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Pipe-in-pipe: Using existing pipe systems.

# speed•pipe® bundle SRV 50 / 8 x 10. Laying instructions.

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# content

## Publisher.

**gabo Systemtechnik GmbH**
**a Member of HellermannTyton**
Am Schaidweg 7
94559 Niederwinkling
GERMANY

Tel. +49 9962 950-200
Fax +49 9962 950-202
info@gabocom.com
www.gabocom.com

Business division gabocom
Author: Martin Ziermann
Approval: Markus Karl
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Pipe-in-pipe: Using existing pipe systems.

# General information.
# **speed•pipe® bundle SRV 50 / 8 x 10.**

Use existing pipe systems for fibre optic with the speed•pipe® bundle SRV 50 / 8 x 10.

For existing cable duct systems with a diameter > 110 mm, the speed•pipe® bundle SRV 50 / 8 x 10 is the fastest and most cost effective kind of broadband expansion.

Chapters 1 – 5 are divided into the following sections:

- Overview of general information
- Laying temperatures
- Field of application
- Cutting speed•pipe® and speed•pipe® bundles
- Tensile forces

These installation instructions are essential for the construction and assembly work in order to successfully guarantee the functionality of your network.

# Overview.
# First indications.

## Protection from contamination and mechanical damage.

The speed•pipe® bundle SRV and the internal speed•pipe® must be protected against contamination and mechanical damage during transport, storage and processing.

## Avoid damage and distortion.

Any damage and distortion of the speed•pipe® (ovalisation) must be avoided as it can cause a decrease in the blowing distance of the micro cables.

The speed•pipe® ends must be protected against the penetration of dirt and water by means of dust covers, end plugs ES or sealing elements EZA-t.

| | |
|---|---|
| **dust covers:** | protection against dust, dirt and splashing water, not pressure-tight |
| **end plugs:** | pressure-tight up to 0.5 bar |
| **sealing elements:** | pressure-tight up to 0.5 bar |

The SRV and the speed•pipe® are UV-resistant (3 years southern european climate). When storing them over a long period of time (several months) the SRV must be protected against direct solar radiation.

**Please note:**
The laying instructions are important for the correct completion of construction and installation work.

# Laying and notes.
# 2. Laying temperatures.

## Laying event at temperatures of 10 °C below zero.

The high-quality material PE-HD of the speed•pipe®
and the jacket pipe allows the laying event at temperatures
of 10 °C below zero.

## Optimum at temperatures between 5 and 20 °C.

However, the optimum conditions are obtained
at temperatures between 5 to 20 °C.

## At temperatures below the freezing point, store in heated areas.

At temperatures below the freezing point we recommend
to store the coils with the SRV before laying in heated areas
for 12 to 24 hours.

When preparing fitting lengths please pay attention to the temperature-induced change in length of the ducts. If the temperature of the duct wall increases or decreases by 1 Kelvin (1 K = 1 °C) the PE-HD duct shall extend or shorten by 0.2 mm per meter length. Thus, the duct shortens by 1 mm in case of a temperature difference of Δ -5 Kelvin.

In the construction of all kind new fibre optic routes, to avoid tension in the duct system particularly in midsummer the duct string must be placed in the trench some time before it is filled, to reach an adaption between duct and soil.

# Laying and notes.
## 3. Field of application.

The speed•pipe® bundle SRV 50 / 8 x 10 is inserted as an accessory conduit into existing conduits of the cable duct construction out of PVC-U 110.

**The following occupancy variations are possible:**

**A)**
A speed•pipe® bundle
in the empty cable duct
pipe KKR 110.

**B)**
A speed•pipe® bundle
in a KKR 110 occupied with a cable
(max. Ø 50 mm).

**C)**
Two speed•pipe® bundles
in an empty KKR 110.

# Laying and notes.
## 4. Cutting speed•pipe® / SRV.

**For cutting the SRV or the speed•pipe® never use chip-producing tools like a saw.**

Separate the bundle by means of a pipe cutter. The internal speed•pipe® must be separated with a speed•pipe® cutter.

The cutting of the speed•pipe® for coupling it with a transparent permanent connector (DSM) must be carried out by a straight rectangular cut towards the pipe axis.

Cut speed•pipe® that are not coupled with a transparent permanent connector (DSM) afterwards, immediately must be sealed against dirt and the penetration of water by means of a corresponding EZA-t or ES.

*Note* Please consider the respective assembly instruction for installing the connector.


speed•pipe® cutter
and pipe cutter

# Laying and notes.
# 5. Tensile forces.

## MAXIMUM PERMITTED TENSILE FORCE.

For the pulling-in process into the duct always use a pulling grip. In doing so, the speed•pipe® and the jacket pipe must be gradated in a way that a uniform force distribution is reached on the entire SRV.

**The following tensile force must not be exceeded.**

| Name | Max. recommended tensile strength (at 20 °C) | Tensile strength at break (at 20 °C) |
|---|---|---|
| **SRV 50 / 8 x 10** | 2500 | 3400 |

Optimum tensile forces are reached at a temperature range from 5 to 20 °C.
In case only the jacket pipe of the SRV is stressed the following tensile force must not be exceeded.

| Name | Max. recommended tensile strength (at 20 °C) | Tensile strength at break (at 20 °C) |
|---|---|---|
| **Jacket pipe Ø 50** | 700 | 1000 |

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# Laying instructions.
# **The speed•pipe® bundle SRV 50 / 8 x 10 in practical use.**

The speed•pipe® bundle combines varicolored speed•pipe® to a loose compound. In just one step several speed•pipe® can be pulled into the existing duct systems simultaneously.

In sections 6 and 7 you will find all necessary steps for the practical application of the SRV 50 / 8 x 10:

- Preparation
- Correct pulling of the speed•pipe® bundle
- Sealing and fixing
- Blowing in micro and mini cables

Note:
Please note that the local conditions and specific laying procedures may lead to deviations from the recommended priciples in chapters 6.1 – 6.3.

# Laying instructions.
## 6.1 Preparation.

**FIRST STEPS:**

**1)** Cleaning the conduit KKR.

**2)** Testing and calibrating the ability to penetrate of the KKR.

**3)** Placing the laying carriage with SRV 50 / 8 x 10 in a linear direction to the manhole.

**4)** Use laying tools to avoid any damage of the jacket pipe
(e. g. edge roller at the manhole, cable-protection bow).

Laying aids
at a glance

Cable-protection bow

Manhole edge roller

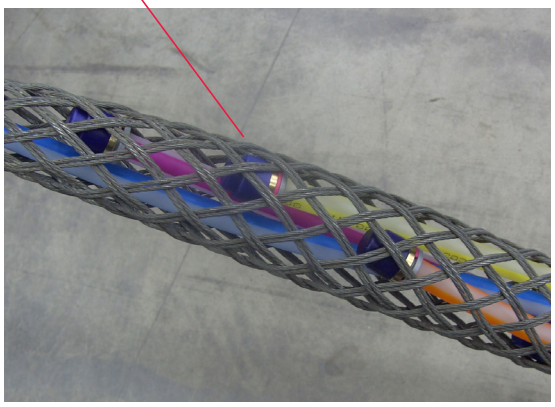
# Laying instructions.
## 6.2 Installation of the pulling grip.

**1)** Gradate speed•pipe® and jacket pipe to achieve a uniform force distribution on the entire SRV:

→ cut back the jacket pipe for approx. 500 mm.
→ crosscut the speed•pipe® in 70 mm gradations.

