

Erich Stallkamp ESTA GmbH  
德国Stallkamp（斯多康）机械集团公司

斯多康（北京）科技有限公司

## 不锈钢罐系列

装配快捷 | 寿命长 | 适应各种需求  
Quick assembly | Durable | For all requirements



# 选材论证

## Steely arguments

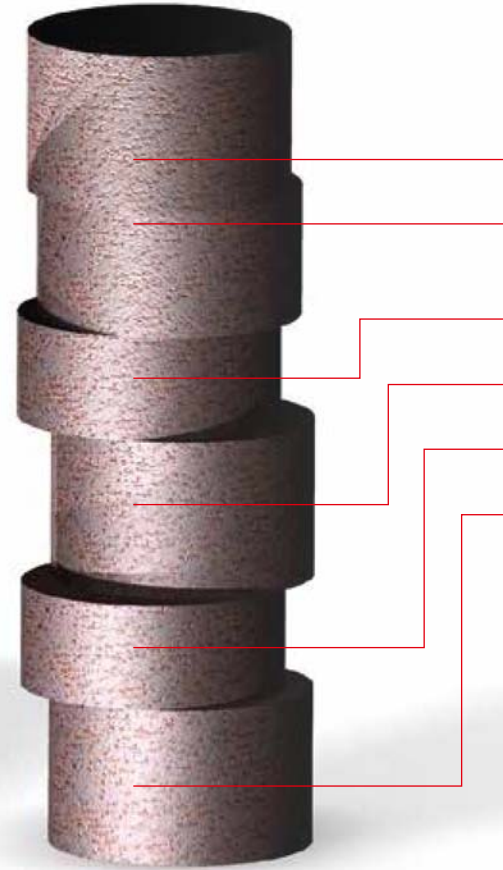
不锈钢 | Stainless steel  
安装费用 | Assembly costs

采购费用 | Material costs



## 费用比较

## Stainless steel cost comparison



### 30年的不锈钢罐制造经验！

- 特有的表面涂层保证了罐体非常好的抗腐蚀性（化学、生物等）
- 灵活性高，可根据需求做各种规格的装配
- 装配式罐体具有非常好的扩展性：可随时加高加深，还可整体拆卸移动

### 30 years of stainless steel tanks

- Corrosion resistance and chemical and biological neutrality due to razor-thin, chemically resistant passive layers
- Absolutely flexible
- Subsequent expansion through adding height and depth, disassembly or displacement possible any time thanks to segment-like design

## 其它材质 | Other materials

- 额外运营费用 | Additional operating costs
- 更新维护费用 | Renovation and repair costs
- 生产损失费用 | Production loss costs
- 安装费用 | Assembly costs
- 采购费用 | Material costs
- 废弃处置费 | Hazardous waste disposal costs

## 不锈钢----最佳选择!

选择不锈钢材质做罐体总是值得的! 维护和使用成本最低。与此同时, Stallkamp不锈钢罐的使用寿命是是无与伦比的长。不锈钢由于其特殊的化学成分而具有非常好的抗腐蚀性。由于它的成分中含有铬, 形成耐腐蚀性强的钝化层隔绝表面与空气中的水或氧发生化学反应。如果钝化层由于外部影响而被损坏, 它会由不锈钢的特殊成分矩阵重新建立起防腐层。与其他材料或材料组合相比, 不锈钢在使用后可以完全回收, 无任何问题。

## Stainless steel - What else?

It is always worth opting for stainless steel. Secondary costs for maintenance and repair are reduced to a minimum. At the same time, the lifespan of Stallkamp stainless steel tanks is pretty much unrivalled. Rust-free stainless steel owes its resistance to corrosion to a simple chemical reaction. Due to its chrome content, a razor-thin, chemically resistant passive layer is formed at the surface in connection with the oxygen in the air or water. If the passive layer is damaged due to external influences, it re-builds itself from the matrix of the stainless steel. In contrast with other materials or material combinations, rust-free stainless steel can be fully recycled without any issues after use.

不锈钢材质编号 1.4301 ( DIN 17440/EN 10088-2)  
**Series production material no. 1.4301 as per DIN 17440/EN 10088-2 (or equivalent)**

国家标准	德标 (DIN/EN)	美标 (ASTM)	英标 (BS)	法标 (NF)	日标 (JIS)	俄标 (GOST)	葡标 (PN)
缩写 Abbreviation	X 5 CrNi 18-10	304	304 S 31	Z 7 CN 18-09	SUS 304	08 Ch 18N 10	OH 18N 9

不锈钢材质编号 1.4571 ( DIN 17440/EN 10088-2)  
**or if required, material no. 1.4571 as per DIN 17440/EN 10088-2 (or equivalent)**

国家标准	德标 (DIN/EN)	美标 (ASTM)	英标 (BS)	法标 (NF)	日标 (JIS)	俄标 (GOST)	葡标 (PN)
缩写 Abbreviation	X 6 CrNiMoTi 17-12-2	316 TI	320 S 31	Z 6 CNDT 17-12	SUS 316 Ti	10 Ch 17N 13 M2T	H 17N 13 M2T

