



HSE Hot Work Management Procedure

Document No.: CLADDING-HSE-PD-34

Chapter 1 General Provisions

Article 1 Purpose

To standardize the HSE (Health, Safety and Environment) management of hot work in the Company, prevent fire and explosion accidents, safeguard the life safety of operators, the Company's property safety and the safety of the surrounding environment, and ensure the compliance and controllability of hot work in links such as material warehousing, equipment maintenance and equipment servicing, this procedure is formulated in accordance with laws and regulations including the *Fire Protection Law of the People's Republic of China*, *Work Safety Law of the People's Republic of China*, as well as requirements from the Group Company and PipeChina.

Article 2 Basis

This procedure is formulated in accordance with laws, regulations and institutional documents including the *Work Safety Law of the People's Republic of China*, *Fire Protection Law of the People's Republic of China*, *Regulations on the Safety Management of Hazardous Chemicals*, *Regulations on Fire Safety Management of Organizations, Institutions, Enterprises and Public Institutions*, *PIPING SYSTEM PTE LTD HSE Management System Requirements*, *Hot Work Safety Management Specification*, *General Principles for Fire Safety Management of Warehousing Premises*, *HSE Work Permit Management Regulations* and *HSE Emergency Preparedness and Response Management Procedure*.

Article 3 Scope of Application

1. This procedure applies to all hot work in the Company's production and operation areas, including but not limited to:
 - Cutting, welding and grinding work in production areas (equipment maintenance workshops, equipment servicing areas);
 - Equipment maintenance and pipeline welding work in warehousing areas (finished product warehouses, raw material warehouses, hazardous materials temporary storage areas);

- Temporary hot work within 50 meters of office areas and living quarters (e.g., outdoor facility maintenance, railing welding);
 - Temporary hot work for pipeline equipment repair in other areas (e.g., loading/unloading operation areas, open spaces).
2. The applicable objects include the Company's in-house operators, contractors (outsourced units) and third-party personnel entering the operation areas; it covers the entire process of hot work application, approval, execution, supervision and acceptance.

Chapter 2 Management Responsibilities

Article 4 Responsibilities of the HSE Management Department (Quality, Health, Safety and Environmental Department)

1. Responsible for formulating and revising this procedure and supporting documents (e.g., *Hot Work Permit* template, risk analysis form, safety checklist), and supervising the implementation by all departments;
2. Reviewing special-grade and complex first-grade hot work plans, conducting final approval for special-grade and first-grade hot work, and verifying the compliance of the approval process for second-grade hot work;
3. Organizing HSE training for hot work (including risk identification, emergency disposal and fire-fighting equipment use), and conducting regular special inspections on hot work;
4. Leading the investigation of safety accidents caused by hot work, analyzing causes, formulating corrective measures and establishing accident files;
5. Responsible for supervising the configuration and maintenance of emergency equipment related to hot work (e.g., fire extinguishers, combustible gas detectors, fire blankets, fire hoses).

Article 5 Responsibilities of Departments in Charge of Operation Areas

1. Material Warehousing Department: Responsible for coordinating hot work in warehousing areas, clearing combustibles around the operation site (e.g., packaging cartons, anti-corrosion coating barrels), defining warning zones and sealing holes/gaps in the operation area;
2. Equipment Management Department: Responsible for initiating hot work applications in production areas (maintenance workshops, servicing areas), providing safety technical parameters of hot work equipment (welding machines, cutting torches) and ensuring the explosion-proof compliance of equipment;
3. Office/Logistics Department: Responsible for applying for hot work around office areas and living quarters, coordinating operation time (avoiding office peak hours) and clearing flammables under and around the operation point (e.g., green plants, waste paper);

4. Each department in charge shall designate a dedicated person (safety officer) to review the hot work risk analysis form, confirm operation conditions (ventilation, isolation measures) and supervise on-site implementation of the work.

Article 6 Responsibilities of the Outsourcing Management Department

1. Reviewing the qualifications of contractors (outsourced units) (requiring hot work permits and operators holding special operation certificates), signing HSE agreements for outsourced work and clarifying hot work safety responsibilities;
2. Conducting on-site safety training for contractors' hot work personnel (including the Company's hot work regulations and risk points in the operation area), and retaining training records;
3. Assigning dedicated personnel to supervise contractors' hot work throughout the process, ensuring compliance with this procedure and having the right to stop non-compliant operations.

Article 7 Responsibilities of Personnel Related to Hot Work

1. Hot Work Applicant (Work Supervisor):
 - Submitting hot work applications and providing complete application materials (*Hot Work Permit*, operators' qualification certificates, safety measures plan, emergency plan);
 - Implementing pre-work safety precautions (e.g., clearing combustibles, setting up isolation barriers, preparing fire-fighting equipment);
 - Designating qualified on-site supervisors, managing safety during the work process and handling abnormal situations promptly;
 - Organizing on-site cleaning after work and completing work termination procedures after confirming no residual fire.
2. Hot Work Approver:
 - Reviewing the necessity of hot work (whether hot work is mandatory, availability of alternative plans);
 - Verifying on-site implementation of safety measures (isolation, fire-fighting, ventilation measures);
 - Signing the *Hot Work Permit*, specifying work time, scope and validity period, and supervising the work process;
 - Having the right to revoke the hot work permit if work conditions change.
3. Hot Work Operators:
 - Working with valid special operation certificates (for welding and thermal cutting) and strictly prohibiting work without certificates or with expired certificates;

- Inspecting the safety of hot work equipment (welding machine grounding, no leakage from cutting torches, compliant distance between gas cylinders) before work;
- Strictly following safety operating procedures and working within the permitted scope; strictly prohibiting unauthorized expansion of the hot work area or extension of work time;
- Paying attention to environmental changes (e.g., wind direction, abnormal gas odor) during work, stopping work immediately if abnormalities are found and cooperating with emergency disposal.

4. Hot Work Supervisors:

- Working with valid supervision qualifications after special training, and staying on-site throughout the work process (no leaving or wandering between posts);
- Inspecting the preparation of emergency equipment (fire extinguishers, fire blankets, first-aid kits) before work and confirming unobstructed fire-fighting access;
- Monitoring combustible gas concentration in real time (recording test results in accordance with standards) and supervising the compliance of operators' operations;
- Having the right to stop non-compliant operations (e.g., unlicensed operation, work beyond the permitted scope) and immediately stopping work and activating emergency measures in case of emergencies.

Chapter 3 Classification of Hot Work

Article 8 Special-Grade Hot Work

1. Definition: Hot work conducted in high-risk areas, specifically including:

- Hot work in and within 10 meters of flammable and explosive hazardous areas (hazardous materials temporary storage areas, warehouses storing ethanol/acetone/epoxy coatings);
- Hot work around toxic and harmful gas areas (e.g., oil-containing pipelines, storage tanks) or major hazard sources (e.g., high-pressure equipment);
- Hot work inside confined spaces (equipment oil tanks, storage tank interiors);
- First-grade hot work conducted during holidays (including weekends), at night (22:00-6:00) or in severe weather (wind force \geq Level 5, thunderstorms) shall be upgraded to special-grade.

- #### 2. Control Requirements: Applications shall be submitted 24 hours in advance. The HSE Management Department shall organize risk assessment (Job Safety Analysis - JSA), and the Company's responsible leader (authorized by the top leader) shall conduct final approval; 2 supervisors shall be assigned on-site, dual isolation (fire blanket + fire baffle) shall be set up, and fire trucks or mobile fire pumps shall be on standby on-site.

Article 9 First-Grade Hot Work

1. Definition: Hot work conducted in key fire prevention areas, specifically including:

- Hot work for equipment maintenance involving oil lubrication systems in production areas (maintenance workshops);
 - Hot work in and within 5-10 meters of general storage areas (storing steel pipes, valves) in warehousing areas;
 - Hot work within 10-50 meters of office areas and living quarters;
 - Hot work in loading/unloading operation areas close to pipeline equipment stacks (distance \leq 3 meters).
2. Control Requirements: Applications shall be submitted 12 hours in advance, reviewed by the head of the department in charge of the operation area and approved by the HSE Management Department; 1 supervisor shall be assigned on-site, and combustible gas shall be tested every 30 minutes with test results recorded.

