

The cloverleaf ring.

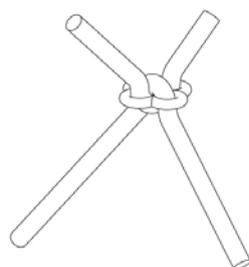
It's a piece of jewellery, only more useful.

The clover leaf ring is known in classical architecture as the Quadrifol. The first intersection points in a three dimensional rope net were formed with round rings at Berliner Seilfabrik in 1971. This style of equipment can still be found off and on in playgrounds. From the beginning, the intersection points were formed by looping the ropes around one another. A more durable intersection in which the forces are transferred directly from one rope line to another is impossible here.



After safety rules were established for playgrounds, finger pinch points were also defined. Openings of > 8 mm can't be prevented in all round ring applications. If rope lines of the same size are looped, the cloverleaf ring shape is required in order to avoid gaps.

This simple idea for fixing points of intersection in ropes has been patented for 20 years. In the meantime, the use of the cloverleaf ring has been expanded to include other rope



Einsatz des Kleeblattringes:

In octahedron-based nets

- Univers
- Tetragodes (SC-Line)
- Pentagode

In icosahedron-based nets

- Cosmo
- Greenville
- Roplay/Tripoli



Round ring in a structure from 1978

designs and diameters. Since then, we have been using a patented method to incorporate our cloverleaf ring in spatial nets.

In spatial nets, the cloverleaf ring is the only connecting element that makes it possible to exchange individual rope lines on the spot. It is being specially manufactured for us in a drop forging process from a high-quality, corrosion-resistant aluminium alloy. Since the 80's, millions of these elements have been incorporated into spatial nets by our associates – not one has failed!

Intellectual property rights:

- European patent for threading process # 24444691, issued on 05 June, 2013
- Worldwide patent applications

Facts

- **The cloverleaf ring maintains the loop points securely in position**
- **At the point of intersection, the forces are transferred directly from rope to rope.**
- **High-strength, non-corroding aluminium alloy**
- **European patent, worldwide patent application**
- **The cloverleaf ring makes it possible to replace individual ropes**

Berliner ropes.

More cable than rope

Berliner Seilfabrik has been focussing on the manufacture of ropes since 1865. Initially, it produced steel elevator cables for the German elevator industry, which was conceived in Berlin. The quality of Berlin cables became known throughout the world.

As concentration shifted to playground equipment in 1995, the rope design of course changed, as did the materials used. However, one thing did not change: the machines used to produce them. The use of these heavy machines developed for full-steel cables resulted in a significant compression of threads encasing the outer steel strands. This resulted in a much higher thread count in Berliner Seilfabrik U-ropes than in competitors products. This, in turn, lead to incomparable wear resistance.



It is not necessary to glue or melt the threads in order to keep them in place in the rope composite. An additional benefit of this is that rope flexibility is not limited. The often-heard argument that internal fusing or glueing would reduce wear is nonsense. Wear takes place on the outside.



Berliner Seil is only genuine with the coloured tracer thread "stranded with max. 63 rpm".



Independent investigations have proven that the ropes of Berliner Seilfabrik have the highest wear resistance by far. Our requirements of colour-fastness of the ropes exceed those of even the automobile industry. To guarantee this colour-fastness, we use polyester threads.

Our rope designs are based on natural fibres. These and our standard ropes have four outer strands to provide a high degree of traction. Beginning at 18 mm, a 6-strand rope makes the most sense based on rope design, since otherwise the rope structure would be too coarse. Rope tensions are important to having fun and to life span. Ropes that are manufactured with a fibre core for cost reasons sag over the years, lose their tension and exhibit increased wear due to shoulder contact of the outer strands.

Facts

- **Best wear resistance through compressed threads**
- **Maximum traction through an optimum number of external strands**
- **Low stretching thanks to a steel core**
- **Maximum colour-fastness through the use of polyester threads**
- **Consistent quality through a proprietary core manufacturing process**
- **High flexibility in rope designs and colour selection**

The Terranos clamp.

In the Terranos, everything hangs on the T-clamp.