**2)** Seal the single speed•pipe® against the penetration of dirt and water with end plugs ES 10.

*recommended product: transparent permanent end plugs*

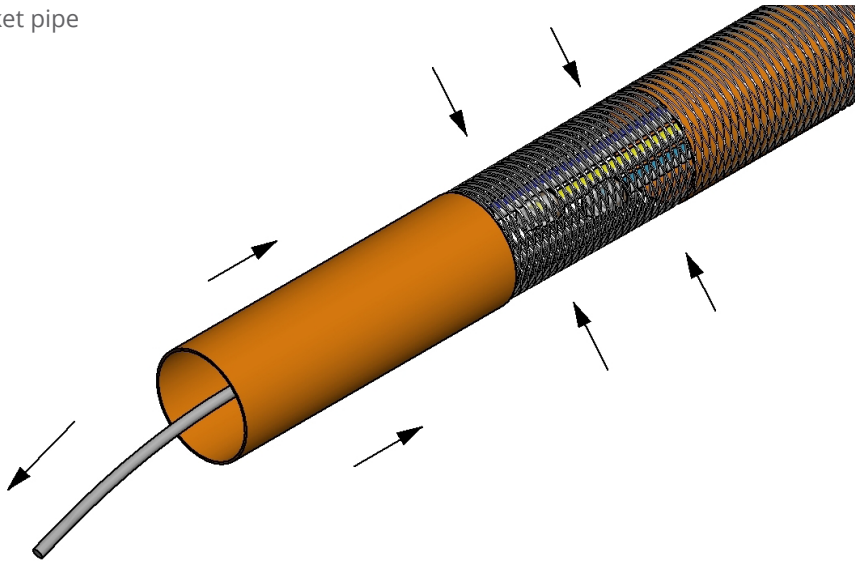


**3)** Bend the end of jacket pipe around the speed•pipe® and fix it with fabric tape.

**4)** Pull the pulling grip (Ø 50) onto the jacket pipe of the speed•pipe® bundle and fix it with fabric tape (bend respectively approx. 10 cm over pulling grip and jacket pipe).

**Please note:**
For reducing the friction during the pulling process, additionally a piece of jacket pipe can be attached onto the pulling grip.

**1)** Pulling a piece of jacket pipe onto the pulling grip.



**2)** Wrap glass-fabric tape or similar round the ends of the coated jacket pipe.

# Laying instructions.
## 6.3 Pulling in the speed•pipe® bundle SRV 50 / 8 x 10.

- The speed•pipe® bundle SRV 50 / 8 x 10 is pulled in by means of a traction rope or a tube snake.

- Assistance at the coil end may be required as well as at the launching / pulling manhole.

- It is to be avoided that the speed•pipe® bundle is placed at the direct access area of the manholes. Therefore, consider the deflection (see page 17) at drawn through or connected SRV.

- In case of short distances between the manholes the SRV can be drawn through using protective sheets and pulling spouts.

- In case the KKR is to be occupied with two speed•pipe® bundles, these can be pulled in one after the other or at the same time.

- The use of lubricant (e. g. Polywater J-19 V Gel; Polywater SP – 128 V Flu) is reducing the pulling in friction.

# Laying instructions.
## 6.4 Sealing and fixing the SRV to the cable duct conduit.

**Sealing and fixing the speed•pipe® bundle SRV 50 / 8 x 10 to the KKR 110 in the cable duct is carried out by using the sealing element ADE / TDUX 100 (tyco / CommScope) and is necessary on both sides in each manhole.**

For stiffening the jacket pipe, first attach an outside stiffener (SHa) or in case of double occupation with SRV an outside double stiffener (DSHa) around the bundle, see „Assembly instruction for outside stiffener“.

### APPLICATION STEPS:

**1)** The outside stiffener SHa is put onto the jacket pipe of the SRV.

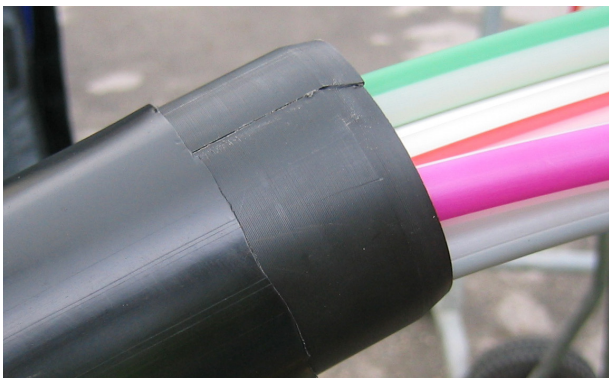
**2)** Combined installation of the outside stiffener SHa and tyco / CommScope ADE / TDUX into the KKR 110.

