

Tuchenhagen

Product Recovery Systems



Tuchenhagen Product Recovery Systems Structure

Advantages using Product Recovery Systems

Preconditions for pigging

Features of the Product Recovery Systems

Sizes

Range of Applications

Pig

Pig Cleaning Station

Pig Catching Station

Pig Stopper

Functional Descriptions

- Product Recovery System Type EMI/1

- Product Recovery System Type EMII/1

- Product Recovery System Type DM/1

Manual Product Recovery Systems

Semi-automatic Product Recovery Systems

Pigable VARIVENT[®] - Mixproof Valve Type L

Questionnaire

Advantages of using Product Recovery Systems

Reduction of



- Product losses
- Waste water load
- Disposal of product residues
- Cleaning times
- Production down times
- Water consumptions
- Detergent consumptions

⇒ **COST SAVING**

Preconditions for pigging

- Fluid products suitable for pumping
- Same inside diameter all over the pipe system
- Pipes and bends with circular cross sections
- Flat and smooth welds inside the pipe
- Connection fittings suitable for pigging with rounded transitions on the inside

Features of the Tuchenhagen Product Recovery Systems

- Recovery of valuable products
- Automated process and thus fully verifiable
- Safe operation due to matrix piped closed systems – no removal of the pig for operational purposes required
- Permanent product exchange when the product streams around the pig in the pig station – no dead corners
- Fully CIP-/SIP-able
full integration into CIP-/SIP operations
- Optional use in Ex-hazard areas
- Temperature resistant up to 130 °C
- Pressure resistant up to 10 bar
- Product contacted parts made of 1.4404/1.4571
- Pipe connections with VARIVENT[®] flange connections
- Product contacted seals made of EPDM, FKM or HNBR
- Pigs made of Silicone or FKM

Sizes

Sizes	Pipe inside diameter
DN 25	26,0 mm
DN 40	38,0 mm
DN 50	50,0 mm
DN 65	66,0 mm
DN 80	81,0 mm
DN 100	100,0 mm
1" OD	22,2 mm
1 ½" OD	34,9 mm
2" OD	47,6 mm
2 ½" OD	60,3 mm
3" OD	73,0 mm
4" OD	97,6 mm

Range of Applications

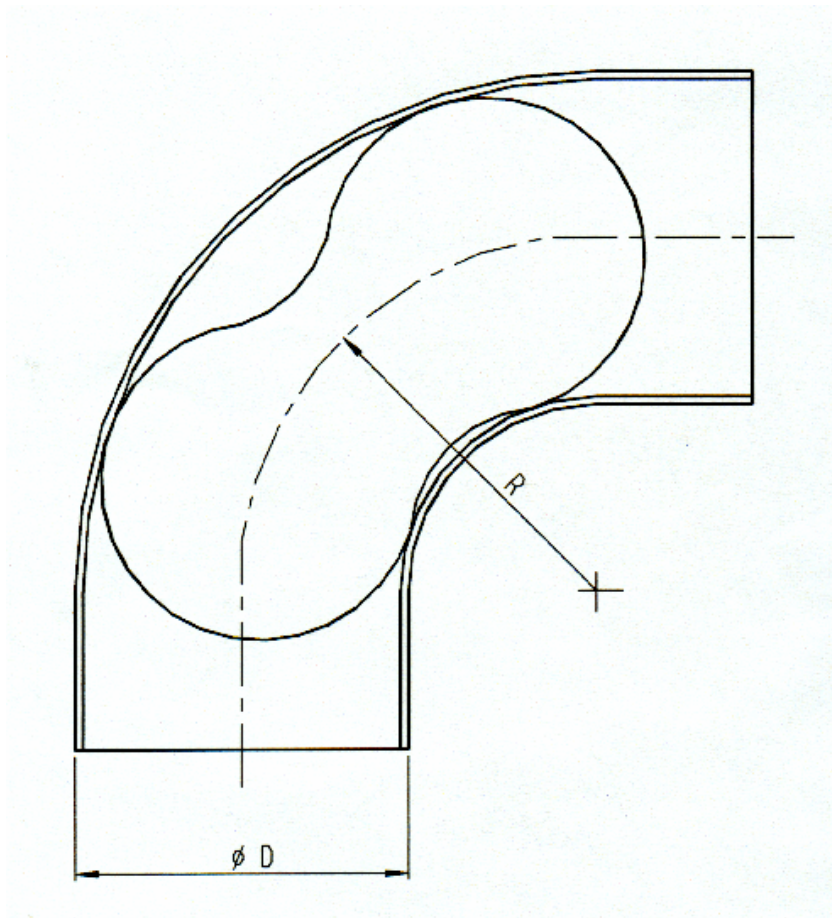
- **Cosmetic and Chemical Industries**
 - Shampoo, lotion, cream
 - Tooth paste
 - Cleaning agents, detergents, softeners
- **Food Industry**
 - Yoghurt, quark, cheese
 - Fruit, juice
 - Pastry, vegetable oil
 - Sauces, ice cream
- **Beverage Industry**
 - Concentrates
 - Syrup

Features of the Pig

- Double-ball shaped pig that ensures an optimal adaption to pipes and pipe bends
- Suitable for passing standard bends of smallest centre radius
- Pig materials made of Silicone or FKM; FDA conform
- Temperature resistant up to 130 °C
- Pig detection from the outside of the pipe via magnet-inductive proximity switches