We think that our Terranos clamp today is so visually appealing that we even use it as a pure design element, usually underscored with a special colour. Examples can be found in our Terranova program.

The T-clamp, which we also call the Terranos clamp, is used wherever we connect rope and tubular elements to our 133mm Terranos posts. Our CNC machining centre is capable of all conceivable cuts „with ease“. Frox and Chrox connections, receptacles for mounting brackets to hold shackles and surfaces for tube connections at various angles.



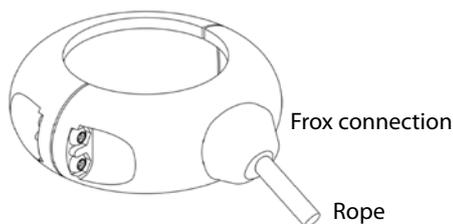
The use of Frox and Chrox connectors guarantees that rope forces are transferred optimally to the posts so that a long rope lifespan is guaranteed, while at the same time providing a design that is safe and appropriate for childrens' hands.

T-clamps can be adjusted continuously on the Terranos posts. This allows installation tolerances to be compensated and rope tensions to be corrected.

Our Terranos clamp is used as standard equipment in the following product groups:

- Terranos & Terranova
- Greenville
- HodgePodge

Terranos clamp



Facts

- **Continuous height adjustability on Terranos and Terranova posts**
- **Connection of the clamp halves using vandalism-proof connections**
- **Shape-locked holding of Frox Chrox Bracket connections**
- **Tubes can be held in place within a large range of angles**

The Frox connection.

A secure thing.

Elements of heavy machinery are often seen at playgrounds in the form of connectors for ropes. These eyebolts, shackles, turnbuckles, etc. have no place in playgrounds where children play (where hands can reach).

Berliner Seilfabrik has always taken great pains to ban such elements from playground equipment. Examples include the Frameworkx space frame, the rope-to-tube clamps, the ASTEM-TT system, etc., etc...

We developed the Frox connection for connecting ropes to Terranos posts. The name is derived from its appearance... it looks like a frog!



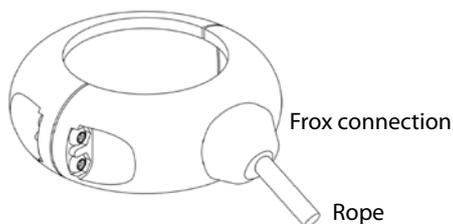
The rope end is pressed into place with a pressed end collar, a 2-part polyamide sphere holds the end of the rope and guarantees a proper seat in the Frox housing. The Frox is connected to the Terranos post using special Terranos clamps made for holding the Frox housing. The dimensional match between the Frox housing and the polyamide sphere allow the connected rope to be aligned in the direction of tension within a specific range. Collars at the sphere prevent damage to the rope at the housing.

The Frox housing consists of the same high-quality aluminium alloy as the Terranos clamp. It is similarly colour-coated with polyester in a powder coating process.

Our Frox connection is used as standard equipment in the following product groups:-

- Terranos
- Greenville
- CombiNation

Terranos clamp



Facts

- **Connection of ropes to posts that are gentle on hands**
- **No sharp edges, pinch points, openings that are dangerous to fingers**
- **Clean alignment of rope sections in the direction of tension**
- **Fast, inexpensive replacement of spheres when they wear out thanks to their two-part design**

The Terranos posts.

The special steel tube.

It is just a steel tube, so what's so great about it? Our Terranos posts have a bit of an unusual dimension to them (diameter of 133 mm, length varies according to the attachment element), but it is visually and statically tailored to our rope systems and the forces that occur in them. One could certainly use 100 mm posts in this or that case, but this would disrupt the harmony of the dimensions we chose for design reasons.

To responsibly handle the resources, we vary the wall thicknesses of the tubes. We use 3 mm to 15 mm thick tubes, depending on the static load on the posts.

This rational adherence to the matching of post dimensions to the Terranos clamp and to the system sphere speaks our



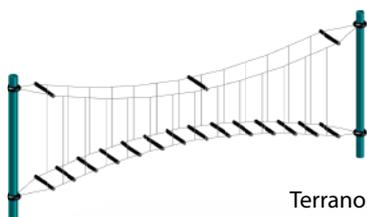
design language, resulting in the high recognition value of Berliner Seilfabrik products.

