



Cladding-Technology-Shanxi-Co.,-Ltd- CLADDING-MPS-010-Mold-Repair- Cladding-MPS

模具修复堆焊尺寸恢复、检验、机加工与最终验收工艺 规程

Mold Repair Cladding Dimension Restoration, Inspection, Machining and Final Acceptance Process Specification

文件编号	Document No.	CLADDING-MPS-010
版本号	Version	A/0
生效日期	Effective Date	2024-01-01
编制部门	Prepared By	工艺技术部
批准人	Approved By	总经理



1 目的 Purpose

本工艺规程规定了科雷丁技术（山西）有限公司在模具修复堆焊作业中，针对模具尺寸恢复、堆焊层质量检验、机加工处理及最终验收等环节的技术要求与操作规范，确保修复后的模具满足使用性能要求，延长模具使用寿命，降低客户生产成本。

This process specification defines the technical requirements and operational standards for mold dimension restoration, cladding layer quality inspection, machining treatment, and final acceptance in mold repair cladding operations at CLADDING-Technology-Shanxi-Co.,-Ltd, ensuring that repaired molds meet performance requirements, extend service life, and reduce customer production costs.

2 适用范围 Scope

本工艺规程适用于公司承接的各类模具堆焊修复项目，包括但不限于：

This process specification applies to various mold cladding repair projects undertaken by the company, including but not limited to:

- 注塑模具型腔、型芯尺寸恢复
- Injection mold cavity and core dimension restoration
- 压铸模具工作表面强化修复
- Die casting mold working surface strengthening and repair
- 冲压模具刃口及工作部位修复
- Stamping mold edge and working area repair
- 锻造模具型面修复与强化
- Forging mold surface repair and strengthening
- 粉末冶金模具尺寸恢复
- Powder metallurgy mold dimension restoration
- 玻璃模具型面修复
- Glass mold surface repair

3 职责 Responsibilities

3.1 工艺技术部 Technical Process Department

- 编制和修订本工艺规程
- Prepare and revise this process specification



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- 制定模具修复堆焊工艺方案
 - Develop mold repair cladding process plans
 - 确定堆焊材料匹配方案
 - Determine cladding material matching schemes
 - 审核修复工艺参数
 - Review repair process parameters
 - 处理工艺异常与技术问题
 - Handle process abnormalities and technical issues

3.2 生产部 Production Department

- 按工艺规程执行堆焊作业
- Execute cladding operations according to this specification
- 控制堆焊工艺参数
- Control cladding process parameters
- 记录生产数据与过程信息
- Record production data and process information
- 确保堆焊层质量符合技术要求
- Ensure cladding layer quality meets technical requirements

3.3 质量部 Quality Department

- 制定检验标准与验收准则
- Develop inspection standards and acceptance criteria
- 执行堆焊层质量检验
- Execute cladding layer quality inspection
- 出具检验报告
- Issue inspection reports
- 监督工艺执行过程
- Supervise process execution

3.4 机加工车间 Machining Workshop

- 按图纸要求进行机加工处理
- Perform machining according to drawing requirements
- 保证加工尺寸精度
- Ensure machining dimensional accuracy



- 控制表面粗糙度
- Control surface roughness
- 保护堆焊层不受损伤
- Protect cladding layer from damage

3.5 项目经理 Project Manager

- 协调各部门工作
- Coordinate work among departments
- 跟踪项目进度
- Track project progress
- 与客户沟通确认技术要求
- Communicate with customers to confirm technical requirements
- 组织最终验收
- Organize final acceptance

4 管理内容与程序 Management Content and Procedures

4.1 模具修复前评估 Pre-repair Assessment

4.1.1 损坏状况评估 Damage Assessment

接收待修复模具后，由工艺技术部组织技术人员对模具损坏状况进行全面评估，评估内容包括：

After receiving molds for repair, the Technical Process Department shall organize technical personnel to conduct comprehensive assessment of mold damage conditions, including:

评估项目	Assessment Item	评估内容	Assessment Content
损坏类型	Damage Type	磨损、裂纹、变形、腐蚀等	Wear, cracks, deformation, corrosion, etc.
损坏部位	Damage Location	型腔、型芯、刃口、导柱等	Cavity, core, edge, guide pillar, etc.
损坏程度	Damage Severity	尺寸偏差量、深度、面积	Dimensional deviation, depth, area
材料状况	Material Condition	基体材料、硬度、组织	Base material, hardness,



		状态	microstructure
使用要求	Usage Requirements	工作温度、压力、介质等	Working temperature, pressure, medium, etc.

4.1.2 修复可行性分析 Repair Feasibility Analysis

根据损坏评估结果，工艺技术部应进行修复可行性分析，确定：

Based on damage assessment results, the Technical Process Department shall conduct repair feasibility analysis to determine:

- 是否适合采用堆焊修复工艺
- Whether cladding repair process is suitable
- 推荐堆焊材料类型及规格
- Recommended cladding material type and specification
- 预估修复成本与工期
- Estimated repair cost and schedule
- 修复后模具预期使用寿命
- Expected service life of repaired mold

4.1.3 工艺方案制定 Process Plan Development

工艺技术部根据评估结果制定详细工艺方案，方案内容包括：

The Technical Process Department shall develop detailed process plans based on assessment results, including:

- 堆焊工艺方法选择（TIG/MIG）
- Cladding process method selection (TIG/MIG)
- 堆焊材料匹配方案
- Cladding material matching scheme
- 预热及层间温度控制要求
- Preheating and interpass temperature control requirements
- 堆焊层数及每层厚度
- Number of cladding layers and thickness per layer
- 焊后热处理方案
- Post-weld heat treatment plan
- 机加工余量确定
- Machining allowance determination



4.2 尺寸恢复工艺 Dimension Restoration Process

4.2.1 模具预处理 Mold Pre-treatment

堆焊前应对模具进行以下预处理：

The following pre-treatment shall be performed on molds before cladding:

（1）表面清理 Surface Cleaning

- 清除模具表面的油污、氧化皮、锈蚀等杂质
- Remove oil, oxide scale, rust and other impurities from mold surface
- 采用丙酮或酒精清洗待堆焊区域
- Clean cladding area with acetone or alcohol
- 确保堆焊区域清洁干燥
- Ensure cladding area is clean and dry

（2）基准测量 Reference Measurement

- 使用三坐标测量机或专用量具测量模具关键尺寸
- Measure key mold dimensions using CMM or special measuring tools
- 记录原始尺寸数据，建立尺寸档案
- Record original dimension data and establish dimension archive
- 确定尺寸恢复目标值
- Determine dimension restoration target values

（3）装夹定位 Fixturing and Positioning

- 设计专用工装夹具，确保模具定位准确
- Design special fixtures to ensure accurate mold positioning
- 采用磁性或机械方式固定模具
- Fix mold using magnetic or mechanical methods
- 预留堆焊操作空间
- Reserve cladding operation space

4.2.2 堆焊材料选择 Cladding Material Selection

根据模具基体材料和使用要求选择匹配的堆焊材料：

Select matching cladding materials based on mold base material and usage requirements:

模具基体材料	Mold Base Material	推荐堆焊材料	Recommended Cladding Material	适用场景	Application Scenario
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Cr12MoV	Cr12MoV	ER80S-B2	ER80S-B2	冷作模具	Cold work mold
H13	H13	ER554-B2	ER554-B2	热作模具	Hot work mold
45#钢	45# Steel	ER50-6	ER50-6	一般结构件	General structural parts
3Cr2W8V	3Cr2W8V	ER554-B2	ER554-B2	压铸模具	Die casting mold
硬质合金	Hard Alloy	Co 基合金	Co-based Alloy	高耐磨要求	High wear resistance

4.2.3 TIG 堆焊工艺参数 TIG Cladding Process Parameters

对于精密模具修复，优先采用 TIG 堆焊工艺，典型工艺参数如下：

For precision mold repair, TIG cladding process is preferred, with typical process parameters as follows:

参数项目	Parameter Item	参数范围	Parameter Range	备注	Remarks
焊接电流	Welding Current	80-160A	80-160A	根据板厚调整	Adjust according to thickness
电弧电压	Arc Voltage	12-18V	12-18V	保持电弧稳定	Maintain arc stability
焊接速度	Welding Speed	50-150mm/min	50-150mm/min	控制稀释率	Control dilution rate
氩气流量	Argon Flow Rate	10-15L/min	10-15L/min	保护气体	Shielding gas
焊丝直径	Wire Diameter	1.6-3.2mm	1.6-3.2mm	根据材料选择	Select according to material
预热温度	Preheating Temperature	100-300°C	100-300°C	根据材料确定	Determine according to material
层间温度	Interpass Temperature	≤250°C	≤250°C	防止过热	Prevent overheating



4.2.4 MIG 堆焊工艺参数 MIG Cladding Process Parameters

对于大面积尺寸恢复，可采用 MIG 堆焊工艺提高效率，典型工艺参数如下：

For large area dimension restoration, MIG cladding process can be used to improve efficiency, with typical process parameters as follows:

参数项目	Parameter Item	参数范围	Parameter Range	备注	Remarks
焊接电流	Welding Current	180-300A	180-300A	根据板厚调整	Adjust according to thickness
电弧电压	Arc Voltage	22-30V	22-30V	保持熔池稳定	Maintain pool stability
焊接速度	Welding Speed	200-500mm/min	200-500mm/min	提高效率	Improve efficiency
气体流量	Gas Flow Rate	15-20L/min	15-20L/min	Ar+CO ₂ 混合气	Ar+CO ₂ mixture
焊丝直径	Wire Diameter	1.2-1.6mm	1.2-1.6mm	根据设备选择	Select according to equipment
送丝速度	Wire Feed Speed	4-8m/min	4-8m/min	与电流匹配	Match with current
预热温度	Preheating Temperature	100-250°C	100-250°C	根据材料确定	Determine according to material

4.2.5 堆焊操作要求 Cladding Operation Requirements

（1）起弧与收弧 Arc Starting and Stopping

- 采用引弧板起弧，避免在模具上直接起弧
- Use arc starting plate, avoid direct arc starting on mold
- 收弧时填满弧坑，防止产生弧坑裂纹
- Fill arc crater when stopping to prevent crater cracks
- 弧坑处适当增加停留时间
- Appropriately increase dwell time at arc crater

（2）堆焊层控制 Cladding Layer Control

- 严格控制每层堆焊厚度，单层厚度不超过焊丝直径的 1.5 倍



- Strictly control thickness per layer, single layer thickness shall not exceed 1.5 times wire diameter
- 层间彻底清渣，去除氧化皮
- Thoroughly clean slag between layers, remove oxide scale
- 控制层间温度，防止过热
- Control interpass temperature, prevent overheating

(3) 稀释率控制 Dilution Rate Control

- TIG 堆焊稀释率控制在 10%-20%
- TIG cladding dilution rate controlled at 10%-20%
- MIG 堆焊稀释率控制在 15%-25%
- MIG cladding dilution rate controlled at 15%-25%
- 通过调整工艺参数控制稀释率
- Control dilution rate by adjusting process parameters

(4) 变形控制 Deformation Control

- 采用分段堆焊、对称堆焊方式
- Use segmented cladding, symmetrical cladding methods
- 合理安排堆焊顺序
- Arrange cladding sequence reasonably
- 必要时采用反变形措施
- Use anti-deformation measures when necessary

4.3 堆焊层检验 Cladding Layer Inspection

4.3.1 外观检验 Visual Inspection

堆焊完成后，应对堆焊层进行外观检验，检验项目包括：

After cladding , visual inspection shall be performed on cladding layer, including:

检验项目	Inspection Item	合格标准	Acceptance Criteria
表面质量	Surface Quality	无气孔、夹渣、裂纹	No porosity, slag inclusion, cracks
焊缝成形	Weld Formation	焊缝均匀，过渡平滑	Uniform weld, smooth transition
尺寸偏差	Dimensional Deviation	符合工艺要求	Meet process requirements
咬边	Undercut	深度≤0.5mm	Depth ≤0.5mm



余高	Reinforcement	符合设计要求	Meet design requirements
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4.3.2 尺寸检验 Dimensional Inspection

使用精密量具对堆焊层尺寸进行检验：

Use precision measuring tools to inspect cladding layer dimensions:

- 堆焊层厚度：使用超声波测厚仪测量
- Cladding layer thickness: Measure using ultrasonic thickness gauge
- 堆焊区域尺寸：使用三坐标测量机测量
- Cladding area dimensions: Measure using CMM
- 尺寸偏差：控制在 $\pm 0.2\text{mm}$ 以内
- Dimensional deviation: Controlled within $\pm 0.2\text{mm}$
- 平面度：控制在 0.1mm 以内
- Flatness: Controlled within 0.1mm

4.3.3 硬度检验 Hardness Inspection

对堆焊层进行硬度测试，验证堆焊材料性能：

Perform hardness testing on cladding layer to verify material performance:

堆焊材料	Cladding Material	硬度要求	Hardness Requirement	测试方法	Test Method
ER80S-B2	ER80S-B2	HRC 45-55	HRC 45-55	洛氏硬度	Rockwell Hardness
ER554-B2	ER554-B2	HRC 40-50	HRC 40-50	洛氏硬度	Rockwell Hardness
ER50-6	ER50-6	HB 200-280	HB 200-280	布氏硬度	Brinell Hardness
Co 基合金	Co-based Alloy	HRC 50-60	HRC 50-60	洛氏硬度	Rockwell Hardness

4.3.4 无损检测 Non-destructive Testing

根据模具重要性，对堆焊层进行无损检测：

Perform non-destructive testing on cladding layer according to mold importance:



(1) 渗透检测 Penetrant Testing

- 检测堆焊层表面裂纹
- Detect surface cracks in cladding layer
- 采用荧光或着色渗透剂
- Use fluorescent or dye penetrant
- 检测灵敏度不低于 B 级
- Detection sensitivity not lower than Grade B

(2) 磁粉检测 Magnetic Particle Testing

- 适用于铁磁性材料堆焊层
- Applicable to ferromagnetic material cladding layers
- 检测表面及近表面缺陷
- Detect surface and near-surface defects
- 采用交流或直流磁化
- Use AC or DC magnetization

(3) 超声波检测 Ultrasonic Testing

- 检测堆焊层内部缺陷
- Detect internal defects in cladding layer
- 检测堆焊层与基体结合质量
- Detect bonding quality between cladding layer and base
- 采用直探头或斜探头检测
- Use straight probe or angled probe

4.3.5 金相检验 Metallographic Inspection

对关键模具堆焊层进行金相检验：

Perform metallographic inspection on critical mold cladding layers:

- 检验堆焊层组织状态
- Inspect cladding layer microstructure
- 检验堆焊层与基体结合界面
- Inspect bonding interface between cladding layer and base
- 检验是否存在过热组织
- Inspect for overheated microstructure
- 检验碳化物分布均匀性
- Inspect carbide distribution uniformity



4.4 机加工工艺 Machining Process

4.4.1 机加工前准备 Pre-machining Preparation

堆焊层检验合格后，进入机加工工序，加工前准备工作包括：

After cladding layer inspection passes, proceed to machining process. Pre-machining preparation includes:

- 确认堆焊层尺寸及位置
- Confirm cladding layer dimensions and position
- 确定加工基准面
- Determine machining datum surface
- 制定机加工工艺路线
- Develop machining process route
- 准备专用刀具及工装
- Prepare special tools and fixtures

4.4.2 粗加工 Rough Machining

粗加工的目的是去除大部分加工余量，为精加工做准备：

The purpose of rough machining is to remove most of the machining allowance for finishing preparation:

加工参数	Machining Parameter	参数值	Parameter Value	备注	Remarks
切削深度	Cutting Depth	1-3mm	1-3mm	根据材料调整	Adjust according to material
进给速度	Feed Rate	0.1-0.3mm/r	0.1-0.3mm/r	保证加工效率	Ensure machining efficiency
切削速度	Cutting Speed	80-150m/min	80-150m/min	根据刀具材料	According to tool material
冷却方式	Cooling Method	充分冷却	Adequate Cooling	防止刀具磨损	Prevent tool wear

4.4.3 半精加工 Semi-finishing

半精加工的目的是获得较高的尺寸精度和表面质量：



The purpose of semi-finishing is to achieve higher dimensional accuracy and surface quality:

- 切削深度: 0.3-1mm
- Cutting depth: 0.3-1mm
- 进给速度: 0.05-0.15mm/r
- Feed rate: 0.05-0.15mm/r
- 尺寸公差: IT8-IT9
- Dimensional tolerance: IT8-IT9
- 表面粗糙度: Ra 3.2-6.3 μ m
- Surface roughness: Ra 3.2-6.3 μ m

4.4.4 精加工 Finishing

精加工的目的是达到图纸要求的最终尺寸和表面质量:

The purpose of finishing is to achieve final dimensions and surface quality required by drawings:

加工参数	Machining Parameter	参数值	Parameter Value	备注	Remarks
切削深度	Cutting Depth	0.1-0.3mm	0.1-0.3mm	保证精度	Ensure accuracy
进给速度	Feed Rate	0.02-0.08mm/r	0.02-0.08mm/r	保证表面质量	Ensure surface quality
切削速度	Cutting Speed	100-200m/min	100-200m/min	根据材料调整	Adjust according to material
尺寸公差	Dimensional Tolerance	IT6-IT7	IT6-IT7	按图纸要求	According to drawing
表面粗糙度	Surface Roughness	Ra 0.8-1.6 μ m	Ra 0.8-1.6 μ m	按图纸要求	According to drawing

4.4.5 精磨加工 Precision Grinding

对于高精度要求的模具型面，采用精磨加工:

For high precision mold surfaces, use precision grinding:

- 砂轮选择: CBN 砂轮或金刚石砂轮
- Wheel selection: CBN wheel or diamond wheel
- 砂轮粒度: W10-W20
- Wheel grit: W10-W20



- 磨削深度：0.02-0.05mm
- Grinding depth: 0.02-0.05mm
- 表面粗糙度：Ra 0.2-0.4 μ m
- Surface roughness: Ra 0.2-0.4 μ m
- 尺寸精度：IT5-IT6
- Dimensional accuracy: IT5-IT6

4.4.6 机加工注意事项 Machining Precautions

（1）刀具选择 Tool Selection

- 根据堆焊材料硬度选择合适刀具
- Select appropriate tools according to cladding material hardness
- 优先选用硬质合金或 CBN 刀具
- Prefer carbide or CBN tools
- 刀具刃口应锋利，避免崩刃
- Tool edges should be sharp, avoid chipping

（2）切削参数 Cutting Parameters

- 采用小切深、小进给、高转速
- Use small cutting depth, small feed, high speed
- 避免断续切削
- Avoid intermittent cutting
- 保证充分冷却
- Ensure adequate cooling

（3）装夹方式 Fixturing Method

- 采用软爪或专用夹具
- Use soft jaws or special fixtures
- 避免夹紧力过大导致变形
- Avoid excessive clamping force causing deformation
- 保证定位准确
- Ensure accurate positioning

4.5 焊后热处理 Post-weld Heat Treatment

4.5.1 热处理目的 Purpose of Heat Treatment

堆焊后热处理的主要目的：

Main purposes of post-cladding heat treatment:



- 消除堆焊应力
- Eliminate cladding stress
- 改善堆焊层组织
- Improve cladding layer microstructure
- 提高堆焊层韧性
- Improve cladding layer toughness
- 稳定堆焊层尺寸
- Stabilize cladding layer dimensions

4.5.2 热处理工艺参数 Heat Treatment Process Parameters

根据堆焊材料确定热处理工艺参数：

Determine heat treatment process parameters according to cladding material:

堆焊材料	Cladding Material	加热温度	Heating Temperature	保温时间	Holding Time	冷却方式	Cooling Method
ER80S-B2	ER80S-B2	820-860℃	820-860℃	2-4h	2-4h	炉冷	Furnace cooling
ER554-B2	ER554-B2	800-840℃	800-840℃	2-4h	2-4h	炉冷	Furnace cooling
ER50-6	ER50-6	600-650℃	600-650℃	2-3h	2-3h	空冷	Air cooling
Co 基合金	Co-based Alloy	1050-1100℃	1050-1100℃	1-2h	1-2h	空冷	Air cooling

4.5.3 热处理操作要求 Heat Treatment Operation Requirements

- 采用箱式炉或井式炉进行热处理
- Use box furnace or pit furnace for heat treatment
- 加热速度控制在 100-150℃/h
- Control heating rate at 100-150℃/h
- 保温时间按工件有效厚度计算
- Calculate holding time according to effective thickness
- 冷却速度按工艺要求控制
- Control cooling rate according to process requirements
- 热处理后及时检验硬度
- Inspect hardness promptly after heat treatment



4.6 最终验收 Final Acceptance

4.6.1 验收准备 Acceptance Preparation

最终验收前，应完成以下准备工作：

Before final acceptance, complete the following preparations:

- 整理所有检验记录
- Organize all inspection records
- 准备验收所需文件资料
- Prepare documents required for acceptance
- 确认验收标准与验收方法
- Confirm acceptance standards and methods
- 通知客户验收时间
- Notify customer of acceptance time

4.6.2 验收项目 Acceptance Items

最终验收项目包括：

Final acceptance items include:

（1）外观检查 Visual Inspection

- 模具表面无损伤、无缺陷
- Mold surface free from damage and defects
- 型面光洁度符合要求
- Surface finish meets requirements
- 标识清晰完整
- Markings clear and complete

（2）尺寸检验 Dimensional Inspection

- 使用三坐标测量机检测关键尺寸
- Use CMM to inspect key dimensions
- 尺寸公差符合图纸要求
- Dimensional tolerance meets drawing requirements
- 形位公差符合要求
- Geometric tolerance meets requirements

检验项目	Inspection Item	公差要求	Tolerance Requirement
型腔尺寸	Cavity Dimension	±0.02mm	±0.02mm



型芯尺寸	Core Dimension	±0.02mm	±0.02mm
平面度	Flatness	0.02mm	0.02mm
垂直度	Perpendicularity	0.02mm	0.02mm
平行度	Parallelism	0.02mm	0.02mm

(3) 硬度检验 Hardness Inspection

- 堆焊层硬度符合技术要求
- Cladding layer hardness meets technical requirements
- 硬度分布均匀
- Hardness distribution uniform
- 硬度测试点不少于 5 个
- No less than 5 hardness test points

(4) 功能性试验 Functional Test

- 试模验证模具功能
- Trial molding to verify mold function
- 检查成型产品质量
- Inspect molded product quality
- 验证模具使用寿命
- Verify mold service life

4.6.3 验收文件 Acceptance Documents

最终验收应提供以下文件：

The following documents shall be provided for final acceptance:

- 模具修复工艺方案
- Mold repair process plan
- 堆焊工艺参数记录
- Cladding process parameter records
- 堆焊层检验报告
- Cladding layer inspection report
- 机加工检验记录
- Machining inspection records
- 热处理工艺记录
- Heat treatment process records



- 最终验收报告
- Final acceptance report

4.6.4 验收结论 Acceptance Conclusion

验收结论分为以下三种：

Acceptance conclusions are classified as follows:

- 合格：所有验收项目符合要求
- Qualified: All acceptance items meet requirements
- 让步接收：个别项目轻微偏差，不影响使用
- Concession acceptance: Minor deviation in individual items, does not affect use
- 不合格：关键项目不符合要求，需返工
- Unqualified: Key items do not meet requirements, rework required

5 监督考核 Supervision and Assessment

5.1 过程监督 Process Supervision

质量部应对模具修复堆焊全过程进行监督，监督内容包括：

The Quality Department shall supervise the entire mold repair cladding process, including:

- 工艺参数执行情况
- Process parameter execution
- 堆焊层质量状况
- Cladding layer quality status
- 机加工质量状况
- Machining quality status
- 检验记录完整性
- Inspection record completeness

5.2 质量考核 Quality Assessment

建立质量考核机制，考核指标包括：

Establish quality assessment mechanism, assessment indicators include:

考核指标	Assessment Indicator	目标值	Target Value	权重	Weight
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一次合格率	First Pass Rate	≥95%	≥95%	40%	40%
客户满意度	Customer Satisfaction	≥90%	≥90%	30%	30%
返工率	Rework Rate	≤5%	≤5%	20%	20%
交货准时率	On-time Delivery Rate	≥95%	≥95%	10%	10%

5.3 持续改进 Continuous Improvement

- 定期分析质量数据，识别改进机会
- Regularly analyze quality data, identify improvement opportunities
- 收集客户反馈，持续优化工艺
- Collect customer feedback, continuously optimize process
- 推广先进工艺技术和设备
- Promote advanced process technology and equipment
- 加强员工技能培训
- Strengthen employee skill training

6 附则 Supplementary Provisions

6.1 文件管理 Document Management

- 本工艺规程由工艺技术部负责解释和修订
- This process specification is interpreted and revised by the Technical Process Department
- 工艺规程修订需经技术负责人审批
- Process specification revision requires approval by technical director
- 工艺规程变更应及时通知相关部门
- Process specification changes shall be promptly notified to relevant departments

6.2 相关标准 Related Standards

本工艺规程参考以下标准：

This process specification references the following standards:

- GB/T 19418 焊接 钢、镍及镍合金的焊接工艺评定



- GB/T 19418 Welding - Welding procedure qualification for steel, nickel and nickel alloys
- GB/T 3323 金属熔化焊焊接接头射线照相
- GB/T 3323 Radiographic testing of fusion-welded joints in metals
- GB/T 11345 钢焊缝手工超声波探伤方法和探伤级别
- GB/T 11345 Manual ultrasonic testing of steel welds and testing levels
- GB/T 9445 无损检测 渗透检测 人员资格鉴定和认证
- GB/T 9445 Non-destructive testing - Penetrant testing - Qualification and certification of personnel
- JB/T 9649 焊接工艺规程编制要求
- JB/T 9649 Requirements for welding procedure specification preparation

6.3 记录表格 Record Forms

本工艺规程配套使用以下记录表格：

The following record forms are used with this process specification:

- 模具修复评估表 Mold Repair Assessment Form
- 堆焊工艺参数记录表 Cladding Process Parameter Record Form
- 堆焊层检验报告 Cladding Layer Inspection Report
- 机加工检验记录表 Machining Inspection Record Form
- 最终验收报告 Final Acceptance Report

6.4 生效与修订 Effective and Revision

- 本工艺规程自发布之日起生效
- This process specification takes effect upon release
- 本工艺规程每年评审一次
- This process specification is reviewed annually
- 工艺规程修订版本号按 A/0、A/1、A/2 递增
- Process specification revision version numbers increment as A/0, A/1, A/2

编制	Prepared	审核	Reviewed	批准	Approved
工艺技术部	Technical Process Dept.	质量部	Quality Dept.	总经理	General Manager
日期:	Date:	日期:	Date:	日期:	Date: