

A concise guide to the different types of padlocks and the corresponding insurance / security ratings.



This document was produced in collaboration with the Crime Prevention Design Service and the Hertfordshire Constabulary. Reproduction of this guide has been granted under the discretion of the Crime Prevention Design Service and other Constabularies within the United Kingdom for the purpose of improving security and reducing crime.

Contents

Mistakes by Insurance Companies	2
Official Standards and Testing Grades	3
Security Rating Matrix	6
Padlock Parts and Mechanism	7
The Different Types of Padlock	8
Combination Padlocks	9
Weatherproof / Marine Padlocks	10
Picking a Padlock	11
Master Key & Keyed Alike	12

Links

Guide to padlocks online resource:
<http://www.nothingbutpadlocks.com/advice>

Secured By Design Initiative:
<http://www.securedbydesign.com>

Master Locksmiths Association:
<http://www.locksmiths.co.uk>

1/ Overview

Choosing the right padlock can be a little more complicated than you might imagine and there are a number of different factors that you may need to consider.

Online there are very few useful sources of information relating to padlocks and their uses. Very often individuals and companies alike will choose a lock that is unsuitable for its intended use and may, in some cases, invalidate their insurance. We have produced this guide to help the police, companies and general public more aware of the different standards and padlock models on the market.

Firstly, insurance companies will often advise wrongly or overstate the required grade. It is important to understand these.

2// Mistakes by Insurance Companies

Most of the time an insurance company will ask for any padlock that is protecting insured items to be either of the following requirements. It is important to note these mistakes:

a. "Have a minimum of 5 levers"

Most padlocks do not have levers any longer. It is uncertain where this confusion has come from but it is likely that they have taken the advice from BSEN standards relating to doors locks which often do contain levers. Some lever padlocks do still exist but the range is so limited and the quality varies a lot. In general you should not use the no. of levers as determining factor for choosing a padlock.



An example of a closed shackle padlock which is small and not especially secure.

b. "Be of a close shackle design"

This is a very limited recommendation. There is no doubt that a close shackle padlock is more secure than an open shackle type. You can read more about the different types later in this document. However, the closed shackle locks which do exist, vary greatly in strength, size and security and they only take into consideration the one aspect of the lock which increases security.

With this advice, many members of the general public will get away with the smallest and cheapest closed shackle lock available.

c. “Use a CEN Grade 6 Padlock”

A few insurance companies who have done a little research will come across a grading system called Central European Norm. It has 6 grades with 6 being the highest. As such they by default apply the highest grade to protect themselves.

This blanket clause is totally unrealistic as the grades are not proportional. For example, Grade 5 is not 1/6th weaker than Grade 6. In fact Grade 6 is almost twice as strong as 5.

This advice leaves customers having to purchase padlocks in excess of £130 which would rarely fit their current hasp, bolt or chain and be totally excessive.

3/// Official Standards and Testing Grades

There is no single grading system we can use with padlocks since a few different standards have cropped up over the years. However, we can certainly cross reference them so that the advice given is approximately standardised. Here is a summary of the common ones you will come across along with a matrix at the end of this section.

a. Central European Normal (CEN)

CEN means Central European Norm. It was devised some time ago when the major padlock manufacturers got together to devise a testing standard.

Generally speaking it has 6 grades:

- GRADE 6 – Maximum Security
- GRADE 5 – Extra High Security
- GRADE 4 – High Security
- GRADE 3 – Medium / High Security
- GRADE 2 – Standard Security
- GRADE 1 – Low Security

We summarise the grades in the matrix later in this section but you can read more about CEN here:

www.nothingbutpadlocks.com/advice/insurance-cen/





b. British Standards Institution - BSEN 12320

The British Standards Institution (BSI) created 12320 specifically for padlocks. It uses a digit system to gauge a lock by Classification of use, corrosion resistance and strength.

Classification and corrosion resistance have little practical use and so generally speaking it is simply be a case of recommending a padlock to adhere to BSEN 12320.

However, BSEN follows the same grades and CEN so recommending a padlock which is simply BSEN 12320 approved has no real meaning. It needs to be BSEN 12320 Grade 1-6 for example

As such you can interchange the British BSEN standard with the European CEN Standard without any confusion.

NOTE: you will not see any padlock manufacturer using the BSI Kite Mark or Logo on their padlock packaging. You might however see the CEN logo.



c. Sold Secure

The standard was originally setup but the Master Locksmiths Association which informally acts as a governing body for trusted and reputable locksmiths. It has only 3 grades:

GOLD – Ultra High Security
SILVER – High Security
BRONZE – Medium Security

Generally speaking, Sold Secure has not taken off amongst padlock manufacturers who have failed to send their products off for independent Sold Secure testing. They felt it was a little limited in terms of only 3 grades.

That said, it has been very popular on bike locks due to the simplicity for the general public. Many insurance company use this grade when quoting for bicycle insurance.

Although Sold Secure is limited as a padlock standard or grade, some leading brands are taking more notice. For example ABUS have recently put their whole 83 SERIES through the test and have been approved.

You can read more about Sold Secure here:

www.nothingbutpadlocks.com/advice/sold-secure-padlocks/

Important Note:

SEAP (Security Equipment Assessment Panel) was renamed CPNI in 2013 so for all intents and purposes they are the same thing but many people still use the SEAP name, probably since it is slightly easier to remember.

d. SEAP and CPNI

You might come across this standard occasionally but it is not a major standard for padlocks. Fortunately, it is quite easy to understand since it follows CEN in the same way that BSEN 12320 does.

CPNI stands for Centre for the Protection of National Infrastructure. They have many documents that try to formalise the various standards for security applications. They have a specific document for Door Locks which includes Padlocks. After you have eventually read the whole document it then refers to the various BSEN grades that specifically give testing standards for things like door locks, padlocks, doors etc. The BSEN standard for padlocks is BSEN12320 which we have just referred to in section 3B.

The bottom line is that BSEN1230 follows a grading system called CEN (Central European Norm) which has grades from 1-6. You can see those on our website in the high security padlocks section. Confused yet? We wouldn't blame you. To summarise:

- SEAP is actually CPNI
- CPNI doesn't approve padlocks or make grades specifically
- The CPNI standard follows the grades as per CEN
- See CEN in Section 3A of this document.

You can download the full PDF CPNI guide here:

www.nothingbutpadlocks.com/advice/seap-cpni-padlocks/

e. Loss Prevention Certification Board (LPS 1654)

The 'Loss Prevention Certification Board' (LPCB) sounds like an official panel of members that set standards but unfortunately it is not. The LPCB is a brand name of the BRE Group, a private company that creates groups of standards amongst other things.

The standards that they create are usually prefixed LPS. Roughly speaking, LPS 1654 attempts to test locks independently and against real life force attacks with different devices, as opposed to technical strength which CEN does. Unfortunately not many manufacturers have signed up to it, nor know of it.

The other downfall of LPS 1654 is that the testing limits are set too highly meaning that most padlocks do not get any grade and even the high security ones will end up with only grade 2 -4 from a range of 8. The last time we checked, no padlock on the market has managed to exceed LPS 1654 Grade 5. You can read more here:

www.nothingbutpadlocks.com/advice/lps-1654-padlocks/



4//// Security Rating Matrix

With all of the different testing standards and grades there is no single standard that you go on. What we can do is apply theoretical uses and then cross reference which grades sit within each.

There is no doubt that CEN or BSEN12320 is the most commonly requested standard but they certainly can't be relied up on alone.



Low Security:

Garden gates, single tool boxes, securing furniture etc.

Grade: CEN 1 & 2, LPS 1652 Level 1



Medium Security:

Sheds, containing general garden equipment, electrical cabinets, small gates, low - medium cost bicycles etc.

Grade:
BSEN 12320 Grade 3
CEN Grade 3
Sold Secure Bronze



High Security:

Heavy duty gates, security bollards, containers, storage units, security shutters, expensive bicycles etc.

Grade:
BSEN 12320 Grade 4 or 5
CEN Grade 4 / 5
Sold Secure Silver
LPS 1652 Level 2 / 3



Ultra High Security:

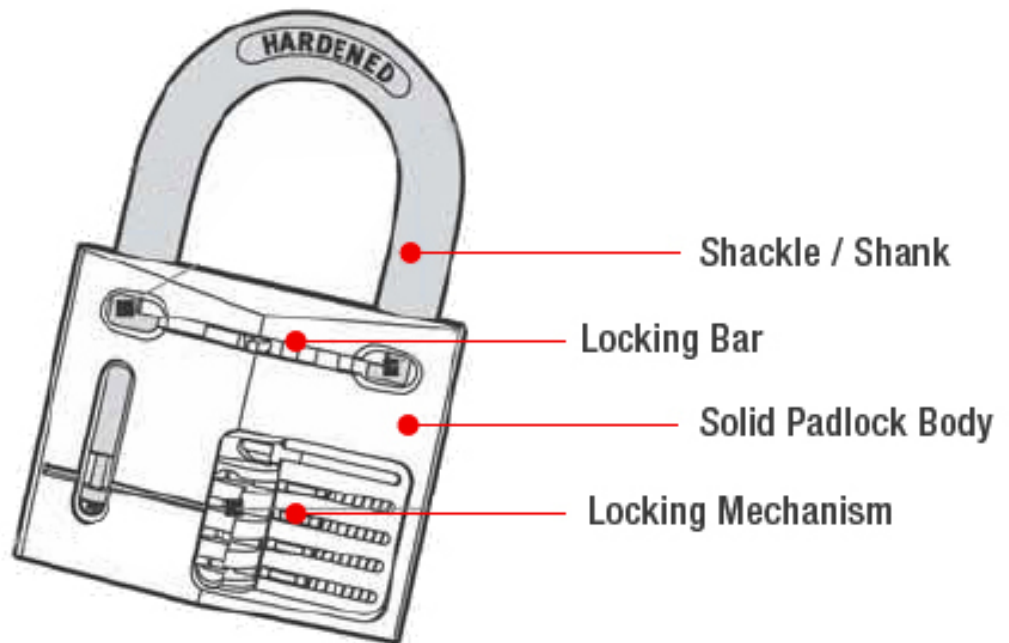
Warehouse doors, containers with expensive items, security doors, machinery, motorcycles, large steel gates etc.

Grade:
BSEN 12320 Grade 5 or 6
CEN Grade 5 / 6
Sold Secure Gold
LPS 1652 Level 4+

5//// Padlock Parts and Mechanism

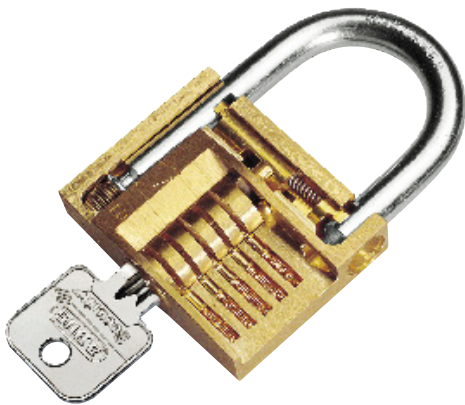
Padlocks usually consist of a solid body, a locking mechanism and a shackle. There are various different styles but the basic design and operation is the same.

Most padlocks use solid metal bodies with the exception of disc of the padlock and as the size of the padlock increases then the larger the keyway and locking mechanism can be.



The keyway and locking mechanism usually contains between 3 and 7 small pins which are spring loaded. As the key entered the padlock barrel the different notches on the key allow the pins to be aligned correctly. Once aligned then the barrel can rotate, unlocking the shackle.

Some padlocks use spring loaded shackles which will pop out when unlocked. Others have to be manually removed.



The shackle or shank is the U-shaped bar that loops round from, and back into, the padlock body. This is the most exposed part of the padlock and more susceptible to be attacked. Once again, as the overall size of the padlock increases, the larger the shackle can be making it more secure.

Some padlocks are designed differently and therefore have slightly different properties. We have a dedicated section below explaining the different shapes, designs and the merits of each.

6///// The Different Types of Padlock

a. The Closed Shackle Padlock



A common design is the 'closed shackle' padlock. This means that the shackle is guarded in some way, making it more difficult to attack with a saw or bolt cutters. Usually the body of the padlock is extended upwards and around the shackle. Many insurance companies will have a minimum requirement that a padlock used as a security device is of a closed shackle design.

It is important however to remember that by enclosing the shackle it reduces the usable clearance of your padlock. The clearance is the area between the shackles that enable you to lock it through a hole, around a bar or onto a cable. Remember to check the full dimensions on our site before making your decision.

b. The Straight Shackle Padlock



The next most common design is the 'straight shackle' padlock. These are commonly known as shutter padlocks since they fit perfectly on to the locking bar of steel roller-shutter doors. Many people are however misled to assume that they are only designed for roller-shutters.

In fact they are excellent all round padlocks and afford the classification of a 'closed shackle' padlock simply due to their unique design. They are often used to secure shipping containers and large warehouse doors because of their high security nature and ease of use.

c. The Discus, Circular or Round Shackle Padlock



As the name suggests this style of padlock has a curved shackle that goes right the way around its circumference.

The very design automatically affords it the status and security rating of a 'closed-shackle' padlock making it resistant to attacked from bolt cutters when standard padlocks may fail:



The padlock body itself is not solid, contrary to the traditional padlock design. The circular shackle is enclosed in two opposing metal cases to form the disc. The keyway is

WARNING: In recent year many budget disc padlocks have entered the marketplace and have damaged the reputation of the original design. Many cheaper alternatives can in fact by hammered on the join between the two halves of the disc body causing them to fall apart and expose the mechanism.

then situated directly in the centre of the lock. Since the shackle is not spring loaded, damage to the keyway barrel by force or drilling will not open the padlock and it will remain disabled and locked. It is for this reason that they remain a highly popular choice.

d. Long Shackle Padlocks

These are not strictly a unique design but simply a traditionally shaped padlock with an extended shackle (the U-Shaped bar). By extending the shackle it does make the padlock more convenient by increasing the locking area and as a result they prove highly popular. However, since the shackle is the weakest point of the padlock, increasing its size inevitably reduces the security rating allowing bolt cutters and saws more room to manoeuvre.

7/////// Combination Padlocks



A common question is “are combination padlocks as good as keyed padlocks”. The simple answer is no. The mechanism of a combination padlock is such that it cannot be as strong as a keyed padlock. A combination padlock can also be cracked over time simply by trying each code in turn.

Rarely will an insurance company cover you when using a combination padlock. They are however hugely cost effective when multiple users require access to a single place. Additionally, the advantages of not needing to carry a key are unmatched and sometimes a necessity.

Most combination padlocks can be reset when open making them even more convenient. The problem of the code being maliciously reset by a single authorised user do occur and as a result padlock manufactures countered the problem by introducing high-security padlocks which require a key in order to reset the code.



The issue of cracking the code simply by systematically trying each number is a problem though. A 3 dial padlock with 10 numbers on each dial can be cracked in around 40 minutes and a 4 dial lock in 4-5 hours. As a result, we would never recommend using a combination padlock in a remote or unmonitored location.

Please note that many combination padlocks can also be cracked using various other technical methods and this is something to be aware of when considering your security option.

8//////// Weatherproof / Marine Padlocks



Marine grade padlocks by ABUS in the 70ib range. Even without the protective plastic jacket they are 100% non corrosive using stainless steel and brass only.



This lock looks like the ones above but is in fact not marine grade. It pays to check the specification and ensure the shackle and mechanism are stainless.

A fully weatherproof padlock is one that uses 100% stainless and non-corrosive materials. They are also know as marine padlocks and suitable for saline and other extreme environments. This is a common question and often the answer is no.

The first thing to seize up and prevent a padlock from functioning properly is the internal mechanism. This mechanism is very small and complex, using a tiny pins and springs. When these rust or corrode they will prevent the key from operating the lock barrel correctly and eventually prevent the lock from being opened at all.

However, many non-marine padlocks are perfectly suitable for outdoor use and many high-quality padlocks use non-corrosive internal mechanisms.

a. The Security / Weatherproof Dilemma

The dilemma between a standard and fully marine padlocks due to the metal used in the shackle and body of the padlock. Fully non-corrosive alloys and metals are by their nature softer and as a result can be sawn, cut or bolt cropped more easily. For example we offer two types of brass padlock. A standard type with a 'hardened-steel' shackle and a fully weatherproof type with a 'stainless-steel' shackle. They are the same size and same design but the fully weatherproof model will be more easily attacked due to the softer metal composition of the shackle. Consider this when choosing the padlock which is correct for your application.

Generally we would recommend standard padlocks with hardened shackles for general outdoor use. The shackle may discolour over time but rest assured that you're padlock is stronger and this corrosion will not affect the function.

If however you plan on leaving your padlock for extend periods of time unused, by the sea, on a boat, underwater or in other extreme environments then the marine grade padlocks would be best. Any padlock with the 'rain-drop' icon is a fully weatherproof marine grade padlock.

There are exceptions to the rule. Some high-end padlocks are made from hardened steel and yet still boast a fully marine grade status. An example of these would be the ABUS Granit series. In 2009 they cataphorically coated their premier high-security padlocks which is both durable and completely covers all corrosive areas of the padlock. Accelerated tests showed that they were capable of normal function in very extreme environments for over 80 years.

Remember that even a marine grade padlock is susceptible to grit, sand and dirt. For these some padlocks are encased within a plastic jacket and a guarded keyway. They are usually marine grade also and make an ideal option for padlocks which are exposed to both moisture and other solid elements.

9//////// Picking a Padlock



Lock pick sets like this are commonly available online legally via Amazon or eBay but in the hands of an amateur then they can only realistically bypass small and cheaper padlocks.

Any padlock can be picked but some more easily than others. At the top end they are near impossible for even the most experienced locksmiths to pick and even then it could take hours.

Within a padlock are spring loaded pins of different lengths. These are pushed up when the key is placed into the lock barrel. The notches on the key cause the pins to be aligned and the barrel to rotate. Using specialised lock picks it is possible to manipulate almost every padlock to open.

Generally speaking picking is not a huge risk any longer and thieves tend not to have the skills to be able to effectively get past a modern padlock. A lot of the security standards discussed early emphasise on the number of unique key combinations and difficult to pick the locks but these are arguably overstated.

However, when securing especially valuable items you may want a padlock that is impossible to pick. As an example, the manufacturers ABUS and Abloy have developed cylinders for their padlocks which use rotating disks rather than pins. ABUS Padlocks which use this system are known as their Granit Plus range. Since the discs can be rotated 360 degrees it makes it near impossible to be compromised and the key can only be copied by an authorised lock-smith using a unique code card provided within the padlock.



There is a large lock-picking community out there but fortunately the vast majority of these people are responsible and pick locks purely for fun and the challenge.

10////////// Master Key & Keyed Alike Padlocks

Most padlocks are only opened by the specific key assigned to them. However, it can sometimes be convenient to have all the padlocks in a set use the same key or be opened by a single master key.

When they leave the factory a padlock is usually what we call “Keyed Different”. This means that each one off the production line is produced with a locking mechanism at random. On average two padlocks within about 500 will not be the same and will not be opened by the same key. This minimum number of repeats will be lower on smaller padlocks where less pins are used and on budget types where accuracy and quality control is lacking.

a. Keyed Alike

For convenience many people will buy 10 padlocks and want them all to be identical and work from the same set of keys. These are known as ‘Keyed Alike’ padlocks. Since their cost is often only marginally more expensive than ‘keyed different’ types, they are highly popular. A set of keyed alike padlocks is often known as a ‘Suite’. A single suite therefore contains all identical padlocks.



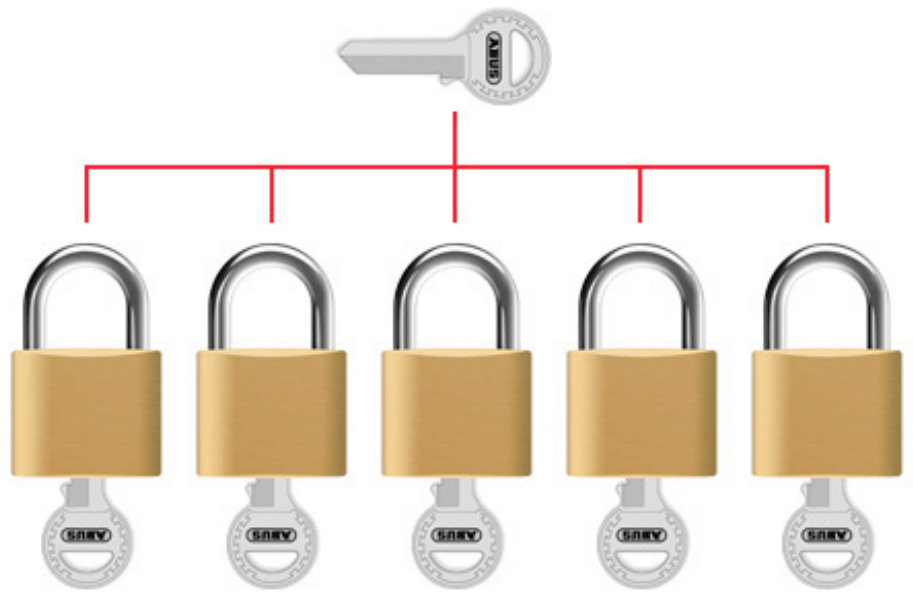
A common question is whether or not this will compromise security since inevitably other people will be using the same keyed alike set. The answer is yes others will have the same set but you must remember that in security, convenience always comes at a price.

This risk can be reduce though since the more premium brands of padlock will have many sets available, making this problem much less

common. If you buy locks from a specialist then you are more likely to get a key that is no especially common since they can afford to hold more stock in the varies keyed alike numbers available.

b. Master Keyed

A 'Master Key' padlock is a unique padlock with its' own key but part of a larger set. The whole set then can be overridden by what is known as the 'Master-Key'. For obvious reasons the master-key should be kept secure as an unauthorised copy would compromise the security of the whole set.



Due to the complexity in creating this type of padlock they do cost significantly more than keyed alike/different padlocks. When security and convenience is essential, a master-key setup is the ultimate option.

Summary

Generally speaking you should buy from a decent manufacture and avoid unbranded locks which tend to be cheap imports. ABUS and Abloy make the best locks with the strongest grade of hardened steel. Squire, Sterling, Ingersoll, Shield, Masterlock and Burg Wachter are also good brand names.

You can use a variety of testing standards but ideally you should recommend a few based upon the given application. For example in medium security situation you should have a lock that is at least either CEN Grade 3 or Sold Secure Bronze.

If you require any further advice do not hesitate to call or visit our website:

T: 0151 266 86 06

www.nothingbutpadlocks.com