



Our Ref.: NT/103471/18-09

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 Report No: NDT/RT/180359-01/18

RADIOGRAPHIC EXAMINATION REPORT

Client and Testing Particulars

Client :	Tenaga Tiub Sdn Bhd	Procedure No:	NT/RT/ASME Rev 7.0
Project :	20 - 108 Ester Flash Preheater	IQI type :	ASTM 1B
Job No:	TT 18031	Film Manufacturer/Type :	FUJI 100(classII)
Material:	SA 516 GR 70	Density :	2.2-3.8
Welding Process :	GTAW / SMAW	Sensitivity:	0.33mm(5 wires visible)
Examination Code :	ASME V	Source to Object Distance :	508mm
Acceptance Code:	ASME Sect. VIII DIV.1 : 2017 Ed.+Tema 9TH Ed.	Source Side of Object to Film Distance:	(9.5+3)mm
Examination Date:	09 April 2018	No of Radiograph(exposure) :	Single Exposure
		No. of Film Each Cassette :	1 Film
		Radiographic Technique :	SWSI
		Film Viewing Technique :	Single Wall Viewing
		Source Type/Size :	Iridium192 (3.2mm)
		Location Markers :	Film Side

Radiographic Examination Result

Weld Reference (Welder No)	WT (mm)	RT (mm)	Pipe Diameter (mm)	Material Thickness (mm)	Film Position	Film Interpretation	Result	Remarks
E-105 TT-851 (U)								
LS-1 (WN346)	12.5	3	508	9.5	0 - 1 1 - 2	Por NRI	Accept Accept	

End of Report

Legend:

TI: Tungsten Inclusion	NRI: No Relevant Indication	Uc: Undercut	Por: Porosity	WT: Weld Thickness
SI: Slag Inclusion	LP: Lack of Penetration	Con: Concavity	BT: Burn Through	RT: Reinforcement Thickness
LF: Lack of Fusion	EP: Excess Penetration	AR: Artifact	Sur: Surface	

Personnel Particulars

Radiographer : Emirsham - NDT Lev. II
 Interpreted & Evaluated By: Amat Hamidi - NDT Lev.II
 Date: 10 April 2018

Client Representative:



Name:
Date:



NUSANTARA TECHNOLOGIES SDN. BHD. (187753-D)

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Report No: NDT/RT/180359-02/18

RADIOGRAPHIC EXAMINATION REPORT

Client and Testing Particulars

Client :	Tenaga Tiub Sdn Bhd	Procedure No:	NT/RT/ASME Rev 7.0
Project :	20 - 108 Ester Flash Preheater	IQI type :	ASTM 1B
Job No:	TT 18031	Film Manufacturer/Type :	FUJI 100(classII)
Material:	SA 516 GR 70 / SA 105	Density :	2.2-3.8
Welding Process :	GTAW / SMAW	Sensitivity:	0.33mm(5 wires visible)
Examination Code :	ASME V	Source to Object Distance :	508mm
Acceptance Code:	ASME Sect. VIII DIV.1 : 2017 Ed.+Tema 9TH Ed.	Source Side of Object to Film Distance:	(71/9.5+3)mm
Examination Date:	09 April 2018	No of Radiograph(exposure) :	Single Exposure
		No. of Film Each Cassette :	1 Film
		Radiographic Technique :	SWSI
		Film Viewing Technique :	Single Wall Viewing
		Source Type/Size :	Iridium192 (3.2mm)
		Location Markers :	Film Side

Radiographic Examination Result

Weld Reference (Welder No)	WT (mm)	RT (mm)	Pipe Diameter (mm)	Material Thickness (mm)	Film Position	Film Interpretation	Result	Remarks
E-105 TT-851 (U)								
CS-1 (WN346)	74 / 12.5	3	508	71 / 9.5	0 - 1	NRI	Accept	
					1 - 2	Por / Uc	Accept	
					2 - 3	Uc	Accept	AR
					3 - 4	Uc	Accept	
					4 - 5	NRI	Accept	
					5 - 0	NRI	Accept	AR

