

SECTION A TITLE PAGE

QUALITY SYSTEM MANUAL

FOR THE

**CONSTRUCTION, REPAIR AND ALTERATION OF MECHANICALLY ASSEMBLED
(NON WELDED) PRESSURE PIPING
AND
THE MANUFACTURE OF FITTINGS OF CATEGORY “A”, “B” & “C”**

IN ACCORDANCE WITH

ASME B31.3 PROCESS PIPING CODE,

CSA B51

AND

THE ALBERTA SAFETY CODES ACT AND REGULATIONS

BY

**COMPACT COMPRESSION INC.
(CCI)**

At shop located at

**#8, 1820 – 30TH AVENUE N.E.
CALGARY, ALBERTA
T2E 7M5**

EDITION # 2

Manual # 8

Registration No. AQP-21112

Un-Controlled Copy

Section B COPY OF CURRENT CERTIFICATE OF AUTHORIZATION



the pressure equipment safety authority

Certificate of Authorization Permit

Quality Management System

Expiry Date: **June 18, 2010**

Reg. No.: **AQP-21112**

This is to certify that:

COMPACT COMPRESSION INC.

#8, 1820 - 30 AVENUE N.E.

CALGARY, ALBERTA

having complied with the provisions of the SAFETY CODES ACT, is hereby authorized to:

Construct, Repair/Alter ASME B31.3 Mechanically Assembled Process Piping

Manufacture Category 'A', 'B' & 'C' Fittings in accordance with CSA B51

at the above SHOP address.



Form No. AB-121
Rev. (2006/04)

Dated at Edmonton, this 12th day of June, 2007

A blue ink signature, likely of the Chief Inspector and Administrator, written over a horizontal line.

Chief Inspector and Administrator

Certificate No.: 5537

SECTION C QUALITY SYSTEM MANUAL REGISTER

A. CONTROLLED COPIES (1 -7)

1. Alberta Boilers Safety Association
2. Alberta Boilers Safety Association (2nd Manual for Regional Office)
3. Compact Compression Inc. - Approved Copy - Master
4. President, Compact Compression Inc.
5. Operations Manager, Compact Compression Inc.
6. Quality Control Manager, Compact Compression Inc.
7. Engineering Manager, Compact Compression Inc.

B. UNCONTROLLED COPIES (8)

8. Sales Manager, Compact Compression Inc.

SECTION D SCOPE OF WORK

- D.1 This section defines the intended scope of work to be performed by CCI under this Quality System.
- D.2 New screwed pressure piping constructed under this Quality System shall conform to the scope, and all requirements of ASME B31.3 Codes and the Alberta Safety Codes Act. Threaded piping constructed, repaired or altered shall be limited to sizes, thicknesses, materials and design pressure and temperature as specified in ASME B31.3 (latest Codes and agendas)
- D.3 Threaded piping shall be designed and constructed for normal and category D fluid service only as defined in ASME B31.1
- D.4 Threaded piping shall not be constructed for severe cyclic service conditions as defined in ASME B31.3.
- D.5 Threaded pipe joints shall not be seal welded.
- D.6 Only threaded piping systems exempt from post weld heat treat and radiography, ultrasonic, magnetic particle and liquid penetrant in accordance with ASME B31.3 shall be designed and constructed.
- D.7 Construction of Boilers and Pressure Vessels are not within the scope of this quality system therefore CCI shall not engage in these activities.
- D.8 This quality system includes a description of procedures for The Manufacture of Category “A”, “B” and “C” Pressure Fittings in accordance with the Alberta Safety Codes Act and CSA B51.
- D.9 As welding is not included in this quality system, any welding on pressure fittings manufactured under this quality system will be sub-contracted to an organization with an Alberta Certificate of Authorization for the required activity and the requisite welding procedure specifications.



#8, 1820 – 30th Avenue N.E.
Calgary, Alberta, Canada T2E 7M5
Phone: (403) 219-3026
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SECTION E STATEMENT OF AUTHORITY

This Quality System Manual accurately describes the organisation and systems to be used by Compact Compression Inc. (CCI) when constructing, repairing, altering and mechanical assembly of threaded (non-welded) process piping systems and Category “A”, “B” and “C” Pressure Fittings; to ensure compliance with ASME Pressure Piping Codes B31.3, CSA B51 as applicable, Customer Specifications, and the Alberta Safety Codes Act.

The Quality Control Manager is hereby appointed to administer the system described in this manual. The Quality Control Manager has sufficient and well defined responsibility along with the authority and organisational freedom to initiate, recommend, and provide solutions to any quality control problems.

This Quality System has the full support of senior management who will ensure that adequate resources, including trained personnel, are provided in order to effectively implement the Quality System.

Any person assigned a responsibility within this Quality Control Manual may delegate the performance of the activity to another qualified person, however, the responsibility remains with the individual as assigned. Whenever responsibilities are assigned within this Quality Control Manual to a department, the department manager shall ultimately be responsible.

Any Quality System problem which cannot be resolved through designated channels, as described in this manual, shall be brought to my attention for resolution without compromising the Code or this Quality System.

Chris Blundell
President

Date

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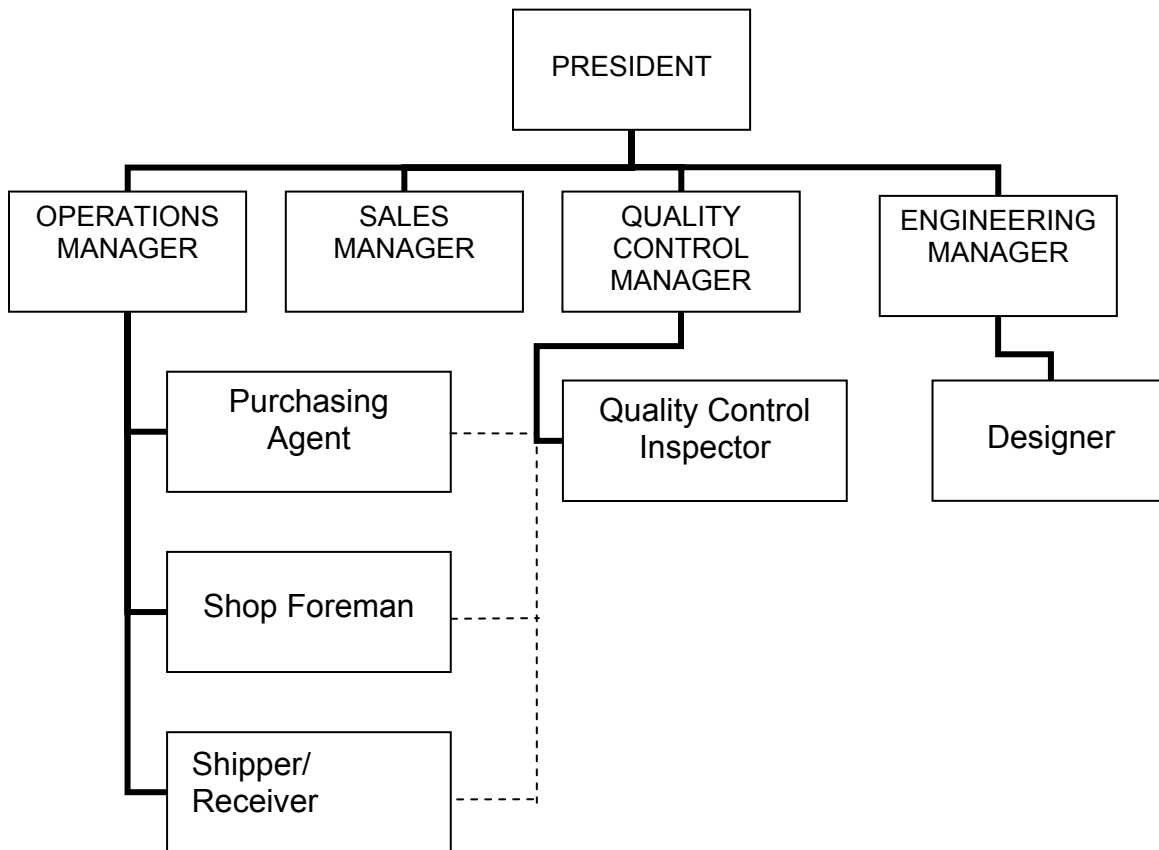
SECTION 2 REVISION SUMMARY

REV NO.	DATE	SECTION	PAGE	CHANGE	QUALITY CONTROL MGR.	ABSA SAFETY CODES OFFICER
0	1 May 2004	all	all	First release		
1	1 Sept 2006	all	all	Minor editorial changes		
1	1 Sept 2006	11	23-26	Added SECTION 11 MANUFACTURE OF FITTINGS		
1	20-Apr-2007	all	all	Edition #2 issued		

SECTION 3 ORGANIZATION CHART

NOTES: More than one position may be held by one person.
Duties may be transferred or delegated but responsibility remains with the person assigned.

ORGANIZATION CHART COMPACT COMPRESSION INC.



SECTION 4 DEFINITIONS

4.1 ABSA

ABSA is the regulatory organisation delegated by the Province of Alberta to provide pressure equipment safety services under the Alberta Safety Codes Act, and acts as the sole Jurisdiction/Regulatory Authority as defined in CSA B51 Code and the ASME Code.

4.2 ABSA SAFETY CODES OFFICER

A person appointed by the Technical Administrator of ABSA to administer the Alberta Safety Codes Act and Regulations (Pressure Equipment).

4.3 ALBERTA SAFETY CODES ACT

The Alberta Safety Codes Act as it applies for pressure equipment and the following regulations under the Safety Codes Act:

- Pressure Equipment Safety Regulation
- Pressure Equipment Exemption Order
- Pressure Welders' Regulations
- Administrative Items Regulation

4.4 ASTM

American Society for Testing and Materials

4.5 BILL OF MATERIAL (BOM)

A list of all parts used on a product (generally "STANDARD PRODUCT") designed, manufactured and sold by Compact Compression. The BOM along with the P&ID form the basis of the product definition.

4.6 C.G.S.B.

Canadian General Standards Board

4.7 CCI

Compact Compression Inc.

4.8 CODE

Latest edition and addenda of the following American Society of Mechanical Engineers Codes:

- a) ASME B31.3 Process Piping
- b) Latest edition and addenda of Canadian Standards Association CSA B51 – Boiler, Pressure Vessel and Pressure Piping Code

4.9 CSA

Canadian Standards Association

4.10 DESIGNER

As related to a specific job or item of pressure equipment, the Designer is the person responsible for all design functions described by this quality system and for complying with all design rules and requirements of the construction Code.

4.11 JOB FILE

A file which contains all records and documents which are essential to ensure the quality of the product. This file shall be assigned the number of each job. This number shall be a means of identifying each job file.

4.12 NONCONFORMITY

Any condition which renders an item unacceptable or indeterminate for use because it does not comply with the Code, the Alberta Safety Codes Act, the Owner's specifications, design specifications or this Quality System Manual. Examples of nonconformities include physical defects, test failures; improper documentation, loss of material identification, and deviations from drawings, specifications or procedures.

4.13 OWNER'S INSPECTOR

Inspector designated by the owner to verify that all required examinations and testing have been completed. For the inspections of piping systems, he/she shall satisfy himself/herself that the piping system conforms to all applicable Code rules and company requirements (e.g. refer to ASME B31.3 Chapter 1, paragraph 300 and Code Chapter VI, paragraph 340 for requirements).

4.14 P. & I.D.

Process and instrumentation diagrams.

4.15 PESR

Pressure Equipment Safety Regulation (AB-516)

4.16 PRESSURE PIPING SYSTEMS UNDER SAFETY CODES ACT JURISDICTION

Pipe, tubes, conduits, fittings, gaskets, bolting and other components which make up a system, the sole purpose of which is to convey and control the flow of expansible fluid between two points, at a pressure above 103 kPa (15 psi). Transmission pipelines as defined in the Pipeline Act are not under Safety Codes Act jurisdiction.

4.17 QUALITY CONTROL INSPECTOR (QCI)

An employee of Compact Compression Inc. designated by the Quality Control Manager to perform the Quality System duties as defined in this manual. The Quality Control Inspector reports through Quality Control Manager to the President on any Quality System related issue.

4.18 QUALITY CONTROL MANAGER (QCM)

An employee of CCI designated by the President to have the responsibility and authority to maintain a Quality System and the organisational freedom to recognise Quality System problems and to provide solutions to those problems.

4.19 REGISTERED DESIGN

Drawings, specifications and information required by the PESR, which have been reviewed and accepted for registration by the ABSA.

4.20 STANDARD PRODUCT

A product complete with options that is designed and built by CCI to meet a specification developed by CCI. Said specification is intended to satisfy a common requirement of CCI Customers and the only variations between units are pre-designed options.

SECTION 5 MANUAL CONTROL

- 5.1 This section describes the system for preparing, revising and controlling the distribution of this Quality System Manual.
- 5.2 The QCM is responsible for implementing this system. His/her duties include the following:
- (a) To approve all proposed changes to the Quality System Manual, by signature and date on the Revision Summary page.
 - (b) To ensure that all revisions have been accepted in writing by ABSA prior to implementation. This acceptance will be indicated by a signature and date on the Revision Summary page.
 - (c) To issue complete new manuals with the revision number at the bottom of the page and retrieve and/or dispose of obsolete manuals when revisions are made
 - (d) To maintain a file of returned document transmittal forms for copies of manuals that are not on site (ABSA copies) to ensure traceability of manual changes.
- 5.3 If additional controlled manuals are issued, the QCM will keep a list indicating manual numbers and who they are assigned to. Uncontrolled manuals may be issued for information but shall not be used for construction. "Uncontrolled" shall be indicated on the front page of these manuals.
- 5.4 A controlled copy of this manual shall be available at all times, on sites where work under this Quality System is being performed. This copy shall be made available to the ABSA Safety Codes Officer and/or the Owner's Inspector upon request.

