HARNESSES

a guide for climbers and mountaineers

INTRODUCTION 03
TYPES OF HARNESS 04
FULL-BODY HARNESS 05
FULL-BODY HARNESS FOR CHILDREN 06
SIT-HARNESS 06
CHEST-HARNESS 09
PARTS AND FEATURES 10
MATERIALS AND CONSTRUCTION 12
FITTING 13
CARE AND MAINTENANCE 14

PHOTO: GREG EPPERSON/SHUTTERSTOCK.COM

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CONTENTS

1. **Introduction** **03**
2. **Types of harness** **04**
   - Type A: Full-body harness **05**
   - Type B: Full-body harness for children **06**
   - Type C: Sit-harness **06**
   - Type D: Chest-harness **09**
3. **Parts and features** **10**
   - Materials and construction **12**
   - Fitting **13**
   - Care and maintenance **14**

SECTION 01

INTRODUCTION

Whether you're cranking your way up a sport climb in Kalymnos or gingerly traversing Tower Ridge in deep snow, your harness provides the vital link between you, your rope and the rest of your safety chain.

Harnesses have come a long way since they first supplanted the bowline around the waist or the swami belt, with many now boasting advanced technology and numerous useful features. This is good news in terms of safety, comfort and practicality, though if you're on the hunt for a new harness it can lead to some confusion. This guide aims to navigate you past the variety of different types, offer advice on how to look after your harness to maximise the lifetime and help you determine when it's time to retire it.

SECTION

02

TYPES OF HARNESS

Climbing harnesses sold in the EU must conform to the EN 12277 standard. Those featuring the UIAA Safety Label additionally conform to the UIAA 105 standard, which is broadly similar to but slightly more stringent than the EN standard. Find out more about standards on the UIAA website: www.theuiaa.org/safety-standards

EN 12277 specifies four different types of climbing harness, each with their own set of test requirements.

› TYPE A: FULL-BODY HARNESS

The least popular type of harness, mainly used by centres who need to cater for people of all shapes and sizes. Some people's morphology means that they will not be adequately retained by a waist-belt, and require the additional security of shoulder straps as provided by this type of harness. Full-body harnesses also provide a high attachment point, which reduces the chance of the climber inverting in a fall. This is particularly useful if the centre of gravity of the user is high, for example if wearing a rucksack. Despite their security, full-body harnesses often feel rather restrictive which limits their appeal for the majority of users. They may be a good option for women who wish to continue to climb during the early stages of pregnancy, but always seek advice from a medical practitioner first.

PHOTO: BMC

PHOTO: CAMPIT

PHOTO: CLIMBINGTECHNOLOGY.COM

TYPE B: FULL-BODY HARNESS FOR CHILDREN

Similar to the above exceptthose designed for children are tested for a maximum user weight of 40 kg. Younger children require a full-body harness because they have a higher centre of gravity than adults, and also frequently don't have the defined waist needed to retain a waist-belt adequately. The point at which a child progresses from a full-body harness to a sit-harness depends on many factors including their level of performance, but the points above should remain paramount when making any such decision.

TYPE C: SIT-HARNESS

By far the most popular type of harness, the sit-harness consists of a waist-belt and two leg-loops. This type of harness comes in many styles, some aimed at specific types of climbing and others hoping to do nearly everything.

PHOTO: ARCTERYX.COM

All-round harnesses – Whilst there is no harness on the market that is ideal for every climbing application, most people choose to use a single harness. Inevitably this leads to some compromises, but a good all-rounder features plenty of size adjustment for both waist and legs so it can be used both in summer and winter, and has good racking options for winter and summer equipment.

TYPES OF HARNESS

PHOTO: BLACKDIAMONDEQUIPMENT.COM

Alpine harnesses – These are designed to be as light as possible, with minimal padding or extra features. They often incorporate a quick-release buckle on each leg-loop to allow the user to put the harness on with boots and crampons. These harnesses are also ideal for ski-mountaineering and adventure-racing.

PHOTO: WILDCOUNTRY.COM

Trad harnesses – Harnesses designed for traditional or adventure climbing will have a large number of gear-loops and may be padded for comfort on hanging belays and for all-day use.

Sport harnesses – Sport harnesses are similar to trad harnesses, though they require fewer gear-loops and are designed for hard climbing – meaning a good range of movement and minimal weight are the key design drivers.

PHOTO: PETZL.COM

PHOTO: DMMCLIMBING.COM

Centre harnesses – These are meant for use by groups and for climbing wall rental. They are highly adjustable to fit a wide range of users, and there will only be one or two gear-loops if any. Although good for their intended purpose, they aren't generally suited to climbers who are wishing to lead or climb outdoors.

Women's harnesses – Women's harnesses are designed to fit the body shape of women better than other harnesses. This means they have a higher, smaller waist and relatively wider leg-loops. The extra height is usually achieved by a longer belay-loop or a longer rise on the leg-loops.