End of Report

Legend:

TI: Tungsten Inclusion	NRI: No Relevant Indication	Uc: Undercut	Por: Porosity	WT: Weld Thickness
SI: Slag Inclusion	LP: Lack of Penetration	Con: Concavity	BT: Burn Through	RT: Reinforcement Thickness
LF: Lack of Fusion	EP: Excess Penetration	AR: Artifact	Sur: Surface	

Personnel Particulars

Radiographer : Emirsham - NDT Lev. II

Interpreted & Evaluated By: Amat Hamidi - NDT Lev.II

Date: 10 April 2018



Client Representative:

Name:

Date:



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Report No: NDT/RT/180359-03/18

RADIOGRAPHIC EXAMINATION REPORT

Client and Testing Particulars

Client :	Tenaga Tiub Sdn Bhd	Procedure No:	NT/RT/ASME Rev 6.0
Project :	Surface Condenser	IQI type :	ASTM 1B
Job No:	TT 17146	Film Manufacturer/Type :	FUJI 100(classII)
Material:	SA 516 GR 70	Density :	2.2-3.8
Welding Process :	GTAW / SMAW	Sensitivity:	0.33mm(5 wires visible)
Examination Code :	ASME V	Source to Object Distance :	400mm
Acceptance Code:	ASME Sect. VIII DIV.1 : 2015 Ed.+Tema 9TH Ed.	Source Side of Object to Film Distance:	(15.9+3)mm
Examination Date:	09 April 2018	No of Radiograph(exposure) :	Single Exposure
		No. of Film Each Cassette :	1 Film
		Radiographic Technique :	SWSI
		Film Viewing Technique :	Single Wall Viewing
		Source Type/Size :	Iridium192 (3.2mm)
		Location Markers :	Film Side

Radiographic Examination Result

Weld Reference (Welder No)	WT (mm)	RT (mm)	Pipe Diameter (mm)	Material Thickness (mm)	Film Position	Film Interpretation	Result	Remarks
E-54-01A								
LS 2 R1 (WN200)	18.9	3	—	15.9	0 - 1	Con	Accept	

End of Report

Legend:

TI: Tungsten Inclusion	NRI: No Relevant Indication	Uc: Undercut	Por: Porosity	WT: Weld Thickness
SI: Slag Inclusion	LP: Lack of Penetration	Con: Concavity	BT: Burn Through	RT: Reinforcement Thickness
LF: Lack of Fusion	EP: Excess Penetration	AR: Artifact	Sur: Surface	

Personnel Particulars

Radiographer : Emirsham - NDT Lev. II

Interpreted & Evaluated By: Amat Hamidi - NDT Lev.II

Date: 10 April 2018

Client Representative:

Name:
Date:





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Report No: NDT/RT/180359-04/18

RADIOGRAPHIC EXAMINATION REPORT

Client and Testing Particulars

Client :	Tenaga Tiub Sdn Bhd	Procedure No:	NT/RT/ASME Rev 6.0
Project :	Surface Condenser	IQI type :	ASTM 1B
Job No:	TT 17146	Film Manufacturer/Type :	FUJI 100(classII)
Material:	SA 516 GR 70	Density :	2.2-3.8
Welding Process :	GTAW / SMAW	Sensitivity:	0.33mm(5 wires visible)
Examination Code :	ASME V	Source to Object Distance :	400mm
Acceptance Code:	ASME Sect. VIII DIV.1 : 2015 Ed.+Tema 9TH Ed.	Source Side of Object to Film Distance:	(15.9+3)mm
Examination Date:	09 April 2018	No of Radiograph(exposure) :	Single Exposure
		No. of Film Each Cassette :	1 Film
		Radiographic Technique :	SWSI
		Film Viewing Technique :	Single Wall Viewing
		Source Type/Size :	Iridium192 (3.2mm)
		Location Markers :	Film Side

Radiographic Examination Result

Weld Reference (Welder No)	WT (mm)	RT (mm)	Pipe Diameter (mm)	Material Thickness (mm)	Film Position	Film Interpretation	Result	Remarks
E-54-01A								
CS-2a (WN356)	18.9	3	-	15.9	0 - 1	NRI	Accept	
					1 - 2	NRI	Accept	
					2 - 3	NRI	Accept	AR
					3 - 4	NRI	Accept	
					4 - 5	Por	Accept	
					5 - 6	NRI	Accept	
					6 - 7	NRI	Accept	
					7 - 8	Por	Accept	

End of Report

Legend:

TI : Tungsten Inklusion	NRI : No Relevant Indication	Uc : Undercut	Por : Porosity	WT : Weld Thickness
SI : Slag Inklusion	LP : Lack of Penetration	Con : Concavity	BT : Burn Through	RT : Reinforcement Thickness
LF : Lack of Fusion	EP : Excess Penetration	AR : Artifact	Sur : Surface	

Personnel Particulars

Radiographer : Emirsham - NDT Lev. II

Interpreted & Evaluated By: Amat Hamidi - NDT Lev.II

Date: 10 April 2018



Client Representative:

Name:
Date:



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Report No: NDT/RT/180359-05/18

RADIOGRAPHIC EXAMINATION REPORT

Client and Testing Particulars

Client :	Tenaga Tiub Sdn Bhd	Procedure No:	NT/RT/ASME Rev 6.0
Project :	Surface Condenser	IQI type :	ASTM 1B
Job No:	TT 17146	Film Manufacturer/Type :	FUJI 100(classII)
Material:	SA 516 GR 70	Density :	2.2-3.6
Welding Process :	GTAW / SMAW	Sensitivity:	0.33mm(5 wires visible)
Examination Code :	ASME V	Source to Object Distance :	400mm
Acceptance Code:	ASME Sect. VIII DIV.1 : 2015 Ed.+Tema 9TH Ed.	Source Side of Object to Film Distance:	(15.9+3)mm
Examination Date:	09 April 2018	No of Radiograph(exposure) :	Single Exposure
		No. of Film Each Cassette :	1 Film
		Radiographic Technique :	SWSI
		Film Viewing Technique :	Single Wall Viewing
		Source Type/Size :	Iridium192 (3.2mm)
		Location Markers :	Film Side

Radiographic Examination Result

Weld Reference (Welder No)	WT (mm)	RT (mm)	Pipe Diameter (mm)	Material Thickness (mm)	Film Position	Film Interpretation	Result	Remarks
E-54-01A								
CS-3a (WN356)	18.9	3	-	15.9	0 - 1	Por	Accept	
					1 - 2	NRI	Accept	
					2 - 3	SI	Accept	
					3 - 4	NRI	Accept	AR
					4 - 5	SI	Accept	
					5 - 6	NRI	Accept	
					6 - 7	Por	Accept	
					7 - 8	SI	Reject	

End of Report

Legend:

TI: Tungsten Inclusion	NRI: No Relevant Indication	UC: Undercut	Por: Porosity	WT: Weld Thickness
SI: Slag Inclusion	LP: Lack of Penetration	Con: Concavity	BT: Burn Through	RT: Reinforcement Thickness
LF: Lack of Fusion	EP: Excess Penetration	AR: Artifact	Sur: Surface	

Personnel Particulars

Radiographer : Emirsham - NDT Lev. II

Client Representative:

Interpreted & Evaluated By: Amat Hamidi - NDT Lev. II

Date: 10 April 2018

Name:

Date:





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RADIOGRAPHIC EXAMINATION REPORT

Client and Testing Particulars

Client :	Tenaga Tiub Sdn Bhd	Procedure No:	NT/RT/ASME Rev 6.0
Project :	Surface Condenser	IQI type :	ASTM 1B
Job No:	TT 17146	Film Manufacturer/Type :	FUJI 100(classII)
Material:	SA 516 GR 70	Density :	2.2-3.8
Welding Process :	GTAW / SMAW	Sensitivity:	0.33mm(5 wires visible)
Examination Code :	ASME V	Source to Object Distance :	400mm
Acceptance Code:	ASME Sect. VIII DIV.1 : 2015 Ed.+Tema 9TH Ed.	Source Side of Object to Film Distance:	(15.9+3)mm
Examination Date:	09 April 2018	No of Radiograph(exposure) :	Single Exposure
		No. of Film Each Cassette :	1 Film
		Radiographic Technique :	SWSI
		Film Viewing Technique :	Single Wall Viewing
		Source Type/Size :	Iridium192 (3.2mm)
		Location Markers :	Film Side

Radiographic Examination Result

Weld Reference (Welder No)	WT (mm)	RT (mm)	Pipe Diameter (mm)	Material Thickness (mm)	Film Position	Film Interpretation	Result	Remarks
E-54-01A								
LS 1 R1 (WN200)	18.9	3	—	15.9	6 - 7 8 - 9	Por SI	Reject	Reject

End of Report

Legend:

TI: Tungsten Inclusion	NRI: No Relevant Indication	Uc: Undercut	Por: Porosity	WT: Weld Thickness
SI: Slag Inclusion	LP: Lack of Penetration	Con: Concavity	BT: Burn Through	RT: Reinforcement Thickness
LF: Lack of Fusion	EP: Excess Penetration	AR: Artifact	Sur: Surface	

Personnel Particulars

Radiographer : Emirsham - NDT Lev. II

Client Representative:

Interpreted & Evaluated By: Amat Hamidi - NDT Lev.II

Date: 10 April 2018

Name:

Date:





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RADIOGRAPHIC EXAMINATION REPORT

Client and Testing Particulars

Client :	Tenaga Tiub Sdn Bhd	Procedure No:	NT/RT/ASME Rev 6.0
Project :	Stripper 10 Barg Preheater	IQI type :	ASTM 1B
Job No:	TT 17198	Film Manufacturer/Type :	FUJI 100(classII)
Material:	SA 106 GR B / SA 516 GR 70	Density :	2.2-3.8
Welding Process :	GTAW / SMAW	Sensitivity:	0.33mm(5 wires visible)
Examination Code :	ASME V	Source to Object Distance :	323.9mm
Acceptance Code:	ASME Sect. VIII DIV.1 : 2015 Ed.+Tema 9TH Ed.	Source Side of Object to Film Distance:	(9.53+3)mm
Examination Date:	09 April 2018	No of Radiograph(exposure) :	Single Exposure
		No. of Film Each Cassette :	1 Film
		Radiographic Technique :	DWSI
		Film Viewing Technique :	Single Wall Viewing
		Source Type/Size :	Iridium192 (3.2mm)
		Location Markers :	Film Side

Radiographic Examination Result

Weld Reference (Welder No)	WT (mm)	RT (mm)	Pipe Diameter (mm)	Material Thickness (mm)	Film Position	Film Interpretation	Result	Remarks
E-702 TT-801 (U)								
CS-3 (WN346)	12.53	3	323.9	9.53	0 - 1	NRI	Accept	
					1 - 2	NRI	Accept	
					2 - 3	NRI	Accept	
					3 - 0	Por	Accept	

End of Report

Legend:

TI: Tungsten Inclusion	NRI: No Relevant Indication	Uc: Undercut	Por: Porosity	WT: Weld Thickness
SI: Slag Inclusion	LP: Lack of Penetration	Con: Concavity	BT: Burn Through	RT: Reinforcement Thickness
LF: Lack of Fusion	EP: Excess Penetration	AR: Artifact	Sur: Surface	

Personnel Particulars

Radiographer : Emirsham - NDT Lev. II

Client Representative:

Interpreted & Evaluated By: Amat Hamidi - NDT Lev. II

Date: 10 April 2018



Name:
Date:



Our Ref. : NT/103471/18-09

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Report No: NDT/RT/180359-08/18

RADIOGRAPHIC EXAMINATION REPORT

Client and Testing Particulars

Client :	Tenaga Tiub Sdn Bhd	Procedure No:	NT/RT/ASME Rev 6.0
Project :	2nd Stage Intercooler	IQI type :	ASTM 1B
Job No:	TT 17198	Film Manufacturer/Type :	FUJI 100(classII)
Material:	SA 106 GR B	Density :	2.2-3.8
Welding Process :	GTAW / SMAW	Sensitivity:	0.33mm(5 wires visible)
Examination Code :	ASME V	Source to Object Distance :	168.3mm
Acceptance Code:	ASME Sect. VIII DIV.1 : 2015 Ed.+Tema 9TH Ed.	Source Side of Object to Film Distance:	(7.11+3)mm
Examination Date:	09 April 2018	No of Radiograph(exposure) :	Single Exposure
		No. of Film Each Cassette :	1 Film
		Radiographic Technique :	DWSI
		Film Viewing Technique :	Single Wall Viewing
		Source Type/Size :	Iridium192 (3.2mm)
		Location Markers :	Film Side

Radiographic Examination Result

Weld Reference (Welder No)	WT (mm)	RT (mm)	Pipe Diameter (mm)	Material Thickness (mm)	Film Position	Film Interpretation	Result	Remarks
E-509 TT-802 (U)								
CS-3 (WN346)	10.11	3	168.3	7.11	0 - 1	NRI	Accept	
					1 - 2	NRI	Accept	
					2 - 0	NRI	Accept	

End of Report

Legend:

TI: Tungsten Inclusion	NRI: No Relevant Indication	Uc: Undercut	Por: Porosity	WT: Weld Thickness
SI: Slag Inclusion	LP: Lack of Penetration	Con: Concavity	BT: Burn Through	RT: Reinforcement Thickness
LF: Lack of Fusion	EP: Excess Penetration	AR: Artifact	Sur: Surface	

Personnel Particulars

Radiographer : Emirsham - NDT Lev. II

Client Representative:

Interpreted & Evaluated By: Amat Hamidi - NDT Lev.II

Date: 10 April 2018



Name:

Date:



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Report No: NDT/RT/180359-07/18

RADIOGRAPHIC EXAMINATION REPORT

Client and Testing Particulars

Client :	Tenaga Tiub Sdn Bhd	Procedure No:	NT/RT/ASME Rev 6.0
Project :	2nd Stage Intercooler	IQI type :	ASTM 1B
Job No:	TT 17198	Film Manufacturer/Type :	FUJI 100(classII)
Material:	SA 106 GR B	Density :	2.2-3.8
Welding Process :	GTAW / SMAW	Sensitivity:	0.33mm(5 wires visible)
Examination Code :	ASME V	Source to Object Distance :	168.3mm
Acceptance Code:	ASME Sect. VIII DIV.1 : 2015 Ed.+Tema 9TH Ed.	Source Side of Object to Film Distance:	(7.11+3)mm
Examination Date:	09 April 2018	No of Radiograph(exposure) :	Single Exposure
		No. of Film Each Cassette :	1 Film
		Radiographic Technique :	DWSI
		Film Viewing Technique :	Single Wall Viewing
		Source Type/Size :	Iridium192 (3.2mm)
		Location Markers :	Film Side

Radiographic Examination Result

Weld Reference (Welder No)	WT (mm)	RT (mm)	Pipe Diameter (mm)	Material Thickness (mm)	Film Position	Film Interpretation	Result	Remarks
E-509 TT-802 (U)								
CS-2 (WN346)	10.11	3	168.3	7.11	0 - 1	NRI	Accept	
					1 - 2	NRI	Accept	
					2 - 0	NRI	Accept	

End of Report

Legend:

Ti: Tungsten Inclusion	NRI: No Relevant Indication	Uc: Undercut	Por: Porosity	WT: Weld Thickness
SI: Slag Inclusion	LP: Lack of Penetration	Con: Concavity	BT: Burn Through	RT: Reinforcement Thickness
LF: Lack of Fusion	EP: Excess Penetration	AR: Artifact	Sur: Surface	

Personnel Particulars

Radiographer : Emirsham - NDT Lev. II

Interpreted & Evaluated By: Amat Hamidi - NDT Lev.II

Date: 10 April 2018



Client Representative:

Name:
Date: