter persons. Various aspects such as your body’s figure, your sleeping habits and your personal perceptions about a comfortable and good sleep interfere when choosing the right degree of hardness for your mattress.

It is easier to soften up a firm mattress with the proper padding or bedding, than it is to firm up an overly soft one that is causing backache. However, firm mattresses are designed to feel hard, so even when adding padding to a firm mattress it will not feel like a soft one, because the body will sink through the foam onto the hard surface underneath. A firm or very firm bed might be topped with a foam pad giving the user the best of both worlds - good support and soft cushioned feel.

A firm mattress will not automatically provide higher durability than a softer one. But it is obvious that a soft mattress used by a heavy sleeper will not last as long as a suitable harder mattress would. Also the sleeping habits of each person will influence the supportability of a mattress.

Anyway, it is very subjective when making the choice for a firm or soft one. That is why it is so important to try out the comfort of different mattresses. It is therefore strongly recommended to buy a mattress in a good bedding shop where one can try out various kinds of techniques as well as different degrees of firmness. The prospective buyer should spend at least 15 minutes on a mattress in the store. By spending five minutes on his back and both sides he will be more likely to determine if the mattress he is trying is the right choice. Lying on the back - if a user can slide his/her hand under the small space of the back very easily and his/her shoulders and hips are uncomfortable, the mattress is too hard. If it takes a lot of effort to roll over, the bed is too soft. If it is uncomfortable for the user's hips and shoulders, it is too hard. The user should test the mattress on the type of base that it will be used on later. If it is a bed for two people, both users should try it at the same time.

In the end it is recommendable to have a good retailer consultation: he should check whether the mattress correctly supports the spine or if the mattress is too hard or soft - even when it feels good for the consumer.

A new mattress should be put on a firm base, never on a saggy one. Most manufacturers of mattresses suggest that the consumer should regularly rotate and flip the mattress. Otherwise, they caution the mattress will fail. Buying a new mattress together with the base makes sense as in this case one makes sure the sleeping system fits well together and supports health and good sleep in the best possible way.

C. Pillows

Just as a bed provides good support for your body, the real purpose of the pillow is to fill in the different gaps created between the head and the trunk, making the spinal column rest in the correct position without causing damage to the vertebrae. It should hold the head in the same relation to the shoulders and spine as if standing with correct upright posture.

The selection of a suitable pillow should be made with due care. Each person has an individual way of using his/her pillow. First of all it is a matter of sleeping position, lying face-up, facedown or sideways. If one sleeps on the side, one may want a fairly firm pillow to give head and neck extra support. If one sleeps on the back, a medium-firm pillow may help to cradle the head with more "give". And if one sleeps on the stomach, a soft pillow to lessen the strain on the neck may be the solution. Sometimes, however, the pillow is embraced, folded or even crumpled.

Pillows can be classified into high and low, hard and soft. All the possible types come from this simple classification. Various materials are used to stuff pillows: fibres, feathers, polyurethane, latex, visco-elastic foam, springs etc.

Even with regular washing, pillows tend to accumulate large amounts of dust and vast numbers of microbes among the fill and it is recommended to replace them every few years. People suffering from chemical sensitivities and/or allergies widely and successfully use hypoallergenic pillows.

From a range of feather pillows, hypoallergenic pillows, water pillows, air pillows, all these different types of bed pillows offer special comfort, considering different individual needs.

Feather pillows give great comfort and natural support to the neck and head because of the feather's ability to retain its shape. Feather pillows seem to conform to the contour of the neck, while staying firm enough to hold up the shape in the desired sleeping position. One may hear the term 'down' when referring to feather pillows. Down is a light, fluffy fill, which retains maximum warmth and volume. The right mixture of down and feathers creates a pillow with a good balance in firmness, warmth, and fluffy volume. Today, artificial fills have become more common than feathers.

Therapeutic contour pillows cradle and support the head and neck, whether in memory foam, traditional foam, or latex. Fully conforming to the contours of the neck and head and therefore reducing pressure points, these pillows are greatly sought after for full support and comfort. Some feature removable foam inserts, giving various simple adjustment options so as to create the pillow to suit personal comfort needs.

Neck pillows and neck rolls can be used to help maintain the normal anterior curve of the cervical spine during rest by giving good support. The comfort and wellness of the neck cannot only allow more proper sleep, but it also has a good chance of relieving headaches and tension. Neck pillows can also be used under the back or knees.

