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1. INTRODUCTION

This manual defines the requirements concerning Qatar Chemical’s commitment to meeting the Occupational Safety and Health Association’s, OSHA, Process Safety Management (PSM), Q-Chem Operational Excellence system Element 3.8 and the requirements of paragraph 6.6 of API 510 - Pressure Vessel Inspection Code concerning the quality control system for the repair organization of Pressure Relieving Devices.

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2. SCOPE / PURPOSE

The primary intent of this document is to serve as a bridging document to specific Quality Control/Quality Assurance documents that support the servicing, maintenance, inspection and testing of Pressure Relieving Devices (PRD’s). All types of PRD’s are covered by the requirements defined in this document as well as those documents referenced within this document, as applicable.

This Pressure Relieving Device Quality Control Manual shall be used by all personnel engaged in the servicing, setting, testing and record-keeping of all pressure relieving devices at Q-Chem, to ensure that pressure relief devices are serviced and set in accordance with the Q-Chem guidelines/procedures/policies and with the applicable Sections I or VIII of the ASME Code, API Code recommendations.

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3. DEFINITIONS

DCC - Document Control Center
MOC - Management of Change
EDMS - Electronic Document Management System
PM - Preventive Maintenance
PMI - Positive Material Identification
SMP - Standard Maintenance Procedure
QC - Quality Control, Activity governed by a document containing the minimum specific requirements to insure the level of quality is attained for specific activities.
RDD - Rupture Disc Devices
PRD - Pressure Relieving Device
PRV - Pressure Relieving Valve
PVRV - Pressure Vacuum Relief Valve
4. ORGANIZATION CHART

Management of the overall maintenance servicing and testing of Pressure relieving devices shall be as per the organization chart below. Responsibilities of all involved including those individuals who are not directly involved are detailed in different work procedures referred to in this Manual.

![Organization Chart]

5. SCOPE OF WORK

Servicing of Pressure Relief Valves will consist of pre-testing, disassembling, reconditioning, replacement of soft gaskets/soft O-rings, reassembling and leak/ tightness testing of valves. Only manufacturers' supplied spare parts will be used. Valve parts shall be reconditioned only within manufacturers' tolerances. Valves shall be tamper proof sealed and tagged, as per relevant work procedure, before releasing for reinstallation on site.

Servicing of Pressure/Vacuum Relief Valves will consist of pre-testing where applicable, disassembling, reconditioning, replacement of soft gaskets/soft O-rings, reassembling. Testing will be done as and when applicable. Although no adjustment is required for dead weight valves, seat tightness test shall be done.

Servicing of Rupture Disc Devices (RDD) will mainly consist of removing the (RDD) assembly, cleaning of all parts and re-installing back on site. Inspection and replacement of the rupture disc element will be done every time when the (RDD) is due to servicing.

Servicing of Depressurizing system components such as Pressure Vent Stacks and Flame Arrestors will consist of dismantling, cleaning and inspection. Internals will be replaced as and when required.

In addition to the above operational testing, all new PRV's will be tested in Q-Chem's shop prior to initial installation to confirm manufacturers' set pressures.

Details of the scope of work are given in the relevant work procedures.

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6. DRAWINGS AND SPECIFICATIONS

6.1 Reference/technical/support documents/drawings/datasheets related to pressure relieving devices shall be stored/made available through Electronic Document Management System (EDMS) in order to ensure that it is current and readily available and accessible to all affected employees.

6.2 Pressure Relieving Devices Datasheets in a controlled hardcopy form shall be retained in the Document Control Center.

6.3 Creation/Revision Management of documents related to pressure relieving devices shall be through Document Management System and following procedures/policies/forms:

- **TE-DCC-PRO-00-0015** Document Update/Modification Request
- **TE-DCC-PRO-00-0003** Document Numbering
- **TE-DCC-SFM-00-0004** Document, Update/Modification Request Form

6.4 Frequency of testing of Pressure Relieving system shall be managed through inspection management system (Meridium) and which should match with SAP PM plan frequency.

6.5 Pressure Relieving Devices records/information related to maintenance, history, inspection, and testing are stored in the following locations.

- **SAP**
- **EDMS**

6.6 Documents related to calibrations of tools, instruments and pressure gauges used for calibration and testing of pressure relieving devices shall be maintained by Shop Supervisor.

6.7 Records pertaining to Skill Training and Certification of personnel involved in servicing and testing of pressure relieving devices shall be maintained by Shop Supervisor.

7. MATERIALS AND SPARE PARTS

Only manufacturer’s supplied spare parts will be used. All incoming materials/spare parts will be subject to thorough visual inspection by the Materials Department - Materials Warehouse. MA-WHS-PRO-00-0001 Goods Receipt Procedure shall be followed to ensure that received materials/spare parts meet the specifications outlined in the purchase order. Positive material identification PMI shall be also carried out following **TE-STA-GLN-00-0001** Positive Material Identification Guideline.

Materials/spare parts that are defective and/or not identified shall be stored in designated non-compliance areas until resolved.

Q-Chem shall not normally manufacture valve parts; if manufactured, an approved inspection test plan shall be followed. The Maintenance Shop shall recondition parts only within manufacturer's tolerances.

Materials/spare parts shall be adequately stored so as not to deteriorate or become damaged.
8. REPAIR AND INSPECTION PROGRAM

All Pressure Relieving Devices and depressurizing system components shall be inspected/tested at intervals that are frequent enough to verify that the valves perform reliably. All Pressure Relieving Devices shall be tested prior to installation and after overhauls/repair and as per established maintenance/testing frequency or any valid reason that make the Pressure Relieving Device suspect.

Maintenance/testing frequency of Safety Relief Valves and Pressure/Vacuum Relief Valves shall be defined as per API 576 and based on actual service conditions, availability, operating experience etc, and shall be controlled as outlined in TE-STA-GLN-00-0035 Guideline for the Maintenance, Inspection, and Testing of Pressure Relieving Devices. However, other Pressure Relieving Devices, such as rupture disks, Pressure Vent Stacks and Flame Arrestors shall be thoroughly examined at intervals determined on the basis of service conditions.

The intervals between pressure relieving device testing and inspection may be also decided per a Risk Based Inspection analysis as defined in API.

The inspection and testing frequency shall be regularly reviewed and adjusted as and when necessary, based on the performance of the PRD. All frequency changes shall be documented using TE-STA-SFM-00-0047 PRD PM Frequency Review Form.

Maintenance and repair works should be carried out following the best industry practices and as per TE-STA-GLN-00-0035 Guideline for the Maintenance, Inspection, and Testing of Pressure Relieving Devices. Details of maintenance, repair and testing shall be as per the Q-Chem’s work procedures relevant to each type of pressure relieving devices as referenced to in this Manual.

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9. WELDING, NON-DESTRUCTIVE TESTING & HEAT TREATMENT

No welding or heating shall normally be used during servicing or repairing of Pressure Relief Devices. However, in case it is absolutely required; then welding, preheating, non-destructive testing and heat treatment will be in strict accordance with TE-STA-MNL-00-0001 Welding Manual and TE-STA-GLN-00-0044 Stationary Equipment Repair/Alteration Guideline.

Q-Chem shall not normally manufacture PRD parts; if manufactured, an approved inspection test plan, with necessary NDT’s included, shall be followed. The Work Shop shall recondition parts only within manufacturer's tolerances.

10. VALVE TESTING, SETTING AND LEAK TESTING

Valve testing, setting, leak testing and sealing shall be in line with the applicable requirement of the following documents, depending on the type of the valve:
11. PRESSURE GAUGE CALIBRATION

All pressure gauges used for Pressure Relief Valve testing shall be recalibrated as per Standard Maintenance Procedure MC-INS-SMP-00-0006 (Pressure Gauge) and shall be properly stored. The Shop Supervisor will ensure the following:

- All Test Gauges will be recalibrated by the Valve Shops or approved off-site facilities.
- The maximum interval between recalibration will be six month or whenever error is suspected.
- All test gauges will be identified by serial number and date of last calibration and a record maintained in a logbook for this purpose. Logbook and calibration documents shall be duly maintained by the Shop Supervisor.

12. CONTROLLED COPIES OF THIS MANUAL

Electronic copy of this manual is available at EDMS and accessible to all personnel. Original paper copy as well as electronic copy is controlled by DCC as per Records and Document Management Policy QC-IMT-PCY-00-0002 and Key Document Types and Signing Authority QC-IMT-PCY-00-0003. No other controlled copies are intended to be maintained.

13. REPAIR PERSONNEL TRAINING/QUALIFICATION

The valve repair personnel engaged on Pressure Relief Devices servicing and testing shall meet the requirements detailed in TE-STA-GLN-00-0035 Guideline for the Maintenance, Inspection, and Testing of Pressure Relieving Devices. Records of qualifications and experience are kept in the Valve Shop office. It is the Valve Shop Supervisor’s responsibility to ensure these qualifications are maintained and updated.
14. REPAIR NAMEPLATE AND SEALING

Sealing the serviced/tested Pressure Relieving Device shall be carried out in order to protect the spring setting from changes/adjustments by unauthorized persons. A tamper proof seal shall be installed such that the cap cannot be opened without breaking the seal and to eliminate possible tampering and/or changes to the valve set pressure or blow-down due to vibration, rough handling or unauthorized adjustments.

A stainless steel repair nameplate of 25mmX100mmX0.8mm thick shall be attached to the valve through the stainless steel wire of tamper proof seal and shall be listing the following fields (see figure-1):

- Servicing Party (i.e. Contractors Name, Q-Chem Valve Repair Shop etc. as applicable)
- Equipment Tag Number
- Date of Inspection
- Set Pressure
- Cold Differential Set Pressure (if applicable)

All information shall be stamped into repair nameplate or mechanically scribed only.

<table>
<thead>
<tr>
<th>Name of Servicing Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment Tag Number</td>
</tr>
<tr>
<td>Set Pressure</td>
</tr>
</tbody>
</table>

Figure 1 - Valve Repair Nameplate
15. RESPONSIBILITIES

MAINTENANCE:

- Implement of this manual and any future amendments.
- Identify, initiate and provide solutions to any problem related to servicing and setting safety relief devices. Involve Technical ERG as and when necessary.
- Notify Technical ERG of any valve failing pre-test.
- Schedule/coordinate release of Pressure Relieving Devices/Flame Arrestors/Pressure Vents from Production for subsequent inspection.
- Overhaul and/or arrange with the Contractors to overhaul and test Pressure Relieving Devices/Flame Arrestor/Pressure Vent as per the relevant procedure as and when they are due/available.
- Witness and certify final set pressure and leakage tests.
- Seal and tag all Pressure Relieving Devices after testing is completed.
- Transport and reinstall the PRD in the correct location.
- Fill relevant checklist and file completed checklist in EDMS.
- Load completed Checklist in EDMS and forward hard copy to Stationary Equipment Inspector / Engineer.

TECHNICAL/ERG:

- Provide technical support, and assistance with any quality control problem which cannot be resolved by Maintenance/Materials.
- Identify/review the inspection/test frequency of Pressure Relief Devices/Flame Arrestor/Pressure Vent.
- Randomly audit maintenance/inspection/testing activities of PRD’s.
- Update inspection records and test data in inspection management system (Meridium).
- Conduct quality assurance audit for Pressure Relieving Devices PM completion verification.

PRODUCTION:

- Release all Pressure Relieving Devices at the scheduled date.
- Verify/ensure the installation of all Pressure Relieving Devices in correct location.
- Ensure that all isolating valves to Pressure Relieving Devices are car sealed at “Open” position during normal operation.

MATERIALS:

- Materials Warehouse will ensure that all incoming spare parts/materials related to Pressure Relieving Devices meet the specifications outlined in the purchase order and entering the materials into the computerized inventory control system.
Received parts shall have a thorough visual inspection and positive materials identification. Parts that are defective and/or not identified/meeting the specs shall be stored in designated non-compliance areas until resolved.

- Maintaining inventory levels as specified by Maintenance Department.
- Ensuring spare parts are stored so as not to deteriorate or become damaged.

16. REFERENCES

Policy
- HSE-HGN-PCY-00-0001 Operational Excellence Policy
- QC-PSM-PCY-00-0008 Equipment Integrity Policy
- QC-PSM-PCY-00-0010 Management of Change Policy
- QC-IMT-PCY-00-0002 Document Management Policy (under approval)
- QC-IMT-PCY-00-0003 Key Document Types and Signing Authority.

Guidelines
- TE-STA-GLN-00-0035 Guideline for the Maintenance/Inspection of Pressure Relieving Devices
- TE-ERG-GLN-00-0010 Material Purchase, Verification, Storage, and Handling Guideline
- TE-STA-GLN-00-0001 Positive Material Identification Guideline
- TE-STA-GLN-00-0044 Stationary Equipment Repair/Alteration Guideline

Procedures
- TE-STA-PRO-00-0029 Vendor Doc 05.9040.270, AGW-Pilot Operated Safety Valve Maintenance Instructions, Type 443/453/463
- TE-STA-PRO-00-0030 Vendor Doc 05.9040.233, AGW-Pilot Operated Safety Valve Maintenance Instructions, Type 9390
- TE-STA-PRO-00-0031 Vendor Doc 05.2252.000, AGW-Piston Lift Stop Adjustment, Pilot Operated PRV'S
- TE-STA-PRO-00-0032 Vendor Doc Fig 121, AG MARVAC Installation and Instruction for PVRV
- TE-STA-PRO-00-0033 Vendor Doc, GLENFIELD Install, Operation, and Maintenance Instructions for APEX Air Release Valve
- TE-STA-PRO-00-0034 Vendor Doc, BREETEC Installation and Maintenance Instruction for PVRV
- TE-STA-PRO-00-0035 Vendor Doc, IMI MARTSON Maintenance Instruction for Rupture Disc Assemblies
- TE-STA-PRO-00-0036 Hot Setting of Safety Valves Procedure
- TE-STA-PRO-00-0037 Spring Loaded Safety Relief Valves Test Procedure
- TE-STA-PRO-00-0039 Pilot Operated Safety Relief Valves Test Procedure
- TE-STA-PRO-00-0040 Pressure/Vacuum Relief Valve Test Procedure
- TE-STA-PRO-00-0041 Rupture Disc Inspection Procedure
- TE-ERG-PRO-00-0006 Non-Conformance Reporting Procedure
- TE-DCC-PRO-00-0015 Document Update/Modification Request
- TE-DCC-PRO-00-0003 Document Numbering
- PD-PGN-PRO-00-0001 Relief Device Removal, Tracking, and Reinstatement Procedure
- MA-WHS-PRO-00-0001 Goods Receipt Procedure
- MC-INS-SMP-00-0006 Pressure Gauge
Manuals

TE-STA-MNL-00-0001  Welding Manual

Standard Forms

TE-STA-SFM-00-0003  Spring Loaded Safety Relief Valve Inspection Checklist
TE-STA-SFM-00-0004  400 Series Pilot Operated Safety Relief Valve Inspection Checklist
TE-STA-SFM-00-0005  Pressure/Vacuum Relief Valve Inspection Checklist
TE-STA-SFM-00-0006  Rupture Disc Inspection Checklist
TE-STA-SFM-00-0007  Safety Valve Hot Setting Checklist
TE-ERG-SFM-00-0008  Non-Conformance Report Form
TE-STA-SFM-00-0023  Positive Material Identification Technician Training Checklist
TE-STA-SFM-00-0024  Positive Material Identification Report Form
TE-STA-SFM-00-0032  Flame Arrestor and Pressure Vent Inspection Checklist
TE-DCC-SFM-00-0009  Document Creation/Revision Form
QC-PSM-SFM-00-0010  Equipment Integrity, Deviation From
TE-DCC-SFM-00-0004  Document, Update/Modification Request Form
TE-STA-SFM-00-0047  PRD PM Frequency Review Form

Plans

QC-PSM-PLN-00-0003  Quality Assurance Audit Plan for Relief Device PM Completion Verification

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