

# learning the ropes

By Frank Bennett, Beal

**With** an ever increasing choice from manufacturers, the hardest part about buying a dynamic climbing rope can be deciphering what's on offer, and understanding how it relates to your chosen activity. The days of simply choosing 9mm or 11mm are long gone, and from a light single to a heavy half, things can get very confusing.

However, all is not lost, armed with a few facts it is possible to not only make the right choice of rope, but also to understand what all those strange symbols at the end of your new rope mean.

The technical information encountered on rope labels is dictated by two standards. Manufacturers make ropes to the European Standard (European Norms EN 892) and have them tested by an independent laboratory. Some manufactures also have their ropes tested to the older UIAA standard that, for some tests is more demanding, but this is not required by law. This article explains how to read this information.

## Impact force

This rather evocative term means the force transmitted to the climber at the moment a fall is arrested. This force is also transmitted along the length of the rope towards the anchor points, runners, karabiners and the belayer.

It is the capacity of the rope to absorb the energy of the fall, which makes it possible to reduce the Impact Force and thus diminish its effects. A low Impact Force rope will provide a "soft landing", i.e. a gradual slowing, as opposed to being pulled to an abrupt halt. This is obviously more comfortable, but importantly a Low Impact Force rope will absorb a lot of the energy from within a climbers protection system of runners and belays, thus improving the chances of keeping them in place.

For EN892 Impact Force is measured using a test derived from the UIAA standards. For a single rope the standard allows a maximum value of 12kN during

## THE ROPE END

The rope end indicator allows you to assess an unlabelled or used rope. If it has passed the Standards, it will feature the CE and UIAA symbols, and it will also indicate the length and type of rope using the following symbols:



### SINGLE ROPE

Used in single form as the name suggests. Designed for rock climbing, best suited to relatively straight pitches and routes that do not require an abseil descent.



### TWIN ROPE

Now of limited use, with a requirement to clip both ropes every time. New low weight half ropes with greater safety and usefulness have virtually replaced this type.



### HALF ROPE

Half ropes, as used in double rope technique, are recommended for trad climbing, mountaineering and long rock routes where abseil descents are required. Also recommended whenever runners are of dubious quality notably on ice and snow.



### MOUNTAIN WALKING or TOUR ROPE

Used to assist security on mountain walks, glacier or ski mountaineering trips. Normally 8mm dynamic, in a choice of lengths, with and without tie-in markers. Not suitable for rock or mountain climbing.

the arrest of the UIAA standard drop (fall factor 1.78) with an 80kg mass. For a double rope a single strand is tested, (i.e. a half rope) and the Impact Force must be below 8kN during the arrest of the first UIAA drop with a mass of 55kg.

*Choose the lowest Impact Force rope if you use "trad" gear or ice screws, or just want the longest possible use. The Impact Force of all ropes will increase with use and as they accumulate falls.*

### Number of falls

To conform to the standard the rope must withstand five successive drops tested with the mass in the Impact Force test. However the number of falls quoted for single and for double ropes are not directly comparable as they are not tested with the same mass. Although the EN892/UIAA test only examines the first five test drops, manufacturers do also test ropes to destruction and will quote in the product information the number of drops to failure. This is a useful guideline, the more drops the better, but because test rigs vary between manufacturers these figures should not be taken too literally.

### Knotability

The name given to the test to indicate the handling and suppleness of a rope. The test is performed on a simple overhand knot under a 10kg load; a calibrated mandrel is used to assess the internal diameter of the knot. The resultant measurement must be less than 1.1 times the rope diameter.

*Choose a rope with a low ratio for more flexibility (easier to knot) and softer handling. Or choose a rope with a ratio near to the test maximum for firmer handling and a consistent "round" feel that will be a little harder to knot but easier to untie after loading.*

### Sheath slippage

The core (kern) and sheath (mantel) of the rope are two independent components, which, if the construction is not carefully matched, have a tendency to dislocate and slide against each other.

Under the effect of a descender the sheath deforms and little by little it bunches, creating a slack zone around the core and bulge points, known as the sock effect. This effect results in more rapid wear, particularly when top roping or other intensive use, and it also risks jamming in descenders or belay devices.