Pig in a bend

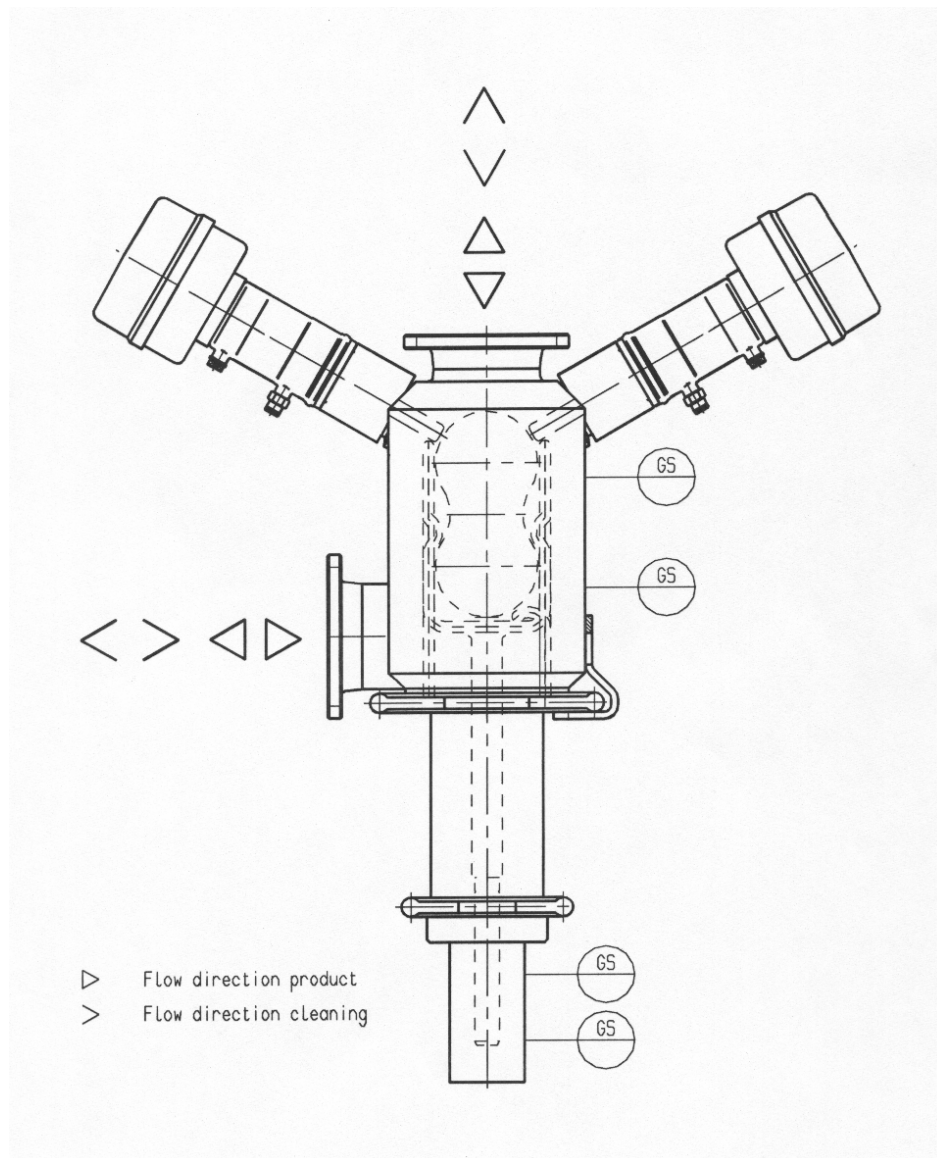


D Outside Diameter
R Centre Radius

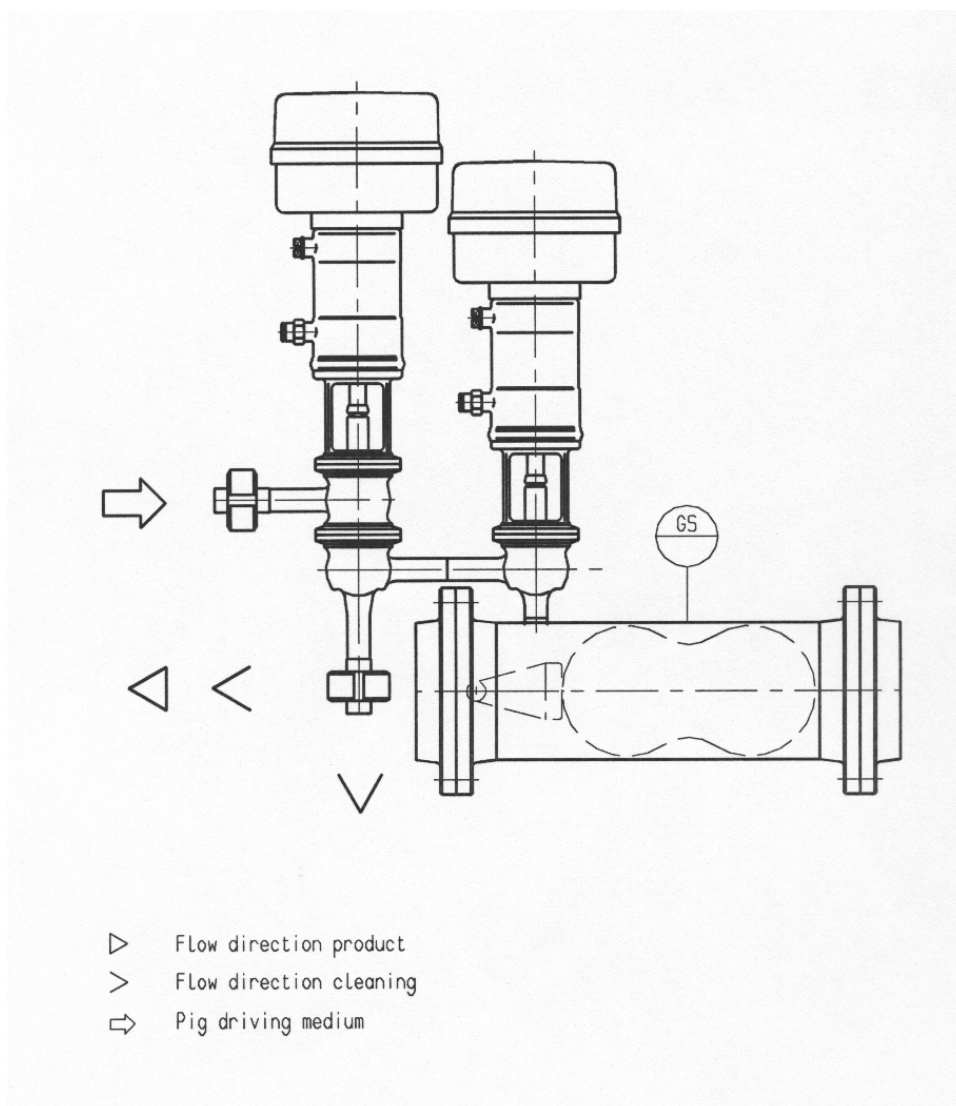
Features of the Pig Cleaning Station

- Product transfer through the pig station – with or without the pig positioned in the station
- Permanent product exchange when the product floods the pig in the pig station – no dead corners
- During production and cleaning, streaming through the pig station in both directions possible
- Low pressure drop due to identical flow cross sections in the pipe and around the pig in the pig station
- Permanent monitoring of the pig positions from the outside via magnet-inductive proximity switches
- Pocked-free design – fully CIP-/SIP-able up to 130 °C
- Easy integration of the pig station into the pipe system
- Easy and safe removal and re-installation of the pig
- Flexible use of the pig station as launching and/or receiving station

Pig Cleaning Station



Pig Catching Station



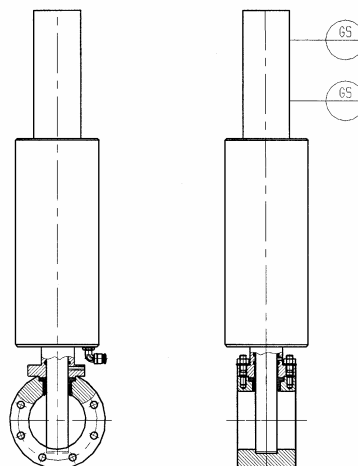
Pig stopper

Function

- Positioning of pigs before or behind T-outlets in pipe systems
- Retention of the pig in the launching station (PRSystem EMII/1)

Features

- Stopper stem passes through the entire pipe cross section
- Resting position spring-to-close \Rightarrow pig path closed
- Pneumatically actuated position \Rightarrow pig path free
- Installation between VARIVENT[®] flanges with groove



Functional Description

Product Recovery System Type EMI/1

On production end, the product left in the pipe is automatically pushed out with a pig towards the receiving station. Then the pig returns automatically to the launching station.

The pigging program can be controlled and operated either by an existing control system or by an independent local control unit. The communication between both control systems can be realized via a bus system or via potential free coupling relays.

Production

During production the pig is firmly held in position in the launching station. The valves of the pigging system are in the non-actuated operating mode. The product enters the system at interface A, floods the pig and leaves the system at the receiving station towards F.

Product push-out

For pushing-out of the residual product with the pig the system interface A must be closed.

The pig is pushing the product through the catching pipe of the receiving station towards F. After the pig has reached the receiving station, the system interface F is additionally closed and the pig is pushed back into the launching station.

CIP

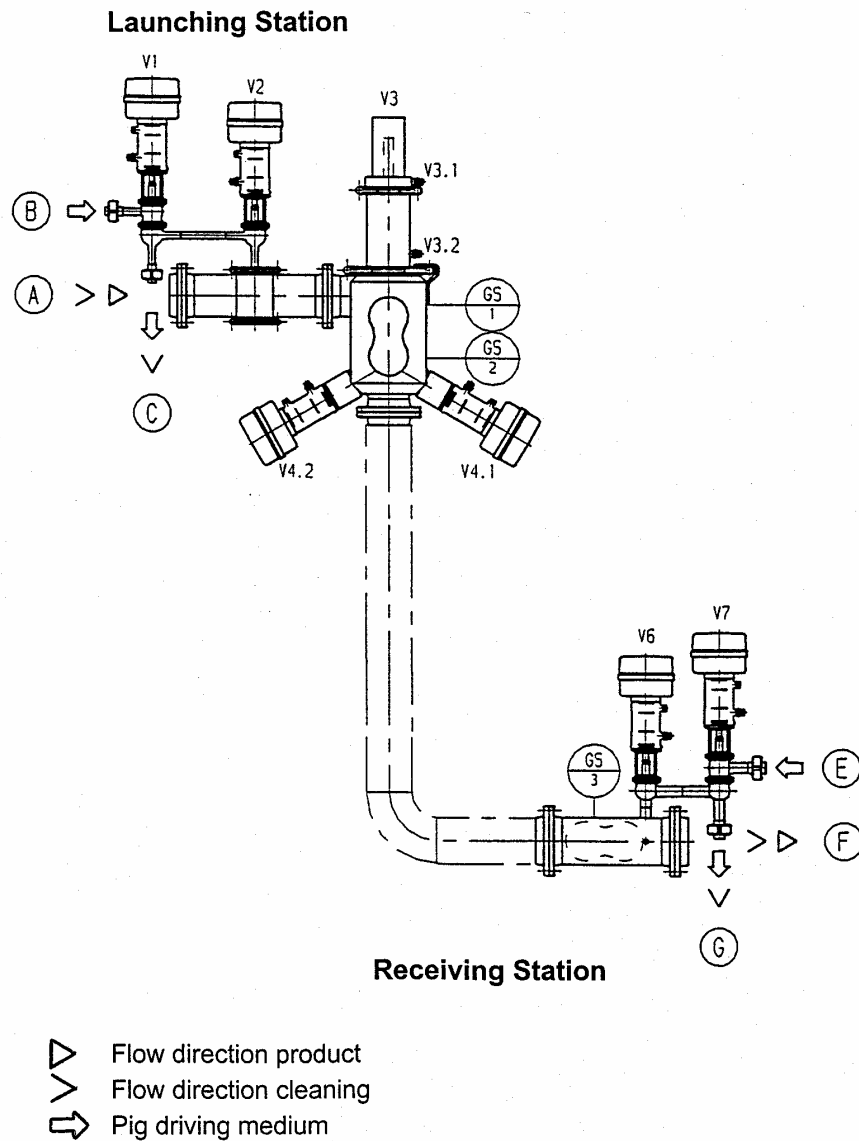
Cleaning of the pig launching and the pig receiving station is integrated into the pipe cleaning program.

The pig is firmly held in position in launching station. Cleaning solutions are supplied via the system interface A. The pipes are cleaned in direction C, F and G. The pig is cleaned together with the flooding of the launching station.

Sterilisation by steam

Steam can enter the system either via interface A or F. The pig is firmly held in position in the launching station.