# 牢固与灵活

## Indestructible and flexible

1984年以来在工业和农业领域广泛使用

不锈钢储液罐，用于水、废水、粪尿、发酵物等物料的储存，罐体同样用于沼气项目。

- 由特殊的高强度不锈钢和加固的边缘型材组成，形成非常坚固的罐体
- 装配快速简洁
- 不需要按DIN 11622规定做年度检查
- Stallkamp可提供屋顶覆盖系统和所有附加组件
- 寿命长
- 由专业装配团队安装
- 广泛用于农业、工业等各领域

## Wide-ranging possibilities for industry and agriculture since 1984

As stainless steel liquid storage tanks for water, waste water, manure, fermentation residues, etc., our tanks can also be used for biogas.

- Extremely sturdy tank walls due to special high-strength stainless steel and extra firm edge profiles
- Quick and simple assembly of the stainless steel segments
- No annual inspection obligation as per DIN 11622
- Stallkamp roof systems and add-on components offer all options
- Long lifespan due to high-grade stainless steel
- Assembly by our assembly teams
- Ideal for agriculture, industry and commerce



带膜屋顶的波纹不锈钢储液罐  
Corrugated steel tanks with a membrane roof



不锈钢污水罐  
Stainless steel tank for waste water



带升降装置的组装现场  
Assembly with lifting gear



污水罐  
Waste water tank

## 快速组装，永久安全！

我们可供应罐体和附件

- 罐体顶盖：不锈钢屋顶、薄膜屋顶、双层膜屋顶或玻璃钢屋顶
- 钢板厚度从底层向上逐层递减
- 不锈钢底板
- 配备工作平台
- 铝制爬梯
- 固定式梯子
- 各种观察口
- 溢流管道
- 各种穿壁管道/法兰
- 泵送和泵出端口
- 各种泵和搅拌器

## Quickly assembled, permanently secure!

We supply individual components and tank accessories

- Tank cover: stainless steel roofs, membrane roofs, double membrane roof or GRP roof
- Tank insulation with cladding made from trapezoidal sheets
- stainless steel floor
- Work platforms
- Aluminium ladders
- Stairs
- Fixed ladders
- Inspection openings in various designs
- Overflow channels
- Various wall bushings/flanges
- Suction and filling ports
- Various pump and agitator technologies



# 平板不锈钢罐

## Stainless steel tanks

### 平板不锈钢罐

由混凝土底板上的加强型不锈钢护套板分段装配而成。每片钢板有水平和垂直接头并与中间型材螺纹连接。在垂直接头中，连接板重叠并通过专门开发的螺纹连接件进行连接。

罐体的上边缘由额外加固的包边构成。使用特殊的液体密封剂将外壳钢板彼此密封并且密封到混凝土底板上。罐壁与底板的连接由不锈钢制成的周围底角制成，该底角用螺栓锚固件固定。

除此之外，还有完整的开发程序和最高质量标准生产。CAD / CAM系统帮助我们的设计师进行规划和设计。我们的专业技术与最先进的生产设备的完美结合生产出卓越持久的产品。

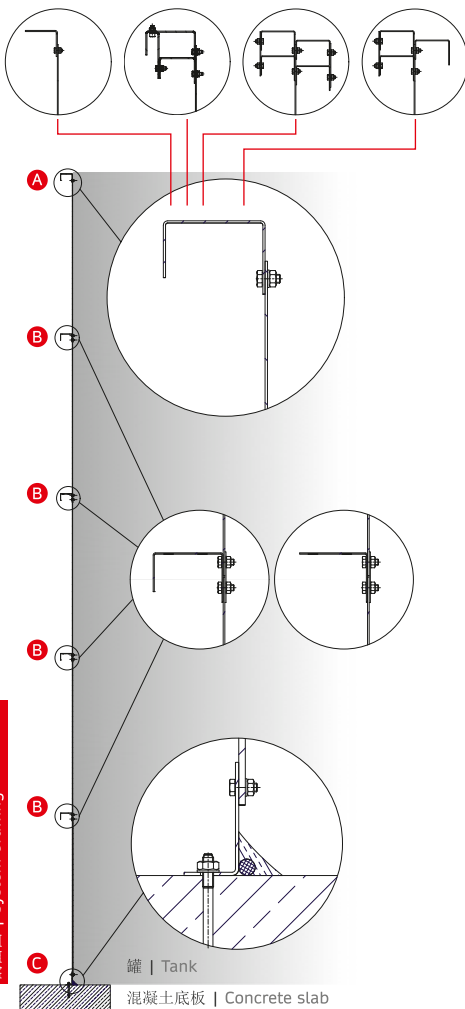
The stainless steel tank is created in a segment-like design from profile-reinforced stainless steel shell plates on a concrete base plate. The plates are slotted together at the horizontal joints and bolted together with the intermediate profiles. At the vertical joints, the shell plates overlap and are joined using internally developed screw connections.