The Sheath Slippage test is the only test parameter for which the EuroNorm requirement differs from that of the UIAA. After pulling two metres of rope through a designated constriction, the European Standard requires that the sheath slippage should be less than 40 mm, or 2%, whilst the UIAA standard is more severe, requiring a value less than 20mm, or 1%.

*Choose a rope with a low sheath slippage, or even better 0%, to avoid jamming risks.*

### Extension (Elongation) under load

This must not exceed 8% for single ropes, or 10% for double ropes under a load of 80kg. It is this elasticity that allows the rope to absorb the fall energy, but the stretch must be limited or the rope will behave like a bungee.

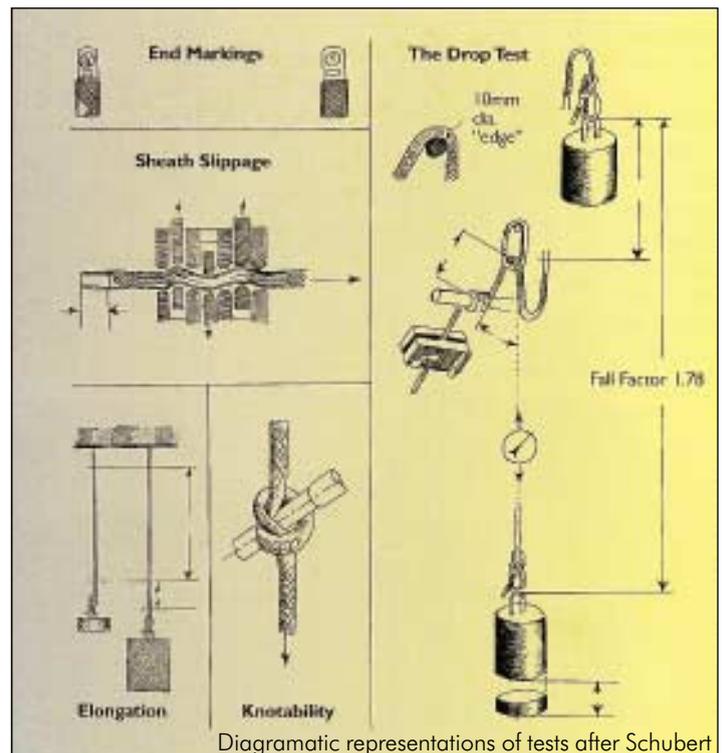
*Choose a rope below the required maximum for comfort and performance.*

### Extension during the first fall

This must not exceed 40% in the standard UIAA test.

### Diameter and weight

Ropes of a large diameter generally have a longer active life. However there are some new ropes on the market that use a 50% sheath to 50% core ratio giving an increase of up to 30% life over standard ropes of the same diameter. These new ropes tend to have a higher impact force and so may not be ideal for all types of climbing, but in high wear and tear situations they can be an excellent choice.



Diagrammatic representations of tests after Schubert

Because rope construction varies in this way the measure of rope diameter is of less relevance than the weight per metre, and it is better to compare the latter than the stated diameters. The overall performance of a rope may be considered as a balance between its weight/m and its dynamic ability.

### Number of bobbins

This is not part of the standard but does give helpful criteria to assess the abrasion resistance and handling of the rope. The sheath that encircles and protects the rope core is formed from groups of filaments, each woven from a bobbin. For a given diameter of rope a larger number of bobbins will give better dynamic characteristics, but a smaller number of bobbins will give better abrasion resistance.

*For single ropes choose 48 bobbins for dynamic performance or 32 bobbins to maximise abrasion resistance. On half ropes fewer bobbins are required to give comparable performance.*

### Dry treatment

A wet rope is unpleasant to handle and prone to freezing, hence various chemical and physical treatments exist to reduce the amount of moisture absorbed. Dry treatment also increases rope life by reducing the tendency of dirt to enter the weave and by reducing running friction. The dry treatment wears off with extensive use, but this is being addressed with a superior polymerisation process.

*Choose dry treated ropes for Winter or alpine use, or if you like climbing in the rain: they will be lighter, easier to handle, and last longer.*

## MORE INFO

**For much more information on ropes, take a look at the BMC Ropes booklet. Priced only £2.50 to members / £4.00 to non members, available from the BMC office.**

