

## 管子安装的基本要求

### Basic request for piping installation

管子在船上安装时, 必须严格地按照下列的工艺原则进行. 这些原则也是检验的重点.

When pipes are installed in vessel, must be done according to following craft. This principia is emphases of inspection.

1. 凡要穿过船体结构, 如横梁、肋骨、肘板、纵桁、内底板、液舱箱柜及甲板等处时, 应严格按开孔图或工艺技术要求规定先划线, 经指定的人员复验无误后再开孔, 严禁任意开孔. 在船体重要构件上开孔, 应按要求进行加强, 即用开孔补偿方法进行加强。

When pipes through structure, for example, beam, frame, web plate, long-girder, inner bottom, liquid tank and deck etc., firstly line strictly according to craft request, then open after checked by appointed person. Strictly prohibit open arbitrarily. If open on strong structure, should be reinforced according to request.

2. 管子穿过水密或气密结构处时, 应采用贯通件或座板; 穿过非水密平台、甲板或非水密隔墙时, 应加装防护罩, 并双面焊接。

When pipe through watertight or airtight structure, penetration piece or foundation plate should be used. When through non-watertight platform, deck or bulkhead, protection cover should be installed and double welding.

3. 淡水管不得通过油舱, 油管也不得通过淡水舱, 如不可避免时, 应在油密隧道或套管内通过. 其他管子通过燃油舱时, 管壁应加厚, 且不得有可拆接头。

Freshwater pipe not to be allowed through oil tank, oil pipe not to be allowed through fresh water tank. If not to be avoided, pipe should be through in oiltight tunnel or casing pipe. Other pipe through fuel oil tank, pipe thickness should be added and knock-down union joint not to be allowed.

4. 燃油舱柜的溢流管和测量管应避免通过居住舱室, 如有困难, 则管子不得有可拆接头。

Flow over pipe and measure pipe should be avoided through accommodation. If there is difficulty, knock-down union joint not be allowed.

5. 蒸汽管、油管、水管应避免设在配电板上方或其后面, 若不可避免时, 不得设置可拆接头, 并有可靠的保护措施或托盘。

Steam pipe, oil pipe and water pipe should be avoided to install above/behind switchboard.

6. 蒸汽管、排气管、热水管应远离电缆。蒸汽管、排气管法兰距电缆的空间距离, 平行敷设的应不小于 100mm, 交叉敷设的应不小于 50mm; 热水管管壁距电缆应不小于 100 mm。特殊情况不能达到以上规定时, 应增加隔热层厚度。

Steam pipe, exhaust pipe and hot water pipe should be away from cable. Distance between flange of steam pip/exhaust pipe and cable, parallel laying not less than 100mm, cross laying not less than 50mm. Distance

between hot pipe and cable not less than 100mm. If not to be satisfied above rule, heat insulation layer's thickness should be added.

7. 油管及油柜应避免设在锅炉、烟道、蒸汽管、排气管及电器上方，如有困难时，应采取有效措施，防止油滴在管子或设备的热表面上。

Oil pipe/tank should be avoided to install above boiler, funnel tunnel, steam pipe, exhaust pipe and electric equipments. If not, effectual way should be adopted to prevent oil from dropping to hot surface of pipe or equipments.

8. 在货舱、锚链舱、煤舱以及其他易受碰损处所的管子，应具有坚固的便于拆装的防护罩。

Hard and knock-down protection cover should be adopted to protect pipes in cargo room, chain locker, coal tank and other tanks that pipe easily be mangled, .

9. 各种管路应根据需要，在管子、附件、泵、滤器和其他设备的最低处安装泄放阀。

According to request of different piping, drainage valve should be installed on the lowest part of pipe, accessory, pump, filter and other equipments.

10. 所有蒸汽管、排气管和温度较高的管路应包扎绝热材料，绝热层外缘的表面温度一般不能超过 60℃，可拆接头及阀件处的绝热材料应便于拆换。

All steam pipe, exhaust pipe and higher temperature pipes should bind up insulation material. Temperature of insulation surface is not to exceed 60°C.

11. 非冷藏装置的管路通过冷藏舱时，应包扎防冻材料，以防冻裂。一般情况下，通过温度 0℃ 或低于 0℃ 舱室的管子，应与该舱室的钢构件作绝热分隔。

Non-refrigeration plant's pipe through refrigeration room should be bind up antifreezing material to prevent frost crack. Normally, pipe through tank of 0°C or under 0°C should be insulated with structure of this tank.

12. 由于船舱环境较差，且立体作业，因此在每根管子安装时都应注意清洁工作，应按管子安装顺序拆除封头进行安装，以防止异物或污水落入管内，造成不必要的返工。

Because condition is not good and work solid in vessel, every pipe must be keep clean when install them. According to installation order to backout close over install them to prevent sundries or sewage from falling into pipe so as to unnecessarily do poorly done work over again.

13. 镀锌钢管不准敲击，也不准使用火焰加热、气割和电焊焊接。下列情况可以除外，但必须用环氧富锌底漆或其它等效涂层修补。

Punch, heating by touch, welding are not allowed for galvanized pipes expect following conditions, repair with epoxy zinc primer or equal paints are needed after below action.

- (1) 在船上焊接的套筒接头；

sleeve connections welded on board

- (2) 在船上焊接的通舱管件的复板；

double plates of penetrations welded on board

(3) 在船上调整定位的管子法兰，以及焊接在镀锌管上的紧固件。

Flanges adjusted on board and fasteners welded on galvanized pipes

14. 管子安装时应横平、竖直、美观、整齐、牢固可靠。

When pipe is installed, pipe should be kept horizontal, vertical, beautiful, orderly and firmly.

15. 钢法兰管子，其法兰与法兰连接，法兰与机械设备（包括管路附件）接口连接要自然对准，不许用撬杠和夹具等强行对中。

Pipe with steel flange, flange & flange and flange & equipments should be jointed naturally, forced align with crowbar or other tool is not allowed.

## 管系安装流程

原理图到位→开始放样→放样小票下发车间→材料准备→下料→  
弯管→上平台→焊接→打磨→内厂交验→出厂处理（酸洗、镀锌）  
→回厂到车间登记领用（酸洗管涂漆）→施工队领用上船进入现  
场安装（提前准备好图纸、焊机、所需工具、按图纸领用阀件、  
管卡、螺丝、垫片等等）→安装出现修改到放样室协商解决→安  
装完毕进入船校→到项目下船校材料→打领料单→ERP 盖印→仓  
库领料→车间弯管→运输上船气割、打磨、点焊（船校）→施工  
完毕管路拆下运回车间焊接→打磨→内厂交验→出厂处理（酸洗、  
镀锌）→回厂到车间登记领用（酸洗管涂漆）→施工队领用上船  
安装→系统安装完成需自检、互检（管卡、螺丝、铭牌、证书）  
准备交验→外观、压力交厂检→交船东、船检→得到认可后管路  
复位系统安装完成（部分管需串油）→涂漆→管路分色（流向箭头）  
→进入调试→试航.



## Piping installation Sequence

Diagram issued→Start lofting→Send spool to workshop→material prepared→baiting→bending→on bench→Welding→Grinding→shop inspection→outside treatment (pickling, galvanization) →return back for release (paint for pickling pipes ) → release to subcontractor for site install (drawings, welding machine, tools, valve, clamps, bolts, washer and so on totally prepared) →spooling center to solve modifications →site checkout after installation →order checkout materials from project team →print out the MR →ERP stamping →pick out materials from warehouse →bending in workshop →transit to work ship for cutting, grinding, tack weld (checkout) →transit back to workshop for welding after pre installation → grinding → shop inspection → outside treatment (pickling, galvanization) →return back for release (painting for galvanization pipe) →release to subcontractor for site install →self inspection with unite inspection after installation, (clamps, bots, name plates, certificate) ready for inspection →inspection of visual and pressure test by QC →Inspected by owner and DNV →pipes replaced after approval to finish whole installation (flushing for what needed) →Painting →Pipe color(flow arrow) →testing &commissioning →sea trial.

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