

Always. Reliable. Tight.



## KES cable entry systems

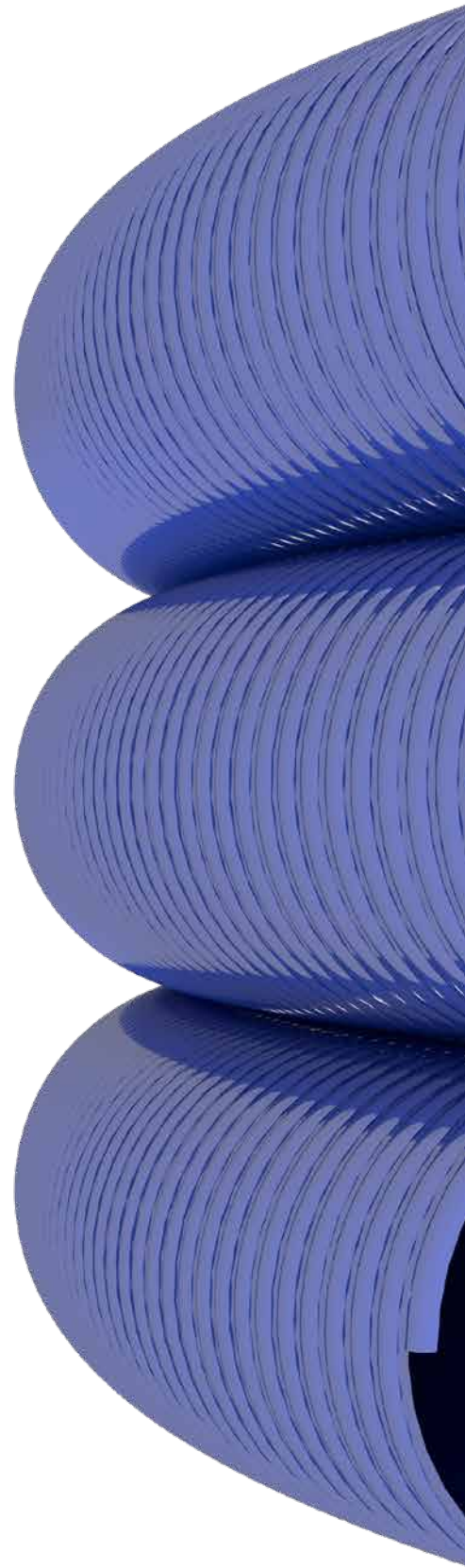
# KES cable entry systems

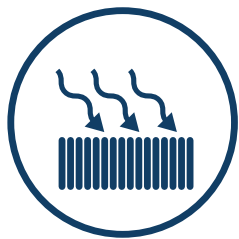
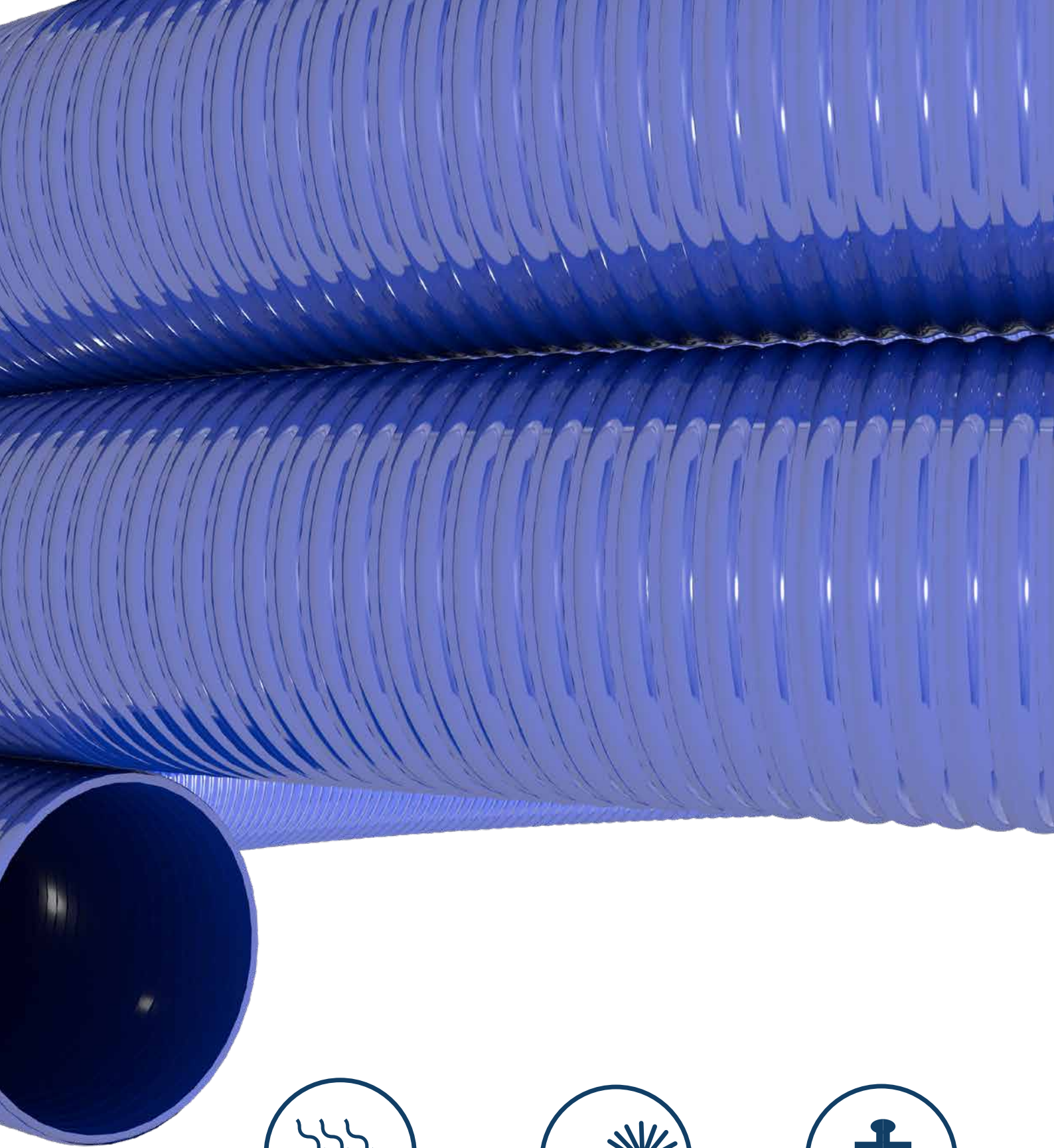
Over the course of its life, a building frequently undergoes renovation or refurbishment. In most cases, however, these activities only take place in the parts of the building located above ground level. Nonetheless, the requirements for the cable infrastructure in a building can also change significantly over time.

This is where it is recommended during construction of a building to provide for spare openings and lay a robust, durable empty conduit route via which lines can be replaced or new lines laid without having to dig up the entire conduit route every time.

For this purpose, Hauff-Technik offers the KES150 pressure-tight cable entry system, which is compatible with the Hateflex14150 and Hauff-Flex 150 spiral hoses, as well as various options for cable sealing. This system can be relied upon to provide optimum protection for the cables that are being laid.

The main areas of application for pressure-tight cable entry systems are building entries, substations, converter stations or cable shafts.





**Pressure tight**



**Flexibility**



**Stability**

# Empty conduit ducts with Hauff-Flex and Hateflex

## Features and benefits

The Hateflex and Hauff-Flex 150 plastic spiral hoses are developed and optimised for civil engineering applications. They are made of UV-stabilized soft PVC, reinforced with spiral of hard PVC. The smooth inside ensures easy and gentle cable feeding thanks to minimal frictional forces. The impact and break resistance of the materials used enables loading and transport tasks, even at low temperatures.

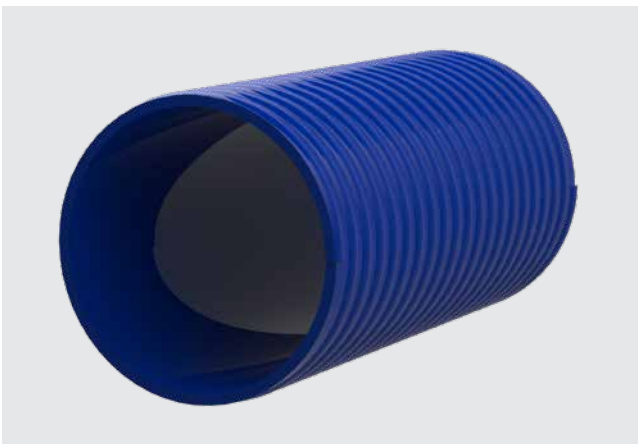
Thanks to their flexibility, Hateflex and Hauff-Flex 150 are simple and easy to install. They are available up to a length of 25 m and can be freely extended with the aid of connecting sleeves. At the end of the hose, transition and end sleeves enable cables laid to be sealed and combined with conventional cable ducts.

The Hateflex14150 is a flexible and very stable plastic spiral hose for use under heavy compression stress, **peak compressive strength 745 N**.

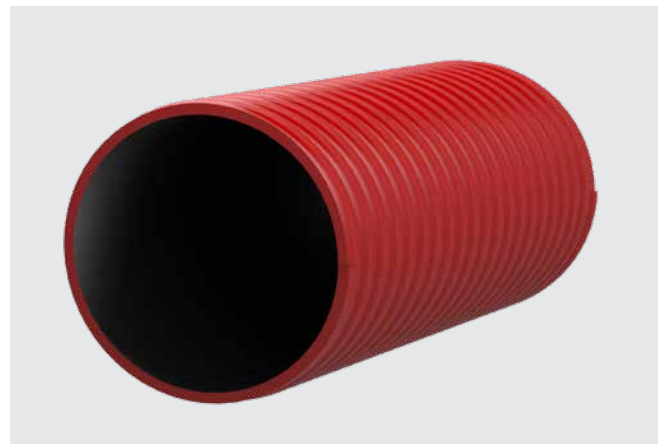
A pressure-tight cable entry system for up to **2.5 bar external pressure** can be created using the associated connection components.

The Hauff-Flex 150 is a very flexible and stable plastic spiral hose for use under normal compressive stress, **peak compressive strength 320 N**.

A pressure-tight cable entry system for up to **1.0 bar external pressure** can be created using the associated connection components.



Hateflex14150



Hauff-Flex 150

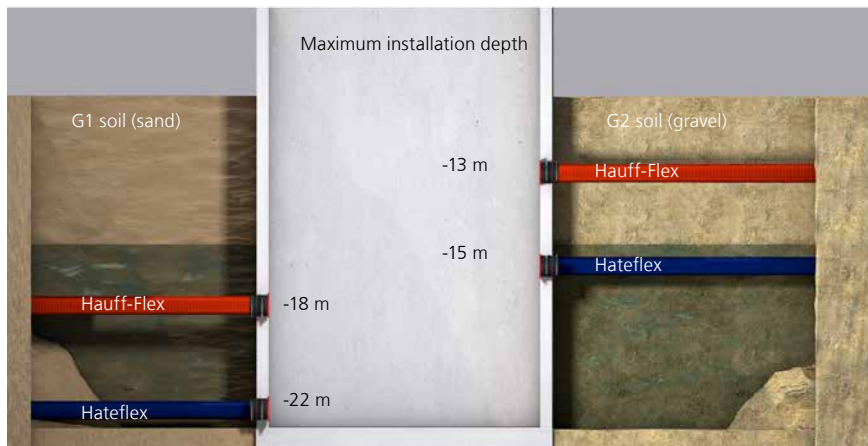
## Peak compressive strength according to DIN EN 61386-24

An important property of cable hoses is their mechanical load capacity. This is calculated and classified according to the pressure test described in DIN EN 61386-24. The test describes the maximum vertical force that needs to be exerted on the pipe apex for its inner diameter to be deformed by 5%.



Figure peak compressive strength

## Routing depth of cable ducts



Maximum routing depth of cable ducts

The installation depth of cable ducts is defined by the earth coverage above the pipe apex. It depends on the earth and traffic load and varies according to soil type G1 and G2.

The soil types are classified according to worksheet ATV-DVWK-A 127. G1 corresponds to non-cohesive soils, i.e. coarse sand or gravel. G2 corresponds to low-cohesive soils, incl. fine sands, in some cases silt.

## Heavy load traffic (heavy trucks)

Various road traffic loads are classified and used to determine static load capacity. Here, a distinction is made between LKW12 trucks (minimum load), SLW30 and SLW60 trucks. The last-mentioned truck represents a total load of 600 kN, around 60 t.

The Hateflex und Hauff-Flex cable hoses are suitable for SLW60 trucks from a minimum earth coverage of 0.5 m.



Minimum routing depth of cable ducts for heavy load traffic with SLW60 trucks

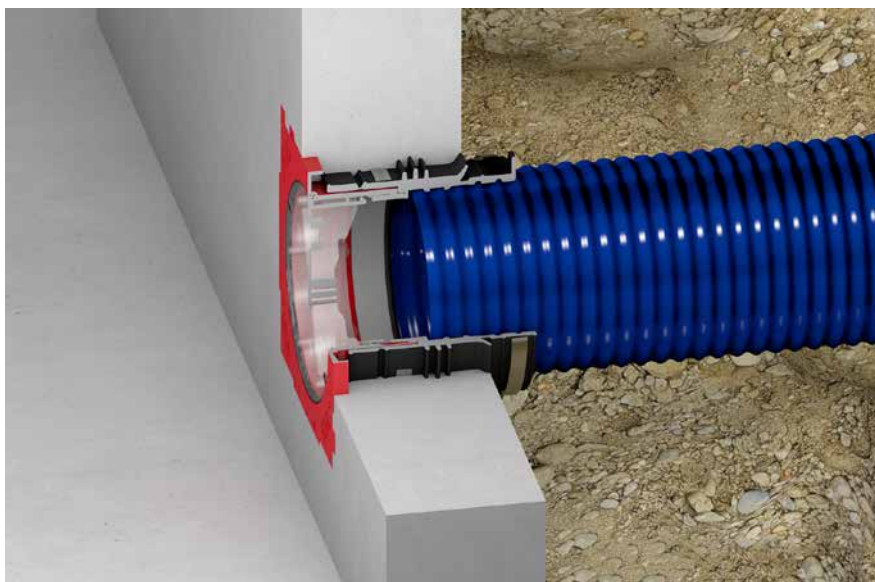
# Inserts for wall and floor slab

## Features and benefits

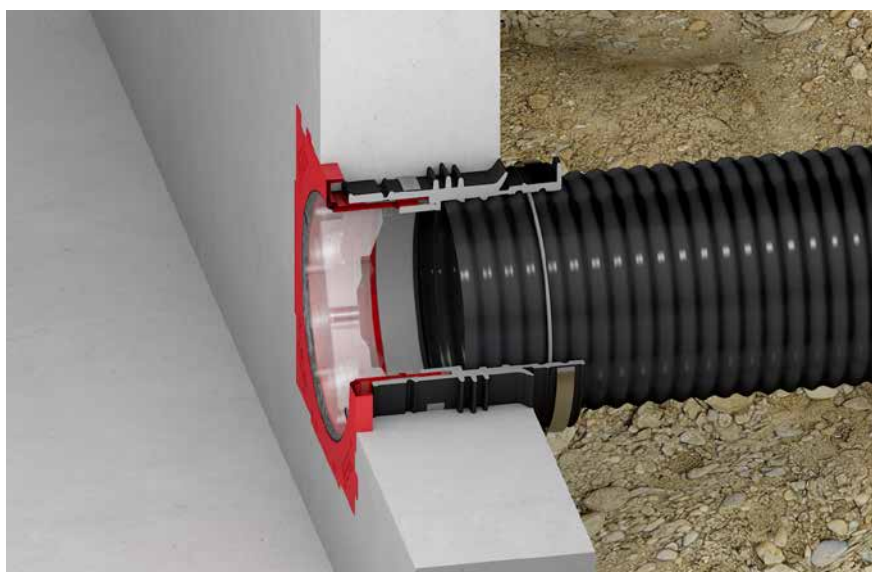
The inserts for cable entry systems impress above all through their simplicity. With the rubber plug-in and rubber folding method on the outside of the building, no additional pipe components are necessary, installation is performed attaching the empty conduits together without using any tool. Due to the defined insertion depth to the stop within the sleeve, a stable, elastic connection can be created within the concrete wall. Settlement of the soil or other forces acting on the empty conduits can therefore be compensated without difficulty. This is where the folding sleeve method offers an additional pull-out protection through an attached clamping strap.

On the inside of the building, a pressure-tight closing cover ensures gas-tightness and water-tightness, even after connecting empty conduits. During cable feeding, various system seals can be inserted here.

## Wall connection in new buildings



HSI150 KMA with connected Hateflex14150 cable duct



HSI150 KMA with connected corrugated pipe



## Single wall insert with plug-in socket

for setting in concrete and connecting smooth cable ducts

HSI150 GSM160

For connection on one side of system seals for cables (inside) and the connection of cable ducts (outside).



## Single wall insert with foldable rubber sleeve

for setting in concrete and connecting corrugated cable ducts

HSI150 KMA

For the direct connection of cable ducts and corrugated cable ducts (outside) and the connection of system seals for cables (inside).



## Single wall insert with foldable rubber sleeve

for setting in concrete and connecting corrugated cable ducts

HSI150 KMA WR

For the direct connection of corrugated cable ducts (outside) and the connection of system seals for cables (inside). The clip rings ensure dimensional stability of the corrugated pipe being connected.

Connection to the floor slab in new buildings



## Cement-coated wall sleeve

floor entry for Hateflex spiral hose

KES MA150 ZVR150

For the direct connection of cable ducts routed through the floor slab. The seal with the cables is created with a press seal.

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Wall connection for waterproof concrete tank in stock



## Connection kit for cable entry system with core drill holes/wall sleeve

for retrofit installation

KES150 MA KB SET

Pipe socket with sleeve for the direct connection of cable ducts to core drill holes or wall sleeves. The seal to the wall is established with two press seals.

Wall connection for black tank and fresh concrete composite systems in stock



## Polymer flange

for subsequent dowelling

HSI150 DFK

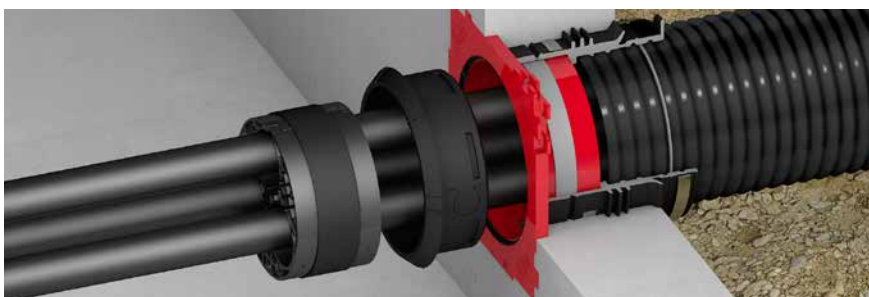
Polymer flange for retrofit dowelling via core drill holes. Used for the gastight and watertight connection of system seals for cables and cable ducts.



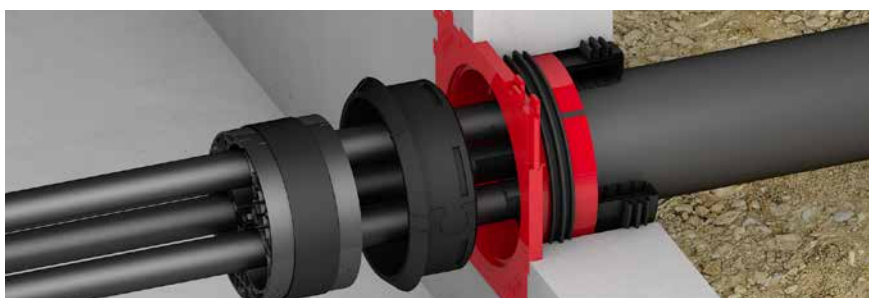
## Other combination options according to application

Hauff-Technik offers the optimal cable entry system for every requirement. The individual components, cable duct hose, insert, connection and end sleeves are perfectly matched so that power and data can flow securely. Depending on the load and application conditions, the components can be combined in various ways to form a system.

### Pressure tightness up to 0.5 bar



The HSI150 KMA WR can be used for connecting conventional corrugated pipes. With this cable entry system, the pressure-tightness depends on the corrugated pipe, but is generally up to 0.5 bar.



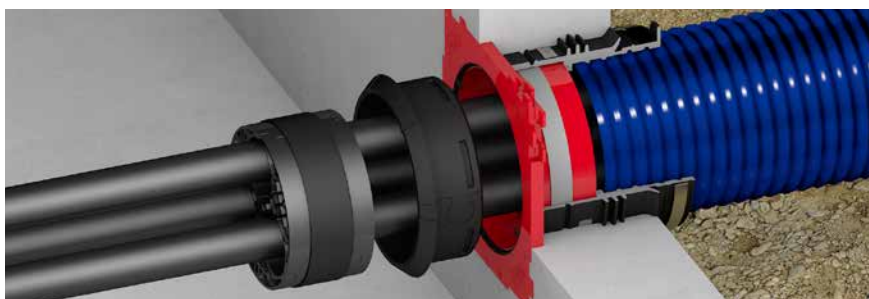
At a required pressure-tightness up to 0.5 bar, the HSI150 GSM can be used for the connection of smooth cable ducts. An HSI150 DG system cover is installed on the inside of the building for cable sealing.

### Pressure tightness up to 1 bar



At a required pressure-tightness up to 1 bar, the Hauff-Flex 150 cable duct hose can be used. Connection to the building is via HSI150 KMA. An HSI150 DG system cover is installed on the inside of the building for cable sealing.

