

TUV SUD South Asia

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CERTIFICATE OF CONTROL

[Rule 13(2) of SMPV(U) Rules, 2016]

Certificate No. : PV(R)444/CPS56110/12(2)/TN/275

Date : 24/04/2018

1.0 Manufacture Detail :-

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| 1.0 Manufacture: | M/s.Cryolor Asia Pacific Private Limited |
| 1.1 Fabrication shop CCE approval No: | A/S/HQ/TN/PVM/2(S87394) Dated:19.01.2018 |
| 1.2 Validity of shop approval No: | Validity till 31.12.2018 |
| Address of manufacturing unit indicating Place/Site: | 100 KM Miles stone, |
| Plot No./Survey No: | GST Road, |
| Village/Ind. Estate: | Village Kadaimalaiputtur |
| District : | KANCHIPURAM |
| State : | Tamil Nadu |
| 1.4 Purchaser/for whom intended: | Stock |
| 1.5 Site of installation: | Stock |
| 1.6 Purchase order No: & Date: | Stock |
| 1.7 Manufacturer's drawing No1: | HC002573 Rev.A |
| Manufacturer's drawing No2: | HC002575 Rev.00 |
| Manufacturer's drawing No3: | HC002390 Rev.00 |
| Manufacturer's drawing No4: | -- |
| 1.8 Chief Controller Of Explosives: Approval Reference of design drawing: Dated: | PV(M)-805/III 12/09/2017 |
| 1.9 Inspection Date(First): | 03/11/2017 |
| 1.10 Inspection Date(Final): | 29/03/2018 |
| 1.11 Type of construction: a) Horizontal/vertical/underground/aboveground/ Mounded Vessel of mm dia X mm length(TL to TL or WL to WL) with dish ends b)mm dia Horton Sphere | Vertical Cryogenic Storage Vessel RVTA19 1850 mm OD x 6000 mm WL to WL -- |
| 1.12 Job or Vessele Identification No: | C290222 |

2.0 Design Data:-

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| 2.1 Design and construction code: | ASME SECTION VIII DIV.1 |
| 2.2 Name of compressed gas: | LIN/LOX/LAR |
| 2.3 Water capacity(Gross/net in case of cryogenic vessel): | 19290 / 17770 Ltrs. |
| 2.4 Maximum allowable working pressure: | 17.335 Kg/cm2 |
| 2.5 Design Pressure: | 19.272 Kg/cm2 (including kg/cm2 ststic head+ kg/cm2 External Load) |
| 2.6 Operating Temprature: | -196 /-183/-186 for inner vessel and Ambient for outer vessel Degree celcius to -196 Degree celcius |
| 2.7 Design Temperature: | +50 Degree celcius to -196 Degree celcius |
| 2.8 Corrosion allowance: | 0 mm |
| 2.9 Joint efficiency: | SHELL LONG SEAM 1.0, CIR-SEAM-0.9, HEAD-1.0 |
| 2.10 Radiography: | Longitudinal 100 % Circumferential 100 % T-joints 100 % Spot -- % |
| 2.11 Post weld heat treatment: | Not Applicable. |



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|--------------------------|-------------------------------|----------------------|----------------------|
| 2.12 Hydrotest pressure: | 29.572 Kg/cm ² | | |
| 2.13 Thickness: | | Shell | Dish end |
| | a) Min. calculated without CA | 6.463 mm | 6.441 mm |
| | b) Corrosion Allowance | 0 mm | 0 mm |
| | c) Nominal | 6.7 mm | 8.0 mm |
| | d) Actual Thickness observed | Between 7.0 & 7.2 mm | Between 7.3 & 7.7 mm |

Note: In case of cryogenic vessel, please indicate design data of inner as well as outer vessels.

3.0 Material Specification:-

| Item | Specification | Origin And T.C. No. |
|----------------|-----------------|---|
| Main Shell | SA 240 TYPE 304 | Jindal stainless Limited, T.C.No.:JSL-JRD/QA/2017-18/DOM/00339896 |
| Dish ends | SA 240 TYPE 304 | SHANXI TAIGANG STAINLESS STEEL CO LTD.,T.C.NO:6144911724643744 |
| Flanges | | |
| Cover Flanges | | |
| Coupling | | |
| Nozzle pipe | SA 312M TP 304 | TUBACEX PRAKASH INDIA PVT LTD., T.C.NO:TPIPL/MTC/01778, MAXIM TUBES COMPANY PVT LTD., T.C.NO:MTCPL/2016-2017/0408-B,MTCPL/2016-2017/0309-B, MTCPL/2015-2016/0937-B,MTCPL/2013-14/0723-B |
| Pad plate | | |
| Fasteners | | |
| Gaskets | | |
| Internals | | |
| Ladder support | | |
| Vessel support | SA 240 TYPE 304 | Jindal Stainless limited, T.C.No.:JSL-JRD/QA/2017-18/DOM/00311575 |

* Test certificates for materials are varified and found in order.

4.0 Welding Details:-



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| 4.1 WPS/PQR/WPQ: | Procedure & performance test as per ASME SECTION IX and found satisfactory |
| 4.2 Names of qualified welders: | CAP003-MR.R.Bangaru,CAP002- Mr.N.Sivakumar, CAP010-Mrs.S.Vidhya, CAP015-Mr.B.Sabiran, CAP023-Mr.R.Manivannan, CAP031-Ms.V.Andal, CAP036-Mr.P.Gnanaprakash, CAP007-Mr.R.Thirunavukarasu,CAP030-, CAP011-Mrs.Devi,CAP006-Mr.R.Sundarasan |
| 4.3 Name of CCE approved third party inspecting agency who qualified the welders and validity of their performance qualification: | TUV SUD SOUTH ASIA, CAP010, CAP015, CAP002,CAP003,CAP030, CAP011,CAP007,CAP023,CAP036,CAP006, CAP031 VALIDITY TILL-06.05.2018 |
| 4.4 Weldings process: | GTAW & SAW |
| 4.5 Welding consumables: | SAW Filler Metal- ER 308L SAW 125, ADOR FONTECH, SAW Flux- |



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| | 120S- ADOR FONTECH, TIG Filler Wire- ER 308L, TIG-120, ADOR FONTECH |
| 4.6 Calibration Certificate, validity & make of welding machine(s): | Make SAF-FRO; Identification No.: TIG/AM-1,TIG/VM-1to TIG/AM-8,TIG/VM-8,TIG/AM-10,TIG/VM-10 to TIG/AM-14,TIG/VM-14,Calibration Due on 15-Aug-2018,Make SUBARC-5,Identification No.: SAW/AM-1; SAW/VM-1 to SAW/AM-2; SAW/VM-2 Calibration Due on -15-Aug-2018, |
| 5.0 Inspection & Tests at Shop :- | |
| 5.1 Raw Materials: | MTCs reviwed for Inner Vessel Plate,Pipes |
| 5.2 Set ups: | Inner Vessel Shell LS Fit up, CS Fit up, Dished End with Nozzle Fit up & Shell with Dished End set ups. |
| 5.3 Magnetic practice test: | Not applicable |
| 5.4 Dye Penetrant Test: | After Cold stretching Long Seam welding, attachment welding Dye Penetrant test performed satisfactory. |
| 5.5 Ultrasonic Flaw detection: | Not Applicable |
| 5.6 Radiography: | Satisfactory |
| 5.7 Production Control Test Results: (weld test coupons) | Not Applicable |
| 5.8 Post weld heat treatment method: | Not done Local stress relieving Witnessed on at -- Hrs. at -- Hrs. |
| 5.9 Post weld heat treatment method: | Not Applicable |
| 5.10 Review of heat treatment log sheets and charts: | Not Applicable |
| 5.11 Internal and External Visual Inspection: | Satisfactory |
| 5.12 Pneumatic test of RF Pads : | At None Kg/cm2(g) -- |
| 5.13 Dimensional Checks: | Satisfactory |
| 5.14 Dish end thickness measurement: | Minimum observed 7.3 mm After Dish forming against 6.441 mm minimum calculated thickness |
| 5.15 Workmanship: | Satisfactory |
| 5.16 Hydrostatic Test : | Witnessed at 29.572 kg/cm2 kg/cm2(g) for 30 minuts on 08.03.2018 and found satisfactory. |
| 5.17 As built drawing: | Drawing No. HC002573 Rev. AB "As Built" prepared by manufacturer Reviewed and endorsed |
| 6.0 Method of support :- | --- |
| 7.0 Internal equipment(s), if any:- | None |
| 8.0 Stamping on vessel:- | |
| 8.1 Hard punch location: | Name plate on outer vessel |
| 8.2 Manufacturer's Name: & Identification mark: | Cryolor Asia Pacific Manufacturer Name Plate |
| 8.3 Client/purchaser: | Stock |
| 8.4 Purchase order No: | Stock |
| 8.5 Job No./Item No./Equipment No.: | C290222 |
| 8.6 year of manufacturing: | 2018 |
| 8.7 Design Code: | ASME Sec VIII Div-1 |
| 8.8 Max. Allowable Pressure: | 17.335 kg/cm2 |
| 8.9 Design Pressure(In casr of cryogenic Vessel, furnished both for inner and outer vessels): | 19.272Kg/cm2 |
| 8.10 Design Temperature: | +50 Degree Celcius to -196 Degree Celcius |
| 8.11 Water capicity(gross): | 19290 Liters |
| 8.12 Intended for: | LIN / LOX / LAR gas service |
| 8.13 Gas capicity(if liquefiable): | -- Kgs. |
| 8.14 Radiography: | FULL |



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|--|--------------------------------|
| 8.15 Post weld Heat treatment: | -- |
| 8.16 Hydrotest Date: | 08/03/2018 |
| 8.17 Hydrotest Pressure: | 29.572 kg/cm2 |
| 8.18 Inspection by: | TUV SUD South Asia |
| 8.19 Inspecting Agency's stamp: | TUV SUD |
| 8.20 Certificate No: | PV(R)444/CPS56110/12(2)/TN/275 |
| Dated: | 23/04/2018 |
| 8.21 As built drawing No: | HC002573 Rev. AB |
| 9.0 Conclusion:- | |
| Conclusion: The undersigned inspectores hereby certify that the above pressure vessel is designed, fabricated, tested and inspected during various stages of manufacturer in accordance with above said code and found fit for use for the designed service. | |
| Issued at: | Mumbai |
| Issued on: | 24/04/2018 |
| 10.0 Remarks:- | |
| Remarks: | |
| <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>Signature : <i>[Signature]</i> (Narayanan Krishnan) BE Mechanical AVP-COG Name of Counter Signing Authority/Person Ref. No. :CPS56110-2; Revalidation Date : 03/07/2013 Place: Mumbai Date : 24/04/2018</p> </div> <div style="text-align: center;">  <p>Signature : <i>[Signature]</i> (Prakash Naik) BE Mechanical General Manager - Technical Name of Competent Person Ref. No. :CPS56110-1; Revalidation Date : 03/07/2013 Place of Test: Chennai Date : 24/04/2018</p> </div> </div> | |
| Note : This Certificate shall be generated through PESO's Online System. This Certificate shall be considered valid only when signed by Competent Person and Counter Signing Authority both. | |