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PAGES: 10 (INC'L COVER & NOTE)

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DPT Procedure

Inlet Separator (VSP-Z6011)



REVIEWED BY [Signature]

DATE 5/18/09



Purchaser's review and/or release for fabrication shall not be construed as relieving seller of any obligation or responsibilities with respect to these documents of the items to be furnished by seller pursuant thereto.

(Previously submitted by ProSep, combined with Procedures for other NDE technique, as "0801-RCT-NDE" and recorded by WP under Vendor Doc No. "0801-RCT-NDE-DGIP-0001")

Customer: BPXA / WP

Project: WRDX GPP

PO / Job No.: 10741230-0019

Deliverable Item No.: 2.1, 6.1

SDDR Item No.: B02

VDC No.: 36

Rev. No.	Date	Prepared By	Checked By	Description
A	05/11/09	RC	BN	Issued for Approval

Note:



VND	DISC	PROJ #	P.O.	SEQ	SHT	REV	TAG
	VS	37305244-02	0019	00024	001	001	VSP-Z6011

#36

B02

2.1.6.1

The Serial Numbers and Calibration Information for the equipment used in these procedures will be provided with the projects "Final Data" submittal.

RC TECHNICAL WELDING & FABRICATION, INC.
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PROCEDURE FOR LIQUID PENETRANT EXAMINATION

Procedure No. PT-1, REV. 1, May 25, 2007

1. SCOPE

This procedure covers the general practices and requirements for liquid penetration, as required by ASME Boiler and Pressure Vessel Code, Section I, V, & VIII, Current Edition and Addenda.

The Liquid Penetrant Examination is an effective means for detecting discontinuities which are open to the surface of nonporous metals and other materials. Typical discontinuities detectable by LP are cracks, seams, laps, cold shuts, laminations, and porosity.

A Liquid Penetrant is applied to the surface to be examined and allowed to enter discontinuities. All excess penetrant is then removed, the part is dried and a developer is applied. The developer functions as a blotter to absorb penetrant that has been trapped in discontinuities as a contrasting background to enhance visibility of penetrant indications. The dyes in penetrants are either color contrast (visible under white light) or fluorescent (visible under ultraviolet light).

2. PERSONNEL

A. Personnel performing these examinations shall be qualified and certified in accordance with H & G's Written Practice, which meets SNT-TC-1A.

Only Level II or Level III personnel shall perform and interpret tests.

3. PROCEDURE REVISION

A revised procedure will be made:

- A. when a change is made and the type of penetrant materials or in the processing technique;
- B. when a change is made in the type of pre-cleaning materials or processes;
- C. for any change in part processing that can close surface openings of discontinuities or leave interfering deposits.

4. PENETRANT MATERIALS

Liquid penetrant examination performed in accordance with this procedure shall include all penetrants, solvents or cleaning agents, developers, etc., used in the examination process Per T-621.1 (b) of Section V, Art. 6.

	<u>Manufacturer</u>	<u>Brand Name</u>
Cleaner or Solvent	Magnaflux	Spotcheck SKC-S
Penetrant	Magnaflux	Spotcheck SKL-SP Spotcheck SKL-WP
Developer	Magnaflux	Spotcheck SKD-S2

5. CONTROL OF CONTAMINANTS

Certifications shall be obtained of contaminant content for all liquid penetrant materials used on nickel base alloys, austenitic stainless steels, and titanium. These certifications shall include penetrant manufacturers' batch numbers and the test results obtained. Records shall be maintained as required by ASME Section V.

Maximum Allowable Level of Contaminants

A. Nickel Base Alloys - all materials shall be analyzed individually for sulphur content as follows:

- (1) Individual sample of penetrant materials with exception of cleaners shall be prepared for analysis by heating 50 grams of material in a 150mm nominal diameter glass Petri dish at a temperature of 194°F to 212°F for 60 minutes
- (2) Analysis of Residue - If residue is less than 0.0025 g, material is acceptable without further analysis. If residue is 0.0025 g or more, the procedure shown in 1. Above shall be repeated, and the residue analyzed in accordance with ASTM SD 129 or ASTM SD 1552.
- (3) Individual Sample of Cleaner / Remover shall be prepared for analysis by heating 100 grams of the material in a 150mm nominal diameter glass Petri dish at a temperature of 194°F to 212°F for 60 minutes.
- (4) Analysis of Residue – If residue is less than 0.005 g, material is acceptable without further analysis. If residue is 0.005 g or more, the procedure shown in 5.A. (3) above shall be repeated and the residue analyzed in accordance with ASTM SD 129 or ASTM SD 1552. Alternately, material may be decomposed in accordance with SD-129 and analyzed in accordance with ASTM SD 516 Method B. Sulphur content shall not exceed 1% of the residue by weight.

B. Austenitic Stainless Steel or Titanium

All materials shall be analyzed individually for chlorine and fluorine content as follows:

- (1) An individual sample of penetrant materials, with the exception of cleaners shall be prepared for analysis by heating 50 g of material in a 150mm nominal diameter glass Petri dish at a temperature of 194°F to 212°F for 60 minutes.

- (2) If residue is 0.0025 g or more, the procedure shown in 5.B. (1) above shall be repeated. Residue may be analyzed in accordance with ASTM SD 808 and total shall not exceed 1% by weight. Alternately, residue shall be analyzed in accordance with SE-165 Annex 2 for chlorine and SE165 Annex 3 for fluorine, and total chlorine plus fluorine content shall not exceed 1% by weight.
- (3) An individual sample of cleaner/remover shall be prepared for analysis by heating 100 g of material in a 150mm nominal diameter glass Petri dish at a temperature of 194°F to 212°F for 60 minutes.
- (4) If residue is 0.005 g or more, procedure shown in 5.B (3) above shall be repeated. Residue may be analyzed in accordance with ASTM SD 808, and total shall not exceed 1% by weight. Alternately, residue shall be analyzed in accordance SE-165 Annex 2 for chlorine and SE-165 Annex 3 for fluorine, and total chlorine plus fluorine content shall not exceed 1% by weight.

6. SURFACE PREPARATION (Pre-Cleaning)

- A. In general, satisfactory results may be obtained when the surface of the part is in the as-welded, as-rolled, as-cast, or as-forged conditions. Surface preparation by grinding, machining or other methods may be necessary where surface irregularities could mask indications of unacceptable discontinuities.
- B. The surface to be examined and all adjacent areas within at least 1 in. shall be dry and free from all dirt, grease, lime, scale, welding flux, weld spatter, oil, and other extraneous matter that could obscure openings or otherwise interfere with the examination.
- C. Cleaner/Remover shall be used to clean the surfaces to be examined prior to application of the penetrant.

7. DRYING AFTER PREPARATION

After cleaning, drying of surfaces to be examined shall be accomplished by normal evaporation or with forced hot or cold air. Drying time shall be 3 to 7 minutes.

8. TECHNIQUES

A color contrast penetrant shall be used with the solvent removable process.

A. TECHNIQUES FOR STANDARD TEMPERATURES

For standard techniques, the temperature of penetrant and surface of the part to be processed shall not be below 50°F to 100°F temperature range during the examination. Local heating or cooling may be done provided part temperature remains in the 50°F to 100°F range during the examination. If it is not practical to stay within these temperature limitations, other temperatures may be used provided the procedures are qualified as in 7.B Techniques for Nonstandard Temperatures.

B. TECHNIQUES FOR NONSTANDARD TEMPERATURES

- (1) When not practical to conduct an examination within the 50°F to 100°F range, the examination procedure at the lower or higher temperature range shall be qualified. This shall require the use of a quench cracked aluminum block (liquid penetrant comparator block) shall be used.
- (2) Liquid Penetrant Comparator Blocks shall be made of aluminum ASTM B209, Type 2024 3/8" thick with face dimensions of approximately 2 inches by 3 inches. At the center of each face, an area of approximately 1 inch in diameter shall be marked with a 950°F temperature/indicating crayon or paint. Marked area shall be heated with a blowtorch, Bunsen burner or similar device to a temperature between 950°F and 975°F. Specimen will be immediately quenched in cold water to produce a network of fine cracks on each face.

Block shall then be dried by heating to approximately 300°F. After cooling, the block shall be cut in half (one-half of specimen marked Block A and the other Block B). As an alternate, separate blocks 2" x 3" can be made using the heating and quenching technique as described. Two comparator blocks with matched crack patterns may be used. Blocks shall be marked "A" and "B".

(3) Comparator Applications

- (a) If qualifying of dye penetrant examination procedure at a temperature of less than 50°F, the procedure shall be applied to block "B" after block and all materials have been cooled and held at the proposed exam temperature until the comparison is completed. A standard procedure, which has previously been, demonstrated as suitable for use shall be applied to block "A" in the 50°F to 100°F temperature range. The indications of cracks shall be compared between blocks "A" and "B". If the indications obtained under the proposed conditions on block "B" are essentially the same as obtained on block "A" during examination at 50°F to 100°F, the proposed procedure shall be considered qualified for use.
- (b) If the proposed temperature for the examination is above 100°F, block "B" shall be held at this temperature throughout the examination. The indications of cracks shall be compared while block "B" is at the proposed temperature and block "A" is at the 50°F to 100°F temperature range.
- (c) A procedure qualified at a temperature lower than 50°F shall be qualified from that temperature to 50°F.
- (d) To qualify a procedure for temperatures above 100°F, the upper and lower temperature limits shall be established and the procedure qualified at these temperatures.

- (e) When using color contrast penetrants, it is permissible to use a single comparator block for the standard and nonstandard temperatures and to make the comparison by photography.

If the single comparator block/photographic technique is used, processing details as applicable (7.B.3a and 3b above) apply. Block shall be cleaned between the two processing steps. Photos shall be taken after processing at the nonstandard temperature and at the standard temperature. Indication of cracks shall be compared between the two photographs. The same criteria for qualification as in 7.B.1 above shall apply. The identical photographic techniques shall be used to make the comparison photographs.

9. TECHNIQUE RESTRICTIONS

Fluorescent examination shall not follow a color contrast penetrant examination. Intermixing of penetrant materials from different manufacturers will not be done.

10. EXAMINATION

- A. Penetrant Application - The temperature of the surface to be examined and the penetrant materials shall be 50°F to 100°F. After the part has been cleaned, dried, and cooled, penetrant shall be applied to the surface to be inspected so that the entire part or area under inspection is completely covered with penetrant. Penetrant shall be applied by any suitable means, i.e., dipping, brushing, or spraying. If compressed air type spray apparatus is used, filters shall be placed on the up-stream side to prevent contamination of the penetrant in the lines.
- B. Dwell time for penetrant shall be as indicated by Section V, Table T-672.

Material	Form	Type of Discontinuity	Dwell Times (Note 1) (Minutes)	
			Penetrant	Developer
Aluminum, magnesium, steel, brass, bronze, titanium, high-tem. alloys	Castings & Welds	Cold shuts, porosity, lack of fusion, cracks	5	10
	Wrought materials, extrusions, forgings, plate	Laps, cracks	10	10
Carbide-tipped tools	All Forms	LOF, porosity, cracks	5	10
Plastic, Glass	All Forms	Cracks	5	10
Ceramic	All Forms	Cracks, porosity	5	10

- C. Excess Penetrant Removal - After the specified penetration time has elapsed, any penetrant remaining on the surface shall be removed, taking care to minimize removal of penetrant from discontinuities.
- Solvent Removable Penetrants - Excess solvent removable penetrants shall be removed by wiping with a cloth or absorbent paper, repeating the operation until most traces of penetrant have been removed. The remaining traces shall be removed by lightly wiping the surface with cloth or absorbent paper moistened with solvent. To minimize removal of penetrant from discontinuities, care shall be taken to avoid the use of excess solvent. Flushing the surface with remover is prohibited.
- D. Drying After Excess Penetrant Removal
Solvent Removable Technique - Surfaces shall be dried by evaporation, blotting, wiping, or forced air. Drying time shall be 3 to 7 minutes.
- E. Developing - Developer shall be applied as soon as possible after penetrant removal.
- (1) Wet Developer Applications - Prior to applying suspension, developer shall be thoroughly agitated.
- Non-Aqueous Developer Application - shall be applied by spraying. If part is inaccessible, developer will be brushed on. Drying shall be by normal evaporation.
- (2) Developing time for final interpretation shall begin immediately or as soon as a wet developer coating is dry.
- F. Interpretation
Final interpretation shall be made within 10 to 60 minutes after a wet developer coating is dry. If bleed-out does not alter exam results, longer periods are permitted. If surface to be examined is large enough to preclude complete examination within established time, the examination shall be performed in increments.
- (1) Characterizing Indications - If penetrant diffuses excessively into developer, formation of indications during developer application shall be closely observed.
- (2) Color Contrast Penetrants - Surface discontinuities are indicated by bleed-out of the penetrant, which is normally deep red in color. A minimum light intensity of 100 fc (1000 Lx) is required to ensure adequate sensitivity during the exam and evaluation of indications.
- (3) Fluorescent Penetrants - Essentially the same as (2) above with the exception that the exam is performed using a black light as follows:
- Performed in a darkened area
 - Examiner shall be in darkened area 1 to 5 minutes prior to performing the exam.
If he wears glasses, they shall not be photo sensitive.
 - Black light shall warm up a minimum of 5 minutes prior to use or measurement of intensity of ultraviolet light emitted.
 - Black light intensity shall be measured at least every 8 hours and whenever work station is changed.
 - Black light intensity shall be measured with a black light meter. Minimum of 1000uW/cm² on the surface of the part being examined is required.
 - The light source, technique used, and light level verification is required to be demonstrated one time, documented, and maintained on file.

G. Removal of Developer after Inspection (Post Examination Cleaning)

It shall be removed promptly after inspection with a water stream or spray nozzle, cleaner or by wiping or blotting with a clean cloth.

11. EVALUATION

- A. All indications shall be evaluated in terms of the acceptance standards of the referencing Code Section.
- B. Discontinuities at the surface will be indicated by bleed-out of penetrant.
- C. Broad areas of fluorescence or pigmentation that could mask indications of discontinuities shall be cleaned and re-examined.

12. REPORTING

The Report of Examination shall include as a minimum the following:

- A. Date of Inspection
- B. Procedure and its revised number
- C. Materials used to perform the inspection
- D. Sales order number
- E. Identification markings on parts
- F. Results of examination
- G. Name, signature and ASNT level of technician who performed the inspection.

13. ACCEPTANCE STANDARDS - Per Customer Specifications

For ASME Section VIII, Div. 1 applications, this procedure shall be certified to be in accordance with the requirements of T-150 of Section V per Section VIII Div. 1, App. 8, 8-1(c).

Written by:

Harry W. Gibson, NDE Level III

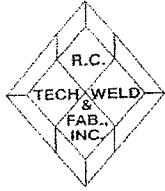
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ENGINEERING & QUALITY CONTROL LIQUID PENETRANT TEST REPORT

SHOP ORDER : _____ DATE : _____

CUSTOMER : _____

PURCHASE ORDER : _____

SPECIFICATION : ASME SECTION VIII DIV. 1 APP. 8 SURFACE TEMP. : 85 - 95 DEG °F

PROCEDURE NO. : PT-3 TECHNIQUE : VISIBLE

MATERIALS : PENETRANT : MAGNAFLUX SKL-WP BATCH : _____

DEVELOPER : MAGNAFLUX SKD-S2 BATCH : _____

REMOVER : WATER DWELL TIME : 15 MINUTES

QTY	DESCRIPTION OF WELD	REMARKS
		NONE

WITNESSED BY _____

APPROVED BY _____
RUBEN LOZANO (LEVEL II)

ASSISTANT _____
RAUL S. CARDONA III