

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-23/0579
of 18 September 2023

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Small wastewater treatment plant retrofit kit type
cleani_CE

Product family
to which the construction product belongs

Water Supply & Sewage/Drainage - sewerage
components

Manufacturer

utp umwelttechnik pöhl GmbH
Weidenberger Straße 2-4
95517 Seybothenreuth
DEUTSCHLAND

Manufacturing plant

utp umwelttechnik pöhl GmbH
Weidenberger Straße 2-4
95517 Seybothenreuth
DEUTSCHLAND

This European Technical Assessment
contains

6 pages including 1 annex which form an integral part of
this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

180041-00-0704

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Specific Part

1 Technical description of the product

The product covers retrofit kits for small wastewater treatment plants type cleani_CE at three variants consisting of prefabricated and manufacturer assembled technical equipment for the retroactive installation in existing sewage works which are buried into the ground to retrofit them to small wastewater treatment plants of one range.

The retrofit kits consist of components for biological treatment of domestic wastewater. The ETA covers three variants with the following respective components:

Variant D	Variant D+H	Variant D+P
Charging lifter	Charging lifter	Charging lifter
Secondary sludge lifter	Secondary sludge lifter	Secondary sludge lifter
Clear water lifter	Clear water lifter	Clear water lifter
PLC control unit (on wall bracket or in outdoor cabinet or wall cabinet)	PLC control unit (on wall bracket or in outdoor cabinet or wall cabinet)	PLC control unit (on wall bracket or in outdoor cabinet or wall cabinet)
Air compressor	Air compressor	Air compressor
Air distributor	Air distributor	Air distributor
Weight with diaphragm disc aerator	Weight with diaphragm disc aerator	Weight with diaphragm disc aerator
Fabric tube	Fabric tube	Fabric tube
Mounting parts	Mounting parts	Mounting parts
	UV unit (Modul Type H)	Precipitants tank with mounting bracket and pump

Annex 1 shows the components and the system design of the product.

The product is not covered by a harmonised European standard (hEN).

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

2 Specification of the intended use according to the applicable European Assessment Document

The retrofit kits for small wastewater treatment plants are intended for the retroactive installation in existing sewage works outside buildings to retrofit them to small wastewater treatment plants (including guest houses and businesses) used for populations up to 50 inhabitants. These retrofitted small wastewater treatment plants are designed for the treatment of domestic wastewater. Domestic wastewater does not include rainwater.

The performances given in Section 3 are only valid if the retrofit kit is used in compliance with the specifications and conditions especially the installation in suitable tank(s) of sewage works given in Annex 1 and the small wastewater treatment plant is operated and maintained in accordance with the manufacturer's requirements.

The dimension, geometry and specifications of the tanks which shall be retrofitted shall be conforming to the tank used for the treatment efficiency test.

Load bearing capacity, water tightness and durability of the tanks have to be verified separately.

The verifications- and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the retrofit kits for small wastewater treatment plants of at least 10 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	
Components from metal or metal alloy	class A1
Mounting parts made from metal: other materials:	class A1 small components, no contribution to fire
PP-HT-pipes: Charging lifter Secondary sludge lifter Clear water lifter	class E*
Sealings	NPD
Fabric tube	NPD
Weight with diaphragm disc aerator	no contribution to fire
Pump, air compressor, PLC control unit	covered by other regulations
Retro fit kit type "cleani_CE" complete	NPD
* for wall thickness 1.8 – 3.3 mm	

3.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance	Performance		
		Variant D	Variant D+H	Variant D+P
Treatment efficiency				
Efficiency ratios				
COD	Min. value	89,9 %	89,9 %	91,7 %
	Max. value	98,6 %	98,6 %	98,7 %
	Average value	94,5 %	94,5 %	95,5 %
BOD ₅	Min. value	96,7 %	96,7 %	95,5 %
	Max. value	99,6 %	99,6 %	99,4 %
	Average value	98,6 %	98,6 %	98,4 %
Suspended solids (SS)	Min. value	90,2 %	90,2 %	89,2 %
	Max. value	98,9 %	98,9 %	99,9 %
	Average value	96,5 %	96,5 %	96,8 %

Essential characteristic	Performance			
		Variant D	Variant D+H	Variant D+P
Treatment efficiency				
Effluent parameters				
COD	Min. value	12 mg/l	12 mg/l	11 mg/l
	Max. value	58 mg/l	58 mg/l	53 mg/l
	Average value	35 mg/l	35 mg/l	31 mg/l
BOD ₅	Min. value	2 mg/l	2 mg/l	2 mg/l
	Max. value	7 mg/l	7 mg/l	13 mg/l
	Average value	4 mg/l	4 mg/l	4 mg/l
Suspended solids (SS)	Min. value	3 mg/l	3 mg/l	7,0 mg/l
	Max. value	24 mg/l	24 mg/l	7,8 mg/l
	Average value	11 mg/l	11 mg/l	7,4 mg/l
NH ₄ -N (T ≥ 12°C)	Min. value	0,1 mg/l	0,1 mg/l	0,1 mg/l
	Max. value	1,0 mg/l	1,0 mg/l	1,5 mg/l
	Average value	0,2 mg/l	0,2 mg/l	0,6 mg/l
N _{anorg.} (T ≥ 12°C)	Min. value	2,9 mg/l	2,9 mg/l	8,5 mg/l
	Max. value	18,6 mg/l	18,6 mg/l	20,0 mg/l
	Average value	10,3 mg/l	10,3 mg/l	14,6 mg/l
P _{total}	Min. value	0,4 mg/l	0,4 mg/l	0,3 mg/l
	Max. value	6,7 mg/l	6,7 mg/l	2,5 mg/l
	Average value	3,5 mg/l	3,5 mg/l	1,3 mg/l
Faecalcoliforme	Min. value	npd	0,5 /100 ml	npd
	Max. value		4080 /100 ml	
	Average value		294 /100 ml	

3.4 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Accessibility	fulfilled

3.5 Aspects of durability

Essential characteristic	Performance
Durability	fulfilled

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD No.180041-00-0704 the applicable European legal act is: 2015/1959/EU.

The system to be applied is: 3

For uses subject to regulations on reaction to fire the applicable AVCP systems are generally 1, 3 or 4 depending on the conditions defined in the said Decision. However, taking into account the provisions given in clause 2.2.2 only systems 3 and 4 apply for the products covered by this EAD.

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 18 September 2023 by Deutsches Institut für Bautechnik