We use steel as a starting material. The welded, calibrated tubes have a limited tolerance range so that a defined clamping force to our Terranos posts is guaranteed.

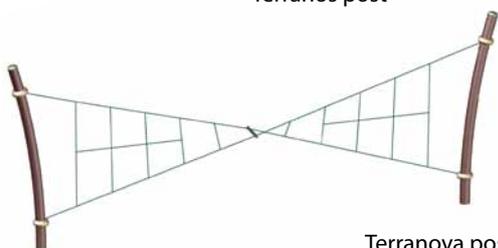
As an alternative, the posts can also be provided in stainless steel qualities. Our standard paint coating is our two-layered epoxide/polyester coating, in all available RAL colours. In addition, if there is direct contact with sea water the posts can also be galvanized beneath the paint coatings. The finishing touch of our posts is their aluminium cap.

Our Terranos post is used as standard equipment in the following product groups:

- Terranos
- Terranova
- Greenville
- CombiNation



Terranos post



Terranova post

Facts

- Tailored dimensionally to the Terranos clamp system
- Even diameter while varying the wall thickness depending on the use
- Best corrosion resistance through a variable coating system
- Almost any colour possible

The ball knot.

Often copied and never achieved.

Originally conceived for use in avalanche and submarine defence nets, playground net equipment would now be inconceivable without ball knots.

We've used this aluminium drop-forged part, which was tailored specially to our ropes, millions of times since the beginning of the 80's! None of the hydraulically pressed, spherical rope intersection points have ever failed under use for play.



Once the patent for the special tube shape expired in 2001, copies of this element have shown up on the European market. However, these are not nearly as harmonically matched and they are often made of unsuitable materials.



The ball knot before hydraulic pressing



The shape and machining methods selected by us always guarantee a spherical shape that is no danger to a child's fingers under a variety of applications, without sharp edges, gaps and burrs. A new form of the ball knot, invisible from the outside, guarantees an even more precise dimensional machining of the aluminium parts. A patent application has been filed for the form changes, guaranteeing Berliner Seilfabrik a new technological advantage.

Our ball knot is used as standard equipment in the following product groups:

- Terranos & Terranova
- UFOs
- Pentagodes
- Tetragodes (SC-Line)
- all nets, bridges and tunnels in Greenville, CombiNation and Univers

Facts

- **Safe, shape-locked connection of rope intersection points in surface nets**
- **High traction, safe hold of the intersection position**
- **Corrosion-resistant, recyclable aluminium alloy**
- **Impact-resistant at all temperatures, maximum vandalism protection**
- **No gaps, edges and openings that can injure children's fingers**
- **Gentle on hands**
- **Worldwide patent application for the new internal shape. International publication number: WO 2014/027088A1**

The Chrox connection.

With us, every connection is gripping.

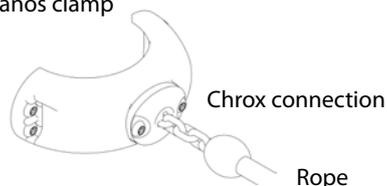
The rope tension within net landscapes is very important to the life span of the rope, the load on the load-bearing structures and of course to the enjoyment of play.

Using organically shaped posts, such as in our Terranova program, it is nearly impossible to precisely determine the rope lengths before installation. We conceived of the Chrox for these cases. The name is a combination of Frox and chain.

Like the Frox connection, the Chrox connection sits on the Terranos clamp. However, its jaw is shaped such that a chain can be held in it.



Terranos clamp



Using a carabiner hook, which holds no force, but only guarantees the position of the chain link, the rope connection can be adjusted at intervals of the length of the chain links, thereby allowing the correct rope tension to be selected. The excess chain end disappears into the Terranos clamp.

Our Chrox connection is used as standard equipment in the following product groups:

- Terranos
- Terranova
- CombiNation
- Greenville

Facts

- Simple adjustment of rope lengths and rope tensions on the spot
- Compensation for installation imprecision
- No pinch points and sharp edges where people reach