TSA COATING INSPECTION REPORT

TECHNIQA SURFACE ENGINEERING FZE L.L.C

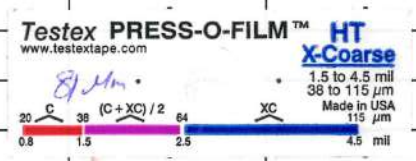
Report No: FBM-4804-010 (4804-01-A2)

Client/Contractor Name	FBM HUDSON FZE
Main Contarctor	PETRO CHINA WEST QURNA 1
End User	CHINA PETROLEUM ENGINEERING & CONST. CORPORATION (CEPCC)
Project Name	OIL TRAINS 2 AND 3

Item Description Reference Drawing No	CRUDE / PRODUCT HEAT EXCHANGER IQWQ-CE820-VDINS-D7-1600 Rev 1	Acceptance Standard Document no	IQWQ-CE820-VPPNT-00-1602 Rev 1 4804-00-PE-003
Client Item/Tag No Vendor Item/Tag no Coated Part Name	IQD7-HBG623502 A2 (S.no : 23/JAWS/007) 4804 - 01 A2 Channel course I to Shell Course II		

Ambient Condition (*)

Dry Air Temp °C (Max.)	35	-	-	-	-
Dew Point °C(Max.)	24.4	-	-	-	-
Humidity %(Max.)	47%	-	-	-	-
Steel Surface Temp.°C (Max.)	34.1	-	-	-	-
Date :	25.05.2024	-	-	-	-



Surface Preparation- SA 3 as per ISO 8501-1 / Required anchor profile : 60 - 83 µm				**Abrasive Material : GARNET 20/40 Batch : B#AR/B5021**	
Surface Position		Surface Profile Achieved: **81 µm**	Dust Level:< 2	Blast Clean	Remove Dust & Grit etc.
Inside	Outside	Weld imperfections	Remove Oil& Grease		
N.A	Yes	Repaired / Removed	Yes	YES	Yes

PAINT SYSTEM- D

Coat	**TSA COATING**	-	-	-	-
Material	**Thermal Arc Sprayed Metallic Coating - ALUMINIUM Kymera Int's Aluminium wire Grade : AWS -1100 grade Batch no : A2303116, C2303115**	-	-	-	-
Min.DFT Specified	200 - 350µm	-	-	-	-
Accum.Min DFT	200 - 350µm	-	-	-	-
Actual DFT	260 ~ 350 µm	-	-	-	-
Time of Application & Date	09.00 ~ 14.00	-	-	-	-
	25.05.2024	-	-	-	-
Inspection Time & Date	03.00 PM	-	-	-	-
	28.05.2024	-	-	-	-
Accepted Time & Date	03.30 PM	-	-	-	-
	28.05.2024	-	-	-	-

Remarks :

TSA Coating have coated only on the Insulation area of the Channel course I to Shell Course II. (Including the Nozzle, Lifting leg and name plate)
All the Remaining parts will be painted.
1) Refer Attached TSA aluminium wire and sealer coat paint batch certificate.
2)The air compressor Blotter Test is performed before dry abrasive blast cleaning.
3) After blast cleaning,prior to the TSA application, Surface is checked for surface profile, Dust level and Ambient condition.
After the TSA application prior to the Sealer coat, TSA Build up was carried out and the DFT inspection was conducted and Accepted.
4) Instrument Elcometer Used for checking DFT :-Sr. No. PE18886/YK15469 Calibration due date 02.02.2025
5) Instrument Elcometer Dew point Meter Used for checking Ambient Condition :-Sr. No. YH12329 Calibration due date 01.05.2025

Contractor	Tested By	Accepted By	Client/TPI	Customer/TPI	Remarks
Company	Techniqa	FBM-KNM-FZCO			
Name	Muneer Mohamed	Muthukumar R			
Signature					
Date	28.05.2024	28.05.2024			

Elcometer 142 Dust Assessment
In Accordance With ISO 8502-3

Evaluation de la quantité de poussière selon ISO 8502-3 - Staubabschätzung in Übereinstimmung mit ISO 8502-3

Name: Muneer Mohamed
Nom - Name

Date: 25-05-24
Date - Datum

Time: 10:00 AM
Heure - Zeit

Company: FBM Hudson FZE
Société - Firma

Location: Jafza
Lieu - Ort

Dust quantity rating (Mean):
Quantité de poussière (moyenne):
Staubmengeneinschätzung (Durchschnitt)
1

Dust particle size: (See table)
Taille des particules de poussière: (voir tableau)
Staubpartikelgröße: (Vgl. Tabelle)
1