**3)** Filling and sealing the tyco / CommScope ADE / TDUX.

# Laying instructions.
## 6.5 Sealing and fixing the single speed•pipe® in the SRV.

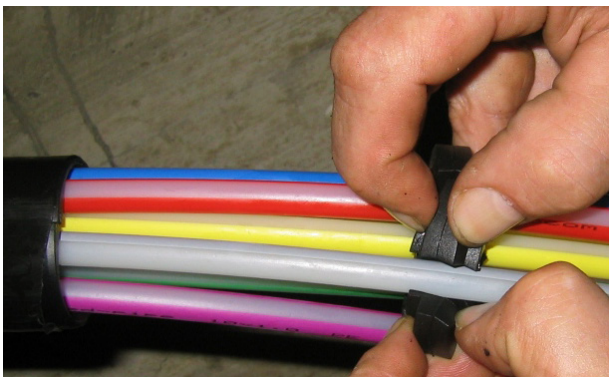
EXECUTION STEPS:

**1)** Use a knife and crosscut the jacket pipe with approx. 15 - 20 cm protrusion to the wall of the manhole.

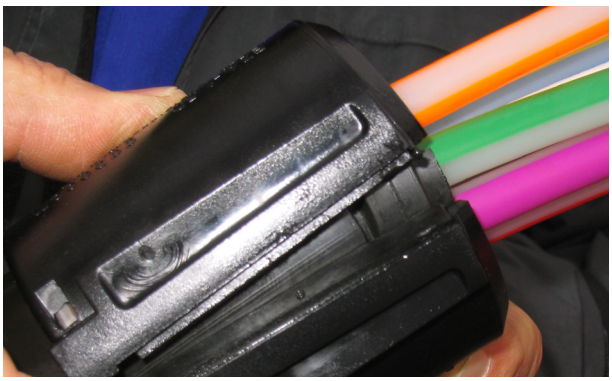


**2)** Put the inside stiffener (SHi 50) around speed•pipe®.

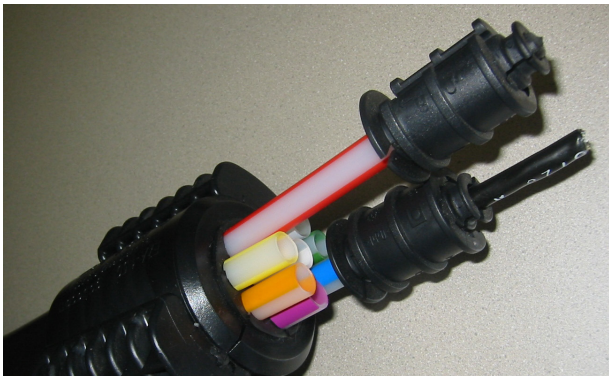
**3)** For shaping and stiffening purposes insert the SHi evenly into the jacket pipe.



**4)** Remove the eight sealing disc dummy plugs of the EZA-t 50 / 8 x 10 and put them around the speed•pipe®. Subsequently push them up to the jacket pipe (lubricants simplify the installation).



**5)** Put both housing shells around the jacket pipe and the sealing disc and then install the fixing clamps.



**6)** Installation of the EZA-t 10 on the speed•pipe® 10 x 1.0.

# Laying instructions.
## 6.6 Deflecting of drawn through SRV in the cable duct.

**Please note:**
After having fixed the SRV in the KKR 110, the bundle must be deflected in the manhole in a way that it doesn't obstruct further infeed and extracting works and that there is no risk of damage during these works.

