Base Load Power Hub (BLPH)

Nondestruction Examination Procedure

Document Number: 1723001595-QC-PRO-00025

ROSETTI MARINO	
1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED
NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.	
Sign	Date
Comandini Massimo Level III NDT EN - ISO9712 WI CSWIP 3.1	27-05-2024

Document Class: 3

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02	14/05/2024	Issue for Information (IFI)	Y.D.LEE	Y.W.LEE	S.J.CHO
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HYOSUNG HEAVY INDUSTRIES

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SH.	DESCRIPTION	REVISIONS							
		00							
1	Cover	X							
2	Table of Contents	X							
3	Revision / Change Log	X							
4~8	Nondestruction Examination Procedure	X							

Revision / Change Log

Rev.	Description
00	ISSUE FOR INFORMATION (IFI)
01	ISSUE FOR INFORMATION (IFI)
02	ISSUE FOR INFORMATION (IFI)

HOLDS LIST

No.	Description
1.	
2.	
3.	
4.	

NONDESTRUCTION EXAMINATION PROCEDURE

for 72.5 kV 31.5 kA Gas Insulated Switchgear

DOCUMENT NO.	:	1723001595-QC-PRO-00025
CUSTOMER	:	CrossWind.
PROJECT	:	BASE LOAD POWER HUB (BLPH) 66kV SWITCH GEAR (GIS)
DATE OF ISSUE	:	14 May, 2024
REVISION NO.	:	Rev. 2

1. PERSONNEL QUALIFICATION

The examiner who carries out dye penetrant test and evaluates indication on all the other welds shall be qualified as a Level 2 or 3 in the applicable method and on the relevant product sector in accordance with the requirements of ISO9712.
The operator shall have a valid near vision acuity test, which permits reading, a minimum of Times Roman N°4.5 or equivalent letters Jaeger 1 at not less than 30 cm with one or both eyes, either corrected or uncorrected.
Colour vision shall be sufficient that the candidate can distinguish contrast between the colours used in NDT method.

2. NDT EXTENSION

The extend shall be in accordance to Spec. ASME Sec.V and will reported on design drawings and inspection test plan.

3. SURFACE PREPARATION

The examination surface and adjacent areas within at least 1 inch (25mm), prior to penetrant application, shall be dry and free of rust, paint, grease, oil, water, welding flux, weld spatters or any other impediments that may prevent the penetrant from entering the discontinuity
Weld should be brushed or ground to remove surface irregularities prior to inspection.
After cleaning the surfaces with cleaner, drying of the surfaces to be examined shall be accomplished by normal evaporation, for at least 5 minutes prior to application of the penetrant.
For welds requiring cap to be ground flush for inspection purposes final PT examination shall be performed after cap removal.
Status of weld shall be reported in PT inspection report.

4. CONSUMABLES

For execution of Penetrant Test the following materials shall be used:

- ➢ Cleaner CGM Velnet / Elite BC1 or MAGNAFLUX SKC-S cleaner
- ➢ Penetrant CGM Red W / Elite K71B2p or MAGNAFLUX SKL-SP2 penetrant
- ➢ Remover Water
- ➢ Developer CGM White W rotrivel U / Elite D112A or MAGNAFLUX SKD-S2 developer

※ Note: Above materials can be applied as similar product with the same function.
Equivalent products may be used but is not allowed mixed products from different manufacturer.
All products used for the inspection (cleaner, penetrant, developer) shall be with impurity levels of sulphur and halogens in the products shall not exceed 1%.

Products will be detailed on the Technique Sheet.

5. PENETRANT EXAMINATION

The temperature of the surface to be processed shall be from 10°C to 50°C.
Local heating and cooling is permitted provided that parts temperature remains in the required range.
Penetrant shall be applied by spraying.
Penetration dwell time shall be 10 minutes, during that time penetrant shall not be allowed to dry.
If for any reason the penetrant does dry, the examination procedure shall be repeated, beginning with a cleaning of the examination surface.
For temperatures from 5°C up to 10°C, minimum penetrant dwell time shall be 2 times the value listed.

6. EXCESS PENETRAL REMOVAL

After the specified penetration time has elapsed, any excess penetrant remaining on the surface shall be removed with low pressure water.
Excess penetrant shall be removed by washing (rinsing), immersion or wiping using water.
Care shall be taken to minimize the effect of mechanical action caused by the rinsing method.
The remaining traces shall be removed by wiping the surface with a cloth or absorbent paper, lightly moistened with water.
To minimize removal of penetrant from discontinuities, care shall be taken to avoid the use of excess water.
After excess penetrant removal the surface shall be dried.
At all times the surface temperature shall be not raised above 50°C.
Flushing the surface with solvent, following the application of the penetrant and prior to developing, is prohibited.

7. DEVELOPER APPLICATION

The developer shall be applied after penetrant removal by means of spraying, the time interval shall not exceed that established in the procedure.
The developer shall be thoroughly agitated to ensure adequate dispersion of suspended particles.
The developer shall be applied so that a thin coating is obtained over the entire area of interest. During the developer application the nozzle shall be kept at a distance not less than 12" (300 mm).

8. EVALUATION

Any indication on the detector indicates the possibility of discontinuity (false or true).
Anyhow the true size and type of discontinuities are difficult to evaluate.
It is a good practice that the surface shall be closely observed during the application of the developer.
The drying after removal excess penetrant shall be maximum 5 minutes.

Final interpretation shall be made after allowing the penetrant to bleed-out for at least shall be minimum 15-20 minutes.

