

The image shows several Ancon LinkPro lifting loops, which are made of twisted steel wire. Some are purple and some are black. They are arranged on a concrete surface, with some loops being attached to a rebar structure. A large, detailed view of a purple loop is shown in the foreground, highlighting its twisted wire construction and a grey metal connector. The background shows a concrete wall and floor with several other loops, some attached to a rebar grid. The overall scene is set in a construction or industrial environment.

LinkPro

Lifting Loops

Safe, efficient, precast concrete handling.
Ideal for the civil engineering sector.

Ancon[®]

The latest addition to our comprehensive LIFTING SYSTEM range

Ancon LinkPro

Fibre-cored/steel-cored lifting loops to facilitate the safe and efficient handling of precast and prestressed reinforced concrete units, including bridge and shell beams

- ✓ Safe, reliable, fully engineered solution
- ✓ Suitable for axial and diagonal lifting
- ✓ Colour-coded for WLL visual check
- ✓ Manufactured from corrosion resistant galvanised steel
- ✓ No specialist lifting clutches or equipment required
- ✓ No recess formers required
- ✓ Suitable for use with standard lifting hooks/shackles

System Components

Each LinkPro loop is manufactured from galvanized, high strength, 1770MPa grade fibre-cored/steel-cored steel wire rope, joined with a swaged ferrule and fitted with a colour-coded tag detailing the product code, working load limit (WLL) and batch number. A colour-coded painted section, designed to be left exposed after installation, provides a visual check that the correct embedment depth has been achieved.

Design Considerations

LinkPro applications should be engineered to meet the requirements of the WorkSafe NZ Good Practice Guidelines for Safe Handling, Transportation and Erection of Precast Concrete Elements 2018, taking into consideration the rigging, element dimensions, weight, concrete strength, reinforcing etc.



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System Benefits

Ancon LinkPro provides a safe, reliable, fully engineered solution to the issues of handling the size and scale of precast concrete units used in the civil engineering sector. LinkPro is easily installed, without recess formers, ready for direct connection to standard lifting hooks and shackles. Refer to Figure 1.

LinkPro is suitable for axial and diagonal lifting, with a maximum sling angle of 60°, from manufacture until final installation of the precast concrete element.

The multi-stranded, fibre-cored/steel-cored construction of LinkPro features small diameter outer wires (see table for details) which generate low bending stresses when loaded.

When shackle pins are used in high load designed applications we recommend a diameter not less than 3.5 times diameter rope thickness. For further information, please refer to Ancon for engineered lifting design guidance.

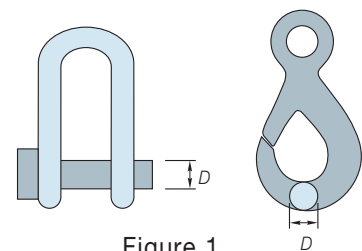


Figure 1

LinkPro Range, Colour Codes and Dimensions

| Product Code | WLL tonnes | Tag Colour Code | Rope Diameter (d) mm | Overall Height (H) mm | Embedment Depth (h _{ef}) mm | Installation Depth (h _{inst}) mm | Exposed Insert Height (e) mm | Min. Width (W _{min}) mm | Max. Width (W _{max}) mm | Approx. Weight kg |
|--------------|---------------|-----------------|----------------------|-----------------------|---------------------------------------|--|------------------------------|-----------------------------------|-----------------------------------|-------------------|
| LP04 | Dark Green | | 12 | 370 | 269 | 275 | 95 | 100 | 160 | 0.6 |
| LP06 | Blue | | 16 | 425 | 312 | 320 | 105 | 145 | 200 | 1.2 |
| LP08 | Silver | | 18 | 480 | 331 | 340 | 140 | 170 | 235 | 1.8 |
| LP10 | Pink | | 20 | 525 | 380 | 390 | 135 | 185 | 255 | 2.4 |
| LP12 | Yellow | | 22 | 590 | 424 | 435 | 155 | 200 | 285 | 3.5 |
| LP16 | Lilac | | 24 | 670 | 478 | 490 | 180 | 260 | 330 | 4.5 |
| LP20 | Ochre | | 28 | 750 | 531 | 545 | 205 | 280 | 325 | 6.8 |
| LP25 | Brown | | 32 | 850 | 599 | 615 | 235 | 300 | 400 | 9.8 |
| LP32 | Black | | 36 | 885 | 632 | 650 | 235 | 310 | 425 | 12.9 |
| LP37 | Bright Orange | | 40 | 950 | 670 | 690 | 260 | 340 | 470 | 17.5 |
| LP42 | Bright Orange | | 44 | 1000 | 698 | 720 | 280 | 350 | 545 | 22.2 |
| LP47 | Bright Orange | | 44 | 1100 | 748 | 770 | 330 | 390 | 545 | 24.3 |
| LP52 | Bright Orange | | 48 | 1200 | 846 | 870 | 330 | 420 | 580 | 31.5 |
| LP57 | Bright Orange | | 48 | 1350 | 946 | 970 | 380 | 480 | 590 | 35.4 |

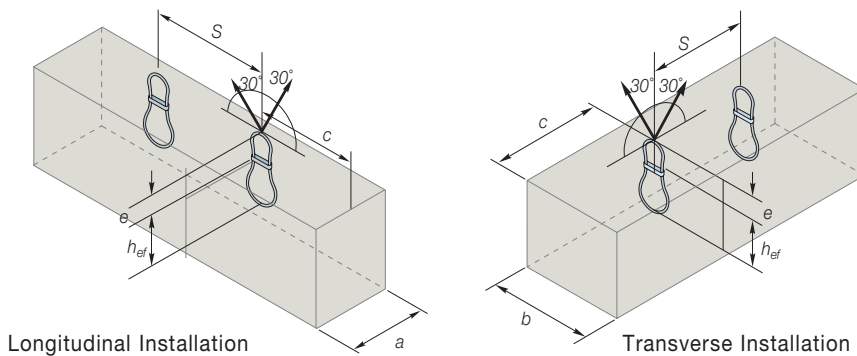
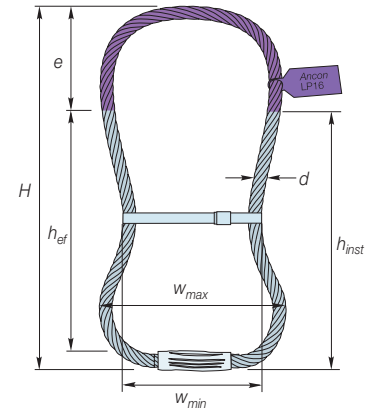
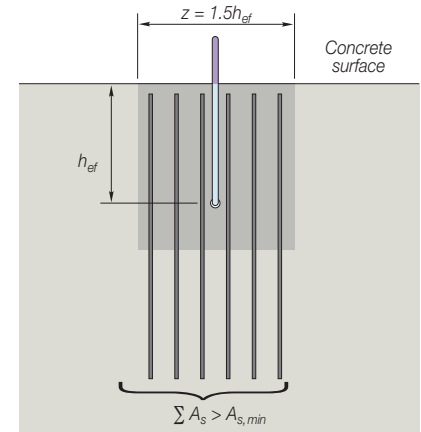


Figure 2



Reinforcement Details

Figure 3

Minimum precast element dimensions and reinforcement requirements

The recommended concrete compressive strength for lifting $f_{cm} = 30\text{MPa}$.

Factor of Safety for Lifting = 3.

The minimum precast element dimensions and required reinforcement at $f_{cm} = 30\text{MPa}$ is shown in the table below.

The minimum spacing s between any two LinkPro loops is $2c$. Refer to Figure 2.

The reinforcement should be evenly distributed in the critical zone either side of a loop over a width $z = 1.5h_{ef}$. Refer to Figure 3.

If the design shear reinforcing of the precast element A_s is less than $A_{s,min}$ shown in the tables, then additional reinforcement e.g. hairpins, stirrups or hooked bars should be added to increase the area to $A_{s,min}$. The ties should be evenly and closely spaced around the LinkPro loop at approximately 50mm spacing while complying with bar spacing requirements of relevant design standards.

Reinforcement should be designed by the lifting design engineer, detailed on the shop drawings and placed in accordance with the approved lifting design. Where additional reinforcement is required, ensure it is not in contact with the swaged ferrule.

LinkPro has been designed to be used in conjunction with reinforcement details from relevant design standards.

In the transverse installation, if any bars need to be cut to install the loop, they should be replaced by bars of the same size and lapped in accordance with the relevant design standard.

For applications which fall outside the scope of the table, please contact Ancon for design guidance.

Minimum Precast Element Dimensions and Shear Reinforcement Requirements for Lifting at 30MPa

| Product Code | WLL tonnes | End Distance (c) mm | Minimum Precast Element Width | Minimum Precast Element Width | Critical Zone Width (1.5h _{ef}) (z) mm | Minimum Area Reinforcement (A _{s,min}) in Critical Zone mm ² |
|--------------|------------|---------------------|----------------------------------|--------------------------------|--|---|
| | | | Longitudinal Installation (a) mm | Transverse Installation (b) mm | | |
| LP04 | 4 | 460 | 140 | 200 | 404 | 205 |
| LP06 | 6.5 | 550 | 210 | 245 | 468 | 332 |
| LP08 | 8 | 590 | 220 | 270 | 497 | 409 |
| LP10 | 10 | 670 | 280 | 285 | 570 | 511 |
| LP12 | 12.5 | 640 | 290 | 300 | 636 | 639 |
| LP16 | 16 | 850 | 400 | 400 | 717 | 818 |
| LP20 | 20 | 940 | 470 | 470 | 797 | 1023 |
| LP25 | 25 | 1050 | 530 | 530 | 899 | 1278 |
| LP32 | 32 | 1110 | 610 | 610 | 948 | 1636 |
| LP37 | 37 | 1180 | 640 | 640 | 1005 | 1892 |
| LP42 | 42 | 1230 | 680 | 680 | 1047 | 2147 |
| LP47 | 47 | 1320 | 680 | 680 | 1122 | 2403 |
| LP52 | 52 | 1480 | 630 | 630 | 1269 | 2659 |
| LP57 | 57 | 1660 | 590 | 590 | 1419 | 2914 |

Installation, Lifting and Handling

Pre-Installation

Store to avoid any damage to loops. Check LinkPro for defects prior to casting. Loops with evidence of mechanical damage, kinking, broken or unravelling wires, crushing, wear, corrosion or other serious damage should be discarded. If in doubt, contact Ancon.

Installation

Carefully place LinkPro in its correctly measured position between the reinforcement, with the swaged ferrule at the bottom and the coloured section and WLL tag left exposed at the top, and tie to the reinforcement to minimise movement during casting. Ensure the swaged ferrule does not come into contact with the reinforcing bars or prestressing strand.

LinkPro should be placed and aligned either parallel (longitudinal installation) or perpendicular (transverse installation) to the direction of the expected load in accordance with the shop drawings, as approved by the lifting design engineer. The specified loop capacities, embedment depths, spacing and edge distances should be strictly adhered to.

During installation, take care not to damage the exposed lifting section of the loops.

When installing LinkPro ensure the band around the loop is not removed, for guidance please contact the Ancon Engineering Team.

Lifting and Handling

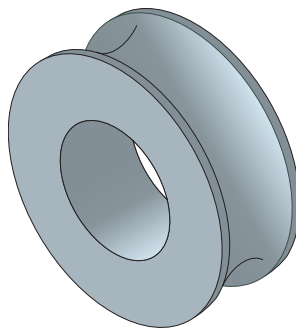
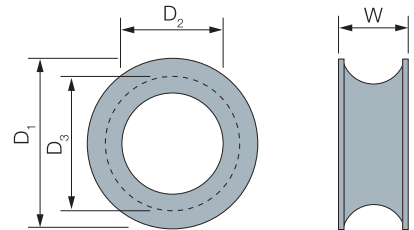
LinkPro may be diagonally loaded at an inclination of 30° (Sling angle 60°), see Maximum Sling Angle drawing. The rigging design shall be provided by the lifting design engineer and shown on the erection shop drawings. Refer to Figure 4.

Notes:

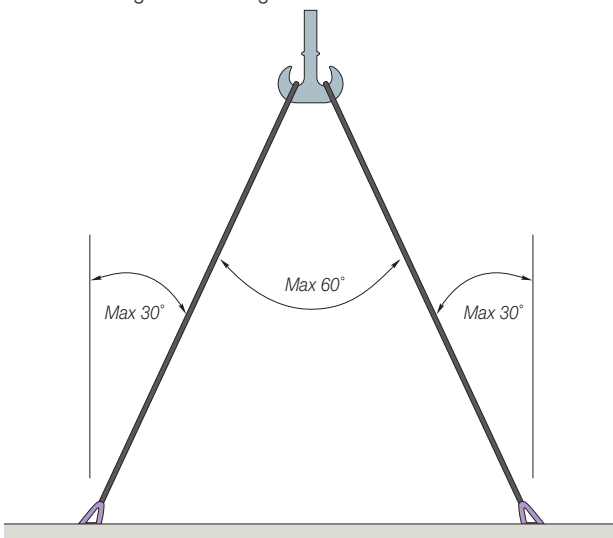
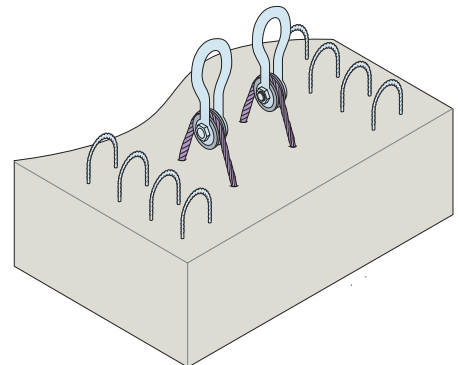
- Ensure that the rigging configuration does not result in a lever arm or bending moment during hook up
- When using crane hooks, Ancon recommends lifting with $D/d = 3.5$. In addition, when lifting with large LinkPro sizes (LP20 and above) Ancon recommends lifting with Ancon Thimbles so the correct radius is on the loop to ensure safe lifting
- Do not bend LinkPro to an angle greater than 30° during any lifting, handling or storage of the precast elements prior to the final installation of the precast element
- Where precast elements are to be stacked, sufficient separators must be used between the precast elements to prevent damage to LinkPro by bending beyond 30°, mechanical damage, crushing or abrasion
- After installation/use, the exposed loop may be cut off as required. Consideration should be given to corrosion protection of the cut ends if they are to remain exposed

Ancon Thimbles for LinkPro Lifting Loops

| Product Code | Lifting Loops | D ₁ (mm) | D ₂ (mm) | D ₃ (mm) | W (mm) |
|--------------|---------------|---------------------|---------------------|---------------------|--------|
| LPT20-25T | LP20-LP25 | 150 | 85 | 117 | 48 |
| LPT32-37T | LP32-LP37 | 185 | 100 | 140 | 56 |
| LPT42-57T | LP42-LP57 | 230 | 135 | 179 | 64 |



Ancon Thimble



Maximum Sling Angle

Figure 4

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