

Page**Planning and installation information for lifting stations**

▪ Product advantages	40
▪ Suggested installation, areas of use, standards requirements	41
▪ Help in selecting a system	42
▪ Help in ordering	43
▪ Overview of standards, load classes	44
▪ IP protection classes, backflow level, backflow loop	45
▪ Planning information, dimensioning	46 – 47
▪ Installation information	48
▪ Maintenance and inspection	49

Reliability and functioning

- ✓ High degree of functional reliability thanks to durable pressure sensor technology for controlling lifting stations (with certain types only)
- ✓ High degree of resistance against sludges and other contamination

High quality

- ✓ Quality assurance through third-party surveillance
- ✓ Meet the high GET quality criteria



Material

- ✓ Corrosion-resistant lifting station collection containers made of either plastic or high-quality V4A stainless steel (1.4571 material)

Compact design

- ✓ Easy to transport inside thanks to light weight and small dimensions, fits through any standard doorway ≥ 800 mm (lifting stations for free-standing installation)



Special «custom-tailored» solutions

- ✓ Rotary lobe pump lifting stations, for gently pumping, upstream from grease separator systems, kitchen wastewater containing oils and greases, featuring very gentle pump operation due to pulsation-free HiFlo® piston
- ✓ Containers with individual dimensions based on specific property requirements (i.e. larger container volume) can be manufactured on short notice according to customer specifications
- ✓ Grease separator systems with integrated lifting station available on request



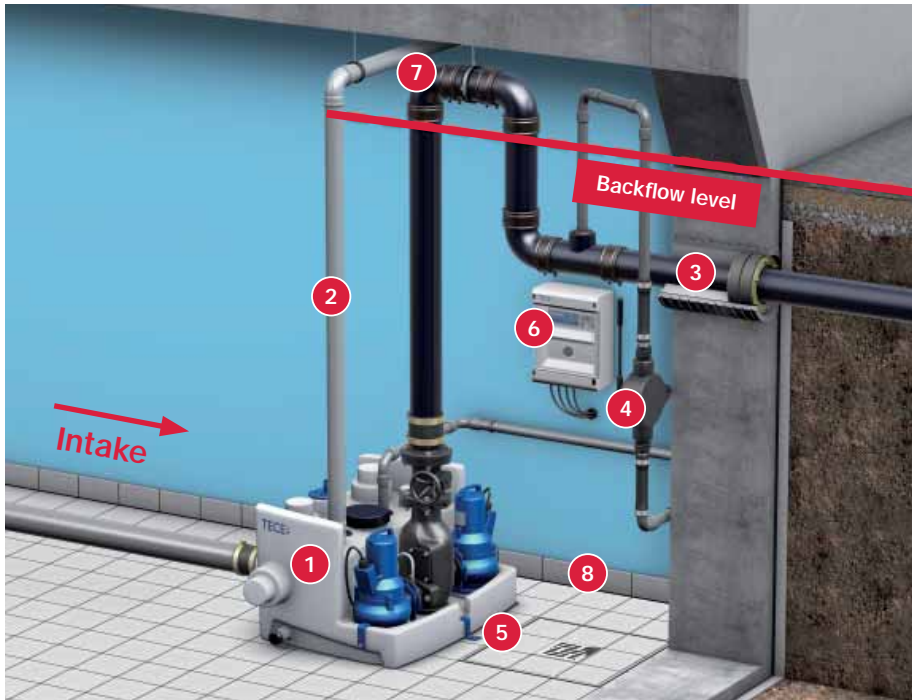
Wide variety of accessories

- ✓ Including gate valves, flange sleeves etc.
- ✓ Special adapters (rubber expansion joints) for flexible, tension-free connection to discharge line in acc. with DIN EN 12056
- ✓ Acoustic / visual alarm devices
- ✓ Software for optimizing idle times: in case one pump fails, a practically new replacement pump is always available

Ready-to-install pump shafts

- ✓ Pre-fabricated plastic shafts for underground installation, with integrated intake and connection fittings on the venting pipe or empty cable channel and discharge line connection
- ✓ Low weight makes transport easy

Suggested installation



1	TECEbasika – Duo lifting station
2	Venting pipe
3	Discharge line to drainage system
4	Manually operated membrane pump
5	Lifting station for underground installation (pump well)
6	Control unit
7	Backflow loop

Areas of use and standards requirements

<p>Drainage points below sewage system level DIN 1986-100, par. 7.4.1</p>	<ul style="list-style-type: none"> Wastewater collected from drainage points that is not able to be introduced to the public sewage system through a free drop (gravity drainage) must be drained by means of automatic lifting systems having a backflow loop complying with DIN EN 12056-4 or, under certain conditions, by means of backflow preventers complying with DIN EN 13564-1.
<p>Backflow protection in general DIN EN 12056-1, par. 5.5 DIN EN 12056-4, par. 4 DIN EN 1825-2, par. 7.3 DIN EN 752-1</p>	<ul style="list-style-type: none"> Wastewater collecting below the backflow level must be fed to the drainage system by means of a lifting station that functions automatically. The use of backflow preventers is permissible in certain exceptional cases (refer to DIN 12056-4, par. 4 on this). Backflow protection is provided by wastewater lifting stations having a backwater loop (i.e. part of the discharge line of the lifting station above the backflow level). Only systems designed with a backwater loop provide dependable protection against backflows. When the calm water surface of a grease separator system lies below the backwater level, the system must be drained by a downstream lifting station.
<p>Requirement for dual lifting station DIN 1986-100, par. 7.4.3</p>	<ul style="list-style-type: none"> According to DIN EN 12050-1, in systems where wastewater feed may not be interrupted (e.g. downstream from a grease separator system), a dual lifting station must be installed.
<p>Special case: gentle pumping of wastewater containing grease</p>	<ul style="list-style-type: none"> According to DIN EN 1825-2, kitchen wastewater containing greases must be fed to a grease separator by way of a free gradient (min. of 2‰ or 1:50). If this is not possible due to the height of the intake pipe, in exceptional cases wastewater containing grease may be fed to the separator by means of a TECEbasika rotary lobe lifting station. This system pumps wastewater gently and generates little turbulence. Conventional lifting stations, incorporating a centrifugal pump, may not be employed, as this would generate strong turbulence and, in turn, emulsions as the kitchen wastewater is pumped. Since grease separators have only a limited capability of separating emulsions, separation in compliance with standards would not be ensured.
<p>Surface water below the backflow level DIN EN 12056-4, par. 5.1</p>	<ul style="list-style-type: none"> Any surface water collecting outside of the building below the backflow level must be pumped off, separately from domestic wastewater, by a lifting station outside of the building (e.g. in a pre-fabricated pump shaft).

1 Help in selecting a lifting station

1. Intake criteria	<input type="checkbox"/> Conditions for introduction to sewage system e.g. wastewater of commercial or industrial origin which may, for instance, contain light liquids or greases, must first be treated in a separator system. <input type="checkbox"/> Wastewater is to be pumped gently e.g. when introducing kitchen wastewater containing greases into a grease separator system (when gravity drainage is not possible)	<ul style="list-style-type: none"> ■ DIN EN 12056-4 ■ DIN 1986-100, par. 6 ■ Local requirements ■ National requirements
2. Pumped media	<input type="checkbox"/> Domestic wastewater <input type="checkbox"/> Faecal-free wastewater (greywater) <input type="checkbox"/> Wastewater containing faeces (blackwater) <input type="checkbox"/> Rainwater <input type="checkbox"/> Industrial wastewater (service water, substances contained in it)	
3. Installation site	<input type="checkbox"/> Free-standing installation in a frost-proof room <input type="checkbox"/> Underground installation in a frost-proof room (pump well) <input type="checkbox"/> Underground installation outside of building <ul style="list-style-type: none"> – Load class A 15 (load capacity up to 1.5 t, may be walked over) – Load class B 125 (load capacity up to 12.5 t, may be driven over by passenger vehicle) – Load class D 400 (load capacity up to 40 t, may be driven over by truck) 	<ul style="list-style-type: none"> ■ DIN EN 12056-4 ■ DIN EN 12050 ■ DIN EN 752
4. Installation criteria	<input type="checkbox"/> Backflow level <input type="checkbox"/> Lift capacity and pipe route (distance from sewer) <input type="checkbox"/> Room size (within buildings) <input type="checkbox"/> Explosion hazard in room where installed <input type="checkbox"/> Noise pollution (noise-protection measures) <input type="checkbox"/> Groundwater level (outside of buildings) ▶ buoyancy control <input type="checkbox"/> Electricity / power supply (400 V)	<ul style="list-style-type: none"> ■ DIN EN 12056-4 ■ DIN 1986-100 ■ DIN EN 752 ■ ATV-Merkblatt M 167
5. Dimensioning	<input type="checkbox"/> Design units of wastewater intake <input type="checkbox"/> Total life height (geodetic height + pressure loss due to height) <input type="checkbox"/> Calculation of the working point of the pump <input type="checkbox"/> Selection of discharge line nominal diameter <input type="checkbox"/> Selection of required fittings <input type="checkbox"/> Check of minimum flow rate <input type="checkbox"/> Calculation of container volume	<ul style="list-style-type: none"> ■ DIN EN 12056-4 ■ DIN 1986-100 ■ DIN EN 752
6. Selection of lifting station	<input type="checkbox"/> Selection of pump / lifting station <ul style="list-style-type: none"> – single lifting station – Dual lifting station – Explosion-proof model – Open / closed system (with lifting stations for faeces) <input type="checkbox"/> Selection of accessories (gate valves, manually operated membrane pump, fault-signalling devices etc.) <input type="checkbox"/> Determination of piping <ul style="list-style-type: none"> – Intake pipe – Discharge line – Venting pipe 	

2 Project details:

Building project / building:		Planning: (company stamp)	
<input type="radio"/> To be newly built	<input type="radio"/> Improvement, installation in an existing building		
Location:		Company:	
Owner:		Contact person:	
Phone:		Phone:	
Fax:		Fax:	
E-mail:		E-mail:	
Specialized retailer: (company stamp)		Building company: (company stamp)	
Company:		Company:	
Contact person:		Contact person:	
Phone:		Phone:	
Fax:		Fax:	
E-mail:		E-mail:	

3 Selection of the right TECEbasika lifting station

Pumping capacity Q:	m ³ /h	Installation site <input type="checkbox"/> Free standing (above-ground installation) <input type="checkbox"/> Installation in ground plate (underground installation) <input type="checkbox"/> For underground installation outdoors
Lift capacity H:	m	
Required container volume:	Litres	
TECE service		Pumped medium <input type="checkbox"/> Faecal-free wastewater (greywater) <input type="checkbox"/> Wastewater containing faeces (blackwater)
<input type="checkbox"/> Calculation of the required pump capacity and selection of the lifting station – in acc. with DIN EN 12056-4 and DIN 1986-100 – based on customer information		Design <input type="checkbox"/> Single lifting station (Mono) <input type="checkbox"/> Dual lifting station (Duo) <input type="checkbox"/> Rotary lobe pump lifting station
		Accessories <input type="checkbox"/> Manually operated membrane pump <input type="checkbox"/> Gate valve <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____

Important standards for drainage ducts: Current as of 1 July 2007

Standard / guide-	Title	Details	Revision / issue
DIN EN 12056-1	Gravity drainage systems inside buildings – general requirements	5.5 Backflow 5.7 Strength and stability	January 2001
DIN EN 12056-4	Gravity drainage systems inside buildings – wastewater lifting plants – layout and calculation	4. Backflow protection 5. Installation 6. Dimensioning 7. Putting into service 8. Maintenance and inspection	January 2001
DIN 1986-100	Drainage systems for buildings and property (supplementary regulations to DIN EN 12056 and DIN EN 752)	7. Backflow protection	January 2001
DIN 1986-3	Drainage systems for buildings and property – regulations for operation and maintenance	Table 1: Inspection and maintenance procedures	November 2004
DIN EN 752-3	Drainage systems outside of buildings	Part 3: Planning	September 1996
DIN EN 752-6	Drainage systems outside of buildings	Part 6: Pump units	June 1998
DIN EN 12050-1/2 (product standard)	Wastewater lifting stations for draining buildings and property – building and inspection principles	Part 1: Stations for lifting faeces Part 2: Lifting stations for faecal-free wastewater	Part 2001
ATV-Merkblatt M 167	Separator and backflow prevention systems	Backflow prevention systems	July 1995

Classification of load capacities for vehicular and pedestrian areas according to DIN EN 124

Load capacity class	Maximum permissible load	Area / place of use
A 15	< 1.5 t	For areas of traffic used by pedestrians and cyclists only as well as similar areas, e.g. landscaped areas
B 125	< 12.5 t	For footways, pedestrian and similar areas, car parking lots and parking decks
C 250	< 25 t	Applies only to channels in curbside areas, where the channel sole is a maximum of 50 cm below the roadway and 20 cm below the footway, and to side lanes of roads
D 400	< 40 t	For road surfaces (including pedestrian streets), parking areas and similar paved traffic areas (e.g. federal motorway parking areas)
E 600	< 60 t	For non-public areas of traffic subject to particularly high wheel loads, e.g. roads in industrial buildings
F 900	< 90 t	For special areas, such as airport areas where aircraft operate

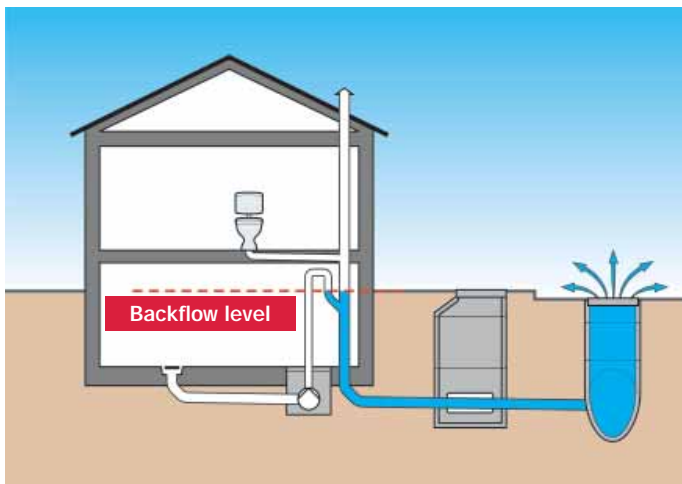
Protection classes according to DIN EN 60034-5 (IEC 60034-5)

Lifting stations, pumps, motors, switch cabinets and similar devices have varying protection classes. Protection classes, e.g. IP 66, IP 67, IP 68 etc. refer to the following:

The first digit indicates the amount of protection against entry of solid foreign particles.
The second digit describes the amount of protection against intrusion of water with damaging effects; refer to table.

1st digit IP XY Foreign particle protection	Meaning Against intrusion of solid foreign particles	2nd digit: IP XY Protection against water	Meaning Against intrusion of water with damaging effects
0	Not protected	0	Not protected
1	50 mm	1	Vertical water drops
2	12.5 mm	2	Obliquely falling drops (15° angle)
3	2.5 mm	3	Splashed water, dropping angle up to 60°
4	1.0 mm	4	Spray water from all directions
5	Protected against dust	5	Stream of water e.g. from a jet nozzle
6	Dust-tight	6	Strong stream of water
7	-	7	Occasional submersion under defined pressure and time conditions
8	-	8	Permanent submersion, operating conditions defined by manufacturer

Definition of backflow level



- The backflow level is defined in DIN EN 12056-4 as the upper edge of the street or curb where the system is connected to the public sewage system, unless otherwise defined by the authorities responsible for wastewater disposal.
- Despite dimensioning according to recognized rules of engineering or careful operation of the public sewage system, due to economic considerations, public sewage ducts for mixed water and rainwater cannot be so designed so generously as to be able to drain with ease water collecting through a «once-in-a-century» rainfall.
- In the case of heavy rains, sewage duct backflow as well as backflow in drain pipes must therefore be reckoned with. Thus, according to regional drainage regulations, every party connected to the sewage system must adequately protect themselves in accordance with DIN and EN standards against damage due to backflow. All drainage points below the backflow flow must consequently be protected against backflow as well (refer to Illustration 1).

Dewatering of drainage points below the backflow level – with lifting station (backflow protection in acc. with DIN EN 12056-4)

Planning information and dimensioning according to DIN EN 12056-4

Backflow protection DIN EN 12056-4, par. 4 DIN 1986-100

- DIN EN 12056 and DIN 1986-100 require sewage collecting below the backflow level as well as precipitation water from small surfaces below the backflow level to be drained to the public sewage system, backflow-free, by means of a lifting station, with backflow loop, that functions automatically.
- All drainage points above the backflow level are to be dewatered through a natural gradient (gravity principle). Sewage from these drainage points may not be drained off through backflow preventers or wastewater lifting stations (except in special cases, such as when old buildings are renovated).
- In general, when planning drainage systems, the principle applies that surface water (rainwater) that collects must be drained away from, and not fed into, the building. Correspondingly, rainwater surfaces must be drained, backflow-free, by separate pump stations or lifting stations outside of the building.

Buoyancy control DIN EN 12056-4, par. 5.1

- Lifting stations for which a buoyancy risks exists must be secured against buoyancy. Such protection is either pre-mounted on the containers or must be retrofitted.
- Lifting stations must be mounted on their bases in such a manner that they are stable and secured against rotation, so that they do not begin to «creep» or pivot while in operation.

Ventilation DIN EN 12056-4, par. 5.3



- Lifting stations must be vented by way of the roof. The venting pipe may be connected either to the main venting duct or to the secondary one.

Main venting duct

This is an extension of a vertical wastewater drop pipe, above the last pipe branch or the last pipe connection, with one end open to the atmosphere.

Secondary venting duct

This is a vertical venting pipe, connected to a wastewater drop pipe, which serves to limit pressure fluctuation within the wastewater drop pipe.


- **The venting pipe for a lifting station may never be connected to the venting intake pipe for a grease separator system.**
- Lifting stations for faeces, designed to DIN EN 12056, must have a venting pipe with a minimum diameter of DN 70, while DN 100 is preferable.
- Bleed valves are not permitted in areas subject to backflow risk or in lifting station containers complying with DIN 1986-100, par. 8.2.3.4.

Intake DIN EN 12056-4, par. 5.2



- A gate valve must be mounted on the intake side in order to ensure that the lifting station is able to be exchanged or repaired without difficulty.
- Intake pipes must be connected to the lifting station in such a way as to be potential-free.
- Net weight of pipes must be supported through measures taken by the building operator.

Planning information and dimensioning according to DIN EN 12056-4

<p>Discharge line DIN EN 12056-4, par. 5.2</p> 	<ul style="list-style-type: none"> ■ Drainage points below the backflow level must be protected against backflow from the sewage system by means of automatic lifting stations having a backflow loop complying with DIN EN 12056-4 or, under certain conditions, by means of backflow preventers complying with DIN EN 13564-1. The processing or planning party are liable for any omission of a backflow preventer. ■ The discharge pipe of the lifting station must be laid, together with the bottom of the backflow loop, above the backflow level. ■ Discharge pipes must be connected to a buried pipe or collecting pipe. The discharge pipe must withstand at least 1.5 times the maximum pumping pressure of the lifting station. ■ No other drainage points may be connected to the discharge pipe.
<p>Noise protection DIN EN 12056-4, par. 5.1</p>	<ul style="list-style-type: none"> ■ All pipe connections to lifting stations must be designed so as to be flexible and include noise protection. <p>Note: When planning and installing a system, attention should be given from the very beginning to choosing low-noise faucets, pipes and through-wall fittings so as to keep noise levels as low as possible. Noise emissions can be annoying and result in reduced property value.</p>
<p>Installation site / room DIN EN 12056-4, par. 5.1 DIN EN 12056-1</p>	<ul style="list-style-type: none"> ■ The room where the system is installed must have adequate illumination as well as intake and exhaust ventilation in order to prevent any build-up of condensate. The room should in addition be large enough to allow a working space, next to and above the equipment to be operated, that is at least 60 cm wide and high. ■ A pump well (lifting station installed underground) must be provided to drain water from the room. The pump well may be drained by way of the pump discharge line to the lifting station discharge line, yet downstream from the backflow loop.
<p>Collecting container DIN EN 12056-4, par. 5.1</p>	<ul style="list-style-type: none"> ■ Collecting containers for wastewater containing faeces may not be structurally connected to the building. Thus, for wastewater containing faeces, only lifting stations for faeces with free-standing collecting containers are permissible inside buildings. ■ Collecting containers for wastewater containing faeces must have a net volume of 20 l and be water- and odour-tight. Similar to built-in shafts, they are considered explosion-proof areas. EX protection requirements in accordance with DIN must be observed. ■ Any surface water collecting outside of the building below the backflow level must be drained, separately from domestic wastewater, through a separate lifting station outside of the building.
<p>Electrical connection DIN EN 12056-4, par. 5.5</p>	<ul style="list-style-type: none"> ■ Electrical connection may only be performed by a qualified electrician. Applicable local requirements must be observed. ■ Non-submersible switching devices and alarm equipment must be installed in a dry, well ventilated room that is safe from flooding.
<p>Shaft covers DIN EN 124</p>	<ul style="list-style-type: none"> ■ For pump shafts outside of buildings, load capacity classes for pedestrian and vehicular areas as prescribed in DIN EN 124 must be observed. Refer to the table «Classification of load capacities» on page 44.
<p>Dimensioning of lifting stations</p>	<ul style="list-style-type: none"> ■ Lifting stations and pumps must be dimensioned in accordance with DIN EN 12056-4. ■ TECE service: Upon request we will be glad to calculate the pump capacity you require and assist you in selecting the lifting station suited to the specific area of use.

Installation information in acc. with DIN EN 12056-4, par. 5

Pipe connections / pipe lines

- All drainage points below the backflow level that are connected to the lifting station must be designed and installed in accordance with DIN EN 12056.
- All pipe connections to lifting stations must be designed so as to be flexible and include noise protection.
- Drain pipes must be connected to the lifting station completely potential-free. The weight of the pipes must be supported through measures taken by the building operator.
- All pipes must be connected in such a manner that they are able to empty themselves automatically. Pipes may not become narrower as seen from the flow direction.
- The minimum nominal diameter of the discharge must correspond to Table 1 (see below).
- The discharge pipe must be laid, together with the bottom of the backflow loop, above the backflow level; refer to recommended installation.
- Discharge pipes may not be connected to wastewater drop pipes but must always be connected to a buried pipe or collecting pipe.
- Fittings connecting the discharge pipe to the buried or collecting pipe must be designed in the same way as connections for pipes not under pressure.
- The discharge pipe must withstand at least 1.5 times the maximum pumping pressure of the lifting station.
- A gate valve is to be provided downstream from the backflow preventer both on the intake and on the discharge pipe side.
- Adequate openings for cleaning are to be provided in buried and collecting pipes.

Table 1: Minimum nominal diameters of discharge pipes according to DIN EN 12056-4

Lifting station type	Minimum nominal diameter
Lifting station for faeces without break-down of faeces in acc. with DIN EN 12050-1	DN 80
Lifting station for faeces with break-down of faeces in acc. with DIN EN 12050-1	DN 32
Sewage lifting station (free faeces-free wastewater) in acc. with DIN EN 12050-1	DN 32

Maintenance and inspection in acc. with DIN EN 12056-4, par. 7 and DIN 1986-3

<p>Inspection</p>	<ul style="list-style-type: none"> ■ Lifting stations should be inspected by the operator once a month by observing at least two switching cycles to ensure proper operation.
<p>Maintenance</p>	<ul style="list-style-type: none"> ■ Maintenance should be performed by qualified personnel according to intervals as follows: <ul style="list-style-type: none"> – Lifting stations in commercial areas: every 3 months – Lifting stations in residential blocks: every 6 months – Lifting stations in single family dwellings: once a year <p>Qualified personnel:</p> <p>Personnel employed by organizations that are independent of the operator as well as technical experts or other institutions are termed «qualified» if they possess the necessary expert knowledge for operating, maintaining and inspecting separator systems.</p> <ul style="list-style-type: none"> ■ The following tasks are normally to be performed during maintenance: <ul style="list-style-type: none"> – Check joints for leak-tightness – Operate valves, lubricate and readjust if required – Open and clean backflow preventers – Clean drain pump, check impeller and bearings – Check oil level – Clean inside of collecting container if required – Check electricalconnections for proper functioning – Upon completion of maintenance tasks, perform a trial run and put the station into operation. – Complete a maintenance report.
<p>Maintenance contract</p>	<ul style="list-style-type: none"> ■ Plant operators are advised to conclude a maintenance contract with a qualified company in order to have maintenance and service tasks performed regularly. <p>▶ <i>A sample maintenance contract can be ordered from TECE.</i></p>

