

1. Product Name

FUKO Injection Hose

2. Manufacturer

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3. Product Description

FUKO is a yellow, flexible PVC hose, available in two sizes. The hose has a solid core and lateral openings covered by neoprene strips, all banded by an open webbed nylon mesh.

Basic Use: The FUKO Injection Hose is designed for use in any concrete structure that contains joints with or without hydrostatic pressure on one or both faces of the structure. Its use prevents water movement through concrete joints in reservoirs, locks, canals, dams, sewage treatment plants, bridges, stadiums, basements, floor slabs, parking garages, underpinnings, tunnels, subways, water tanks and similar structures.

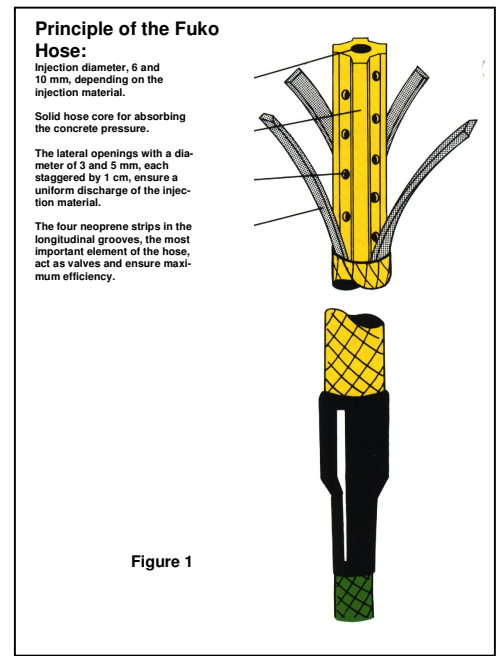
Composition and Materials:

The FUKO Injection Hose consists of a specially formulated polyvinyl chloride (PVC) compound. The material is tough, flexible, resilient, chemically inert and is not affected by weather, low temperatures or constant immersion in water. It will withstand rough treatment during installation. The FUKO Hose is easy to install and splice. It is not affected by concrete additives and most water solutions of organic chemicals.

Sizes: Available in two basic sizes. (See Table 1)

- FUKO Type 1 – Outside diameter 3/4" (19mm), longitudinal internal injection hole diameter 1/4" (6mm), discharge openings diameter 1/8" (3mm). Use FUKO Type 1 on concrete joints where Duroseal Inject, resins or ultrafine cement is to be injected.

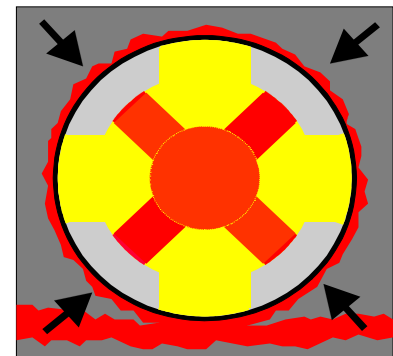
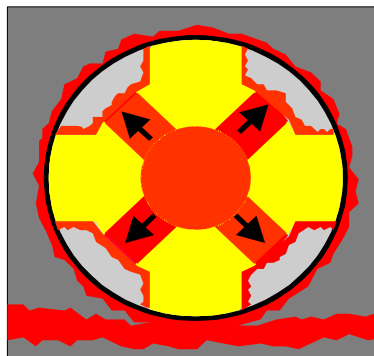
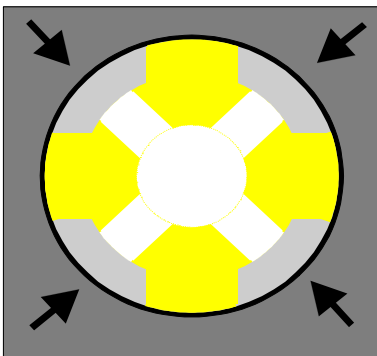
- FUKO Type 2 – Outside diameter 15/16" (24mm), longitudinal internal hole diameter 3/8" (10mm), discharge openings diameter 3/16" (5mm). Use FUKO Type 2 in concrete joints, tunnels, underpinning, top-down construction or voids where Portland cement or large quantities of other fine cements or injection materials are expected to be used.



Color: Canary yellow.

Principle Function: The FUKO Hose, both Type 1 and 2, has a solid core to absorb concrete pressure. The hose has small diameter lateral openings along each side, at staggered intervals (Figure 1) to ensure a uniform discharge of injection material. A cross-section of the hose reveals four grooves in which the lateral openings are situated (Figure 2). Neoprene strips are located in each of the four grooves and act as one-way valves during injection (Figure 3). This design ensures that injection material passes out, but nothing can return (Figure 4).

Figures 2, 3, & 4



The mode of action is simple. External concrete pressure closes the discharge openings. Internal injection pressure compresses the neoprene strips and enables the injection material to discharge into the joint freely.

4. Technical Data

FUKO Injection Hose is unaffected by alkalis, sewage, most water solutions of organic chemicals, hydrocarbons (fuels), mineral oils, acids and alcohol.

5. Installation

Preparation: All **FUKO** Hoses should be protected from oil, dirt, concrete spatter and damage and should be left clean to receive the concrete. The surface into which the **FUKO** Injection Hose is to be installed should preferably be even. The surface generated by an internal vibrator while compacting the concrete will be suitable. No additional handwork to smooth the surface is necessary.

Tools Required for Installation: Knife to cut **FUKO** Hose into lengths. Hot-air appliance (heat gun). Electric drill and appropriate drill bits 1/4" (6mm). Hammer.

Accessories: Reinforced PVC vent ends (transparent and colored). Plastic connecting nozzles. Rapid glue. Black shrink-on sleeves. Insulating tape. Closure plugs. **FUKO** Hose Anchor Clips and **FUKO** Injection Packer with coupling.

Installation Procedures: The **FUKO** Injection Hose is to be installed in maximum lengths of 40' (12m), any length less should be used as field conditions require. For normal wall thickness of 8-16", the injection hose should be installed in the center of the wall (Figure 5). In thick walls, the installation of two hoses is possible. The same

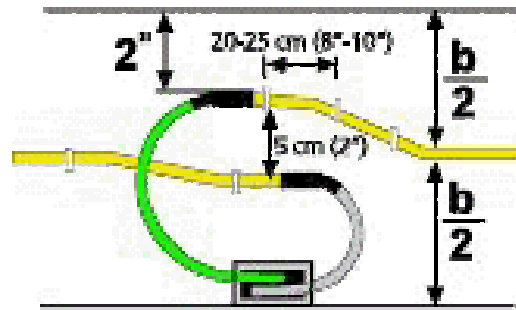


Figure 5

dimensions also apply to seal off foundation slabs with vertical joints.

The hose is clamped into position with **FUKO** Anchor Clips spaced approximately 6-10" (15-25cm) apart (Figures 5 and 6). Drill a 1/4" (6mm) hole into the substrate. The **FUKO** Anchor Clip is then pressed into place or hammered lightly until a snug connection is made.

It is essential that there is direct contact between the **FUKO** Hose and the concrete (Figure 6).

This will prevent floating of the hose in freshly poured concrete, and will ensure that the injection material will reach the concrete joint and not the sound concrete of the wall. The concrete surface must be cleaned of stones and debris prior to installation of injection hose.

THE FUKO INJECTION HOSE MUST NOT BE FASTENED TO THE REINFORCEMENT BARS IN THE CONSTRUCTION, AS THIS WILL PREVENT PROPER PRESSURIZATION DURING INJECTION AND LACK OF COVERAGE BY THE INJECTED MATERIAL THROUGHOUT THE JOINT AREA. DO NOT CRISS-CROSS ANY YELLOW FUKO INJECTION HOSES. ALWAYS USE THE PVC VENT ENDS FOR CROSSING

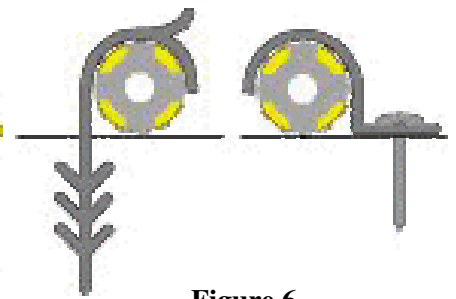


Figure 6

OVER THE YELLOW FUKO HOSE.

Visible honeycombs at the surface should be patched directly after dismantling formwork to avoid loss of injection materials during the injection operation. After pouring concrete, only the PVC vent ends are visible. The different colored vent ends are made to be easily located and distinguished after the concrete has been poured. The injection hose and vent ends must be encased in at least 3-4" (8-10cm) of concrete.

Tools Required for Injection: Based on selection of sealing material, alternate tools are required.

- One-component pump or
- Two-component pump.
- Pump accessories and attachments.
- Electric drill with mixing attachment.
- Diaphragm/vacuum pump (alternative).

Contact BBZ or its Area Representative for recommendation of sealing material and required equipment for proper injection.

Injection of Sealing Materials: The waiting period between pouring concrete and injecting the **FUKO** Hose is determined by the curing time of the concrete, normally 28 days. If

this is not possible, contact the Manufacturer (BBZ).

Injection Procedures: Injection starts at one end of the hose and follows these steps: Remove the closure plugs from both the injection end and the opposite vent end. Close the chosen injection end with a flat-headed or conical (zerk) **FUKO** Injection Packer nipple/packer combination to suit the injection pump nozzle. Fill the hose with injection material with an injection pump until the material flows out the other end. Close that other end with another **FUKO** Injection Packer and resume pumping. Injection pressure should be between 75-150 psi (5-10 bar). From the moment that no further material flows into the joint, gradually increase the pressure at the pressure adjusting unit until the necessary pressure is reached (generally about 500-600 psi delivery pressure) (35-40 bar). Maintain pressure for approximately 3-5 minutes up to 600 psi (40 bar). This is essential to allow the injection material to thoroughly penetrate the joint.

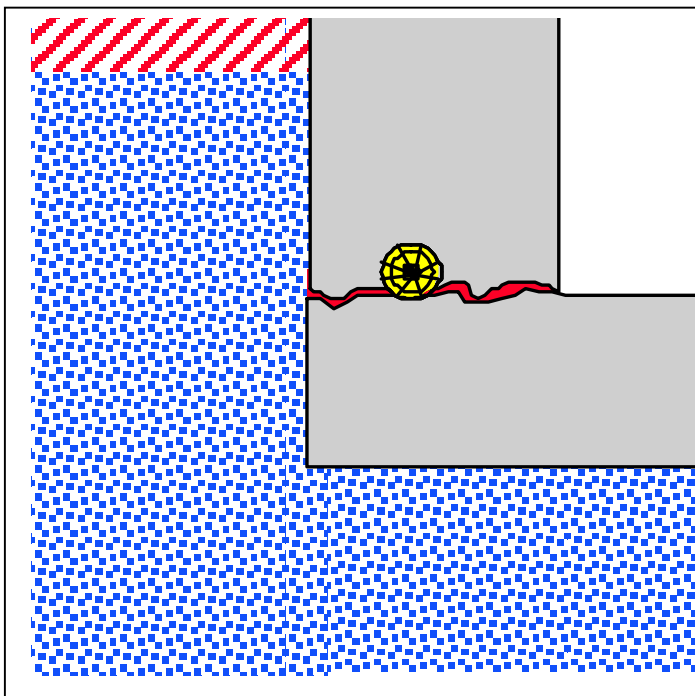
Important: To seal the joint, apply moderate pressure for a

long injection time, rather than exerting a high pressure for a short injection time. Once a maximum pressure of 600 psi (40 bar) is held for approximately 5 minutes, re-inject the specified injection material into the injection hose from the opposite vent end within the gel time of the injection material. This is to ensure that an even pressure distribution is guaranteed over the entire length of the joint. During the gel time, or setting time, pressurize the **FUKO** Hose again for a moment. If the injection material penetrates the wall surface, this should be patched with rapid cement. Remove the **FUKO** Injection Packers. Close the vent ends with closure plugs. Follow this procedure for all injection materials.

For Multiple Use: If it is anticipated that there may be a future maintenance program required (due to settlement or other movement, for example), or if a leak test is required, then the following procedure must be followed prior to curing of the injected material. This can only be accomplished if **Duroseal Inject** and/or cement is used.

Disconnect the **FUKO** Injection Packers. Connect a vacuum pump to either PVC vent end. Place the other vent end into a bucket filled with water. During the vacuum process the **Duroseal Inject** or cement grout will be removed from the **FUKO** Hose, the valves will be closed and the hose will be directly flushed with water (see Figure 4). When the water flow is clear on the vacuum side, disconnect the water supply (take the vent end out of the water bucket). Disconnect the vacuum pump and close the injection end and the remaining vent end with the closure plugs. This procedure allows the re-injection of the **FUKO** Hose at any time, if required.

Types of Injection Materials: In most cases, the Manufacturer (BBZ) recommends **Duroseal Inject 1K/2K** for watertight or environmental concerns, and Microcement grout for structural requirements. Polyurethane and epoxy resins can also be used in **FUKO** Type 1. All of the aforementioned products, plus Portland cement, including additives, can be used in **FUKO** Type 2.



Advantages:

1. Simplifies procedures, as no concrete kerbs or keyways are needed. Once the base concrete has set, the injection hoses is installed; concrete may then be poured atop the hose.
2. No time-consuming fixing of waterstop, and no additional formwork in the area of the joints, thus, reducing wage and material costs.
3. Defects caused by poor concrete compaction, e.g., cracks emanating from the connecting area of floor/wall joint are also injected.
4. The joint can be tested for leakage by injecting water through the hose.
5. FUKO can also be installed wherever the use of waterstop is not possible for structural reasons.

6. Availability and Cost

Availability: FUKO Types 1 and 2 and Duroseal Injection materials and related products are available throughout the United States, Canada and internationally. Contact Manufacturer (BBZ) or an Area Representative for information and the licensed applicator in your area.

Cost: Costs may vary with the specific job and method of application. Specific job cost can be obtained from BBZ, an Approved Applicator or Product Representative.

7. Warranty

BBZ AG and BBZ GmbH warrant that the products manufactured by them shall be free from material defects. The obligation of BBZ AG and BBZ

GmbH under this warranty, should any of the products prove defective, shall be limited to replacement of the defective product. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSES. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

Limitations of Liability: The Manufacturer and BBZ in no event, whether claim is based on warranties, contract negligence or otherwise, are liable for incidental or consequential damages.

8. Maintenance

None required.

9. Technical Services

Engineering services are available through BBZ. Trained Representatives are established in principal cities and markets throughout the continental United States, Canada and internationally. Any technical advice furnished by the manufacturer or any representative of the manufacturer concerning the use or application of the FUKO Hose or related materials is believed to be reliable, but the manufacturer and BBZ make no warranty, express or implied, of any use or application for which such advice is furnished.

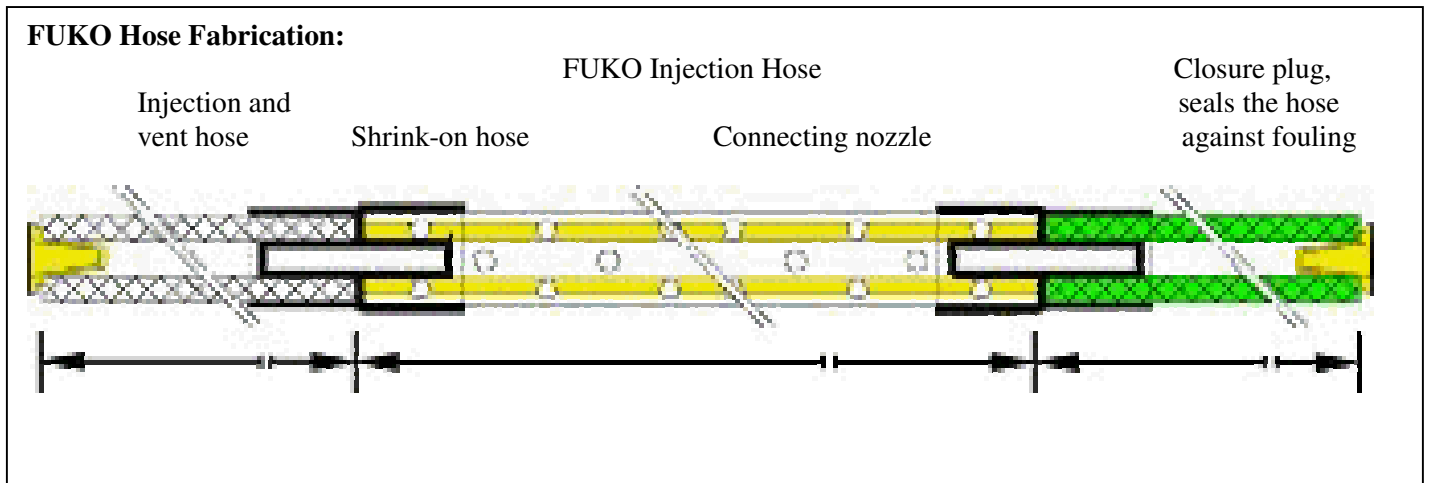


Table 1

Hose Dimensions:				
	Internal Diameter	External Diameter	Injection Openings	Hole Spacing
FUKO 1	6 mm	19 mm	3 mm	20 mm
FUKO 2	10 mm	24 mm	5 mm	25 mm