PHOTO: SINGINGROCK.COM

PHOTO: DMMCLIMBING.COM

Children's harnesses – When children progress from a full-body to a sit-harness, they may find that adult harnesses don't go down small enough or that those that do are of the 'Centre' type and are not that useful if leading. Children's sit-harnesses fill this gap, offering the features of an adult sit-harness in a smaller package. Parents and coaches of young climbers should take note - the injury tolerance of young climbers has not been clearly established, which means that it is not known whether lead climbing falls using standard equipment are likely to lead to immediate injury or issues later in life. Until further research has been undertaken, a cautious approach to the adoption of lead climbing and use of sit-harnesses is advisable.

PHOTO: METOLIUSCLIMBING.COM

Specialised harnesses – There are some highly specialised harnesses that deserve a mention. Canyoneering and caving harnesses are designed specifically for these activities and may feature extra-thick webbing and protection for abrasion resistance. Big-wall harnesses are built to be sat in all day and have attachment points for just about everything. Harnesses are now even being built into clothing, claiming greater comfort and ease of movement.

PHOTO: MAMMUT.CH

TYPE D: CHEST-HARNESS

A chest-harness is designed to be used in conjunction with a sit-harness to do the same job as a full-body harness. They are a useful addition for centres to cater for a wider range of clients, and for situations when otherwise a full-body harness would be required.

PHOTO: DMMCLIMBING.COM

SECTION
03

PARTS AND FEATURES

As with all climbing equipment, the key to good harness design is having all the required features and nothing else. Below is a summary of the features you may see on harnesses and their purpose.

Tie-in point – This should be clearly indicated in the instructions, and is sometimes colour coded to aid identification. Always tie in using the approved methods and locations given by the manufacturer.

Belay/abseil loop – This is a full-strength webbing loop which is used to attach a belay or abseil device to the harness. Particularly useful for if you do not intend or need to be tied into the rope, it can often (always check the instructions!) be used as an attachment point – for example when clipping into an anchor temporarily using a sling.

Gear-loops – These are used to attach any equipment you may need when climbing. For climbing walls and top-roping you may only need one loop to hold your belay device when it's not in use. For leading you'll need more - four is normal but some harnesses have more for when you need to carry a big rack of gear. Some harnesses also feature slots for holding ice-screw racking tools - very useful for winter/alpine climbers. When you're buying a harness it's important to try out the gear-loops and check that they're in easy to reach locations.

Buckles/adjusters – These allow the webbing to be adjusted for size whilst locking securely under load. Adjustable leg-loops add weight and complexity to the harness, but allow different thicknesses of clothing to be worn or for one harness to fit a range of different people. There are two types of adjustment – self-locking and back-thread. Self-locking adjusters do not require you to thread the webbing back through the buckle, whereas with back-thread buckles this is vital to avoid the harness coming undone under load. Some harnesses have quick-release fittings to make it easier to put the harness on with boots or crampons. Whilst this can save time and effort on an alpine or winter climb, the possibility of unintentional release means some care is required.

Wear reinforcement/wear indicators – A protective cover or reinforcement is generally added to high wear areas such as the tie-in point, in order to extend the harness lifetime. Wear indicators are included on some harnesses to help the user determine when a harness should be retired. These utilise different coloured components so that when the outer layer is worn it reveals the contrasting material beneath. These can be a useful tool for determining the life of key points, though it should not replace a full check of your harness.

Comfort Features – These include padding on the waist-belt and leg-loops, stiffened lumbar supports and extra-wide webbing. A driving force in modern design has been to increase support and comfort without the usual weight penalty, although the lightest harnesses inevitably make some sacrifice in this regard. Another comfort feature, not to be neglected, is ventilation and moisture transport – particularly useful for climbing in warm weather.

Haul-loop – A small loop found at the back of the harness for attaching a haul line. As this is not usually load bearing it should never be used for clipping in to anchors. Haul-loops are generally featured on big-wall harnesses.

PHOTO: ARCTERYX.COM

DYNEEMA WEBBING HARNESS
PHOTO: BLUEICE.COM

MATERIALS AND CONSTRUCTION

The original and simplest type of construction uses flat nylon webbing sewn together to make the required shape. This method is still used for most Alpine and Centre harnesses. The attachment of shaped pieces of foam padding increases comfort when hanging or taking falls. A refinement is to link the padding around the waist into one component which is free to move. Such a 'floating' waist-belt enables gear loops and padding to be moved to the desired position regardless of the adjustment of the waist-belt webbing. Foam tends to roll and give under pressure, so the inclusion of stiffer polymer material in the lumbar region is sometimes used to provide extra support.

Another approach is to move the load-bearing webbing to the outside edges of the foam, sometimes called a frame construction. This can result in a very light and comfortable harness, especially if the foam is heavily perforated and backed on the skin side with a wicking fabric.

A more recent innovation has been to incorporate the load bearing and comfort components together using a laminated construction. Thermo-forming allows 3D structures to be created using foam which can more closely follow the human form. Some harnesses make use of high-strength materials such as Dyneema for some components such as the belay-loop and reinforcement fabric, and at least one harness also uses this material for the webbing.