### Pressure tightness up to 2.5 bar



For a cable entry system with a pressure-tightness up to 2.5 bar, use the Hateflex14150 cable duct hose. The connection to the building is via the HSI150 KMA, cable sealing on the inside of the building with an HSI150 DG system cover.

# Tips on installation

## Pipe trench and support

The dimensions prescribed by the specifications or structural calculation must be observed.

The depth of the trench is based on the height of the installed cable ducts (the pipe clearances are defined by the spacers, depending on the pipe diameter) and the pipe coverage to be achieved.

## Single row installation, filling and compression

1. The pipe trench should be excavated to the necessary depth; the trench bottom must be compressed in such a way that subsidence is ruled out.
2. The trench bottom should be levelled free of stones and kept free of foreign bodies. A sand bed of approx. 10 cm should be added.
3. The Hateflex hose system should be covered with 10 cm of sand and compressed by hand. The remaining pipe trench should be filled in 30-cm layers with stone-free fill material and compressed. The following clearances should be taken into account.

- Hateflex14150 – min. clearance of 40 mm
- Hauff-Flex 150 – min. clearance of 40 mm

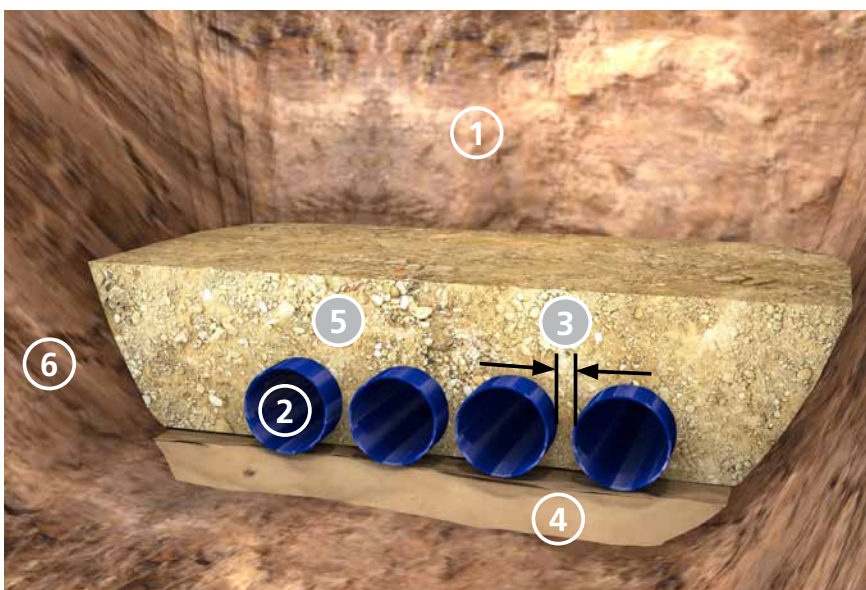
Finally, a warning tape should be set up.



*Excavated material deposited next to cable trenches may not be left to fall back in, nor may it endanger structural stability.*

*Pipe installation must be carried out according to the currently valid regulations.*

*While they are being compressed, the pipes may no longer be shifted to the side.*

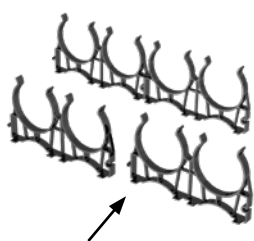


1. Duct trench
2. e.g. 4 x Hateflex14150
3. Clearance (C)
4. Trench bottom: stone-free or 10 cm compressed sand bed
5. Compression of Hateflex hoses with 10 cm coverage
6. Compressed soil

Single-layer Hateflex hose system

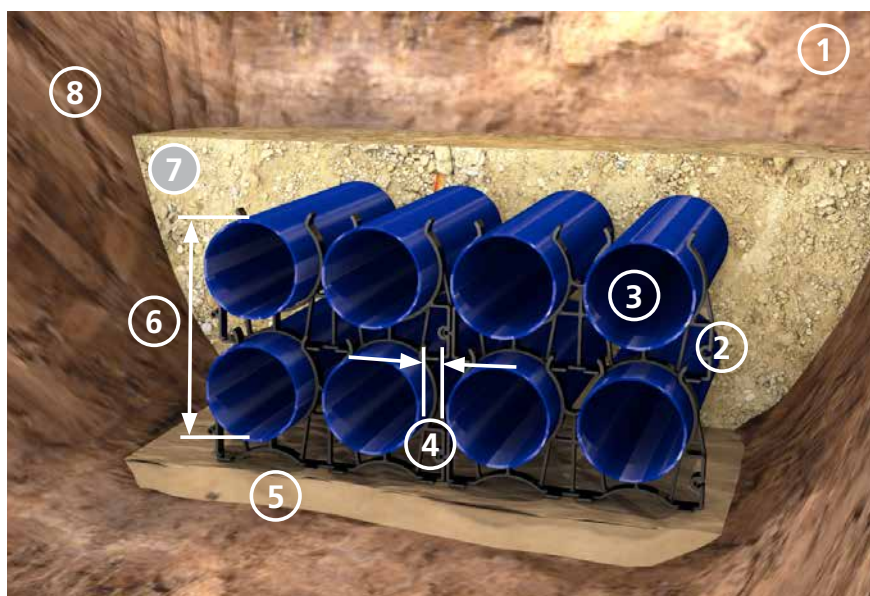
## Multiple row installation, filling and compression

- If more than two hoses are being installed, connect the spacers together. Slot the eyelet onto the pin for this purpose.



*If cable ducts are installed in multiple rows, the installation and fill work in the area of the cable ducts overlap. Refer to the following illustration for the work sequence. Skilled experts must be deployed in carrying out and monitoring the construction project.*

- In the first layer, place the spacers directly on the soil and clip in the hose.
- Fill up space between and next to the pipes and compress.
- In the case of multi-layer hose systems, the spacers are placed on the layer of hoses immediately below. The hoses can then be clipped in again (see graphic below).
- Proceed with additional layers in the same way as with the previous ones.



- Duct trench
- Spacer
- Cable duct
- Clearance (C)
- Trench bottom: stone-free or 10 cm compressed sand bed
- Height of pipe bundle
- 10 cm: upper limit of line zone according to DIN EN 1610
- Coverage

Multi-layer Hateflex hose system

## Notes on compression

In order to prevent damage to the pipes and the system seal inserts on the cable entries (HSI90 und HSI150), the fill material in the area of the cable entries should always be handled using light compression devices.



*The use of medium to heavy-duty pounding and vibrating devices is not permitted in the case of soil coverage of less than 1 metre in a compressed state!*

### The following regulations and guidelines must be observed:

- Guideline ZTVE-StB 94/97 (Additional technical terms of contract and guidelines for earthworks in road construction)
- DIN standards regarding the classification of soils

### The following factors determine the potential feed lengths:

- Cable (type/weight/flexibility)
- Route layout (height profile)
- Number/position/radiuses of curves/inaccuracies
- Friction coefficient (cable/pipe wall)
- Lubricant (type/quantity)
- Feed method and speed (also surface temperature)
- Ratio of internal pipe diameter to cable diameter
- Quality of the installation, e.g. pipe support/compression of embedding material = influence on pipe deformation/filling/compression of the bed around pipe bends/curves = important for absorbing mechanical loading when feeding in cables.

## Bending radiuses

The following minimum radiuses apply to Hateflex systems at an installation temperature of 20° C.

- Hateflex14150 – 900 mm
- Hauff-Flex 150 – 900 mm

## Transport, storage and disposal

When unloading and transporting packaging items, please proceed with care and observe the symbols on the packaging. Avoid throwing or dropping the pallets, pipes and accessory parts, or subjecting or allowing them to impact heavily against each other.

Inspect the delivery for completeness and transport damage immediately on receipt. In the event of transport damage being visible from the outside, proceed as follows. Do not accept the delivery or only do so subject to reservations. Make a note of the extent of damage in the transport documentation or delivery note provided by the transporter. Submit a claim for every defect as soon as it has been identified. Please note that claims for damages can only be asserted within the applicable claim period.

The plastic spiral hoses must be stored in such a way that they are not exposed to low temperatures (<5° C), high temperatures (>50° C) or direct sunlight. Protect the spiral hoses from damage, damp and soiling prior to installation. Only undamaged parts may be installed.


If no return or disposal agreement has been concluded, recycle dismantled components after they have been properly dismantled. Dispose of packaging material, plastics, elastomers and metals according to the applicable environmental regulations.

# Article and system overview



## Inserts

Figure	Article	Wall thickness/ length	Order reference	Article number	GTIN
	Single wall insert with foldable rubber sleeve	120	<b>HSI150 1X1 KMA172/120</b>	3030476250	-
		140	<b>HSI150 1x1 KMA172/140</b>	3030477593	-
		150	<b>HSI150 1X1 KMA172/150</b>	3030477595	-
		200	<b>HSI150 1X1 KMA172/200</b>	3030476251	-
		250	<b>HSI150 1X1 KMA172/250</b>	3030477597	-
		300	<b>HSI150 1X1 KMA172/300</b>	3030477598	-
		350	<b>HSI150 1X1 KMA172/350</b>	3030477599	-
		400	<b>HSI150 1X1 KMA172/400</b>	3030477600	-
		450	<b>HSI150 1X1 KMA172/450</b>	3030477601	-
		500	<b>HSI150 1X1 KMA172/500</b>	3030477602	-
	Single wall insert with plug-in socket	180	<b>HSI150 1x1 GSM160/180</b>	2120209180	-
		200	<b>HSI150 1x1 GSM160/200</b>	3030303292	-
		240	<b>HSI150 1x1 GSM160/240</b>	3030303417	-
		250	<b>HSI150 1x1 GSM160/250</b>	3030303419	-
		300	<b>HSI150 1x1 GSM160/300</b>	3030303421	-
		365	<b>HSI150 1x1 GSM160/365</b>	3030303423	-
		400	<b>HSI150 1x1 GSM160/400</b>	3030303425	-
		500	<b>HSI150 1x1 GSM160/500</b>	3030303427	-
	Cement-coated wall sleeve	500	<b>KES MA150 ZVR150/500</b>	2125502000	4052487139991



## Connection components

Figure	Article	Wall thickness/ length	Order reference	Article number	GTIN
	Connection kit for cable entry systems with core drill hole/wall sleeve	500	<b>KES150 MA KB SET</b>	2125818500	4052487140409




## Cable duct hose

Figure	Article	Length	Order reference	Article number	GTIN
	Plastic spiral conduit hose for cable entry system	2	<b>Hateflex14150/2000B</b>	3030366925	4052487233163
		3	<b>Hateflex14150/3000B</b>	3030366901	4052487233118
		4	<b>Hateflex14150/4000B</b>	3030366902	4052487233101
		5	<b>Hateflex14150/5000B</b>	3030366904	4052487233095
		6	<b>Hateflex14150/6000B</b>	3030366909	4052487233057
		8	<b>Hateflex14150/8000B</b>	3030366912	4052487233033
		10	<b>Hateflex14150/10000B</b>	3030366915	4052487233231
		12	<b>Hateflex14150/12000B</b>	3030366918	4052487233217
		15	<b>Hateflex14150/15000B</b>	3030366921	4052487233194
		18	<b>Hateflex14150/18000B</b>	3030366923	4052487233187
		20	<b>Hateflex14150/20000B</b>	3030366924	4052487233170
		25	<b>Hateflex14150/25000B</b>	3030366893	4052487232869
			Plastic spiral conduit hose for cable entry system	15	<b>Hauff-Flex150/15000R</b>
20	<b>Hauff-Flex150/20000R</b>			3030369865	4052487234375
25	<b>Hauff-Flex150/25000R</b>			3030369867	4052487234368

## Connection and end components

Figure	Article	Area of application, cable OD (mm)	Order reference	Article number	GTIN
	Sealing kit, interchangeable insert	48 - 83	<b>KES150 MA WE160 SG 1x48-83 SET</b>	2125817103	4052487164764
		22 - 58	<b>KES150 MA WE160 SG 3x22-58 SET</b>	2125817102	4052487164757
		8 - 36	<b>KES150 MA WE160 SG 6x8-36 SET</b>	2125817101	4052487164740
	Connection sleeve for extending the spiral hose	-	<b>KES150 MA150-172/150-172</b>	2128020000	4052487058407

## Accessories

Figure	Article	Order reference	Article number	GTIN
	Spacer 1x2 for attaching and positioning hose packages with Hateflex14150 (can be combined using a simple plug-in system)	<b>KES150 1x2 AH PP</b>	3030361164	4052487233347
	Spacer set (2 x) to enlarge the axial spacing of the wall inserts to 250 mm. Enables block assembly of HSI150 and HSI90	<b>HSI AH40 SET2</b>	3030300093	4052487220156
	Flexible head spanner (G), for walls with thermal insulation up to 100 mm (GD)	<b>SLS 6G</b>	5200010040	4052487233491
		<b>SLS 6GD</b>	5200010041	4052487233484

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