



Hengyi Industries Sdn Bhd
恒逸实业（文莱）有限公司

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Anti-Corrosion Insulation Management System

防腐保温管理制度

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1 Purpose

目的

The system is hereby formulated in order to strengthen the anti-corrosion management of the equipment, frame and pipe in the refining unit system, prevent corrosion leakage of the equipment pipe and corrosion collapse of the frame, and ensure the safe and long-term operation of the unit.

为加强炼油装置系统内设备、框架及管道的防腐蚀管理，预防设备管道腐蚀泄漏、框架腐蚀坍塌，保障装置安全长周期运行，特制订本制度。

2 Scope of Application

适用范围

This System is applicable to all departments of the Company.

本制度适用于公司各部门。

3 Terms and Definitions

术语和定义

Anti-corrosion insulation: refers to the use of various means such as improving the material grade, corrosion monitoring and the application of suitable thermal insulation form and surface coating to prevent corrosion of equipment and pipelines and heat loss during operation.

防腐保温：是指采取各种手段如提高材质等级、腐蚀监测以及采用合适的绝热形式和采用表面涂料等，来防止设备和管线的腐蚀和运行过程中的热损失。

4 Management Responsibilities

管理职责

4.1 Specified administrative authority

归口管理部门

4.1.1 The Equipment Management Dept. is the specified administrative authority of the Company for anti-corrosion insulation.

机械动力部是公司防腐保温的归口管理部门。

4.1.2 It is responsible for the review and release of the anti-corrosion insulation management system, monitoring the implementation and performance of the system, preparing the anti-corrosion insulation work plan of the Company, and establishing a sound anti-corrosion insulation maintenance technical file.

负责防腐保温管理制度的审核和发布，监控制度执行和绩效情况，编制公司防腐保温工作计划，建立健全防腐保温检修技术档案。

4.1.3 The Dept. shall supervise and inspect the quality inspection of the coating and be responsible for the construction management of the Company's fireproof coating.

监督检查涂料质检情况，负责公司防火涂料的施工管理。

4.1.4 It shall organize the supervision, inspection and assessment of the implementation effect of the process anti-corrosion measures.

组织对工艺防腐蚀措施的实施效果进行监督、检查、考核；

4.1.5 The Dept. shall be responsible for the management of the surface color and mark color of the Company's equipment, pipes and steel structures.

负责公司设备、管道、钢结构的表面色及标志色的管理。

4.2 Coordinated administrative authority

协同管理部门

4.2.1 The Scheduling & Dispatch Dept. is responsible for the technical management of process anti-corrosion, and is responsible for the management of equipment, pipes, valves and media names and flow direction mark accuracy in the units and systems.

计划调度部负责工艺防腐蚀的技术管理，负责装置和系统内设备、管道、阀门及介质名称及流向标志准确性的管理。

4.2.2 The HSE Dept. is responsible for the applicability inspection of fireproof coatings, taking part in the review of fireproof coating construction scheme, and participating in the quality acceptance of fireproof coating construction projects.

HSE 管理部负责防火涂料的适用性把关，参与审核防火涂料施工方案，参加防火涂料施工项目的质量验收。

4.2.3 The Materials Supply Dept. is responsible for entrusted inspection of quality of the inbound anti-corrosion insulation materials.

物资装备部负责对所购防腐保温材料的入厂质量委托检验工作。

4.3 Executive departments

执行部门

4.3.1 Each operation department is the executive department.

各运行部门为执行部门。

4.3.1.1 They are responsible for the fixed-point thickness measurement of equipment and

pipes in the operation department; they shall properly operate and organize the production in strict accordance with the operating specifications and anti-corrosion process requirements.

负责所在运行部设备、管道定点测厚工作；严格按照操作规程和防腐蚀工艺要求，正确操作和组织生产。

4.3.1.2 They are responsible for the routine maintenance and inspection of anti-corrosion facilities, corrosion monitoring facilities and thermal insulation facilities, and shall establish and improve the basic files of equipment anti-corrosion insulation.

负责防腐蚀设施、腐蚀监测设施、绝热设施的日常维护和检查工作，建立健全设备防腐保温基础档案。

4.3.1.3 They are responsible for the commission handling of construction, on-site construction management, and quantities review of painting and insulation projects.

负责涂装、保温项目的施工委托办理、现场施工管理、工作量审核等工作。

4.3.1.4 They are responsible for supplying a mark list of equipment, pipes, valves and media flow direction, and maintaining the surface color and mark of equipment, pipes and steel structures in the units and systems.

负责提供设备、管道、阀门及介质流向等标志清单，维护装置和系统内设备、管道、钢结构的表面色及标志。

4.3.2 The Instrument Control Dept. is responsible for the routine maintenance of the on-line corrosion monitoring system.

仪表控制部负责在线腐蚀监测系统的日常维护工作。

4.3.3 The Lab Dept. is responsible for the inbound quality inspection and quality random inspection of anti-corrosion materials such as anti-corrosion coating and agents entrusted by the Materials Supply Dept. and the Equipment Management Dept.

质量检验部负责物资装备部及机械动力部委托的防腐蚀涂料及药剂等防腐材料的入厂质量检验、质量抽检工作。

5 Management Content

管理内容

5.1 Anti-corrosion design

防腐蚀设计

5.1.1 The anti-corrosion design should comprehensively consider various anti-corrosion technical measures (process anti-corrosion, adding anti-corrosion agent, electrochemical protection, anti-corrosion coating, corrosion-resistant material, anti-corrosion lining, etc.), and shall conduct a technical and economic assessment of the selected scheme to achieve economic, effective and feasible purposes.

防腐蚀设计应综合考虑各种防腐蚀技术措施（如工艺防腐蚀、添加防腐蚀药剂、电化学保护、防腐蚀涂料、耐蚀材料、防腐蚀衬里等），对所选择的方案应进行技术经济评价，达到经济、有效、

可行的目的。

5.1.2 When selecting the equipment, the corrosion characteristics, flow conditions, temperature, pressure, stress state of the equipment, impact load and other factors of the process media should be fully considered. Processing units for high sulfur content and high sour value should also be selected according to the *Material Selection Guideline for Design of Major Equipment in Key Units Processing Sour Crude Oil* (SH/T3096), the *Material Selection Guideline for Equipments and Piping in Service in Parts of Units Processing Sour Crude Oil* and the *Material Selection Guideline for Design of Major Piping in Key Units Processing Sour Crude Oil* (SH/T3129).

设备选材时，应充分考虑工艺介质的腐蚀特性、流动状态、温度、压力及设备的应力状况、冲击载荷等因素。高含硫、高酸值原油加工装置还应按 SH/T3096《加工高含硫原油重点装置主要设备设计选材导则》、《加工高含硫原油部分装置在用设备及管道选材指导意见》和 SH/T3129《加工高硫原油重点装置主要管道设计选材导则》进行选材。

5.1.3 When designing the structure of the equipment, the influence of the structure on corrosion should be fully considered, and a reasonable structure should be selected to avoid corrosion of the equipment caused by unreasonable design.

在设备结构设计时，应充分考虑结构对腐蚀的影响，选择合适的结构，避免设计不合理造成设备腐蚀。

5.2 Project construction and acceptance

工程施工与验收

5.2.1 The Construction Contractor shall prepare a construction scheme, which shall include construction technical measures under abnormal climatic conditions.

施工单位应编制施工方案，方案中应包含异常气候环境下施工技术措施。

5.2.2 Construction personnel must receive specialized technical training to meet on-site construction techniques and safety requirements; construction machinery and detecting instrument must meet on-site construction requirements.

施工人员须经过专业技术培训，满足现场施工技术及安全要求；施工机具和检测仪器须符合现场施工要求。

5.2.3 Materials used for anti-corrosion construction should be inspected and confirmed to meet design requirements, and the quality should meet national or relevant industry standards. For new materials and new products, in addition to the inbound quality inspection, they should also be checked whether they own the technical appraisal certificate of the relevant department.

检查确认用于防腐蚀施工的材料满足设计要求，质量达到国家或有关行业标准。对新材料、新产品除必须进行入厂质量检验外，还应查验其是否具有相关部门的技术鉴定证书。

5.2.4 The Equipment Management Dept. and the Construction Contractor shall properly organize the construction management of the anti-corrosion project, and strictly implement the

corresponding technical specifications and construction processes to ensure the construction quality and safety.

机械动力部和施工单位要组织好防腐蚀工程的施工管理工作，严格执行相应的技术规范和施工工艺，确保施工质量和安全。

5.2.5 Quality inspection and acceptance of anti-corrosion engineering projects should be strengthened. Each construction working procedure must receive the intermediate quality inspection and those who fail to pass the inspection will not be allowed to enter the next working procedure. After construction completion, a comprehensive quality acceptance is required.

加强防腐蚀工程项目的质量检查和验收。每道施工工序必须经过中间质量检验，检验合格后方可进入下一道工序，施工结束后，要进行全面的质量验收。

5.3 Corrosion inspection

腐蚀检查

5.3.1 The Equipment Management Dept. shall organize and prepare an overall scheme for corrosion inspection. The Operation Dept. shall properly carry out the daily corrosion inspection of the equipment and pipes of the department as well as the corrosion inspection during the shutdown and overhaul of the unit.

机械动力部组织编制腐蚀检查总体方案。运行部开展好本部门设备、管道日常性的腐蚀检查工作及装置停工大修期间的腐蚀检查工作。

5.3.2 The contents and methods of corrosion inspection of equipment and pipes shall be specifically implemented with reference to the *Regulations on Equipment Anti-corrosion Management of Refinery and Chemical Enterprises*.

设备及管道腐蚀检查内容、方法，具体参照《炼化企业设备防腐蚀管理规定》执行。

5.3.3 Writing requirements for the equipment corrosion inspection report:

装置腐蚀检查报告撰写要求：

5.3.3.1 The daily corrosion inspection of the Operation Dept. should be prepared in the monthly equipment report.

运行部日常性的腐蚀检查编制在设备月报中。

5.3.3.2 Within one and a half months after the unit is maintained and put into production, the Operation Dept. shall include the corrosion inspection summary into the shutdown maintenance summary. For example, the specialized inspection team has conducted corrosion inspection and should submit corrosion inspection reports to the Equipment Management Dept. and the Operation Dept.

装置检修投产后的一个半月内，运行部在停工检修总结中应包括腐蚀检查总结，如专业检查队伍已经进行过腐蚀检查，应向机械动力部、运行部提交腐蚀检查报告。

5.3.3.3 The corrosion inspection report of the specialized inspection team shall record the site conditions in a true and complete manner, including texts, forms, pictures and thickness

measurement records. The corrosion inspection report should contain comprehensive analysis and conclusion, with comprehensive analysis on corrosion phenomena, corrosion causes, etc., and recommendations for equipment updating, maintenance items of the next cycle, and process and material anti-corrosion measures. The original of the corrosion inspection report should be stored in the Operation Dept.

专业检查队伍腐蚀检查报告要真实、完整地记录现场情况,包括文字、表格、图片、测厚记录等。腐蚀检查报告应有综合分析和结论,对腐蚀现象、腐蚀原因等作出综合分析,并对设备更新、下周期检修项目、工艺及材料防腐蚀措施等提出建议。腐蚀检查报告原稿存于运行部。

5.4 Thickness measurement management

测厚管理

5.4.1 The range of fixed-point thickness measurement includes equipment and pipes of the production unit that are susceptible to corrosion and scouring, inflammable, combustible, and with toxicity, especially in the locations that are subject to corrosion caused by high temperature sulfur, naphthenic acid and low temperature wet hydrogen sulfide.

定点测厚范围为生产装置易受腐蚀、冲刷、易燃、易爆、剧毒的设备及管道,特别是受高温硫、环烷酸和低温湿硫化氢腐蚀的部位。

5.4.2 The selection, addition, deletion or change in frequency of the thickness measurement point is determined by the Equipment Management Dept. and the Production and Operation Dept.

测厚点的选定、增加、删除或测厚频率的改变由机械动力部和生产运行部共同确定。

5.4.3 The thickness measurement frequency can be divided into 1 month, 3 months, 6 months, one year, two years or one maintenance cycle. The specific thickness measurement frequency can be determined according to the all previous thickness measurement data, the specific location of the site, all previous maintenance and repair conditions, and the process operation parameters.

测厚频率可分为 1 个月、3 个月、6 个月、一年、两年或一个检修周期不等,具体测厚频率可根据历次测厚数据、现场具体位置、历次检维修情况和工艺操作参数来确定。

5.4.4 The Operation Dept. shall draw a three dimensional drawing for the fixed-point thickness measurement. The three dimensional drawing mainly includes the pipe material and specifications, the major equipment to be connected, the media name, the pipe direction and the media flow direction, and the determined thickness measurement points and serial numbers shall be marked.

运行部应绘制专为定点测厚用空视图,空视图主要包括管道材质与规格、连接主要设备、介质名称、管道走向和介质流向等,并标注已确定的测厚点及序号。

5.4.5 For the determined thickness measurement point, the Operation Dept. shall sort the basic parameters (location, material, media, temperature, pressure, original wall thickness) into a form and input it into the EM system. The fixed-point thickness measurement personnel

should be familiar with the process flow, have certain ultrasonic thickness measurement experience, and be relatively permanent.

对已确定的测厚点，运行部应将其基本参数（位置、材质、介质、温度、压力、原始壁厚）整理成表格，输入到 EM 系统中。定点测厚人员应熟悉工艺流程、具有一定的超声波测厚经验，并相对固定。

5.4.6 The expired measuring points shall be measured according to the plan formulated at the beginning of the year, and the thickness measurement data shall be input into the EM system within seven working days after the end of the thickness measurement.

到期的测点按年初制定的计划进行测厚，并在测厚结束后七个工作日内将测厚数据输入到 EM 系统中。

5.4.7 Thickness measurement method and data processing

测厚方法及数据处理

5.4.7.1 The test area of the thick measurement point on the pipeline is the circle center of the thickness measurement area. Each thickness measurement should be repeated twice, with two deviations not exceeding 0.2mm. If an abnormal value is found, the measurement range is to be expanded.

管线上测厚点的测试区域为测厚区域的圆心，每次测厚重复进行两次，两次偏差不超过 0.2mm。如发现异常值时，要扩大测定范围。

5.4.7.2 The high temperature ultrasonic thickness gauge is used as the test instrument with an accuracy of $\pm 0.1\text{mm}$.

测试仪器采用高温超声波测厚仪，精度应达到 $\pm 0.1\text{mm}$ 。

5.4.7.3 Direct contact probes should be adopted, and high temperature probes should be used for measurements at high temperatures ($>100^{\circ}\text{C}$).

探头采用直接接触式探头，高温下（ $>100^{\circ}\text{C}$ ）的测量应采用高温探头。

5.4.7.4 A suitable coupling agent should be used, and a high temperature coupling agent should be applied to the thickness measurement at high temperature.

选用合适的耦合剂，高温部位测厚应用高温耦合剂。

5.4.7.5 For measurement at high temperature, the sound velocity of instrument should be corrected. The thickness obtained after the sound velocity correction of the instrument is the actual thickness of the pipeline.

高温下的测量，应对仪器的声速进行校正。仪器声速校正后所得的厚度为管线的实际厚度。

5.5 Management of anti-corrosion coating

防腐涂料管理

5.5.1 Purchase of anti-corrosion coating

防腐涂料的采购

5.5.1.1 The anti-corrosion coating should be purchased based on quality & price within the product range of qualified suppliers of the Materials Supply Dept. to select the appropriate

anti-corrosion coating manufacturer products. The quality indicators of the purchased anti-corrosion coating should meet the technical specifications of anti-corrosion coating.

选购防腐涂料应在物资装备部合格供应商产品范围内比质比价，选择合适的防腐涂料厂家产品。所采购防腐涂料的质量指标应达到防腐涂料技术指标。

5.5.1.2 For one purchase batch of anti-corrosion coating with a quantity of one ton or more, the Materials Supply Dept. shall entrust the Lab Dept. to conduct quality inspection. For one purchase batch of anti-corrosion coating with a quantity of less than one ton, the Materials Supply Dept. shall entrust the Lab Dept. to conduct quality random inspection, and the random inspection frequency shall not be less than 1 time/month.

一个批次采购数量在一吨及以上的防腐涂料，物资装备部应委托质量检验部进行质量检验。一个批次采购数量在一吨以下的防腐涂料，物资装备部应委托质量检验部进行质量抽查，抽查频率均不小于 1 次/月。

5.5.2 Construction of anti-corrosion coating

防腐涂料的施工

5.5.2.1 Safety management during construction shall be carried out in accordance with the requirements of the *Technical Code for Construction safety in Petrochemical Engineering* (SH3505) and the Company's safety management related systems.

施工中的安全管理按 SH3505 《石油化工施工安全技术规程》和公司安全管理有关制度的要求执行。

5.5.2.2 For all kinds of engineering projects in the construction of anti-corrosion coating, the construction quality of derusting, primer and topcoat shall be accepted and confirmed; the derusting quality of overhaul and repair projects shall be jointly inspected and confirmed by the Equipment Management Dept. and the User; the intermediate brushing quality shall be inspected and confirmed by the User; upon completion, the Equipment Management Dept. shall organize relevant departments to carry out the project completion acceptance. All inspection and acceptance results should be included in the *Quality Acceptance Sheet for Coating Anti-corrosion Construction*.

各类工程项目在防腐涂料施工中，除锈、底漆、面漆施工质量应进行质量验收、确认；大修、维修项目的除锈质量由机械动力部、使用单位共同检查确认；中间涂刷质量由使用单位检查确认；工程完工时，由机械动力部组织相关单位进行工程竣工验收。所有的检查与验收都应当填写《涂料防腐施工质量验收单》。

5.5.2.3 For oil tank anti-corrosion, in order to ensure traceability of the anti-corrosion coating used, the Construction Contractor shall carefully fill in the *Record for Coating Anti-corrosion Construction* during the construction process.

对于油罐防腐，为了使所用的防腐涂料具有可追溯性，施工单位在施工过程中应认真填写《涂料防腐施工记录单》。

5.5.2.4 For oil tanks or complete set of units, after construction of anti-corrosion coating, the "Nameplate of Anti-corrosion Works" should be painted in a conspicuous place (see Appendix 1).

对于油罐或成套装置，防腐涂料施工结束后，应在其显眼处涂刷“防腐工程铭牌”（见附件 1）。

5.6 Process anti-corrosion management

工艺防腐管理

Process anti-corrosion management shall be carried out in accordance with the relevant regulations of the Scheduling & Dispatch Dept.

工艺防腐管理按计划调度部有关规定执行。

5.7 Thermal insulation material management

绝热材料管理

5.7.1 Principle for selection

选择原则

5.7.1.1 For thermal insulation materials, materials with small thermal conductivity, low density, low cost and low construction difficulty should be preferred. Under high temperature (low temperature) conditions, composite materials can be selected after comprehensive economic comparison.

绝热材料应优先选用热导率小、密度小、造价低、易于施工的材料制品，在高温（低温）条件下经综合经济比较后可选用复合材料。

5.7.1.2 It is forbidden to use soft or semi-soft materials for insulation of buried pipes.

埋地管道严禁采用软质或半软质材料保温。

5.7.1.3 Generally, 0.5 ~ 0.8mm aluminum skin is used as the outer protective layer for the metal protective layer.

金属保护层一般采用 0.5~0.8mm 铝皮作为外保护层。

5.7.1.4 The detachable box structure should be suitable for valve insulation.

阀门保温宜采用可拆盒式结构。

5.7.1.5 A new insulation material should be on trial first and then gradually promoted.

采用新型保温材料时应先试点，再逐步推广。

5.7.2 Quality evaluation

质量评定

5.7.2.1 In order to ensure the quality of the insulation works and facilitate inspection and repair, the insulation quality should be inspected and evaluated from the insulation thickness, surface temperature and appearance.

为了保证保温工程质量，便于检查和维修，对保温质量应从保温厚度、表面温度和外观情况进行检查和评定。

5.7.2.2 The allowable deviation and inspection method for the installation thickness of the insulation layer are shown in Table 1 below.

绝热层安装厚度的允许偏差和检验方法见下表 1。

Table 1 Installation deviations of insulation material**表 1 绝热材料安装偏差表**

Item 项 目				Allowable deviation 允许偏差	Inspection methods 检验方法
Thickness 厚度	Embedded layer spread method, bundle-up method, tiling method and pasting method 嵌装层铺法、捆扎法、拼砌法及粘贴法	Insulation layer 保温层	Rigid product 硬质制品	+10mm -5mm	Dimensional inspection 尺寸检查
			Semi-rigid and soft products 半硬质及软质制品	+10%, but not more than +10mm; -5%, but not less than -8mm +10%，但不得大于+10mm；-5%，但不得小于-8mm	Pinprick and ruler metering inspection 针刺、尺量检查
		Cold insulation layer 保冷层		+5mm 0	Pinprick and ruler metering inspection 针刺、尺量检查
	Filling method, casting method and spraying method 填充法、浇注法及喷涂法	Thermal insulation layer thickness >50mm 绝热层厚度>50mm		+10%	For filling method, measure the distance between the solid layer and the workpiece with a ruler; for casting and spraying methods, pinprick and ruler metering inspection 填充法用尺测量固形层与工件间距检查；浇注及喷涂法针刺、尺量检查
		Thermal insulation layer thickness ≤50mm 绝热层厚度≤50mm		+5mm	

5.7.2.3 Appearance

外观情况

(1) It is strictly forbidden to add fixing parts to the lap joint between the metal protective layer pipe elbow and the metal casing on the straight pipe section as well as the circumferential joint of the metal casing expansion of the straight pipe section.

金属保护层管道弯头与直管段上金属护壳的搭接及直管段金属护壳膨胀的环向接缝部位严禁加置固定件。

(2) The circumferential and longitudinal joints of the metal protective layer of the equipment and pipes must be in a upper-on-lower manner; the circumferential joints of the horizontal pipes should be lapped along the horizontal direction.

设备及管道金属保护层的环向、纵向接缝必须上搭下，水平管道的环向接缝应顺水搭接。

(3) The appearance of the metal protective layer shall be free of turnup, opening, warped joint or obvious pit, and the outward appearance shall be neat and beautiful.

金属保护层的外观应无翻边、豁口、翘缝或明显凹坑，外表应整齐美观。

(4) The lap joint of the metal protective layers should be even and tight. The lap joint dimension of general position of indoor equipment and pipes should be $\geq 30\text{mm}$; the dimension of expansion joint should be $\geq 50\text{mm}$. The lap joint dimension of general position under open air or humid environment should be $\geq 50\text{mm}$; the dimension of expansion joint should be $\geq 75\text{mm}$; the lap joint dimension of joint position between the elbow and the straight pipe section under the high temperature environment shall be $75\sim 150\text{mm}$; $50\sim 70\text{mm}$ shall be suitable for the low and medium temperature environment; the dimension of the cold insulation lap joint should be $30\sim 50\text{mm}$; the lap joint dimension of the flat wall surface of the equipment should be $\geq 20\text{mm}$.

金属保护层的搭接应均匀严密。室内设备及管道一般部位搭接尺寸应 $\geq 30\text{ mm}$ ；膨胀缝部位搭接尺寸应 $\geq 50\text{ mm}$ 。露天或潮湿环境一般部位搭接尺寸应 $\geq 50\text{ mm}$ ；膨胀缝部位搭接尺寸应 $\geq 75\text{ mm}$ ；弯头与直管段接缝部位高温搭接尺寸应搭 $75\sim 150\text{ mm}$ ；中、低温搭接尺寸应搭 $50\sim 70\text{ mm}$ ；保冷搭接尺寸应搭 $30\sim 50\text{ mm}$ ；设备平壁面搭接尺寸应 $\geq 20\text{ mm}$ 。

(5) The fixing parts of the metal protective layer should be installed firmly, without looseness and uniform in spacing. The fixed spacing in the straight pipe sections between the metal hold hoop bands for the cold insulation structure is $250\sim 300\text{mm}$; the fixed spacing in the straight pipe section between the self-tapping screws for the insulation structure is $150\sim 200\text{mm}$, and the fixed spacing in the elbow section is determined according to specific conditions; the fixed spacing between the flat walls of the equipment is $\geq 250\text{mm}$.

金属保护层的固定件应安装牢固，无松动，间距均匀一致。保冷结构金属抱箍带固定间距直管段 $250\sim 300\text{ mm}$ ；保温结构自攻螺丝固定直管段间距 $150\sim 200\text{ mm}$ ，弯头部位固定间距视具体情况确定；设备平壁固定间距 $\geq 250\text{ mm}$ 。

(6) The longitudinal joint of the pipe metal protective layer shall be parallel to the pipe axis, and the position shall be $15^\circ\sim 45^\circ$ below the horizontal centerline. When there are obstacles on the side or bottom, it may be moved to within 60° above the horizontal centerline of the pipe.

管道金属保护层的纵向接缝应与管道轴线保持平行，位置宜在水平中心线下方的 $15^\circ\sim 45^\circ$ 处，当侧面或底部有障碍物时，可移至管道水平中心线上方 60° 以内。

(7) The circumferential joint of the pipe metal protective layer shall be perpendicular to the pipe axis; the circumferential joint of the metal protective layer of the equipment and the large-scaled storage tank shall be perpendicular to the longitudinal joint and shall be neat and beautiful.

管道金属保护层的环向接缝应与管道轴线保持垂直；设备及大型贮罐金属保护层的环向接缝应与纵向接缝相互垂直，并应整齐美观。

(8) The metal protective layer branch pipe and the main pipe at the tee joint of the pipeline should be fixed in turnup manner at the intersection, and should be lapped along the horizontal direction.

管道三通部位金属保护层支管与主管在相交部位宜翻边固定，并应顺水搭接。

5.7.3 Maintenance

维护和检修

5.7.3.1 All departments should regularly check the insulation of equipment and pipes under their jurisdiction.

各部门应定期检查辖区内的设备、管道绝热情况。

5.7.3.2 When the hoisting equipment for construction is installed and maintained, it is strictly forbidden to use the insulation pipeline as the hoisting fulcrum. It is forbidden to walk or tread on the pipeline to damage the insulation material.

安装、检修施工吊装设备严禁利用绝热管线作起吊支点，禁止在管线上行走、践踏、损坏绝热材料。

5.7.3.3 If it is found that the thermal insulation layer is damaged due to temperature changes and corrosion, the defect should be eliminated in time; if the situation is serious, the cause should be analyzed and recorded on file.

如发现因温度变化和腐蚀造成绝热层破坏时，应及时进行消缺，对情况严重的应当分析原因并记录存档。

5.7.3.4 Valves and flanges on exposed parts of general equipment and pipes shall be of detachable thermal insulation structure. The buried thermal insulation pipeline should have good technical properties such as thermal insulation, anti-corrosion, waterproof and high strength, and adopts the form of pipe trench. The pipeline close to the ground should be equipped with a protective layer of rigid waterproof thermal insulation material.

一般设备及管道上裸露部分的阀门、法兰应采用可拆卸式绝热结构。埋地绝热管线，应具备绝热、防腐、防水、强度等良好的技术性能，采用管沟形式。紧挨地面的管线，应采用硬质防水绝热材料保护层。

5.7.3.5 The thermal insulation materials removed due to equipment and pipeline maintenance and emergency repair shall be repaired immediately after completion of the maintenance, which shall not exceed 10 days at the latest. After thermal insulation construction of equipment and pipes, the temperature rise of the outer surface of the protective layer must be lower than 25°C; after cold insulation of the equipment and pipes, the temperature of the outer surface of the protective layer is required to not exceed the dew point temperature.

因设备和管道检修、抢修所拆除的绝热材料，待检修完毕后立即修复，最迟不得超过 10 天。设备、管道经过绝热施工后，其保护层外表面的温升必须低于 25℃；设备、管道经过保冷后，其保护层外表面温度要求不超过露点温度。

5.7.3.6 After the thermal insulation construction is completed, the Equipment Management Dept. shall organize the acceptance.

绝热施工完毕由机械动力部组织验收。

6 Inspection and Supervision

检查与监督

The Equipment Management Dept. shall be responsible for the supervision, inspection and assessment of the management and implementation of the anti-corrosion insulation by the Operation Dept.

机械动力部负责对运行部防腐保温管理执行情况进行监督检查考核。

7 Associated Procedures and Records

关联程序和记录

7.1 Associated procedures

关联程序

7.1.1 Management Procedures for Equipment Anti-corrosion (HYBN-T2-07-0030-2024-2)

设备防腐管理程序 HYBN-T2-07-0030-2024-2

7.1.2 Management Procedures for Equipment Anti-corrosion Inspection (HYBN-T2-07-0031-2024-2)

设备防腐检查管理程序 HYBN-T2-07-0031-2024-2

7.1.3 Management Procedures for Equipment Anti-corrosion Thickness Measurement (HYBN-T2-07-0032-2024-2)

设备腐蚀测厚管理程序 HYBN-T2-07-0032-2024-2

7.1.4 Management Procedures for Equipment Anti-corrosion Coating Construction (HYBN-T2-07-0033-2024-2)

设备防腐涂料施工管理程序 HYBN-T2-07-0033-2024-2

7.1.5 Management Procedures for Equipment Insulation (Cold Insulation) (HYBN-T2-07-0034-2024-2)

设备保温（冷）管理程序 HYBN-T2-07-0034-2024-2

7.2 Associated records

关联记录

7.2.1 Inspection and Analysis Report for Coating (HYBN-T6-07-0090-001-2018)

涂料检验分析报告 HYBN-T6-07-0090-001-2018

7.2.2 Quality Acceptance Sheet for Anti-corrosion Coating Construction (HYBN-T6-07-0091-001-2018)

防腐涂料施工质量验收单 HYBN-T6-07-0091-001-2018

7.2.3 Record for Coating Anti-corrosion Construction (HYBN-T6-07-0092-001-2018)

涂料防腐施工记录单 HYBN-T6-07-0092-001-2018

7.2.4 Records for Thickness Measurement (HYBN-T6-07-0093-001-2018)

测厚记录表 HYBN-T6-07-0093-001-2018

8 Supplementary Rules**附则**

8.1 This System is under the jurisdiction of Equipment Management Dept.

本制度由机械动力部归口管理。

8.2 This System is drafted by Equipment Management Dept.

本制度起草部门：机械动力部。

8.3 Equipment Management Dept. is responsible for the interpretation of this System.

本制度解释权归机械动力部拥有。

8.4 Revision, preparation and approval of the System are shown in Table 2:

本制度版本编制和审批情况见表 2:

Table 2 Revision, preparation and approval of document**表 2 文件版本编制和审批情况**

2	2024-04-01	Deng Xianlin 邓咸林	Zhao Tingyun 赵挺云	Xu Ye 徐野	Chen Liancai 陈连财
Revision 版本	Issued date 颁布日期	Prepared by 编制人	Reviewed by 审核人	Authorized by 审定	Approved by 批准人

9 Appendices**附件**

9.1 Appendix 1: Nameplate of Anti-corrosion Works

附件 1: 防腐工程铭牌

Appendix 1

附件 1

Nameplate of Anti-corrosion Works
防腐工程铭牌

1 Nameplate format

铭牌格式

Project name 项目名称	
Construction Contractor 施工单位	
Person in charge of project 项目负责人	
Construction date 施工日期	
Warranty period 质保期	

2 Nameplate requirements

铭牌要求

2.1 Production: spraying method is generally required.

制作：一般要求采用喷涂方法。

2.2 Dimensions: 800mm (width) × 500mm (height).

尺寸：800mm（宽）×500mm（高）。

2.3 Font: Song typeface

字体：宋体

2.4 Location: the nameplate should be located in a conspicuous location of the Project; for storage tank, it is required to be sprayed on the tank wall at the beginning of the winding staircase.

位置：铭牌应位于工程醒目位置，对于储罐要求喷在盘梯起始处的罐壁上。