

Pump cleaning 泵的清洗

关于卫生传送，高品质的产品需要清洁泵，在加工完产品后泵需要立即清洁。在下次生产中，设备必须是清洁无菌的
The transfer of hygienic, high quality products requires a clean pump. Therefore at the end of a production process the pumps must be cleaned immediately. The plant needs to be clean and free from germs before starting a new production cycle.

清洗就是从设备中移走所有的产品剩余，一个完全清洁表面是把可见不易见的
Cleaning is the operation to remove all traces of product from the plant. A properly cleaned surface is free from visible, perceptible or chemically detectable dirt deposits (residue).
只有用化学方法才可以把污垢沉积去掉

Cleaning 清洗

The standard cleaning process for plants is the **CIP** - (Cleaning in Place). This implies cleaning without dismantling of the plant by means of CIP fluids.
设备的标准清洗程序是 C I P，这意味着清洗是不需要分拆设备，用 C I P 流体清洗

CIP

In the food industry a CIP process requires the following steps: 在食品工厂一个 C I P 程序需要以下步骤

- preliminary rinsing with water 初步清水冲洗
- flushing with alkaline solution 碱性溶液冲洗
- intermediate rinsing with water 再用清水冲洗
- flushing with acid 酸冲洗
- rinsing with clean water 最后洁净清水冲洗

为了清洗效率，C I P 流体必须是激流，在管内最小流速也应在 2 M / S
To clean the unit efficiently a turbulent flow of the CIP fluid is required. A minimum flow velocity in pipes is usually 2 m/s.

CIP plant cleaning
C I P 设备清洗

被正位移泵传送粘性流体通常速度较低，为了获得进行 C I P 所需的流量
Viscous fluids are often transferred by positive displacement pumps at low flow velocities. In order to obtain the flow rate required for CIP it may be necessary to fit an additional cleaning pump such as a centrifugal pump. 通常额外的加台离心泵作为清洗泵

F r i s t a m 泵完全适合 C I P，他们有关特性如下：
Fristam pumps are fully CIP capable. They are characterised by:

CIP compatible design
C I P 兼容设计

- welded and ground joints 基本接缝是焊接的
- round edges and angles 各边都是圆倒角
- smooth joining 平滑接缝
- no narrow gaps and dead legs 没有狭孔和死角
- O-rings immersed in the pump housing O型圈入泵体
- smooth, nonporous internals with a high surface finish 无毛刺，凹坑的高品质光滑表面

Pump cleaning

SIP

在C I P程序后再进行S I P（消毒程序），对于某些对微生物敏感的产品
After CIP cleaning an additional sterilisation in place process (SIP) may be required when highly sensitive products are handled, inactivating any micro-organisms which might be still present in the pump. 是必须的，这就需要泵支持S I P

The sterilisation can be carried out by means of chemicals, hot water or steam. In the dairy industry the sterilisation temperature is approximately 145° C.

消毒通过化学方法，热水，蒸汽等手段完成，在牛奶工业消毒温度大约145度

Units of measure
计量单位

	符号	实际单位	相关单位
流量	Q	m ³ / h	l / h
总压头	H	m	m
NPSH值	NPSH	m	m
功耗	N	KW	Nm / s
泵效		%	-
转速	n	l / min	l / s
压力	P	Pa	N / m ²
密度	p	Kg / dm ³	Kg / dm ³
流速	v	m / s	m / s
重力加速度	g	m / s ²	m / s ²

索引

总流出压头

Used indices:

geo = total discharge head
S = suction side 吸入端
D = discharge side 流出端
E = inlet cross section 入口横截面
A = discharge cross section 出口横截面
V = loss 损耗

压力P

Pascal

Pa . 100 KPa = 1 bar

总压头

Met er

1 m = 0 . 1 bar *)

动态粘度

mPas

1 mPas = 1 cP

Conversion

单位转换

*) valid only for water

*) 值仅适用于水

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