APPLICABLE DOCUMENTS/FORMS

- Document Transmittal, Exhibit 5.1

COMPACT COMPRESSION INC
DOCUMENT TRANSMITTAL

TO:

[illegible]

INSTRUCTIONS:

PLEASE DESTROY ALL PREVIOUS ISSUES/REVISIONS AND RETURN SIGNED CONFIRMATION OF RECEIPT BY FAX TO:

I confirm the receipt of listed documents:

Signature

Date

SECTION 6 CONTRACT REVIEW

- 6.1 This section describes the system to ensure that contract requirements are defined and agreed upon prior to the start of work.
- 6.2 CCI designs and builds standard pre-engineered packages and sells them to end users. CCI is responsible for all engineering, design registration with ABSA (if necessary), purchasing, material identification and traceability, assembly, measuring and test equipment, pressure tests, record maintenance registration and traceability for its products and their components.
- 6.3 CCI customers purchase a pre-engineered product and are not responsible for activities under this quality manual. For standard piping product, CCI will act on behalf of the future owner. The QCM is shall have the responsibility of certifying the Construction Data Reports for Pressure Piping as required by the PESR.
- 6.4 Customers may supply components for use in standard, pre-engineered packages. Code material will be checked by the QCM in accordance with Section 8 – Material Control.

SECTION 7 DOCUMENT CONTROL

- 7.1 This section describes the system for the preparation, review, approval, distribution and retrieval of all essential documents including design drawings and specifications, P&ID's, mechanical flow sheets, line equipment lists, bill of materials, spool sheets, isometrics and work instructions.
- 7.2 The Engineering Manager is responsible for the preparation and approval of design drawings, spool drawings, P&IDs, calculations and specifications in accordance with the applicable ASME piping Code, CSA B51 – Boiler, Pressure Vessel and Pressure Piping Code, and the Alberta Safety Codes Act.
- 7.2.1 The QCM or his designee shall review the design specifications and drawings to ensure the piping system and fittings can be constructed in compliance with the Code. The design specifications and drawings shall include the following information:
- (a) Code of construction (e.g. ASME B31.3 normal service).
 - (b) Material description including material specification, grade, dimensions, schedule, type, and rating.
 - (c) Design pressure and maximum and minimum design temperatures of system, and if applicable, ASME B31.3 service category.
 - (d) Test Pressure and medium.
 - (e) Construction details, supports, etc.
 - (f) Additional requirements.
- 7.2.2 The QCM or his designee shall be responsible for verifying that the design drawings and specifications have been submitted in duplicate to the ABSA Design Survey Section with form AB-96 for systems that exceed 0.5 cubic metres in aggregate capacity. For piping systems less than or equal to 0.5 cubic metres in capacity, the submission of drawings is not mandatory; however, all pressure piping systems must comply with the requirements of the Code. All design drawings for pressure piping systems exceeding 0.5 cubic metres in aggregate capacity shall be stamped by a Registered Professional Engineer.
- 7.2.3 For a Standard Product if the piping system meets the following criteria
- (a) new piping systems having an aggregate volume equal to or less than 0.5 cubic metres.

To fulfil the specification requirements of Par. 7.2, the QCM shall maintain a bill of material for the Standard Product which shows material specifications and part numbers for each part of the piping system and ensure that all parts available for assembly into a piping system are part numbered. (raw pipe to be part numbered on one end) The QCM shall obtain approval for the bill of material from the Engineering Manager. The Engineering Manager shall maintain the relevant calculations as per the ASME Piping Code and the Alberta Safety Codes Act in the Engineering Tests And Calculations file for each Standard Product.

7.3 The QCM is responsible for the control of all documents and drawings. His/her duties include:

- (a) to release all drawings by stamping (or writing) "Issued For Construction" on the drawing, and initialling and dating each drawing.

Job File

- (b) To initiate and maintain numbered job file(s) at site containing customer purchase orders, bill of materials and applicable quality control forms and documents as referenced in this manual.

Drawing and Specification Distribution

- (c) to maintain a drawing list indicating the drawing title, number and revision, copies issued and the name of the person to whom they were issued.
- (d) to issue drawings, specifications, purchase orders, bill of materials and applicable quality control forms to the shop.
- (e) to recall and destroy all superseded documents. Alternatively, these may be marked "Void" and kept in Job File.

SECTION 8 MATERIAL CONTROL

- 8.1 This section describes the system for ordering, receiving, identifying and maintaining traceability of all Code material.

Note: All the material receiving, identification, verification and coding requirements defined in this section also apply to Owner supplied material. When material is supplied by the Owner it shall be checked by the QCM/QCI upon receipt against the Owners material list (see Par 8.3).

8.2 Purchasing

- 8.2.1 The Purchasing Agent shall be responsible for ordering all material. The Purchasing Agent will prepare a purchase order (Exhibit 8.1) from the material list on the drawing or Bill of Material. It shall include the following information as appropriate to the product:

- (a) Purchase order (P.O.) Number and Job No.
- (b) ASME/ASTM specification number and grade, schedule dimensions, fitting, type, rating, etc. as applicable.
- (c) Supplementary requirements such as Heat Treatment (normalizing), special chemistry, etc.
- (d) Requests for material test reports when required by Code (optionally require name of company's P.O. number be written on MTRs).
- (e) Statement that all fitting designs must be registered with the ABSA.

- 8.2.2 One copy of the purchase order shall be forwarded to the Vendor and one copy shall be retained by the Purchaser in the job file or in the case of a STANDARD PRODUCT in the vendor file.

- 8.2.3 Material substitutions must be approved by the Engineering Manager. Revised drawings and specifications shall be prepared and issued in accordance with Section 7 of this manual.

- 8.2.4 All purchase orders containing material to be used for Code work must be approved by the QCM to ensure the purchase order contains the required information as listed in section 8.2.1.

- 8.2.5 All pipe ordered is SA106B seamless pipe.

8.3 Material Receiving

The Shipper/Receiver is responsible for receiving and storage of material at site. His/her duties include:

- (a) Checking all incoming material against the purchase order/Owner's material list, and packing slip for:
 - (i) visible damage
 - (ii) correct dimensions
 - (iii) correct material markings, specification and grade, size, schedule, rating, name of manufacturer or trademark, etc. as applicable.
- (b) Checking MTRs (material test reports) against material markings and verifying that all material markings match those described on the MTRs and confirming that the MTRs are identified with the purchase order number; acceptance shall be indicated by initial and date on the MTR.

(c) Segregating and identifying acceptable material.

8.4 Pressure Vessels and Skid Package Units

The QCI will visually examine each pressure vessel and skid package upon arrival and will notify the Vendor and or shipping company if damage is suspected.

The ABSA Safety Codes Officer shall be notified as necessary when system has been completed to enable him/her to verify the boiler or pressure vessel installation. He/she shall also be informed immediately if any pressure vessel is damaged. (Refer to 9.4)

8.5 Nonconforming Items/Material

Any material or item that does not meet above requirements shall be considered a nonconformity and shall be processed in accordance with Section 12 of this Manual.