Karsten Kathage
Vice President

beglaubigt:
Hartstock



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11

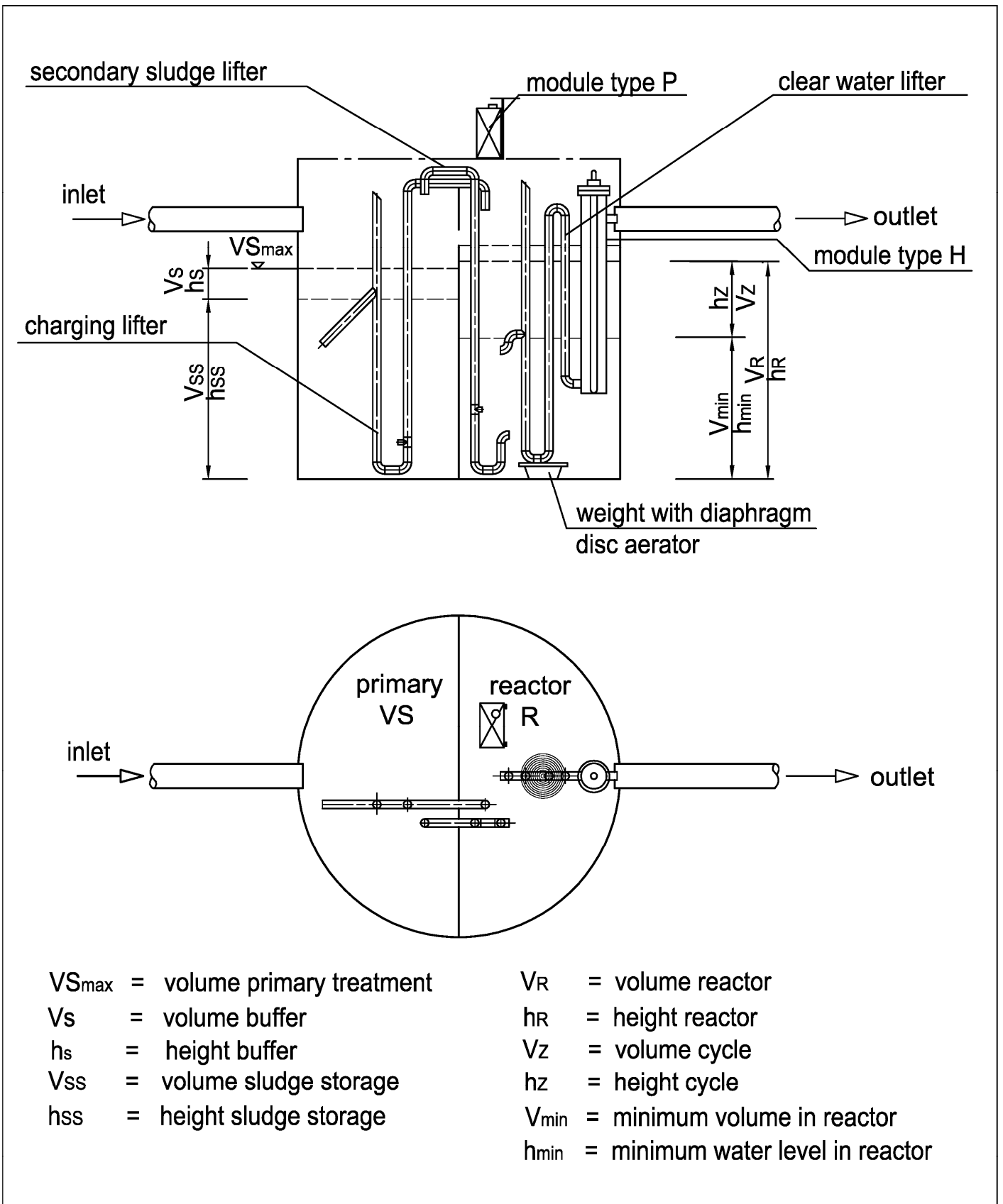
	Description	Specification
1	Aluminium sheet – wall bracket	Optionally also in outdoor cabinet or wall cabinet
2	PLC control unit	Optional, depending on PE and function
3	Air distributor	Servo motor or solenoid valve
4	Air compressor	Size, type, depending on PE and Wt
5	Charging lifter, HT-pipe DN 50 – DN 100	DN depending on PE, red marking
6	Secondary sludge lifter, HT-pipe DN 50 – DN 100	DN depending on PE, green marking
7	Clear water lifter, HT-pipe DN 50 - DN 100	DN depending on PE, optionally as electric pump, blue marking
8	Weight with diaphragm disc aerator	Quantity depending on air compressor
9	Fabric tube	Length object-dependent, standard up to 10 m
10	Module type H	Reactor casing with mounting bracket for UV
11	Module type P	Precipitants tank with mounting bracket and tank