Test 1

Test 2

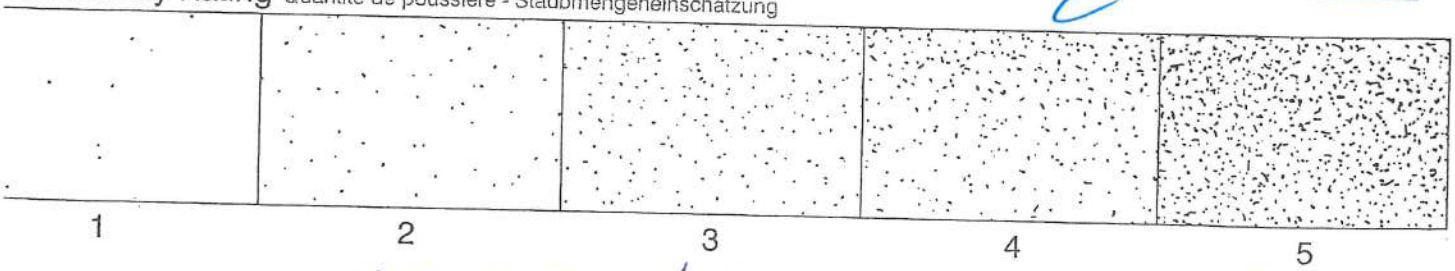
Test 3

Test 4

Test 5

RINA AV R AA 055 Date 25/5/24

ust Quantity Rating Quantité de poussière - Staubmengeneinschätzung



urface identification: 4.80S - 01 - A2 (channel course A shell course 1)
ntification surface - Identifizierung der Oberfläche

ubstrate backing used:
scription substrat de base utilisé
wendetes Trägermaterial unter Klebeband
☑ Elcometer 142 (T14219454) ☐ Other
Autre - Andere

Muneer Mohamed 25/5/24

ture of surface tested: Blasted Surface
ture de la surface testée - Beschaffenheit der getesteten Oberfläche

hesive tape used:
ésif utilisé
wendetes Klebeband
☑ Elcometer 142 (T9999358) ☐ Other
Autre - Andere

intertek moody Reviewed Witnessed Initial Date: 25/5/24 AE - 0022

TSA COATING INSPECTION REPORT

TECHNIQA SURFACE ENGINEERING FZE L.L.C

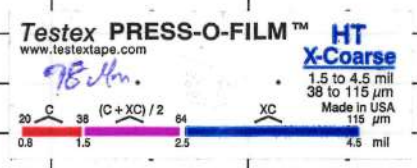
Report No: FBM-4804-011 (4804-01-A2)

Client/Contractor Name	FBM HUDSON FZE
Main Contarctor	PETRO CHINA WEST QURNA 1
End User	CHINA PETROLEUM ENGINEERING & CONST. CORPORATION (CEPCC)
Project Name	OIL TRAINS 2 AND 3

Item Description Reference Drawing No	CRUDE / PRODUCT HEAT EXCHANGER IQWQ-CE820-VDINS-D7-1600 Rev 1	Acceptance Standard Document no	IQWQ-CE820-VPPNT-00-1602 Rev 1 4804-00-PE-003
Client Item/Tag No Vendor Item/Tag no Coated Part Name	IQD7-HBG623502 A2 (S.no : 23/JAWS/007) 4804 - 01 A2 Shell Course III to Elliptical Head		

Ambient Condition (*)

Dry Air Temp °C (Max.)	37.2	-	-	-	-
Dew Point °C(Max.)	17.5	-	-	-	-
Humidity %(Max.)	32%	-	-	-	-
Steel Surface Temp.°C (Max.)	37.5	-	-	-	-
Date :	27-05-2024	-	-	-	-



Surface Preparation- SA 3 as per ISO 8501-1 / Required anchor profile : 60 - 83 µm				Abrasive Material : GARNET 20/40 Batch : B#AR/B5021	
Surface Position		Surface Profile Achieved: 78 µm	Dust Level:< 2	Blast Clean	Remove Dust & Grit etc.
Inside	Outside	Weld imperfections	Remove Oil& Grease		
N.A	Yes	Repaired / Removed	Yes	YES	Yes