The upper tank edge is constructed from an extra-rigid edge profile. The shell plates are joined together and sealed with the concrete slab using a manure and waste

water-proof special sealant. The connection of the tank wall to the base plate is made by a circular stainless steel floor bracket, which is fastened with bolt anchors.

All of this is subject to the highest standards of quality throughout development and completion in-house. CAD/CAM systems support our designers in planning and design. The perfect combination of the special expertise of our staff and state-of-the-art production facilities mean excellent, durable products.

包边设计根据客户不同需求而不同 | Edge design varies according to requirements



剖面图 | System drawing

- A** 包边: 根据罐体规格和容量定制  
Edge profile: tailored to tank size and load
- B** 中部固定件: 根据罐体规格  
Intermediate profile: based on tank size
- C** 底部支撑: 由地板支架和混凝土槽之间的密封槽密封  
Floor bracket: Sealing channel bonds with floor bracket and concrete slab

不锈钢罐规格汇总表 | Stainless steel tank overview

每层片数 Plates per ring	层数   Rings		高   Height (m)							
	直径 Tank Ø (m)	占地面积 tank area (m²)	1	2	3	4	5	6	7	8
			总容积(m³)   Gross volume (m³)							
3	2,303	4	6	11	16					
4	3,071	7	10	19	29					
5	3,839	12	16	30	45					
6	4,607	17	23	43	64					
7	5,374	23	31	59	88	116				
8	6,142	30	40	77	114	151	189			
9	6,910	37	51	98	145	192	239	286		
10	7,678	46	63	121	179	237	295	353		
11	8,445	56	76	146	216	286	356	427	497	
12	9,213	67	90	174	257	341	424	508	591	
13	9,981	78	106	204	302	400	498	596	694	792
14	10,749	91	123	237	350	464	577	691	805	918
15	11,516	104	141	272	402	532	663	793	924	1,054
16	12,284	119	161	309	457	606	754	903	1,051	1,199
17	13,052	134	181	349	516	684	851	1,019	1,186	1,354
18	13,820	150	203	391	579	767	954	1,142	1,330	1,518
19	14,588	167	226	436	645	854	1,063	1,273	1,482	1,691
20	15,355	185	251	483	715	946	1,178	1,410	1,642	1,874
21	16,123	204	277	532	788	1,044	1,299	1,555	1,810	2,066
22	16,891	224	304	584	865	1,145	1,426	1,706	1,987	2,267
23	17,659	245	332	638	945	1,252	1,558	1,865	2,172	2,478
24	18,426	267	361	695	1,029	1,363	1,697	2,031	2,365	2,698
25	19,194	289	392	754	1,117	1,479	1,841	2,203	2,566	2,928
26	19,962	313	424	816	1,208	1,600	1,991	2,383	2,775	3,167
27	20,730	337	457	880	1,302	1,725	2,148	2,570	2,993	3,415
28	21,497	363	492	946	1,401	1,855	2,310	2,764	3,218	3,673
29	22,265	389	528	1,015	1,503	1,990	2,477	2,965	3,452	3,940
30	23,033	417	565	1,086	1,608	2,130	2,651	3,173	3,695	4,216
31	23,801	445	603	1,160	1,717	2,274	2,831	3,388	3,945	4,502
32	24,568	474	642	1,236	1,829	2,423	3,017	3,610	4,204	4,797
33	25,336	504	683	1,314	1,946	2,577	3,208	3,839	4,470	5,102
34	26,104	535	725	1,395	2,065	2,735	3,405	4,075	4,745	5,416
35	26,872	567	768	1,479	2,189	2,899	3,609	4,319	5,029	5,739
36	27,639	600	813	1,564	2,315	3,067	3,818	4,569	5,320	6,071
37	28,407	634	859	1,652	2,446	3,239	4,033	4,826	5,620	6,413
38	29,175	669	906	1,743	2,580	3,417	4,254	5,091	5,928	6,765
39	29,943	704	954	1,836	2,717	3,599	4,481	5,362	6,244	7,125
40	30,711	741	1,004	1,931	2,859	3,786	4,713	5,641	6,568	7,496
41	31,478	778	1,055	2,029	3,003	3,978	4,952	5,926	6,901	7,875
42	32,246	817	1,107	2,129	3,152	4,174	5,196	6,219	7,241	8,264
43	33,014	856	1,160	2,232	3,303	4,375	5,447	6,519	7,590	8,662
44	33,782	896	1,214	2,337	3,459	4,581	5,703	6,825	7,947	9,070
45	34,549	937	1,270	2,444	3,618	4,792	5,965	7,139	8,313	9,487

可根据客户需求提供其它规格和材质  
Additional sizes and materials upon request

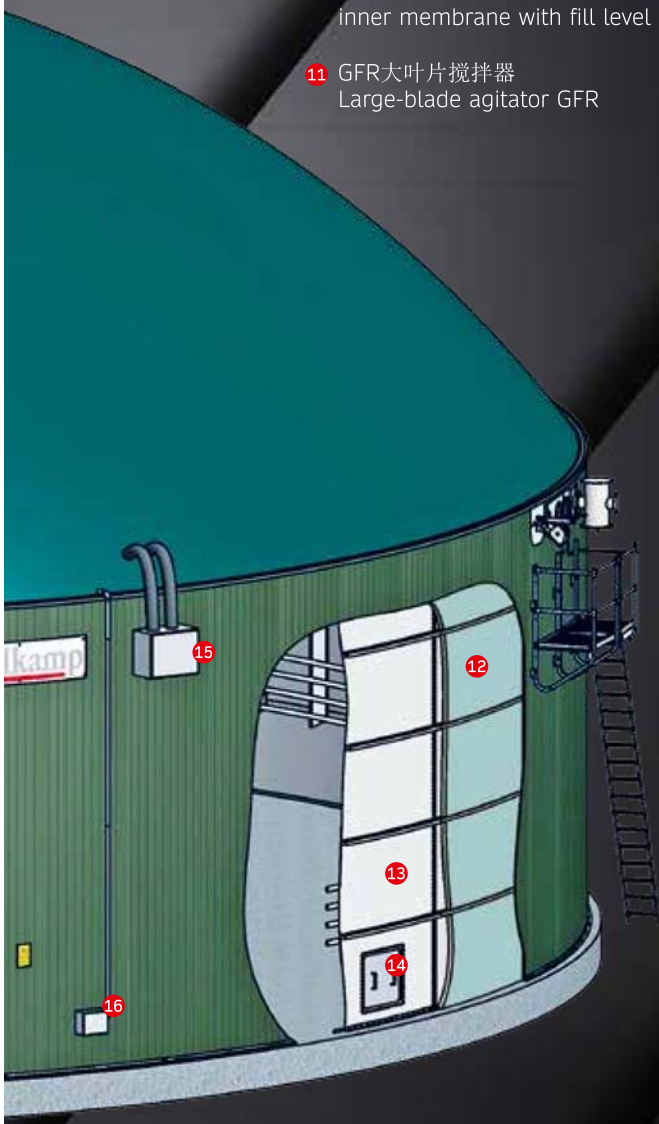
# 平板不锈钢发酵罐

Stainless steel digester





- 1 干物质进料口 | Solids input
- 2 气体溢出口 | Gas removal
- 3 搅拌器支架气密装置  
Gas-tight wall control for agitator
- 4 双层检查口 | Double inspection glass
- 5 过载/负压保护器  
Excess/negative pressure protection
- 6 防爆隔膜 | Bursting disc
- 7 波纹不锈钢加热管  
Heating from corrugated stainless steel pipe
- 8 不锈钢支撑圈 | Stainless steel crown ring
- 9 中心支撑杆 | Central support
- 10 双膜顶:  
外膜  
可调节高度的内膜  
Double membrane roof consisting of:  
outer membrane  
inner membrane with fill level belt
- 11 GFR大叶片搅拌器  
Large-blade agitator GFR
- 12 保温层 | Insulation
- 13 不锈钢罐 | Stainless steel tank
- 14 检查口 | Inspection opening
- 15 供气系统 | Support air supply
- 16 气体显示 | Gas fill level indicator
- 17 取样防护装置  
Frost-protection cover for taking samples
- 18 镀锌铝板防护层  
Cladding from aluminium trapezoidal sheets
- 19 加热口 | Heating port
- 20 LAR长轴搅拌器  
Longitudinal axis agitator LAR with lattice mast
- 21 带梯子的工作平台  
Work platform with ladders
- 22 带气密装置的TMR潜水搅拌器  
Submersible motor agitator TMR with gas-tight wall bushing
- 23 液体进料口/排空口 (排渣口)  
Suction and filling ports through the tank wall
- 24 基板线 | Substrate line



# 波纹不锈钢罐

## Corrugated steel tank

波纹钢罐体是由不锈钢板轧制而成。不锈钢板先轧制波纹和卷成圆弧形，然后组装成罐体。波纹钢罐底板由钢筋混凝土制成。单独的钢板在水平和垂直的接合处重叠固定，并使用特制的螺纹连接件连接。

罐体的上边缘由加固的包边组成。使用特殊的防水专用密封剂将外壳板彼此密封，并且密封到混凝土底板上。罐壁与底板的连接由不锈钢制成的周围底角制成，该底角用螺栓锚固件固定。

除此之外，还有完善的开发程序和最高质量标准生产。CAD/CAM系统帮助我们的设计师进行规划和设计。我们的专业技术与最先进的生产设备的完美结合生产出卓越持久的产品。

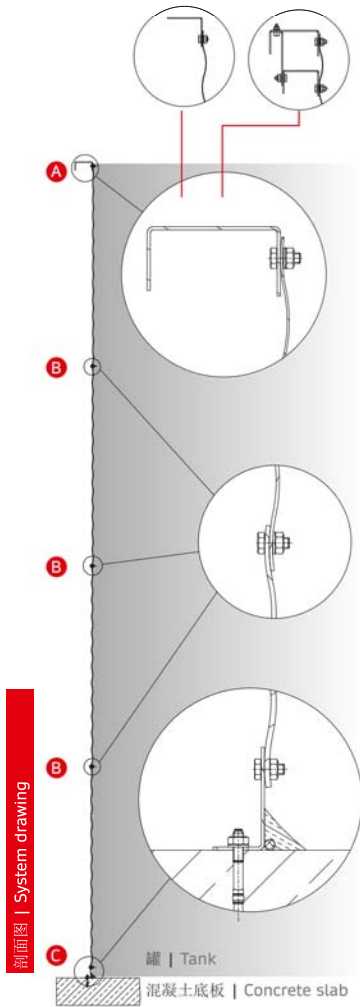
**Our corrugated steel tanks** are made out of stainless steel sheets which are individually corrugated and rolled to diameter. The base plates of the corrugated steel tanks are made from reinforced concrete. The individual shell plates overlap at the horizontal and vertical joints and are joined using internally developed screw connections.

The upper tank edge is constructed from an extra-rigid edge profile. The shell plates are joined together and sealed with the concrete slab using a manure and waste water-proof special sealant. The connection of the tank wall

to the base plate is made by a circular stainless steel floor bracket, which is fastened with bolt anchors.

As with our stainless steel tanks, our corrugated steel tanks are completely developed and produced in-house in conformance with the highest standards of quality. CAD/CAM systems support our designers in planning and design. The perfect combination of the special expertise of our staff and state-of-the-art production facilities mean excellent, durable products.

包边设计根据客户不同需求而不同 | Edge design varies according to requirements



- A** 包边：根据罐体规格和容量定制  
Edge profile: tailored to tank size and load
- B** 水平板连接  
Horizontal plate connection
- C** 底部支撑：由地板支架和混凝土槽之间的密封槽密封  
Floor bracket: Sealing channel bonds with floor bracket and concrete slab

每圈片数 Plates per ring	罐体直径 Tank Ø (m)	占地面积 tank area (m <sup>2</sup> )	层数   Rings								
			高   Height (m)	1	2	3	4	5	6	7	8
			总容积 (m <sup>3</sup> )   Gross volume (m <sup>3</sup> )								
3	2,745	6	9	18	26	35	44				
4	3,661	11	16	32	47	62	78				
5	4,576	16	26	50	73	97	121				
6	5,491	24	37	71	106	140	175				
7	6,406	32	50	97	144	191	238				
8	7,321	42	66	127	188	249	310				
9	8,236	53	83	161	238	315	393	470			
10	9,151	66	103	198	294	389	485	580			
11	10,067	80	124	240	355	471	587	702			
12	10,982	95	148	285	423	561	698	836	973		
13	11,897	111	174	335	496	658	819	981	1,142		
14	12,812	129	201	389	576	763	950	1,137	1,325	1,512	
15	13,727	148	231	446	661	876	1,091	1,306	1,521	1,735	
16	14,642	168	263	508	752	997	1,241	1,486	1,730	1,975	
17	15,557	190	297	573	849	1,125	1,401	1,677	1,953	2,229	
18	16,473	213	333	642	952	1,261	1,571	1,880	2,190	2,499	
19	17,388	237	371	716	1,060	1,405	1,750	2,095	2,440	2,784	
20	18,303	263	411	793	1,175	1,557	1,939	2,321	2,703	3,085	
21	19,218	290	453	874	1,295	1,717	2,138	2,559	2,980	3,401	
22	20,133	318	497	960	1,422	1,884	2,346	2,809	3,271	3,733	
23	21,048	348	544	1,049	1,554	2,059	2,564	3,070	3,575		
24	21,963	379	592	1,142	1,692	2,242	2,792	3,342	3,893		
25	22,879	411	642	1,239	1,836	2,433	3,030	3,627	4,224		
26	23,794	445	695	1,340	1,986	2,631	3,277	3,923			
27	24,709	480	749	1,445	2,141	2,838	3,534	4,230			
28	25,624	516	806	1,554	2,303	3,052	3,801	4,549			
29	26,539	553	864	1,667	2,470	3,274	4,077	4,880			
30	27,454	592	925	1,784	2,644	3,503	4,363				
31	28,369	632	987	1,905	2,823	3,741	4,659				
32	29,285	674	1,052	2,030	3,008	3,986	4,964				
33	30,200	716	1,119	2,159	3,199	4,239	5,279				
34	31,115	760	1,188	2,292	3,396	4,500	5,604				
35	32,030	806	1,259	2,429	3,599	4,768	5,938				
36	32,945	852	1,332	2,569	3,807	5,045	6,283				
37	33,860	900	1,407	2,714	4,022	5,329					
38	34,775	950	1,484	2,863	4,242	5,621					
39	35,690	1,000	1,563	3,015	4,468	5,921					
40	36,606	1,052	1,644	3,172	4,700	6,228					
41	37,521	1,106	1,727	3,333	4,938	6,543					
42	38,436	1,160	1,812	3,497	5,182	6,867					
43	39,351	1,216	1,900	3,666	5,432	7,197					
44	40,266	1,273	1,989	3,838	5,687	7,536					
45	41,181	1,332	2,081	4,015	5,949	7,883					
46	42,096	1,392	2,174	4,195	6,216	8,237					
47	43,012	1,453	2,270	4,379	6,489	8,599					

可根据客户需求提供其它规格和材质  
Additional sizes and materials upon request



# 不锈钢储液罐

## Stainless steel storage tanks

### 不锈钢罐及配件 Tanks with attachment parts and accessories

- ① 罐侧边的泵送系统（泵入和泵出）  
Suction and filling station above the tank edge
- ② 罐底部穿过罐体的泵送系统（泵入和泵出）  
Suction and filling station below through the tank wall
- ③ 穿壁套管 | Wall bushing
- ④ 潜水搅拌机 | Submersible motor agitator
- ⑤ 带梯子的工作平台  
Work platform with ladders
- ⑥ 4.0m高位置穿过罐体的泵送系统（泵入和泵出）  
Suction and filling station in 4 m Height through tank wall
- ⑦ 检查口 | Inspection opening





# 坚如磐石，免维护

## Indestructible and free of maintenance costs

我们有理由庆祝。1984年，Stallkamp建造了第一座由不锈钢制成的粪尿储存罐（当时采用的是“Ley”品牌）。作为试点项目的客户，我们通过Bakum-Vestrup项目赢得了Grafe家族信任。通常用混凝土，搪瓷或木材来建造罐体，所以决定采用我们的不锈钢罐体并不容易。事实证明，他们做出了正确的选择，我们的不锈钢罐体被证明是最好的。

如果你今天再看看这座储存罐，它已经遵守了诺言！“当我父亲建造他的那一天起，它仍然矗立在那里（还在正常使用）”！老Bernard Grafe说。多年来一直没有什么维修费用，这笔投资绝对是值得的，Bernard Grafe的后代们仍然会从他的祖父母的决定中受益！

**We have reason to celebrate.** In 1984 Stallkamp built the first manure tank made of stainless steel (at that time under the "Ley" brand). We were able to win the Grafe family from Bakum-Vestrup as customers for the pilot project. As it was common to construct tanks from concrete, enamel or wood, the decision was not easy. Ultimately crucial was that the new tank should be made indestructible by the stainless steel.

Taking a look at the manure tank today, it has kept that promise. "It looks exactly the same as the day my dad had it made", enthuses Bernard Grafe Senior. Not one penny was spent on servicing over those years. The investment was definitely worthwhile, and even Bernard Grafe Junior is still profiting from the decision of his grandparents.





8,559 m<sup>3</sup> 世界上最大的波纹不锈钢储存罐 (俄罗斯)  
8,559 m<sup>3</sup> The world's largest corrugated steel tank made of stainless steel



4,230 m<sup>3</sup> 粪尿储存罐 (保加利亚)  
4,230 m<sup>3</sup> One out of 17 manure tanks in Bulgaria



波纹不锈钢罐和混凝土增高罐 (波纹不锈钢) 罐  
Corrugated steel tank and heightened concrete tank with corrugated steel tank



6,283 m<sup>3</sup> 波纹不锈钢罐 (捷克共和国)  
6,283 m<sup>3</sup> Corrugated steel tank in the Czech Republic



波纹不锈钢罐  
Corrugated steel tank



侧视图  
Side view



不锈钢罐鸟瞰图  
Stainless steel tank from a bird's eye view



沼气发酵罐, 二级发酵罐和沼液储存罐  
Digester, secondary digester and end storage of digestate of a biogas plant



波纹不锈钢罐 (克罗地亚)  
Corrugated steel tank in Croatia

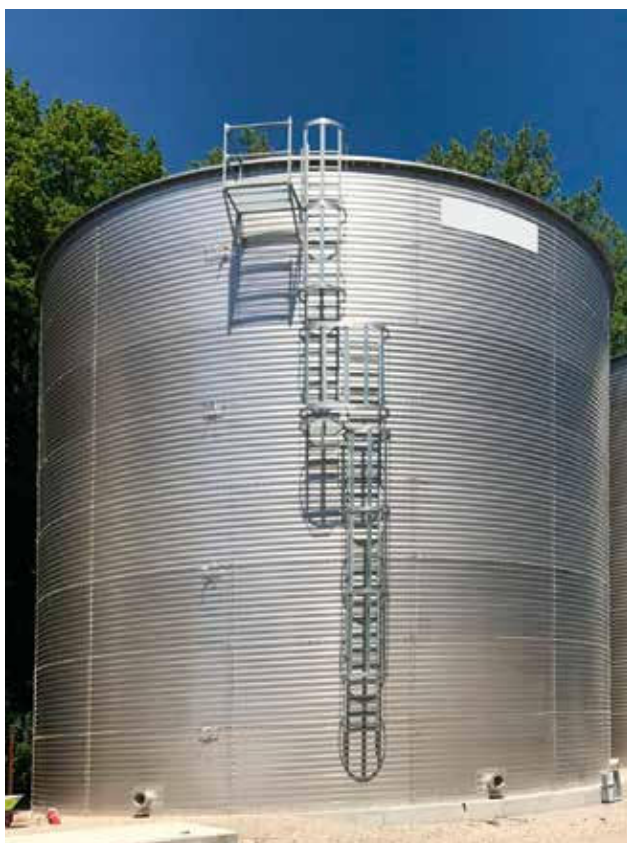




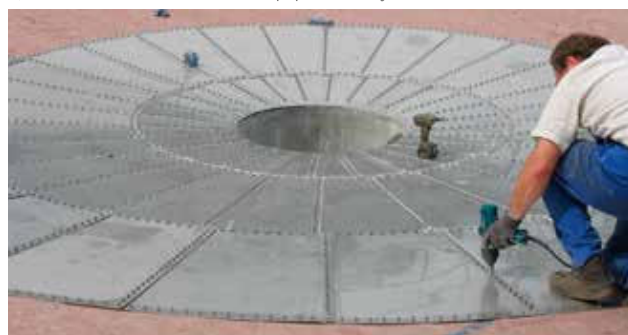
平板不锈钢罐  
Stainless steel tanks



1,661 m<sup>3</sup> 造纸厂的污水储存罐  
1,661 m<sup>3</sup> Waste water tank for the paper industry



1,304 m<sup>3</sup> 膨润土悬浊液储存罐（瑞士）  
1,304 m<sup>3</sup> Bentonite suspension tank in Switzerland



不锈钢底板-漏斗状，倾角10°  
Stainless steel floor, funnel-shaped, sloping down 10°



1,664 m<sup>3</sup> 平板不锈钢罐和51 m<sup>3</sup> 波纹不锈钢罐——造纸厂  
1,664 m<sup>3</sup> Stainless steel tank and 51 m<sup>3</sup> corrugated steel tank in the paper industry



572 m<sup>3</sup> 波纹不锈钢板的污水储存罐  
572 m<sup>3</sup> Waste water storage made from corrugated steel



罐侧边的泵送系统（泵入和泵出）  
Suction and filling station above tank edge

# 罐顶 | Roofs

## 不同应用的罐顶材料

Stallkamp生产的不锈钢罐广泛用于各种领域。在工业和农业领域，有些地方使用时，顶部通常没有覆盖。然而，在许多情况下，顶部要求必须有覆盖或者密封。根据应用场合，罐体覆盖物的要求各不相同。

## Roof models for different applications

The stainless steel tanks from Stallkamp are used in the widest range of fields. In industry and agriculture they are used in many cases without a cover. However, in lots of cases they have, or need to have, a cover. The requirements of a tank roof differ significantly depending on the application.

## 不锈钢屋顶 | Stainless steel roof

- 无支撑屋顶  
(取决于罐直径)
- 弹性密封圈和特殊的接缝技术
- 特殊设计的顶盖内缘滴露收集装置，保证罐内壁上无结露
- 全不锈钢螺栓和紧固件
- 设置了可开启的检查口，便于维护和检查
- 屋顶倾角10° 或15°
- 可根据需要安装各种管道
- Available as a self-supporting roof  
(depending on tank diameter)
- Joints and seams with permanently elastic seals and special sealing compound
- No condensation on the tank wall due to a circumferential drip edge on the inside of the cover segments
- Screw connections completely made from stainless steel
- Opening with cover for maintenance and inspection purposes
- Roof pitch 10° or 15°
- Possibility of introducing bushings



不锈钢屋顶的储存罐  
Tanks with stainless steel roof construction



## 膜屋顶 | Membrane roof

- 绿色或灰色的织物增强膜
  - 减少气体排放
  - 膜与罐体边缘用不锈钢型材固定
  - 中心支撑杆用不锈钢管或防腐处理的钢管
  - 覆盖边缘设置有集露槽收集凝结水，罐壁上无结露
  - 2个标准检修口
  - 屋面坡度约25°
  - 抗紫外线UV涂层，杀菌处理
  - 阻燃等级DIN 4102 B1（难燃材料）
- Fibre-reinforced membrane, available in green or grey
  - Helps reduce emissions
  - Fixing using stainless steel fixing profiles at the tank edge
  - Central support made from steel with resilient special coating or as stainless steel supports
  - No condensation on the tank wall due to a circumferential drip edge on the inside of the cover segments
  - 2 inspection openings as standard
  - Roof pitch is approx. 25°
  - UV-resistant, fungicidal
  - Flame retardant to DIN 4102 B1



膜屋顶俯视图 | Membrane roof from above



膜屋顶侧视图 | Tank view outside with membrane roof

## GRP(复合玻璃钢)屋顶 | GRP covers

- 可作为自支撑平屋顶，平滑圆顶或带肋圆顶（取决于罐直径）
  - 由于弯曲的覆盖部分和径向肋结构，具有高刚度和高浮力
  - 弹性密封圈和特殊的接缝技术
  - 覆盖边缘设置有集露槽收集凝结水，罐壁上无结露
  - 全不锈钢螺栓和紧固件
  - 设置了可开启的检查口，便于维护和检查
- Available as self-supporting flat roof, smooth dome or ribbed dome (depending on tank diameter)
  - Highly convex and high load-bearing capacity due to curved cover segments and radial rib structure
  - Joints and seams with permanently elastic seals and special sealing compound
  - No condensation on the tank wall due to a circumferential drip edge on the inside of the cover segments
  - Screw connections completely made from stainless steel
  - Opening with cover for maintenance and inspection purposes



玻璃钢平屋顶  
Flat roof design



光滑的圆顶屋顶  
Smooth dome roof design



带肋的圆顶屋顶  
Ribbed dome roof design

## 双膜屋顶 | Double membrane roof

- 由外膜和承压的内膜组成
  - 两层膜之间的压力和四周的支撑结构组成膜的支撑系统
  - 内膜由生成的沼气产生的压力而形成张力，外膜则提供保护层
  - 内部结构设计有防止膜浸入发酵物料的保护装置（发酵产气初期，内部压力不够，不足以支撑起膜）
  - 罐体边缘与膜采用不锈钢型材固定
  - 中心支持轴的材料：与液体接触部分采用1.4301不锈钢（304不锈钢），与气体接触部分采用1.4571不锈钢（316不锈钢）
  - 气体含量指示采用机械指示器或者电子指示器
  - 适用于沼气行业
  - 甲烷气体渗透率低
- Consisting of an outer membrane and a pressure-dependent inner membrane
  - Supporting air supply including stainless steel housing provides pressurisation in the supporting air space between the membranes
  - The inner membrane adjusts itself to the volume of the gas tank, with the outer membrane offering constant protection
  - Sub-structure prevents the double membrane dipping into the substrate when pressure drops during operations
  - Fixing using stainless steel fixing profiles at the tank edge
  - Central support made from 1.4301 for use with liquids and 1.4571 for use with gases
  - Gas fill level indicator mechanical or electric
  - Suitable for use in the biogas sector
  - Low methane gas permeability



采用气密双层膜屋顶的沼气发酵罐 | V4A biogas tanks with gas-tight double membrane roof



双层膜屋顶沼气发酵罐（日本）  
Biogas tank with double membrane roof in Japan



料斗和缓冲罐（日本）  
Hopper and buffer tank in Japan

# 更大 | Think bigger

## 现有罐体增容 | Adding height to existing tanks

对于许多现有的混凝土罐，存储容积可以很容易地增加！

### 优点

- 投资很少就可以增加额外的存储量
- 不需要额外建造储存罐
- 无需额外的购买泵/搅拌器

The storage capacity of many existing concrete tanks can be increased effortlessly! Requirements for this are the structural suitability of the tank and substrate, a smooth and straight crown and the possibility of introducing Ø 12 bore holes for adhesive anchors.

### Advantages

- Cost-effective, additional storage space
- No construction of additional tanks necessary
- No additional costs for new pump/agitator technology



混凝土罐体加高  
Adding height to a tank



混凝土罐上加高的两圈罐  
2. Ring on concrete tank



加高后的混凝土罐  
Heightened concrete tanks

## Stallkamp原有罐体加高 | Adding depth to Stallkamp tanks

支持Stallkamp原有不锈钢罐的增容。先决条件是容器和底座还未达到额定承载能力

### 优点

- 投资很少就可以增加额外的存储量
- 不需要额外建造储存罐
- 无需额外的购买泵/搅拌器
- 模块化结构

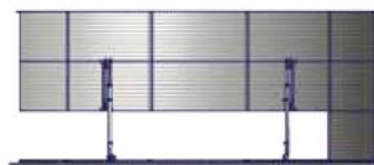
Stainless steel tanks from Stallkamp can have their depth extended. Requirements for this are the tanks and substrate are suitable for this and the maximum extension height has not yet been reached.

### Advantages

- Cost-effective, additional storage space
- No construction of additional tanks necessary
- No additional costs for new pump/agitator technology
- Modular construction



罐体增加容积（已有两圈）  
Adding depth to a tank (2 rings)



升起原有罐体  
Lifting the tank



增容后的罐体（三圈）  
Depth-extended, 3-ring tank



## 德国制造 品质保证

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 <p>罐体</p>						

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