Product Recovery System EMI/1



Functional Description

Product Recovery System Type EMII/1

On production end, the product left in the pipe is automatically pushed out with a pig towards the receiving station. The pig leaves in the receiving station for cleaning. After cleaning the system, the pig returns automatically to the launching station.

The pigging program can be controlled and operated either by an existing control system or by an independent local control unit. The communication between both control systems can be realized via a bus system or via potential free coupling relays.

Production

During production the pig is firmly held in position in the launching station. If vacuum builds up in the product pipe, the pig stopper is preventing the pig from sliding out of the launching station. The valves of the pigging system are in the non-actuated operating mode. The product enters the system at interface D and leaves the system at the receiving station towards F.

Pigging

For the pushing-out of residual products with the pig the system interface A and D must be closed.

The pig is pushing the product through the receiving station towards F. After product push-out the pig remains in the receiving station for subsequent system cleaning.

CIP

The cleaning steps for the pig launching and receiving stations must be integrated into the pipe cleaning program.

The pig is positioned in launching station. Cleaning solutions are supplied via the system interfaces A and D. The pipes are cleaned in direction C, F and G.

The pig is cleaned together with the flooding of the receiving station.

Water flush-out

After cleaning, the pig is pushed back to the launching station. For this purpose the system interfaces A, D and F must be closed. The water left in the pipe from the last cleaning step is flushed out through the launching station towards direction C.

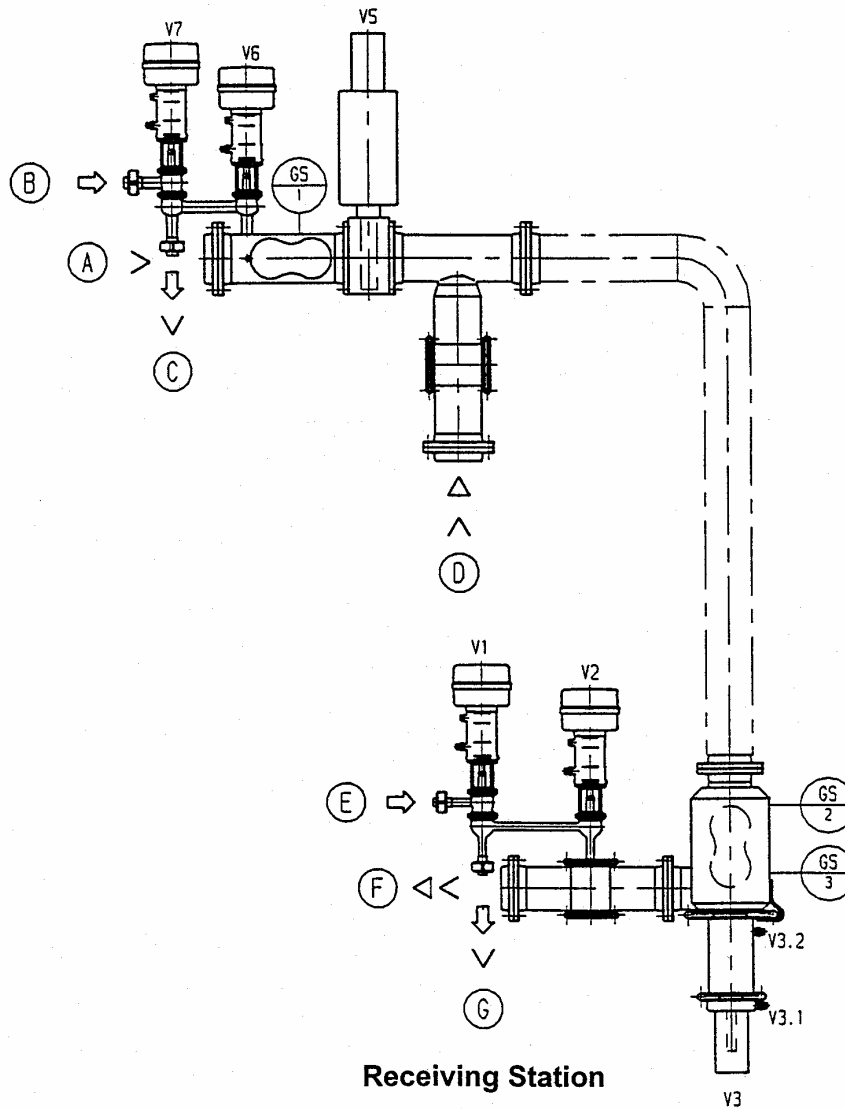
Sterilisation by Steam

Steam can enter the system either via interface D or F.

The pig is firmly held in position in the launching station

Product Recovery System EMII/1

Launching Station



- ▷ Flow direction product
- > Flow direction cleaning
- ⇒ Pig driving medium

Functional Description

Product Recovery System Type DM/1

One pig each is positioned in the two pigging stations. This ensures that at production end the product can be pushed out in two directions on choice. After product push-out, the active pig returns automatically in its pigging station.

The pigging program can be controlled and operated either by an existing control system or by an independent local control unit. The communication between both control systems can be realized via a bus system or via potential free coupling relays.

Production

During production the pigs are firmly held in position in their stations.

The valves of the pigging system are in the non-actuated operating mode. The product enters the system at interface A, floods the pigs in their stations and leaves the system at the launching/receiving station S2 towards F.

Pigging in production direction

For pushing out residual product with pig S1 towards the station S2, the system interface A must be closed.

The pig is pushing the product through the launching/receiving station S2 towards F. As soon as pig S1 is pushed against pig S2, the system interface F is additionally closed and pig S1 is pushed back to its station.

Pigging against the production direction

Pushing out residual product with pig S2 against the production direction is analogous to the push-out with pig S1 in production direction.

The system interface F must be shut-off. The pig S2 is pushing the product through the launching/receiving station S1 towards A.

CIP

The cleaning steps for the pig stations are integrated into the pipe cleaning program.

The pigs are firmly held in position in their stations. Cleaning solutions are supplied via the system interface A. The pipes are cleaned in direction C, F and G.

Sterilisation by Steam

Steam can enter the system either via interface A or F.