Article 10 Second-Grade Hot Work

1. Definition: Low-risk hot work conducted in general areas, specifically including:
- Hot work in non-confined spaces far from oil products and coatings in production areas (e.g., fixed welding stations in maintenance workshops);
 - Temporary hot work in open spaces outside warehousing areas (distance $>$ 10 meters from warehouses);
 - Simple hot work (e.g., outdoor railing maintenance) beyond 50 meters of office areas and living quarters.
2. Control Requirements: Applications shall be submitted 4 hours in advance, reviewed by the safety officer of the department in charge of the operation area and approved by the department head; 1 supervisor shall be assigned on-site, combustible gas shall be tested once before work, and additional tests shall be conducted as needed during work.

Article 11 Exempted Hot Work

1. Definition: Low-risk hot work that can be completed immediately, specifically including:
- Small-scale repairs using explosion-proof electric soldering irons (work time \leq 15 minutes);
 - Routine hot work in fixed hot work points (e.g., dedicated welding stations in maintenance workshops) that have passed acceptance by the HSE Management Department.
2. Control Requirements: No *Hot Work Permit* is required, but the safety officer of the operation area shall confirm work conditions (no combustibles, emergency equipment in place); operators shall take personal protection and clean the site after work; fixed hot work points shall be inspected once a month to ensure the integrity of fire prevention measures.

Chapter 4 Hot Work Management Process

Article 12 Work Application and Approval

1. Application Conditions:

- Hot work operators hold valid special operation certificates;
- A detailed safety measures plan (including isolation, fire-fighting and ventilation measures) has been formulated;
- Necessary fire-fighting equipment (fire extinguishers, fire blankets, fire hoses) and emergency materials (first-aid kits) have been prepared;
- On-site supervisors (qualified through training) have been designated, and pre-work safety technical disclosure has been completed.

2. Application Materials:

- *Hot Work Permit* (to be filled with work location, time, grade, method and personnel information);
- Copies of operators' special operation certificates;
- Hot work safety measures plan (including risk identification and control measures);
- Special emergency plan (to be prepared separately for special-grade and complex first-grade hot work).

3. Graded Approval:

- Special-grade hot work: Applicant → Department Head → HSE Management Department Head → Company Responsible Leader (validity period ≤ 8 hours);
- First-grade hot work: Applicant → Department Safety Officer → Department Head → HSE Management Department Head (validity period ≤ 24 hours);
- Second-grade hot work: Applicant → Department Safety Officer → Department Head (validity period ≤ 48 hours);
- Approvers shall verify on-site safety measures; approval shall be denied if requirements are not met; re-application is required if work is not completed within the validity period.

Article 13 Pre-Work Preparation

1. Risk Identification:

- Led by the safety officer of the operation area, the applicant, supervisor and operator shall jointly conduct JSA analysis to identify risk points:
 - Combustibles (e.g., cartons, plastics, residual oil products), flammable gases (e.g., coating volatile gases, acetylene leaks);
 - Work environment risks (poor ventilation, confined spaces, cross-operation impacts);
 - Equipment risks (welding machine leakage, gas cylinder leaks, tool failures);
- Control measures shall be formulated for identified risks (e.g., clearing combustibles → covering with fire blankets → forced ventilation), and all parties shall sign to confirm the analysis results.

2. Implementation of Safety Measures:

- Isolation Measures: Clear combustibles within 5 meters of the work point; isolate non-clearable combustibles with fire baffles; seal holes and gaps on the ground and walls of the operation area to prevent sparks from spreading to adjacent areas;
- Fire-Fighting Measures: Equip fire-fighting equipment based on risk grade (2 pieces of 4kg dry powder fire extinguishers for general hot work; 35kg mobile fire extinguishers + fire blankets + fire hoses for hazardous materials areas); ensure unobstructed fire-fighting access (width \geq 1.2 meters);
- Ventilation Measures: Use forced ventilation (e.g., axial fans) in confined or enclosed areas; ensure good air circulation in naturally ventilated areas to avoid combustible gas accumulation.

3. On-Site Inspection:

- Supervisors shall use calibrated combustible gas detectors to conduct tests in accordance with the *Gas Detection Standards*:
 - Test the work point and the upwind 10-meter range within 30 minutes before work; for substances with lower explosive limit (LEL) \geq 4%, concentration $<$ 0.5% LEL; for substances with LEL $<$ 4%, concentration $<$ 0.2% LEL;
 - For confined spaces, additional tests for oxygen content (19.5%-23.5%) and toxic gas concentration ($<$ allowable concentration) are required;
- Inspect hot work equipment: Welding machine grounding resistance \leq 4 Ω , no leakage from cutting torches, distance between oxygen cylinders and acetylene cylinders \geq 5 meters, distance from hot work point \geq 10 meters, and anti-backfire devices installed on both cylinders;
- Fill out the *Hot Work Safety Checklist*; work can only start if all inspection items are qualified.

Article 14 Work Execution

1. Confirmation of Work Permit:

- Before work, operators shall confirm the validity of the *Hot Work Permit*; supervisors shall read out the safety technical disclosure content (work scope, risk points, emergency measures); all participants shall sign for confirmation;
- Set up warning signs ("Hot Work in Progress, No Entry") on-site; supervisors shall guide unrelated personnel to stay away from the warning zone.

2. Work Process Control:

- Operators shall strictly work within the permitted scope and control spark splashing (use spark-catching basins to collect welding slag, with fire-resistant cotton laid in the basins);
- Supervisors shall supervise throughout the process and record work conditions (gas test values, equipment status, personnel status) once per hour; combustible gas shall be tested every 30 minutes (every 20 minutes in confined spaces);

- Strictly prohibit non-compliant operations: No hot work on pressurized equipment/pipelines, no use of open flames to test tightness, no unauthorized changes to work methods.

3. Work Suspension Conditions:

- Supervisors shall immediately stop work and revoke the hot work permit if any of the following occurs:

- Changes in safety conditions (e.g., sudden wind force \geq Level 5, thunderstorms, ventilation failure);

- Detection of excessive combustible gas concentration or toxic gas leakage;

- Failure of fire-fighting facilities (insufficient pressure in fire extinguishers, blocked water hoses);

- Malfunctions of hot work equipment (welding machine leakage, cutting torch backfire) or non-compliant behaviors of personnel (unlicensed operation, supervisor absence).

Article 15 Control of Special Hot Work

1. Hot Work in Confined Spaces:

- Comply with the *Company Confined Space Work Safety Management Regulations* and apply for the *Confined Space Work Permit*;

- Maintain continuous forced ventilation during work and test gas concentration every 20 minutes;

- Operators shall wear rescue ropes; assign emergency rescuers (with rescue equipment on standby) outside the space; communicate every 10 minutes; conduct emergency rescue immediately in case of emergencies.

2. Hot Work at Height (work height \geq 2 meters):

- Apply for the *Work at Height Permit*; operators shall wear double-hook safety belts (high-hanging and low-using); set up safety platforms or scaffolding (load-bearing capacity \geq 2.5kN/m²);

- Set up spark-catching basins below the work point (coverage exceeding the work point by 1 meter); prohibit personnel passage below; supervisors shall supervise throughout the process on the ground;

- Prohibit carrying hot work tools up/down during climbing; use ropes to transfer tools to prevent injury from falling.

3. Cross Hot Work:

- The department in charge of the operation area shall coordinate uniformly, clarify the main work unit and supporting units, and designate an overall supervisor;

- All work units shall sign cross-work safety agreements and clarify safety responsibilities;

- Implement isolation and protection measures (e.g., set up fire-proof partitions in the lower work area); no sparks or tools shall be thrown downward from upper work areas; each work point shall be equipped with a supervisor.

Article 16 Post-Work Management

1. On-Site Cleaning:

- Operators shall extinguish residual fire (douse welding slag with cold water), recover hot work tools (cut off power to welding machines, close gas cylinder valves), and clean the work site (welding slag, fire-fighting facilities, waste materials);
- Supervisors shall inspect the work area and surrounding areas (e.g., gaps, low-lying areas) to confirm no residual fire or heat hazards.

2. On-Site Supervision and Observation:

- A 30-minute observation period shall be retained after special-grade and first-grade hot work, and 15 minutes after second-grade hot work; supervisors shall inspect the site every 10 minutes during the observation period to confirm no re-ignition signs;
- For hot work in confined spaces or at height, additional inspections of the area below the work point and adjacent areas are required to prevent fire caused by residual sparks.

3. Permit Closure:

- The applicant and supervisor shall jointly fill out the *Hot Work Acceptance Form*, indicating "Work Completed, On-Site Safe";
- Supervisors shall retrieve the *Hot Work Permit* and archive it together with the *On-Site Record Form*, *Gas Test Record* and *Safety Checklist*;
- The department in charge of the operation area shall organize and collate hot work records monthly, submit them to the HSE Management Department for storage, with a retention period of no less than 1 year.

Chapter 5 Emergency Management

Article 17 Emergency Plans

The HSE Management Department shall take the lead in formulating the *Hot Work Fire and Explosion Emergency Plan*, specifying the following content:

1. Emergency Organization: Commander-in-Chief (Company Responsible Leader), members (personnel from HSE, Equipment, Warehousing and Medical First-Aid Departments);

2. Emergency Disposal Process (see Appendix E):

- Initial Abnormalities: If residual fire re-ignition or gas leakage is detected, immediately stop work and cut off power/gas supply;
- Initial Fire: Supervisors use on-site fire extinguishers to put out the fire; operators assist in covering with fire blankets;
- Large-Scale Fire/Explosion: Immediately call the Company's emergency hotline (24-hour duty), evacuate surrounding personnel to safe areas and activate fire pumps;

- Personnel Injuries: First-aid personnel provide initial treatment for scalded or gas-poisoned personnel and call 120 for medical assistance;
- 3. Emergency Contact Information (fire department 119, hospital 120, superior unit phone number), posted in prominent locations in the operation area.

Article 18 Emergency Preparation and Training

1. Emergency Preparation:

- Equip the work site with emergency materials: first-aid kits (containing burn ointment, tourniquets), explosion-proof fans, emergency lighting and communication equipment (walkie-talkies);
- The HSE Management Department shall inspect emergency equipment quarterly to ensure it is in good condition and effective; all departments shall maintain fire-fighting facilities regularly (inspect fire extinguisher pressure and fire hose tightness monthly).

2. Training and Drills:

- Newly recruited personnel related to hot work shall receive no less than 8 hours of emergency training (including case studies, practical operation of fire extinguishers and first-aid skills) and can only take up their posts after passing the assessment;
- The HSE Management Department shall organize hot work emergency drills (including fire fighting, leakage disposal and personnel evacuation) once a quarter, with participants including applicants, supervisors, operators and emergency rescuers;
- Complete an assessment report within 7 days after the drill, summarize problems (e.g., slow emergency response, unskilled equipment use) and update the emergency plan.

Article 19 Accident Reporting and Disposal

1. In case of hot work safety accidents (fire, explosion, scald, gas poisoning), on-site personnel shall immediately report to the HSE Management Department and the Company's Emergency Command Center, and shall not delay or conceal the accident;
2. The Emergency Command Center shall activate the emergency plan and organize rescue:
 - Fire: Extinguish the fire first (use on-site equipment for initial fires, call 119 for large-scale fires), then evacuate personnel;
 - Leakage: Close gas cylinder valves, ventilate with explosion-proof fans and prevent fire sources from approaching;
 - Personnel Injuries: Provide immediate first aid (e.g., cooling scalds, transferring poisoned personnel to ventilated areas) and call 120 for medical assistance;
3. After accident disposal, the HSE Management Department shall take the lead in establishing an investigation team, analyze causes (e.g., failure to clear combustibles, inadequate testing), issue an accident investigation report, formulate preventive measures and hold responsible persons accountable.

Chapter 6 Inspection and Assessment

Article 20 Inspection Mechanisms

1. Daily Inspection:

- The safety officer of the operation area shall inspect the hot work site daily, focusing on verifying:
 - Validity of the *Hot Work Permit*, performance of supervisors' duties and availability of fire-fighting equipment;
 - Authenticity of gas test records and compliance of the work process;
- Immediately stop non-compliant operations if found, fill out the *Hot Work Non-Compliance Rectification Form* and require rectification within a time limit.

2. Special Inspection:

- The HSE Management Department shall conduct special HSE inspections on hot work monthly, focusing on:
 - Completeness of work records in high-risk areas (hazardous materials temporary storage areas, confined spaces);
 - Calibration of combustible gas detectors (once every 6 months) and maintenance of emergency equipment;
 - Management of contractors' hot work (qualification review, training records, supervision and supervision).

3. Annual Audit:

- The Company shall organize an annual HSE audit of the hot work management system, entrust a third-party institution to evaluate the system and issue an audit report;
- The HSE Management Department shall conduct an annual audit of *Accident Records* and *Emergency Drill Records* to evaluate the effectiveness of emergency response.

Article 21 Assessment and Rewards/Punishments

1. Rewards:

- Departments with no hot work violations or safety accidents within a year shall be given HSE performance bonus points (accounting for 10% of the department's total score);
- Individuals (supervisors, safety officers) who promptly identify and stop major safety hazards (e.g., work with excessive gas concentration, unlicensed hot work) shall be awarded a cash prize of RMB 500-2,000;
- Individuals who propose adopted improvement suggestions for hot work management (e.g., optimizing safety measures, improving emergency efficiency) shall be awarded a cash prize of RMB 1,000-3,000.

2. Punishments:

- For conducting hot work without a permit, the applicant shall be fined RMB 1,000 and the department head shall be fined RMB 2,000; those causing accidents shall be held accountable in accordance with Company regulations, and those involving violations of laws shall be transferred to judicial authorities;
- For supervisors who leave their posts, falsify gas test records or fail to stop non-compliant operations, their supervision qualifications shall be suspended for 3 months and 15 performance points shall be deducted;
- For contractors violating this procedure, their HSE performance bond (RMB 5,000-20,000) shall be deducted; cooperation shall be terminated for serious violations;
- For general accidents (economic loss < RMB 50,000 or minor scalds), the department head shall be suspended for inspection and relevant responsible persons shall have 30% of their annual performance deducted; for major accidents (economic loss ≥ RMB 500,000 or casualties), relevant persons shall be held criminally responsible.

Chapter 7 Supplementary Provisions

Article 22 Relevant Documents

1. *Fire Protection Law of the People's Republic of China*
2. *Work Safety Law of the People's Republic of China*
3. *Regulations on the Safety Management of Hazardous Chemicals*
4. *Regulations on Fire Safety Management of Organizations, Institutions, Enterprises and Public Institutions*
5. *HSE Management System Requirements*
6. *Hot Work Safety Management Specification*
7. *HSE Work Permit Management Regulations*
8. *HSE Emergency Preparedness and Response Management Procedure*
9. *Company Confined Space Work Safety Management Regulations*

Article 23 Record Forms

1. *Hot Work Permit*
2. *Hot Work Safety Checklist*
3. *Hot Work On-Site Record Form* (including gas test records)
4. *Hot Work Acceptance Form*
5. *Hot Work Non-Compliance Rectification Form*
6. *Emergency Drill Assessment Report*
7. *Job Safety Analysis (JSA) Form for Hot Work*

Article 24 Interpretation and Effectiveness of the Procedure

1. This procedure shall be interpreted by the Company's HSE Management Department (Quality, Health, Safety and Environmental Department);
2. This procedure shall take effect from the date of issuance, and the former *Hot Work Safety Regulations of Pipeline Materials and Equipment Co., Ltd.* shall be repealed simultaneously.

Article 25 Appendices

1. Appendix 1: *Hot Work Permit Template (Special-Grade/First-Grade/Second-Grade)*
2. Appendix 2: *Hot Work Safety Checklist*
3. Appendix 3: *Hot Work Prohibitions*
4. Appendix 4: *Gas Detection Standards*
5. Appendix 5: *Hot Work Emergency Disposal Flowchart*

Appendices

Appendix 1: Hot Work Permit (Template)

Item	Content to be Filled
Applying Department	(Department in charge of the operation area, e.g., Equipment Management Department, Warehousing Department)
Work Location	(Detailed location, e.g., North Area of Maintenance Workshop, East Side of Hazardous Materials Temporary Storage Area)
Work Content	(Hot work method + object, e.g., "Welding DN200 Steel Pipe Interface", "Cutting Waste Equipment Bracket")
Work Time	From ____ year ____ month ____ day ____ hour ____ minute to ____ year ____ month ____ day ____ hour ____ minute (Validity: Special-grade ≤ 8h, First-grade ≤ 24h, Second-grade ≤ 48h)
Hot Work Grade	<input type="checkbox"/> Special-grade <input type="checkbox"/> First-grade <input type="checkbox"/> Second-grade
Operator Information	Hot Work Operator: _____ Certificate No.: _____; Supervisor: _____ Certificate No.: _____

Confirmation of Safety Measures	1. Combustibles cleared <input type="checkbox"/> 2. Fire-fighting equipment in place <input type="checkbox"/> 3. Qualified gas test <input type="checkbox"/> 4. Good ventilation <input type="checkbox"/>
Gas Test Result	Combustible gas concentration: _____ % LEL; Oxygen content: _____ %; Test Time: _____
Approval Comments	Department Safety Officer: _____ Date: _____; Department Head: _____ Date: _____
	HSE Management Department: _____ Date: _____; Company Responsible Leader (for Special-grade): _____ Date: _____
Work Termination Confirmation	On-site cleaned, no residual fire/hazards: Applicant: _____ Supervisor: _____ Date: _____

Appendix 2: Hot Work Safety Checklist

Inspection Category	Inspection Item	Inspection Content	Inspection Standard	Inspection Result (<input type="checkbox"/> Qualified <input type="checkbox"/> Unqualified)	Remarks
Personnel Qualification	Operator Qualification	Special operation certificate	Valid certificate, matching work type	<input type="checkbox"/> Qualified <input type="checkbox"/> Unqualified	Retain copy
	Supervisor Qualification	Supervision qualification certificate	Qualified through training, valid certificate	<input type="checkbox"/> Qualified <input type="checkbox"/> Unqualified	
Equipment & Facilities	Hot Work Equipment	Welding machines, cutting torches, gas cylinders	Good grounding of welding machines, no leakage from cutting torches,	<input type="checkbox"/> Qualified <input type="checkbox"/> Unqualified	Check anti-backfire devices

			compliant distance between gas cylinders		
	Fire-Fighting Equipment	Fire extinguishers, fire blankets, fire hoses	Normal pressure of fire extinguishers, no damage to hoses, sufficient quantity	<input type="checkbox"/> Qualified <input type="checkbox"/> Unqualified	Mobile fire extinguishers required in hazardous materials areas
Environment & Protection	Combustible Clearance	5-meter range around work point	No combustibles such as cartons, plastics, residual oil products	<input type="checkbox"/> Qualified <input type="checkbox"/> Unqualified	Non-clearable items isolated
	Isolation Measures	Fire baffles, hole sealing	Baffles in place, holes/gaps sealed	<input type="checkbox"/> Qualified <input type="checkbox"/> Unqualified	
	Ventilation Condition	Natural/forced ventilation	Forced ventilation in confined spaces, good air circulation	<input type="checkbox"/> Qualified <input type="checkbox"/> Unqualified	Check fan operation
Gas Test	Combustible Gas Concentration	Work point and upwind area	LEL \geq 4%: < 0.5% LEL; LEL < 4%: < 0.2% LEL	<input type="checkbox"/> Qualified <input type="checkbox"/> Unqualified	Complete test records
	Oxygen Content (Confined Space)	Air in operation area	19.5%-23.5%	<input type="checkbox"/> Qualified <input type="checkbox"/> Unqualified	

Emergency Preparation	Emergency Equipment	First-aid kits, explosion-proof fans, communication equipment	Complete first-aid supplies, functional fans/walkie-talkies	<input type="checkbox"/> Qualified <input type="checkbox"/> Unqualified	
	Emergency Access	Access width, unobstructed condition	Width \geq 1.2 meters, no obstacles	<input type="checkbox"/> Qualified <input type="checkbox"/> Unqualified	
Inspector's Signature:		Inspection Date: ____ year ____ month ____ day	Work Supervisor's Confirmation :		

Appendix 3: Hot Work Prohibitions

1. Personnel Prohibitions

1. Strictly prohibit hot work by personnel without special operation certificates or with expired certificates;
2. Strictly prohibit hot work by personnel under the influence of alcohol, fatigue (continuous work over 8 hours) or suffering from work-impeding diseases (hypertension, epilepsy);
3. Strictly prohibit non-compliant command (e.g., forcing risky work, omitting safety measures);
4. Strictly prohibit hot work without supervisors or when supervisors leave their posts.

2. Work Prohibitions

1. Strictly prohibit work when safety measures are not implemented (e.g., combustibles not cleared, unqualified gas test);
2. Strictly prohibit work beyond the scope of the *Hot Work Permit* (time, area, method);
3. Strictly prohibit work near pressurized equipment, pipelines or unisolated flammable and explosive equipment;
4. Strictly prohibit work using unqualified tools (e.g., leaking cutting torches, ungrounded welding machines).

3. Environmental Prohibitions

1. Strictly prohibit work when the safety distance from combustibles is insufficient (< 5 meters);

2. Strictly prohibit work in areas with excessive combustible gas concentration (> specified limit) or accumulation risks;
3. Strictly prohibit work in areas with blocked emergency access or failed fire-fighting facilities;
4. Strictly prohibit outdoor work in thunderstorms, wind force \geq Level 5 or visibility < 50 meters (heavy fog).

Appendix 4: Gas Detection Standards

1. Detection Requirements

1. Detection Time:

- Complete the first test within 30 minutes before work;
- During work: Test every 30 minutes in general areas, every 20 minutes in confined spaces;
- Re-test if work is interrupted for more than 30 minutes (or work location is changed);
- Immediate test in case of abnormal situations (e.g., detecting abnormal odor, equipment leakage).

2. Detection Scope:

- The 3-meter range around the work point as the core area, and the 10-meter upwind range as the extended area;
- For confined spaces, test three heights (top, middle, bottom) inside the space;
- For work near oil product or coating storage areas, expand the detection scope to 5 meters around the storage area.

2. Qualification Standards

1. Combustible Gas Concentration:

- For substances with LEL \geq 4% (e.g., propane, acetylene): Test value < 0.5% LEL;
- For substances with LEL < 4% (e.g., hydrogen, methane): Test value < 0.2% LEL;
- For mixed combustible gases, follow the strictest standard.

2. Other Gas Concentrations:

- Oxygen content: 19.5%-23.5% (work prohibited if below 19.5% or above 23.5%);
- Toxic gases (e.g., carbon monoxide, hydrogen sulfide): Concentration < national specified allowable concentration (e.g., CO < 30mg/m³).

3. Record Requirements:

- Test results shall be filled in the *Hot Work On-Site Record Form* and signed by the tester and supervisor;
- Immediately stop work if test data is abnormal; re-test after identifying causes and rectifying.

Appendix 5: Hot Work Emergency Disposal Flowchart

flowchart TD

A[Detect Abnormality (Fire/Leakage/Exceedance)] --> B[Immediately Stop Work]

B --> C[Cut Off Power/Gas Supply (Turn Off Welding Machine/Gas Cylinder Valves)]

C --> D[Determine Abnormality Type]

D -->|Fire| E[Initial Fire: Supervisor Uses On-Site Fire Extinguishers/Fire Blankets to Extinguish Fire]

E --> F[Large-Scale Fire: Call 119 + Company Emergency Hotline, Evacuate Surrounding Personnel]

D -->|Gas Leakage| G[Turn On Explosion-Proof Fan for Ventilation, Set Up Warning Zone to Prohibit Fire Sources]

G --> H[Large Leakage: Close Relevant Valves, Contact Professionals for Disposal]

D -->|Personnel Injury| I[Scald: Rinse with Cold Water; Poisoning: Transfer to Ventilated Area]

I --> J[Call 120 for First Aid, Report to HSE Management Department Simultaneously]

F --> K[Protect Accident Scene, Collect Evidence (Permit/Test Records)]

H --> K

J --> K

K --> L[Cooperate with Accident Investigation, Implement Rectification Measures]