PAINT SYSTEM- D

Coat	**TSA COATING**	-	-	-	-
Material	**Thermal Arc Sprayed Metallic Coating - ALUMINIUM Kymera Int's Aluminium wire Grade : AWS -1100 grade Batch no : A2303116, C2303115**	-	-	-	-
Min.DFT Specified	200 - 350µm	-	-	-	-
Accum.Min DFT	200 - 350µm	-	-	-	-
Actual DFT	255 ~ 350 µm	-	-	-	-
Time of Application & Date	10.00 ~ 14.00	-	-	-	-
	27.05.2024	-	-	-	-
Inspection Time & Date	03.00 PM	-	-	-	-
	28.05.2024	-	-	-	-
Accepted Time & Date	03.30 PM	-	-	-	-
	28.05.2024	-	-	-	-

Remarks :

TSA Coating have coated only on the Insulation area of the Shell Course III to Elliptical Head (Including the Nozzle, Lifting leg and name plate).
All the Remaining parts will be painted.
1) Refer Attached TSA aluminium wire and sealer coat paint batch certificate.
2)The air compressor Blotter Test is performed before dry abrasive blast cleaning.
3) After blast cleaning,prior to the TSA application, Surface is checked for surface profile, Dust level and Ambient condition.
After the TSA application prior to the Sealer coat, TSA Build up was carried out and the DFT inspection was conducted and Accepted.
4) Instrument Elcometer Used for checking DFT :-Sr. No. PE18886/YK15469 Calibration due date 02.02.2025
5) Instrument Elcometer Dew point Meter Used for checking Ambient Condition :-Sr. No. YH12329 Calibration due date 01.05.2025

Contractor	Tested By	Accepted By	Client/TPI	Customer/TPI	Remarks
Company	Techniqa	FBM-KNM FZCO			
Name	Muneer Mohamed	Muthukumar R			
Signature					
Date	28.05.2024	28.05.2024			

intertek moody Reviewed Witnessed Initial Date 28/5/24 AE - 0022

28/5/24

Elcometer 142 Dust Assessment
In Accordance With ISO 8502-3

Evaluation de la quantité de poussière selon ISO 8502-3 - Staubabschätzung in Übereinstimmung mit ISO 8502-3

Name: Muneer Mohamed
Nom - Name

Date: ~~28~~ 27-05-2024
Date - Datum

Time: 10:30 AM
Heure - Zeit

Company: FBM Hudson Fze
Société - Firma

Location: Jafza
Lieu - Ort

Dust quantity rating (Mean): 1
Quantité de poussière (moyenne):
Staubmengeneinschätzung (Durchschnitt)

Dust particle size: (See table) 1
Taille des particules de poussière: (voir tableau)
Staubpartikelgröße: (Vgl. Tabelle)

Test 1

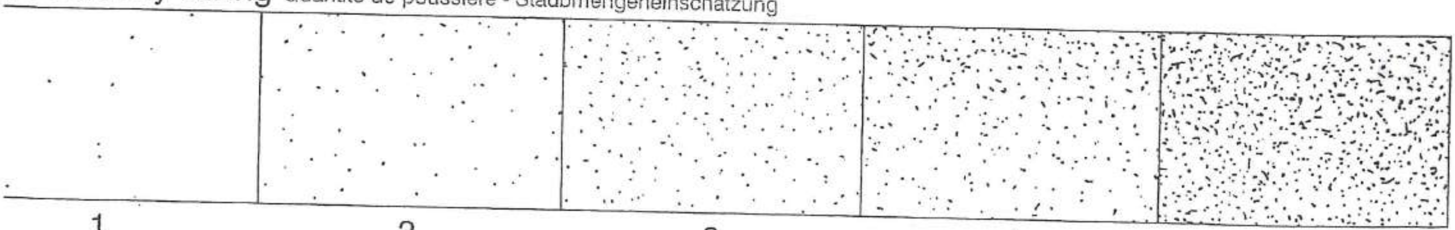
Test 2

Test 3

Test 4

Test 5

ıst Quantity Rating Quantité de poussière - Staubmengeneinschätzung



1 2 3 4 5

ırface identification: 4804-01-A2 (Shell course 2)
ıntification surface - Identifizierung der Oberfläche

ıbstrate backing used: ☑ Elcometer 142 (T14219454) ☐ Other
scription substrat de base utilisé Autre - Andere
ʼwendetes Trägermaterial unter Klebeband

ıture of surface tested: Blasted Surface
ture de la surface testée - Beschaffenheit der getesteten Oberfläche

hesive tape used: ☑ Elcometer 142 (T9999358) ☐ Other
ıésif utilisé Autre - Andere
wendetes Klebeband

RINA ☐W ☐R AA055 Date: 27/5/24

moody ☐ Reviewed ☑ Witnessed Initial Date: 27/5/24 AE - 0022

Muneer Mohamed
27/5/24

TECHNIQA SURFACE ENGINEERING FZE L.L.C	SEALER COATING INSPECTION REPORT				Report No: FBM-4804-012 (4804-01-A2)
	Client/Contractor Name Main Contarctor End User Project Name	FBM HUDSON FZE PETRO CHINA WEST QURNA 1 CHINA PETROLEUM ENGINEERING & CONST. CORPORATION (CEPCC) OIL TRAINS 2 AND 3			
Item Description Reference Drawing No	CRUDE / PRODUCT HEAT EXCHANGER IQWQ-CE820-VDINS-D7-1600 Rev 1		Acceptance Standard Document no	IQWQ-CE820-VPPNT-00-1602 Rev 1 4804-00-PE-003	
Client Item/Tag No Vendor Item/Tag no Coated Part Name	IQD7-HBG623502 A2 (S.no : 23/JAWS/007) 4804 - 01 A2 Elliptical Head to Channel Course I				
Ambient Condition (*)					
Dry Air Temp °C (Max.)	33.1	-	-	-	-
Dew Point °C(Max.)	14.8	-	-	-	-
Humidity %(Max.)	37%	-	-	-	-
Steel Surface Temp.°C (Max.)	34.5	-	-	-	-
Date :	28.05.2024	-	-	-	-
Surface Position		Surface Profile Achieved: N/A	Dust Level:< 2	Blast Clean	Remove Dust & Grit etc.
Inside	Outside	Weld imperfections	Remove Oil& Grease		
N.A	Yes	Repaired / Removed	Yes	YES	Yes
PAINT SYSTEM- D					
Coat	SEALER COATING	-	-	-	-
Material	Silicone finish Carboline Thermaline 4700 Aluminium C901 Batch no : 300047248 Thinner 10 Batch no : 300047001	-	-	-	-
Min.DFT Specified	38 - 50 µm	-	-	-	-
Accum.Min DFT	238 - 400 µm	-	-	-	-
Actual DFT	240 - 395 µm	-	-	-	-
Time of Application & Date	14.00 ~ 16.00	-	-	-	-
	28.05.2024	-	-	-	-
Inspection Time & Date	09.00 AM	-	-	-	-
	29.05.2024	-	-	-	-
Accepted Time & Date	09.30 AM	-	-	-	-
	29.05.2024	-	-	-	-

Remarks :

Sealer Coating have coated only on the Insulation area of the Elliptical Head to Channel Course I. (Including the Nozzle, Lifting leg and name plate).
All the Remaining parts will be painted.

1) Refer Attached sealer coat paint batch certificate.
2) After the TSA Application, DFT inspection was conducted and accepted . And Prior to the sealer coat application the surface was scraped completely across the surface to remove all the hard or sharp particles.
4) Instrument Elcometer Used for checking DFT :-Sr. No. PE18886/YK15469 Calibration due date 02.02.2025
5) Instrument Elcometer Dew point Meter Used for checking Ambient Condition :-Sr. No. YH12329 Calibration due date 01.05.2025

Contractor	Tested By	Accepted By	Client/TPI	Customer/TPI	Remarks
Company	Techniqa	FBM-KNM FZCO			
Name	Muneer Mohamed	Muthukumar R			
Signature					
Date	29.05.2024	29.05.2024			

TECNIQA LLC

intertek moody Reviewed Witnessed Initial: Date: 29/5/24 AE - 0022

RINA Date: 29/5/24

TECHNIQA
SURFACE ENGINEERING FZE LLC

ADHESION / PULL-OFF TEST REPORT

Job No. 4804
Report No:4804-01-A2

Adhesion / Pull-off Test (According to ASTM D4541)

Client/Contractor Name : FBM HUDSON FZE
Main Contractor Name : PETRO CHINA WEST QURNA 1
End User : CHINA PETROLEUM ENGINEERING & CONST. CORPORATION (CPECC)
Vendor Item/Tag no : 4804 – 01 – A2
Equipment Description : CRUDE / PRODUCT HEAT EXCHANGER
Client Item/Tag No : IQD7-HBG623502 A2 (S.no : 23/JAWS/007)
Specified Coating System : D
Test Equipment Used : *PosiTest* AT-M Manual adhesion Tester
Substrate temperature : 26.0°C & 35. 0°C

Ambient Condition (*) - Painting System-TSA					
Air Temp°C (Max.)	37.2				
Dew Point°C(Max.)	17.5				
Humidity %(Max.)	32%				
Steel Surface Temp°C (Max.)	37.5				
Date:	27.05.2024				
Surface Preparation- SA 3 as per ISO 8501-1 / Required anchor profile : 60 - 83 µm					
Surface Position		Surface Profile: 78 µm	Dust Level:< 2	Blast Clean (SA-3)	Remove Dust & Grit etc.
Inside	Outside	Grind Weld	Remove Oil& Grease		
N. A	Yes	Smooth	Yes	Yes	Yes
PAINT SYSTEM - D					
Coat	**TSA COAT**				
Material	Thermal Arc Sprayed Metallic Coating - ALUMINIUM Kymera Int's Aluminium wire Grade : AWS -1100 Batch no :A2303116,C2303115				
Min.DFT Specified	200 - 350µm				
Accum.Min DFT	200 - 350µm				
Actual DFT	255 ~ 350 µm				
Time of Application & Date	10.00 ~ 14.00				
	27.05.2024				
Pull off Inspection Time & Date	04.06.2024				
	1:30				
Accepted Date/Signed	04.06.2024				

W R AA055
04/06/24

04/06/24

FOR FBM

FOR CPECC
04/06/24

TECHNIQA
SURFACE ENGINEERING FZE LLC

ADHESION / PULL-OFF TEST REPORT

Job No. 4804
Report No:4804-01-A2

PAINT SYSTEM SPECIFICATION		
Painting System	**D**	
TSA Coating	Thermal Arc Sprayed Metallic Coating - ALUMINIUM	
No of Coats	1	
Total DFT (µm)	200 - 350µm	
Total DFT (µm)	**200 - 350µm**	

Test 1 (Dolly - 1)
Actual DFT : 281 µm
Pull off value: 18.25 MPa
Mode : 90% B (cohesive failure), 5% A/B (Adhesive failure), 5% Y (Glue Failure)

Test 2 (Dolly - 2)
Actual DFT : 299 µm
Pull off value: 19.51 MPa
Mode : 85% B (cohesive failure), 5% A/B (Adhesive failure), 10% Y (Glue Failure)

Test 3 (Dolly - 3)
Actual DFT : 302 µm
Pull off value: 20.63 MPa
Mode : 90% B (cohesive failure), 5% A/B (Adhesive failure), 5% Y (Glue Failure)

Remarks:

- **Dolly was fixed on 03.06.2024 at 12:00 Hours.**
- **Pull off Test was conducted on 04.06.2024 at 12:00 Hours.**
- **The Testing was done in accordance with ASTM D4541**
- **As per Coating Procedure : IQWQ-CE820-VPPNT-00-1602 Rev A**

Qualification Criteria of the Pull-Off Test for the specified Coating System in Accordance with ASTM D4541 for this specification: ≤ 6.3 Mpa POV

W R AA 055
Date: 04/06/24
04/06/24

TECNIQA Engineering Excellence
TECNIQA LLC
04/06/24

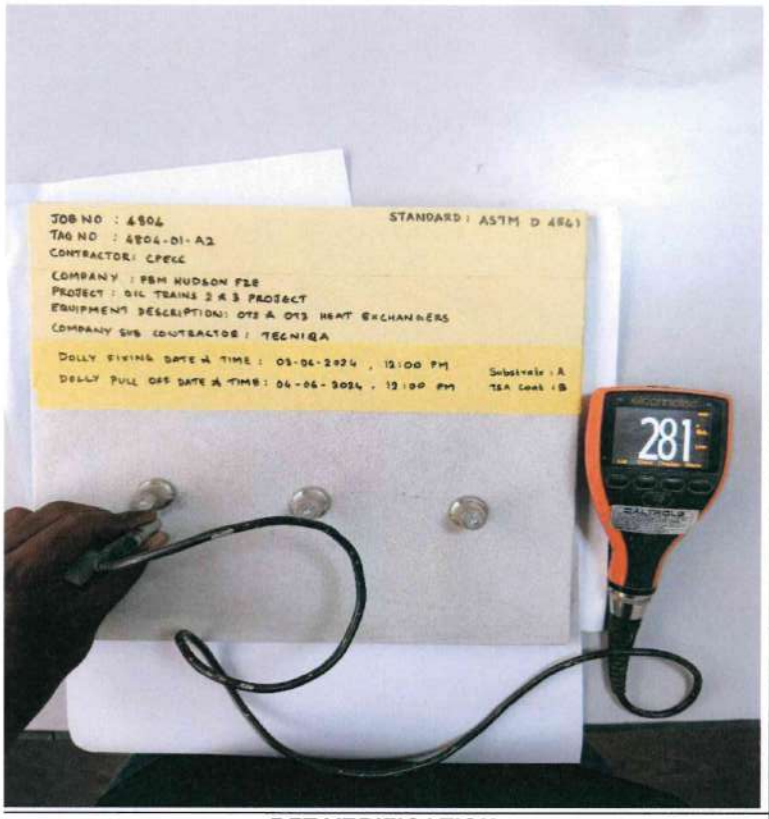
FOR FBM

TECHNIQA
SURFACE ENGINEERING FZE LLC

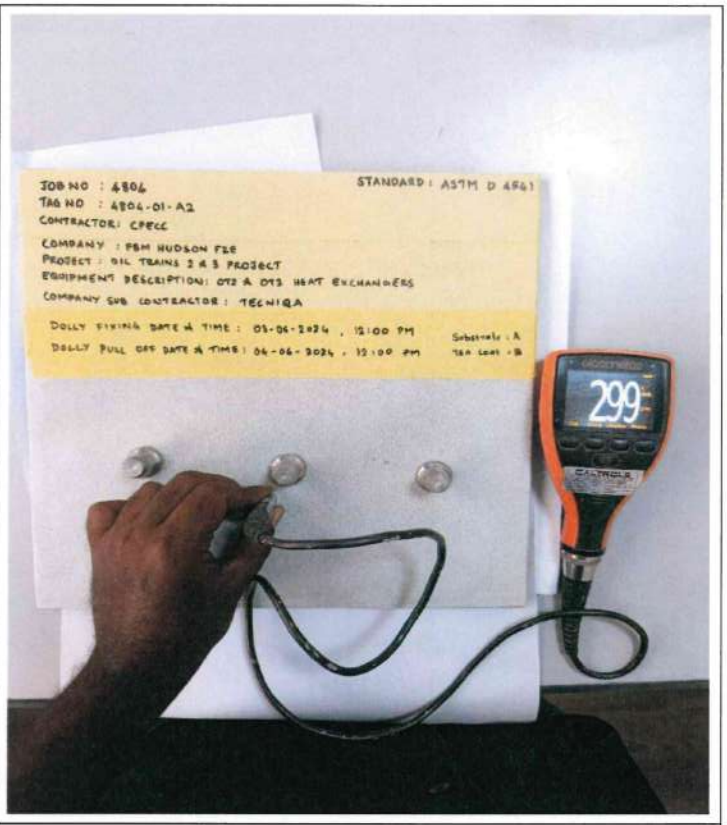
ADHESION / PULL-OFF TEST REPORT

Job No. 4804
Report No:4804-01-A2

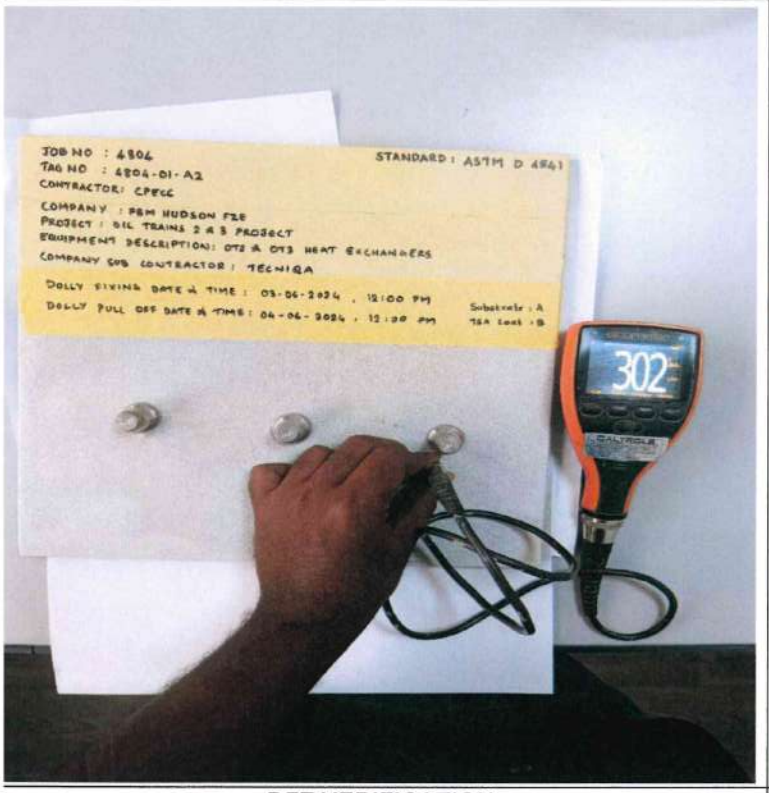
PHOTO REPORT



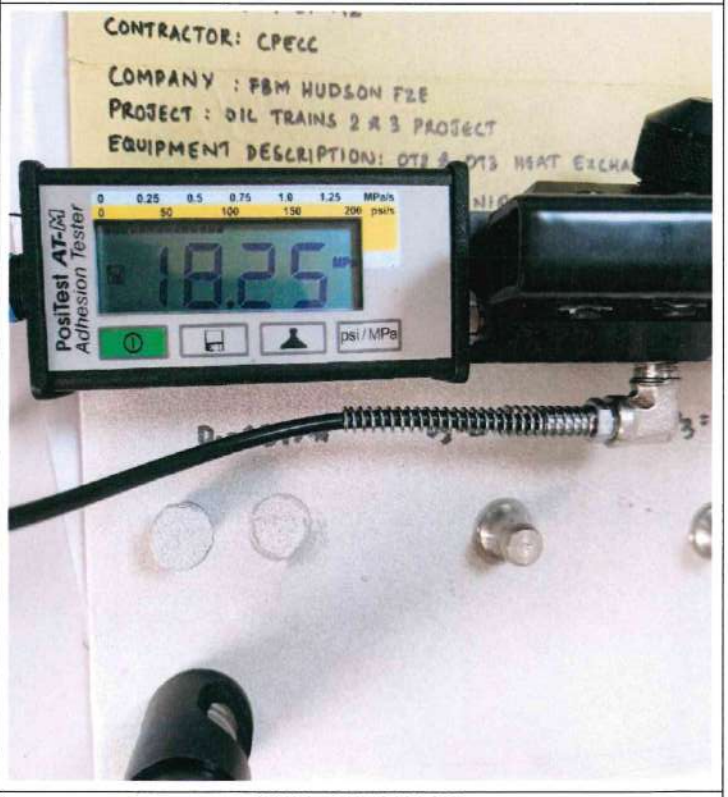
DFT VERIFICATION



DFT VERIFICATION



DFT VERIFICATION



PULL OFF VALUE

04/06/24

FOR FBM

04/06/24

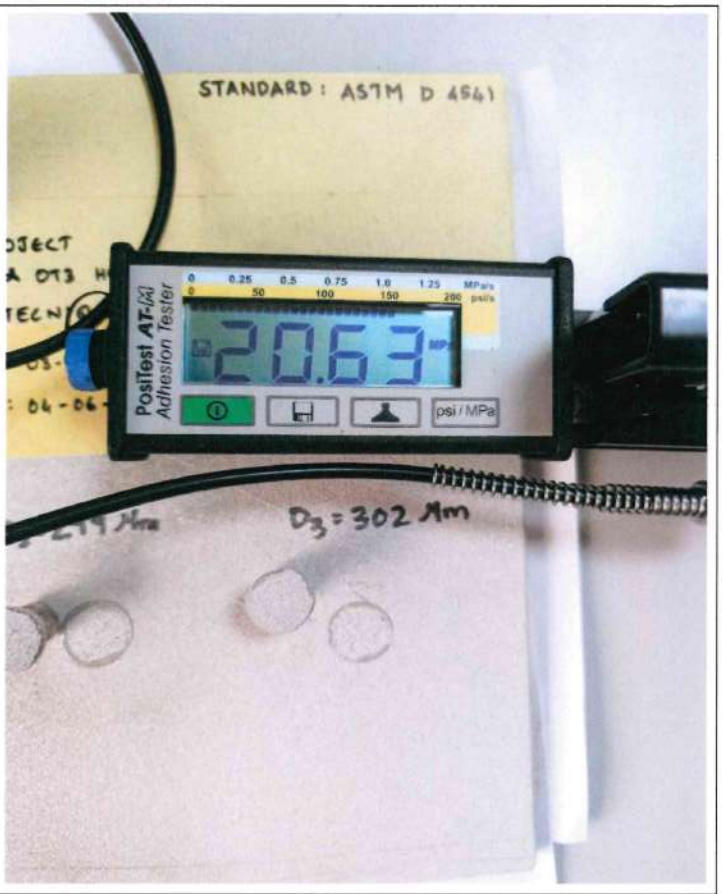
04/06/24

TECHNIQA
SURFACE ENGINEERING FZE LLC

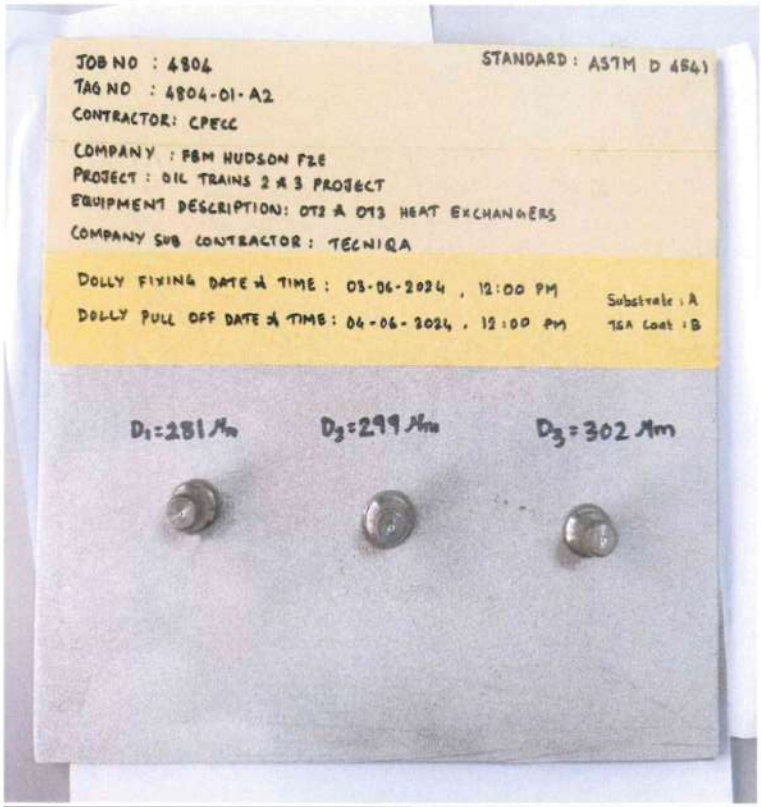
ADHESION / PULL-OFF TEST REPORT

Job No. 4804
Report No:4804-01-A2

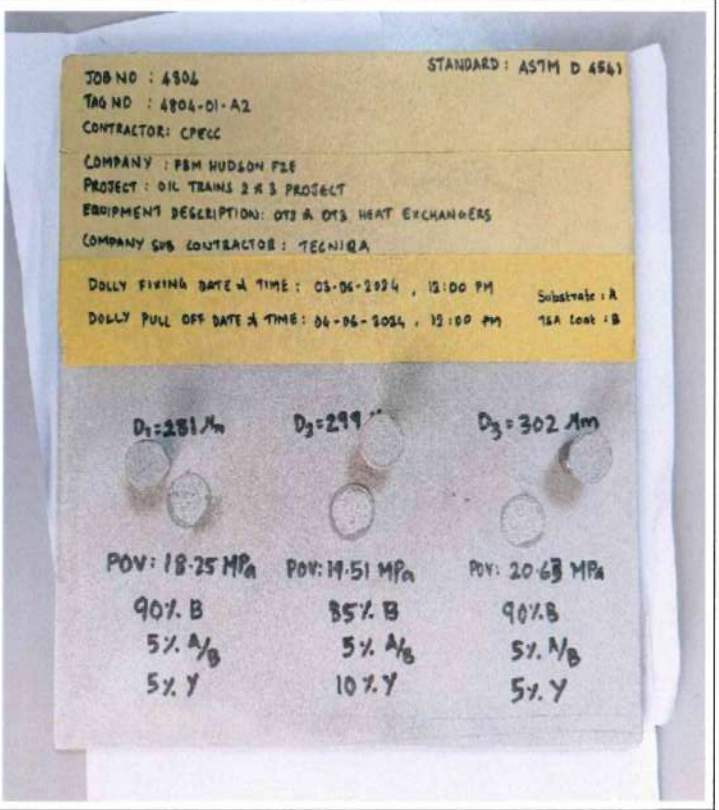
PULL OFF VALUE



PULL OFF VALUE



BEFORE PULL OFF



AFTER PULL OFF

04/06/24

FOR FBM

04/06/24

TECHNIQA
SURFACE ENGINEERING FZE LLC

ADHESION / PULL-OFF TEST REPORT

Job No. 4804
Report No:4804-01-A2

Contractor	Tested By	Witnessed By	Client/TPI	Customer/TPI	Remarks
Name	**Muneer Mohamed**	**Muthukumar**	intertek moody Reviewed Witnessed Initial: Date: 04/06/24 AE - 0022		
Company	**Tecniqa**	**FBM Hudson Fze**			
Signature	TECNIQA LLC	FBM HUDSON FZE P.O. Box 17499 Dubai UAE JEBEL ALI FREE ZONE			
Date	04-06-2024	04-06-2024			

Conclusion:

The Pull Off Test results were acceptable as the average POV of the results was above the acceptable Pull-Off Values. The Surface Preparation and application are acceptable. Results of the adhesion test have been accepted.

04/06/24