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Jakob AG, Drahtseilfabrik, CH-3555 Trubschachen, Switzerland
Tel. +41 34 495 10 10, Fax +41 34 495 10 25
www.jakob.ch, eMail: inox@jakob.ch
Green façades for a pleasant atmosphere.

Façade greening, so far usually left to chance, has gained a new dimension: Jakob® INOX LINE.

Attractive training systems for microgardens can be built with a few easy-to-assemble components made of high-grade stainless steel.

The days of haunted castles are over: Green façades are appealing, ecologically sensible and useful. The latest insights on climbing plants combined with tastefully designed and technically sophisticated training systems open a treasure chest of greening variations and styles. Greening makes sense from a construction physics point of view and has many ecological benefits. The future is indeed green: it will be shaped by the creative collaboration of innovation-driven architects with greening specialists.
GOOD REASONS FOR GREENING
CLIMBING PATTERNS / TRAINING SYSTEMS
CLIMBERS AT A GLANCE
HOW TO PLAN TRAINING SYSTEMS
GREENGUIDE ROPE STYLES F1 – F6
COMPONENT COMBINATIONS
ROPE / EXTERNAL THREADS
END STOP / EYES / LOOPS
SPACERS / WEBNET
CROSS CLAMPS
ROD SYSTEM
TRELLISWORK
COLUMN GREENING
WOODEN ROD SYSTEM
SECTIONS / ASSEMBLY AIDS
DOCUMENTATIONS JAKOB
INTERIOR TEMPERATURE REGULATION

The familiar pergola of southern countries is an ancient but highly efficient method of interior temperature regulation. It promotes the formation of an insulating layer of air, thereby preventing an excessive increase of the inside temperature due to direct solar irradiation. This principle also offers several advantages when applied to vertical structures: the insulating cushion of air between vegetation and façade evens out temperature fluctuations and noticeably reduces heating and air-conditioning costs.

FAÇADE PROTECTION AND VENTILATION

A well-designed covering of vegetation is a natural shield against lashing rain or ultraviolet radiation. In addition, the space between the façade and the greenery has a temperature-regulating effect and promotes optimum ventilation as well.

THE AESTHETICS OF GREENING

The integration of greened surfaces into contemporary architecture presents novel design opportunities. Planners and architects who have teamed up with greening specialists are already producing outstanding results and are defining new dimensions for “art on buildings.”

REVALUATION OF EXISTING STRUCTURES

Without any risk whatsoever, professionally conceived façade-greening schemes can aesthetically upgrade bleak storage buildings or non-descript concrete apartment blocks. Beneficial side effects include natural air-conditioning, reduction in energy costs and an extension of the useful life of the structure.

COMPLEMENTARY GREENED SURFACES IN URBAN ENVIRONMENTS

A large number of buildings in conurbations offer locations where plants can be grown. Ever-increasing land prices necessitate the erection of high-rise structures. The subminiature gardens on housing estates or balconies benefit materially – the greening of buildings is economical, ecologically favourable and, at the same time, enhances the quality of life.
Characteristics and requirements of climbers

The natural habitats of the climbing plants are for the most part in woodland and forests, clearings and peripheral zones. Supported by other plants, they work their way upwards to the light (several species thrive and support themselves on rocks). The climbing plants have developed a variety of climbing patterns (A to F).

Growing conditions as near as possible to those in natural habitats must be provided to ensure the successful covering of façades - moist, humus-rich and loose-packed soil together with a support structure appropriate to any of the climbing patterns. Generally speaking, good supplies of water and nutrients are important. An additional water supply may be imperative to ensure healthy growth.

The correct training system must be selected for each specific climber.

With regard to optimising the planting location, there can be divergences from the typical bionomic habitat such as a shady root-run and sunlight for the top of the plant.

- Wisteria, trumpet vine (Campsis) as well as several Clematis varieties require unobstructed sunlight to encourage free flowering.
- Ivy (Hedera), many honeysuckle (Lonicera) and Clematis varieties do best in lightly shaded locations.
Adhesive-sucker climbers support themselves with short lateral shoots tipped with glandular discs that adhere to any surface, even those that are quite smooth. Although these plants require no auxiliary means of support, they can cause damage to buildings.

- Boston ivy (Parthenocissus tricuspidata)
- Leaf-climbing hydrangea
- Trumpet vine (Campsis)
- Euonymus fortunei

Vines twine around their supports as a result of the circular movement of their stem tips (circumnutation). Only a single vertical support (wire rope) is required.

- Watermelon, honeysuckle (Lonicera)
- Staff tree (Celastrus)
- Hops (Humulus)
- Morning glory (Ipomoea)

Leaf-stem climbers form coils around their supports with their leaf stems. Grid-like or reticular structures provide the best supports.

- Clematis (most varieties)
- Nasturtiums (Tropaeolum)

Climbing and rambler roses

- Bramble-like shrubs (Rubus)
- Winter-flowering jasmine
- Scrambling plants work their way up by using epidermal outgrowths such as prickles, hook-like thorns and bristles.

- Climbing and rambler roses
- Bramble-like shrubs (Rubus)
- Winter-flowering jasmine

Adventitious root climbers require no auxiliary means of support. They attach themselves firmly to rocks, tree trunks or façades. These climbers, too, can cause damage to buildings.

- Ivy
- Climbing hydrangea
- Trumpet vine (Campsis)
- Euonymus fortunei

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- Climbing and rambler roses
- Bramble-like shrubs (Rubus)
- Winter-flowering jasmine

Leaf-climbers develop clinging, often beautiful structures that respond to external stimuli. Grid-like or reticular structures provide the optimum supports.

- Grape vines (Vitis)
- Ampelopsis
- Passion flowers (Passiflora)
- Cucumeraceae

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- Clematis (most varieties)
- Nasturtiums (Tropaeolum)

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- Nasturtiums (Tropaeolum)
- Cucumeraceae
BUILDING GREENING IN THE WORLD’S VEGETATION AND CLIMATE ZONES

The greening of buildings meets all the requirements for consideration as an important element in contemporary housing-estate planning.

Main advantage
Occupies very little ground space but nevertheless has many uses.

Example: energy saving
Large amounts of energy and considerable sums of money can be saved by greening buildings with climbing plants, particularly in climatic zones where inner rooms are cooled at certain times (e.g. in Mediterranean countries, Southern USA, Japan, Australia, etc.).

Example: well-being
Improved ambient conditions, a better quality of life, easing the ecological burden – all these benefits are readily attainable by covering buildings with greenery.

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Example: well-being
Improved ambient conditions, a better quality of life, easing the ecological burden – all these benefits are readily attainable by covering buildings with greenery.
This zone is characterised by its continental-type climate of short, warm summers and long, severe winters. Evergreen climbing shrubs such as ivy are at their climatic limit in this zone.

- **Clematis alpina**, sibirica, vitisba, virginiana, macropetala, tangutica
- **Parthenocissus quinquefolia**
- **Polygonum adulta**, baldschuanicum
- **Celastrus scandens**
- **Actinidia kolomikta**, arguta, etc. (with edible fruits)
- **Vitis aestivalis**, amurensis, riparia

Precipitation is evenly distributed throughout the year. The summers are warm, the winters moderately cold – the climate typical of Central and Western Europe.

Temperatures lower than –15 °C tend to occur rarely in Central Europe, and hard frosts (below –5 °C) are hardly to be expected in oceanic regions such as the broadleaf forest zone of Eastern Asia or New Zealand. In contrast, the temperature can sink to –30 °C and even lower in the north of the USA. The species that flourish in these regions are those listed under the boreal coniferous forest zone heading. Experts should be consulted in case of doubt.

In the regions with a moderately cold winter (Central and Western Europe), a wide range of attractive **Clematises**, **Loniceras**, climbing roses, etc., are available in addition to the “classics” listed in zone 1.

Many plants that thrive in Mediterranean regions do well in the mild-winter regions of the deciduous forest zones. The harder **Passiflora** species, **Solanum crispum** and **Trachelospermum jasminoides** flourish in the company of plants representative of the colder zones.
Such zones are found around the Mediterranean Sea, in California, on the Cape, and in South Australia. They are characterised by hot, dry summers and mild, humid winters. Light frosts are exceptional. A great variety of attractive climbers and wall shrubs flourish here in all their splendour. These include Bougainvillea and many Passifloras (Passiflora amethystina, mollissima, antioquiensis, Distictis buccinatoria, Pandorea jasminoides, Po
dranea ricasoliana, Beaumontia grandiflora...). In addition, somewhat tender climbing roses such as Rosa brunoni ‘La Mortola’ or “Banks’s rose” (Rosa banksiae) do well here. Watering during the summer months is essential.