Small wastewater treatment plant retrofit kit type cleani_CE

Parts list cleani_CE

Annex 1.1

English translation prepared by DIBt

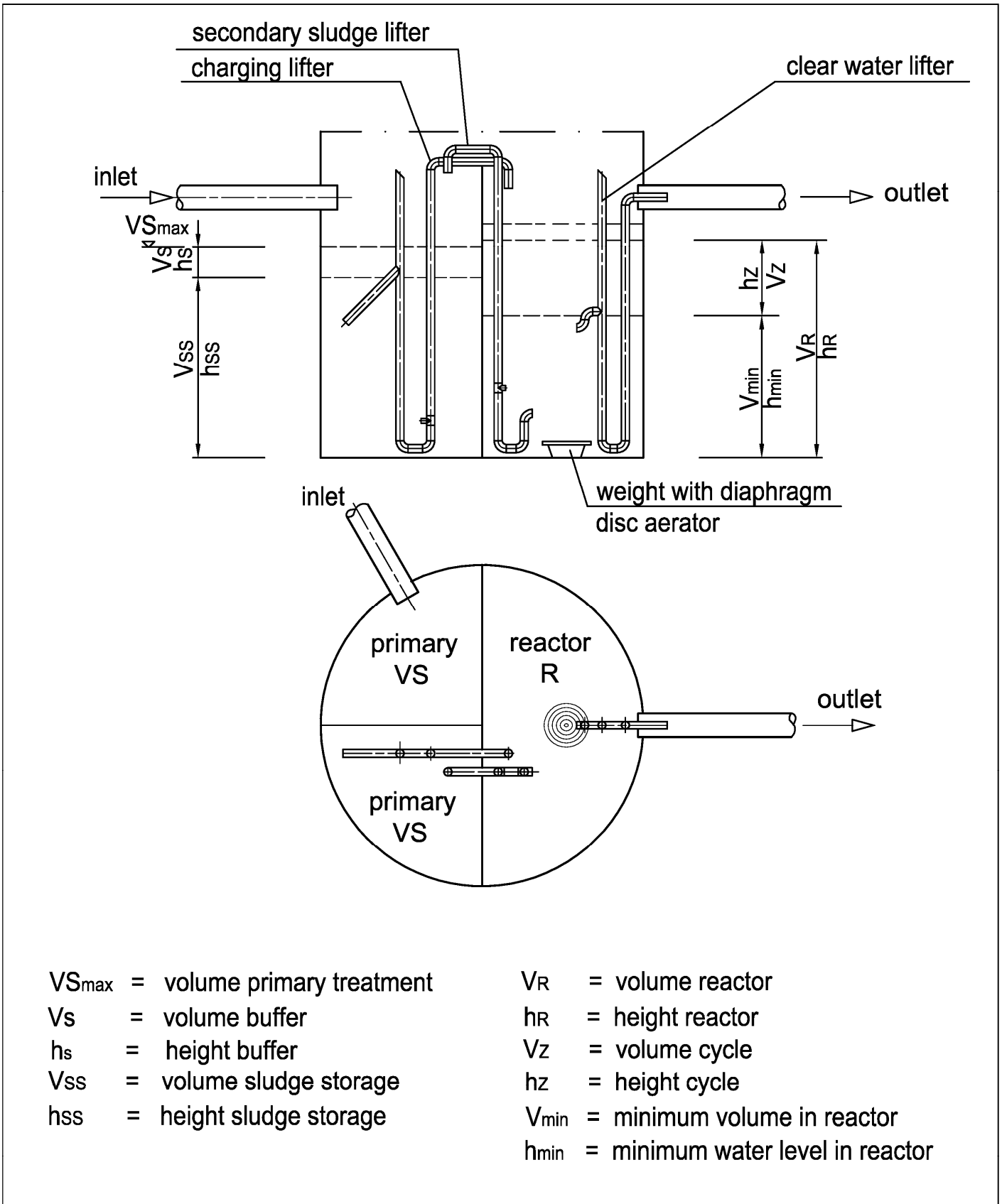


Small wastewater treatment plant retrofit kit type cleani_CE

Single tank system, two-chamber version with module type P and module type H

Annex 1.2

English translation prepared by DIBt

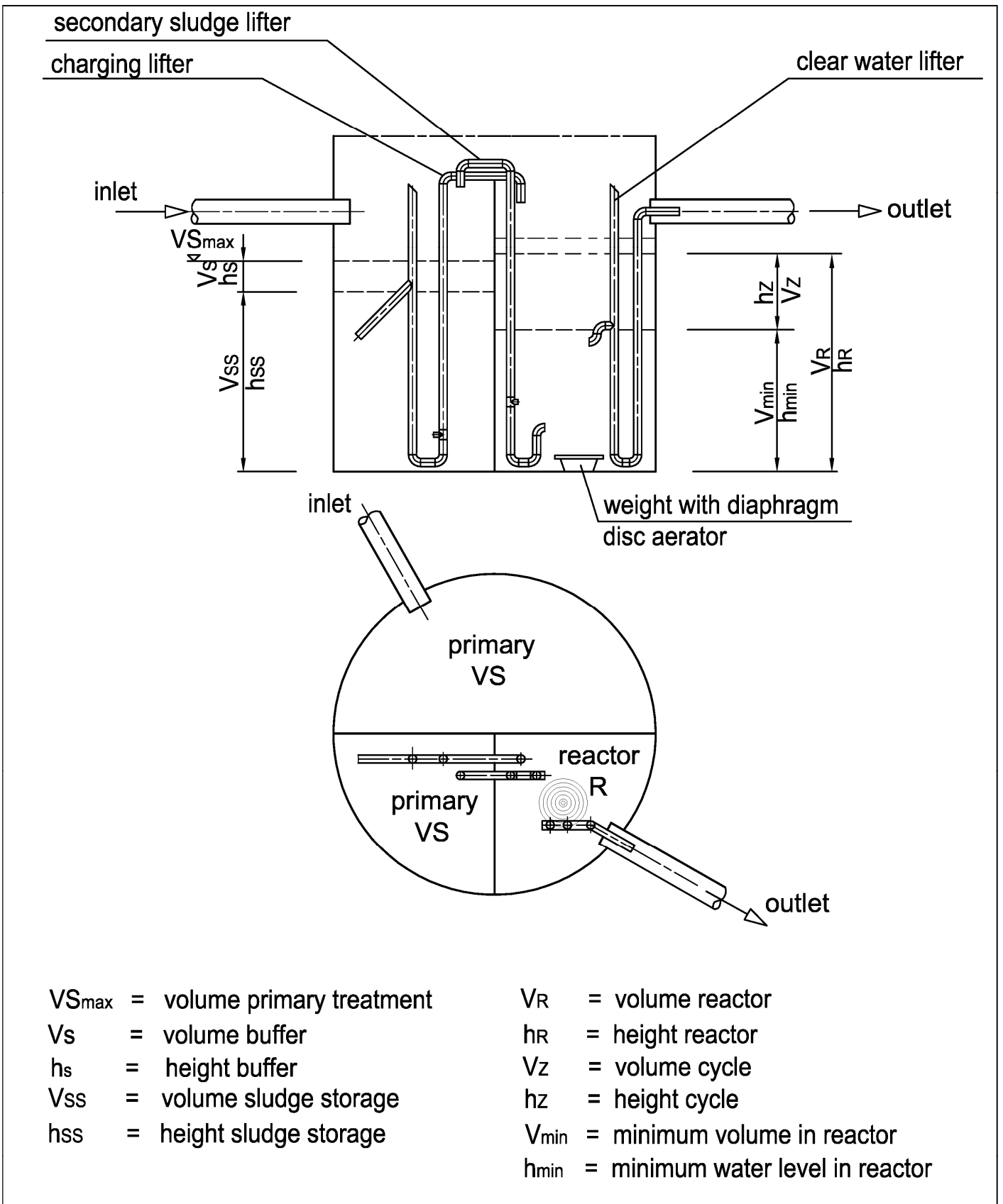


Small wastewater treatment plant retrofit kit type cleani_CE

Single tank system, three-chamber version

Annex 1.3

English translation prepared by DIBt

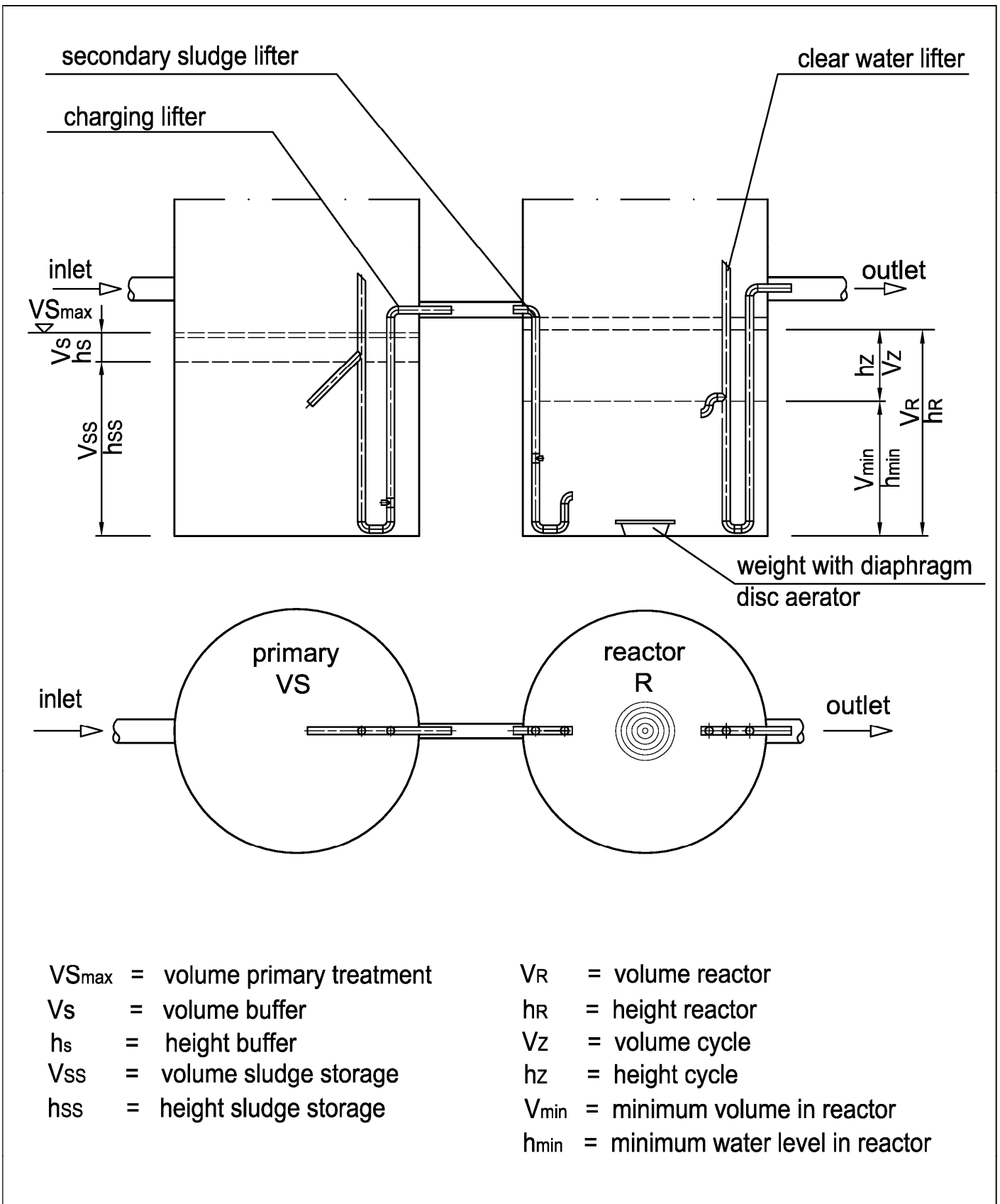


Small wastewater treatment plant retrofit kit type cleani_CE

Single tank system, three-chamber version

Annex 1.4

English translation prepared by DIBt

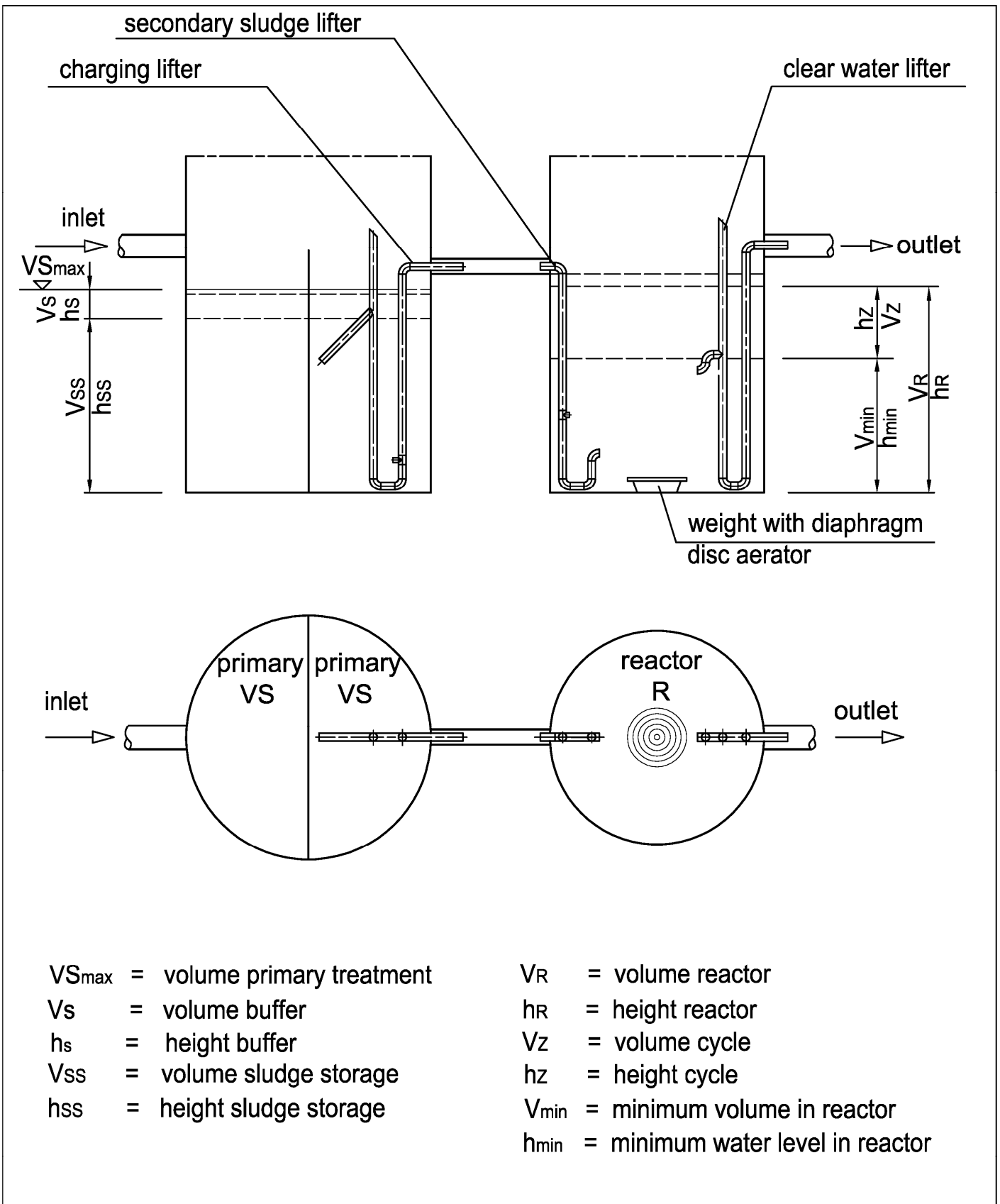


Small wastewater treatment plant retrofit kit type cleani_CE

Two-tank system

Annex 1.5

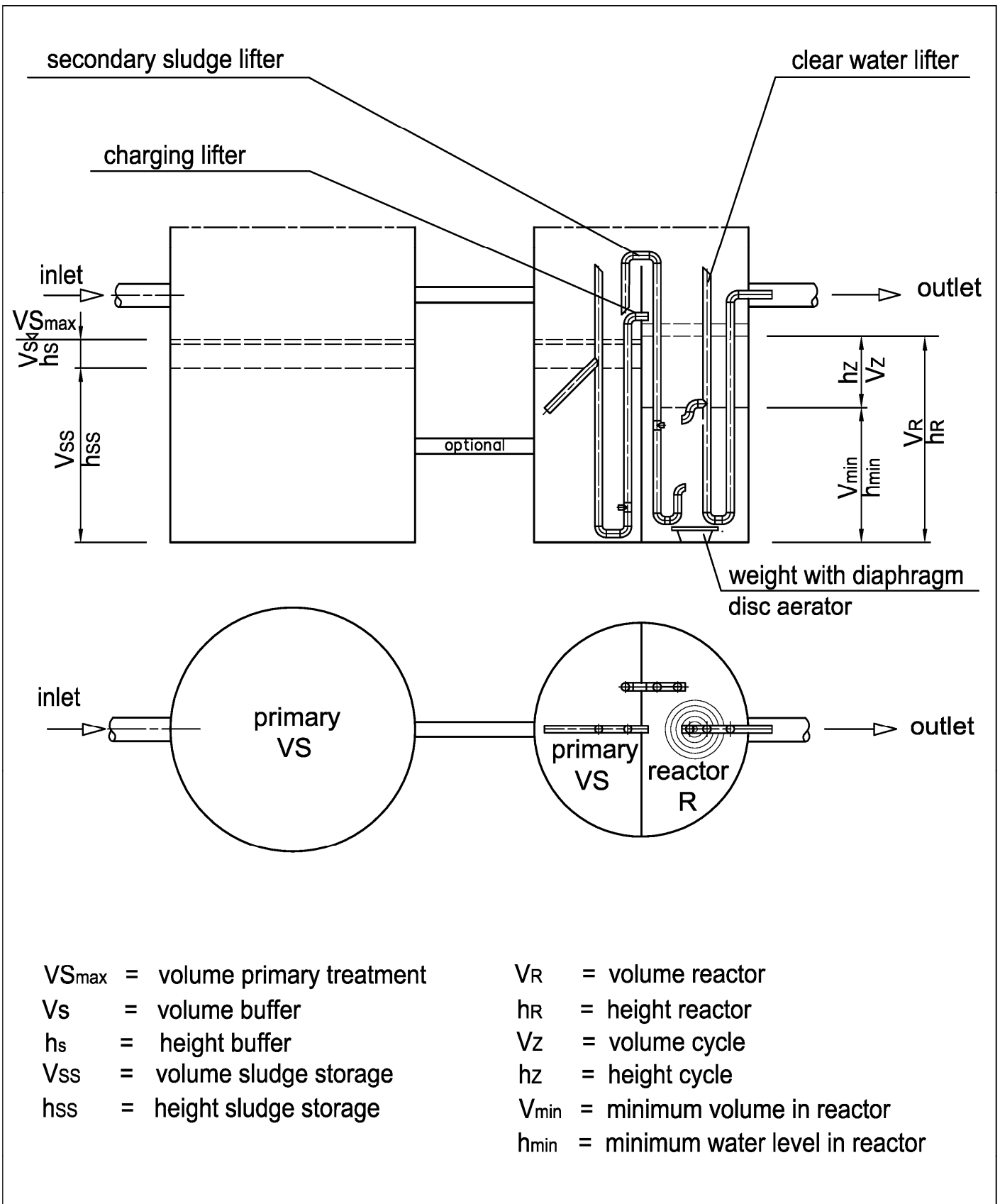
English translation prepared by DIBt



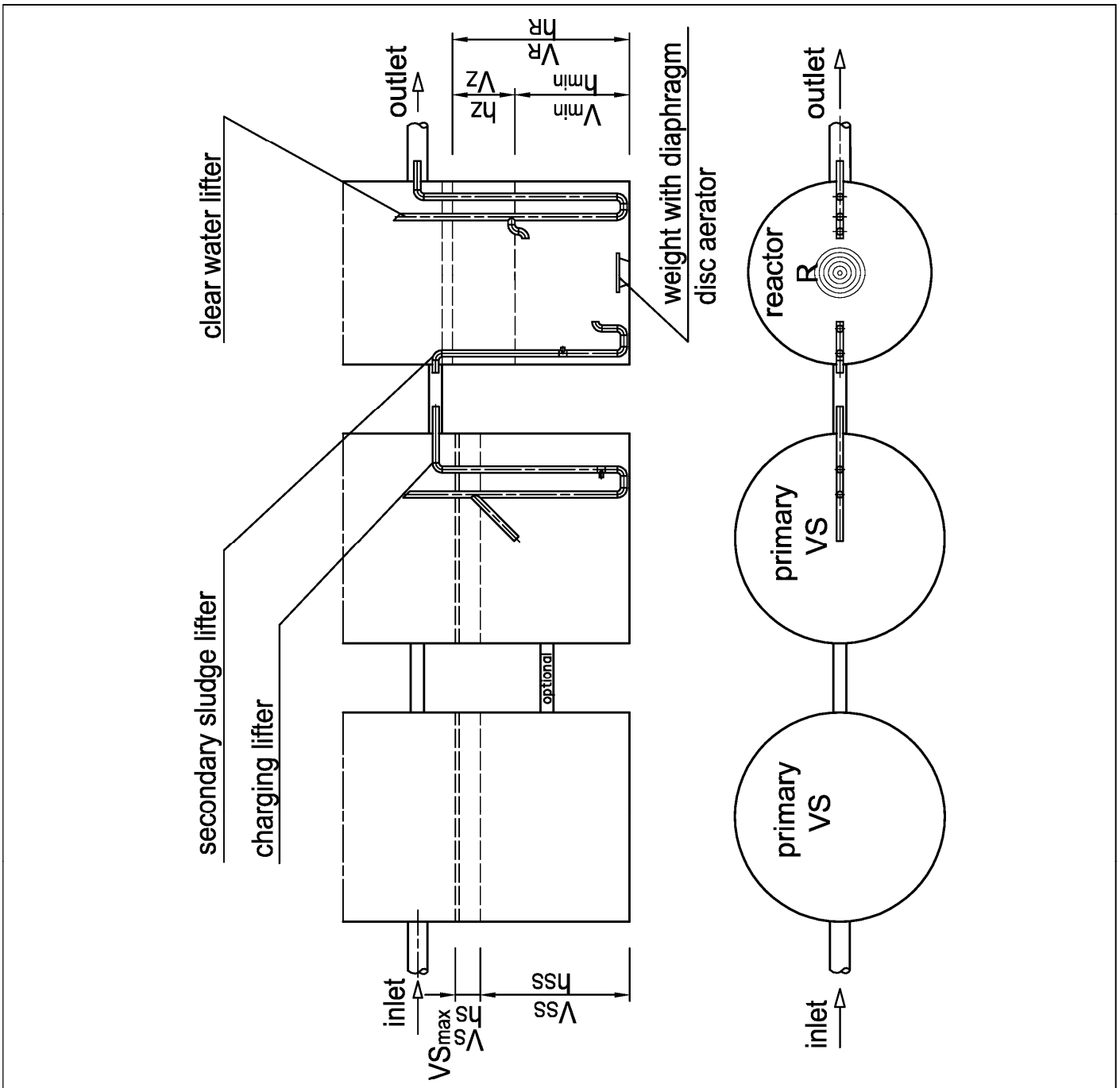
Small wastewater treatment plant retrofit kit type cleani_CE

Two-tank system

Annex 1.6



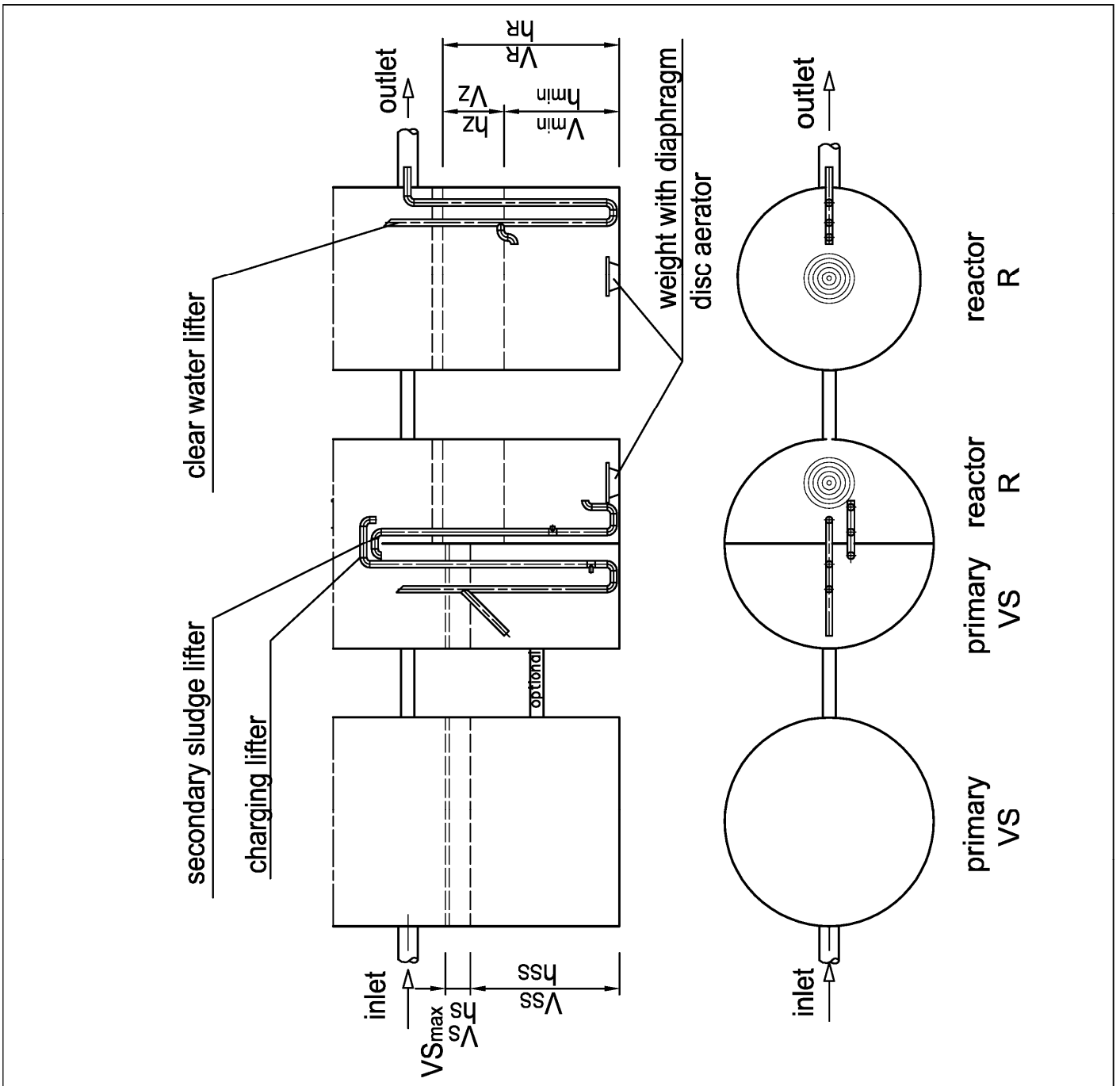
Small wastewater treatment plant retrofit kit type cleani_CE	Annex 1.7
Two-tank system	



VS_{max} = volume primary treatment
 V_s = volume buffer
 h_s = height buffer
 V_{ss} = volume sludge storage
 h_{ss} = height sludge storage

V_R = volume reactor
 h_R = height reactor
 V_z = volume cycle
 h_z = height cycle
 V_{min} = minimum volume in reactor
 h_{min} = minimum water level in reactor

Small wastewater treatment plant retrofit kit type cleani_CE	Annex 1.8
Multi-tank system	



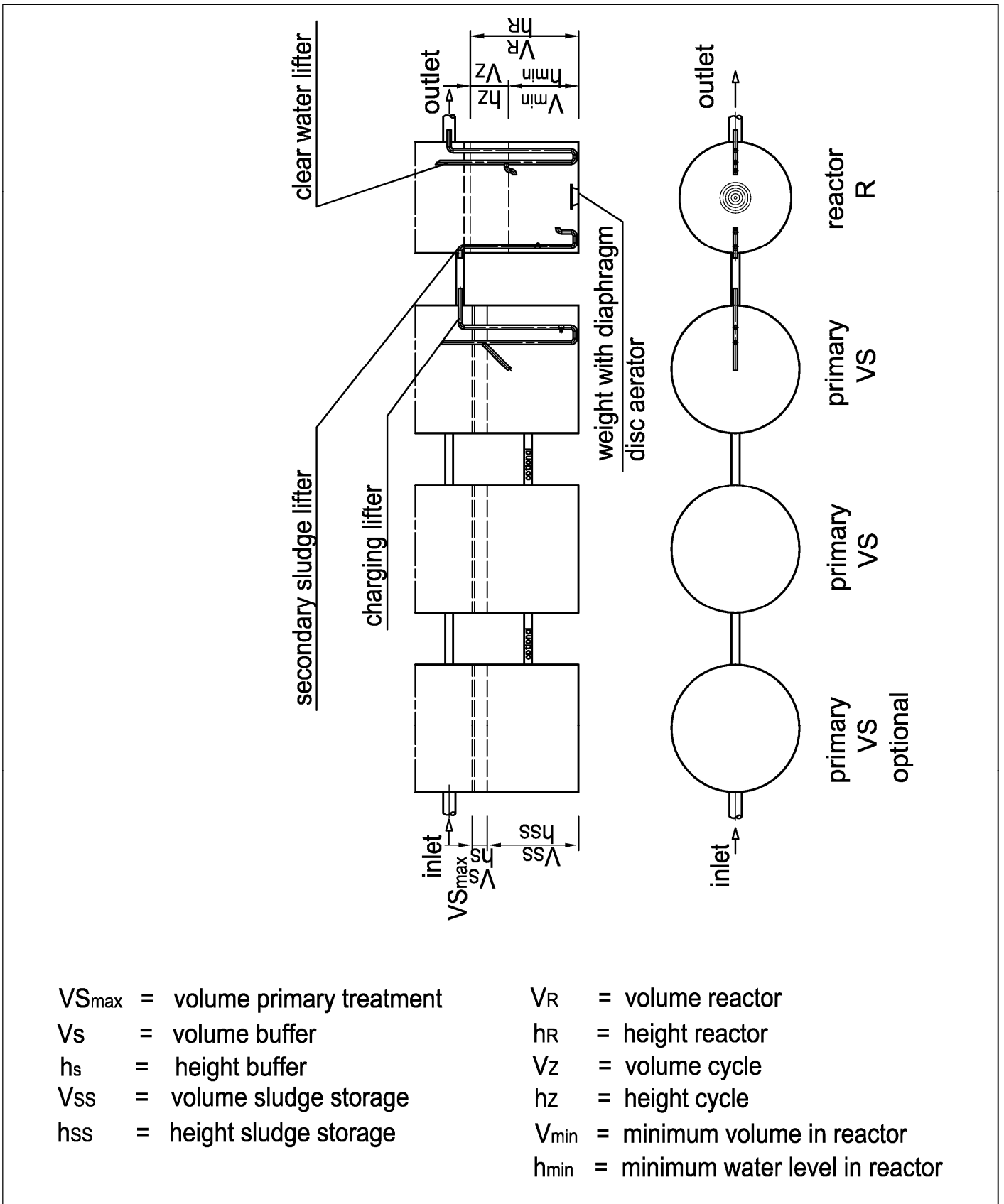
$V_{S_{max}}$ = volume primary treatment
 V_s = volume buffer
 h_s = height buffer
 V_{ss} = volume sludge storage
 h_{ss} = height sludge storage

V_R = volume reactor
 h_R = height reactor
 V_Z = volume cycle
 h_Z = height cycle
 V_{min} = minimum volume in reactor
 h_{min} = minimum water level in reactor

Small wastewater treatment plant retrofit kit type cleani_CE

Multi-tank system

Annex 1.9



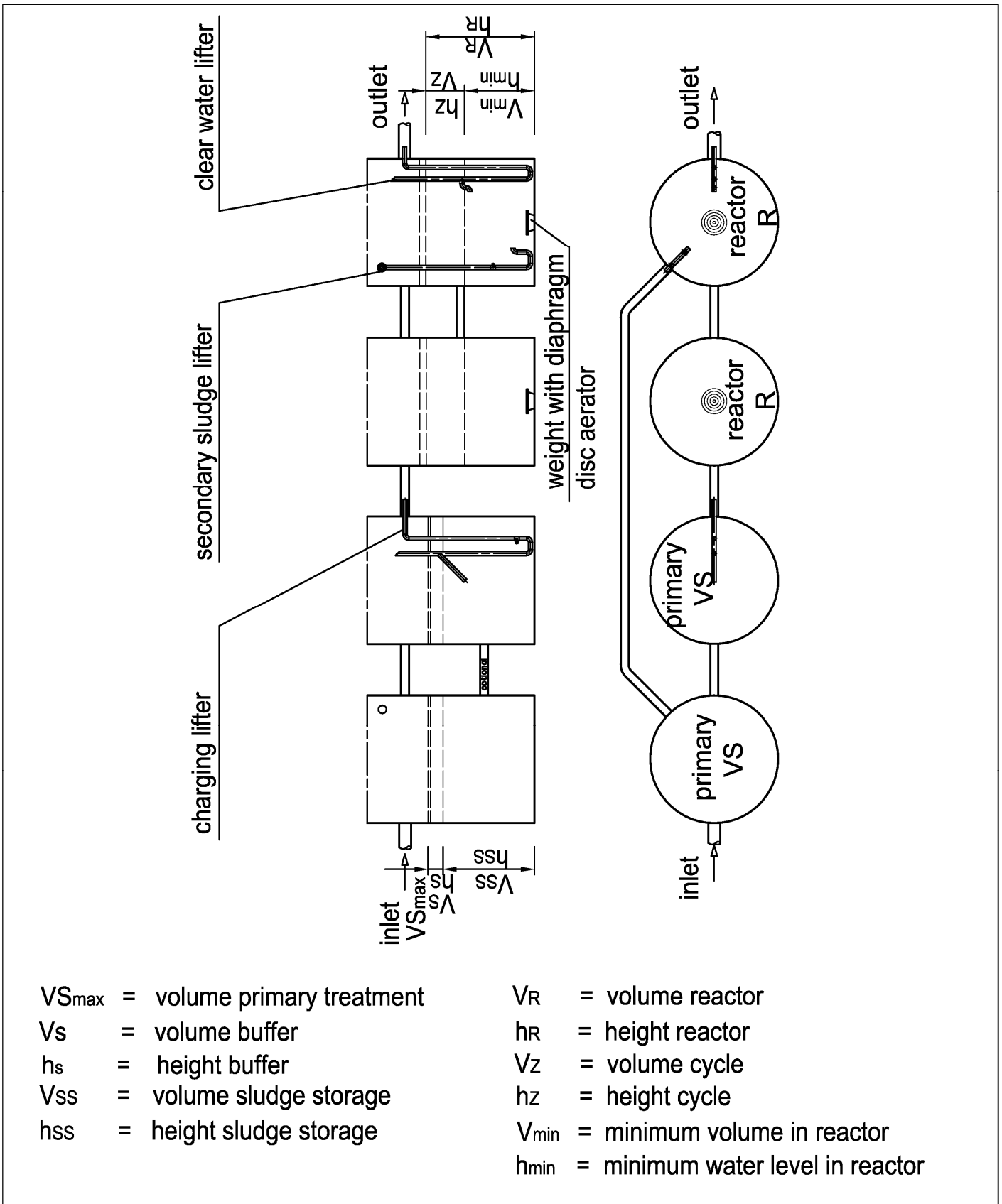
$V_{s_{max}}$ = volume primary treatment
 V_s = volume buffer
 h_s = height buffer
 V_{ss} = volume sludge storage
 h_{ss} = height sludge storage

V_R = volume reactor
 h_R = height reactor
 V_z = volume cycle
 h_z = height cycle
 V_{min} = minimum volume in reactor
 h_{min} = minimum water level in reactor

Small wastewater treatment plant retrofit kit type cleani_CE

Multi-tank system

Annex 1.10



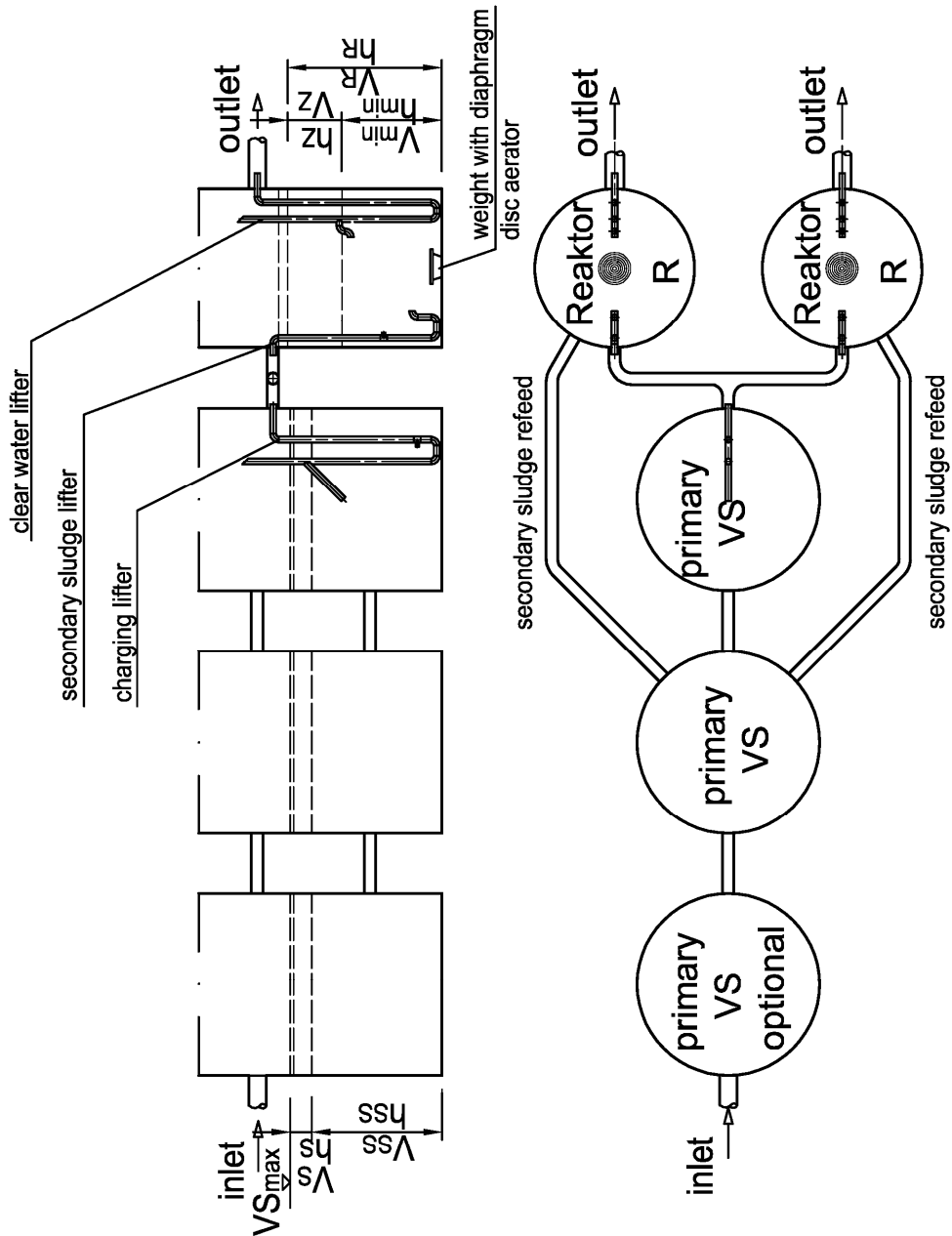
VS_{max} = volume primary treatment
 V_s = volume buffer
 h_s = height buffer
 V_{ss} = volume sludge storage
 h_{ss} = height sludge storage

V_R = volume reactor
 h_R = height reactor
 V_z = volume cycle
 h_z = height cycle
 V_{min} = minimum volume in reactor
 h_{min} = minimum water level in reactor

Small wastewater treatment plant retrofit kit type cleani_CE

Multi-tank system

Annex 1.11



$V_{s_{max}}$ = volume primary treatment
 V_s = volume buffer
 h_s = height buffer
 V_{ss} = volume sludge storage
 h_{ss} = height sludge storage

V_R = volume reactor
 h_R = height reactor
 V_z = volume cycle
 h_z = height cycle
 V_{min} = minimum volume in reactor
 h_{min} = minimum water level in reactor

Small wastewater treatment plant retrofit kit type cleani_CE

Multi-tank system

Annex 1.13

Dimensioning table cleani_@_CE with sludge storage

PE	Inlet		Primary treatment				Biology			OPTIONAL		
	daily waste water inflow $Q_d = (150) \times PE$ [m ³ /d]	daily peak $Q_p = 10 \text{ h/d}$ [m ³ /h]	Q_{10} $Q_{10} = Q_p / (Q_p \cdot h)$ [m ³]	BOD ₅ /d 60g x PE [Kg]	sludge storage 250l x PE [m ³]	buffer $V_{a,FW} = 6 \times Q_{10}$ [m ³]	BOD ₅ /d after primary treatment $B_{SB,FW} = 60g \times PE$ [Kg]	reactor volume $V_{R10} = 300l \times PE$ [m ³]	cycle volume $V_c = (45l) \times PE$ [m ³]	volumetric load B_k [kg/m ³]	module type H UV/Watt	module type P ml precipitant per cycle
4	0,60	10	0,06	0,24	1,00	0,56	0,24	1,20	0,18	0,20	40	17
6	0,90	10	0,09	0,36	1,50	0,74	0,36	1,80	0,27	0,20	40	26
8	1,20	10	0,12	0,48	2,00	0,92	0,48	2,40	0,36	0,20	40	34
10	1,50	10	0,15	0,60	2,50	0,90	0,60	3,00	0,45	0,20	40	43
12	1,80	10	0,18	0,72	3,00	1,08	0,72	3,60	0,54	0,20	40	51
14	2,10	10	0,21	0,84	3,50	1,26	0,84	4,20	0,63	0,20	40	60
16	2,40	10	0,24	0,96	4,00	1,44	0,96	4,80	0,72	0,20	75	68
18	2,70	10	0,27	1,08	4,50	1,62	1,08	5,40	0,81	0,20	75	77
20	3,00	10	0,30	1,20	5,00	1,80	1,20	6,00	0,90	0,20	75	85
22	3,30	10	0,33	1,32	5,50	1,98	1,32	6,60	0,99	0,20	75	93
24	3,60	10	0,36	1,44	6,00	2,16	1,44	7,20	1,08	0,20	75	102
26	3,90	10	0,39	1,56	6,50	2,34	1,56	7,80	1,17	0,20	75	110
28	4,20	10	0,42	1,68	7,00	2,52	1,68	8,40	1,26	0,20	75	119
30	4,50	10	0,45	1,80	7,50	2,70	1,80	9,00	1,35	0,20	75	127
32	4,80	10	0,48	1,92	8,00	2,88	1,92	9,60	1,44	0,20	120	136
34	5,10	10	0,51	2,04	8,50	3,06	2,04	10,20	1,53	0,20	120	144
36	5,40	10	0,54	2,16	9,00	3,24	2,16	10,80	1,62	0,20	120	153
38	5,70	10	0,57	2,28	9,50	3,42	2,28	11,40	1,71	0,20	120	161
40	6,00	10	0,60	2,40	10,00	3,60	2,40	12,00	1,80	0,20	120	170
42	6,30	10	0,63	2,52	10,50	3,78	2,52	12,60	1,89	0,20	120	178
44	6,60	10	0,66	2,64	11,00	3,96	2,64	13,20	1,98	0,20	120	186
46	6,90	10	0,69	2,76	11,50	4,14	2,76	13,80	2,07	0,20	120	195
48	7,20	10	0,72	2,88	12,00	4,32	2,88	14,40	2,16	0,20	120	203
50	7,50	10	0,75	3,00	12,50	4,50	3,00	15,00	2,25	0,20	120	212

General requirements:
Flow rate primary treatment <= 0,2 m/h
Water depth reactor >= 1,00 m

Special cases not listed in the table can be interpolated linearly!

Small wastewater treatment plant retrofit kit type cleani_@_CE

Dimensioning table cleani_@_CE with sludge storage

Annex 1.14

English translation prepared by DIBt

Dimensioning table cleani_CE with primary treatment

PE	Inlet			Primary treatment			Biology			OPTIONAL		
	daily waste water inflow $Q_d = (150) \times PE$ [m³/d]	daily peak $Q_p = 10 \text{ h/d}$ [m³/h]	Q_{10} $Q_{10} = Q_d / (Q_d \cdot h)$ [m³]	BOD ₅ /d 60g x PE [Kg]	primary treatment 425l x PE [m³]	buffer $V_{F, min} = 6 \times Q_{10}$ [m³]	BOD ₅ /d after primary treatment $B_{SB, min} = 40g \times PE$ [Kg]	reactor volume $V_{100} = 200l \times PE$ [m³]	cycle volume $V_c = (45l) \times PE$ [m³]	volumetric load B_k [kg/m³]	module type H UV/Watt	module type P ml percipitant per cycle
4	0,60	10	0,06	0,24	2,00	0,56	0,16	1,00	0,18	0,16	40	17
6	0,90	10	0,09	0,36	2,55	0,74	0,24	1,20	0,27	0,20	40	26
8	1,20	10	0,12	0,48	3,40	0,92	0,32	1,60	0,36	0,20	40	34
10	1,50	10	0,15	0,60	4,25	0,90	0,40	2,00	0,45	0,20	40	43
12	1,80	10	0,18	0,72	5,10	1,08	0,48	2,40	0,54	0,20	40	51
14	2,10	10	0,21	0,84	5,95	1,26	0,56	2,80	0,63	0,20	40	60
16	2,40	10	0,24	0,96	6,80	1,44	0,64	3,20	0,72	0,20	75	68
18	2,70	10	0,27	1,08	7,65	1,62	0,72	3,60	0,81	0,20	75	77
20	3,00	10	0,30	1,20	8,50	1,80	0,80	4,00	0,90	0,20	75	85
22	3,30	10	0,33	1,32	9,35	1,98	0,88	4,40	0,99	0,20	75	93
24	3,60	10	0,36	1,44	10,20	2,16	0,96	4,80	1,08	0,20	75	102
26	3,90	10	0,39	1,56	11,05	2,34	1,04	5,20	1,17	0,20	75	110
28	4,20	10	0,42	1,68	11,90	2,52	1,12	5,60	1,26	0,20	75	119
30	4,50	10	0,45	1,80	12,75	2,70	1,20	6,00	1,35	0,20	75	127
32	4,80	10	0,48	1,92	13,60	2,88	1,28	6,40	1,44	0,20	120	136
34	5,10	10	0,51	2,04	14,45	3,06	1,36	6,80	1,53	0,20	120	144
36	5,40	10	0,54	2,16	15,30	3,24	1,44	7,20	1,62	0,20	120	153
38	5,70	10	0,57	2,28	16,15	3,42	1,52	7,60	1,71	0,20	120	161
40	6,00	10	0,60	2,40	17,00	3,60	1,60	8,00	1,80	0,20	120	170
42	6,30	10	0,63	2,52	17,85	3,78	1,68	8,40	1,89	0,20	120	178
44	6,60	10	0,66	2,64	18,70	3,96	1,76	8,80	1,98	0,20	120	186
46	6,90	10	0,69	2,76	19,55	4,14	1,84	9,20	2,07	0,20	120	195
48	7,20	10	0,72	2,88	20,40	4,32	1,92	9,60	2,16	0,20	120	203
50	7,50	10	0,75	3,00	21,25	4,50	2,00	10,00	2,25	0,20	120	212

General requirements:
Flow rate primary treatment $\leq 0,2$ m/h
Retention time $\geq 1,5$ h, reduction COD and BOD₅ by 33%
Water depth reactor $\geq 1,00$ m

*1 Minimum volume primary treatment $\geq 2,00$ m³
*2 Minimum volume SBR-reactor $\geq 1,00$ m³

Special cases not listed in the table can be interpolated linearly!

Small wastewater treatment plant retrofit kit type cleani_CE

Dimensioning table cleani_CE with primary treatment

Annex 1.15