8.6 Material Identification and Traceability

- 8.6.1 The QCM is responsible for the material Identification and traceability system. He/she shall
- (a) Keep a file of all material MTRs which will contain the date that the material was received
 - (b) Maintain a list of all jobs, their start date and finish date.
 - (c) Ensure that all pipe purchased for pressure piping is maintained in a segregated area separate from material used for general fabrication
- 8.6.2 The QCM shall ensure that all pipe is marked as follows:
- (a) All unpainted pipe, with the exception of pipe in full lengths, shall have its grade (for example "A106B") written on each individual piece with a permanent felt marker or paint marker.
 - (b) Pipe painted red, blue, green, or grey, will be seamless SA106B. No other grade of pipe shall bear these colours.
- 8.6.3 The QCM shall ensure that welded piping spools received are identified with a line number, spool number and job number and that spool tests are supplied with each shipment. A Construction Data Report for Piping systems (AB83) is required from the subcontractor.
- #### 8.7 Customer Supplied Material
- 8.7.1 The proper application and installation on CCI standard compressor packages of all customer supplied materials is the responsibility of the Engineering Manager.
- 8.7.2 Material is received in accordance with Section 8.3

APPLICABLE DOCUMENTS/FORMS

- Purchase Order, Exhibit 8.1
- ABSA/Alberta Municipal Affairs Forms
- Construction Data Report for Piping Systems, AB-83

EXHIBIT 8.1 PURCHASE ORDER

Compact Compression Inc.

#3, 1820 - 30 Avenue NE
Calgary, Alberta T2E 7M5
Canada P 403-219-3022, F 403-291-6615

PURCHASE ORDER

P.O. No.: 9999
P.O. Date: 20-Nov-2003
Page: 1
Ship Date: 20-Nov-2003

Vendor:

Trans Am Piping Products Ltd.
7025 - 44th Street S.E.
Calgary, Alberta T2C 4E8
Canada

Ship To:

Compact Compression Inc.
#3, 1820 - 30 Avenue NE
Calgary, Alberta T2E 7M5
Canada

Business No.: 85503 1084

Item No.	Ordered	Unit	Description	Tax	Unit Price	Amount
1207	10	Each	P Flange Thrd 1" 300 RF A105N	G	12.96	129.60
1216	10	Each	P Nip 1"x4" SCH80 Smls A106B	G	1.66	16.60
1248	10	Each	P Tee Thrd FS 1" 2000 A105N	G	3.57	35.70
1253	10	Each	P Union Thrd FS 1" 3000 A105N	G	6.06	60.60
1197	10	Each	P Bushing FS Hex 2"x1" A105N	G	4.90	49.00
1290	10	Feet	Pipe 1" SCH80 Smls A106B	G	1.68	16.80
			- Mill Test Reports Required			
			G - GST 7.00%			
			GST			21.58
			Terms: Net 30			
			PLEASE NOTE: All fitting designs must be registered with the Alberta Boilers Safety Association			
Shipped By Deliver				Freight		0.00
				Total Amount		329.88

SECTION 9 EXAMINATION AND INSPECTION PROGRAM

9.1 This section describes the system to verify that all pressure piping construction, repair or alteration meets the Code, job specifications and drawings. The QCM is responsible for ensuring that all Code required inspections are performed.

9.2 QCM's Duties

The QCM is responsible for the overall examination program. He/she shall:

- (a) Issue Quality System manuals, drawings, Quality System forms, ABSA forms, bill of materials, purchase orders, calibration records, etc. to the QCI prior to start of work.
- (b) Review all completed records for compliance with the Code, and this Quality System, and forward the Completion of Construction Declaration Form (AB-81) to ABSA (for piping systems exceeding 0.5 m³ in volume).
- (c) Ensure that each individual assigned to perform Quality System functions is competent and fully understands all applicable requirements referred to in this Quality System Manual.
- (d) Initiate a Job File, and maintain all records detailed in Section 16 in this file.
- (e) Prepare and sign the Alberta Construction Data Report For Piping Systems (AB-83) for all spools and /or complete systems constructed, repaired or altered by CCI and file in job file and customers package.

9.3 QCI's Duties

The QCI is responsible for the site examination program. He/she shall:

- (a) Perform all the examinations required under the Code. These are detailed on the Pressure Piping Examination and Inspection Sheet (Exhibit 9.1). Additional functions will be detailed on back of the checklist, when applicable.
- (b) Sign and date each function on the Pressure Piping Examination and Inspection Sheet when satisfactorily completed.
- (c) Examine each system after completion and prior to pressure testing against design specifications and drawings using the Pressure Test Examination Guide (Exhibit 14.1).

APPLICABLE DOCUMENTS/FORMS

- Pressure Piping Examination Checklist, Exhibit 9.1
- ABSA/Alberta Municipal Affairs Forms
- Completion of Construction Declaration, AB-81
- Construction Data Report for Piping Systems, AB-83

EXHIBIT 9.1 PRESSURE PIPING EXAMINATION AND INSPECTION SHEET

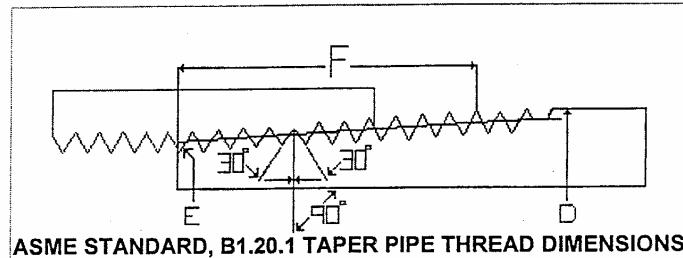
PRESSURE PIPING EXAMINATION AND INSPECTION SHEET				
JOB NUMBER:				
NO.	FUNCTION	MANUAL REFERENCE	SIGNATURE OR INITIAL AND DATE	
			Q.C INSPECTOR	Date
1	Drawings, ABSA registration if total volume over .5m ³	7.22		
2	ABSA Safety Codes Officer (when required) and Owner's Inspector notified.	8.4, 9.3		
3	QC manual and forms available at QC office, Job file started	9.2(a) 9.2(d)		
4	Material checked against P.O., drawings, and specifications. Identification confirmed.	8.3 8.6		
5	Threaded piping assembly procedure available	10.2(h)		
6	Visual inspection of all completed threaded joints	10.2		
7	Each system checked against specifications and drawings before pressure test.	9.3(d) 9.3(f)		
8	All deficiencies recorded and signed off by Q.C.I. before pressure test.			
9	Pressure Test checked. Gauge calibration verified, gauge # recorded.	15.4 / 14.3		
10	System checked after test. Deficiencies recorded and corrected. (Exhibit 15.2)	15.4		
11	Construction data reports (AB-83) prepared and signed by QCM and Owner's Inspector.	9.2(d)		
12	Declaration form (AB-81) submitted to ABSA for systems over .5M ³	9.2(d)		

Hold points indicated by an asterisk *.

SECTION 10 MECHANICAL PIPING ASSEMBLY

- 10.1 This section describes the system for controlling threaded piping assemblies
- 10.2 The QCI, or his designee is responsible for the control of assembling threaded piping and verifying that ASME B31.3 Code requirements are complied with as follows
- (a) Threaded piping is designed for Normal fluid service and Category D fluid service only
 - (b) Threaded joints shall not be seal welded
 - (c) Threaded piping layout shall minimize stress on joints and special consideration shall be given for stresses due to thermal expansion. Provision shall be made to counteract forces that tend to unscrew joints
 - (d) Threaded flanges in which the pipe ends project through to serve as the gasket may only be used for Category D fluid service
- 10.3 The QCM/QCI shall be responsible to verify that
- (a) For taper threaded joints
 - a. Joint threads of both mating components shall conform to ASME B1.20.1
 - b. Male threaded components shall be used in accordance with table 314.2.1 and it's notes as specified in ASME B31.3
 - c. Female threaded components shall be at least equivalent in strength and toughness to threaded components listed in table 326.1 of ASME B31.3
 - d. Couplings having straight threads may be used for category D fluid service only and only with threaded mating components.
 - (b) Thread Cutting Procedures
 - e. All threads will be cut with a powered thread cutting machine (rigid or equivalent)
 - f. The thread die holding mechanism will be equipped with a automatic die release that releases the dies and stops the cutting action when the pipe has reached a predetermined depth in the die
 - g. Thread gages will be available at the thread cutting machine at all times
 - h. The operator of the thread cutting machine will use the thread gage to check the first off of any size of any thread cut during any quarter shift (quarter shifts being broken by coffee breaks and lunch) or any die change and the depth of the automatic die release will be reset to ensure conformance to the thread gage.
 - (c) Threaded Piping assembly
 - i. Pipe dope will be available at the piping assembly areas at all times
 - j. An ASA taper pipe thread chart with thread dimensions and make up dimensions will be available at the piping assembly areas at all times
 - k. All male threads will be coated with pipe dope by use of a brush
 - l. Pipe threads will be tightened to a leak proof tightness as per ASME STANDARD B1.120.1 TAPER PIPE THREAD DIMENSIONS (Exhibit 10.1)
 - (d) Tubing joints will comply with ASME B31.3 Paragraphs 315.1, 315.2 and 315.3

EXHIBIT 10.1 PIPE THREAD ASSEMBLY DIMENSIONAL REQUIREMENTS



Because of the taper, a pipe can only screw into a fitting a certain distance before it jams, unlike threading a nut on a bolt. The standard specifies this distance, the effective thread (F). It also specifies another distance, the engagement, which is the distance the pipe can be screwed in by hand without much effort. For workers, instead of these distances, it may be more convenient to know how many threads (turns) to make by hand and how many with a wrench (provided in the two right columns in the table below).

The table shows the distances and number of turns called for in the standard. A tolerance of plus or minus one turn is allowed. All dimensions are in inches.

NOMINAL PIPE SIZE	NUMBER OF THREADS PER INCH	O. D. OF PIPE "D"	MINOR DIA. AT SMALL END OF PIPE *1	PITCH DIA. AT START OF EXT. THREAD "E"	LENGTH OF EFFECTIVE THREAD, EXTERNAL "F"	LENGTH OF ENGAGEMENT TIGHTENED BY HAND	WRENCH MAKEUP LENGTH	HAND TIGHT THREADS	WRENCH MAKEUP THREADS
1/8"	27	.405	0.3339	.36351	.2639	0.180	0.111	4.86	3
1/4"	18	.540	0.4329	.47739	.4018	0.200	0.167	3.60	3
3/8"	18	.675	0.5676	.61201	.4078	0.240	0.167	4.32	3
1/2"	14	.840	0.7013	.75843	.5337	0.320	0.214	4.48	3
3/4"	14	1.050	0.9105	.96768	.5457	0.340	0.214	4.75	3
1"	11.5	1.315	1.1441	1.21363	.6828	0.400	0.261	4.60	3
1-1/4"	11.5	1.660	1.4876	1.55713	.7068	0.420	0.261	4.83	3
1-1/2"	11.5	1.900	1.7265	1.79609	.7235	0.420	0.261	4.83	3
2"	11.5	2.375	2.1995	2.26902	.7565	0.436	0.261	5.01	3
2-1/2"	8	2.875	2.6195	2.71953	1.1375	0.682	0.250	5.46	2
3"	8	3.500	3.2406	3.34062	1.2000	0.766	0.250	6.13	2
3-1/2"	8	4.000	3.7375	3.83750	1.2500	0.821	0.250	6.57	2
4"	8	4.500	4.2344	4.33438	1.3000	0.844	0.250	6.75	2

*1 Minor Diameter at Small End of Pipe - given as information for use in selecting tap drills.

SECTION 11 MANUFACTURE OF FITTINGS

- 11.1 The purpose of this section is to describe procedures and quality system controls for the design, construction, examination, testing, marking and documentation of non-welded, registered Category “A”, “B” and “C” Pressure Fittings in accordance with the Alberta Safety Codes Act and Regulations, and CSA B51. Category “A”, “B” and “C” Pressure Fittings will be manufactured in accordance with all of the preceding requirements described in this quality system manual, with the following additions and/or exceptions.
- 11.2 The Engineering Manager is responsible for the control over the design of fittings and verifying ASME Code requirements are complied with as follows:
- (a) Preparing design calculations (when applicable) and design drawings or specifications in accordance with the Code or Standard of construction (e.g., ASME Section VIII, Division 1, ASME B31.3, ASME B16.5, B16.9, B16.11 etc.).
 - (b) Verifying that design and/or construction drawings contain the following information (as applicable to the Code or Standard of construction);
 - a. drawing title, part number, CRN,
 - b. drawing number, revision number and details of revisions, date,
 - c. dimensions in consistent units of measurement, with tolerance where applicable,
 - d. bill of materials with material specifications in consistent units of measurement,
 - e. Maximum Allowable Working Pressure (MAWP) at coincident maximum design temperature, and Minimum Design Metal Temperature (MDMT) at MAWP,
 - f. Code of construction, Code edition, year and addenda,
 - g. corrosion allowance
 - h. notes identifying additional requirements
 - i. pressure test requirements if applicable
 - j. heat treatment requirements if applicable
 - k. NDE requirements if applicable
 - (c) Reviewing design and/or construction drawings and design calculations to ensure there is an adequate basis for construction and approving these documents, including any client supplied documents. If these documents are customer supplied or if their preparation is subcontracted to an engineering firm experienced in pressure fitting design, the review and approval and document control requirements shall be identical to in-house documents.

Design Registration

- 11.3 For pressure fitting designs that will be registered in Alberta the Designer will prepare and Engineering Manager of CCI will complete the Statutory Declaration form (AB-41) for all items that qualify as Pressure Fittings. CCI will submit the Statutory Declaration form with the applicable drawings, specifications, catalogues and supporting calculations or proof test documentation in triplicate along with a Design Registration Application form (AB-31) to ABSA Design Survey. To obtain the requirements for design registration of pressure fittings in other Canadian jurisdictions the applicable jurisdiction should be consulted.

