

# Pressure pipes Ventilating and flushing

## STRATE systems for venting, flushing and partially emptying sewage pressure pipes

- reliably prevent the formation of toxic, odorous, corrosive gases and acids
- are economic and low-maintenance to operate and significantly extend the service life of the sewage pressure pipes and downstream station sections

STRATE Technologie für Abwasser GmbH offers you complete solutions from a single source. The complex subject of "venting, flushing and partially emptying sewage pressure pipes" needs very careful consideration with regard to application-specific, economic and user-friendly operation coupled with maximum availability. We will be happy to support you with the selection of the STRATE system you need and place our experience at your disposal for detailed consultation on the subject. In this chapter, we would like to give you a brief overview of the biological-chemical change processes which take place in sewage pipes, illustrate solutions and areas of applications as well as present the individual systems and their characteristic properties.

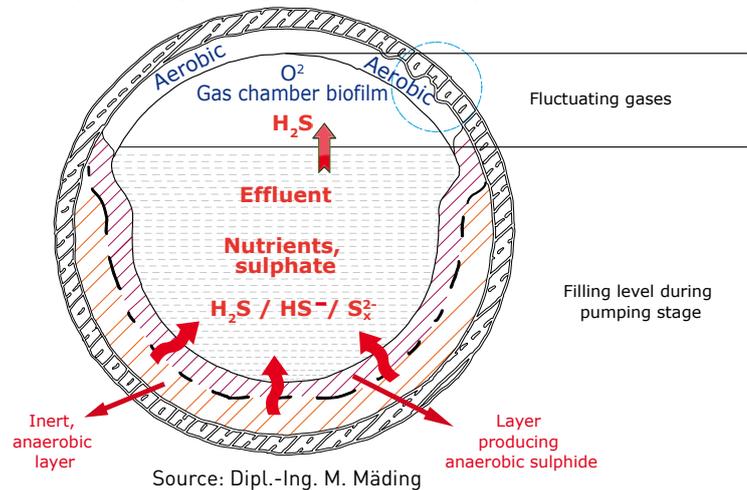
### Causes and effects of biological-chemical processes in effluent pressure pipes

Fresh municipal effluent has a smell of its own which is very similar to compost and is generally not considered unpleasant.

During pumping through the sewage pumping station, the effluent remains for a certain time in the connected pressure pipe before it reaches the sewage plant. This dwelling time directly depends on the pumped sewage quantity, the cross-section of the pipe and the length of the pressure

pipe. Dwelling times of longer than two hours in pressure pipes and/or increased concentrations of organisms in the effluent quickly use up the residual oxygen contained. This leads to anaerobic conditions resulting in intensive odour formation and considerable pollutant burden for the surrounding area e.g. near transition shafts (hydrogen sulphide H<sub>2</sub>S).

1. Unpleasant odour through formation of H<sub>2</sub>S
2. Possible corrosion through  $H_2S + O_2 \rightarrow H_2SO_4$   
(multi-stage biological oxidation of S<sup>2-</sup>)



Source: Dipl.-Ing. M. Mäding



### Note on hydrogen sulphide (H<sub>2</sub>S)

Hydrogen sulphide – nasty smell and extremely dangerous

H<sub>2</sub>S- gas is produced in sewage pipes due to a lack of dissolved oxygen. It produces a nasty, pungent smell like rotten eggs and is considered unpleasant from a concentration of 5 ppm (unbearable from 20 ppm). Hydrogen sulphide is colourless, combustible, soluble in water and explosive in combination with oxygen as well as extremely toxic. H<sub>2</sub>S gas can no longer be perceived by the human scent of smell from 500 ppm and is fatal within 30 minutes in this concentration.

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## Measures for avoiding odour formation during biologicalchemical

In addition, deposits are formed on the inner pipe wall, the so-called "biofilm", which causes a biologicalchemical exchange of substances with negative consequences for the effluent and the whole transport system. The transformation of aerobic to anaerobic micro-organisms makes sewage treatment in the sewage plant more difficult, sulphuric acid corrodes pipelines, shafts, shaft covers and other system components, deposits at low points in the pressure pipe are favoured and may lead to pipeline blockage.

### AWAerob:

The share of oxygen in our ambient air is around 21%. If this air is specifically added to the effluent under the observation of technical conditions in such a way that the oxygen dissolves, the aerobic condition of the effluent can be retained and odour formation prevented to a large extent. The solubility of oxygen in liquids increases as pressure increases. In other words, venting of the effluent is effective in the pressure pipe itself.

### AWAexpand und AWaflush:

Depending on local circumstances and the operating conditions of the sewage pumping system, a feasibility check may show that flushing or partial emptying of the pressure pipe are an alternative to venting.

### Pigs:

For extensive removal of biofilm, regular use of a cleaning pig is the ideal supplement to the STRATE systems for venting, flushing and partially emptying sewage pressure pipes. The pig, a cleaning ball, is introduced to the sewage pumping flow via a pig trap. The pig is conveyed through the complete pressure pipe with the aid of the pump pressure. During this process, additional cleaning of the inner pipe wall is carried out. The pig is removed at the

end of the pressure pipe.

The installation possibilities for STRATE venting, flushing and partially emptying systems are oriented towards existing or planned local buildings. If there is no service building available for the sewage pumping station, housing in a pre-fabricated STRATE AWASTATION service building is a high-quality and economic option. If above-ground installation is not possible, the system can be mounted on a wall bracket directly in the STRATE AWALIFTSCHACHT of the sewage pumping station.



Cleaning pigs of different sizes (source: Dipl.-Ing. M. Mäding)

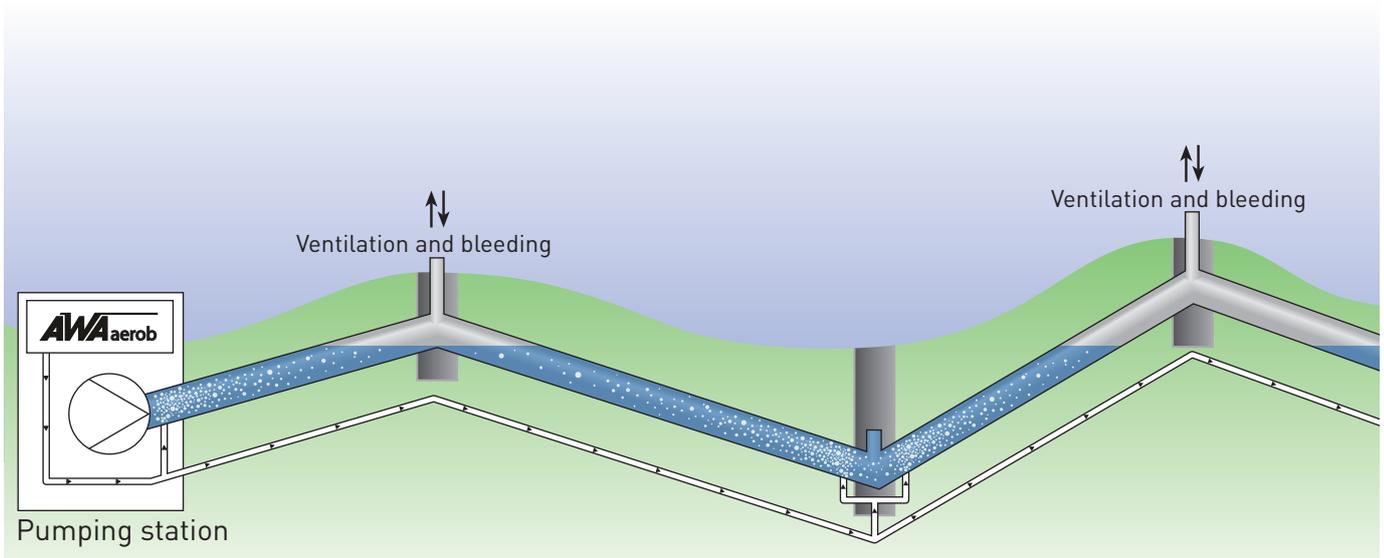


### Note on sewage discharge

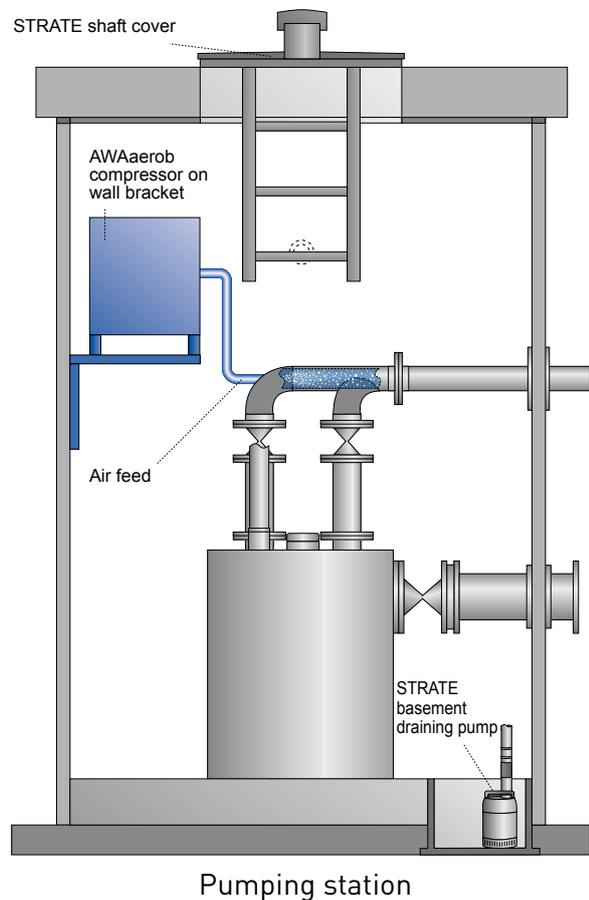
Since it is not possible to refresh sewage containing hydrogen sulphide by means of venting, care must be taken that the sewage is discharged into the pumping station in an aerobic condition. For further pumping, pumping systems with small sewage collecting chambers, low residual water content and without a layer of scum forming are an advantage (corresponds to the STRATE AWALIFT system).



## AWAerob – injection of fine pearls of oxygen from the air

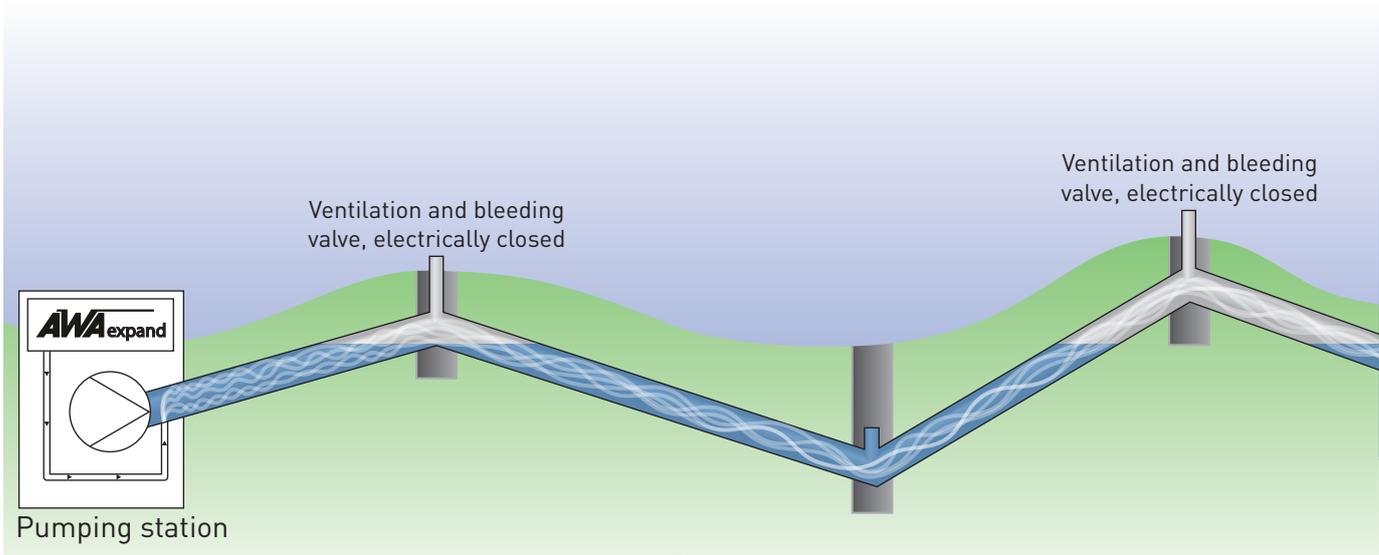


- Ideal for short pressure pipes and high flow speeds in the pressure pipe
- Area of application for pressure pipes  $\leftarrow \leq$  DN 200
- Use with or without accompanying pipe (depending on the high and low points in the pressure pipe)

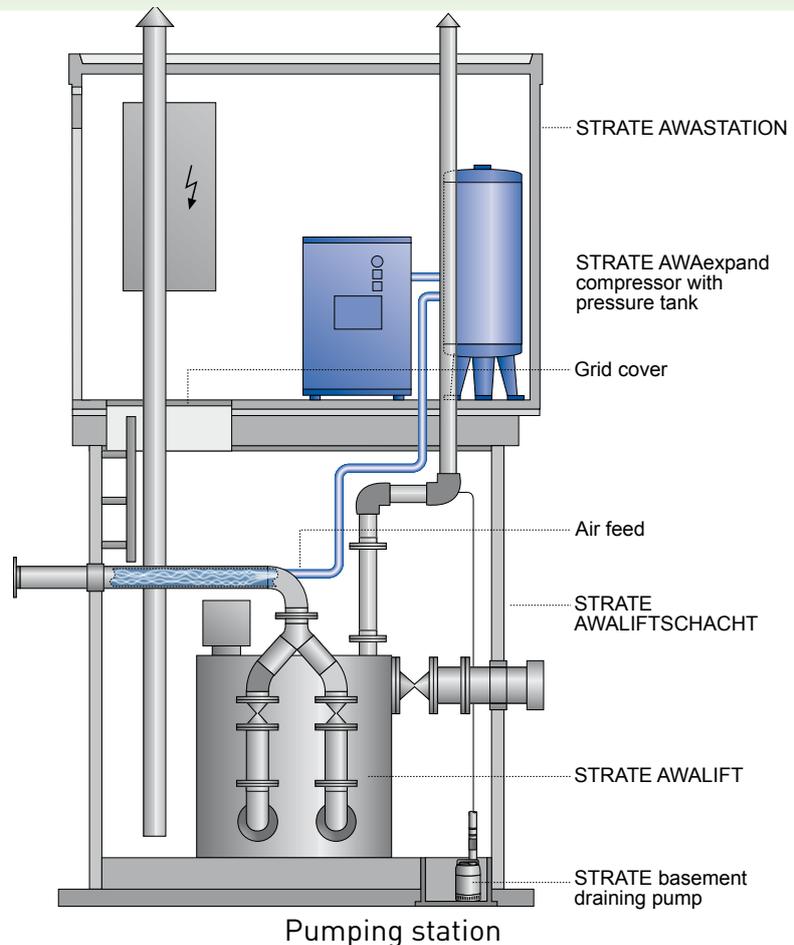




### AWAexpand – compressed air flushing surge after a pumping stage has been

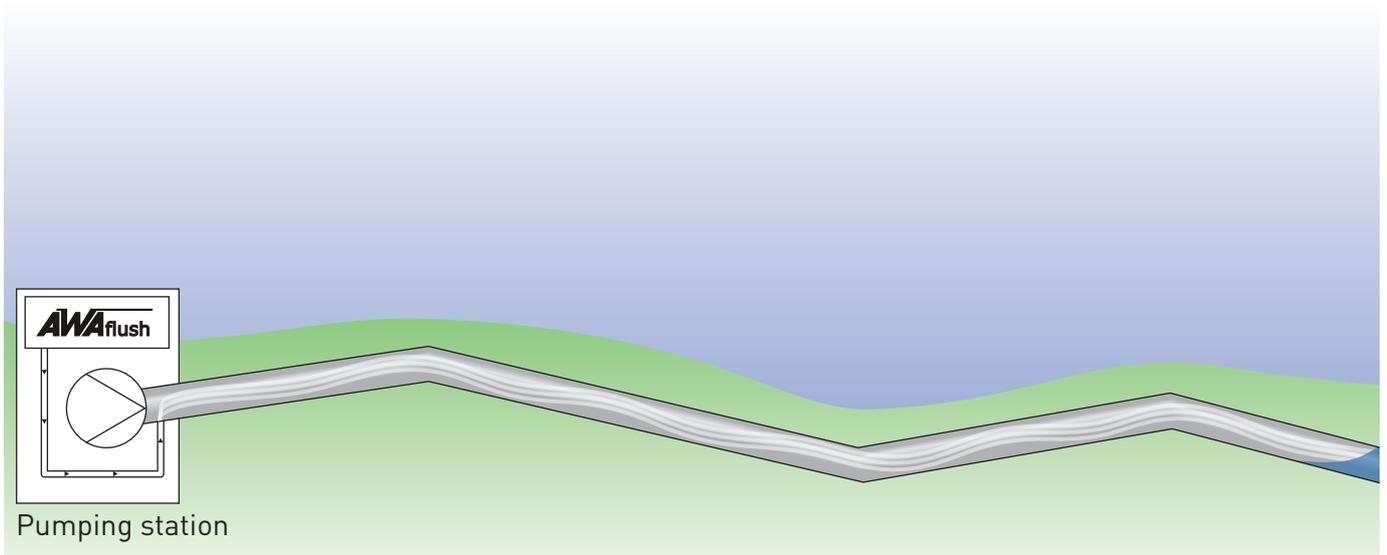


- Ideally suited for longer pressure pipes with several high and low points and longer rising or falling sections
- Mixes oxygen from the air very thoroughly with the sewage
- Prevents formation of biofilm in the pressure pipe (reduces thickness of biofilm, leads to biofilm tearing)
- Area of application for pressure pipes  $\leq$  DN 200
- Ideal for existing pressure pipes, an accompanying pipe is not required

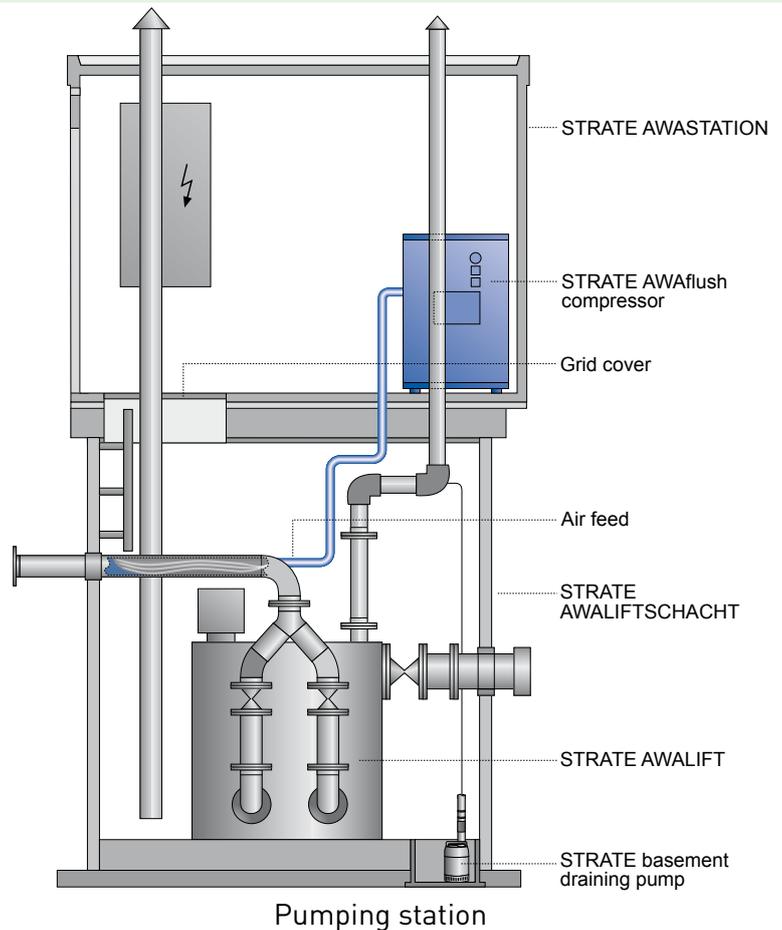




## AWAflush – purging the pipe



- Preferred use in systems which allow the economic emptying or partial emptying of the pressure pipe or in systems into which sewage is not discharged all year round, making emptying of the pressure pipe sensible e.g. on campsites (high/low season)
- For systems where high and low points are not very pronounced
- Can be used when small air pockets can be present in the pressure pipe without affecting the pumping capacity or the pressure pipe itself
- An accompanying pipe is not required





## STRATE-System

### The perfect STRATE system for your special requirements

- Can be selected after consultation with us, please return the project planning sheet for STRATE systems- for venting, flushing and partially emptying sewage pressure pipes to us by e-mail, fax or post for this purpose.



You will find your project planning sheet in this catalogue under "Project planning aids".



You can also find an online version in our download centre!  
[www.strate.com](http://www.strate.com)