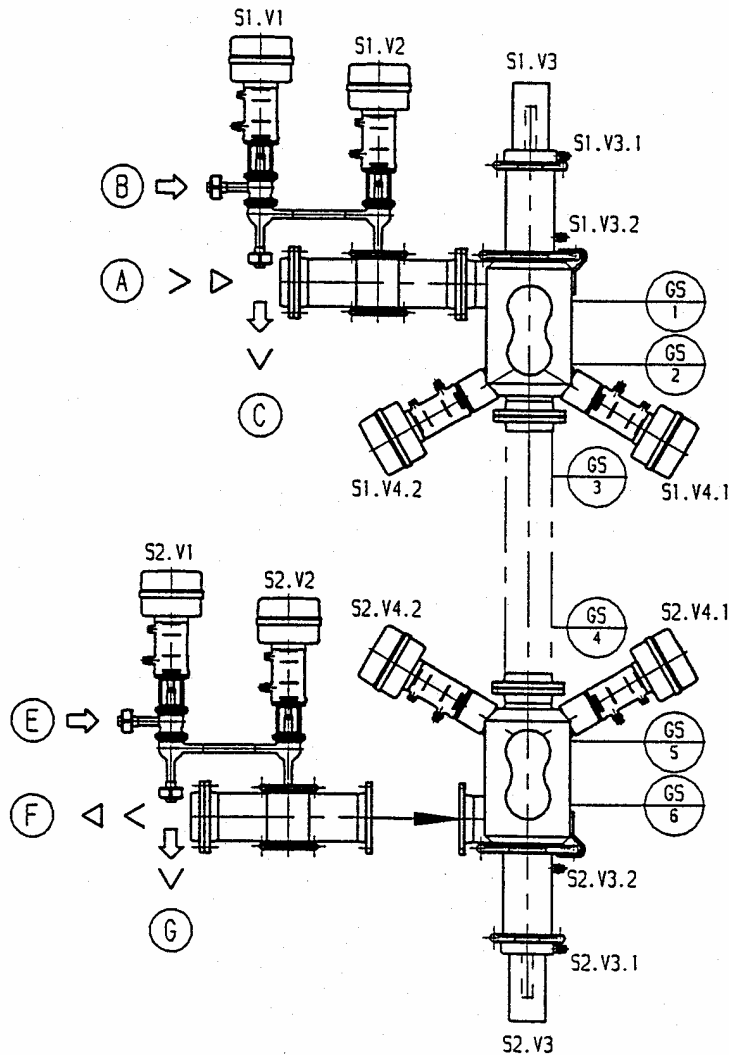
The pigs are positioned in their stations.

Low-foaming system filling

If the product is filled into empty, descending pipes, product and air may mix and foam is produced. This incident is excluded by the use of the pigging system DM/1. For this purpose the pig S2 is pushed against pig S1 prior to production start. Afterwards pig S2 is pushed back into its station by product. In this step the pig serves as a phase separation between product and air.

Product Recovery System DM/1

Launching / Receiving Station S1



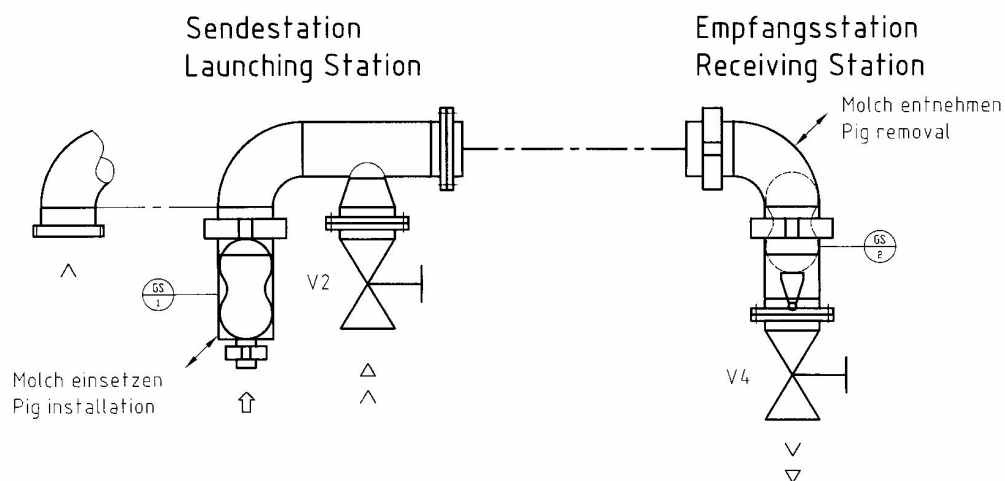
Launching / Receiving Station S2

- ▷ Flow direction product
- > Flow direction cleaning
- ⇨ Pig driving medium

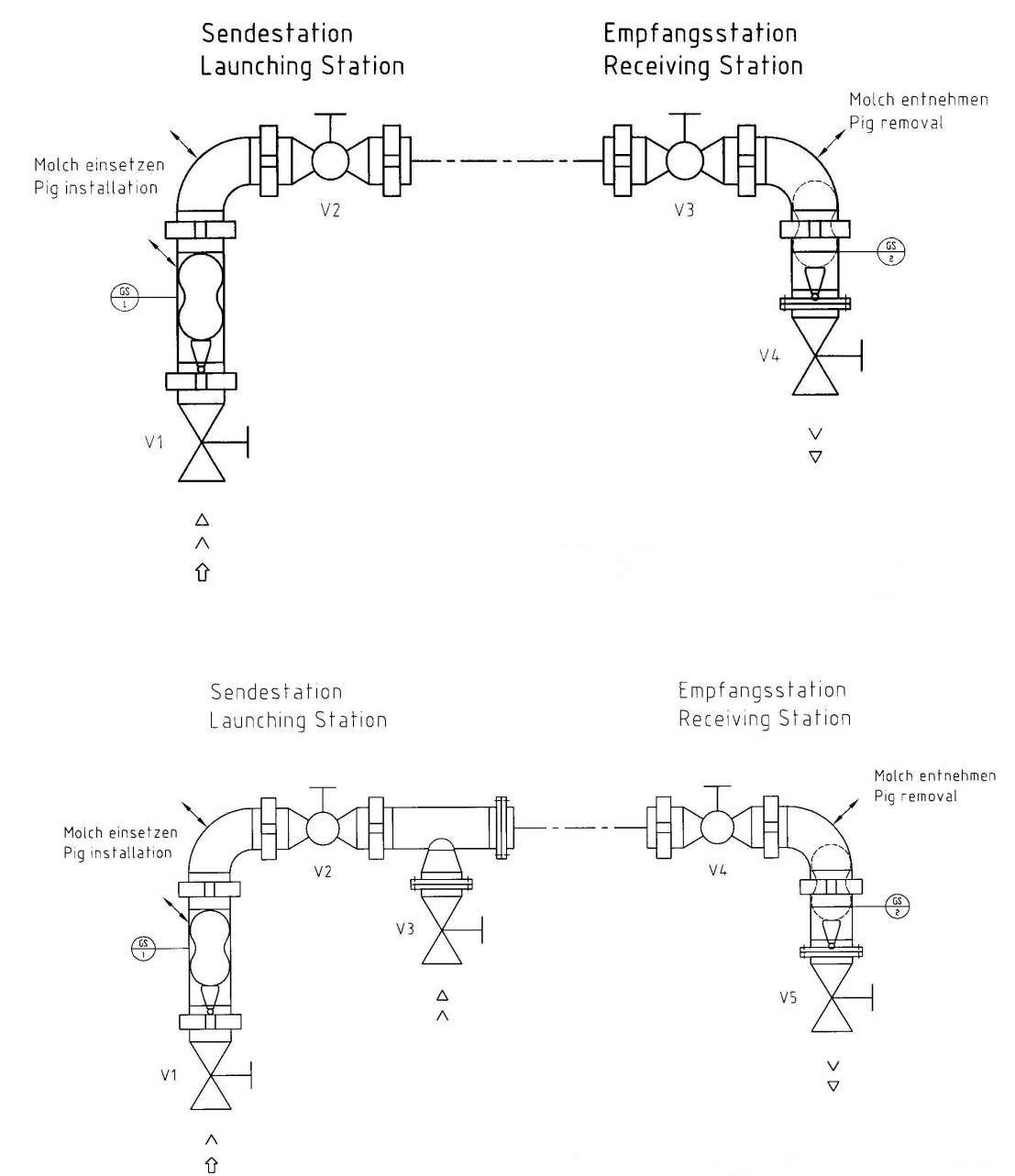
Manual Product Recovery Systems

- Systems without automatic pig cleaning station
- Manual removal of the pig after product push-out – manual cleaning of the pig outside the system
- Installation of the pig into the launching station directly before production start resp. start of pigging process
- Valves with manual actuators only
- Control system for pigging operations not required

Manual Product Recovery System without ball valves



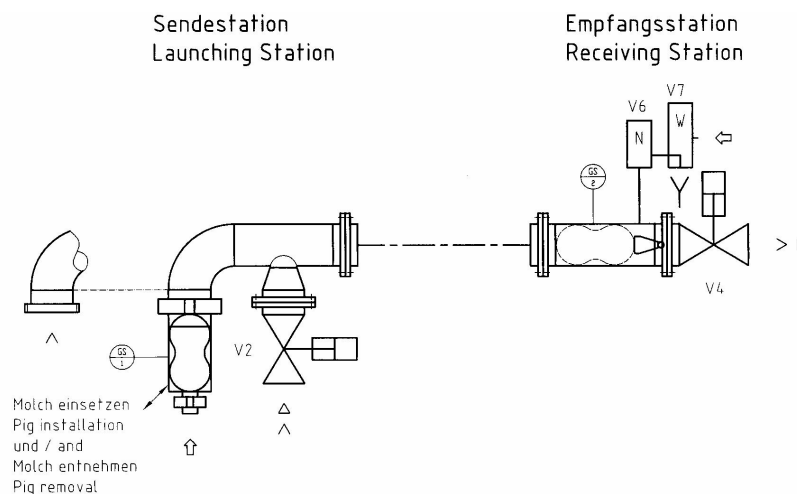
Manual Product Recovery System with ball valves



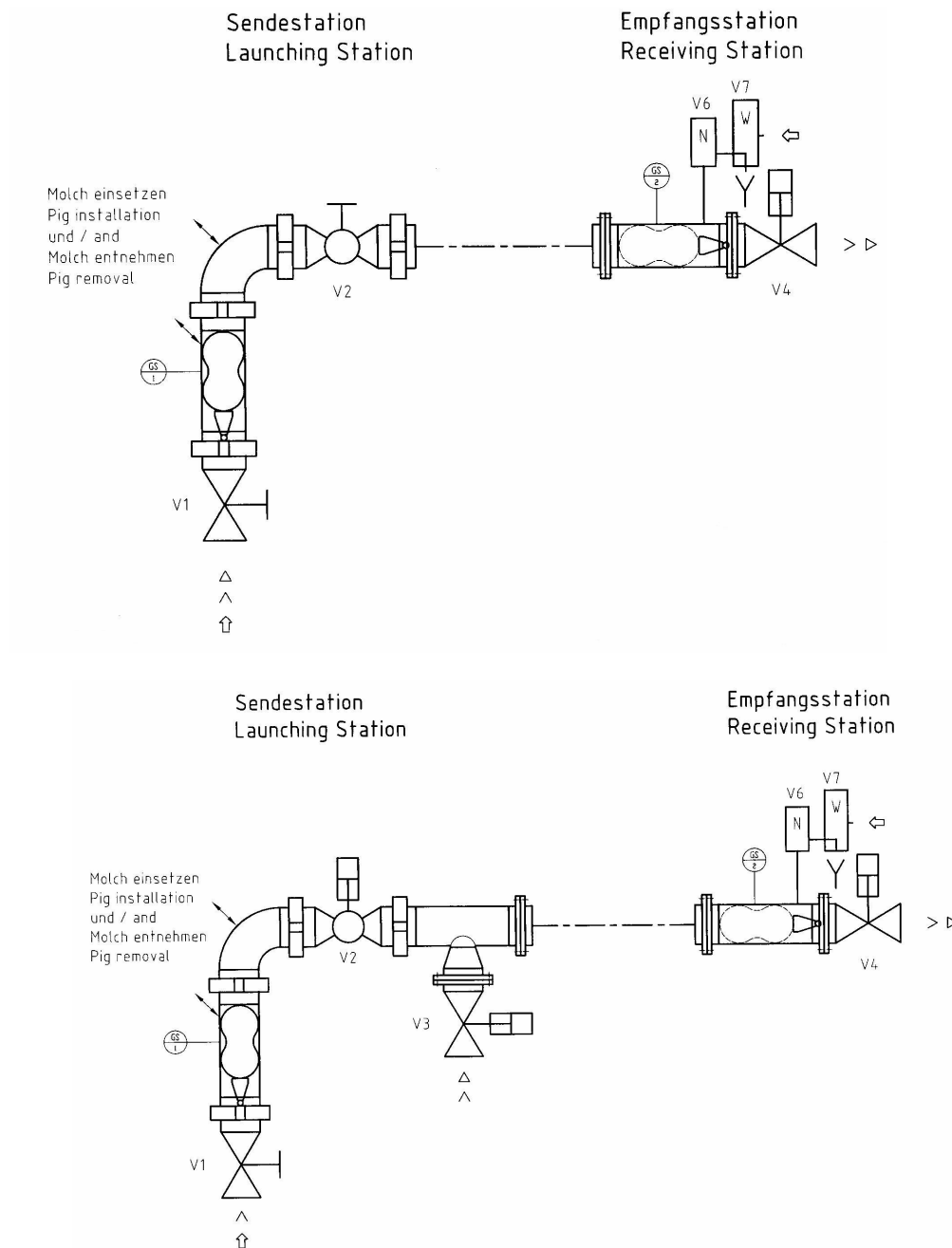
Semi-automatic Product Recovery Systems

- Systems without automatic pig cleaning station
- Manual removal of the pig after product push-out and pig return – manual cleaning of the pig outside the system
- Installation of the pig into the launching station directly before production start resp. start of pigging process
- Valves partly or completely equipped with pneumatic actuators
- Control system for fully automatic pigging operation not necessarily required, actuation of the pneumatic actuators may be carried on by manual operating level

Semi-automatic Product Recovery System without ball valves

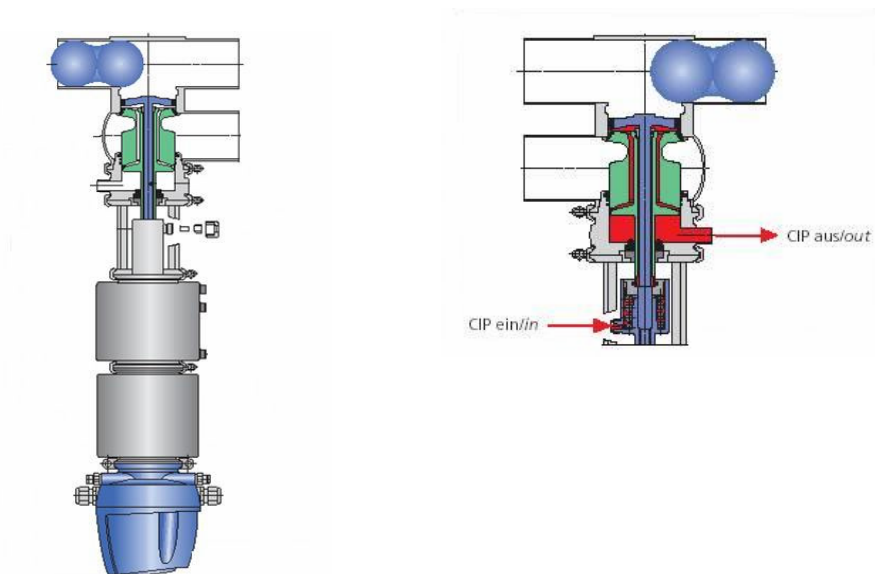


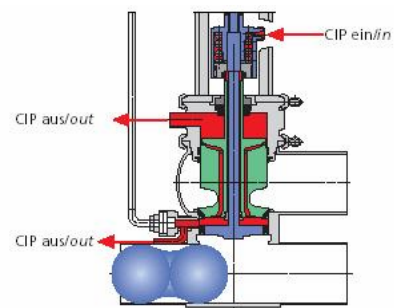
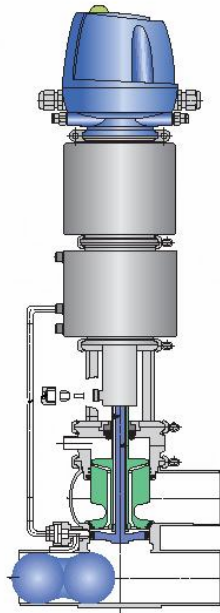
Semi-automatic Product Recovery System with ball valves



Pigable VARIVENT[®] - Mixproof Valve Type L

- Applied
in pigable manifolds and
as pigable tank inlet and outlet valve
- Valve head with radial seal –
similar to the VARIVENT[®] Mixproof valve type R
- Leakage-free switching at installation position vertical upside down,
low leakage switching at installation position vertical
- With or without lifting actuator
- Operating pressure 10 bar max.
- Sizes
Metric from DN 40 to DN 100
Inch OD from 1.5" to 4"





Questionnaire for Pigging Technology

Customer

Company _____

Address _____

Country _____

Telephone / FAX _____

Person in Charge Mr./Ms. _____

GEA Customer Attendance

GEA Company _____

Country _____

Person in Charge Mr./Ms. _____

Pigging pipe

Pre-conditions:

- ◆ all pipes having the same inner diameter
- ◆ same nominal widths
- ◆ no sagging or sharp-edged welds inside the pipes
- ◆ inside smooth transitions at the joints

☐ existing

☐ planned

Nominal width _____

Pipe diameter inside _____ mm outside _____ mm

☐ DIN _____ ☐ other standard _____

Nominal pressure PN _____

Material _____

Sealing material ☐ EPDM ☐ FKM ☐ HNBR

Bends ☐ 90° ratio R/D _____ number _____

(R = centre radius of the, D = pipe outside diameter)

Outlets ☐ Tee number _____

Pipe lengths suitable for pigging _____ m

Height difference between _____ m ☐ descending ☐ ascending
launching and receiving station

Pipe connection fittings outside the pigging stations

- ☐ Tuchenhagen VARIVENT® flange connections number _____
- ☐ Aseptic flange connections acc. to DIN 11864-2 number _____
- ☐ Pipe unions acc. to DIN 11851 number _____
- ☐ Aseptic pipe unions acc. to DIN 11864-1 number _____
- ☐ other _____ number _____

Products

Designation	Density kg/dm ³	Viscosity mPas	Operating temp. °C	Operating pressure barG	Flow rate m ³ /h
1. _____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____

- Product characteristics to 1. ☐ foaming ☐ sliding
☐ other _____
- to 2. ☐ foaming ☐ sliding
☐ other _____

Please include viscosity graphs, viscosity in [mPas] as a function of the shear rate [s⁻¹].

Product pump

Type and manufacturer _____

Material of the pig

Preferred ☐ Silicone ☐ FKM

Pig driving medium

☐ Compressed air ☐ oil free ☐ sterile ☐ dry

air pressure min. _____ max. _____ barG

☐ Water Pressure: _____ barG

☐ Other: _____ Pressure: _____ barG

Cleaning

Cleaning agent	concentration %	temperature °C	time min.
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1. _____	_____	_____	_____
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2. _____	_____	_____	_____
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3. _____	_____	_____	_____
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☐ Pigging pipe to be cleaned after each product push-out

☐ Pigging pipe to be drained after cleaning

☐ Pipe system fully self-draining

☐ Flush-out of the cleaning medium with a pig

Steaming

☐ Steaming of the pigging pipe Temperature _____ °C Time _____ min

Air for pneumatic actuation

☐ oil free ☐ dry

Air pressure min. _____ max. _____ barG

Supply voltage

☐ 230 V AC, 50 Hz

☐ other _____ V _____ Hz

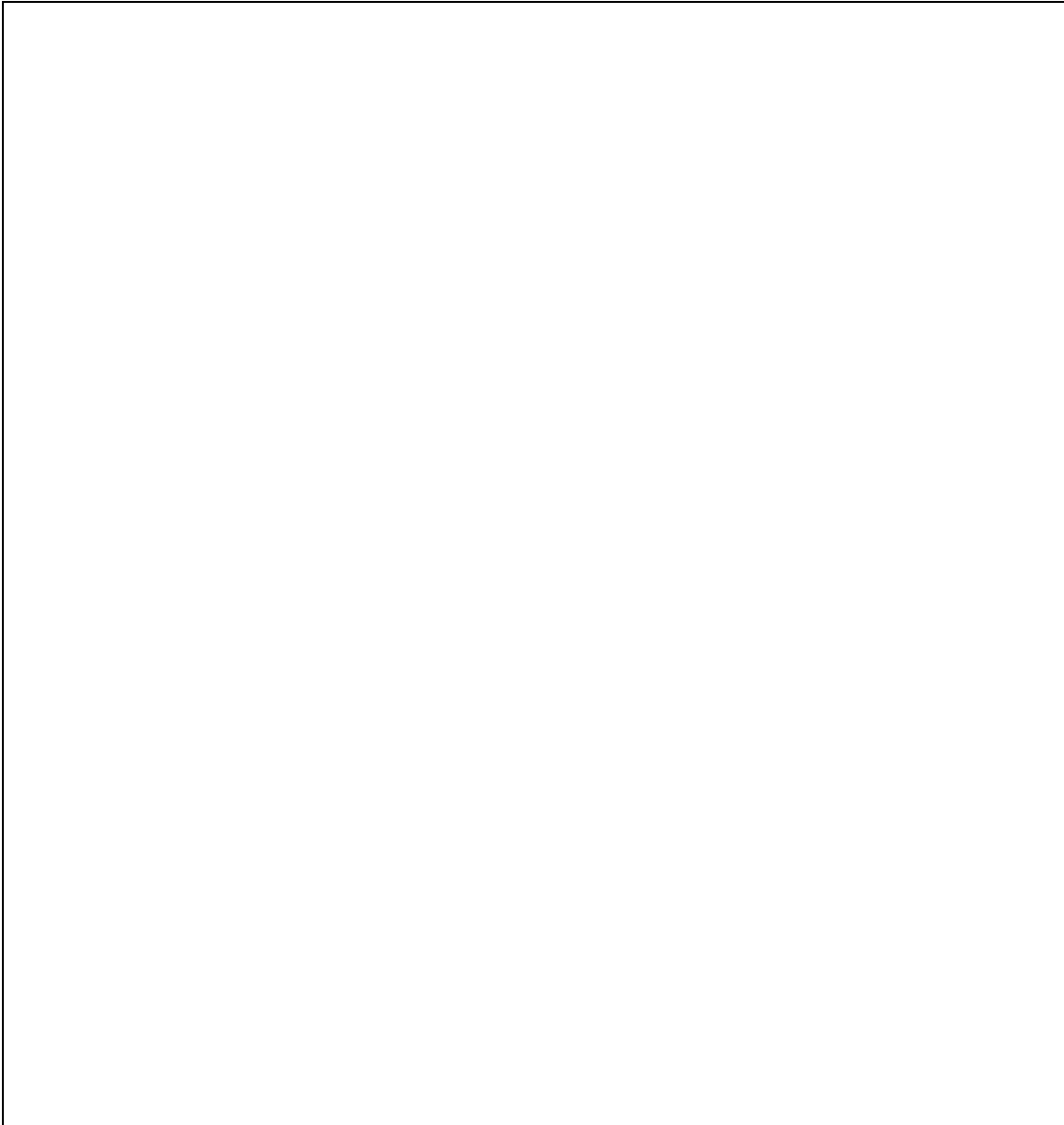
Control voltage

☐ 24 V DC

☐ other _____ V ☐ DC ☐ AC

Special regulations

Isometric sketch of the pipe with length specifications



Place, Date _____

Signature _____