The hot, frost-free humid or variably humid climate supports lush vegetation consisting of a wide range of plants. Many of these familiar to us in Mediterranean gardens (such as Bougainvillea) grow well in this zone, including those that require considerable warmth such as Thunbergia grandiflora and mysorensis, Passiflora coccinea, quadrangularis (giant granadilla), Petraea volubilis, Clytostoma calistegioides, Allamanda cathartica, Pyrostegia venusta. Many species grow satisfactorily in a warm temperate climate (North Island of New Zealand) as well as in the tropics. Other varieties, however, require the humid heat of equatorial regions (e.g. Strongylodon macrobotrys).

Provided that an efficient watering system is available, buildings in these hot, dry regions can be greened to contribute significantly towards a pleasant room temperature. Combination with reliable desert periphery plants (Acacia species, Tamarix, Casuarina, etc.) is good practice because the resulting filter effect slows down wind and drifting sand. Climbers and espaliered plants from the gardens of the usually neighbouring Mediterranean hard-leaf zone such as Kennedia coccinea, Podranea ricasoliana or even Pyrostegia vinusta will grow on buildings with considerable vigour when they are well tended and watered.
DIMENSIONING TRAINING SYSTEMS

The overall load of a greened surface is composed of:
- Weight of the plant
- Wind load on plant surface
- Weight of dew and rain
- Weight of snow
- Weight of training structure

Load distribution

If the entire vertical load is absorbed solely by the training system at the top and bottom, the upper suspension must hold the entire vertical load and half the wind load. The bottom suspension must hold only half the wind load.

The safety factor

The defined vertical load to be absorbed by the upper suspension must be multiplied by a safety factor.

A: PLANT WEIGHT

Depending on the variety, the unit weight per square metre of plant area can vary from 1 to 50 kg/m². The plant weight is influenced by the location, the soil quality, the growth rate and owner care.

B: HORIZONTAL AND VERTICAL WIRE ROPES

When computing rope forces, a distinction must be made between horizontally and vertically tensioned wire ropes.

Intermediate supports for rods and wire ropes

The sag (f) of horizontal or inclined rods and wire ropes can be diminished with intermediate supports.

C: WIND LOAD

When planning and installing training systems, the wind load is an important aspect. It is composed of wind pressure and wind suction as well as side winds on the greened surface. Although it can be assumed that part of the wind will breeze through the vegetation, we recommend looking at the greened mass as a solid surface.

The following suggested values apply to wind suction calculations:
- Height above ground up to 8 metres: approx. 0.5 kN/m²
- Between 8 and 20 metres above ground: approx. 0.8 kN/m²
- Higher than 20 metres above ground: 1.1 kN/m²

A suction effect on the vegetated surface occurs when the wind blows parallel to the greened surface. The resulting tensile forces must be transmitted to the building structure via the dowels.

Incident side winds impose a bending moment on the spacers. In special cases, it may be necessary to reinforce the spacers and/or guy them down with wire ropes.

Where trainers are subsequently attached to a building structure, it should be determined if and at which locations the computed forces are transmitted and where they can be diverted into the foundation.

In new buildings, it is the planner’s responsibility to investigate whether and how training systems should be included and mounted.

D: DEW, RAIN, AND SNOW LOADS

In addition to the weight of the plant, the training structure must also be capable of absorbing dew, rain, and snow loads. This load is factored in by multiplying the plant weight by the following coefficients:

For deciduous plants: plant weight times 2;
for evergreens: plant weight times 3.

E: STRONG TWINING CLIMBERS

At least one end of the wire rope which holds climbers that twine significantly (Wisteria, for example) must be protected with a Jakob® INOX LINE overload clamp (No. 30920-0400-10, page 65). This is the only way to prevent major façade damage by tensile overloads on spacers (Fig. 2, page 29).
**WALL-MOUNTING SPACERS ON VARIOUS BUILDING MATERIALS**

**Through hole in wood**
Headless screw with nut and check nut at back, front ring nut with support washer to absorb lateral forces at front.

**Screw-in nut for wood**
The metric internal thread of the screw-in nut accepts a rope holder or a headless screw.

**Perforated hollow wall anchor**
The perforated anchor is secured with a two-component mortar. The metric internal thread accepts a rope holder.

**Bolt anchor with internal thread**
Suitable for concrete façades and hard stone. The bolt anchor expands and grips when the threaded rod is screwed in.

**Externally insulated façades**
The spacer is mounted on an insulated support tube and thus transfers lateral forces to the substrate (see Figs. A to F).

**Screw threaded rod**
The bolt anchor expands and grips when the threaded rod is screwed in.

**Using hole saw, core out external insulation**
(2) on façade (1) and remove insulation piece (3).

**Slide foamed support tube**
Over threaded rod, support tube length approx. 5 to 8 mm larger than insulation thickness.

**Sliding spacer basket**
(7) on threaded rod and align.

**Attach rope and connectors**
(6) and secure with nut and dome check nut (9).

**Seal gap**
Between support tube and external insulation with silicone putty (10).

**How to plan training systems**

The following parameters are important for planning a training system:

- Selected plant and its weight per m²
- Deciduous or evergreen?
- Which configuration of ropes/rods is needed (horizontal/vertical/combined/inclined, etc.)?
- Orientation: South/North/East/West?
- Special site conditions such as wind, etc.
- Ropes/rod grid aperture and wall clearance

**Ropes / Rods / Sections**

<table>
<thead>
<tr>
<th>Wall mounts</th>
<th>Dimensions (mm)</th>
<th>J [cm²]</th>
<th>W [cm³]</th>
<th>kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacer Ø12/24 (1)</td>
<td>40 / 40 / 4</td>
<td>4.48</td>
<td>1.06</td>
<td>2.42</td>
</tr>
<tr>
<td>GreenGuide spacer Ø 20/50 (2)</td>
<td>30 / 30 / 4</td>
<td>1.31</td>
<td>0.26</td>
<td>1.78</td>
</tr>
<tr>
<td>Eye bolt with support washer (4)</td>
<td>40 / 40 / 4</td>
<td>2.13</td>
<td>0.16</td>
<td>1.26</td>
</tr>
<tr>
<td>Eye bolt with support washer (4)</td>
<td>40 / 40 / 4</td>
<td>0.93</td>
<td>0.09</td>
<td>0.54</td>
</tr>
</tbody>
</table>

- Moment of inertia
- W = moment of resistance

**Technical data**

- All parts of the Jakob® INOX LINE are made of AISI 316, 1.4401, and AISI 316L, which offers excellent corrosion resistance.
- Choosing suitable materials
- The different atmospheric conditions (rural, urban, industrial) determine the choice of materials. Urban and industrial atmospheres may contain aggressive carbon-containing particles and sulphur dioxide (SO2). At sea level, the air contains aerosols with chloride ions. Rural air is usually unproblematic.
- All parts of the Jakob® INOX LINE are made of AISI 316, 1.4401, and AISI 316L, which offers excellent corrosion resistance.
- The life span of plants for façade greening can range from 30 to 100 years! To assure that the training systems outlive the plants, the selection of materials is very crucial.

**Choosing suitable materials**

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**DIY ASSEMBLY OF END CONNECTORS**

Technically mature end connectors make it possible to complete the termination of the wire ropes on site. Non-tensionable end connectors (A) are swaged with the rope at the factory.

- The rope (B) can be terminated to the correct length on site with the separately supplied LT2 external thread ends (C) (Fig. 45.1, page 45) and wire rope cutters.

**ADJUST AND SECURE ROPE TENSION**

Using the tensionable end connectors (D) which should be located at easily accessible points of the installed training system, the wire ropes can be moderately tensioned.

- If the tension is too high, the spacers and anchors will be unnecessarily burdened. The tension should be great enough to prevent the ropes and plants from being rocked back and forth by the wind.
- The end connectors should be secured with check nuts to prevent unintentional loosening.
- Find out if the training system should be electrically earthed.

**SELECTING THE APPROPRIATE CLIMBERS**

Ecological considerations speak in favour of including indigenous plants in the selection.

- Basically, local greening specialists should be consulted.
- Some ideas are provided on pages 12 to 17.

**CARING FOR GREENED FAÇADES**

Simple façade vegetation requires little care. Sophisticated and attractive plant combinations with climbing roses, Clematis, grape vines or kiwis need to be cared for by professionals on a regular basis. This care is rewarded with blossoms, fruit, and freedom from pests.

- Training systems that are compatible with the intended plants generally eliminate the need for attaching the plants. Climbing roses and grape vines are exceptions to this rule. However, climbers do need a good manual or automatic water and nutrient supply.
- Pest problems will hardly occur if the plants are compatible with the site. Pesticides should not be used in residential zones.
- Many climbers (such as honeysuckle) only need to be cut back if their growth is to be controlled. Climbing roses, many Clematis varieties, grape vines and kiwis will grow vigorously and stay healthy if professionally cut. They will look better and develop more blossoms and fruit as well.
- In the course of the years, the weight of the plants will increase. It may be necessary to retension the wire ropes or add anchors and reinforcement elements.
GREENGUIDE ROPE STYLES F1 / F2 / F3
For DIY installation / Material: A316 (V4A)
Completely terminated wire ropes with top and bottom spacers. Types F1, F2, and F3 are designed for different load cases and available for different wall clearances.