Additionally, the speed•pipe® bundle must not be placed in the direct access area of the manhole. With regard to the blowing in lengths choose quite wide bending radii!

# Laying instructions.
## 6.7 Connecting the SRV in the cable duct.

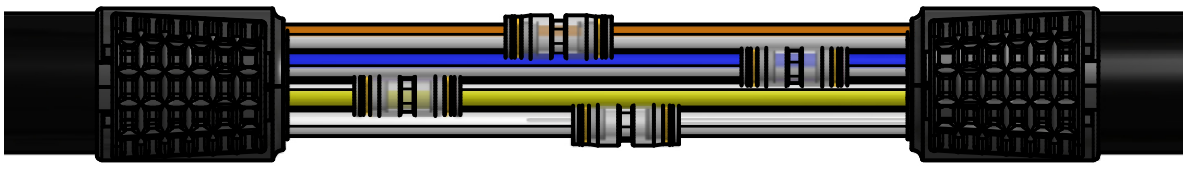
LAYING INSTRUCTIONS:

**1)** Cut both jacket pipes (together at least 1 m).

**2)** Seal both ends of the bundle with EZA-t 50 / 8 x 10.

**3)** Afterwards cut the single speed•pipe® each shifted for at least 120 mm. A straight, right-angled cut to the pipe axis is observed!

**4)** Connect the speed•pipe® of the same colour with DSM 10.



# Laying instructions.
## 6.8 Protection of the speed•pipe® at joints by using PPWR-t 50.

**Between the two sealing elements EZA-t 50 / 8 x 10 the speed•pipe® must be connected with a separated corrugated pipe PPWR-t 50. Thus the speed•pipe® are protected against direct mechanical damages.**

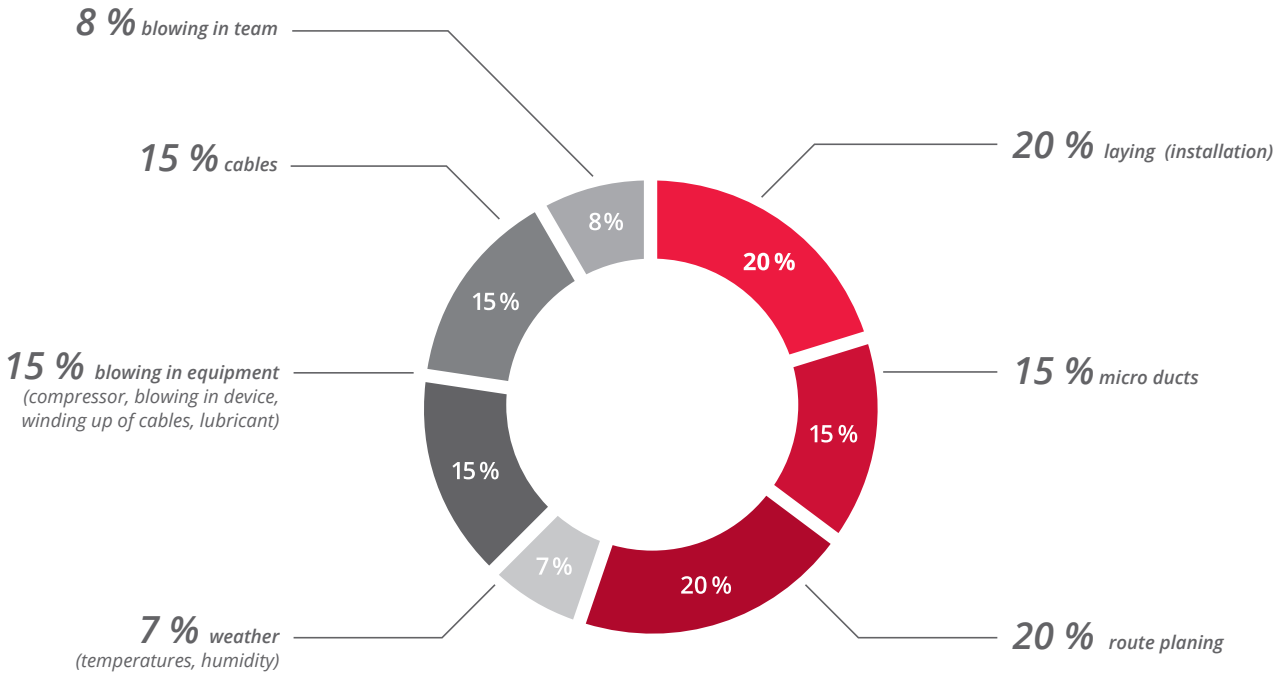
# Laying instructions.
## 7. Blowing in micro cables.

