

IGP ENGINEERS PVT LIMITED

Post Box No. 8674, CIN U27200TN1979PTC007868 / GST No. -33AAACI0920Q1ZN
No. 79 (Old No. 299), Valmiki Street, Thiruvannmiyur, Chennai-600 041, INDIA

GRAMS : "SPIRAGER" Fax: 91-44-2440552, 24425511 E-mail: igp@igpindia.com Web Site : www.igp-group.com

Factory : UNIT - I : No. 277/2, Old Mahabalipuram Road, Kottivakkam, Chennai - 600 041.
UNIT - II: No. 21, Gangai Amman Koil Street, Keelur, Thiruporur Panchayat - 603 108.



MANAGEMENT SYSTEM CERTIFICATION
DNV-GL

ISO 9001, ISO 14001

REF: QF-03/4007

TEST CERTIFICATE EN 10204, TYPE - 3.2

Date: 07.09.2020

CLIENT : RELIANCE INDUSTRIES LTD. ✓
PO.NO : 294/240237413 DT:01.07.2019 ✓
QAP NO : RIL/Mech/QAP /04 REV:00 DT: 28.08.2019 (NON STANDARD GASKETS) ✓
PROJECT : DDP RIL JAMNAGAR
Inspection Offered QTY : 01 No's ✓

MATERIAL DETAILS

Sl. No.	MATERIAL DETAILS	TEST CERTIFICATE		
		T.C. NUMBER	DATE	
01	GRAPHITE SGL "E"	(0.60 mm)	0476/20	10.02.2020 ✓
02	SS 304/304L	(0.20 mm)	TSPL/T/02/200205-09/C-M-Met-4316-001	04.03.2020 ✓
03	SS 304/304L	(3.20 mm)	TSPL/T/02/200224-23/C-M-Met-4638-013	18.03.2020 ✓

HARDNESS DETAILS

Sl. No.	MATERIAL DETAILS	HARDNESS TEST	
		LOAD	BHN
01	SS 304/304L	(0.20 mm)	62.5 Kgs
02	SS 304/304L	(3.20 mm)	62.5 Kgs



ORDER STATUS : COMPLETE



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 No. 79 (Old No. 299), Valmiki Street, Thiruvannmiyur, Chennai-600 041, INDIA
 GIRAMS : "SPIRAGET" Fax: 91. 44 - 24405152, 24425511 E : 24420608, 24425639, 24425742
 E-mail : igp@igpindia.com Web Site : www.igp-group.com

Factory : UNIT - I : No. 277/2, Old Mahabalipuram Road, Kottivakkam, Chennai - 600 041.
 UNIT - II : No. 21, Gangai Amman Koil Street, Keelur, Thiruporur Panchayat - 603 108.

REF: QF-03/4007

Sheet: 02 of 02
 Date: 07.09.2020

DIMENSIONAL INSPECTION REPORT

DESCRIPTION: SS 304 Spiral Wound Graphite Filled Gasket with SS304 Inner Ring & SS304 Outer Bare Winding Dimension as per PO ✓

PO Sl. No.	ITEM CODE	TYPE	Outer Bare Winding OD	Gasket ID	Inner Ring ID	Gasket Thick	Ring Thick	Qty In Nos.
05 ✓	2001788931 ✓	Round	1623.00 ✓	1620.00 ✓	1570.00 ✓	4.50 ✓	3.20 ✓	01 ✓

RESULT:

1. All Gasket Visually inspected and Found Satisfactory.
2. Gasket Dimension Checked Reference to Purchase Order, and Found Within the Acceptable Limits..
3. Spw Gasket - Winding Ring Material are PMI Checked with Reference to Material Specification 10080-1-SS-PP-018 Rev-0 and Found Meeting the Requirements.
4. Spw Gaskets - Winding & Ring Material are hardness Checked with Reference Qap and found Within the Acceptable limits
5. Spot Weld as Per ASME B16.20 and Found Satisfactory.
6. Gasket Fitment Verified and found Inorder.





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**Instrument Model No : X - MET 8000 SMART
Serial Number : 811885
Date of Calibration & Service
Done On : 17.02.2020
Calibration Due on : 16.02.2021**



WITNESSED BY

RESULT : WE CONFIRM THAT SPIRAL WINDING AND RING MATERIAL PMI CARRIED OUT ON 100% AND FOUND MEETING THE SPECIFICATION REQUIREMENTS & RECORDED IN MINIMUM / MAXIMUM VALUE

DOC.NO: IGP/PMIR/00

REVISION: 01. DATE: 20/08/2014



SGL CARBON GmbH - Postfach 1193 - 86400 Meringen

Test Report 2.2 | No. 0476/20

IGP
ENGINEERS PVT LIMITED
No. 79 (Old No 29/9), Valmiki Street
600041 Thiruvanmiyur, Chennai
India

acc. to EN 10204
Signed Wolfgang Mayr
Department Quality management
Telephone +49 8271 63-1287
Facsimile +49 8271 63-101287

Date February 10, 2020

Your purchase order IGP/SWG/I/040/19-20
Delivery Note / Item 31155576 / 1
Order / Item 17202846 / 1

Delivery:

Item 1 4902 ST Tape SIGRAFLEX®
F06010E
50 m x 5,5 ± 0,2 mm x 0,6 mm

pile no	2001023801	2001023901	2001024001	2001024101	2001024201	2001024401
	2001024501	2001024601	2001024701	2001024801	2001024901	2001025001
	2001025101	2001025201	2001025301	2001025401	2001025501	2001025601
	2001025701	2001025801	2001025901	2001026001	2001026201	2001026301
	2001026401	2001026501	2001026801			

Test result/properties:

Carbon content [%]	Halogen content [ppm]	Thickness [mm]	Chloride content [ppm]	Tensile strength [N/mm²]
≥ 99.0	≤ 40.0	ca 0.6	≤ 10.0	≥ 40
Area weight [g/m²]	Ash content [%]	Bromide content [ppm]	Fluoride content [ppm]	Iron content [ppm]
ca 600.0	≤ 1.0	≤ 10.0	≤ 10.0	≤ 1800.0
Density [g/cm³]	Oxidation TGA 670°C [%/h]	Sulphur content [ppm]		
ca 1.0	< 4.0	< 300.0		

Values are valid for the graphite foil only, not for the final product.

Compressibility ASTM F2168: 45%

Recovery ASTM F2168: 14%

The above graphite materials fulfills the requirements according ASTM F2168 and Shell specification MESC 85/203.

The requirements agreed upon the order are fulfilled.



This certificate has been generated automatically and is valid without signature.

IGP
REVIEWED & ACCEPTED





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S.No : 238/16, Aathanancheri Village, Padappai - 601 301,
Sriperumpudur (T.K), Kancheepuram (Dist)



TC - 6618

Tel No : +91 44 2717 4805 / 801 / 802 / 803, E-mail : info@tiiservices.com / Web : www.tiiservices.com
PAN : AADCT8942Q, TIN : 33561667359, Corporate ID No : U74900TN2011PTC126535 & ST : AADCT8942QSD001 GSTIN : 33AADCT8942Q1ZN

ISO / IEC : 17025 : 2017 Accredited by NABL, Dept. of Science & Technology, India

TEST REPORT

Test Report No: TSPL/ T/02/200205 - 09/C-M-Met-4316 - 001

Date : 04.03.2020

ULR -TC66182000002627F		Page 1 of 4
Customer Name & Address:		
M/s. IGP Engineers Pvt Ltd Factory : 277/2, Old Mahabalipuram Road, Kottivakkam, Chennai - 600 041	Letter Ref No	: DC NO : 14767 Date : 04.02.2020
	Received Date	: 05.02.2020
	Test Date(s)	: 02.03.2020
Details of Sample : Sheet Size : 0.20 mm Thick : Material : SS 304 / SS 304L (NACE MR0175) : MRN No : 444 : Heat No : 1901J0431 : Qty : 1 No	Tii SAMPLE ID : 4316 : 001	
1		
Discipline -Group/ Test Performed : Chemical Testing	: Metals & Alloys(OES)	
Test Method	: ASTM E 1086 : 2014	

S.NO	Test Parameters	Observation
1	Carbon (C) (%)	0.024 ✓
2	Silicon (Si) (%)	0.27 ✓
3	Manganese (Mn) (%)	1.59 ✓
4	Phosphorus (P) (%)	0.032 ✓
5	Sulphur (S) (%)	0.005 ✓
6	Chromium (Cr) (%)	18.36 ✓
7	Molybdenum (Mo) (%)	0.21 ✓
8	Nickel (Ni) (%)	8.17 ✓
9	Copper (Cu) (%)	0.48 ✓
10	Tungsten (W) (%)	0.021 ✓
11	Nitrogen (N) (%)	0.040 ✓
12	Ni + 2Mo	8.78 ✓
13	PREN	19.73 ✓

Remarks : The above Chemical Composition MEETS the requirement of

ASTM A240 - 2019 Type 304/304L UNS S30400/S30403/ NACE MR0175 /ISO 15156 (Part 3):2015 (E)

IGP	REVIEWED & ACCEPTED	REVIEWED / NOTED
N.CHINNIAH	Engineer's PVT LTD	% WITNESSED
REASSURANCE	N.CHINNIAH	Technical Inspection Services
MR. ABDUL SAMATHA	173/2020	

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ISO / IEC : 17025 : 2017 Accredited by NABL, Dept. of Science & Technology, India

TEST REPORT

Test Report No: TSPL/ T/02/200205 - 09/C-M-Met-4316 - 001

Date : 04.03.2020

ULR -TC66182000002627F	Page 2 of 4
2	
Discipline -Group/ Test Performed : Mechanical Testing	: Mechanical Properties of Metals (Tensile Test)

S.NO	Test Parameters	Observation
1	Yield Strength (N/mm ² or Mpa)	334
2	Tensile Strength (N/mm ² or Mpa)	620
3	Elongation in 50 mm GL (%)	41

Remarks : The above Tensile parameters MEETS the requirement of ASTM A240 - 2019

Type 304/304L UNS S30400/S30403

3	
Discipline -Group/ Test Performed : Mechanical Testing	: Mechanical Properties of Metals (Micro Vickers Hardness Test)
Test Method	: ASTM E384 - 2017

S.NO	Test Parameters	Specified Value	Observation
1	Location		Surface
2	Load (gm)		300
3	Observed Values (HV)		142,145,141
4	Converted Values (BHN)	160 Max	140,142,139

Remarks : Hardness value meets the Customer Specification

IGP
REVIEWED & ACCEPTED



MR. ABDUL SAMATHA

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TEST REPORT

Test Report No: TSPL/ T/02/200205 - 09/C-M-Met-4316 - 001

Date : 04.03.2020

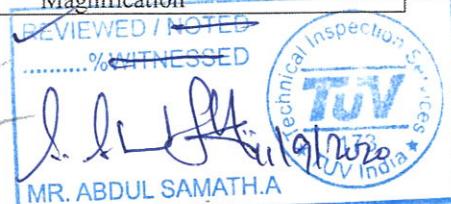
ULR -TC66182000002627F	Page 3 of 4
4	
Discipline -Group/ Test Performed : Mechanical Testing - Metallography Test (Micro Examination)	
Test Method : ASTM E407 - 2007 (RA 2015 e1), ASM Metals Hand Book Vol.9-2004	
Test Conditions	Value
Mag / Etchant	200x / 10 % Oxalic Acid Electro Etched
Test Parameters	Observation
Micro Structure	Micro examination of the specimen revealed step between the grains with annealed twin boundaries present in the austenitic matrix. Solution annealing Satisfactory.
Photo .	The Microphotograph is exhibited in Annexure A.

Remarks : Microstructure meets the requirement of NACE MR0175/ISO 15156 (Part 3) : 2015 (E)

5	
Discipline -Group/ Test Performed : Mechanical Testing - Metallography Test	
(Intergranular Corrosion Test (Practice - E))	
Test Method : ASTM A262 - 2015	
Test Conditions	Value
Sensitization Temp (Degree Celcius)	Specimen was sensitized at 675° C for 1 hour
Test Solution	Copper - Copper Sulfate - 16% Sulfuric Acid
Duration of Test (Hours)	15 Hours
Test Parameters	Observation
Size (mm)	100.15L x20.08W x 0.20 Thk in mm
Total Surface Area of the Specimen (cm ²)	= 40.7011 cm ²
Start of Boiling (dd/mm/yy)	06.02.2020 (6.00 pm)
End of Boiling (dd/mm/yy)	07.02.2020 (9.00 am)
Bend Test	1T/180 Degree
Evaluation	No Cracks and IG Fissures Observed at 20x Magnification. No Intergranular attack Observed at 250x Magnification

Conclusion : Test Found Satisfactory.

Remarks : The Macro & Micro Photographs are exhibited in Annexure - A.



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TEST REPORT

ANNEXURE – A

Test Report No: TSPL/ T/02/200205 - 09/C-M-Met-4316 - 001

Date : 04.03.2020

ULR -TC661820000002627F

Page 4 of 4

Micro Examination Photographs



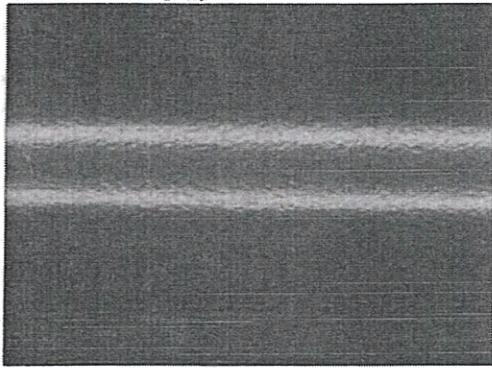
Mag : 200x



Mag : 250x

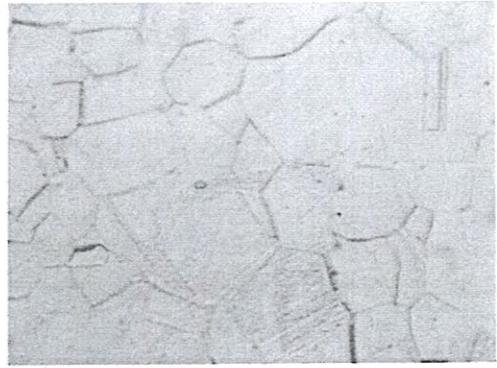
Intergranular Corrosion Test (Practice -E)

Macro Photograph



Mag: 20x

Micro Photograph



Mag:250x

-----END OF THE TEST REPORT-----

**IGP
REVIEWED & ACCEPTED**



Authorized Signatory

S.GUNASEKARAN

Technical Manager (Mechanical)

REVIEWED / NOTED

% WITNESSED

MR. ABDUL SAMATHA

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TEST REPORT

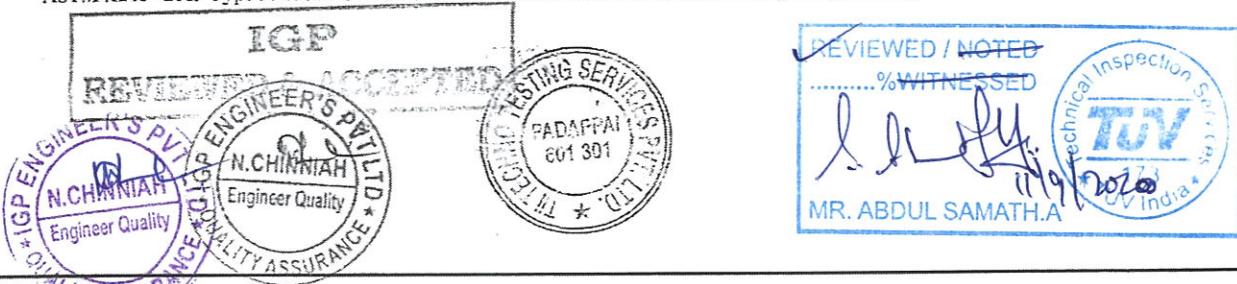
Test Report No: TSPL/ T/02/200224 - 23/C-M-Met-4638 - 013

Date : 18.03.2020

ULR -TC66182000004495F		Page 1 of 4
Customer Name & Address:		
M/s. IGP Engineers Pvt Ltd Factory : 277/2, Old Mahabalipuram Road, Kottivakkam, Chennai - 600 041	Letter Ref No : DC NO : 14784 Received Date : 24.02.2020 Test Date(s) : 04.03.2020	Date : 20.02.2020
Details of Sample : Sheet Size : 3.20 mm Thick : Material : SS 304 / SS 304L (NACE MR0175) : MRN No : 396 : Heat No : 21901641	Tii SAMPLE ID : 4638 : 013	
1		
Discipline -Group/ Test Performed : Chemical Testing	: Metals & Alloys(OES)	
Test Method	: ASTM E 1086 : 2014	

S.NO	Test Parameters	Observation
1	Carbon (C) (%)	0.029
2	Silicon (Si) (%)	0.53
3	Manganese (Mn) (%)	1.62
4	Phosphorus (P) (%)	0.034
5	Sulphur (S) (%)	0.014
6	Chromium (Cr) (%)	18.70
7	Molybdenum (Mo) (%)	0.036
8	Nickel (Ni) (%)	8.02
9	Copper (Cu) (%)	0.020
10	Tungsten (W) (%)	0.012
11	Nitrogen (N) (%)	0.021
12	Ni + 2Mo	8.09
13	PREN	19.17

Remarks : The above Chemical Composition MEETS the requirement of
ASTM A240 - 2019 Type 304/304L UNS S30400 / S 30403 /NACE MR0175 /ISO 15156 (Part 3):2015 (E)

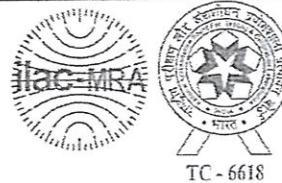


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TEST REPORT

Test Report No: TSPL/T/02/200224 - 23/C-M-Met-4638 - 013

Date : 18.03.2020

ULR -TC661820000004495F	Page 2 of 4
2	
Discipline -Group/ Test Performed : Mechanical Testing	: Mechanical Properties of Metals (Tensile Test)
Test Method	: ASTM A370 : 2017a