Buckles are generally made from either aluminium alloy or steel.

FITTING

Getting a harness that fits well is very important, not only to ensure that it will hold you securely in a fall but also to provide day-long comfort. The following steps will help you get the right size sit-harness.

1 Loosen all straps fully and put the harness on. The feet should go through the leg-loops and the waist-belt should be brought up above the hips.

2 Tighten the waist-belt to a comfortable level. It should be possible to fit a flat hand between the harness and the body, though if you can make a fist the belt should be tightened further. When buying a new harness, check that there is enough webbing to enable you to loosen and tighten the harness slightly, depending on clothing.

3 Tighten the leg-loop adjustment if present. These should not be uncomfortable or restrict movement, though if they are too slack they will make sitting in the harness or holding a fall when belaying very uncomfortable.

4 A good harness vendor will have somewhere for you to clip into and sit in your harness. This is the only way to check whether it will be comfortable – what can seem like a good fit when standing can soon change when hanging on a belay or lowering from the wall.

5 If the harness fits well it will feel comfortable and secure. Try adjusting the leg-loops and ensure the 'rise' of the harness (the distance between the leg-loops and waist-belt) is correct to get a good fit.

6 Be sure to try on as many harnesses as possible to make sure you get the right one for you.

7 When fitting chest-harnesses and full-body harnesses, the straps should be tight enough to avoid slack webbing but should not cause a hunched back.

WATCH: How to put on a harness
tv.thebmc.co.uk/video/how-to-put-a-harness-on

PHOTOS: BMC

CARE AND MAINTENANCE

In common with all other items of climbing safety equipment, it's important to ensure that your harness is safe to use before you entrust your well-being to it.

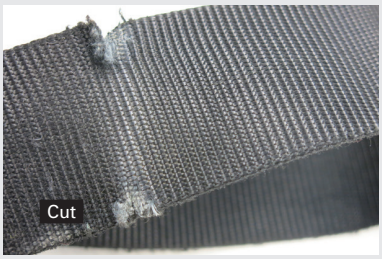
PRE-USE CHECK

Before each and every use of the harness, quickly check that there are no major problems with it. Check for any obvious physical damage or evidence of contamination with chemicals, and ensure that the harness is correctly assembled with any buckles threaded correctly.

THOROUGH INSPECTION

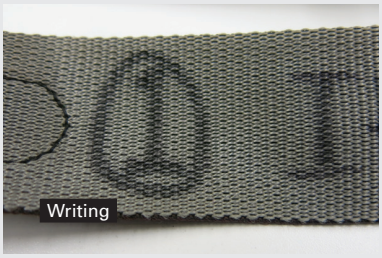
At least once a year or more frequently if the harness is used intensively, make a thorough and detailed inspection for damage and deterioration. Check every part of the harness, not just the most obvious high wear areas. Any action you take will depend on the type of damage and its severity.

Abrasion


Cut

Contamination

Wear


Writing

Corrosion

PHOTOS: BMC

DAMAGE TYPES AND PREVENTION

Retirement – There are two reasons to retire a harness. The first is if during a pre-use check or thorough inspection you find a problem serious enough to warrant retirement. Perhaps more likely is that the harness will reach its maximum lifetime as given by the manufacturer. This information is supplied with the harness or can be found on the manufacturer's website, with five years from first use being fairly typical. The date of manufacture can be found on the harness, usually on a fabric tab on the inside of the webbing. While it may be tempting to continue to use a harness that looks OK past its retirement date, consider the consequences of a failure and weigh that up against the cost of a new harness.

WATCH: How to check a harness
tv.thebmc.co.uk/video/how-to-check-a-harness-for-damage

Component	Damage	Causes	Prevention	Action
Webbing	Cuts	Contact with sharp objects such as ice screws, axes or crampons	Use racking devices that keep screws away from the harness and take care when putting your harness on over crampons	Retire
Webbing	Abrasion	Contact with rock	Difficult to prevent, a thorough inspection should follow climbs that involve a lot of contact with rock, such as chimneys	Minor wear = monitor. Widespread or acute wear = retire
Webbing	Melting	Friction against ropes, contact with hot surfaces or substances, slippage of buckles during large falls	Never let textile items run over each other. Avoid force drying and contact with hot objects including cigarette ash	Retire
Webbing	Microscopic damage to fibres	Salt water, dirt or chalk	Wash your harness in warm water after contact	If washed without undue delay, little or no long term effect
Webbing	Deterioration of fibres	UV light	Store out of direct sunlight	Serious fading = retire
Webbing	Chemical damage to fibres	Chemicals, particularly acids	Store and transport carefully	Retire
Stitching	Broken strands	Contact with rock, sharp objects	Avoid contact where possible.	Retire if any load-bearing stitching is broken
Buckles	Corrosion	Salt water	Wash in clean water and dry before storing after use on or near sea cliffs	Retire if corroded

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