**For blowing in micro cables into the speed•pipe® that are integrated in the SRV we recommend a blowing in pressure up to 15 bar at speed•pipe®.**

Optimum blowing in values are reached at a temperature range from 5 to 20 °C. The cable to be blown in must not be exposed to direct solar radiation. It might also be helpful to use lubricants that are tested and recommended by specialist companies (e. g. Micro-Jettinglube, Vetter).

# Laying instructions.
## 7.1 Dependence of the blowing in lengths to be achieved on several factors.

The blowing in lengths to be achieved depend on several factors.



# Laying instructions.
## 7.2 Requirements for achieving optimum blowing in lengths.

### THE MICRO CABLE / MINI CABLE.

- The cable diameter should be within the specified diameter ranges (see table).

| speed•pipe® | min. cable diameter* | max. cable diameter* |
|---|---|---|
| 10 x 1.0 | 3.0 mm | 6.8 mm |

* Including tolerances

- The cable diameter has a significant influence on the blowing in length.
- The cable diameter should be uniform and should not vary for more than 0.3 mm.
- The cable sheath should be as smooth as possible.
- The surface of the micro cable should be dry and clean and should not exceed temperatures of more than 25 °C (ideal 15 °C).
- The micro cable ideally has been optimised to the gabocom speed•pipe® and has been certified on a test track.
- The cable shouldn’t have any axial run out.

# Laying instructions.
# 7.2 Requirements for achieving optimum blowing in lengths.

**BLOWING IN MICRO / MINI CABLE.**

- The coil of the micro cable must be easily rotable.
- Make sure the coil can be immediately rewound in case of an unexpected stop.
- Ensure cleanness of the micro cable.
- Only use an appropriate blowing in device (e. g. Vetter).
- Use a compressor with strong airflow, with max. pressure of 15 bar.
- Clean the speed•pipe® (inside) with a clean cylindrical sponge.
- The airflow out of the compressor must be clean, oil-free, dry and cooled down by using a re-cooler to approx. 8 °C – 10 °C over environmental temperature.
- The maximum blowing in speed should be limited to 80 m/min.
- Use appropriate lubricants.
- According to the common rules the permissible range of the blowing-in temperature amounts from -2 °C to +37 °C.
- The utilisation of a „Lubricator" for a permanent wetting of the micro cable with lubricants has a positive impact on the blowing in speed and blowing in length.
- Mount a cable conduct head on the top of the cable.

# Laying instructions.
# 7.2 Requirements for achieving optimum blowing in lengths.

**LUBRICANT.**

**For blowing in micro cables we recommend:**

- Micro-Jettinglube or Gliss Air 108.
- Pay attention to the correct dosing according to the manufacturer's data.
- Before blowing in the micro cable the lubricant must be spread in the speed•pipe® by means of a cylindrical sponge.

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## Contact.
## Personal. Competent.

**gabo Systemtechnik GmbH**
**a Member of HellermannTyton**
Am Schaidweg 7
94559 Niederwinkling
GERMANY

Tel. +49 9962 950-200
Fax +49 9962 950-202

**info@gabocom.com**
**www.gabocom.com**