- 11.4 ABSA Design Survey may require that unusual designs be proof tested in accordance with ASME Section VIII, Division 1, Paragraph UG-101. The QCM shall arrange to have these tests witnessed by an ABSA Authorized Inspector. The test will be documented on a Proof Test Report, which will be signed by the QCM and Authorized Inspector, attesting to the results of the test.
- 11.5 When drawings are revised and the revisions affect the design, the revised drawings will be re-submitted to ABSA or the applicable jurisdiction. Prior to reissuing drawings for previously designed Pressure Fittings, the Designer will review and revise as necessary, the drawings and design calculations to ensure compliance with the latest applicable construction Code or Standard Edition and Addenda. The Designer's review and approval shall be documented by initial and date on the drawings and design calculations.
- 11.6 All fitting design registrations expire 10 years after the issue date. Prior to starting construction of a pressure fitting the QCM shall verify that the CRN was issued or re-issued within 10 years. If the existing CRN is more than 10 years old the design must be submitted, as described in paragraph 11.3 above, for re-registration.

Material Control

- 11.7 Fittings are manufactured from material purchased by CCI and no fittings are manufactured from owner supplied material.
- 11.8 The Purchasing Agent shall be responsible for ordering all material. The Purchasing Agent will prepare a purchase order (Exhibit 8.1) from the material list on the drawing or Bill of Material. It shall include the following information as appropriate to the product:
- (a) Purchase order (P.O.) Number and Job No.
 - (b) ASME/ASTM specification number and grade, schedule dimensions, fitting, type, rating, etc. as applicable.
 - (c) Supplementary requirements such as Heat Treatment (normalizing), special chemistry, etc.
 - (d) Requests for material test reports when ordering material

One copy of the purchase order shall be forwarded to the Vendor and one copy shall be retained by the Purchaser in the job file or in the case of a STANDARD PRODUCT in the vendor file.

- 11.9 All purchase orders containing material to be used for Code work must be approved by the QCM to ensure the purchase order contains the required information as listed in section 11.8
- 11.10 Raw Material Receiving

The Shipper/Receiver is responsible for receiving and storage of raw material at site. His/her duties include:

- (a) Checking all incoming raw material against the purchase order and packing slip for:
 - (i) visible damage
 - (ii) correct dimensions
 - (iii) correct material markings, specification and grade, size, schedule, rating, name of manufacturer or trademark, etc. as applicable.

- (b) Checking MTRs (material test reports) against material markings and verifying that all material markings match those described on the MTRs and confirming that the MTRs are identified with the purchase order number; acceptance shall be indicated by initial and date on the MTR.
- (c) Identifying acceptable material by initialling the material with a permanent felt marker or paint marker of any colour that will be clearly visible on that material.
- (d) Segregate acceptable material.

11.11 Completed Fittings Receiving

- 11.11.1 The Shipper/Receiver is responsible for receiving and storage of completed fittings at site. He/she is responsible for checking all incoming fittings against the purchase order and packing slip for:
 - (i) visible damage
 - (ii) correct stamped markings as defined by MSS SP-25-1998 in addition to the following:
 - the identifying mark (as indicated on the AB-31) which shall be (“ CCI ”)
 - the part number and revision number as indicated on engineering drawings
 - the Purchase Order number on which the raw material was acquired per Section 11.8
 - (iii) Example markings on a non-ferrous threaded fitting:
CCI - 2435R1
PO13232
SB221
350 at 275F
- 11.11.2 The QCI shall check all incoming fittings against the drawings and is responsible for:
 - (i) ensuring the pressure fittings meet the drawing dimensional specifications detailed in the engineering drawings by doing a 10% inspection per lot. If non-conforming product is found, then a 100% inspection will be performed. Non-conforming product will be handled as per existing procedures.
 - (ii) logging inspection on the Pressure Fittings Examination and Inspection Sheet, Exhibit 11.1
 - (iii) identifying acceptable fittings by filling in the stampings with a paint marker of any colour.
 - (iv) segregating acceptable fittings.

11.12 Nonconforming Items/Material

Any material or item that does not meet above requirements shall be considered a nonconformity and shall be processed in accordance with Section 12 of this Manual.

Material Identification and Traceability

- 11.13 The QCM is responsible for the material identification and traceability system. He/she shall
 - (a) Keep a file of all material MTRs which will contain the date that the material was received
 - (b) Maintain a list of all jobs, their start date and finish date.
 - (c) Ensure that all materials for manufacture of fittings is maintained in a segregated area separate from material used for general fabrication
 - (d) Drawings and calculations will be kept separately with Engineering identified by part number.
- 11.14 The QCM shall ensure that all raw material for manufacture of fittings is marked with the material grade and MTR reference number with a permanent felt marker or paint marker.

Performance Standards

- 11.15 Performance testing on Coded fittings may be conducted where appropriate. The Engineering Manager shall be responsible for the testing procedure and/or testing standard.
- 11.15.1 All Category “C” fittings designed to proprietary standard (ie. not constructed to a recognized standard such as B16.34) shall be tested to a performance standard as defined by CCI and approved by the Engineering Manager, or, where appropriate, by installing the fitting into the intended application and testing the fitting in its actual operating conditions. Pressure testing of the fitting would be conducted at the required test pressure of the system in which the fitting is installed. The pass rate shall be 100% and the job file shall contain the signature or initials of the individual that performed the test.
- 11.16 The proper application and installation on CCI standard compressor packages of the pressure fittings manufactured under this quality manual is the responsibility of the Engineering Manager.

APPLICABLE DOCUMENTS/FORMS

- Pressure Fittings Examination and Inspection Sheet, Exhibit 11.1
ABSA/Alberta Government (Municipal Affairs) Forms
- Design Registration Application, AB-31
- Statutory Declaration, AB-41

EXHIBIT 11.1 PRESSURE FITTINGS EXAMINATION AND INSPECTION SHEET

[illegible]

SECTION 12 NONCONFORMITIES

- 12.1 This section describes the system for identifying, documenting, and resolving nonconformities found at receiving, during construction, repair or alteration, examination or testing.
- 12.2 The QCM shall be responsible for the disposition and approval of all nonconformities.
- 12.3 All nonconformities relating to completed pressure piping and fittings shall be corrected or eliminated before the completed component can be considered to comply with the Code.
- 12.4 Identification No./Documentation
- 12.4.1 All nonconformities shall be reported immediately to the QCI and shall be identified by tagging the item and removing the item from the work area. A detailed description of each nonconformity shall be provided on a Nonconformance Report (Exhibit 12.1). The QCI will be responsible for documenting the nonconformity.
- 12.5 Disposition
- 12.5.1 For nonconformities requiring in-depth analysis, a Corrective & Preventive Action Request (CPAR) will be filled out during the resolution phase at the QCM's discretion (Exhibit 12.2). The QCM is responsible for documenting the disposition of all nonconformities.
- 12.5.2 If the resolution of a nonconformity alters the design specifications in any way, the QCM and the Engineering Manager must both approve the disposition. Examples of this are material substitutions or incorrect size and/or thickness.
- 12.5.3 All documentation pertaining to nonconformities will be filed in the job file.

APPLICABLE DOCUMENTS/FORMS

- Nonconformance Report, Exhibit 12.1
- Corrective & Preventive Action Request (CPAR), Exhibit 12.2

EXHIBIT 12.1 NONCONFORMANCE REPORT

CCI Nonconformance Report			
Originator(s):		Date:	Report Number:
Nonconformance Description:			
WO# / PO #	Part No.	Part Description:	Qty.
Steps to Prevent Inadvertent Use of the Item or Process:			
Corrective/Preventive Action and Disposition			
Apparent Cause:			
Root Cause Analysis Required? Yes <input type="checkbox"/> No <input type="checkbox"/>			
Planned Corrective/Preventive Action: Independent verification required? Yes <input type="checkbox"/> No <input type="checkbox"/>			
Comments:			
No.	Corrective Action		
DISPOSITION (if applicable): Use-as-is <input type="checkbox"/> Repair <input type="checkbox"/> Rework <input type="checkbox"/> Return to Vendor <input type="checkbox"/> Scrap <input type="checkbox"/> Other _			
Person(s) Responsible for the Corrective/Preventive Action and/or Disposition			Approval of Corrective/Preventive Action
No.	Name(s)	Due Date	
			QC Manager or Designee _____ Date _____
Closing the Nonconformance			
Planned Corrective/Preventive Action Has Been Completed			Independent Verification Has Been Completed
No.	Name(s)	Date	
			Name _____ Date _____
Distribution:			

EXHIBIT 12.2 CORRECTIVE & PREVENTIVE ACTION REQUEST (CPAR)

CORRECTIVE AND PREVENTIVE ACTION REQUEST (CPAR)

Purpose:	Used to rectify and or improve any aspect of the quality system.
Scope:	Used in conjunction with suggestions and non-conformance reports when deemed necessary by the QCM.
Responsibility:	All employees are encouraged to use the suggestion portion. The QCM will generate a report for non conformance requirements.

A	Originator Section
	Date: _____ Department: _____ CPAR#:
	Discrepancy (s) or suggestion:
	Submitted By: _____ Proposed Action discussed with:
	Date agreed upon to check effectiveness: _____ NCR#:

B	Action Taken by QC Manager
	1.Root Cause Investigation Results: _____
	2. Process Document Affected: _____ Quality Manual Section Affected: _____
	3. Corrective Action Taken: _____
	QC Mgr Signature: _____ Date: _____

C	Verification of Effectiveness
	Disposition: Accepted _____ Rejected: _____ Date: _____
	Remarks: _____
	QC Mgr Signature: _____ Date: _____

D	Verification by Auditor
	Disposition: Accepted _____ Rejected: _____ Date: _____
	Summary: _____
	Internal Auditor Signature: _____ Date: _____

SECTION 13 MEASURING AND TEST EQUIPMENT

13.1 This section describes the system to control the calibration of pressure gauges and recorders.

13.2 The QCM is responsible for the control of test equipment. He/she shall ensure that:

- (a) all gauges and recorders are identified with a serial number and date of required re-calibration (Calibration Expiry Date).
- (b) all gauges are calibrated by a qualified testing laboratory against a master gauge or dead weight tester traceable to a national standard.
- (c) all gauges used for pressure testing shall have a range suitable for the test pressure (1.5 to 4 times the test pressure) and are accompanied by a copy of the latest calibration record.
- (d) pressure gauges shall be calibrated at intervals not exceeding 12 months.
- (e) records of pressure gauge calibrations are maintained.
- (f) all safety relief valves used for pressure testing shall be calibrated by a qualified testing laboratory against a master gauge traceable to a national standard. Testing intervals shall not exceed 24 months.
- (g) records of safety relief valve calibrations are maintained.
- (h) all calibration blocks used in Section 13.3(b) shall be checked by a qualified testing laboratory at an interval not exceeding 10 years, or immediately upon a visible sign of damage.

13.3 The QCI shall:

- (a) examine the equipment, prior to the test, for visible damage and verify that the gauge is of suitable range for the test
- (b) check the calibration status of the vernier, calliper, micrometer, etc., against a calibration block prior to using the gauge at every instance that he/she takes possession of the gauge for the purpose of inspection as outlined in Section 11.11. He/she shall confirm the calibration status on the Pressure Fittings Examination and Inspection Sheet (Exhibit 11.1)
- (c) bring to the attention of the QCM any equipment that requires recalibration or repair
- (d) return all test equipment to the QCM upon completion of testing
- (e) male pipe threads will be checked with pipe thread gauge calibrated to ANSI/ASME B1.20.1
- (f) female pipe threads will be checked by inserting a male pipe thread that has been checked as in (e)
- (g) straight threads shall be checked against a finger gauge

SECTION 14 PRESSURE TEST

- 14.1 This section describes the system for ensuring that pressure testing including pneumatic, service and sensitive leak tests are completed in accordance with the design specifications and Code service category requirements for piping systems of .5 cubic meters in volume or less.
- 14.2 CCI assembles Natural Gas compressors with screwed piping or welded piping and vessels tested by it's subcontractors to conform to Code service category requirements. CCI has determined as per ASME Code B31.3 paragraph 345.5 that a hydrostatic pressure test of the complete pressure piping system is impractical due to the nature of components (compressors, regulating valves etc) that are incorporated in the system that could be damaged by such a test. CCI has elected to perform a pneumatic test in lieu of a Hydrostatic test.
- 14.3 CCI does not assemble piping systems over .5m³ so it uses as "Standard Pneumatic Test Procedure" which has been accepted by ABSA to perform it's pressure test.
- 14.4 Written Procedures - All pressure tests shall be performed in accordance with a written test procedure which meets with Code and design specifications. Leak tests will be performed before the system is started up.
- 14.5 QCM's Duties

The QCM is responsible for the implementation and control of this section. His duties include the following:

- (a) Preparing the written test procedure for all pressure tests. (Exhibit 14.2)
- (b) Distributing the test procedure to shop personnel.
- (c) Submitting a "Standard Pneumatic Test Procedure" to ABSA for acceptance prior to testing.
- (d) Ensuring that two calibrated pressure gages are used for each test
- (e) Signing off the QC check sheet which contains the Leak Test Report Form prior to shipping the compressor to a customer

14.6 QCI's Duties

- (a) Witnessing all pressure tests and verifying that the tests were performed in accordance with the approved procedures and job specifications.
- (b) Examining the system prior to the test and after completion using the Standard Pneumatic Pressure Test Instruction and Report Form, (Exhibit 14.1).
- (c) Standard Pneumatic Pressure Test Instruction and Report Form after each unit is tested.

APPLICABLE DOCUMENTS/FORMS

- Standard Pneumatic Pressure Test Instruction and Report form Exhibit 14.1

EXHIBIT 14.1 STANDARD PNEUMATIC PRESSURE TEST INSTRUCTION AND REPORT FORM

CCI Standard Pneumatic Pressure Test Instruction & Report Form									
Date		Unit S/N		Gauge S/Ns					
Design P Inlet (psig)	Test P Inlet (psig) 1.1x D	Relief P Inlet (psig) 1.1xT	Design P Discharge (psig)	Test P Discharge (psig) 1.1xD	Relief P Discharge (psig) 1.1xT	Design P Fuel gas (psig)	Test P Fuel Gas (psig) 1.1xD	Relief P Fuel Gas (psig) 1.1xT	
QCI	Other authorized personnel								
Leak Test Preparation								QCI	
1	Unit completely assembled as per P&ID and BOM								
3	Blanking Flanges correct thickness								
4	All items which could be damaged by test isolated or removed (control valves, safety valves, instruments, expansion joints, etc.)								
5	All flanges wrapped with masking tape and punctured at one point for leak test								
6	Equipment with internals (ie. filters) that could be damaged, isolated as required.								
7	Test relief valves (PSV) installed – see relief P above								
8	Vents and drains correctly installed								
9	Open and Closed position of all valves verified.								
10	Calibrated Test pressure gages installed (2 for inlet and 2 for discharge)								
11	Inlet pressurization test set up hooked up to inlet (shop air, regulator and blowdown valve)								
12	Discharge pressurization set up hooked up to discharge (amplifier, regulator, blowdown valve)								
13	All unauthorized personnel removed from test area (east bay) and barriers erected								
Leak Test									
Test	Press	Time	Complete?	Retest ?	Reason for failure				
Inlet									
Inlet									
Discharge									
Discharge									
Fuel gas									
Fuel Gas									
Leak Test Completion									
1	Blanking Flanges removed								
2	All items removed or isolated returned to original status								
3	Open and closed positions of valves verified								

Instructions

- 1 Leak test will be supervised by QCI and QCI will fill in Pressure Test Form
- 2 The test will be conducted in the final assembly bay at room temperatures
- 3 If leaks are detected at any point in the test the leaks will be marked, the system slowly depressurized, the leaks repaired and the test repeated from the beginning
- 4 Connect pressure source to suction flange
- 5 Slowly increase pressure to 25 psi and test all joints for leaks with soap water mixture
- 6 Slowly increase pressure to 50 psi and hold for 10 min ensuring no bleed off
- 7 Slowly increase pressure to suction test pressure in increments of 50 psi and hold for 10 Min ensuring no bleed off
- 8 Slowly decrease pressure to Inlet design P and test all joints for leaks with soap water mixture
- 9 Isolate suction from discharge by closing recycle valves (inlet check will isolate main suction line)
- 10 Slowly depressurize inlet
- 11 Slowly Increase discharge pressure to test pressure in 50 psi steps holding each step for 10 min ensuring no bleed off
- 12 Decrease test pressure to design pressure and test all joints for leaks with soap and water
- 13 Adjust fuel gas regulator to design pressure and test all joints for leaks with soap water mixture
- 14 Increase fuel gas regulator to test pressure in 25 psi steps holding each step for 10 min ensuring no bleed off or leaks
- 15 Slowly bleed down pressure
- 16 Return all valves to original positions

EXHIBIT 14.2

CCI STANDARD PNEUMATIC TEST PROCEDURE FOR ASME B31.3 PIPING SYSTEMS ON STANDARD PRODUCTS

1.0 General

- 1.1 All Pneumatic testing of process piping shall be in accordance with ASME B31.3
- 1.2 This standard procedure shall be accepted by ABSA before pneumatic testing proceeds. If the volume of the piping system is greater than .5 cubic meters or if the pneumatic test pressure exceeds 2069 kPa(300psig) then a Job specific pneumatic test procedure will be submitted to ABSA and their acceptance obtained prior to test

2.0 Limitations of standard procedure

- 2.1 Under this standard procedure pneumatic testing will be limited to piping systems constructed of P-1 of P-8 materials, with a flange class of 150 or greater.
- 2.2 The piping system under test will be limited to a volume of less than .5 cubic meters (18 cubic feet)

3.0 Testing design basis

- 3.1 Test pressure shall be 110% of design pressure
- 3.2 A pressure relief device shall be provided having a set pressure not higher than 110% of test pressure . The pressure relief device will be sized to relieve the maximum output of the pressure source to prevent excessive testing pressure

4.0 Testing will take place at a minimum of 17 C (30F) above the minimum design temperature for the piping.

5.0 Test procedure

- 5.1 Prior to test a Pneumatic test procedure and pressure test report will be prepared by the QCM

5.2 Testing

- a. Testing will be performed with air
- b. No unauthorized people will be allowed within 15m (50 ft) of the test area. Barriers signed “DANGER PNEUMATIC PRESSURE TEST IN PROCESS DON’T ENTER” will be erected to keep unauthorized personnel from entering
- c. Wrap all flanged connections with masking tape. Make a small hole for leak testing
- d. A minimum of two calibrated pressure gages shall be used to monitor pressure. The pressure gage range shall be 1.5 to 4 times final test pressure.
- e. Calibrated pressure relief valves will be installed for test. Their pressures will be rated to at least 10% above test pressures.
- f. Carefully pressurize system to 172 kPa (25 psig) and hold for 10 min so system can stabilize
- g. Soap test all welds flanges and other possible leak sources. Mark all leaks for repair
- h. Depressurize carefully and repair all leaks. Repeat leak test (steps e&f) until the system is gas tight at 172 kPa (25 psig)
- i. Slowly increase pressure to 345 kPa. (50 psig) and hold for 10 min ensuring no bleed off. Slowly increase pressure thereafter in increments of 345 kPa. (50 psig) until the test pressure is reached
- j. The minimum hold time at each increment shall be 10 minutes. During each hold period check for leakage by monitoring the pressure for bleed down. The Pneumatic test report shall be complete denoting hold pressures and time at each step.
- k. If a leak is detected at any time the leak is to be marked, the system safely depressurized and the leak repaired and the test begun again(step e)
- l. Once the required test pressure is reached, the pressure is to be held for a minimum of 10 minutes.
- m. The system shall be slowly reduced to design pressure and the system tested for leaks, IF no leaks are detected the test is successful

- 5.3 Depressurizing – The system will be slowly and safely depressurized.

- 5.4 After testing the QCI will sign the test report

Applicable forms - CCI Standard Pneumatic Pressure Test Instruction & Report Form Exhibit 14.1

SECTION 15 RECORD RETENTION

- 15.1 This section describes the records that will be maintained in accordance with Code and contract requirements.
- 15.2 The QCM will ensure that the following records, when applicable, are maintained in the job file or QA file, identified by job number, for a minimum of five years.
- (a) Design specifications
 - (b) Drawings
 - (c) Pressure piping data reports and declaration forms
 - (d) Material test reports
 - (e) NDE reports
 - (f) Physical test reports
 - (g) Radiographic film, interpretation sheets, and inspectors' record of certification
 - (h) Heat treatment records
 - (i) Nonconformity reports
 - (j) Welders' records and weld identification drawings
 - (k) Welding procedures
 - (l) Pressure test procedures and reports
 - (m) Bill of materials, spool lists, purchase orders generated by (name of company)
 - (n) As built drawings