Placed pressure on the body does not end during sleep, so the skeletal structure benefits from the use of side sleeping pillows, body pillows and leg pillows. Side sleeping pillows give comfort and support to the shoulders and upper back while lying on your side. Body pillows can be positioned along with the contours of the body during sleep, such as providing upper support for the shoulders while relieving pressure on the hips by also placing the pillow between your knees.

If the bulk of a body pillow is non-preferred, a leg pillow functions well at relieving pressure and strain on the lower back, knees, and ankles.

Positioning pillows aid in relaxing or sleeping. These pillows range from sit-ups in bed to creating good posture during the process of sleep. This can reduce problems such as back pain, muscle stiffness, neck tension, headaches, or even snoring. They can also be used to aid in recovery and rest after an injury by placing support where needed.

Air pillows provide a nice luxury allowing personalised support and firmness to individual needs. Using pumps and air pockets, one can adjust the air pillow to individual wishes.

Natural fill pillows are good for health in different ways. The special shape of the pillows allows them to fit to the contour of the head, providing support to reduce stress on spine and neck. Most natural fills (such as buckwheat) are also thermodynamic, keeping warm in the winter and cool in the summer.

D. Accessories

There is a wide range of accessories for beds and mattresses. Besides pillows, there are all sorts of blankets, additional washable mattress covers and mattress pads for special needs.

An example of the wide range of special mattress pads are electric mattress pads with zoned heating that keep warm all night long, allergy-free or waterproof mattress pads.

Blankets are subdivided into a lot of types, including quilts, duvets and comforters, depending on their thickness, construction and/or fill material. Blankets were traditionally made of wool, while these days, synthetic fibres are frequently used for the fillings. Throw blankets are smaller blankets, often in decorative colours and patterns that can be used for extra warmth outside of bed. Electric blankets are heated by electricity, similar to electric mattress pads.

A comforter is a type of bedding — a soft flat bag used on a bed as a type of bed cover. It is filled with either an artificial material (such as polyester batting) or a natural material. A comforter is basically a thick, fluffy blanket that is put on the bed to achieve a higher level of comfort and warmth.

A similar type of covering made from feathers (often including down) is generally referred to as a duvet. Duvets are soft flat bags traditionally filled with down or feathers, or a combination of both and used on a bed as a blanket. Duvets originally came out of rural Europe and were made from the down feathers of the Eider duck, which is well known for its usefulness as an insulator.

A quilt is a bed covering composed of a quilt top, a layer of batting, and a layer of fabric for backing, generally combined using the technique of quilting. Quilts are mainly used as decorative bed covers.

E. Issues

1. Allergy

Allergies are an unwanted response of the immune system resulting in inflammation of the eyes and nose (rhinitis), lungs (asthma) and skin (eczema). It is estimated that allergies affect 40% of the population at some time. Most symptoms associated with allergies are so common we do not even realise they are allergies, such as sneezing, wheezing, sinus pain, runny nose, coughing, rashes, itchy eyes and more.

1.1 Dust Mites

Scientists have established a causal link between house dust mites and numerous health problems, including allergic rhinitis and asthma. Statistics tell us that 70% of asthma in the home can be attributed to an allergen present in the excretions from house dust mites. It is also a fact that the number of people, especially children, who are affected by this allergen, rises dramatically each year. The average dust mite is 0,3 mm in length, not visible to the naked eye, so finding it is virtually impossible. But the fact is that they are there.

The bedroom is particularly vulnerable for allergy sufferers as we spend one-third of our life in bed and a lot of other time dressing and preparing for the day. We shed skin scales, which dust mites require for food, into our sleeping environment, collected on linens, pillows, mattress and carpet. House dust mites also require relative humidity levels for several hours per day to thrive. These conditions are reliably provided by a bed in regular use what makes mattresses ideal breeding grounds for the house dust mites. That is why concentrations of mites are generally higher in mattresses than elsewhere in the home.

Some mattress materials are anti-microbial (such as latex and memory foam), so that dust mites will not reside in these mattresses as easily as in others, and as such offer a certain protection.

But latest studies have shown that especially the age of a mattress is responsible for the concentration of antigens derived from house dust mites and that extensive use of mattresses without exchanging them must be seen as a threat to health.