9. VIEWING CONDITION

All the testing area shall be easily accessible in safety condition; if necessary, the part shall be moved, to avoid that limited access could interfere with the test results.
The area under test shall be evenly illuminated at a level of not less than 500 lx (lux) daylight or artificial light.
Light meters shall be calibrated at least once a year or whenever a meter has been repaired.
If meters have not been in use for one year or more, calibration shall be done before being used.

10. ACCEPTANCE CRITERIA

The acceptance criteria shall be the same acceptance criteria of magnetic examination in accordance with ASME Sec.V.
All surfaces to be examined shall be free of the following:
• Relevant linear indications
• Relevant rounded indications greater than 4mm
• 4 or more relevant rounded indications in a line, separated by 1,5mm or less (Edge to Edge)

10.1 Relevant indications

A “relevant” indication is that caused by defect rather than by weld geometry.

10.2 Linear Indication

A “linear” indication is one having a length greater than three times the width. Intermittent and aligned indications shall be treated as a linear indication.

10.3 Rounded Indication

A “rounded” indication is one having circular or elliptical shape with the length equal or less than three times the width.

11. WELD REPAIR

All defects after repair with a new dye penetrant examination, shall be carried out all over the interested area including 50 mm on either side of defects.
The examination after repair shall be performed not earlier than 48 hours after completion weld.
Welding repairs (or replaced welds) shall be examined with the methods prescribed for the original WPS.

12. CLEANING AFTER EXAMINATION

After examination, external surfaces shall be cleaned by solvent or water and will be dried with cloths.

13. EXAMINATION REPORT

All NDT shall be documented, and all reports shall be generate by database (See attachment 3)
The documentation shall include as minimum the following information, where appropriate:

- contract number;
- applicable procedure specification;
- weld identification;
- material type and dimensions;
- description and location (with sketch where appropriate) of all reportable indications;
- welding process used;
- surface conditions;
- post weld heat treatment (if required)
- temperature of the object;
- consumables
- viewing conditions
- date of testing;
- name and qualification level of inspector;
- approval signature of responsible inspector.

14. ATTACHMENT

Attachment 1 – Examination Report

REPORT OF LIQUID PENETRANT EXAMINATION

액 체 침 투 탐 상 검 사 보 고 서

	회사명 : 江苏金鑫电器有限公司 영문명 : JIANGSU JINXIN ELECTRIC APPLIANCE CO. , LTD. 회사주소 : Jiangsu yangzhou city jiangdu sainty east road no. 88 회사 전화번호: 0514-86888888	Report No. 보고서 번호 JX1708- Page No. 페이지 번호 1 of 1

Customer(발주처)	PJT Name / MFG Order NO.
Hyosung	
Item No./Name(제품번호/명)	Dwg No(도면번호)

Penetrant (침 투 제)		Remover (세 척 제)		Developer (현 상 제)	
Brand/Maker (제조사)		Brand/Maker (제조사)		Brand/Maker (제조사)	
Type (종류)		Type (종류)		Type (종류)	
Batch No. (제조번호)		Batch No. (제조번호)		Batch No. (제조번호)	
Pene.time (침투시간)		Remove (제거)	■Handwipe □Wash	Bleed out Time (현상시간)	
Apply (적용)	■Brush □Immerse □Spray □	Apply (적용)	□Brush □Immerse ■Spray □	Apply (적용)	□Brush □Immerse ■Spray □

Examination Time(검사시기) N/A	Thermometer(온도계) N/A	Surface Condition (표면상태) □As Ground ■As Welded □As Casting □As Machined
Method/Process of PT(검사방법/공정) VC-S ■Visible(염색) □Fluorescent(형광)		Block (시험편) N/A / Material/Thickness(재질/두께) (see below)
Light Equipment(조명) : ■ Natural Light(자연광) □Other(White bulb)		Surface Preparation(표면전처리) : ■Solvent remover □Wire brush □Detergent □Vapor degreasing □ Mechanical(grinding,blasting,and etc.)

LUX METER(광도계) N/A		Illumination(조도) Actual : 1020 Lux	Post Cleaning(후처리) ■Yes □No	Test Temp.(표면온도) 15 ℃	
Black Light (자외선등)	□With (사용) ■Without (사용 무)	Maker (제조사)	S/No. (번호)	Intensity (강도)	Due Date (교정유효일)

PO No.	Serial No.	Size	Quantity (EA)	Interpretation
				□ACCEPT □REJECT

* Examination Area : Weld surface and line

				Date of Examination 검사일자 07月22日	QA Manual
Examined by 시 험 자				Owner/Customer 주문주/고객 감독관 □ Witnessed by □ Reviewed by	

REPORT OF LIQUID PENETRANT EXAMINATION
액 체 침 투 탐 상 검 사 보 고 서

	회사명 : 江苏金鑫电器有限公司 영문명 : JIANGSU JINXIN ELECTRIC APPLIANCE CO. , LTD. 회사주소 : Jiangsu yangzhou city jiangdu sainty east road no. 88 회사 전화번호: 0514-86888888	Report No. 보고서 번호 JX1508-2 Page No. 페이지 번호 1 of 2

PO No.	Serial No.	Size	Quantity (EA)	Interpretation

ATTACHMENT

순번 NO.	도면번호 DRAWING NO.	수 량 QUANTITY	PT 시험 전경 사진 PHOTO (VIEW OF PT TEST)
1		1	
2			
3			