S.NO	Test Parameters	Observation
1	Yield Strength (N/mm ² or Mpa)	375 ✓✓
2	Tensile Strength (N/mm ² or Mpa)	707 ✓✓
3	Elongation in 50 mm GL (%)	50 ✓✓

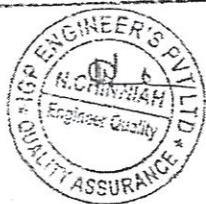
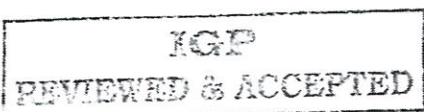
Remarks : The above Tensile parameters MEETS the requirement of ASTM A240 - 2019 Type 304/304L

UNS S30400 / S30403 ✓✓

3	
Discipline -Group/ Test Performed : Mechanical Testing	: Mechanical Properties of Metals
	(Micro Vickers Hardness Test)

S.NO	Test Parameters	Specified Value	Observation
1	Location		Surface
2	Load (gm)		300
3	Observed Values (HV)		156,156,153 ✓✓
4	Converted Values (BHN)	160 Max	152,152,150 ✓✓

Remarks : Hardness value meets the Customer Specification.



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TEST REPORT

Test Report No: TSPL/ T/02/200224 - 23/C-M-Met-4638 - 013

Date : 18.03.2020

ULR -TC661820000004495F	Page 3 of 4
4	
Discipline -Group/ Test Performed : Mechanical Testing - Metallography Test (Micro Examination)	
Test Method	: ASTM E407 - 2007 (RA 2015 e1), ASM Metals Hand Book Vol.9-2004
Test Conditions	Value
Mag / Etchant	200x/250x /10 % Oxalic Acid Electro Etched
Test Parameters	Observation
Micro Structure	Micro examination of the specimen revealed step between the grains with annealed twin boundaries present in the austenitic matrix. Solution annealing Satisfactory.
Photo	The Microphotographs are exhibited in Annexure A. <input checked="" type="checkbox"/>

Remarks : Microstructure meets the requirement of NACE MR0175/ISO 15156 (Part -3) : 2015 (E)

5

Discipline -Group/ Test Performed : Mechanical Testing - Metallography Test	Intergranular Corrosion Test (Practice - E)
Test Method	: ASTM A262 - 2015
Test Conditions	Value
Sensitization Temp (Degree Celcius)	Specimen was sensitized at 675° C for 1 hour
Test Solution	Copper - Copper Sulfate - 16% Sulfuric Acid
Duration of Test (Hours)	15 Hours
Test Parameters	Observation
Size (mm)	100.50L x20.06W x 3.20 Thk in mm
Total Surface Area of the Specimen (cm ²)	= 48.0364 cm ²
Start of Boiling (dd/mm/yy)	27/02/2020 (6.00 pm)
End of Boiling (dd/mm/yy)	28/02/2020 (9.00 am)
Bend Test	1T/180 Degree
Evaluation	No Cracks and IG Fissures Observed at 20x Magnification. No Intergranular attack Observed at 250x Magnification

Conclusion : Test Found Satisfactory

Remarks : The Macro & Micro Photographs are exhibited in Annexure - A.

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ISO / IEC : 17025 : 2017 Accredited by NABL, Dept. of Science & Technology, India

TEST REPORT

ANNEXURE – A

Test Report No: TSPL/ T/02/200224 - 23/C-M-Met-4638 - 013

Date: 18.03.2020

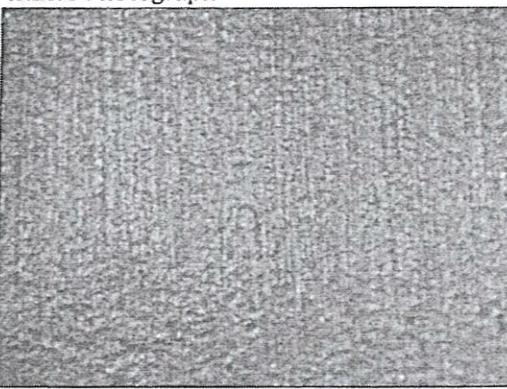
ULR - TC661820000004495F

Page 4 of 4

Micro Examinations



Mag: 200x



Mag: 20x



Mag: 250x

Intergranular Corrosion Test (Practice -E)

Micro Photograph



Mag:250x

IGP

FND OF THE TEST REPORT

REVIEWED & ACCEPTED

Authorized Signatory

S. GUNASEKARAN
(Technical Manager - Mechanical)



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