GREENGUIDE ROPE STYLE F4
For DIY installation / Material: A316 (V4A)
Training structure tailored to your dimensions. The stainless steel angle sections can be supplied with all mounting holds. The scope of the product line covers various load cases.

GREENGUIDE ROPE STYLE F5
For DIY installation / Material: A316 (V4A)
Training structure tailored to your dimensions. The top and bottom mounting sections can be inclined at any angle (under a pitched roof, for example). Wall clearances and loads variable.

GREENGUIDE ROPE STYLE F6
For DIY installation / Material: A316 (V4A)
The training structure consists of two spacers for the beginning and end of the wire rope as well as of deflectors.

Ropes for GreenGuide rope styles F1–F6
Ropes S1 to S7 include all versions which can occur in GreenGuide rope styles and training structures.

Assembly lengths
All tensionable and connectors are supplied as DIY assembly parts. This allows the exact rope length to be determined on site. The ordered rope length should be about 10% longer than the planned length.

On-site assembly
see Fig 45.1, page 45

Tensioning range
information: both thread ends are screwed halfway into the turnbuckle body.

= make longer (relax)
8 mm

= make shorter (tension)
24 mm

No. 20810–0001–00
Top: Swaged radius head and stop bottom: Cut rope with end cap

No. 20810–0002–00
Top: Swaged GreenGuide eye and bottom: Cut rope with end cap

No. 20810–0003–00
Top: Swaged radius head and stop bottom: External thread and LT2

No. 20810–0004–00

No. 20810–0005–00

No. 20810–0006–00
Top: Turnbuckle with GreenGuide eye LT2 bottom: Turnbuckle with GreenGuide eye LT2

No. 20810–0007–00
Top: Turnbuckle with loop LT2 bottom: Turnbuckle with loop LT2
The load and design of a greening system depends on various factors. Please consult pages 18, 19 and 21 for details.

The user is responsible for choosing the correct assembly method (see Fig. 26.5) and the proper rope diameter. Functionality is guaranteed only by Jakob rope No. 10820–0400 with the yellow code filament. Have a civil engineer check strength values and permissible loads on the basis of the given load case (see page 21).
The load and design of a greening system depends on various factors. Please consult pages 18, 19 and 21 for details.
**GREENGUIDE ROPE STYLE**

**F4**

For on-site assembly / Patent: CH89/01601 pending / Material: ropes AISI 316, fittings AISI 316 L

To order: see examples on opposite page

<table>
<thead>
<tr>
<th>Upper mounting section</th>
<th>Angle 30/30/4</th>
<th>Angle 40/40/4</th>
<th>Info: Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td></td>
<td></td>
<td>21, 29, 64</td>
</tr>
<tr>
<td>b</td>
<td>Angle 30/30/4</td>
<td>Angle 40/40/4</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>Flat 30/4</td>
<td>Flat 40/4</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>Flat 30/4</td>
<td>Flat 40/4</td>
<td></td>
</tr>
</tbody>
</table>

**Intermediate mounting section**

<table>
<thead>
<tr>
<th>Max. width with 2 spacers</th>
<th>Suggested: approx. 1500 (with W 100 and plant weight 15 kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. length with 2 spacers</td>
<td>Suggested: approx. 3000 (with W 100 and plant weight 15 kg/m²)</td>
</tr>
</tbody>
</table>

**Bottom mounting section**

<table>
<thead>
<tr>
<th>Wall clearance with spacer Ø 20/50</th>
<th>See wall clearance table on pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall clearance with spacer Ø 40/100</td>
<td>See wall clearance table on pages</td>
</tr>
</tbody>
</table>

**Possible rope types: S1 / S3**

<table>
<thead>
<tr>
<th>Wall mounting on wood, hollow walls, concrete or external insulation. See installation principles and materials on pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>See notes on pages</td>
</tr>
</tbody>
</table>

**Mounting sections**

On request, we will supply the stainless steel sections ready to install with all holes (according to binding drawings).

Horizontal rods combined with vertical wire ropes result in ideal training structures. See description on page 29 and the figure below (30.5).

The load and design of a greening system depends on various factors. Please consult pages 18, 19 and 21 for details.

---

**Assembled lengths for on-site assembly:**

Please see notes on page 25.
The load and design of a greening system depends on various factors. Please consult pages 18, 19 and 21 for details.

Horizontal rods combined with vertical wire ropes result in ideal training structures. Two different methods are available for attaching rods to wire ropes.

- GreenGuide 90° cross clamp (Fig. 30.5, page 30)
- Horizontal rod Ø 3.7 mm No. 30922–0400–00 (Page 65)
- Rope clip for stainless steel rods No. 30920–0400–01 (Fig. 52.2, page 52)

Rope type S4
Rope S4 is supplied with a tensionable end connector and is intended for on-site assembly (rope types see page 25).

Wall mounting
on wood, hollow walls, concrete or external insulation. See installation principles and materials on pages 20 and 64.

Top/bottom mounting sections
Depending on the load case, angle sections 40 / 40 / 4 or 30 / 30 / 4 are identical at the top and bottom.

Intermediate section P2 can also be used as a bottom mounting section P3, depending on function and load case (see Fig. 34.3, page 34).

Section connector
The max. length of the flat and angle sections is 2000 mm. The section connector has two slotted holes. (Page 64, No. 30922–3004 and –4004)

Mounting sections (angle or flat)
- Width (outermost ropes)
- Length of longest rope (upper, bottom)
- Wall clearance (wall rope)
- Rope type (see page 25)
- Wall mounting modes
**GREENGUIDE ROPE STYLE F5**

For on-site assembly | Patent (EBGM pending) | Material: ropes AISI 316, fittings AISI 316L

To order: see examples on opposite page

---

**Mounting sections**

On request, we will supply the stainless steel sections ready to install with all holes (according to binding drawings).

Horizontal rods combined with vertical wire ropes result in ideal training structures. See description on page 29 and the figure below (34.5).

The load and design of a greening system depends on various factors. Please consult pages 18, 19 and 21 for details.

---

**Assembled lengths for on-site assembly:**

*L* always applies to the longest wire rope. Please see notes on page 25.

---

The user is responsible for choosing the correct assembly method (see Fig. 26.5 on page 26) and the proper rope diameter. Functionality is guaranteed only by Jakob rope No. 10620-0400 with the yellow code filament. Have a civil engineer check strength values and permissible loads on the basis of the given load case (see page 21).
GREENGUIDE ROPE STYLE **F6**

For on-site assembly / Material: ropes AISI 316, fittings AISI 316L

To order: see examples on opposite page

---

**Info:** Page

1. **GreenGuide spacer**
   - Matches rope type S6 with GreenGuide eye
   - Page: 25, 43

2. **Intermediate spacer with ring nut**
   - Rope guide or deflection point
   - Pages: 46/49

3. **Spacer with ring nut**
   - Loop of rope S7 is swaged directly to ring nut
   - Pages: 46/49

4. **Wall clearances**
   - 24 / 76 / 93 / 118 (D1 including 12 mm spacer washer)
   - Pages: 40/41

5. **Rope length (assembled length)**
   - L = stretched rope with two assembled end connectors
   - Page: 25

6. **Possible rope types: S6 / S7**
   - See notes on pages
   - Pages: 25

7. **Wall mounting**
   - on wood, hollow walls, concrete or external insulation. See installation principles and materials on pages
   - Pages: 20, 64

---

**Assembled lengths**

For on-site assembly:

Please see notes on page 25.

The sum of all deflections should not exceed 540°, max. 90° par deflection.

---

The user is responsible for choosing the correct assembly method.

The functionality is guaranteed only by Jakob rope No. 10820-0400 with the yellow code filament. Have a civil engineer check the strength values and permissible loads on the basis of the given load case (see page 21).
SUPERB MATERIALS – EASY ASSEMBLY
THE SINGLE ROPE DIAMETER (4 MM) AND ONE THREAD SIZE (M8) MAKE THIS LINE ABSOLUTELY INTEROPERABLE

All parts of the Jakob® INOX LINE are made of top-quality materials. The two alloys used – AISI 316 (1.4401) and AISI 316L (1.4404) – provide high corrosion resistance and plant compatibility.
**WALL CLEARANCE EXAMPLES**

<table>
<thead>
<tr>
<th>Eye bolt, slotted, with support washer</th>
<th>44</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 30836-0044-01</td>
<td>44</td>
</tr>
<tr>
<td>No. 30836-0044</td>
<td>44</td>
</tr>
<tr>
<td>Eye bolt, slotted, with support washer</td>
<td>64</td>
</tr>
<tr>
<td>No. 30836-0064-01</td>
<td>64</td>
</tr>
<tr>
<td>No. 30836-0064</td>
<td>64</td>
</tr>
<tr>
<td>GreenGuide spacer Ø 20 / 50</td>
<td>74</td>
</tr>
<tr>
<td>No. 30919-0058</td>
<td>74</td>
</tr>
<tr>
<td>GreenGuide spacer Ø 20 / 50</td>
<td>91</td>
</tr>
<tr>
<td>No. 30919-0075</td>
<td>91</td>
</tr>
<tr>
<td>GreenGuide spacer Ø 20 / 50</td>
<td>116</td>
</tr>
<tr>
<td>No. 30919-0100</td>
<td>116</td>
</tr>
<tr>
<td>Spacer basket Ø 40 / 100</td>
<td>91</td>
</tr>
<tr>
<td>No. 30897-0075</td>
<td>91</td>
</tr>
<tr>
<td>Spacer basket Ø 40 / 100</td>
<td>116</td>
</tr>
<tr>
<td>No. 30897-0100</td>
<td>116</td>
</tr>
<tr>
<td>Spacer basket Ø 40 / 100</td>
<td>166</td>
</tr>
<tr>
<td>No. 30897-0150</td>
<td>166</td>
</tr>
<tr>
<td>Spacer basket Ø 40 / 100</td>
<td>216</td>
</tr>
<tr>
<td>No. 30897-0200</td>
<td>216</td>
</tr>
</tbody>
</table>

Wall clearance (W) means the distance between the façade and the training system (centre of rope).
1. Spacer basket Ø 40/100 with four different wall clearances.
2. Swaged GreenGuide eye for rope Ø 4 mm (dome nut M8, p. 6/6).
3. Angle section in two sizes: 30/30/4 or 40/40/4 mm.
4. Swaged radius head end stop for rope Ø 4 mm.
5. Climber stud UV-resistant plastic Colour grey.
7. Rope clip for stainless steel rod UV-resistant plastic Colour grey.
8. End cap for wooden rod Ø 25 mm.
10. Wooden rod holder incl. special Mininut for wooden rod Ø 25 mm.
11. Horizontal rod Ø 3.7 for combinations with vertical ropes.
12. Wooden rod Ø 25 glazed spruce (grey) or untreated larch.
13. Wooden rod holder accepts rope guide point.
15. Stainless steel rope Ø 4 Construction 6x7+SE.
ROPE / EXTERNAL THREADS

We assemble all end connectors with wire ropes that are manufactured in-house. Jakob® wire ropes are subject to strict quality inspections. All components are carefully matched. This assures superior functionality and compliance with guaranteed breaking loads. For safety reasons, use only Jakob® wire ropes in combination with items designed for on-site assembly. See description on page 21.

The user is responsible for choosing the correct assembly method and the proper rope diameter. Functionality is guaranteed only by Jakob® wire rope No. 10820–0400 with the yellow code filament.

1. Tensioning range information: both thread ends are screwed halfway into the turnbuckle body.

2. ø3 = make longer (relax)
   ø4 = make shorter (tension)

Swaged external thread
The swaging process lengthens dimension b by about 3%.

2.5 mm

FELCO C7 WIRE ROPE CUTTER
WIRE ROPE END CAP
STAINLESS STEEL ROPE Ø 4 / 6x7 + SE

Right-hand thread
Left-hand thread

No. 10820–0400–01
No. 30804–0400–01
No. 30740–0400–01
No. 30910–0400–01
No. 30850–0400–03
No. 30740–0500
No. 30804–0400
No. 10820–0400

"Company Name" 
On-site assembly Software

The tensioning range information specifies the relative change in length when the screw is turned one thread length:

- ø3 = make longer (relax)
- ø4 = make shorter (tension)

Swaged external thread
The swaging process lengthens dimension b by about 3%.

Tension range:
lengthen +8
shorten –24

Tension range:
lengthen +8
shorten –24

197.5
Tension range: lengthen +12 shorten –24

197.5
Tension range: lengthen +12 shorten –24

108
Tension range: lengthen +4 shorten –12

Breaking strength: 90% of minimum rope-breaking load

Breaking strength: 90% of minimum rope-breaking load

Breaking strength: 90% of minimum rope-breaking load

Breaking strength: 90% of minimum rope-breaking load

Breaking strength: 90% of minimum rope-breaking load
WEBNET
This multifunctional mesh is made of stainless steel wire rope dimensioned to customer specifications. Please contact us for customised planning with WEBNET. Other rope Ø on request.

Correct wall mounting (see page 20) is the responsibility of the user. Strength ratings and permissible loads based on the application must be calculated by a qualified engineer (see page 21).

Curved mounting surface see pages 58/59.

Costs for cut and drilling:

- 0090
- 0020–01 foam-filled
- 0020–11 unfilled
Adjustable cross clamp with support washer

This product may be used only as an intermediate rope guide (not as an end connector). Dimension \( b_1 \) corresponds to the distance between the wall and the inner wire rope.

The user is responsible for choosing the correct assembly method and the proper rope diameter.
The user is responsible for choosing the correct assembly method. Strength ratings and permissible loads based on the application must be calculated by a qualified engineer (see page 21).

Fig 54.2: The GreenGuide overload clamp (page 65) clamps the end of the wire rope. The defined clamping force of 1 kN allows the rope to slip when gripped by vigorously twirling climbers, thus lengthening the rope (see page 19, item E).
### Technical Data

**Greenguide Trellis-work with Swaged Loops**

<table>
<thead>
<tr>
<th>No. 30922-</th>
<th>a (rope length)</th>
<th>b (number of ropes)</th>
<th>g (number of tensioner fittings)</th>
<th>b00 (Tension range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0600-01</td>
<td>max. 6000</td>
<td>5 ropes (G1 / G2 / G3 / G4 / G5)</td>
<td>5 tensioner fittings (G1 / G2 / G3 / G4 / G5)</td>
<td>+8 –24</td>
</tr>
<tr>
<td>0600-03</td>
<td>max. 6000</td>
<td>3 ropes (G1 / G3 / G5)</td>
<td>3 tensioner fittings (G1 / G3 / G5)</td>
<td>+6 –24</td>
</tr>
<tr>
<td>0600</td>
<td>max. 6000</td>
<td>without ropes</td>
<td>without tensioner fittings</td>
<td></td>
</tr>
</tbody>
</table>

**Tensioning Range Information:**
- Both thread ends are screwed halfway into the turnbuckle body.
- = make longer (relax)
- = make shorter (tension)

**Notes:**
- The user is responsible for choosing the correct assembly method and the proper rope diameter. Functionality is guaranteed only by Jakob rope No. 10820-0400 with the yellow code filament. Strength ratings and permissible loads based on the application must be calculated by a qualified engineer (see page 21).
- Functionality is guaranteed only by Jakob rope No. 10820-0400 with the yellow code filament. Strength ratings and permissible loads based on the application must be calculated by a qualified engineer (see page 21).

**Options:**
- **Greenguide Trellis-work with Tensioner fittings**
  - For on-site assembly (without ropes)
  - No. 30922-0600

**Dimensions:**
- Eye thickness: = 12 mm
- ø 8.5 mm
- ø 20 mm
- ø 20 mm
- ø 20 mm
- ø 20 mm
- ø 20 mm
- ø 20 mm

**Assembly:**
- The user is responsible for choosing the correct assembly method and the proper rope diameter. Functionality is guaranteed only by Jakob rope No. 10820-0400 with the yellow code filament. Strength ratings and permissible loads based on the application must be calculated by a qualified engineer.
The user is responsible for choosing the correct assembly method (see page 20). Strength ratings and permissible loads based on the application must be calculated by a qualified engineer (see page 21).
1. End cap
2. Stainless steel rod
3. Wooden rod holder
4. Wooden rod
5. Wooden rod connector

6. Wall mount
7. Spacer
8. Radiused head screws with special MiniNutz
9. Hammer pins
10. GreenGuide cross clamp
11. Rope clip for stainless steel rod

See page 65 for stainless steel rod end cap.
See page 52 for GreenGuide cross clamp.
See page 64 for mounting aids and assembly aids.
See pages 49 and 51 for radiused head screws.
Hammer pins are available for all wooden rod fittings in place of radiused head screws.
Caution: hammer pins cannot be removed once installed!

 Depending on load and desired wall clearance (see pages 49 and 51).

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Wooden rod systems are available with:

- Radiused head screws – 01
- Hammer pins – 02

Possible wall clearances (max. lateral force see page 21):

- Spacer basket Ø 40/100 (page 51): 
  \[ W = \{100 / 125 / 175 / 225 \text{ mm} \} \]

- Spacer Ø 20/50 (page 49): 
  \[ W = \{85 / 100 / 125 \text{ mm} \} \]

- Spacer Ø 12/24 (page 49): 
  \[ W = \{\text{variable, max. 80 mm} \} \]

Support washer Ø 50 (page 50): 
\[ W = 31 \text{ mm} \]

Costs per cut:

- No. 20800 – 0002

Spruce glazed, grey, not drilled
Spruce glazed, grey, drilled
Larch untreated, not drilled
Larch untreated, drilled
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