The recommendations concerning the maximum healthy lifespan of a mattress will vary depending on climatic and other factors, so that it is not possible to make rigid guidelines. But it is obvious that from the hygienic or healthy point of view, it makes no sense to extend replacement cycles for mattresses. That is why EBIA proposes a maximum use of seven to ten years the latest.

Control of dust mite pollution is probably best achieved by an integral approach combining enclosure of the mattress in an occlusive cover, cleaning (with vacuum cleaner) and of course periodical mattress replacement.

1.2 Latex

The protein in natural rubber latex can cause an allergic reaction in some people. The thin, stretchy latex rubber in gloves, condoms and balloons is high in this protein. It causes more allergic reactions than products made of hard rubber (such as tires). Also, because some latex products, such as gloves are coated with cornstarch powder, the latex protein particles stick to

the cornstarch and fly into the air when the gloves are taken off. In places where gloves are being put on and removed frequently, the air may contain a lot of latex particles.

Latex allergy can be mild or severe, with the typical allergic symptoms such as itchy, red, watery eyes, sneezing or runny nose, coughing, rash or hives, chest tightness and shortness of breath and shock. Some people who wear latex gloves get bumps, sores, cracks or red, raised areas on their hands. These symptoms usually appear 12 to 36 hours after contact with latex. A latex-sensitive person can also have a life-threatening allergic reaction with no previous warning or symptoms.

Latex in mattresses is in the form of foam, constituting the mattress core, which is enclosed in the mattress cover. Hence, there is no direct contact to the latex while lying on a latex mattress. There have not been any reported cases of allergies to latex foam. The reason is that people, who are allergic to latex, are normally allergic to the type of latex used in making latex gloves, which is different from the latex foam in mattresses.

2. Chemo-phobia

Today every human being is subjected to contact with countless chemicals from the moment of conception until death. Chemo-phobia is the fear of the effects that unavoidable exposure to man-made chemicals might have. Indoor air can contain various volatile organic compounds (VOCs), from orange zest to substances added to room-freshening aerosols, disinfectants, dry-cleaned clothes, insect repellents and paint. The danger about VOCs is that they can change from a solid or a liquid form into a vapour, and can then be inhaled with the room air.

Mattresses are mostly made of pure, natural materials and manufacturers make sure that they will not outgas any toxic chemicals, following strict guidelines.

3. Disposal

Old beds turn up in the oddest places – at the bottom of lakes, by the side of the road, in the classified ads of newspapers. Clearly, people do not know what to do with their old mattresses! It is estimated that nearly 70% of old beds stay in circulation, handed down like heirlooms to children and other family members. This is especially harmful for children, whose active, developing bodies require the support of a good quality mattress. If the bed is no longer good enough for you, it is not good enough for anybody else; throw it out!

Presently, most disused mattresses end up in the rubbish tip. For disposal, local municipalities, sanitation departments or garbage collectors usually have provisions for picking up larger items. On the other hand, an increasing number of retailers pick up old mattresses and frames when they deliver the new set. Most of them offer this service as part of the purchase price or for a nominal fee and supply the old beds to a proper disposal. Today, specialized firms strip down the disused furniture and pass the component parts on to recycling plants. Foams, fabrics and coils can be recycled, while some few inseparable stuck materials are thrown into the garbage or are burned.

4. Fire prevention

Basically, all mattresses can be furnished with fire prevention. However, the question if a mattress is to be furnished with flame-retardants is mainly a political affair and depends on the governmental fire legislation of each nation.

One of the fire prevention approaches is to add toxic flame-retardants to mattresses; however, these retardants might outgas chemicals that could be harmful to health. In the case of a domestic fire, a mattress having fire prevention will have the effect of not burning the victims but of suffocating them with the toxic gasses.

This is the reason why the retailer should normally be able to inform his customer on which mattresses contain fire retardants and which do not. Generally mattresses produced and sold in the European Union do not contain any of these chemicals.

Mattress manufacturers in junction with EBIA, support the production of mattresses without flame-retardants. But, as already mentioned, there are different fire legislations in different nations, which have prescriptive status for the fabrication of mattresses.

5. Electromagnetic radiation

Electromagnetic radiation is caused by radio waves, e.g. from radio and TV towers, microwaves, cell sites, mobile phones, cordless phones. The background radiation has been rising significantly by factors of thousands in the general population since World War II.

Critics of electromagnetic radiation say there is strong evidence that it can damage cells in a way that is potentially causing cancer. At night when we sleep, our melatonin level rises, goes through our blood to clean up our cells and protect them from becoming carcinogenic. Electromagnetic radiation is said to reduce the cleaning-up effect of melatonin, and critics warn to watch the environment of sleeping not to become polluted by electromagnetic radiation.

It was also asserted, that the coils used in spring core mattresses become magnetised in the presence of normal room electricity, causing a threat to health. But this is not more than a bad rumour. Manufacturers of spring mattresses are aware of the metals' physical qualities and prevent coils from radiation by galvanizing the coils, which makes radiation impossible to arise.

Should a person be very much aware of electromagnetic pollution, it is sensible to pay more attention to the use of electric sleeping accessories such as an electric alarm clock. Critical voices say we should also relocate any electric wires that might be running under our beds. Physically seen electromagnetic radiation always produces heat. So if one cannot feel any kind of heat, the electromagnetic radiation is so minor or inexistent that there is no need to worry about it. But if strong enough, these products may generate a constant stream of electromagnetic energy that might saturate the body.

6. Earth Radiation

Natural earth radiation causes a state of tension in the living organism, which results in short-term improvements of performance. But long-term exposure, particularly during sleep, may result in a debilitating influence.

Earth radiation can disturb and interfere with the normal interaction between the hormonal and nervous system. There are assertions whereas the interplay of glands, hormones and nerves may, depending on the intensity of the radiation and the duration, lead to mutation of body cells.

People concerned with earth radiation phenomena say that the body has a limited ability to deal with disturbances, but it cannot cope with continuous tension or stimulation. Health is directly influenced by radiation, eg cramps, depression, insomnia, bed-wetting, asthma, pains on the weak spots of the body etc. Some scientists assert that earth radiation can even cause illnesses, which result in permanent damage, e.g. cancer.

IV. Lifetime of sleeping systems

Similar to a favourite old chair or a worn pair of shoes, a mattress can still feel comfortable long after it has lost its ability to provide the body with the proper support and comfort it needs. Because sleep is so critical to our ability to function and feel the best, it is important to evaluate the sleeping system on a regular basis. Instead of asking when a mattress should be replaced, a better question might be how long will your mattress continue to provide the comfort and support you need to assure the best night's sleep?
How long a mattress will keep its physical qualities depends on a lot of factors. Is the mattress used nightly or is it a guest room mattress? Was the mattress a top quality mattress when originally purchased? The weight and the sleeping habits of people who sleep on a mattress all factor into how long it will maintain optimum performance. People's bodies change over time and their need for adequate comfort and support increases, as they get older. As we know, technologies advance in all sectors - so mattresses produced today are more sophisticated than those produced a decade ago. That is why it is reasonable to compare the mattress and base you are sleeping on now to newer models at least every few years. Mattress technology is constantly advancing, and it is worthwhile to visit a store just to see what is new in better sleep and comfort.

Even if the exterior of a mattress is in good shape, experts recommend the average mattress to be replaced every seven to ten years. After that, gravity begins to take its toll and mattresses lose a significant amount of both comfort and support. A few obvious signs are lumps, bumps, dips or sagging. The latest study of Dr. Duncan Bain of the University College London, even recommends not to use a mattress longer than seven years for hygiene sake, which is no bad idea considering the average sleeper secretes half a litre of perspiration a night, and up to twice as much when being ill. Furthermore, especially the age of a mattress is responsible for the concentration of antigens derived from house dust mites. That is why extensive use of mattresses without exchanging them must be seen as a threat to health.

Also, it is not justifiable for parents to give their old mattresses to their children. Children's bone structures are not yet fixed and therefore mouldable and more easily damaged. Old mattresses no longer offer the correct support required for these young bodies.

<u>Maintenance and care</u>

- A new mattress should be put on a firm base, never on a saggy base.
- Most mattress manufacturers suggest the consumer to regularly rotate and flip the mattress to reduce wear patterns over time.
- Do not wet a mattress. An impermeable mattress protector can be used to keep it clean.
- A vacuum cleaner can be used for regular cleaning.
- Use a mattress pad to keep the mattress free from stains. If stained, use mild soap with cold water and rub lightly. Do not soak a mattress or base.
- If a mattress has handles, they are usually only for positioning it, not carrying it. See your owner’s manual.
- A spring mattress should not be folded or bent, as is can be permanently damaged.
- Sitting on the same spot of the mattress edge can permanently depress it.

V. Propositions for an excellent sales approach

A. Why people buy a new mattress

Most sales people have no idea why their customers come into the shop to buy a new mattress. Good sales service implies the necessity to find out the customer's reasons for buying new sleeping products.

We tend to assume that there is always a logic reason why the customer thinks he needs a new mattress, e.g. back pain. Researches proved that any buying decision is based on emotional responses. The potential customer is feeling a need or wants to perceive an additional value.

Most customers do not know much about their sleeping system, about mattress technologies and what options they can choose from. Mattresses look a lot alike but there are a lot of differences in quality and comfort to choose from. Very often, the customer tends to decide for the kind of product that best appeals to his emotions. Therefore it is most important to understand these emotional „hot buttons", which differ from person to person.

If you remember that people buy based on benefits defined by them, not by their sales person, you will be probably more successful in meeting the needs of your customers

The only way to find out the needs a customer has, is to ask him. So any sales communication starts with getting to know the buyer's attitudes. You can be sure, if he enters the shop he is generally willing to be informed about the products, and feels a need you can satisfy by presenting good products and service. If he is emotionally and mentally convinced that you sell the right bedding products to him, he will be happy to buy.

B. Good bedding products require good communication

As sleeping habits and the conditions of the body are different for everyone, selling mattresses is really a field for experts. The buyer might not know which products are available but he knows his sleeping habits, his needs and wants to find out which products fit him best. The sales person knows a lot about the various bedding products but knows little about the customer's demands and emotions. There is an information gap that can be overcome by effective communication.

At first the sales person needs to find out what the customer already knows, expects and which preferences he has. After this it is essential that the customer is given best information about sleep, products, choices and additional options he has. It is easy to sell mattresses only by price but in the long run it is more beneficial and challenging for both sides to sell it by quality. A good salesperson enables the customer by communication to choose the product he needs and helps him to find best quality for a fair price.

Getting into emotional contact with the prospective buyer is the first step towards a sale. The salesperson has to find an introduction into the retailer-customer-relationship to establish first mutual trust. This first phase is also important to gain necessary information about the customer and to find out more about him, his needs, his assumptions and his knowledge of sleep and sleeping products quickly, correctly and clearly.

There are certain techniques that can help asking questions to get useful answers:

- Have a leading idea in mind! Realise that the one who asks is the one who is leading the communication process.
- Listen well! Listening is the basis for a successful sales visit. The next question you ask your customer logically follows if you learn to listen really well.
- Ask in the right way! Realise that open questions result in more informative answers.
- Beware of communication killers! Realise that suggestive questions neither lead to good feelings nor to informative answers.

C. The four steps of a selling process

A structured communication process is a key to successful selling. Although each customer is different in his sleeping habits, his demands and his knowledge about sleep, the communication process can be defined in four phases. It is essential for a salesperson to go through these phases step by step and to know exactly at what step you are at a certain moment. These phases can be seen as effective guidelines to reach your sales goals. Be aware that especially the phases of qualifying and presenting may become intertwined and mixed together but nevertheless following the sequence of these phases is important to succeed in making the customer satisfied.

Phase I: Prospecting
Listen well and ask precisely and open to make the customer speak about himself.
In the first phase it is necessary to find out the most about your customer's needs. Which emotions are leading him to enter your shop? For which part of new bedding system is he looking? What are the reasons? Is he more concentrated on getting a low price product or is he willing to pay a fair price for the product that fits him best? What are his assumptions about his sleep, the sleeping products and the demands he has? What kind of information does he need from you?

Phase II: Qualifying
After having a clear view of the customer's demands it is your turn as salesperson to act by giving him the information he needs. You qualify the buyer by giving him valuable and comprehensible pieces of information that confirm his good feelings. If he recognises that you really know what he is looking for he will be more willing to buy. If the customer feels well informed he is more likely to buy and be content with his purchase in the long run.

Phase III: Presenting
After exchanging crucial information on both sides, the next phase in a sales process is to animate the customer to experience different products, their qualities and special benefits. When selling a mattress for example it is not enough to know about different features. The customer is more convinced if he can try out various mattresses. If he knows that there are spring, foam and latex mattresses with different advantages let him try out those mattresses that fit his needs. Seeing, feeling and lying on a mattress that fulfils the customer's demands enables him to judge in a better way which product he might like best. Presenting not only means showing products but creating experiences of comfort and well-being.

Phase IV: Closing
There is not one key of success to finish a sales communication with a purchase but when you feel the customer is willing to buy then you can try to close the buying process. This is best done with a trial close. A trial close is a final qualifier that brings you a step closer to closing or

determining the key concerns of the customer. An example of a trial close is, “Mr. Name, are you ready to buy today?” or “Do you think this mattress is the one you looked for?” Trial closes are usually questions that can be answered with a "Yes" or "No." Only at this point in the process it is useful to break the scheme of asking open questions. Here you require just a “yes” or “no”. In case the prospect responds with a "No," you can ask open questions again like “Why do you think you are not sure to buy now?" If the customer says "Yes," you have a sale. Some sales persons do not realise the key signals after the presenting phase and do not dare to come to the closing. Therefore these trial closes can help to find the right time and check the attitudes of both sides.

D. Conclusive arguing is a skill

Objections occur in every sales discussion. Do not see an objection as a refusal but take it as a chance. An objection shows you that the customer is not yet satisfied. Either he is emotionally not ready to buy or he logically thinks the presented product does not fit him.

In the communication try to differentiate between a pretext or a real demur.

Pretexts are based on a lack of trust in the sales person or the product itself. When the retailer does not succeed in recognizing the motives and emotions behind the pretexts given by the customer, he will soon fail. It does not help to convince the customer with arguments, as it is not more information he needs. Try to ask him what really lies behind his concerns.

In contrast to pretexts demurs are serious matters in a sales communication process. Most demurs appear as questions. The offer of the salesperson is taken seriously, the service checked and there is obviously a certain interest for the product. Give informative answers to the questions asked and try to find out where the customer needs more positive emotion or good information.

Try to point out the value you give in product and in form of information. The investment in a high quality sleeping system with qualified consultation in contrast to Internet shopping or buying out of a catalogue is an investment in restful sleep and health at the same time. Only if long-term customer satisfaction is achieved by the sale of a good mattress, the common activities of manufacturers and retailers lead to success. Products of high quality, good consultation and individual service provide best results for the sake of each individual customer.

VI. Frequently Asked Questions

How can I decide which mattress is the best for me?

There is not a perfect mattress that fits everyone. The best mattress is the one that offers you best comfort and a good price-performance ratio. Therefore the first question when buying a mattress is what are your sleeping habits, your requirements and what extras do you need. Be aware that the different technologies offer you different kinds of comfort and that there is a broad variety of qualities. Mattresses that look alike at first sight may be different.

Why is it important to test a mattress in the store and how should it be tested?

The prospective buyer should spend at least 15 minutes testing each mattress in the store. By spending five minutes on his back and both sides he will be more likely to determine if the mattress he is trying out is the right choice. Lying on the back — if the user slides his/her hand under the small of the back, and it is very easy and his/her shoulders and hips are uncomfortable, the mattress is too hard. Rolling over — if it takes a lot of efforts, the bed is too soft. If it is uncomfortable for the user's hips and shoulders, it is too hard. The user should test the mattress on the type of base that it will be used on. If the bed is for two people, both users should try it at the same time.
Apart from your own feelings let the salesperson check that your spine is supported well in all body zones.

Which level of firmness is recommendable and are firmer mattresses generally better than softer ones?

Be aware that the producers usually indicate the level of firmness of a mattress. As there is no common standard how to define a soft, medium or hard mattress it is crucial that you test yourself which level of firmness fits you best. You cannot generally say that firmer mattresses are better than softer ones. The degree of firmness needed depends on the sleeper's body, his shapes and weight. Usually people who are small and slim need and prefer softer mattresses than people whose body weight is higher. Quality mattresses often offer different zones supporting your body in different areas with adequate strengths.

Do different sleeping positions require different levels of mattress firmness?

Yes, they do. Studies have shown that various sleeping positions require different levels of firmness. A back sleeper needs a mattress that offers enough support to fill in the gaps in the contour of the back, while at the same time providing enough comfort (according to the user's preference). Side sleepers will probably want a softer mattress, as it will support the body's curves to minimize pressure points, especially if they have a more rounded figure. A pillow pulled under the shoulder will support the neck. Stomach sleepers probably need a firmer mattress to keep the spine aligned and to prevent spinal distortion that can result in back pain when waking up.

Which criteria of comfort should a new mattress offer?

There are four basic requirements for a good mattress to enhance the quality of sleep. In order of importance: maintain spinal alignment, reduce surface pressure, regulate body temperature, and resist nasty allergens.

A new mattress should be designed to conform to the spine's natural curves and to keep the spine in alignment when lying down. It should conform to the shape of our body to distribute weight evenly and eliminate high-pressure areas. Sleeping too hot or too cold will also cause tossing and turning. While we sleep, our bodies give off moisture, which gets trapped in our bedding. This dampness interferes with our body's ability to regulate its own temperature. Depending on your individual needs you can choose between different mattress types and different mattress covers affecting your body temperature while sleeping. Some mattress materials have anti-microbial value, so that dust mites will not reside in these mattresses as easily as in others. These mattresses offer a certain protection for those who struggle with allergies.

What is the mattress core made of and which one is the best?

Cores are most often either made of foam, latex or springs. Each of these technologies gives you a different feeling when lying on it, so there is a need to test the different cores in the shop. Latex for example gives you a very good stability and springs offer a good air circulation. Foam mattress evenly spread out the force delivered to it by the body‘s weight but vary according to the type of foam used.

What are the most important kinds of foam mattresses?

Polyurethane (PU) foam mattresses provide very good body support during sleep. They evenly spread out the force of the body‘s weight, to keep neck and spine straight and comfortable. PU foam mattresses are produced with various degrees of firmness and different zones that support best individual shapes of human bodies. PU foam mattresses covered with matching textile fabric regulate temperature and control moisture. Some also include ventilation channels that expel moisture and absorb fresh air, allowing the mattress to breathe throughout the night.

In contrast to PU foam, high resilient foam is characterized by an irregular cell structure showing high flexibility and elasticity. High resilient foam has anti-microbial properties, which offer additional protection to people suffering from allergies.

Visco-elastic or memory foam is made from polyurethane with additional chemicals, increasing the density of the foam and providing a cell structure different from other foams, which makes it less ‘springy’ and slower to recover. Sensitive to weight and temperature, a visco-elastic mattress moulds to the body’s form, supporting it evenly. Due to a quite special and at first quite uncommon feeling of being bedded (for those who have not experienced this kind of mattresses yet), it is recommendable to try it out in a shop before buying.

What are the most important kinds of latex mattresses?

Latex mattresses can be made of natural latex, synthetic latex or a blend of both. They all provide ideal support while reducing pressure points, perfectly reflecting the human form and maintaining the spine in a good position.

Latex foam is an environmentally friendly natural product that biodegrades completely in the environment. Synthetic latex is claimed to have the same properties as natural latex, and nowadays, most latex mattresses tend to be either made of synthetic latex or more typically a combination of synthetic and natural latex. The combination latex core is more resilient.

What are the most important kinds of spring mattresses?

There are three main types of springs, Bonnell, LFK and Pocket springs.

Bonnell springs are double cone or hourglass shaped springs, assembled by helical. They provide a progressive spring support and can be compressed quite easily at first, but offering more support as the pressure to the coils increases. Bonnell spring cores are characterized by unbeatable stability, strength and durability.

The LFK spring system features knotless, light-weight cylindrical springs, assembled by helical, for the medium and medium high price range. Fine wire gauges are responsible for the lower weight, although the coil count is approx. 50% higher than in a Bonnell spring system. Smaller coil diameters create greater surface coverage. The increased flexibility and sensitivity to body contours as well as an excellent support to the sleepers make LFK innerspring systems more comfortable than Bonnells.

Pocket springs are small, soft barrel shaped springs, assembled either by centrally gluing or surface bonding between two sheets of non woven fibre material. Their shape and the welding of each coil into its own fabric pocket allows them to work independently and profiling to the body shape to prevent pressure points. Independent support means that there is little or no transfer of movement from one sleeping partner to another. Pocket springs are highly responsive to even the smallest changes in weight distribution, body shape and sleeping patterns, providing support where needed most. Pocket spring units are perfectly suitable for adjustable beds and motorised slat bases without any loss of comfort and quality.

All spring mattresses provide a good air circulation within the core.

How is latex different from memory foam?

Latex is made from a rubber-based product versus memory or visco elastic foam, which is derived from plastics. Latex provides “instantaneous recovery” as it contours and supports any body movement, while memory foam provides “slow recovery”. With memory foam, the sleeper must wait for her/his body temperature to soften the foam.

Why is it recommendable to buy a bedding system instead of just a mattress?

A good bedding system consists of a good mattress and an appropriate bed base. The mattress and bed base should be chosen together to complement each other giving you a comfortable night's sleep. Mattress and bed base are engineered to work together as a set, and the base takes a lot of the nightly wear and tear and contributes to the overall comfort and support of the bed. Putting a new mattress on an old bed base, pairing it with a base which was not designed to work with or adding a board between the mattress and bed base will impede comfort and reduce the

useful life of your new mattress. Even though a wire frame can support regular coil mattresses, the same is not true for memory foam beds. A proper frame is definitely necessary!

What is the lifespan of a mattress today?

How long a mattress will keep its physical qualities depends on many factors, such as weight and sleeping habits of those people who use it or the quality of the new mattress. But most brand name mattresses these days will last at least 7-10 years on a new bed base. After that, mattresses lose a significant amount of both, comfort and support. Obvious signs are lumps, bumps, dips or sagging and if the cover is stained or torn. Even if for best mattresses physical conditions stay stable, there is another indication to change the mattress: hygiene reasons. For these mattresses should not be used longer than seven years, considering the average sleeper secretes half a litre of perspiration a night, and up to twice as much when being ill. Furthermore, especially the age of a mattress is responsible for the concentration of antigens derived from house dust mites. That is why an extensive use of mattresses without exchanging them must be seen as a threat to health.

What can I do against dust mites?

Mattresses are ideal breeding grounds for house dust mites and that is why concentrations of mites are generally higher in mattresses than elsewhere in the home. Some mattress materials are anti-microbial (such as latex and memory foam), so that dust mites will not reside in these mattresses as easily as in others and these mattresses offer a certain protection. But latest studies have shown that especially the age of a mattress is responsible for the concentration of antigens. That is why EBIA proposes a maximum use of seven to ten years the latest.

Control of dust mite pollution is probably best achieved by an integral approach combining enclosure of the mattress in an occlusive cover, cleaning (with vacuum cleaner) and of course periodical mattress replacement.

Are latex allergies an issue in bedding products?

Latex in mattresses is found in the mattress core, which is enclosed in the mattress cover. Hence, there is no direct contact to the latex while lying on a latex mattress. There have not been any reported cases of allergies to latex foam. The reason is that people, who are allergic to latex, are normally allergic to the type of latex used in making latex gloves, which is different from the latex foam in mattresses.

What are the main characteristics of waterbeds?

Waterbeds combine a water-filled core providing the support with layers of upholstery for insulation and surface comfort. Quality construction is critical when water is involved, so it is crucial for the vinyl and seaming to be designed for maximum durability. Make sure the floor can accommodate a waterbed's weight.

One benefit of a waterbed is the lack of pressure points since the water forms to the body and offers excellent pressure distribution. The key is to ensure the mattress is full enough so there is

enough support. If you sleep with a partner be sure to look for a waterbed that minimizes partner disturbance.

What are the main characteristics of airbeds?

Today's air beds are designed to look like the familiar mattress/box spring combination, with an air-filled core providing the support instead of an innerspring unit or foam core.

The air chambers are completely enclosed and protected within layers of foam. Electronically controlled they pump and release air in and out of the mattress so that comfort and firmness can be adjusted individually for each person, distributing body weight evenly, gently cushioning the body and providing relief to pressure points, back pain, neck, shoulders, hips, etc. These air chambers allow the mattress to distribute body weight evenly, which is why they are highly recommended for people with back pain.

Where can I find more information about mattresses and how can I find a good store to buy one?

If you need more information about mattresses and bed bases it is worthwhile contact a good store with qualified salespersons in contrast to Internet shopping or buying out of a catalogue. It is crucial to look for a shop with a good product presentation, individual consultation and the possibility to try out and compare different mattress types. And if after that you are able to choose a convincing quality product it will be an investment in restful sleep and health at the same time.