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## 全焊式换热器操作维护使用手册

Fully welded plate heat exchanger  
Operation & Maintenance Manual

若设计与规格变更，恕不另行通知。如需完整了解当前版本的更多数据和支持，请访问<http://accessen.com>，我们会及时向您更新。

2017 05 AWOM Rev1



**Accessen** | 随需应变的换热解决方案！  
On Solution For Heat Exchanger

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### 注意 / Notice !

#### 请注意 Attention Please

注意介质、温度压力，为避免碰伤手，搬运金属时一定要做好相关的防护措施，戴好保护手套。

Please pay attention to the media, temperature and pressure, in order to avoid bumping hands, before handling metal must do the relevant protective measures, and wear protective gloves.

#### 保护板 Protective Plates

我们提醒您，遵守安全规则是每个操作人员的责任。

必要的话，艾克森公司可提供保护板作为附件装在所有的板式换热器上。这些保护板可防止由于金属板组件突然泄漏而引起的损坏。

It is the responsibility of each person operating or repairing equipment to take the necessary precautions to comply with all applicable safety regulations.

ACCESSEN will provide protective plates as accessories for all our plate heat exchangers if necessary. These plates will prevent possible injuries and/or damage as a result of sudden leakage from the plate package.



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致用户 To users

亲爱的用户 Dear users

非常感谢你对艾克森的信任和支持，当您在各种不同情况下使用您的艾克森板式换热器时，这本指导手册就是您直接的向导。艾克森公司忠告您仔细阅读这本手册，尤其应使那些每日都在进行此设备的安装、维修或操作的人员得到这本手册。当您的同事需要这本手册，而手册却被束之高阁时，这本手册对您就毫无价值了。

对于用户不按手册的指导和非原厂备件而造成任何设备损坏，艾克森公司概不负责。如果您的板式换热器出现了本手册范围 以外的特殊故障，请不要犹豫，您可与艾克森公司代表联系，不管您在世界上哪个地方，我们都会帮助您。

请用微信扫描下方的二维码，提供更多的技术、服务和备件支持。



致用户 To users

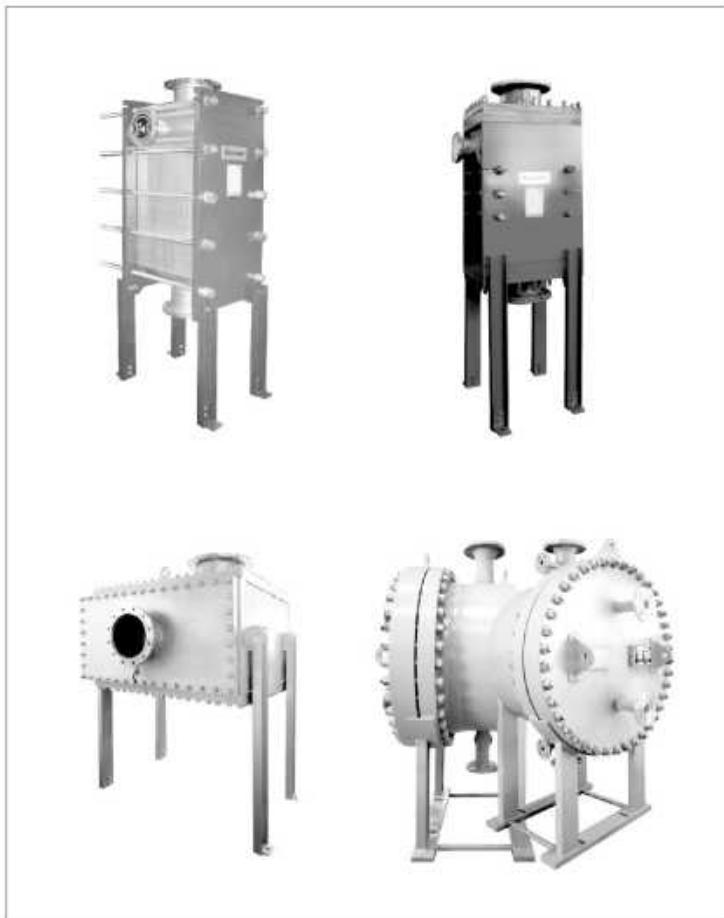
Dear users

Thank you for your trust and support for Accessen, and this guidance manual will be your direct guide when you use Accessen plate heat exchangers in a variety of different situations. Accessen advises you to read this manual carefully, especially to make sure the staffs who to install, operate, or repair the equipment in daily work to obtain it. The manual will become worthless if it is shelved when needed by your workmates.

Accessen is not responsible for any damage to the equipment caused by the operating don't follow the manual's guidance or using the non-original spare parts. If your plate heat exchanger has a special problem other than the scope of this manual, please contact the representative of Accessen without hesitation, and we will supply help no matter where you are in the world.

Scan the QR code below by Wechat, more technical information, after-sales service and spare parts support will be supplied.

铭牌与设备标志 Nameplate and device identification



铭牌与设备标志 Nameplate and device identification

在与艾克森公司通信联系时,请写明型号系列号及生产日期,以便核准设备。

用户可根据铭牌上的制造序列号鉴别产品的生产地。艾克森产品均有唯一的序列号。

板式换热器的所有零件都可以用一个号码进行鉴别。当与艾克森公司联系零件时,请务必提出其标志号码。

When communicating with Accessen, please specify the serial number and date of manufacture in order to approve the equipment.

The user can identify the product according to the serial number on the nameplate. All of Accessen products have a unique serial number.

All spare parts of the plate heat exchanger can be identified with a number. When contacting Accessen, be sure to specify the mark number of the spare parts.



## AWD系列方形全焊接换热器 Square fully welded plate heat exchanger of AWD series

### 1 概述 Overview



AW系列方形全焊接板式换热器分为三种，不可拆，单侧可拆、双侧可拆。

全焊接板式换热器是一种吸取了板式换热器的优点，弥补了管式换热器的不足的新型高效换热设备，最高操作温度为400℃，最高操作压力达3.5Mpa。

全焊接板式换热器相对于管壳式换热器来说，它具有传热效率高，占地面积小，结构紧凑，重量轻，适应性强，热损失少，价格低，污垢系数低等优点。与传统可拆式板式换热器相比，更具有使用操作温度高，操作压力高的特性。还避免了密封橡胶垫受热老化而泄漏及更换的麻烦。它广泛应用于化学工业，石油化工，食品工业，制药行业，电站，机械工业，污水处理等各个领域。

Square fully welded plate heat exchanger of AW series can be divided into non-removable, unilateral detachable and bilateral detachable.

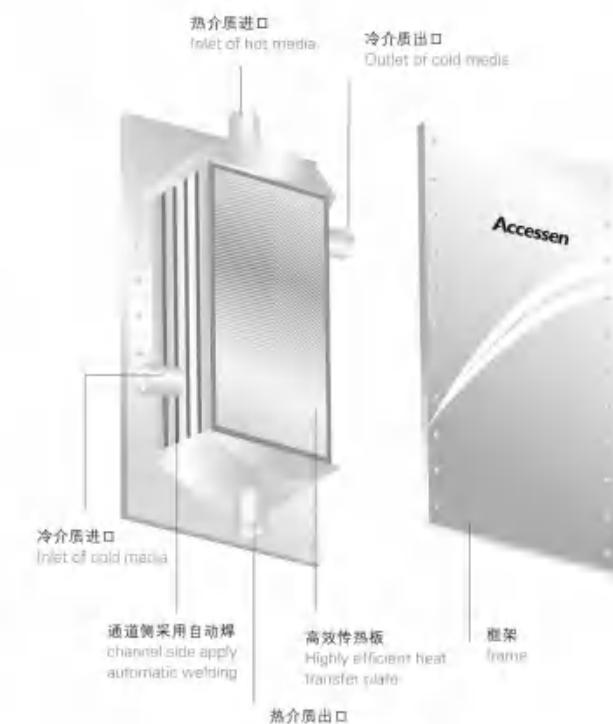
Fully welded plate heat exchangers incorporate all the advantages of traditional plate heat exchangers, and none of the deficiencies of tube heat exchangers. Their maximum operating temperature is 400℃, and maximum operating pressure is 3.5Mpa.

Compared to tube heat exchangers, Welded Plate Heat Exchangers have a high heat transfer efficiency, occupy less space, are more compact, lighter, and flexible, lose less heat, are cheaper, and have less fouling. Compared to traditional plate heat exchangers, they have an even greater advantage in temperature and pressure, leak less, withstand heat better, and require less maintenance and replacement. They are commonly used in the Chemical, Petrochemical, Food, Pharmaceutical, Power Generation, Machinery, and Sewage Treatment industries.

### 2 结构 Structure

全焊接板式换热器结构简单，它由前后压紧板、换热板片组、进出口接管和法兰，夹紧螺柱和支座组成。

Welded Plate Heat Exchangers have a simple composition. They consist of front and back plates, the heat exchange plates, entry and exit openings with flanges and pipes, double bolts, and supports.



注：(接口方位，参见选型图纸) Note: nozzle location as per diagram

## AWD系列方形全焊接换热器 Square fully welded plate heat exchanger of AWD series

### 1. 前后压紧板 Front and Back Plates

前后压紧板是由优质碳素结构钢制成的矩型板块，板上有吊装孔和夹紧螺柱安装孔，通过拧紧夹紧螺柱的螺母，把换热板片组固定于前后压紧板之中。根据用户需要，在前压紧板面板上开有热相介质进出口接管和法兰，也可在换热板片组顶部和底部直接安装接管。

The front and back plates are rectangular and made of carbon steel. They have holes with clamped bolts for hoisting. Once in position, the nuts can be tightened to fix the plates in place. Controllers and flanges can be positioned according to customer requirements, and the adapter can also be installed on the heat exchange plates themselves.

### 2. 换热板片组 Heat Exchange Plates

换热板片组由0.8–1mm 厚度的金属波纹板片焊接组装而成。它去掉了密封垫片，在板片上压出波纹，以形成流体通道并将板片周边彼此焊接成为一个整体。按介质腐蚀工况需要，可提供各种可焊接金属材料，板片波纹为人字型，是一种典型的“网状流”板片，当板片与板片接触时，波纹与波纹相交，形成大量的接触点，可承受较高的压力，传热性能也较好。其顶部和底部及上下侧各焊有介质分布管，分布管上装有进出口接管和法兰，在进口部安装有缓冲装置，防止介质对换热板片组的直接冲刷。

The heat exchange plates are made of 0.8–1 mm thick welded, corrugated metal. No sealing gaskets are needed, and the corrugated surface creates flow pathways which combine the plate area and welding into one system. The plate material is selected according to the corrosion properties of the medium being processed, and the corrugated ridges form a matrix which creates a typical "mesh flow" on each plate. This in turn maximizes the number of contact points, increasing heat transfer

efficiency, and helping the system to withstand high pressure. The top and bottom of the plates have distribution pipes with flanges to control flow and buffers to prevent an overwhelming volume of matter from entering the system at any one time.

### 3. 进出口接管和法兰 Entry and Exit Opening Pipes and Flanges

按不同设计压力和不同设计口径提供相应的进出口接管和法兰。

Pipes and flanges can be positioned according to operational requirements.

### 4. 夹紧螺柱和支座 Double Bolts and Supports

依靠夹紧螺柱使换热板片组和压紧板成为完整的一台热交换设备。底部4个支座提供用户定位安装。

Double bolts fix the system in place and allow it to function. Four lower supports establish a foundation for the system.



## AWPS系列板壳式换热器 Plate-and-shell plate heat exchanger of AWPS series

### 1 概述 Overview



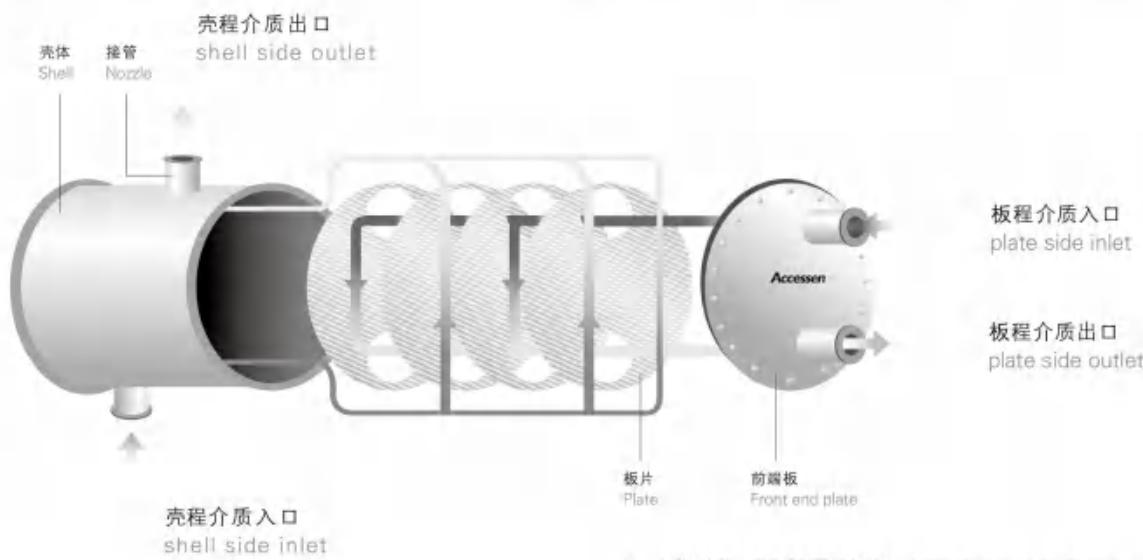
圆形全焊接板式换热器是一种新开发的高温高压、高效紧凑的新型换热器。它体积小，重量轻，安全可靠性高，经济性好。适用于列管所适用的大多应用场合，可替代列管而取得节能增产、节省投资，简化装置、安全可靠、技术进步的应用效果。最高操作温度600°C，最高设计压力10MPa。

The newly developed Plate and Shell Heat Exchanger is very efficient and can withstand high temperature and high pressure conditions. It is compact in design, light, safe, reliable, and economical. It is suitable for the same applications as tube exchangers, and by replacing them saves energy, raises production, reduces costs, simplifies installation, and increases safety and reliability. The maximum operating temperature of 600 °C, the maximum design pressure of 10MPa.

### 2 结构 Structure

圆形全焊接板式换热器结构简单，它由壳体、换热板片组、进出口接管和法兰，面板和支座组成。

The Plate and Shell Heat Exchanger has a simple design. It is comprised of a shell, a plate system, entry and exit holes fitted with pipes and flanges, a front plate, and a foundation.



## AWPS系列板壳式换热器 Plate-and-shell plate heat exchanger of AWPS series

### 1. 壳体 / Shell

壳体是由优质碳素合金结构钢制成的圆桶型结构，遵循压力容器设计，壳体里面把换热板片组固定之中。根据用户需要，可在壳体上下开介质进出口，口径非标制造，设计灵活多变。

The shell is a round cylinder molded from high-quality carbon steel alloy and designed as a pressure vessel. The plate system is fixed inside the shell. Inlet and outlet openings on the shell's top and bottom can be sized according to need, increasing flexibility.

### 2. 换热板片组 / Plate System

换热板片组由0.8-1mm 厚度的金属波纹板片焊接组装而成。它去掉了密封垫片，在板片上压出波纹，以形成流体通道并将板片周边彼此焊接成为一个整体。按介质腐蚀工况需要，可提供各种可焊接金属材料，板片波纹为斜波纹，是一种典型的“网状流”板片，当板片与板片接触时，波纹与波纹相交，形成大量的接触点，可承受较高的压力，传热性能也较好。

The plate system consists of 0.8-1mm thick corrugated metal plates welded together and to the shell. The material for these plates is selected according to the metal-corrosion properties of the liquid. The system does away with sealing gaskets and instead, the ridges protruding from the plates create channels through which liquid can flow. As each plate is welded to the shell, the liquid flowing on each plate remains separate. The ridges on the plates are arranged diagonally rather than horizontally or vertically, creating a typical mesh flow which allows for a large amount of heat transfer between the liquid flowing in each corrugated groove, and allowing the system to withstand substantial pressure.

### 3. 进出口接管和法兰 / Entry and Exit Pipes and Flanges

按不同设计压力和不同设计口径提供相应的进出口接管和法兰。

Entry and exit pipes and flanges are designed according to pressure and size needs.

### 4. 面板和支座 / Front Plate and Foundation

依靠螺柱连接使面板和壳体连接在一起，换热板片组和壳体成为完整的一台热交换设备。底部 4 个支座提供用户定位安装。

Double-screw bolts attach the front plate to the shell, and 4 foundations fix the system in place.



## AWD1C系列全焊接板式换热器 ( 单侧可拆 )

Fully welded plate heat exchanger of AWD1C series (unilateral detachable)



单侧可拆的矩形全焊接板式换热器，它继承了不可拆全焊接板式换热器的优点，即耐高温、高压，又避免了不开拆的缺点（不能打开清洗，只能CIP清洗，清洗不了或内漏了只能报废）。单侧可拆的矩形全焊接板式换热器单侧可打开清洗，材料和制造成本都比双侧开拆低，制造过程简单。产品内漏的话还可以封掉相应的流道之后，继续使用。

单侧可拆的矩形全焊接板式换热器，由板束、压紧板、法兰、方垫片、平盖、夹紧螺柱、支腿、接管、法兰构成。板束为焊接整体不可拆结构，上面装有板片、侧板、塞条和接管组件。

单侧可拆的矩形全焊接板式换热器，根据支腿装在压紧板上面的位置，可为立式或卧式。

单侧可拆的矩形全焊接板式换热器内部板片可多程布置。

1.2 When removing from the crate and installing, ensure the system is not tilted but remains level. In addition, under no circumstances should the system be lifted directly by the flanges or entry and exit pipes.

1.3 As the amount of shrinkage due to welding can vary slightly...

1.4 To connect the entry and exit pipes, loosen the flanges and nuts, then weld on the flanges and pipes. Check to ensure the flanges are tightly sealed and remove any weld beads that have accumulated. The dimensions of the sealing gaskets will correspond to the pipe dimensions.

1.5 If large-scale fouling is anticipated in the pipes, a bypass pipe and valve can be installed on one side of the original pipe. This restores system performance without using chemical cleaners.

1.6 For multi-pass heat exchangers, if a phase change occurs, install a steam trap or steam release opening to avoid steam buildup and liquid blockage.

1.7 For liquids with high quantities of impurities, install a filter.

1.8 Valves should be installed on all entry and exit openings to control flow. Temperature readers and pressure meters should also be installed and used to determine changes in flow volume and cleaning schedule.

## AWD2C全焊接板式换热器 ( 双侧可拆 )

Fully welded plate heat exchanger of AWD2C (bilateral detachable)



双侧可拆的矩形全焊接板式换热器，它继承了不可拆全焊接板式换热器的优点，即耐高温、高压，又避免了不开拆全焊接板式换热器的缺点(不能打开清洗，只能CIP清洗，清洗不了或内漏了只能报废)。内部设有限流装置，可保证两侧介质流动的近似逆流，两侧介质通道均可打开直接清洗。随着全焊接板式换热器的发展，双侧可拆的全焊接板式换热器具有广阔的市场前景。

双侧可拆的全焊接板式换热器，由板束、压紧板、法兰、方垫片、平盖、圆拉杆、支腿、接管、法兰构成。

板束为焊接整体不可拆结构，上面装有板片、侧板、塞条。

双侧可拆的全焊接板式换热器，双侧可打开清洗，出现内漏可堵掉相应的流道后继续使用。

可拆通道走的可以是易结垢和带微小颗粒的介质（如循环水，开式水）。

1.2 When removing from the crate and installing, ensure the system is not tilted but remains level. In addition, under no circumstances should the system be lifted directly by the flanges or entry and exit pipes.

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1.7 For liquids with high quantities of impurities, install a filter.

1.8 Valves should be installed on all entry and exit openings to control flow. Temperature readers and pressure meters should also be installed and used to determine changes in flow volume and cleaning schedule.

## 全焊接板式换热器的操作说明 O & M manual of welded heat exchanger

### 1 全焊接板式换热器的安装与启动

#### Installation and Activation

##### A 安装 Installation

1. 1 开箱检查设备外观, 设备有无在吊装运输过程中不慎遭到损坏, 如果有影响使用的情况, 请及时与本公司取得联系。

1. 2 吊装时, 需保持设备的水平, 防止钢丝绳打滑, 设备上有四只吊装孔供吊装时使用, 切忌直接起吊法兰及接管等部件。

1. 3 由于焊接收缩量变化, 实际安装尺寸会有少量误差, 应根据总装图安置地脚螺栓预留孔, 进行二次灌浆安装定位。

1. 4 按介质进出口标牌连接管道, 定位点焊后, 松开法兰、螺母后再行整体焊接法兰和接管, 焊接时, 接地搭铁必须靠近烧焊处, 以防焊接时板片等零件因焊接电流而损坏。装接时须检查法兰密封面有无电焊珠等影响密封性能的缺陷, 及时排除。密封垫片尺寸与接管相符。放置位置正确。

1. 5 在有颗粒或易生成污垢介质一侧的进出口接管可装接旁路接管和阀门, 以便用化学方法进行反清洗, 恢复设备使用性能。

1. 6 在多程结构换热器中, 如换热介质在换热过程中有相变, 请适当安装疏水器或排汽口, 以免“汽搏”或结液堵塞流道, 影响换热效果和损坏换热器。

1. 7 杂质较多的流体, 请先于过滤。

1. 8 设备的冷热介质进出口处均应安装管道阀门, 以控制冷热介质的流量, 确保设备运行在最佳状态。设备的冷热介质进出口处同时还应安装相应的温度计和压力表, 以便随时监测冷热介质的温度和压力变化情况。并根据温度和压力的变化情况, 及时控制管道阀门以调整冷热介质的流量和决定清洗时间。

## 全焊接板式换热器的操作说明 O & M manual of welded heat exchanger

### B 启动 Activation

2. 1 启动前, 应清除管道内杂物, 防止阻塞。

2. 2 设备应进行受压试验, 试验压力为操作压力或设计压力的 1.3 倍, 保压 30 分钟无泄漏, 且需两侧流道交叉进行。

2. 3 启动时先打开出口阀, 然后同时逐步打开冷热两侧进口阀门, 使压力, 温度, 流量逐步上升至工艺要求, 并检查各夹紧螺柱是否夹紧, 使其夹紧力一致。

2.1 Thoroughly clean the pipes before activation.

2.2 Before activation, conduct a 30 minute pressure test at 1.3 times the expected operational pressure.

2.3 When ready to activate, first open the exit valves, then the entry valves. Gradually allow the pressure, temperature, and flow volume to reach operational levels. Check to ensure all bolts are securely tightened.

## 全焊接板式换热器的操作说明 O & M manual of welded heat exchanger

### 2 全焊接板式换热器停机与清洗

#### Shutting Down and Cleaning

##### A 停机 Shutting Down

1. 1 设备停机时, 应先关闭冷热介质进口阀门。逐步降压降温。

1. 2 若设备长期停用, 应将内部物料残存液放净, 然后用清水将内部冲洗干净, (切忌直接用自来水冲洗, 避免氯离子腐蚀板片) 防止积存液腐蚀板片, 影响设备的使用寿命。

1.1 When shutting down, first close the entry valve and gradually allow pressure and temperature to decrease.

1.2 If a lengthy stoppage period is anticipated, flush all liquid from the system, then run clean water through it for cleaning. Ensure the water is not chlorinated to avoid corrosion.

#### B 清洗 Cleanliness

##### 首先严禁用任何浓度的盐酸清洗!

##### 2. 1 机械清洗

最好用45°C的温水, 压力不超过表压70bar, 通过高压水枪清洗。

##### (1) 准备

首先, 将换热器2腔的水排干净。将板片做好标记, 便于识别。检查两个腔是无压的, 水已经排干净。拆卸时检查压紧端板是否牢固。

##### (2) 端板的拆卸程序

为避免任何变形, 首先应该逐步松动换热器两侧的螺栓然后在松动换热器顶部及底部的螺栓。

##### (3) 用高压水枪清洗板片组。

##### (4) 清洗完毕后压紧板的组装。

##### (5) 水压试验

机械清洗拆装完毕后, 应分别对换热器两腔进行水压试验, 水压试验应按相关标准进行。

##### 2. 2 化学清洗和CIP清洗

可采用硝酸、磷酸、柠檬酸、氨基磺酸。最高浓度4%, 最高温度60度。

(1) 针对微生物(粘质物)--细菌、原生动物、蠕虫、氢氧化钠、碳酸钠。浓度4%, 最高温度80度。

(2) 针对沉淀物--腐蚀产物、氧化铁、泥沙、氧化铝、硝酸、磷酸、柠檬酸、氨基磺酸。最高浓度4%, 最高温度60度

##### (3) 针对油类残留物/沥青/脂肪

可以采用烷族溶液, 石脑油溶液

## 全焊接板式换热器的操作说明 O & M manual of welded heat exchanger

No washing with muriatic acid firstly!

##### 2. 1 Mechanical cleaning

The best water temperature is 45°C. The pressure can't over 70bar of gage pressure. Washing tool is high pressure water gun.

##### (1) . Preparation

Firstly, wipe off water from two cavities of plate heat exchanger and mark plates in order to distinguish. Ensure two cavities are non-pressure and no water. Inspect if clamping end plate is tight or not when disassemble.

##### (2) . Disassemble process for end plate

To avoid any deformation, loose bolts firstly which are in two sides of plate heat exchanger. Then loose bolts on the top and bottom.

##### (3) .Clean plate group with high pressure water gun.

##### (4) .Assemble clamping plate after cleanliness

##### (5) .Hydrostatic test

After mechanical washing and disassembling, have hydrostatic test for two cavities as per relevant standards.

##### 2. 2 Chemical washing and CIP washing

Use nitric acid, phosphoric acid, citric acid, and sulfamic acid. The highest density is 4%. The highest temperature is 60 deg C.

(1) . To microorganism(mucilage)-bacterium, protozoan and oxyurid .Sodium hydroxide, sodium carbonate. Density is 4% and the highest temperature is 80 deg C.

(2) .To precipitate-corrosion products, ferric oxide, silt, alumina.Nitric acid, phosphoric acid, citric acid, and sulfamic acid.Highest density is 4% and highest temperature is 60 deg C.

##### (3) .To oil residue/pitch/fat

Use solution of alkyl series and naphtha solution

### 3 全焊接板式换热器的检修

#### Welding Maintenance

全焊接板式换热器当换热板片组外壳表面焊缝有泄漏，  
可以相应的材料焊条或焊丝用手工氩弧焊进行补焊。

If fluid begins leaking from the weld joints, re-weld to  
seal the leak.

### 订购备件手续 Instructions for ordering spare parts

在订购备件时, 请指明板式换热器的型号和系列号, 这  
些都标明在固定压紧板上的产品铭牌上。或是密封垫片的色  
代号和数字。

订购时进行设备使用信息注册, 以优惠价格购买原厂高  
品质的备件, 扫描下方二维码联系。

When ordering spare parts, please specify the model and  
serial number of the plate heat exchanger, which are  
marked on the nameplate of the fixed pressure plate, or  
specify the color code and the number on the gasket.

Please scan the QR code below to register the equipment  
using information before ordering, to buy the original  
high-quality spare parts at discounted price.

