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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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NSCX PROTOTYPE VACUUM VESSEL SEGMENT
SCOPE OF WORK: NCSX-SOW-121-01-02
SPECIFICATION: NCSX-CSPEC-121-01-01

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| Sub ID 0 | Part ID NSCX PROTOTYPE VACUUM VESSEL SEGMENT | Qty 1 | Drawing ID / Rev SE121-003P / -- |
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SCOPE OF WORK: N

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|---|---|-----------------------|-------------------------|----------------------|--------------------------------------|
| Operation Sub: 0 / Seq: 10 (F) | Resource 700-BLUE TEAM, ENGINEERING SOW 3.2.1 TASK 2 MIT/QA PLANS FOR PVVS FOR VVSA | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121 / A |
|---|---|-----------------------|-------------------------|----------------------|--------------------------------------|

IDC Count : 0 Dwg Count: 5 Pgm Count: 0 QAP Count: 0 NDT Count: 0 WPS Count: 0

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|----------------|----------------|------------|-------------------------|---------------|-------------------|
| Piece # | Part ID | Qty | Drawing ID / Rev | Vendor | Dimensions |
|----------------|----------------|------------|-------------------------|---------------|-------------------|

| | | | | | |
|----|--|------|--|------|--|
| 10 | INCONEL625_062_GTAW-WELD WIRE/GTAW, .062 DIA Vendor Part ID: INCONEL625_062_GTAW Mfg Part ID: INCONEL 625 (F) ASME/AWS SFA 5.14, ERNiCrMo-3 | 34.0 | | 4434 | |
|----|--|------|--|------|--|

INCONEL 625 WELD WIRE, CUT LENGTH
0.062" DIA. X 36" LONG.
SUPPLIED IN 10 LB TUBES.

EACH PIECE OF CUT LENGTH WIRE MUST BE IDENTIFIED AT MINIMUM WITH THE AWS WELD WIRE CLASS.

MATERIAL CERTIFICATION REQ'D WITH SHIPMENT

Material Certification: TRACE ID: 38561
Part Number: SE121-001P
Part Description: PVVS PRIMARY WELDMENT

QAP Count: 3

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|----------------|----------------|------------|-------------------------|---------------|-------------------|
| Piece # | Part ID | Qty | Drawing ID / Rev | Vendor | Dimensions |
|----------------|----------------|------------|-------------------------|---------------|-------------------|

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|----|--|------|--|------|--|
| 30 | INCONEL625_093_GTAW-WELD WIRE/GTAW, .093 DIA Vendor Part ID: INCONEL625_093_GTAW Mfg Part ID: INCONEL 625 (F) ASME/AWS SFA 5.14, ERNiCrMo-3 | 54.0 | | 4434 | |
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INCONEL 625 WELD WIRE, CUT LENGTH
0.093" DIA. X 36" LONG.
SUPPLIED IN 10 LB TUBES.

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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EACH PIECE OF CUT LENGTH WIRE MUST BE IDENTIFIED AT MINIMUM WITH THE AWS WELD WIRE CLASS.

MATERIAL CERTIFICATION REQ'D WITH SHIPMENT

Material Certification: TRACE ID: 41171
Material Certification:
Part Number: SE121-001P
Part Description: PVVS PRIMARY WELDMENT

QAP Count: 4

| Piece # | Part ID | Qty | Drawing ID / Rev | Vendor | Dimensions |
|---------|---|-----|------------------|--------|------------|
| 40 | INCONEL625_035_GMAW-WELD WIRE/GMAW, .035 DIA | 6.0 | | | |
| (R) | Mfg Part ID: INCONEL 625 ASME/AWS SFA 5.14, ERNiCrMo-3 | | | | |

INCONEL625_035_GMAW
WELD WIRE, GMAW .035 DIA.
CERTS AND MILL TEST REPORTS REQUIRED WITH SHIPMENT

Material Certification:
Part Number: SE121-001P
Part Description: PVVS PRIMARY WELDMENT

QAP Count: 3

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | | |
|-------------------------|---|---------------|--------------|--------------|------------------|--------------|--------------|--|--|--|
| Sub: 0 / Seq: 11 (F) | 700-BLUE TEAM, ENGINEERING SOW 3.1 TASK 1 3.1.1 METHODS FOR FABRICATING VVSA 3.1.2 DESIGN CHANGES 3.1.3 PRELIMINARY MIT/AQ FOR VVSA 3.1.4 BUDGETARY COST/SCHEDULE FOR VVSA | 1.00 | 1.00 | 1.00 | | | | | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 | | | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | | |
|-------------------------|---|---------------|--------------|--------------|------------------|--------------|--------------|--|--|--|
| Sub: 0 / Seq: 12 (F) | 700-BLUE TEAM, ENGINEERING SOW 3.3.1 & SOW 3.3.2 Task 8 3.3.1 FINAL MIT/QA FOR VVSA 3.3.2 FINAL COST/SCHEDULE FOR VVSA | 1.00 | 1.00 | 1.00 | | | | | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 | | | |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|-------------------------|---|---------------|-----------------|--------------|-------------------------|
| Sub: 0 / Seq: 13 (F) | 700-BLUE TEAM, ENGINEERING ENGINEERING, PLANNING & PROJECT MGT TASK 9 | 1.00 | 1.00 | 1.00 | |

FOLLOWING IS A LIST STANDARD OPERATING PROCEDURES AND WORK INSTRUCTIONS THAT APPLY IN PART OR IN WHOLE TO THE EXECUTION OF THIS WORK ORDER.

ENGINEERING OPERATIONS WILL BE PERFORMED PER THE FOLLOWING STANDARD OPERATING PROCEDURES: ENGSOP01 - Mfg. Quality Plans; ENGSOP02 - Specification-Standard Control; ENGSOP03 - Internal Drawing Generation; ENGSOP04 - Drawing Control.

CAD / CAM OPERATIONS WILL BE PERFORMED PER THE FOLLOWING STANDARD OPERATING PROCEDURE: CADSOP01 - CNC Program Control;

MANUFACTURING OPERATIONS WILL BE PERFORMED PER THE FOLLOWING STANDARD OPERATING PROCEDURES: MFGSOP01 - Project Manufacturing; MFGSOP02 - Material Handling and Storage; MTL SOP01 - Material Storage; PCSOP01 - Production Control; QASOP01 - Nonconformance Control; QASOP03 - Traceability-Identification

QUALITY ASSURANCE AND INSPECTION OPERATIONS WILL BE PERFORMED PER THE FOLLOWING STANDARD OPERATING PROCEDURES: QASOP01 - Nonconformance Control; QASOP05 - Calibration

RECEIVING INSPECTION OPERATIONS WILL BE PERFORMED PER THE FOLLOWING STANDARD OPERATING PROCEDURE: QASOP04 - Receiving Inspection

IN-PROCESS INSPECTION OPERATIONS WILL BE PERFORMED PER THE FOLLOWING STANDARD OPERATING PROCEDURE: QASOP02 - In Process Inspection

SHIPPING OPERATIONS WILL BE PERFORMED PER THE FOLLOWING STANDARD OPERATING PROCEDURE: SHSOP01 - Shipping-Packaging

MACHINING OPERATIONS WILL BE PERFORMED PER THE FOLLOWING STANDARD OPERATING PROCEDURE: TLGSOP01 - Cutting Tool Control

WELDING OPERATIONS WILL BE PERFORMED PER THE FOLLOWING STANDARD OPERATING PROCEDURES: WLDSOP02 - Qualification of Welders and WPS; WLDSOP03 - Welding Process Development; WLDSOP04 - Stores Control of Weld Wire; WLDSOP05 - Weld Mapping; WLDSOP06 - Welding Filler Metal and Flux Procurement

ENGINEERING OPERATIONS WILL BE PERFORMED PER THE FOLLOWING WORK INSTRUCTIONS: ENGWI001 - Material Card; ENGWI002 - Drawing Control; ENGWI003 - Bill of Manufacturing; ENGWI005 - Engineering Contract Review; ENGWI007 - Work Order Review Release; ENGWI008 - Operation Cards; ENGWI009 - Quality Planning; ENGWI010 - Service Cards; ENGWI013 - Work Order Header Card Maintenance; ENGWI014 - Inspection Fields; ENGWI019 - Nonconformance to Customers.

CAD / CAM OPERATIONS WILL BE PERFORMED PER THE FOLLOWING WORK INSTRUCTIONS: CADWI004 - Developing a CAD/CAM program; CADWI005 - Updating CAD/CAM Program or File

MANUFACTURING OPERATIONS WILL BE PERFORMED PER THE FOLLOWING WORK INSTRUCTIONS: MFGWI018 - Workmanship; PCWI001 - Use of MTM Routing; PCWI004 - Scheduling System Procedures

CLEANING / WASHING OPERATIONS WILL BE PERFORMED PER THE FOLLOWING WORK INSTRUCTION: MFGWI005 - High Pressure-High Temperature Water Cleaning of Parts

SUBCONTRACT OPERATIONS WILL BE PERFORMED PER THE FOLLOWING WORK INSTRUCTION: PCWI005 - Subcontract Procedure; PURWI002 - Vendor Setup and Assessment

NON-DESTRUCTIVE TESTING OPERATIONS WILL BE PERFORMED PER THE FOLLOWING WORK INSTRUCTIONS: NDTWI001 - NDT Exam Personnel Qualification; NDTWI011 - Visual Weld Inspection

QUALITY ASSURANCE, IN-PROCESS INSPECTION OPERATIONS AND/OR RECEIVING INSPECTION OPERATIONS WILL BE PERFORMED PER THE FOLLOWING WORK INSTRUCTIONS: QAWI001 - MTM Inspection Method Guidelines; QAWI006 - Sampling Inspection Criteria; QAWI008 - Receiving Ordered Material; QAWI010 - Calibration; QAWI015 - Checking Out and Returning Gauges; QAWI017 - Recording Inspection Results; QAWI018 - Quality Sign Off Control; QAWI020 - Organization and Control of Quality Records; QAWI021 - Quality Record Storage and Retention; QAWI023 - Nonconformance System Navigation; QAWI026 - Part Relocation with SMX; QAWI027 - SMX Part Inspection Checklist; QAWI028 - QAP Data Package Generation; QAWI029 - Scanning Certifications; QAWI031 - Material Certification Program.

SHIPPING OPERATIONS WILL BE PERFORMED PER THE FOLLOWING WORK INSTRUCTIONS: SHWI002 - Guidelines for Shipping Documentation; SHWI003 - General Guidelines for Building Containers; SHWI004 - Guidelines for Loading Parts for Shipment; SHWI005 - General Guidelines for Packaging Parts; SHWI007 - Guidelines for Coordinating Transport.

WELDING OPERATIONS WILL BE PERFORMED PER THE FOLLOWING WORK INSTRUCTIONS: WLDWI003 - Welding Personnel Training; WLDWI004 - Welder

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|-------------------------------|----------------|-----------------|--|---------------------------------------|

Performance Qualification; WLDWI005 - Storage and Maintenance of Welding Documents; WLDWI006 - Welding Engineering Work Order Review Process; WLDWI007 - Weld Wire and Stub Control; WLDWI008 - Assessment of Welder's Ability
 BLAST BOOTH OPERATIONS WILL BE PERFORMED PER THE FOLLOWING WORK INSTRUCTIONS: SBWI001 - General Sandblast Guidelines;
 MATERIAL PROCUREMENT OPERATIONS WILL BE PERFORMED PER THE FOLLOWING WORK INSTRUCTIONS: PURWI001 - Purchasing Data; PURWI002 - Vendor Setup and Assessment

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 0 NDT Count: 0 WPS Count: 0

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| Operation Sub: 0 / Seq: 14 (U) | Resource 700-BLUE TEAM, ENGINEERING ENGINEERING TECHNICAL SUPPORT | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev | IDC Count : 0 | Dwg Count : 0 | Pgm Count : 0 | QAP Count : 0 | NDT Count : 0 | WPS Count : 0 |
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|---|--|-----------------------|-------------------------|----------------------|--|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Operation Sub: 0 / Seq: 15 (U) | Resource 805-INPROCESS INSPECTION - PLA QUALITY ENGINEERING REVIEW OF CUSTOMER PRODUCT SPECIFICATION AND STATEMENT OF WORK. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev NCSX-SOW-121-01-02 / 02JU | IDC Count : 0 | Dwg Count : 0 | Pgm Count : 0 | QAP Count : 0 | NDT Count : 0 | WPS Count : 0 |
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| Operation Sub: 0 / Seq: 20 (F) | Resource 825-FINAL INSPECTION - PLANTS 1 FINAL VISUAL INSPECTION (ENGINEERING CONCURRENCE REQUIRED). FINAL CLEANLINESS VERIFICATION PER PP475 AND PREPARE CERTIFICATION / CLEANLINESS REPORT COMPILE ELECTRONIC DATA BOOK INFORMATION PER MTM QAP. TAKE SEVERAL PHOTOGRAPHS OF PART PREPARE C OF C AND REQUEST FOR SHIPPING RELEASE (CONTACT ENGINEERING (DOUG MCCORKLE) FOR RELEASE FORM IF NOT AVAILABLE ELECTRONICALLY. WITNESS AND PHOTOGRAPH THE PACKAGING / PREPARATION FOR SHIPMENT (NEXT SEQUENTIAL OPERATION). Test Certification: CLEANLINESS CERTIFICATION Rev: Part Number: SE121-003P Part Description: NCSX PVVS COMPLETE Specification: PP475 Rev: 6 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121 / A | IDC Count : 0 | Dwg Count : 5 | Pgm Count : 0 | QAP Count : 4 | NDT Count : 0 | WPS Count : 0 |
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| Operation Sub: 0 / Seq: 30 (F) | Resource 425-SHIPING - PLANTS 1 & 2 SHIP PER CUSTOMER RELEASE FORM (CONTAINER MANUFACTURED IN SUB I.D. 28) AT A MINIMUM ENSURE THE PART IS COMPLETELY WRAPPED WITH PLASTIC FOAM AND SHRINK WRAP. DO NOT APPLY TAPE TO THE PART. THE PLASTIC FOAM CAN BE TAPED ONLY TO ITSELF TO HOLD POSITION UNTIL SHRINK WRAP IS APPLIED. SPECIAL CRATE REQUIREMENTS: CONTAINER MUST BE CLEARLY MARKED WITH THE FOLLOWING INFORMATION: | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121 / A | IDC Count : 0 | Dwg Count : 5 | Pgm Count : 0 | QAP Count : 4 | NDT Count : 0 | WPS Count : 0 |
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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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SUPPLIER:
 MAJOR TOOL & MACHINE, INC.
 1458 E. 19TH ST.
 INDIANAPOLIS, IN 46218
 CONTENTS:
 SE121 NCSX PVVS
 Specification: PP475 Rev: 3

IDC Count : 0 Dwg Count: 5 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 0

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| Operation Sub: 0 / Seq: 9876 | Resource 601-AUTOMATED SCHEDULING BU Drw N/A IDC N/A | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev IDC Count : 0 Dwg Count: 0 Pgm Count: 0 | Service ID TESTNG/MISC QAP Count: 0 NDT Count: 0 WPS Count: 0 |
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| Sub ID 1 | Part ID SE121 PROTOTYPE VACUUM VESSEL | Qty 1 | Drawing ID / Rev SE121 / A Parent Sub:0 Op:20 |
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| Operation Sub: 1 / Seq: 10 (F) | Resource 230-FABRICATION - WEIDNER FABRICATION OPERATION # 1 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A |
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ACQUIRE THE FOLLOWING DIE FORMED PANELS:

- SE121-001P-2 PANEL 1
- SE121-001P-2 PANEL 2
- SE121-001P-2 PANEL 3
- SE121-001P-2 PANEL 4
- SE121-001P-2 PANEL 5

PRIOR TO FITTING AND TRIMMING, DETERMINE WHICH PANELS ARE GOING TO BE GROUPED AND WELDED TOGETHER AS "SUB-SETS") TO MINIMIZE AND CONTROL WELDING DISTORTION. ENGINEERING CONCURRENCE REQUIRED.

THE PANEL FITTING / INSTALLATION SEQUENCE PLAN IS TO PRODUCE ONE TWO PANEL SUB-SET, AND ONE THREE PANEL SUB SET (ONE WELD AT A TIME). THIS WILL REDUCE THE FINAL ASSEMBLY WELDING DISTORTION FROM 5 TO 2 WELD JOINTS. IT WILL ALSO PROVIDE FOR EASIER ADJUSTMENTS / COMPENSATION AFTER INDIVIDUAL WELDS ARE COMPLETED. THE TWO PANEL SUB-SET WILL BE MADE BY FITTING AND WELDING TWO ADJACENT PANELS TOGETHER, LEAVING EXCESS TRIM STOCK ON EACH OUTER EDGE FOR FITTING THE NEXT PANEL / SUB-SET TO THEM. THE THREE PANEL SUB-SET WILL BEGIN AS A TWO PANEL SUB-SET WITH THE REMAINING INDIVIDUAL PANEL FIT AND WELDED IN PLACE AFTER THE FIRST WELD IS COMPLETED.

ONCE PANEL SUB-SETS AND WELD SEQUENCES HAVE BEEN ESTABLISHED, ALIGN, FIT, AND TRIM EACH PANEL ACCORDING TO THE BUILD FIXTURE REGISTER SURFACES, TRIM LINES, AND ADJACENT PANEL SURFACES.

GRIND WELD PREPS AND CLEAN THE WELD JOINT AND APPROXIMATELY THREE INCHES OF THE SURROUNDING AREA PER PP475. START BY SETTING EACH PANEL INDIVIDUALLY ONTO THE MACHINED REGISTER OF THE BUILD FIXTURE BASE-PLATE (THE DATUM -B- SURFACE (10 DEGREE

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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OFFSET) DOWN). TRIM THE MATING VERTICAL WELD JOINT OF EACH PANEL SET TO PLUS 0.03" (MINIMUM) FROM THE TRIM LINE. TRIM THE OUTER SURFACES OF THE EACH TWO PANEL SET AT LEAST 0.06" OUTSIDE THE TRIM LINE (TO ENSURE TRIM STOCK IS AVAILABLE FOR ADJACENT PANEL / PANEL SUB-SET).

EACH SUB-SET IS TO BE RELEASED FROM THE BUILD FIXTURE AFTER WELDING TO ENSURE STABILITY PRIOR TO TRIMMING, FITTING, AND WELDING SUBSEQUENT PANELS / SETS.

TRIM THE TOP AND BOTTOM EDGES OF EACH PANEL TO APPROXIMATELY 0.04" (MINIMUM) ABOVE THE FIXTURE RISER FACE (FOR SHRINKAGE AND FINAL TRIMMING ALLOWANCE).

NOTE THAT THE INTERIOR PROFILE FIXTURE REST STOP SURFACES ARE POSITIONED AT NOMINAL GEOMETRIC POSITION TO AVOID STARTING ANY LOWER THAN MID-TOLERANCE. SHIM IF NECESSARY TO MAINTAIN AN AVERAGE PROFILE STARTING POSITION OF (+.090"). ENSURE NO GAPS BETWEEN THE PRODUCTION PANELS AND FIXTURE REST STOPS ARE GREATER THAN (+.18") PRIOR TO TACK WELDING IN PLACE. (ENGINEERING CONCURRENCE REQUIRED) ENSURE THE MATERIAL THICKNESS IS ADEQUATE TO ALLOW NORMAL REDUCTION THAT WILL OCCUR FROM GRINDING / BLENDED / POLISHING THE WELDS. INSPECT THICKNESS WITH A U-T GAGE. NOTIFY ENGINEERING (DOUG McCORKLE) IF CONCERNS EXIST. ENSURE EACH PANEL IS ALIGNED (SMOOTH AND CONTINUOUS) TO ITS ADJACENT MEMBER AND MIS-MATCH IS MINIMIZED. CWI / ENGINEERING CONCURRENCE REQUIRED.

AS EACH PANEL IS POSITIONED, FIT AND TRIMMED, LAYOUT AND PRICK PUNCH THE APPROXIMATE INSPECTION POINTS PER DRAWING SE121-001P-1MTM. NOTE THAT THE SOLE PURPOSE OF THE PUNCH MARKS IS TO MAINTAIN REPEATABLE PROFILE INSPECTIONS THROUGHOUT THE FABRICATION PROCESS. THE DEPTH OF EACH PUNCH MARK NEEDS TO BE ONLY DEEP ENOUGH THAT IT WOULD NOT BE REMOVED BY NORMAL PREPARATION / WELDING / BLENDED / BLASTING, ETC.

PREP, AND WELD PANEL SETS TOGETHER (SEQUENCING WELDS AND JOINTS TO MINIMIZE INDIVIDUAL AND OVERALL WELD DISTORTION)

ENSURE QUALITY ASSURANCE AND CERTIFIED WELDING INSPECTORS ARE CLOSELY INVOLVED, AND INTER-PASS PROFILE AND VISUAL INSPECTIONS ARE PERFORMED ON EACH SUB-ASSEMBLY AFTER TACK WELDING, ROOT PASS, EACH INTER-PASS, AND COVER PASS IS COMPLETED.

GRIND PREPS ON EACH PANEL WELD JOINT (*****FINAL WELD PREP CONFIGURATION UNDER DEVELOPMENT!!!! WILL BE FINALIZED AFTER THE WELD TESTING PERFORMED UNDER TEST SUB ID *****).

***NOTE: THE WELD JOINT ROOT / FACE MUST BE ORIENTATED TO KEEP THE BEAD WIDTH ON THE INTERIOR SIDE OF THE VESSEL (VACUUM SIDE) AS NARROW AS POSSIBLE. INTERIOR SIDE WELD FACES SHOULD BE KEPT AS NARROW AS POSSIBLE (1 WELD BEAD WIDTH MAX). PURGE EACH WELD JOINT WITH 100% ARGON. PURGE DAM MATERIAL MUST BE MADE FROM EITHER 625 INCONEL OR 300 SERIES STAINLESS STEEL. NOTE THAT THE PURGE IS TO BE MAINTAINED THROUGHOUT THE WELDING PROCESS ON ALL JOINTS. ASSIST Q/A WITH PROFILE VERIFICATION.

Part Number: SE121-001P
Part Description: NCSX PVVS
Specification: PP475 Rev: 4

IDC Count : 15 Dwg Count: 0 Pgm Count: 0 QAP Count: 3 NDT Count: 0 WPS Count: 1

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
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| Sub: 1 / Seq: 20 | 817-SMX LASER | 1.00 | 1.00 | 1.00 | SE121-001P-1MTM / 2A |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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(F) INSPECTION OPERATION # 1

AFTER EACH SUB-SET IS COMPLETELY TACK WELDED, INSPECT / VERIFY POSITIONING, FITUP, AND PROFILE OF EACH TACK WELDED SUB-SET PER THE FOLLOWING:
 INCLUDE AT LEAST THREE DATUM TARGETS IN EACH POINT CLOUD SCAN FOR ALIGNMENT / VERIFICATION TO THE 3D MODEL.
 ENSURE THE PART PROFILE IS WITHIN THE UPPER HALF OF THE APPLIED BI-LATERAL TOLERANCE AS FOLLOWS: VERIFY THAT NO INSPECTION POINT IS ABOVE THE HIGH LIMIT OF TOLERANCE (OUTWARD) OR BELOW NOMINAL (INWARD).
 RECORD ACTUAL (HIGH/LOW RANGE) ON MTM IDC
 REPORT ANY OUT OF TOLERANCE READINGS VIA MTM NCR
 NOTIFY ENGINEERING (DOUG McCORKLE) FOR EVALUATION OF RESULTS PRIOR TO RELEASING THE PART BACK TO PRODUCTION.
 INSPECTION POINT GRID: 6" CENTERS THROUGHOUT WITH 1" CENTERS AT AND NEAR WELD JOINTS.
 ENSURE THE FIXTURE DATUM TARGETS ARE ADEQUATELY POSITIONED FOR THE REPOSITIONING AT THE NEXT SEQUENTIAL INSPECTION
 INSPECT THE MAGNETIC PERMEABILITY AND MATERIAL THICKNESS AT EACH PROFILE INSPECTION POINT.
 RECORD PROFILE, MAGNETIC PERMEABILITY, AND MATERIAL THICKNESS ON SE121-001P-1MTM, RESULTS MUST BE RECORDED, REVIEWED BY ENGINEERING, SCANNED AND LINKED PRIOR TO COMPLETING THE INSPECTION SEQUENCE.
 Part Number: SE121-001P
 Part Description: PVVS PRIMARY WELDMENT
 Specification: PP476 Rev: 2
 Specification: PP477 Rev: 2
 Specification: PP475 Rev: 6
 Map(s): SE121-001P-1MTM Rev: 2A

IDC Count : 2 Dwg Count: 1 Pgm Count: 0 QAP Count: 6 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|-------------------------|--|--------|----------|-------|------------------|
| Sub: 1 / Seq: 30 (F) | 230-FABRICATION - WEIDNER FABRICATION OPERATION # 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A |

PRIOR TO BEGINNING, NOTIFY ENGINEERING / CFT THE PART IS READY AND AVAILABLE FOR POSSIBLE CUSTOMER HOLD / WITNESS POINT INSPECTION. HOLD FOR RESPONSE AND/OR FURTHER DIRECTION.

BACK PURGE THE WELD JOINT SURFACES WITH 100% ARGON. PURGE DAM MATERIAL MUST BE MADE FROM EITHER 625 INCONEL OR 300 SERIES STAINLESS STEEL.

WELD ROOT PASSES (INCREMENTALLY, USING BACK-STEPPING METHOD TO MINIMIZE SHRINKAGE) ON ALL FIVE WELD JOINTS.

NOTE THAT THE BACK SIDE OF THE JOINT MUST REMAIN PURGED UNTIL THE ENTIRE JOINT IS COMPLETELY FILLED.

NOTE BURN-THROUGH, AND BACK-WELD FACES SHOULD BE KEPT AS NARROW AS POSSIBLE.

CWI VISUAL INSPECT ROOT WELDS 100% UNDER 8X MAGNIFICATION PER ASME CODE ARTICLE 6, SECTION V. ACCEPTANCE PER AWS D1.6, 6.29.1.

Test Certification: CWI CERTIFICATE Rev:

Part Number: SE121-001P

Part Description: PVVS PRIMARY WELDMENT

Method: VT-PP-001 Rev: B

Specification: PP475 Rev: 6

IDC Count : 5 Dwg Count: 0 Pgm Count: 0 QAP Count: 5 NDT Count: 0 WPS Count: 1

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
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| Sub: 1 / Seq: 40 (F) | 817-SMX LASER INSPECTION OPERATION # 2 | 1.00 | 1.00 | 1.00 | SE121-001P-1MTM / 2A |

AFTER THE ROOT WELDS ARE COMPLETE (FABRICATION DEPT. WILL COORDINATE); RE-INSPECT / VERIFY PART PROFILE IS WITHIN APPLIED TOLERANCE AND RECORD WELDING SHRINKAGE / DISTORTION REALIZED TO THIS POINT.
 INSPECTION POINT GRID: 6" CENTERS THROUGHOUT WITH 1" CENTERS AT AND NEAR WELD JOINTS.
 INCLUDE AT LEAST THREE DATUM TARGETS IN EACH POINT CLOUD SCAN FOR ALIGNMENT / VERIFICATION TO THE 3D MODEL.
 RECORD ACTUAL (INDIVIDUAL) MEASUREMENTS ON INSPECTION FORM (SE121-2MTM). RECORD ACTUAL (HIGH/LOW RANGE) ON MTM I.D.C.
 INSPECT AND RECORD MAGNETIC PERMEABILITY.
 REPORT ANY OUT OF TOLERANCE READINGS VIA MTM NCR.
 NOTIFY ENGINEERING (DOUG McCORKLE) FOR EVALUATION OF RESULTS PRIOR TO RELEASING PART. NOTE THAT PROFILE READINGS SHOULD REMAIN NEAR TO ABOVE NOMINAL. INWARD DISTORTION APPROACHING THE LOW LIMIT OF TOLERANCE MUST BE ADDRESSED (AND CORRECTIVE ACTION IMPLEMENTED) PRIOR TO COMPLETING WELDING PROCESS.
 ENSURE THE FIXTURE DATUM TARGETS ARE ADEQUATELY POSITIONED FOR THE NEXT SEQUENTIAL INSPECTION.
 RECORD PROFILE, MAGNETIC PERMEABILITY, AND MATERIAL THICKNESS ON SE121-001P-1MTM, RESULTS MUST BE RECORDED, REVIEWED BY ENGINEERING, SCANNED AND LINKED PRIOR TO COMPLETING THE INSPECTION SEQUENCE.
 Part Number: SE121-001P
 Part Description: PVVS PRIMARY WELDMENT
 Specification: PP476 Rev: 2
 Specification: ASTM A800 Rev: 2001
 Specification: PP475 Rev: 6
 Specification: PP477 Rev: 2
 Map(s): SE121-001P-1MTM Rev: 2A

IDC Count : 2 Dwg Count: 1 Pgm Count: 0 QAP Count: 7 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|-------------------------|--|---------------|-----------------|--------------|-------------------------|
| Sub: 1 / Seq: 70 (F) | 230-FABRICATION - WEIDNER FABRICATION OPERATION # 3 | 1.00 | 1.00 | 1.00 | SE121-001P / A |

AFTER OBTAINING ENGINEERING, Q/A PROFILE ACCEPTANCE, AND AUTHORIZATION TO PROCEED, WELD THE REMAINDER OF THE STRUCTURAL WELD JOINTS. SEQUENCE WELDING AND UTILIZE BACK-STEPPING METHODS TO MINIMIZE DISTORTION AND NUMBER OF INTER-PASSES.
 WELDING (INCLUDING TACK-WELDING BRACING) WITHIN THE FINISH PART ENVELOP ON THE INTERIOR SIDE MUST BE ABSOLUTELY MINIMIZED. ANY TACKING AND/OR WELDING ON THIS SURFACE MUST BE APPROVED BY ENGINEERING.
 CWI VISUAL INSPECT EACH WELD PASS 100% UNDER 8X MAGNIFICATION PER ASME CODE ARTICLE 6, SECTION V. ACCEPTANCE PER AWS D1.6, 6.29.1.
 EACH WELD PREP / WELD INTER-PASS MUST BE CLEANED PER PP475 PRIOR TO WELDING THE NEXT SEQUENTIAL BEAD.
 AFTER WELDING IS COMPLETE, REMOVE ANY TEMPORARY STIFFENING / SUPPORT / SHOP AID DEVICES. BLEND / TOUCH UP ATTACHMENT WELDS AS REQUIRED.
 LAYOUT THE PORT ASSEMBLY LOCATION. (ANGULAR LOCATION, OVERALL LENGTH, AND OUTLINE ARE IDENTIFIED ON THE ASSEMBLY FIXTURE). UTILIZE THE LASER TRACKER TO ENSURE POSITION PRIOR TO TACK WELDING.
 WELD THE PORT EXTENSION SUB-ASSEMBLY IN PLACE PER DRAWING.

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|-------------------------------|----------------|-----------------|--|---------------------------------------|

BACK PURGE THE WELD JOINT SURFACES WITH 100% ARGON. PURGE DAM MATERIAL MUST BE MADE FROM EITHER 625 INCONEL OR 300 SERIES STAINLESS STEEL.

NOTE THAT THE BACK SIDE OF THE JOINT MUST REMAIN PURGED UNTIL THE ENTIRE JOINT IS COMPLETELY FILLED.

CWI VISUAL INSPECT THE PORT EXTENSION WELD 100% UNDER 8X MAGNIFICATION PER ASME CODE ARTICLE 6, SECTION V. ACCEPTANCE PER AWS D1.6, 6.29.1.

FINISH POLISHING (RESTORE TO A 32 MICRO-INCH SURFACE FINISH) AND CLEANING THE INTERIOR SURFACES OF THE PORT SUB-ASSEMBLY. REFER TO CLEANING PROCEDURE PP475

CWI NOTE: THE VISUAL INSPECTION CERTIFICATE SHOULD SPECIFY EACH WELD JOINT / STRINGER PASS. IT SHOULD ALSO CLEARLY DIFFERENTIATE BETWEEN THE STRUCTURAL WELDS AND THE PORT EXTENSION WELDS.

RECORD IDC DATA

NOTE: THE NEXT THREE MANUFACTURING SEQUENCES MUST BE CLOSELY COORDINATED (BAKE-OUT, PREPARATION FOR VACUUM TEST, AND VACUUM TEST). NOTIFY PRODUCTION CONTROL, AND CFT IN ADVANCE. COORDINATION TIMES AND DATES WILL BE PROVIDED.

Test Certification: CWI CERTIFICATE Rev:

Part Number: SE121-001P

Part Description: PVVS PRIMARY WELDMENT

Specification: ASNT 2055 SNT-TC-1A Rev: 1996

Method: VT-PP-001 Rev: B

Specification: PP475 Rev: 6

Specification: PP479 Rev: 2

IDC Count : 5 Dwg Count: 0 Pgm Count: 0 QAP Count: 7 NDT Count: 0 WPS Count: 1

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|-------------------------|--|---------------|-----------------|--------------|--------------------------------|
| Sub: 1 / Seq: 71 (F) | 265-PAINT BOOTH | 1.00 | 1.00 | 1.00 | SE121 / A |
| | BAKE OUT AT 150 DEGREES C (302F) FOR 6 HOURS TO REMOVE MOISTURE IN PREPARATION FOR THE NEXT SEQUENTIAL OPERATION (VACUUM / LEAK TESTING). NOTE THAT THIS SEQUENCE MUST BE COORDINATED WITH THE VACUUM TESTING SERVICE OPERATION. CONTACT ENGINEERING (DOUG McCORKLE) AND SUBCONTRACT ADMINISTRATOR (BOB JOACHIM) PRIOR TO BEGINNING FOR TIMING AND COORDINATION. CYCLE START TIME WILL BE ADVISED. | | | | |
| | Part Number: SE121-001P | | | | |
| | Part Description: PVVS PRIMARY WELDMENT | | | | |
| | Furnace charts: FURNACE CHART | | | | |
| | Specification: PP475 Rev: 6 | | | | |
| | IDC Count : 0 | Dwg Count: 5 | Pgm Count: 0 | QAP Count: 4 | NDT Count: 0 WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|-------------------------|---|---------------|-----------------|--------------|-------------------------|
| Sub: 1 / Seq: 72 (F) | 230-FABRICATION - WEIDNER | 1.00 | 1.00 | 1.00 | |
| | VACUUM TEST PREPARATION: | | | | |
| | PRIOR TO BEGINNING, NOTIFY ENGINEERING / CFT THE PART IS READY AND AVAILABLE FOR POSSIBLE CUSTOMER HOLD / WITNESS POINT INSPECTION. HOLD FOR RESPONSE AND/OR FURTHER DIRECTION. | | | | |
| | SETUP AND PREPARE FOR SUBCONTRACT VACUUM TESTING (WHICH WILL BE PERFORMED AT SEQUENCE 73) AND RADIOGRAPHIC INSPECTION (WHICH WILL BE PERFORMED AT SEQUENCE 75) AS FOLLOWS: | | | | |

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|-------------------------------|----------------|-----------------|--|---------------------------------------|

INSTALL THE SEAL AND VACUUM TEST CAP TO THE CONFLAT FLANGE
 INSTALL AND TORQUE THE FLANGE INSTALLATION BOLTS PER MANUFACTURERS INSTRUCTIONS.
 LAYOUT ALL STRUCTURAL WELDS FOR 100% X-RAY.
 ASSIST WITH THE VACUUM TEST AND ENSURE THE FOLLOWING PRECAUTIONS ARE OBSERVED:

Caution: The vacuum test procedure will subject the vessel to an internal vacuum that generates tremendous forces. Failure of any part of the vessel or test equipment could result in implosive/explosive reactions, ejected parts and dangerous noise levels. Unnecessary personnel should vacate the test area whenever a vacuum is present in the vessel (Except essential personnel).

Specification: PP475 Rev: 2

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | Service ID |
|-------------------------|---|---------------|-----------------|--------------|-------------------------|-------------------|
| Sub: 1 / Seq: 73 (F) | 450-SUBLET VACUUM TEST THE PORT EXTENSION SUB-ASSEMBLY (WELDED TO THE VESSEL WALL) PER PP478 | 1.00 | 1.00 | 1.00 | SE121-003P / -- | MISC/SUBLET |

MTM CONTRACT ADMINISTRATOR NOTE: THIS SEQUENCE MUST BE COORDINATED WITH THE PRECEDING (BAKE OUT) OPERATION. PRODUCTION CONTROL WILL INIATE COORDINATION PRIOR TO BEGINNING THE BAKE OUT OPERATION.

Part Number: SE121-001P

Part Description: PVVS PRIMARY WELDMENT

Customer: PPPL

Test Certification: VACUUM TEST CERTIFICATE Rev:

Specification: ASTM E 498 Rev: 95

Specification: PP475 Rev: 6

Specification: PP478 Rev: --

IDC Count : 0 Dwg Count: 1 Pgm Count: 0 QAP Count: 7 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | Service ID |
|-------------------------|---|---------------|-----------------|--------------|-------------------------|-------------------|
| Sub: 1 / Seq: 75 (F) | 818-MQS CONTRACTOR X-RAY 100% RADIOGRAPHIC INSPECT THE 5 STRUCTURAL WELDS (LOCATIONS IDENTIFIED ON PART) PER THE FOLLOWING: ASME SECTION VIII, DIVISION 1, UW-51 MAP THE FILM NUMBERS AND FILM LOCATIONS ON PART DRAWING. Specification: ASME SECTION VIII Map(s): RADIOGRAPHIC INSPECTION MAP Rev: Part Number: SE121-001P Part Description: PVVS PRIMARY WELDMENT Material Type: 625 INCONEL Test Certification: RADIOGRAPHIC CERTIFICATE Rev: Material Thickness: .375" Specification: 20.A.100 Rev: Specification: PP475 Rev: 6 | 1.00 | 1.00 | 1.00 | SE121-001P / | |

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 9 NDT Count: 0 WPS Count: 0

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|-------------------------|---|---------------|-----------------|--------------|-------------------------|
| Sub: 1 / Seq: 80 (F) | 817-SMX LASER INSPECTION OPERATION # 3 | 1.00 | 1.00 | 1.00 | SE121-001P-1MTM / 2A |

RE-INSPECT / VERIFY PART PROFILE IS WITHIN APPLIED TOLERANCE AND RECORD PRIMARY STRUCTURAL WELDING SHRINKAGE / DISTORTION.
 INSPECTION POINT GRID: 6" CENTERS THROUGHOUT WITH 1" CENTERS AT AND NEAR WELD JOINTS.
 INCLUDE AT LEAST THREE DATUM TARGETS IN EACH POINT CLOUD SCAN FOR ALIGNMENT / VERIFICATION TO THE 3D MODEL.
 RECORD ACTUAL (INDIVIDUAL) MEASUREMENTS ON INSPECTION FORM (SE121-2MTM). RECORD ACTUAL (HIGH/LOW RANGE) ON MTM IDC
 INSPECT AND RECORD MAGNETIC PERMEABILITY.
 REPORT ANY OUT OF TOLERANCE READINGS VIA MTM NCR.
 NOTIFY ENGINEERING (DOUG McCORKLE) FOR EVALUATION OF RESULTS PRIOR TO RELEASING PART.
 ENSURE THE FIXTURE DATUM TARGETS ARE ADEQUATELY POSITIONED FOR THE NEXT SEQUENTIAL INSPECTION.
 RECORD PROFILE, MAGNETIC PERMEABILITY, AND MATERIAL THICKNESS ON SE121-001P-1MTM, RESULTS MUST BE RECORDED, REVIEWED BY ENGINEERING,
 SCANNED AND LINKED PRIOR TO COMPLETING THE INSPECTION SEQUENCE.
 Part Number: SE121-001P
 Part Description: PVVS PRIMARY WELDMENT
 Specification: PP475 Rev: 6
 Specification: PP476 Rev: 2
 Specification: PP477 Rev: 2
 Map(s): SE121-001P-1MTM Rev: 2A

IDC Count : 2 Dwg Count: 1 Pgm Count: 0 QAP Count: 6 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|-------------------------|--|---------------|-----------------|--------------|-------------------------|
| Sub: 1 / Seq: 90 (F) | 230-FABRICATION - WEIDNER LAYOUT AND PLASMA CUT THE PORT EXTENSION TUBE OFF THE VESSEL WALL (NORMAL TO VESSEL SURFACE) PER DRAWING. PLASMA CUT THE PORT OPENING INTO THE VESSEL WALL PER DRAWING (CUT UNDERSIZE ALLOWING FOR GRINDING / SIZING TO PORT EXTENSION I.D.) USE A CIRCLE CUTTING DEVICE TO ENSURE PROPER SIZE AND ROUNDNESS. REMOVE RECAST / HEAT AFFECTED ZONE FROM EACH CUT SURFACE BY GRINDING. GRIND / BLEND THE PORT EXTENSION EDGE AND VESSEL WALL OPENING SMOOTH (MAINTAINING PROPER SIZE AND RELATIONSHIP TO THE I.D. OF THE PORT EXTENSION TUBE). PREP THE EDGES OF THE PORT STUB AND PORT EXTENSION TUBE FOR RE-INSTALLATION. POSITION AND SKIP WELD THE BACKING RING (SE121-003P-4) IN PLACE (TO THE END OF THE DETACHED PORT EXTENSION TUBE) PER DRAWING SE121-003P RE-INSTALL THE PORT EXTENSION ASSEMBLY TO THE PORT STUB AND WELD IN PLACE PER DRAWING SE121-003P. GRIND AND BLEND THE PORT EXTENSION INTERIOR WELD SMOOTH. CWI VISUAL INSPECT EACH WELD PASS 100% UNDER 8X MAGNIFICATION PER ASME CODE ARTICLE 6, SECTION V. ACCEPTANCE PER AWS D1.6, 6.29.1. ENSURE ALL COSMETIC WELDING AND BLENDING IS COMPETE, ENSURE ALL INTERIOR SURFACES ARE POLISHED AND CLEANED, AND PREPARE PART FOR FINAL (EXTERIOR) BLAST AND FINAL INSPECTION. Test Certification: VISUAL INSPECTION CERT Rev: Part Number: SE121-003P Part Description: NCSX PVVS COMPLETE Specification: ASNT 2055 SNT-TC-1A Rev: 1996 | 1.00 | 1.00 | 1.00 | SE121-002P / -- |

| Workorder | Part ID | Qty | Drawing ID / Rev | Engineer | | |
|-----------|---|--------------|------------------|--------------------|--------------|--------------|
| 64880/1.0 | | 1 | SE121-003P / -- | BLUE/DOUG MCCORKLE | | |
| | Method: VT-PP-001 Rev: B Specification: PP475 Rev: 6 | | | | | |
| | IDC Count : 5 | Dwg Count: 1 | Pgm Count: 0 | QAP Count: 6 | NDT Count: 0 | WPS Count: 1 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | |
|--------------------------|---|--------------|--------------|--------------|----------------------|--------------|
| Sub: 1 / Seq: 100 (F) | 817-SMX LASER | 1.00 | 1.00 | 1.00 | SE121-001P-1MTM / 2A | |
| | INSPECT PROFILE IN THE AREA OF THE PORT STUB / PORT EXTENSION. INCLUDE AT LEAST THREE DATUM TARGETS IN EACH POINT CLOUD SCAN FOR ALIGNMENT / VERIFICATION TO THE 3D MODEL. INSPECT MAGNETIC PERMEABILITY IN THE AREA OF THE PORT STUB / PORT EXTENSION WELDING. INSPECT THE INTERIOR SURFACE FINISH OF THE PORT EXTENSION. RECORD IDC DATA Part Number: SE121-003P Part Description: NCSX PVVS COMPLETE Specification: PP475 Rev: 6 Specification: PP476 Rev: 2 Specification: PP477 Rev: 2 Map(s): SE121-001P-1MTM Rev: 2A | | | | | |
| | IDC Count : 3 | Dwg Count: 1 | Pgm Count: 0 | QAP Count: 6 | NDT Count: 0 | WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|---|--------|----------|-------|------------------|
| Sub: 1 / Seq: 105 (U) | 230-FABRICATION - WEIDNER | 1.00 | 1.00 | 1.00 | SE121-003P / -- |
| | INSTALL SUPPORT DEVICES TO LOCATE THE PART BACK ONTO THE FIXTURE SURFACE (UNRESTRAINED) FOR FINAL INSPECTION. Drw N/A IDC N/A IDC Count : 0 Dwg Count: 1 Pgm Count: 0 QAP Count: 0 NDT Count: 0 WPS Count: 0 | | | | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | |
|--------------------------|---|--------------|--------------|--------------|------------------|--------------|
| Sub: 1 / Seq: 110 (F) | 260-SANDBLAST | 1.00 | 1.00 | 1.00 | SE121 / A | |
| | MASK THE INTERIOR SURFACES AND CONFLAT FLANGE FACE. BLAST THE OUTSIDE SURFACE 100% USING 220 GRIT VIRGIN ALUMINUM OXIDE. Specification: PP475 Rev: 2 | | | | | |
| | IDC Count : 0 | Dwg Count: 5 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|---|--------|----------|-------|------------------|
| Sub: 1 / Seq: 115 (F) | 230-FABRICATION - WEIDNER | 1.00 | 1.00 | 1.00 | SE121-003P / -- |
| | SET THE PVVS ONTO THE TEMPORARY SUPPORT DEVICES AND TACK WELD IN PLACE INSTALL TOOLING BALLS TO THE PERIPHERY, TACK WELD IN PLACE. FINAL LOCATION / POSITION TO BE DETERMINED BY Q/A AND APPROVED BY ENGINEERING PRIOR TO WELDING. ENSURE ADEQUATE INERT GAS COVERAGE IS MAINTAINED (on both surfaces) THROUGHOUT THE WELDING AND COOLING PROCESS TO AVOID OXIDATION / DISCOLORATION) REMOVE MASKING AND PROTECTIVE PLASTIC CLEAN PART PER PP475 INSTALL NAMEPLATE PER ENGINEERING DIRECTION | | | | |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|-------------------------------|----------------|-----------------|--|---------------------------------------|

Part Number: SE121-003P
Part Description: NCSX PVVS
Specification: PP475 Rev: 6

IDC Count : 5 Dwg Count: 1 Pgm Count: 0 QAP Count: 3 NDT Count: 0 WPS Count: 2

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|--|--|-----------------------|-------------------------|----------------------|--|
| Operation Sub: 1 / Seq: 120 (F) | Resource 817-SMX LASER FINAL DIMENSIONAL INSPECTION / POTENTIAL CUSTOMER SOURCE INSPECTION. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-003P / -- |
|--|--|-----------------------|-------------------------|----------------------|--|

PRIOR TO BEGINNING, NOTIFY ENGINEERING / CFT THE PART IS READY AND AVAILABLE FOR POSSIBLE CUSTOMER HOLD / WITNESS POINT INSPECTION. HOLD FOR RESPONSE AND/OR FURTHER DIRECTION.

FINAL PROFILE INSPECTION. INSPECT AND RECORD THE VESSEL PROFILE, TRIM LINES (20 DEGREE SURFACES), AND PORT EXTENSION POSITION. INCLUDE AT LEAST THREE DATUM TARGETS IN EACH POINT CLOUD SCAN FOR ALIGNMENT / VERIFICATION TO THE 3D MODEL.
FINAL MAGNETIC PERMEABILITY VERIFICATION.
VERIFY MAGNETIC PERMEABILITY OF ALL STRUCTURAL WELDS (1" increments), VESSEL WALL (6" grid), PORT EXTENSION TUBE (6" grid), CONFLAT FLANGE, FLANGE TO TUBE WELD.
RECORD THE COORDINANTS OF EACH ATTACHED MONUMENT (ENGINEERING INPUT REQUIRED). THESE COODINANTS WILL BE USED TO SETUP FOR PROFILE VERIFICATION AT PRINCETON.
FINAL INTERIOR SURFACE FINISH VERIFICATION. VISUAL INSPECT THE ENTIRE INTERIOR. VERIFY THE ENTIRE SURFACE IS SMOOTH AND FREE OF PITS, DENTS, IRREGULARITIES, GRINDING / SANDING MARKS, ETC... ENSURE THE ENTIRE SURFACE CAN BE WIPED CLEAN WITH A LINT FREE WIPE WITHOUT SNAGGING. INSPECT (APROXIMATE 6" GRID) WITH PROFILOMETER. REFERENCE PP479 RECORD FINAL SURFACE FINISH INFORMATION ON THE INSPECTION DRAWING
RECORD IDC DATA

Part Number: SE121-003P
Part Description: NCSX PVVS COMPLETE
Specification: ASME B46.1 Rev: 95
Certification: MAG. PERM. CERTIFICATION
Certification: PROFILE CERTIFICATION
Certification: INT. SURF. FINISH CERT.
Specification: PP475 Rev: 6
Specification: PP477 Rev: 2
Specification: PP476 Rev: 2
Specification: PP479 Rev: --
Map(s): SE121-001P-1MTM Rev: 2A

IDC Count : 5 Dwg Count: 1 Pgm Count: 0 QAP Count: 11 NDT Count: 0 WPS Count: 0

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|---------------------|--|-----------------|---|
| Sub ID 14 | Part ID SE121-001P-2 PANEL # 1 | Qty 1 | Drawing ID / Rev SE121-001P / A Parent Sub:1 Op:10 |
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| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|------------------|-----------------|---------------|-----------------|--------------|-------------------------|

| Workorder | Part ID | Qty | Drawing ID / Rev | Engineer | |
|--------------------------|--|------|------------------|--------------------|----------------|
| 64880/1.0 | | 1 | SE121-003P / -- | BLUE/DOUG MCCORKLE | |
| Sub: 14 / Seq: 10 (C) | 820-RECEIVING INSPECTION | 1.00 | 1.00 | 1.00 | SE121-001P / A |
| | INSPECT BLANK SIZE PER DEVELOPMENT DRAWING (AUDIT DIMENSIONS WILL BE PROVIDED BY DOUG MCCORKLE) | | | | |
| | INSPECT MATERIAL THICKNESS PER PP477 | | | | |
| | VISUAL INSPECT SURFACE FINISH (PANEL SURFACE SHOULD BE A SMOOTH MILL PRODUCED SURFACE, WITHOUT SCRAPES, GOUGES, HEAVY PITS, ETC... IT SHOULD BE IN A CONDITION THAT CAN BE READILY POLISHED WITHOUT EXCESSIVE MATERIAL REMOVAL (CONTACT ENGINEERING (DOUG MCCORKLE IF FURTHER CLARIFICATION IS NEEDED) | | | | |
| | SAMPLE INSPECT MAGNETIC PERMEABILITY PER PP476, AND ASTM A800, SUPPLEMENTARY REQUIREMENT S1 (BUT THE MEASUREMENT SHALL BE TAKEN IN RELATIVE PERMEABILITY RATHER THAN FERRITE CONTENT). SAMPLE LOT SIZE: AT LEAST 10 EVENLY SPACED LOCATIONS. | | | | |
| | RECORD IDC DATA | | | | |

Specification: ASTM A800 Rev: 01
 Part Number: SE121-001P-2 PANEL 1
 Part Description: DIE FORMED PANEL
 Customer: PPPL
 Specification: ASTM B443 Rev: 00
 Specification: ASME B46.1 Rev: 95
 Specification: PP476 Rev: A
 Specification: PP477 Rev: A
 Specification: PP475 Rev: 2

IDC Count : 3 Dwg Count: 0 Pgm Count: 0 QAP Count: 9 NDT Count: 0 WPS Count: 0

| Piece # | Part ID | Qty | Drawing ID / Rev | Vendor | Dimensions |
|---------|---|-----|------------------|--------------|------------|
| 10 | SE121-001P-2 PANEL # 1-PANEL BLANK .375" THK INCONEL 625 | 1.0 | SE121 / -- | 1810 | |
| (C) | Vendor Part ID: SE121-001P-2 PANEL # 1 | | | | |
| | PANEL BLANK AWJ CUT FROM .375" INCONEL 625 TO PROVIDED GEOMETRICAL SHAPE (SE121-001P-2 PANEL # 1.DXF, REV. --) | | | | |
| | MATERIAL REQUIREMENTS: INCONEL 625 (UNS N06625) PER ASTM B 443-00 ANNEALED MAGNETIC PERMEABILITY SHALL NOT EXCEED 1.00 (REF. ASTM A800). | | | | |
| | SURFACE MUST BE PROTECTED FROM CONTACT WITH IRON AND IRON ALLOY MATERIALS CERTS & MILL TEST REPORTS REQ'D WITH SHIPMENT. | | | | |
| | APPROXIMATE OVERALL SIZE: 54.97*76.37 | | | | |
| | Material Certification: Part Number: SE121-001P-2 PANEL 1 Part Description: DIE FORMED PANEL Specification: ASTM A800 Rev: 2001 Specification: ASTM B443 Rev: 00 Specification: ASTM B46.1 Rev: 95 | | | | |
| | | | | QAP Count: 6 | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|---------------------------------------|--------|----------|-------|------------------|
| Sub: 14 / Seq: 18 (C) | 105-DEBURR PLT 1 LOW BAY | 1.00 | 1.00 | 1.00 | SE121-001P / A |
| | RADIUS ALL CUT EDGES PRIOR TO FORMING | | | | |
| | Specification: PP475 Rev: 2 | | | | |

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|-------------------------------|----------------|-----------------|--|---------------------------------------|

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|---|--------|----------|-------|------------------|
| Sub: 14 / Seq: 20 (F) | 341-PACIFIC 750 1ST FORM OPERATION: LOAD, ALIGN, AND BOLT DIE SET # MTMFX-2883 - MTMFX-2884 INTO THE 750 TON HYDRAULIC PRESS. ENSURE THE DIE SET FACES ARE CLEAN AND FREE OF DIRT, OIL, GRIME, FOREIGN MATTER, RAISED OR EMBEDDED MATERIAL, ETC.... ENSURE THE PANEL BLANK IS CLEAN AND FREE OF FOREIGN MATTER. LOAD THE PANEL BLANK INTO THE DIE SET. HYDRAULIC FORM THE PANEL TO ACHIEVE THE GEOMETRICAL SHAPE CONFORMING TO INSPECTION GAGE # MTMFX-2903. NOTE THAT THE FINAL PANEL TO GAGE GAP TOLERANCE IS .094" MAX. IT IS DESIRED TO GET AS CLOSE TO THIS AS POSSIBLE PRIOR TO ANNEALING. CLOSELY WATCH THE FORMING, WRINKLING, AND SPRING-BACK CHARACTERISTICS OF THE MATERIAL DURING THE FORMING PROCESS. WHEN IT'S APPARENT THE MATERIAL IS WORK HARDENING TO A DEGREE THAT FORMING BECOMES DIFFICULT, OR THE PHYSICAL INTEGRITY OF THE MATERIAL IS AT RISK, PROCEED TO THE NEXT SEQUENTIAL OPERATION (BLAST AND ANNEAL). A FINAL FORMING SEQUENCE IS PROVIDED FOR "FINAL SIZING" AFTER THE MATERIAL HAS BEEN ANNEALED. ENSURE THE PANEL MATERIAL EXTENDS BEYOND THE PERIMETER OF THE GAGE (ENOUGH TO PROVIDE ADEQUATE STOCK ALLOWANCE FOR RE-POSITIONING, RE-STRIKING, AND ACCURATE TRIMMING AFTER ANNEALING). | 1.00 | 1.00 | 1.00 | SE121-001P / A |

Part Number: SE121-001P-2 PANEL 1
 Part Description: DIE FORMED PANEL
 Specification: PP475 Rev: 2

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 3 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|---|--------|----------|-------|------------------|
| Sub: 14 / Seq: 25 (C) | 260-SANDBLAST SHOT BLAST THE ENTIRE PANEL 100% USING 180-220 GRIT VIRGIN ALUMINUM OXIDE MEDIA TO REMOVE ANY RESIDUE / MARKINGS FROM THE INITIAL FORMING PROCESS. MAINTAIN AN APPROXIMATE BLAST ANGLE OF 20 TO 40 DEGREES BLOW OFF ALL RESIDUAL BLAST MEDIA PRIOR TO HANDLING. Specification: PP475 Rev: 6 | 1.00 | 1.00 | 1.00 | SE121-001P / A |

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | Service ID |
|--------------------------|--|--------|----------|-------|------------------|----------------|
| Sub: 14 / Seq: 30 (C) | 520-SUBLET, EXOTIC HEAT TREAT SOLUTION ANNEAL FORMED PANEL PER THE FOLLOWING: ATTACH A MINIMUM OF THREE EQUALLY SPACED THERMOCOUPLES TO THE FORMED PANEL CHARGE FURNACE AND HEAT PART UNTIL THERMOCOUPLE READINGS ARE WITHIN 1900 +/-15F. HOLD PART TEMPERATURE AT 1900 DEGREES F. (+/- 15 DEGREES) HOLD FOR 45 MINUTES (+/ 5 MINUTES) RAPID COOL (VIA. WATER QUENCHING OR FORCED AIR CIRCULATION) TO 1000 DEGREES F. OPEN AIR COOL TO AMBIENT TEMP. Specification: AMS2774 Rev: JUL95 Certification: H/T CERTIFICATE | 1.00 | 1.00 | 1.00 | SE121-001P / A | THRML TR/NA SA |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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Part Number: SE121-001P-2 PANEL 1
Part Description: DIE FORMED PANEL
Customer: PPPL
Furnace charts: FURNACE CHART

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 6 NDT Count: 0 WPS Count: 0

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|--|--|-----------------------|-------------------------|----------------------|---|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Operation Sub: 14 / Seq: 31 (U) | Resource 820-RECEIVING INSPECTION REVIEW HEAT TREAT CERTIFICATE AND FURNACE CHART | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A | IDC Count : 1 | Dwg Count : 0 | Pgm Count : 0 | QAP Count : 0 | NDT Count : 0 | WPS Count : 0 |
|--|--|-----------------------|-------------------------|----------------------|---|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|

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|--|--|-----------------------|-------------------------|----------------------|---|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Operation Sub: 14 / Seq: 35 (C) | Resource 805-INPROCESS INSPECTION - PLA VISUAL INSPECT SURFACE FOR DAMAGE, PITTING, GOUGES, SCRAPES ETC..... ON THE INSIDE (CONCAVE SURFACE), LOOK FOR ANY SURFACE DEFECTS OR IRREGULARITIES THAT MAY INHIBIT ACHIEVING THE REQUIRED 32 MICRO-INCH FINISH REQUIREMENT. ON THE OUTSIDE (CONVEX SURFACE), VERIFY THE SURFACE FINISH STILL MEETS THE REQUIREMENTS OF ASTM B 443-00. NOTIFY ENGINEERING (DOUG McCORKLE) FOR CONCURRENCE VERIFY MAGNETIC PERMEABILITY AND RECORD I.D.C. DATA Part Number: SE121-001P-2 PANEL 1 Part Description: DIE FORMED PANEL Specification: PP475 Rev: 6 Specification: ASTM B443 Rev: 00 Specification: PP476 Rev: 2 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A | IDC Count : 1 | Dwg Count : 0 | Pgm Count : 0 | QAP Count : 5 | NDT Count : 0 | WPS Count : 0 |
|--|--|-----------------------|-------------------------|----------------------|---|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|

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|--|---|-----------------------|-------------------------|----------------------|---|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Operation Sub: 14 / Seq: 40 (C) | Resource 341-PACIFIC 750 2ND FORMING OPERATION ENSURE THE DIE SET FACES ARE CLEAN AND FREE OF DIRT, OIL, GRIME, FOREIGN MATTER, RAISED OR EMBEDDED MATERIAL, ETC.... LOAD THE PREFORMED / ANNEALED PANEL INTO THE DIE SET. "RE-STRIKE" HYDRAULIC FORM THE PANEL TO ACHIEVE THE GEOMETRICAL SHAPE CONFORMING TO INSPECTION GAGE # MTMFX-2903. PANEL TO GAGE GAP TOLERANCE: .094" MAX. NOTIFY INSPECTOR FOR Q/A IDC VERIFICATION Part Number: SE121-001P-2 PANEL 1 Part Description: DIE FORMED PANEL Specification: PP475 Rev: 2 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A | IDC Count : 1 | Dwg Count : 0 | Pgm Count : 0 | QAP Count : 3 | NDT Count : 0 | WPS Count : 0 |
|--|---|-----------------------|-------------------------|----------------------|---|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|

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| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|------------------|-----------------|---------------|-----------------|--------------|-------------------------|

| Workorder | Part ID | Qty | Drawing ID / Rev | Engineer | | | |
|--------------------------|--|---------------|------------------|--------------------|----------------|--------------|--------------|
| 64880/1.0 | | 1 | SE121-003P / -- | BLUE/DOUG MCCORKLE | | | |
| Sub: 14 / Seq: 50 (C) | 260-SANDBLAST SHOT BLAST THE ENTIRE PANEL 100% USING 180-220 GRIT VIRGIN ALUMINUM OXIDE MEDIA TO REMOVE ANY RESIDUE / MARKINGS FROM THE FINAL FORMING PROCESS. MAINTAIN AN APPROXIMATE 20 - 40 DEGREE BLAST ANGLE Specification: PP475 Rev: 4 | 1.00 | 1.00 | 1.00 | SE121-001P / A | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | |
|--------------------------|--|---------------|--------------|--------------|------------------|--------------|--------------|
| Sub: 14 / Seq: 60 (F) | 230-FABRICATION - WEIDNER TRIM PERIMETER TO PROVIDED TRIM-LINES (LEAVING STOCK FOR POSITIONING AND FITTING ON THE FAB FIXTURE). NOTE THAT INSTALLING THE WELD PREP IS NOT REQUIRED AT THIS STAGE (ADDITIONAL FITTING / TRIMMING WILL BE REQUIRED AT INSTALLATION) HIGH PRESSURE WASH PER PP475 NOTIFY Q/A FOR FINAL PANEL PROFILE CONFIRMATION PRIOR TO COMPLETING THE POLISHING AND INSTALLATION OF PROTECTIVE PLASTIC SAND AND POLISH THE INSIDE SURFACE 100% TO ACHIEVE A 32 MICRO SURFACE FINISH (WITH THE EXCEPTION OF THE WELDING / TRIMMING ZONES). CLEAN PANEL PER PP475 APPLY PROTECTIVE PLASTIC FILM (CONTACT DOUG McCORKLE FOR MATERIAL) STAGE PANEL FOR INSTALLATION Specification: PP475 Rev: 3 | 1.00 | 1.00 | 1.00 | SE121-001P / A | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | |
|--------------------------|---|---------------|--------------|--------------|------------------|--------------|--------------|
| Sub: 14 / Seq: 70 (F) | 805-INPROCESS INSPECTION - PLA VERIFY PROFILE TO INSPECTION GAGE # MTMFX-2903. GAP TOLERANCE: .094" MAX. RECORD ACTUAL GAP READINGS ON INSPECTION DRAWING VERIFY PART PERIMETER EXCEEDS GAGE PERIMETER FOR TRIMMING AND FITTING AT ASSEMBLY INSPECT AND RECORD INTERIOR SIDE SURFACE FINISH (LESS PERIMETER / WELD ZONES) AND RECORD ACTUAL READINGS ON INSPECTION DRAWING INSPECT MAGNETIC PERMEABILITY PER PP476 AND ASTM A800, SUPPLEMENTARY REQUIREMENT S1 (BUT THE MEASUREMENT SHALL BE TAKEN IN RELATIVE PERMEABILITY RATHER THAN FERRITE CONTENT. THE SURFACES OF THE PVVS SHELL AND PORT EXTENSION SHALL BE CHECKED AND DOCUMENTED ON A 6" GRID. THE SURFACES AT AND NEAR WELDS WILL BE CHECKED ON A 1" GRID. RECORD ACTUAL PERMEABILITY READINGS ON INSPECTION DRAWING INSPECT MATERIAL THICKNESS PER PP477 (6" GRID) RECORD ACTUAL MATERIAL THICKNESS ON INSPECTION DRAWING Test Certification: SE121-001P-10MTM Rev: 2A Part Number: SE121-001P-2 PANEL 1 Part Description: DIE FORMED PANEL Specification: ASME B46.1 Rev: 95 Specification: ASTM A800 Specification: PP475 Rev: 2 Specification: PP476 Rev: -- Specification: PP477 Rev: -- Specification: PP479 Rev: -- | 1.00 | 1.00 | 1.00 | SE121-001P / A | | |
| | | IDC Count : 3 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 9 | NDT Count: 0 | WPS Count: 0 |

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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|---------------------|--|-----------------|------------------------------|---------------------------|
| Sub ID 15 | Part ID SE121-001P-2 PANEL # 2 | Qty 1 | Drawing ID / Rev / | Parent Sub:1 Op:10 |
|---------------------|--|-----------------|------------------------------|---------------------------|

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|--|--------|----------|-------|------------------|
| Sub: 15 / Seq: 10 (C) | 820-RECEIVING INSPECTION INSPECT BLANK SIZE PER DEVELOPMENT DRAWING (AUDIT DIMENSIONS WILL BE PROVIDED BY DOUG MCCORKLE) INSPECT MATERIAL THICKNESS PER PP477 VISUAL INSPECT SURFACE FINISH (PANEL SURFACE SHOULD BE A SMOOTH MILL PRODUCED SURFACE, WITHOUT SCRAPES, GOUGES, HEAVY PITS, ETC... IT SHOULD BE IN A CONDITION THAT CAN BE READILY POLISHED WITHOUT EXCESSIVE MATERIAL REMOVAL (CONTACT ENGINEERING (DOUG MCCORKLE IF FURTHER CLARIFICATION IS NEEDED) SAMPLE INSPECT MAGNETIC PERMEABILITY PER PP476, AND ASTM A800, SUPPLEMENTARY REQUIREMENT S1 (BUT THE MEASUREMENT SHALL BE TAKEN IN RELATIVE PERMEABILITY RATHER THAN FERRITE CONTENT). SAMPLE LOT SIZE: AT LEAST 10 EVENLY SPACED LOCATIONS. RECORD IDC DATA | 1.00 | 1.00 | 1.00 | SE121-001P / A |

Part Number: SE121-001P-2 PANEL 2
 Part Description: DIE FORMED PANEL
 Specification: ASTM A800 Rev: 01
 Customer: PPPL
 Specification: ASTM B443 Rev: 00
 Specification: ASME B46.1 Rev: 95
 Specification: PP475 Rev: 2
 Specification: PP476 Rev: A
 Specification: PP477 Rev: A

IDC Count : 3 Dwg Count: 0 Pgm Count: 0 QAP Count: 9 NDT Count: 0 WPS Count: 0

| Piece # | Part ID | Qty | Drawing ID / Rev | Vendor | Dimensions |
|-----------|---|-----|------------------|--------|------------|
| 10 (C) | SE121-001P-2 PANEL # 2-PANEL BLANK .375" THK INCONEL 625 Vendor Part ID: SE121-001P-2 PANEL # 2 PANEL BLANK AWJ CUT FROM .375" INCONEL 625 TO PROVIDED GEOMETRICAL SHAPE (SE121-001P-2 PANEL # 2.DXF, REV. --) MATERIAL REQUIREMENTS: INCONEL 625 (UNS N06625) PER ASTM B 443-00 ANNEALED MAGNETIC PERMEABILITY SHALL NOT EXCEED 1.00 (REF. ASTM A800). SURFACE MUST BE PROTECTED FROM CONTACT WITH IRON AND IRON ALLOY MATERIALS CERTS & MILL TEST REPORTS REQ'D WITH SHIPMENT. APPROXIMATE OVERALL SIZE: 35.07*44.03 | 1.0 | SE121 / -- | 1810 | |

Material Certification:
 Part Number: SE121-001P-2 PANEL 2
 Part Description: DIE FORMED PANEL
 Specification: ASTM A800 Rev: 01
 Specification: ASTM B443 Rev: 00
 Specification: ASTM B46.1 Rev: 95

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|-------------------------------|----------------|-----------------|--|---------------------------------------|

QAP Count: 6

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|--------------|--------------|--|--|
| Sub: 15 / Seq: 18 (C) | 105-DEBURR PLT 1 LOW BAY RADIUS ALL CUT EDGES PRIOR TO FORMING Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A | | | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 0 | | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|--------------------------|---|---------------|-----------------|--------------|-------------------------|--------------|--------------|--|--|
| Sub: 15 / Seq: 20 (C) | 341-PACIFIC 750 1ST FORM OPERATION: LOAD, ALIGN, AND BOLT DIE SET # MTMFX-2885 - MTMFX-2886 INTO THE 750 TON HYDRAULIC PRESS. ENSURE THE DIE SET FACES ARE CLEAN AND FREE OF DIRT, OIL, GRIME, FOREIGN MATTER, RAISED OR EMBEDDED MATERIAL, ETC.... ENSURE THE PANEL BLANK IS CLEAN AND FREE OF FOREIGN MATTER. LOAD THE PANEL BLANK INTO THE DIE SET. HYDRAULIC FORM THE PANEL TO ACHIEVE THE GEOMETRICAL SHAPE CONFORMING TO INSPECTION GAGE # MTMFX-2904. NOTE THAT THE FINAL PANEL TO GAGE GAP TOLERANCE IS .094" MAX. IT IS DESIRED TO GET AS CLOSE TO THIS AS POSSIBLE PRIOR TO ANNEALING. CLOSELY WATCH THE FORMING, WRINKLING, AND SPRING-BACK CHARACTERISTICS OF THE MATERIAL DURING THE FORMING PROCESS. WHEN IT'S APPARENT THE MATERIAL IS WORK HARDENING TO A DEGREE THAT FORMING BECOMES DIFFICULT, OR THE PHYSICAL INTEGRITY OF THE MATERIAL IS AT RISK, PROCEED TO THE NEXT SEQUENTIAL OPERATION (BLAST AND ANNEAL). A FINAL FORMING SEQUENCE IS PROVIDED FOR "FINAL SIZING" AFTER THE MATERIAL HAS BEEN ANNEALED. ENSURE THE PANEL MATERIAL EXTENDS BEYOND THE PERIMETER OF THE GAGE (ENOUGH TO PROVIDE ADEQUATE STOCK ALLOWANCE FOR RE-POSITIONING, RE-STRIKING, AND ACCURATE TRIMMING AFTER ANNEALING). | 1.00 | 1.00 | 1.00 | SE121-001P / A | | | | |
| | Part Number: SE121-001P-2 PANEL 2 Part Description: DIE FORMED PANEL Specification: PP475 Rev: 2 | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 3 | NDT Count: 0 | WPS Count: 0 | | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|--------------|--------------|--|--|
| Sub: 15 / Seq: 22 (C) | 230-FABRICATION - WEIDNER CUT OUT A LIFTING EYE FROM THE EXCESS TRIM STOCK THAT WAS REMOVED DURING THE FORMING CYCLE. INSTALL AND WELD IT TO THE PERIPHERAL EDGE OF THE FORMED PANEL (WHICH STILL HAS EXCESS TRIM STOCK REMAINING). POSITIONING CONSIDERATIONS: 1. POSITION TO SUIT NORMAL HANDLING AND LIFTING. 2. POSITION TO SUIT SETTING IN A VERTICAL STANCE IN THE HEAT TREAT OVEN (WIDE SIDE DOWN). 3. SHAPE AND POSITION THE LIFTING HOOK FOR A "QUICK AND EASY GAFF HOOK STYLE GRAB" WHEN REMOVING THE PARTS FROM THE HOT OVEN FOR A RAPID COOLING CYCLE. Specification: PP475 Rev: 3 | 1.00 | 1.00 | 1.00 | | | | | |
| | WPS115 Rev:1 GTAW MAN | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 1 | | |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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GTAW - Manual Fillers: INCONEL625_035_GMAW / INCONEL625_062_GTAW / INCONEL625_093_GTAW
Notes: LIFTING HOOK TO PANEL EDGE

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | Service ID |
|--------------------------|---|---------------|--------------|--------------|------------------|------------------------------|
| Sub: 15 / Seq: 25 (C) | 260-SANDBLAST SHOT BLAST THE ENTIRE PANEL 100% USING 180-220 GRIT VIRGIN ALUMINUM OXIDE MEDIA TO REMOVE ANY RESIDUE / MARKINGS FROM THE INITIAL FORMING PROCESS. MAINTAIN AN APPROXIMATE BLAST ANGLE OF 20 TO 40 DEGREES BLOW OFF ALL RESIDUAL BLAST MEDIA PRIOR TO HANDLING. Specification: PP475 Rev: 6 | 1.00 | 1.00 | 1.00 | SE121-001P / A | THRML TR/NA SA |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | Service ID |
|--------------------------|---|---------------|--------------|--------------|------------------|------------------------------|
| Sub: 15 / Seq: 30 (C) | 520-SUBLET, EXOTIC HEAT TREAT SOLUTION ANNEAL FORMED PANEL PER THE FOLLOWING: ATTACH A MINIMUM OF THREE EQUALLY SPACED THERMOCOUPLES TO THE FORMED PANEL CHARGE FURNACE AND HEAT PART UNTIL THERMOCOUPLE READINGS ARE WITHIN 1900 +/-15F. HOLD PART TEMPERATURE AT 1900 DEGREES F. (+/- 15 DEGREES) HOLD FOR 45 MINUTES (+/ 5 MINUTES) RAPID COOL (VIA. WATER QUENCHING OR FORCED AIR CIRCULATION) TO 1000 DEGREES F. OPEN AIR COOL TO AMBIENT TEMP. Specification: AMS2774 Rev: JUL95 Certification: H/T CERTIFICATE Part Number: SE121-001P-2 PANEL 2 Part Description: DIE FORMED PANEL Customer: PPPL Furnace charts: FURNACE CHART Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A | THRML TR/NA SA |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 7 | NDT Count: 0 WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | Service ID |
|--------------------------|---|---------------|--------------|--------------|------------------|------------------------------|
| Sub: 15 / Seq: 31 (R) | 820-RECEIVING INSPECTION REVIEW HEAT TREAT CERTIFICATE AND FURNACE CHART | 1.00 | 1.00 | 1.00 | SE121-001P / A | THRML TR/NA SA |
| | | IDC Count : 1 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | Service ID |
|--------------------------|--|--------|----------|-------|------------------|----------------|
| Sub: 15 / Seq: 35 (R) | 805-INPROCESS INSPECTION - PLA VISUAL INSPECT SURFACE FOR DAMAGE, PITTING, GOUGES, SCRAPES ETC..... ON THE INSIDE (CONCAVE SURFACE), LOOK FOR ANY SURFACE DEFECTS OR IRREGULARITIES THAT MAY INHIBIT ACHIEVING THE REQUIRED 32 MICRO-INCH FINISH REQUIREMENT. ON THE OUTSIDE (CONVEX SURFACE), VERIFY THE SURFACE FINISH STILL MEETS THE REQUIREMENTS OF ASTM B 443-00. NOTIFY ENGINEERING (DOUG MCCORKLE) FOR CONCURRENCE VERIFY MAGNETIC PERMEABILITY AND RECORD I.D.C. DATA | 1.00 | 1.00 | 1.00 | SE121-001P / A | THRML TR/NA SA |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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Part Number: SE121-001P-2 PANEL 2
Part Description: DIE FORMED PANEL
Specification: PP475 Rev: 6
Specification: ASTM B443 Rev: 00
Specification: PP476 Rev: 2

IDC Count : 1 Dwg Count: 0 Pgm Count: 0 QAP Count: 5 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | | | |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|---------------|--------------|--------------|--------------|--------------|--------------|
| Sub: 15 / Seq: 40 (R) | 341-PACIFIC 750 2ND FORMING OPERATION ENSURE THE DIE SET FACES ARE CLEAN AND FREE OF DIRT, OIL, GRIME, FOREIGN MATTER, RAISED OR EMBEDDED MATERIAL, ETC.... LOAD THE PREFORMED / ANNEALED PANEL INTO THE DIE SET. "RE-STRIKE" HYDRAULIC FORM THE PANEL TO ACHIEVE THE GEOMETRICAL SHAPE CONFORMING TO INSPECTION GAGE # MTMFX-2904. PANEL TO GAGE GAP TOLERANCE: .094" MAX. NOTIFY INSPECTOR FOR Q/A IDC VERIFICATION | 1.00 | 1.00 | 1.00 | SE121-001P / A | | | | | | |
| | Part Number: SE121-001P-2 PANEL 2 Part Description: DIE FORMED PANEL Specification: PP475 Rev: 2 | | | | | IDC Count : 1 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 3 | NDT Count: 0 | WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | | | |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|---------------|--------------|--------------|--------------|--------------|--------------|
| Sub: 15 / Seq: 50 (F) | 260-SANDBLAST SHOT BLAST THE ENTIRE PANEL 100% USING 180-220 GRIT VIRGIN ALUMINUM OXIDE MEDIA TO REMOVE ANY RESIDUE / MARKINGS FROM THE FINAL FORMING PROCESS. Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A | | | | | | |
| | | | | | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | | | |
|--------------------------|---|---------------|-----------------|--------------|-------------------------|---------------|--------------|--------------|--------------|--------------|--------------|
| Sub: 15 / Seq: 60 (F) | 230-FABRICATION - WEIDNER TRIM PERIMETER TO PROVIDED TRIM-LINES (LEAVING STOCK FOR POSITIONING AND FITTING ON THE FAB FIXTURE). NOTE THAT INSTALLING THE WELD PREP IS NOT REQUIRED AT THIS STAGE (ADDITIONAL FITTING / TRIMMING WILL BE REQUIRED AT INSTALLATION) HIGH PRESSURE WASH PER PP475 NOTIFY Q/A FOR FINAL PANEL PROFILE CONFIRMATION PRIOR TO COMPLETING THE POLISHING AND INSTALLATION OF PROTECTIVE PLASTIC SAND AND POLISH THE INSIDE SURFACE 100% TO ACHIEVE A 32 MICRO SURFACE FINISH (WITH THE EXCEPTION OF THE WELDING / TRIMMING ZONES). CLEAN PANEL PER PP475 APPLY PROTECTIVE PLASTIC FILM (CONTACT DOUG McCORKLE FOR MATERIAL) STAGE PANEL FOR INSTALLATION Specification: PP475 Rev: 3 | 1.00 | 1.00 | 1.00 | SE121-001P / A | | | | | | |
| | | | | | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 0 |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | |
|--------------------------|---|---------------|-----------------|--------------|-------------------------|--------------|
| Sub: 15 / Seq: 70 (F) | 805-INPROCESS INSPECTION - PLA | 1.00 | 1.00 | 1.00 | SE121-001P / A | |
| | VERIFY PROFILE TO INSPECTION GAGE # MTMFX-2904. GAP TOLERANCE: .094" MAX. RECORD ACTUAL GAP READINGS ON INSPECTION DRAWING VERIFY PART PERIMETER EXCEEDS GAGE PERIMETER FOR TRIMMING AND FITTING AT ASSEMBLY INSPECT AND RECORD INTERIOR SIDE SURFACE FINISH (LESS PERIMETER / WELD ZONES) AND RECORD ACTUAL READINGS ON INSPECTION DRAWING INSPECT MAGNETIC PERMEABILITY PER PP476 AND ASTM A800, SUPPLEMENTARY REQUIREMENT S1 (BUT THE MEASUREMENT SHALL BE TAKEN IN RELATIVE PERMEABILITY RATHER THAN FERRITE CONTENT. THE SURFACES OF THE PVVS SHELL AND PORT EXTENSION SHALL BE CHECKED AND DOCUMENTED ON A 6" GRID. THE SURFACES AT AND NEAR WELDS WILL BE CHECKED ON A 1" GRID. RECORD ACTUAL PERMEABILITY READINGS ON INSPECTION DRAWING INSPECT MATERIAL THICKNESS PER PP477 (6" GRID) RECORD ACTUAL MATERIAL THICKNESS ON INSPECTION DRAWING Test Certification: SE121-001P-10MTM Rev: 2A Part Number: SE121-001P-2 PANEL 2 Part Description: DIE FORMED PANEL Specification: ASME B46.1 Rev: 95 Specification: ASTM A800 Specification: PP475 Rev: 2 Specification: PP476 Rev: -- Specification: PP477 Rev: -- Specification: PP479 Rev: -- | | | | | |
| | IDC Count : 3 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 9 | NDT Count: 0 | WPS Count: 0 |

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| Sub ID 16 | Part ID SE121-001P-2 PANEL # 3 | Qty 1 | Drawing ID / Rev / Parent Sub:1 Op:10 |
|---------------------|--|-----------------|--|

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|---|---------------|-----------------|--------------|-------------------------|
| Sub: 16 / Seq: 10 (C) | 820-RECEIVING INSPECTION | 1.00 | 1.00 | 1.00 | SE121-001P / A |
| | INSPECT BLANK SIZE PER DEVELOPMENT DRAWING (AUDIT DIMENSIONS WILL BE PROVIDED BY DOUG MCCORKLE) INSPECT MATERIAL THICKNESS PER PP477 VISUAL INSPECT SURFACE FINISH (PANEL SURFACE SHOULD BE A SMOOTH MILL PRODUCED SURFACE, WITHOUT SCRAPES, GOUGES, HEAVY PITS, ETC... IT SHOULD BE IN A CONDITION THAT CAN BE READILY POLISHED WITHOUT EXCESSIVE MATERIAL REMOVAL (CONTACT ENGINEERING (DOUG MCCORKLE IF FURTHER CLARIFICATION IS NEEDED) SAMPLE INSPECT MAGNETIC PERMEABILITY PER PP476, AND ASTM A800, SUPPLEMENTARY REQUIREMENT S1 (BUT THE MEASUREMENT SHALL BE TAKEN IN RELATIVE PERMEABILITY RATHER THAN FERRITE CONTENT). SAMPLE LOT SIZE: AT LEAST 10 EVENLY SPACED LOCATIONS. RECORD IDC DATA Part Number: SE121-001P-2 PANEL 3 Part Description: DIE FORMED PANEL Specification: ASTM A800 Rev: 01 Customer: PPPL | | | | |

Workorder: 64880/1.0 Part ID: Qty: 1 Drawing ID / Rev: SE121-003P / -- Engineer: BLUE/DOUG MCCORKLE

Specification: ASTM B443 Rev: 00
Specification: ASME B46.1 Rev: 95
Specification: PP475 Rev: 2
Specification: PP476 Rev: A
Specification: PP477 Rev: A

IDC Count : 3 Dwg Count: 0 Pgm Count: 0 QAP Count: 9 NDT Count: 0 WPS Count: 0

| Piece # | Part ID | Qty | Drawing ID / Rev | Vendor | Dimensions |
|---------|---|-----|------------------|--------------|------------|
| 10 | SE121-001P-2 PANEL # 3-PANEL BLANK .375" THK INCONEL 625 | 1.0 | SE121 / -- | 1810 | |
| (C) | Vendor Part ID: SE121-001P-2 PANEL # 3 PANEL BLANK AWJ CUT FROM .375" INCONEL 625 TO PROVIDED GEOMETRICAL SHAPE (SE121-001P-2 PANEL # 1.DXF, REV. --) MATERIAL REQUIREMENTS: INCONEL 625 (UNS N06625) PER ASTM B 443-00 ANNEALED MAGNETIC PERMEABILITY SHALL NOT EXCEED 1.00 (REF. ASTM A800). SURFACE MUST BE PROTECTED FROM CONTACT WITH IRON AND IRON ALLOY MATERIALS CERTS & MILL TEST REPORTS REQ'D WITH SHIPMENT. APPROXIMATE OVERALL SIZE: 54.97*76.37 Material Certification: Part Number: SE121-001P-2 PANEL # 1 Part Description: DIE FORMED PANEL Specification: ASTM A800 Rev: 01 Specification: ASTM B443 Rev: 00 Specification: ASTM B46.1 Rev: 95 | | | | |
| | | | | QAP Count: 6 | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|--|---------------|--------------|--------------|--|
| Sub: 16 / Seq: 18 (C) | 105-DEBURR PLT 1 LOW BAY RADIUS ALL CUT EDGES PRIOR TO FORMING Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 NDT Count: 0 WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|---|--------|----------|-------|------------------|
| Sub: 16 / Seq: 20 (C) | 341-PACIFIC 750 1ST FORM OPERATION: LOAD, ALIGN, AND BOLT DIE SET # MTMFX-2887 - MTMFX-2892 INTO THE 750 TON HYDRAULIC PRESS. ENSURE THE DIE SET FACES ARE CLEAN AND FREE OF DIRT, OIL, GRIME, FOREIGN MATTER, RAISED OR EMBEDDED MATERIAL, ETC.... ENSURE THE PANEL BLANK IS CLEAN AND FREE OF FOREIGN MATTER. LOAD THE PANEL BLANK INTO THE DIE SET. HYDRAULIC FORM THE PANEL TO ACHIEVE THE GEOMETRICAL SHAPE CONFORMING TO INSPECTION GAGE # MTMFX-2905. NOTE THAT THE FINAL PANEL TO GAGE GAP TOLERANCE IS .094" MAX. IT IS DESIRED TO GET AS CLOSE TO THIS AS POSSIBLE PRIOR TO ANNEALING. CLOSELY WATCH THE FORMING, WRINKLING, AND SPRING-BACK CHARACTERISTICS OF THE MATERIAL DURING THE FORMING PROCESS. WHEN IT'S APPARENT THE MATERIAL IS WORK HARDENING TO A DEGREE THAT FORMING BECOMES DIFFICULT, OR THE PHYSICAL INTEGRITY OF THE MATERIAL IS AT RISK, PROCEED | 1.00 | 1.00 | 1.00 | SE121-001P / A |

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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TO THE NEXT SEQUENTIAL OPERATION (BLAST AND ANNEAL). A FINAL FORMING SEQUENCE IS PROVIDED FOR "FINAL SIZING" AFTER THE MATERIAL HAS BEEN ANNEALED.
ENSURE THE PANEL MATERIAL EXTENDS BEYOND THE PERIMETER OF THE GAGE (ENOUGH TO PROVIDE ADEQUATE STOCK ALLOWANCE FOR RE-POSITIONING, RE-STRIKING, AND ACCURATE TRIMMING AFTER ANNEALING).

Part Number: SE121-001P-2 PANEL 3
Part Description: DIE FORMED PANEL
Specification: PP475 Rev: 2

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 3 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|
| Sub: 16 / Seq: 22 (C) | 230-FABRICATION - WEIDNER CUT OUT A LIFTING EYE FROM THE EXCESS TRIM STOCK THAT WAS REMOVED DURING THE FORMING CYCLE. INSTALL AND WELD IT TO THE PERIPHERAL EDGE OF THE FORMED PANEL (WHICH STILL HAS EXCESS TRIM STOCK REMAINING). POSITIONING CONSIDERATIONS: 1. POSITION TO SUIT NORMAL HANDLING AND LIFTING. 2. POSITION TO SUIT SETTING IN A VERTICAL STANCE IN THE HEAT TREAT OVEN (WIDE SIDE DOWN). 3. SHAPE AND POSITION THE LIFTING HOOK FOR A "QUICK AND EASY GAFF HOOK STYLE GRAB" WHEN REMOVING THE PARTS FROM THE HOT OVEN FOR A RAPID COOLING CYCLE. Specification: PP475 Rev: 3 | 1.00 | 1.00 | 1.00 | |

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 1

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|---|---------------|-----------------|--------------|-------------------------|
| Sub: 16 / Seq: 25 (C) | 260-SANDBLAST SHOT BLAST THE ENTIRE PANEL 100% USING 180-220 GRIT VIRGIN ALUMINUM OXIDE MEDIA TO REMOVE ANY RESIDUE / MARKINGS FROM THE INITIAL FORMING PROCESS. MAINTAIN AN APPROXIMATE BLAST ANGLE OF 20 TO 40 DEGREES BLOW OFF ALL RESIDUAL BLAST MEDIA PRIOR TO HANDLING. Specification: PP475 Rev: 6 | 1.00 | 1.00 | 1.00 | SE121-001P / A |

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | Service ID |
|--------------------------|---|---------------|-----------------|--------------|-------------------------|-------------------|
| Sub: 16 / Seq: 30 (C) | 520-SUBLET, EXOTIC HEAT TREAT SOLUTION ANNEAL FORMED PANEL PER THE FOLLOWING: ATTACH A MINIMUM OF THREE EQUALLY SPACED THERMOCOUPLES TO THE FORMED PANEL CHARGE FURNACE AND HEAT PART UNTIL THERMOCOUPLE READINGS ARE WITHIN 1900 +/-15F. HOLD PART TEMPERATURE AT 1900 DEGREES F. (+/- 15 DEGREES) HOLD FOR 45 MINUTES (+/ 5 MINUTES) RAPID COOL (VIA. WATER QUENCHING OR FORCED AIR CIRCULATION) TO 1000 DEGREES F. OPEN AIR COOL TO AMBIENT TEMP. Specification: AMS2774 Rev: JUL95 Certification: H/T CERTIFICATE Part Number: SE121-001P-2 PANEL 3 | 1.00 | 1.00 | 1.00 | SE121-001P / A | THRML TR/NA SA |

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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Part Description: DIE FORMED PANEL
Customer: PPPL
Furnace charts: FURNACE CHART
Specification: PP475 Rev: 2

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 7 NDT Count: 0 WPS Count: 0

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|--|--|-----------------------|-------------------------|----------------------|---|---------------------|---------------------|---------------------|
| Operation Sub: 16 / Seq: 31 (U) | Resource 820-RECEIVING INSPECTION REVIEW HEAT TREAT CERTIFICATE AND FURNACE CHART | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 |
| | | IDC Count : 1 | Dwg Count: 0 | Pgm Count: 0 | | | | |

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| Operation Sub: 16 / Seq: 35 (R) | Resource 805-INPROCESS INSPECTION - PLA VISUAL INSPECT SURFACE FOR DAMAGE, PITTING, GOUGES, SCRAPES ETC..... ON THE INSIDE (CONCAVE SURFACE), LOOK FOR ANY SURFACE DEFECTS OR IRREGULARITIES THAT MAY INHIBIT ACHIEVING THE REQUIRED 32 MICRO-INCH FINISH REQUIREMENT. ON THE OUTSIDE (CONVEX SURFACE), VERIFY THE SURFACE FINISH STILL MEETS THE REQUIREMENTS OF ASTM B 443-00. NOTIFY ENGINEERING (DOUG McCORKLE) FOR CONCURRENCE VERIFY MAGNETIC PERMEABILITY AND RECORD I.D.C. DATA Part Number: SE121-001P-2 PANEL 3 Part Description: DIE FORMED PANEL Specification: PP475 Rev: 6 Specification: ASTM B443 Rev: 00 Specification: PP476 Rev: 2 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A | QAP Count: 5 | NDT Count: 0 | WPS Count: 0 |
| | | IDC Count : 1 | Dwg Count: 0 | Pgm Count: 0 | | | | |

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|--|---|-----------------------|-------------------------|----------------------|---|---------------------|---------------------|---------------------|
| Operation Sub: 16 / Seq: 40 (R) | Resource 341-PACIFIC 750 2ND FORMING OPERATION ENSURE THE DIE SET FACES ARE CLEAN AND FREE OF DIRT, OIL, GRIME, FOREIGN MATTER, RAISED OR EMBEDDED MATERIAL, ETC.... LOAD THE PREFORMED / ANNEALED PANEL INTO THE DIE SET. "RE-STRIKE" HYDRAULIC FORM THE PANEL TO ACHIEVE THE GEOMETRICAL SHAPE CONFORMING TO INSPECTION GAGE # MTMFX-2905. PANEL TO GAGE GAP TOLERANCE: .094" MAX. NOTIFY INSPECTOR FOR Q/A IDC VERIFICATION Part Number: SE121-001P-2 PANEL 3 Part Description: DIE FORMED PANEL Specification: PP475 Rev: 2 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A | QAP Count: 3 | NDT Count: 0 | WPS Count: 0 |
| | | IDC Count : 1 | Dwg Count: 0 | Pgm Count: 0 | | | | |

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|------------------|-----------------|---------------|-----------------|--------------|-------------------------|
| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|------------------|-----------------|---------------|-----------------|--------------|-------------------------|

| Workorder | Part ID | Qty | Drawing ID / Rev | Engineer | | | |
|--------------------------|--|---------------|------------------|--------------------|----------------|--------------|--------------|
| 64880/1.0 | | 1 | SE121-003P / -- | BLUE/DOUG MCCORKLE | | | |
| Sub: 16 / Seq: 50 (R) | 260-SANDBLAST SHOT BLAST THE ENTIRE PANEL 100% USING 180-220 GRIT VIRGIN ALUMINUM OXIDE MEDIA TO REMOVE ANY RESIDUE / MARKINGS FROM THE FINAL FORMING PROCESS. Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | |
|--------------------------|---|---------------|--------------|--------------|------------------|--------------|--------------|
| Sub: 16 / Seq: 60 (R) | 230-FABRICATION - WEIDNER TRIM PERIMETER TO PROVIDED TRIM-LINES (LEAVING STOCK FOR POSITIONING AND FITTING ON THE FAB FIXTURE). NOTE THAT INSTALLING THE WELD PREP IS NOT REQUIRED AT THIS STAGE (ADDITIONAL FITTING / TRIMMING WILL BE REQUIRED AT INSTALLATION) HIGH PRESSURE WASH PER PP475 NOTIFY Q/A FOR FINAL PANEL PROFILE CONFIRMATION PRIOR TO COMPLETING THE POLISHING AND INSTALLATION OF PROTECTIVE PLASTIC SAND AND POLISH THE INSIDE SURFACE 100% TO ACHIEVE A 32 MICRO SURFACE FINISH (WITH THE EXCEPTION OF THE WELDING / TRIMMING ZONES). CLEAN PANEL PER PP475 APPLY PROTECTIVE PLASTIC FILM (CONTACT DOUG McCORKLE FOR MATERIAL) STAGE PANEL FOR INSTALLATION Specification: PP475 Rev: 3 | 1.00 | 1.00 | 1.00 | SE121-001P / A | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | |
|--------------------------|---|---------------|--------------|--------------|------------------|--------------|--------------|
| Sub: 16 / Seq: 70 (R) | 805-INPROCESS INSPECTION - PLA VERIFY PROFILE TO INSPECTION GAGE # MTMFX-2905. GAP TOLERANCE: .094" MAX. RECORD ACTUAL GAP READINGS ON INSPECTION DRAWING VERIFY PART PERIMETER EXCEEDS GAGE PERIMETER FOR TRIMMING AND FITTING AT ASSEMBLY INSPECT AND RECORD INTERIOR SIDE SURFACE FINISH (LESS PERIMETER / WELD ZONES) AND RECORD ACTUAL READINGS ON INSPECTION DRAWING INSPECT MAGNETIC PERMEABILITY PER PP476 AND ASTM A800, SUPPLEMENTARY REQUIREMENT S1 (BUT THE MEASUREMENT SHALL BE TAKEN IN RELATIVE PERMEABILITY RATHER THAN FERRITE CONTENT. THE SURFACES OF THE PVVS SHELL AND PORT EXTENSION SHALL BE CHECKED AND DOCUMENTED ON A 6" GRID. THE SURFACES AT AND NEAR WELDS WILL BE CHECKED ON A 1" GRID. RECORD ACTUAL PERMEABILITY READINGS ON INSPECTION DRAWING INSPECT MATERIAL THICKNESS PER PP477 (6" GRID) RECORD ACTUAL MATERIAL THICKNESS ON INSPECTION DRAWING Test Certification: SE121-001P-10MTM Rev: 2A Part Number: SE121-001P-2 PANEL 3 Part Description: DIE FORMED PANEL Specification: ASME B46.1 Rev: 95 Specification: ASTM A800 Specification: PP475 Rev: 2 Specification: PP476 Rev: -- Specification: PP477 Rev: -- Specification: PP479 Rev: -- | 1.00 | 1.00 | 1.00 | SE121-001P / A | | |
| | | IDC Count : 3 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 9 | NDT Count: 0 | WPS Count: 0 |

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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| Sub ID 17 | Part ID SE121-001P-2 PANEL # 4 | Qty 1 | Drawing ID / Rev / | Parent Sub:1 Op:10 |
|---------------------|--|-----------------|------------------------------|--------------------|

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|--|--------|----------|-------|------------------|
| Sub: 17 / Seq: 10 (C) | 820-RECEIVING INSPECTION | 1.00 | 1.00 | 1.00 | SE121-001P / A |
| | INSPECT BLANK SIZE PER DEVELOPMENT DRAWING (AUDIT DIMENSIONS WILL BE PROVIDED BY DOUG MCCORKLE) | | | | |
| | INSPECT MATERIAL THICKNESS PER PP477 | | | | |
| | VISUAL INSPECT SURFACE FINISH (PANEL SURFACE SHOULD BE A SMOOTH MILL PRODUCED SURFACE, WITHOUT SCRAPES, GOUGES, HEAVY PITS, ETC... IT SHOULD BE IN A CONDITION THAT CAN BE READILY POLISHED WITHOUT EXCESSIVE MATERIAL REMOVAL (CONTACT ENGINEERING (DOUG MCCORKLE IF FURTHER CLARIFICATION IS NEEDED) | | | | |
| | SAMPLE INSPECT MAGNETIC PERMEABILITY PER PP476, AND ASTM A800, SUPPLEMENTARY REQUIREMENT S1 (BUT THE MEASUREMENT SHALL BE TAKEN IN RELATIVE PERMEABILITY RATHER THAN FERRITE CONTENT). SAMPLE LOT SIZE: AT LEAST 10 EVENLY SPACED LOCATIONS. | | | | |
| | RECORD IDC DATA | | | | |

Part Number: SE121-001P-2 PANEL 4
Part Description: DIE FORMED PANEL
Specification: ASTM A800 Rev: 01
Customer: PPPL
Specification: ASTM B443 Rev: 00
Specification: ASME B46.1 Rev: 95
Specification: PP475 Rev: 2
Specification: PP476 Rev: A
Specification: PP477 Rev: A

IDC Count : 3 Dwg Count: 0 Pgm Count: 0 QAP Count: 9 NDT Count: 0 WPS Count: 0

| Piece # | Part ID | Qty | Drawing ID / Rev | Vendor | Dimensions |
|---------|--|-----|------------------|--------|------------|
| 10 | SE121-001P-2 PANEL # 4-PANEL BLANK .375" THK INCONEL 625 | 1.0 | SE121 / -- | 1810 | |
| (C) | Vendor Part ID: SE121-001P-2 PANEL # 4 | | | | |
| | PANEL BLANK AWJ CUT FROM .375" INCONEL 625 TO PROVIDED GEOMETRICAL SHAPE (SE121-001P-2 PANEL # 1.DXF, REV. --) | | | | |
| | MATERIAL REQUIREMENTS: INCONEL 625 (UNS N06625) PER ASTM B 443-00 ANNEALED | | | | |
| | MAGNETIC PERMEABILITY SHALL NOT EXCEED 1.00 (REF. ASTM A800). | | | | |
| | SURFACE MUST BE PROTECTED FROM CONTACT WITH IRON AND IRON ALLOY MATERIALS | | | | |
| | CERTS & MILL TEST REPORTS REQ'D WITH SHIPMENT. | | | | |
| | APPROXIMATE OVERALL SIZE: 54.97*76.37 | | | | |

Material Certification:
Part Number: SE121-001P-2 PANEL # 1
Part Description: DIE FORMED PANEL
Specification: ASTM A800 Rev: 01
Specification: ASTM B443 Rev: 00
Specification: ASTM B46.1 Rev: 95

QAP Count: 6

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | | | |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|---------------|--------------|--------------|--------------|--------------|--------------|
| Sub: 17 / Seq: 18 (C) | 105-DEBURR PLT 1 LOW BAY RADIUS ALL CUT EDGES PRIOR TO FORMING Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | | | |
|--------------------------|---|---------------|-----------------|--------------|-------------------------|---------------|--------------|--------------|--------------|--------------|--------------|
| Sub: 17 / Seq: 20 (C) | 341-PACIFIC 750 1ST FORM OPERATION: LOAD, ALIGN, AND BOLT DIE SET # MTMFX-2888 - MTMFX-2889 INTO THE 750 TON HYDRAULIC PRESS. ENSURE THE DIE SET FACES ARE CLEAN AND FREE OF DIRT, OIL, GRIME, FOREIGN MATTER, RAISED OR EMBEDDED MATERIAL, ETC.... ENSURE THE PANEL BLANK IS CLEAN AND FREE OF FOREIGN MATTER. LOAD THE PANEL BLANK INTO THE DIE SET. HYDRAULIC FORM THE PANEL TO ACHIEVE THE GEOMETRICAL SHAPE CONFORMING TO INSPECTION GAGE # MTMFX-2906. NOTE THAT THE FINAL PANEL TO GAGE GAP TOLERANCE IS .094" MAX. IT IS DESIRED TO GET AS CLOSE TO THIS AS POSSIBLE PRIOR TO ANNEALING. CLOSELY WATCH THE FORMING, WRINKLING, AND SPRING-BACK CHARACTERISTICS OF THE MATERIAL DURING THE FORMING PROCESS. WHEN IT'S APPARENT THE MATERIAL IS WORK HARDENING TO A DEGREE THAT FORMING BECOMES DIFFICULT, OR THE PHYSICAL INTEGRITY OF THE MATERIAL IS AT RISK, PROCEED TO THE NEXT SEQUENTIAL OPERATION (BLAST AND ANNEAL). A FINAL FORMING SEQUENCE IS PROVIDED FOR "FINAL SIZING" AFTER THE MATERIAL HAS BEEN ANNEALED. ENSURE THE PANEL MATERIAL EXTENDS BEYOND THE PERIMETER OF THE GAGE (ENOUGH TO PROVIDE ADEQUATE STOCK ALLOWANCE FOR RE-POSITIONING, RE-STRIKING, AND ACCURATE TRIMMING AFTER ANNEALING). Part Number: SE121-001P-2 PANEL 4 Part Description: DIE FORMED PANEL Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 3 | NDT Count: 0 | WPS Count: 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | | | |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|---------------|--------------|--------------|--------------|--------------|--------------|
| Sub: 17 / Seq: 22 (C) | 230-FABRICATION - WEIDNER CUT OUT A LIFTING EYE FROM THE EXCESS TRIM STOCK THAT WAS REMOVED DURING THE FORMING CYCLE. INSTALL AND WELD IT TO THE PERIPHERAL EDGE OF THE FORMED PANEL (WHICH STILL HAS EXCESS TRIM STOCK REMAINING). POSITIONING CONSIDERATIONS: 1. POSITION TO SUIT NORMAL HANDLING AND LIFTING. 2. POSITION TO SUIT SETTING IN A VERTICAL STANCE IN THE HEAT TREAT OVEN (WIDE SIDE DOWN). 3. SHAPE AND POSITION THE LIFTING HOOK FOR A "QUICK AND EASY GAFF HOOK STYLE GRAB" WHEN REMOVING THE PARTS FROM THE HOT OVEN FOR A RAPID COOLING CYCLE. Specification: PP475 Rev: 3 | 1.00 | 1.00 | 1.00 | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 1 |

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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|--|--|-----------------------|-------------------------|----------------------|---|
| Operation Sub: 17 / Seq: 25 (C) | Resource 260-SANDBLAST SHOT BLAST THE ENTIRE PANEL 100% USING 180-220 GRIT VIRGIN ALUMINUM OXIDE MEDIA TO REMOVE ANY RESIDUE / MARKINGS FROM THE INITIAL FORMING PROCESS. MAINTAIN AN APPROXIMATE BLAST ANGLE OF 20 TO 40 DEGREES BLOW OFF ALL RESIDUAL BLAST MEDIA PRIOR TO HANDLING. Specification: PP475 Rev: 6 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A |
|--|--|-----------------------|-------------------------|----------------------|---|

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 0

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|--|---|-----------------------|-------------------------|----------------------|---|-------------------------------------|
| Operation Sub: 17 / Seq: 30 (C) | Resource 520-SUBLET, EXOTIC HEAT TREAT SOLUTION ANNEAL FORMED PANEL PER THE FOLLOWING: ATTACH A MINIMUM OF THREE EQUALLY SPACED THERMOCOUPLES TO THE FORMED PANEL CHARGE FURNACE AND HEAT PART UNTIL THERMOCOUPLE READINGS ARE WITHIN 1900 +/-15F. HOLD PART TEMPERATURE AT 1900 DEGREES F. (+/- 15 DEGREES) HOLD FOR 45 MINUTES (+/ 5 MINUTES) RAPID COOL (VIA. WATER QUENCHING OR FORCED AIR CIRCULATION) TO 1000 DEGREES F. OPEN AIR COOL TO AMBIENT TEMP. Specification: AMS2774 Rev: JUL95 Certification: H/T CERTIFICATE Part Number: SE121-001P-2 PANEL 4 Part Description: DIE FORMED PANEL Customer: PPPL Furnace charts: FURNACE CHART Specification: PP475 Rev: 2 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A | Service ID THRML TR/NA SA |
|--|---|-----------------------|-------------------------|----------------------|---|-------------------------------------|

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 7 NDT Count: 0 WPS Count: 0

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|--|--|-----------------------|-------------------------|----------------------|---|
| Operation Sub: 17 / Seq: 31 (U) | Resource 820-RECEIVING INSPECTION REVIEW HEAT TREAT CERTIFICATE AND FURNACE CHART | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A |
|--|--|-----------------------|-------------------------|----------------------|---|

IDC Count : 1 Dwg Count: 0 Pgm Count: 0 QAP Count: 0 NDT Count: 0 WPS Count: 0

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|--|---|-----------------------|-------------------------|----------------------|---|
| Operation Sub: 17 / Seq: 35 (R) | Resource 805-INPROCESS INSPECTION - PLA VISUAL INSPECT SURFACE FOR DAMAGE, PITTING, GOUGES, SCRAPES ETC..... ON THE INSIDE (CONCAVE SURFACE), LOOK FOR ANY SURFACE DEFECTS OR IRREGULARITIES THAT MAY INHIBIT ACHIEVING THE REQUIRED 32 MICRO-INCH FINISH REQUIREMENT. ON THE OUTSIDE (CONVEX SURFACE), VERIFY THE SURFACE FINISH STILL MEETS THE REQUIREMENTS OF ASTM B 443-00. NOTIFY ENGINEERING (DOUG McCORKLE) FOR CONCURRENCE VERIFY MAGNETIC PERMEABILITY AND RECORD I.D.C. DATA Part Number: SE121-001P-2 PANEL 4 Part Description: DIE FORMED PANEL Specification: PP475 Rev: 6 Specification: ASTM B443 Rev: 00 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A |
|--|---|-----------------------|-------------------------|----------------------|---|

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|-------------------------------|----------------|-----------------|--|---------------------------------------|

Specification: PP476 Rev: 2

IDC Count : 1 Dwg Count: 0 Pgm Count: 0 QAP Count: 5 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|
| Sub: 17 / Seq: 40 (R) | 341-PACIFIC 750 2ND FORMING OPERATION ENSURE THE DIE SET FACES ARE CLEAN AND FREE OF DIRT, OIL, GRIME, FOREIGN MATTER, RAISED OR EMBEDDED MATERIAL, ETC.... LOAD THE PREFORMED / ANNEALED PANEL INTO THE DIE SET. "RE-STRIKE" HYDRAULIC FORM THE PANEL TO ACHIEVE THE GEOMETRICAL SHAPE CONFORMING TO INSPECTION GAGE # MTMFX-2906. PANEL TO GAGE GAP TOLERANCE: .094" MAX. NOTIFY INSPECTOR FOR Q/A IDC VERIFICATION | 1.00 | 1.00 | 1.00 | SE121-001P / A |
| | Part Number: SE121-001P-2 PANEL 4 Part Description: DIE FORMED PANEL Specification: PP475 Rev: 2 | | | | |

IDC Count : 1 Dwg Count: 0 Pgm Count: 0 QAP Count: 3 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|
| Sub: 17 / Seq: 50 (F) | 260-SANDBLAST SHOT BLAST THE ENTIRE PANEL 100% USING 180-220 GRIT VIRGIN ALUMINUM OXIDE MEDIA TO REMOVE ANY RESIDUE / MARKINGS FROM THE FINAL FORMING PROCESS. Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A |

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|---|---------------|-----------------|--------------|-------------------------|
| Sub: 17 / Seq: 60 (F) | 230-FABRICATION - WEIDNER TRIM PERIMETER TO PROVIDED TRIM-LINES (LEAVING STOCK FOR POSITIONING AND FITTING ON THE FAB FIXTURE). NOTE THAT INSTALLING THE WELD PREP IS NOT REQUIRED AT THIS STAGE (ADDITIONAL FITTING / TRIMMING WILL BE REQUIRED AT INSTALLATION) HIGH PRESSURE WASH PER PP475 NOTIFY Q/A FOR FINAL PANEL PROFILE CONFIRMATION PRIOR TO COMPLETING THE POLISHING AND INSTALLATION OF PROTECTIVE PLASTIC SAND AND POLISH THE INSIDE SURFACE 100% TO ACHIEVE A 32 MICRO SURFACE FINISH (WITH THE EXCEPTION OF THE WELDING / TRIMMING ZONES). CLEAN PANEL PER PP475 APPLY PROTECTIVE PLASTIC FILM (CONTACT DOUG McCORKLE FOR MATERIAL) STAGE PANEL FOR INSTALLATION Specification: PP475 Rev: 3 | 1.00 | 1.00 | 1.00 | SE121-001P / A |

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|
| Sub: 17 / Seq: 70 (F) | 805-INPROCESS INSPECTION - PLA VERIFY PROFILE TO INSPECTION GAGE # MTMFX-2906. GAP TOLERANCE: .094" MAX. RECORD ACTUAL GAP READINGS ON INSPECTION DRAWING | 1.00 | 1.00 | 1.00 | SE121-001P / A |

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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VERIFY PART PERIMETER EXCEEDS GAGE PERIMETER FOR TRIMMING AND FITTING AT ASSEMBLY
 INSPECT AND RECORD INTERIOR SIDE SURFACE FINISH (LESS PERIMETER / WELD ZONES) AND RECORD ACTUAL READINGS ON INSPECTION DRAWING
 INSPECT MAGNETIC PERMEABILITY PER PP476 AND ASTM A800, SUPPLEMENTARY REQUIREMENT S1 (BUT THE MEASUREMENT SHALL BE TAKEN IN RELATIVE PERMEABILITY RATHER THAN FERRITE CONTENT. THE SURFACES OF THE PVVS SHELL AND PORT EXTENSION SHALL BE CHECKED AND DOCUMENTED ON A 6" GRID. THE SURFACES AT AND NEAR WELDS WILL BE CHECKED ON A 1" GRID.
 RECORD ACTUAL PERMEABILITY READINGS ON INSPECTION DRAWING
 INSPECT MATERIAL THICKNESS PER PP477 (6" GRID)
 RECORD ACTUAL MATERIAL THICKNESS ON INSPECTION DRAWING

Test Certification: SE121-001P-10MTM Rev: 2A
 Part Number: SE121-001P-2 PANEL 4
 Part Description: DIE FORMED PANEL
 Specification: ASME B46.1 Rev: 95
 Specification: ASTM A800
 Specification: PP475 Rev: 2
 Specification: PP476 Rev: --
 Specification: PP477 Rev: --
 Specification: PP479 Rev: --

IDC Count : 3 Dwg Count: 0 Pgm Count: 0 QAP Count: 9 NDT Count: 0 WPS Count: 0

| Sub ID | Part ID | Qty | Drawing ID / Rev |
|--------|------------------------|-----|--------------------|
| 18 | SE121-001P-2 PANEL # 5 | 1 | / |
| | | | Parent Sub:1 Op:10 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--|--------------------------|--------|----------|-------|------------------|
| Sub: 18 / Seq: 10 (C) | 820-RECEIVING INSPECTION | 1.00 | 1.00 | 1.00 | SE121-001P / A |
| INSPECT BLANK SIZE PER DEVELOPMENT DRAWING (AUDIT DIMENSIONS WILL BE PROVIDED BY DOUG McCORKLE) | | | | | |
| INSPECT MATERIAL THICKNESS PER PP477 | | | | | |
| VISUAL INSPECT SURFACE FINISH (PANEL SURFACE SHOULD BE A SMOOTH MILL PRODUCED SURFACE, WITHOUT SCRAPES, GOUGES, HEAVY PITS, ETC... IT SHOULD BE IN A CONDITION THAT CAN BE READILY POLISHED WITHOUT EXCESSIVE MATERIAL REMOVAL (CONTACT ENGINEERING (DOUG McCORKLE IF FURTHER CLARIFICATION IS NEEDED) | | | | | |
| SAMPLE INSPECT MAGNETIC PERMEABILITY PER PP476, AND ASTM A800, SUPPLEMENTARY REQUIREMENT S1 (BUT THE MEASUREMENT SHALL BE TAKEN IN RELATIVE PERMEABILITY RATHER THAN FERRITE CONTENT). SAMPLE LOT SIZE: AT LEAST 10 EVENLY SPACED LOCATIONS. | | | | | |
| RECORD IDC DATA | | | | | |
| Part Number: SE121-001P-2 PANEL 5 | | | | | |
| Part Description: DIE FORMED PANEL | | | | | |
| Specification: ASTM A800 Rev: 01 | | | | | |
| Customer: PPPL | | | | | |
| Specification: ASTM B443 Rev: 00 | | | | | |
| Specification: ASME B46.1 Rev: 95 | | | | | |
| Specification: PP475 Rev: 2 | | | | | |
| Specification: PP476 Rev: A | | | | | |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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Specification: PP477 Rev: A

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|----------------|--|--------------|-------------------------|---------------|-------------------|--------------|
| | IDC Count : 3 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 9 | NDT Count: 0 | WPS Count: 0 |
| Piece # | Part ID | Qty | Drawing ID / Rev | Vendor | Dimensions | |
| 10 | SE121-001P-2 PANEL # 5-PANEL BLANK .375" THK INCONEL 625 | 1.0 | SE121 / -- | 1810 | | |

Vendor Part ID: SE121-001P-2 PANEL # 5

(C) PANEL BLANK AWJ CUT FROM .375" INCONEL 625 TO PROVIDED GEOMETRICAL SHAPE
(SE121-001P-2 PANEL # 1.DXF, REV. --)
MATERIAL REQUIREMENTS: INCONEL 625 (UNS N06625) PER ASTM B 443-00 ANNEALED
MAGNETIC PERMEABILITY SHALL NOT EXCEED 1.00 (REF. ASTM A800).
SURFACE MUST BE PROTECTED FROM CONTACT WITH IRON AND IRON ALLOY MATERIALS
CERTS & MILL TEST REPORTS REQ'D WITH SHIPMENT.
APPROXIMATE OVERALL SIZE: 54.97*76.37

Material Certification:

Part Number: SE121-001P-2 PANEL # 1
Part Description: DIE FORMED PANEL
Specification: ASTM A800 Rev: 01
Specification: ASTM B443 Rev: 00
Specification: ASTM B46.1 Rev: 95

QAP Count: 6

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|--------------|--|--|--|
| Sub: 18 / Seq: 18 (C) | 105-DEBURR PLT 1 LOW BAY RADIUS ALL CUT EDGES PRIOR TO FORMING Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A | | | | |
| | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 0 | | | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|--------------------------|---|---------------|-----------------|--------------|-------------------------|--|--|--|--|
| Sub: 18 / Seq: 20 (F) | 341-PACIFIC 750 1ST FORM OPERATION: LOAD, ALIGN, AND BOLT DIE SET # MTMFX-2890 - MTMFX-2891 INTO THE 750 TON HYDRAULIC PRESS. ENSURE THE DIE SET FACES ARE CLEAN AND FREE OF DIRT, OIL, GRIME, FOREIGN MATTER, RAISED OR EMBEDDED MATERIAL, ETC.... ENSURE THE PANEL BLANK IS CLEAN AND FREE OF FOREIGN MATTER. LOAD THE PANEL BLANK INTO THE DIE SET. HYDRAULIC FORM THE PANEL TO ACHIEVE THE GEOMETRICAL SHAPE CONFORMING TO INSPECTION GAGE # MTMFX-2907. NOTE THAT THE FINAL PANEL TO GAGE GAP TOLERANCE IS .094" MAX. IT IS DESIRED TO GET AS CLOSE TO THIS AS POSSIBLE PRIOR TO ANNEALING. CLOSELY WATCH THE FORMING, WRINKLING, AND SPRING-BACK CHARACTERISTICS OF THE MATERIAL DURING THE FORMING PROCESS. WHEN IT'S APPARENT THE MATERIAL IS WORK HARDENING TO A DEGREE THAT FORMING BECOMES DIFFICULT, OR THE PHYSICAL INTEGRITY OF THE MATERIAL IS AT RISK, PROCEED TO THE NEXT SEQUENTIAL OPERATION (BLAST AND ANNEAL). A FINAL FORMING SEQUENCE IS PROVIDED FOR "FINAL SIZING" AFTER THE MATERIAL HAS BEEN ANNEALED. ENSURE THE PANEL MATERIAL EXTENDS BEYOND THE PERIMETER OF THE GAGE (ENOUGH TO PROVIDE ADEQUATE STOCK ALLOWANCE FOR RE-POSITIONING, RE-STRIKING, AND ACCURATE TRIMMING AFTER ANNEALING). | 1.00 | 1.00 | 1.00 | SE121-001P / A | | | | |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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Part Number: SE121-001P-2 PANEL 5
 Part Description: DIE FORMED PANEL
 Specification: PP475 Rev: 2

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 3 NDT Count: 0 WPS Count: 0

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|--|---|-----------------------|-------------------------|----------------------|-----------------------------|-----------------------|
| Operation Sub: 18 / Seq: 22 (F) | Resource 230-FABRICATION - WEIDNER CUT OUT A LIFTING EYE FROM THE EXCESS TRIM STOCK THAT WAS REMOVED DURING THE FORMING CYCLE. INSTALL AND WELD IT TO THE PERIPHERAL EDGE OF THE FORMED PANEL (WHICH STILL HAS EXCESS TRIM STOCK REMAINING). POSITIONING CONSIDERATIONS: 1. POSITION TO SUIT NORMAL HANDLING AND LIFTING. 2. POSITION TO SUIT SETTING IN A VERTICAL STANCE IN THE HEAT TREAT OVEN (WIDE SIDE DOWN). 3. SHAPE AND POSITION THE LIFTING HOOK FOR A "QUICK AND EASY GAFF HOOK STYLE GRAB" WHEN REMOVING THE PARTS FROM THE HOT OVEN FOR A RAPID COOLING CYCLE. Specification: PP475 Rev: 3 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev | Service ID |
|--|---|-----------------------|-------------------------|----------------------|-----------------------------|-----------------------|

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 1

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|--|--|-----------------------|-------------------------|----------------------|---|-----------------------|
| Operation Sub: 18 / Seq: 25 (R) | Resource 260-SANDBLAST SHOT BLAST THE ENTIRE PANEL 100% USING 180-220 GRIT VIRGIN ALUMINUM OXIDE MEDIA TO REMOVE ANY RESIDUE / MARKINGS FROM THE INITIAL FORMING PROCESS. MAINTAIN AN APPROXIMATE BLAST ANGLE OF 20 TO 40 DEGREES BLOW OFF ALL RESIDUAL BLAST MEDIA PRIOR TO HANDLING. Specification: PP475 Rev: 6 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A | Service ID |
|--|--|-----------------------|-------------------------|----------------------|---|-----------------------|

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 0

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|--|--|-----------------------|-------------------------|----------------------|---|-------------------------------------|
| Operation Sub: 18 / Seq: 30 (R) | Resource 520-SUBLET, EXOTIC HEAT TREAT SOLUTION ANNEAL FORMED PANEL PER THE FOLLOWING: ATTACH A MINIMUM OF THREE EQUALLY SPACED THERMOCOUPLES TO THE FORMED PANEL CHARGE FURNACE AND HEAT PART UNTIL THERMOCOUPLE READINGS ARE WITHIN 1900 +/-15F. HOLD PART TEMPERATURE AT 1900 DEGREES F. (+/- 15 DEGREES) HOLD FOR 45 MINUTES (+/ 5 MINUTES) RAPID COOL (VIA. WATER QUENCHING OR FORCED AIR CIRCULATION) TO 1000 DEGREES F. OPEN AIR COOL TO AMBIENT TEMP. Specification: AMS2774 Rev: JUL95 Certification: H/T CERTIFICATE Part Number: SE121-001P-2 PANEL 5 Part Description: DIE FORMED PANEL Customer: PPPL Furnace charts: FURNACE CHART Specification: PP475 Rev: 2 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A | Service ID THRML TR/NA SA |
|--|--|-----------------------|-------------------------|----------------------|---|-------------------------------------|

| Workorder | Part ID | Qty | Drawing ID / Rev | Engineer | | | |
|--------------------------|--|---------------|------------------|--------------------|------------------|--------------|--------------|
| 64880/1.0 | | 1 | SE121-003P / -- | BLUE/DOUG MCCORKLE | | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 7 | NDT Count: 0 | WPS Count: 0 |
| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | |
| Sub: 18 / Seq: 31 (U) | 820-RECEIVING INSPECTION REVIEW HEAT TREAT CERTIFICATE AND FURNACE CHART | 1.00 | 1.00 | 1.00 | SE121-001P / A | | |
| | | IDC Count : 1 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 |
| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | |
| Sub: 18 / Seq: 35 (F) | 805-INPROCESS INSPECTION - PLA VISUAL INSPECT SURFACE FOR DAMAGE, PITTING, GOUGES, SCRAPES ETC.... ON THE INSIDE (CONCAVE SURFACE), LOOK FOR ANY SURFACE DEFECTS OR IRREGULARITIES THAT MAY INHIBIT ACHIEVING THE REQUIRED 32 MICRO-INCH FINISH REQUIREMENT. ON THE OUTSIDE (CONVEX SURFACE), VERIFY THE SURFACE FINISH STILL MEETS THE REQUIREMENTS OF ASTM B 443-00. NOTIFY ENGINEERING (DOUG McCORKLE) FOR CONCURRENCE VERIFY MAGNETIC PERMEABILITY AND RECORD I.D.C. DATA Part Number: SE121-001P-2 PANEL 5 Part Description: DIE FORMED PANEL Specification: PP475 Rev: 6 Specification: ASTM B443 Rev: 00 Specification: PP476 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A | | |
| | | IDC Count : 1 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 5 | NDT Count: 0 | WPS Count: 0 |
| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | |
| Sub: 18 / Seq: 40 (F) | 341-PACIFIC 750 2ND FORMING OPERATION ENSURE THE DIE SET FACES ARE CLEAN AND FREE OF DIRT, OIL, GRIME, FOREIGN MATTER, RAISED OR EMBEDDED MATERIAL, ETC.... LOAD THE PREFORMED / ANNEALED PANEL INTO THE DIE SET. "RE-STRIKE" HYDRAULIC FORM THE PANEL TO ACHIEVE THE GEOMETRICAL SHAPE CONFORMING TO INSPECTION GAGE # MTMFX-2907. PANEL TO GAGE GAP TOLERANCE: .094" MAX. NOTIFY INSPECTOR FOR Q/A IDC VERIFICATION Part Number: SE121-001P-2 PANEL 5 Part Description: DIE FORMED PANEL Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A | | |
| | | IDC Count : 1 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 3 | NDT Count: 0 | WPS Count: 0 |
| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | |
| Sub: 18 / Seq: 50 (F) | 260-SANDBLAST SHOT BLAST THE ENTIRE PANEL 100% USING 180-220 GRIT VIRGIN ALUMINUM OXIDE MEDIA TO REMOVE ANY RESIDUE / MARKINGS FROM THE FINAL FORMING PROCESS. Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-001P / A | | |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|---|--------|----------|-------|------------------|
| Sub: 18 / Seq: 60 (F) | 230-FABRICATION - WEIDNER TRIM PERIMETER TO PROVIDED TRIM-LINES (LEAVING STOCK FOR POSITIONING AND FITTING ON THE FAB FIXTURE). NOTE THAT INSTALLING THE WELD PREP IS NOT REQUIRED AT THIS STAGE (ADDITIONAL FITTING / TRIMMING WILL BE REQUIRED AT INSTALLATION) HIGH PRESSURE WASH PER PP475 NOTIFY Q/A FOR FINAL PANEL PROFILE CONFIRMATION PRIOR TO COMPLETING THE POLISHING AND INSTALLATION OF PROTECTIVE PLASTIC SAND AND POLISH THE INSIDE SURFACE 100% TO ACHIEVE A 32 MICRO SURFACE FINISH (WITH THE EXCEPTION OF THE WELDING / TRIMMING ZONES). CLEAN PANEL PER PP475 APPLY PROTECTIVE PLASTIC FILM (CONTACT DOUG McCORKLE FOR MATERIAL) STAGE PANEL FOR INSTALLATION Specification: PP475 Rev: 3 | 1.00 | 1.00 | 1.00 | SE121-001P / A |

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 0

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|---|--------|----------|-------|------------------|
| Sub: 18 / Seq: 70 (F) | 805-INPROCESS INSPECTION - PLA VERIFY PROFILE TO INSPECTION GAGE # MTMFX-2907. GAP TOLERANCE: .094" MAX. RECORD ACTUAL GAP READINGS ON INSPECTION DRAWING VERIFY PART PERIMETER EXCEEDS GAGE PERIMETER FOR TRIMMING AND FITTING AT ASSEMBLY INSPECT AND RECORD INTERIOR SIDE SURFACE FINISH (LESS PERIMETER / WELD ZONES) AND RECORD ACTUAL READINGS ON INSPECTION DRAWING INSPECT MAGNETIC PERMEABILITY PER PP476 AND ASTM A800, SUPPLEMENTARY REQUIREMENT S1 (BUT THE MEASUREMENT SHALL BE TAKEN IN RELATIVE PERMEABILITY RATHER THAN FERRITE CONTENT. THE SURFACES OF THE PVVS SHELL AND PORT EXTENSION SHALL BE CHECKED AND DOCUMENTED ON A 6" GRID. THE SURFACES AT AND NEAR WELDS WILL BE CHECKED ON A 1" GRID. RECORD ACTUAL PERMEABILITY READINGS ON INSPECTION DRAWING INSPECT MATERIAL THICKNESS PER PP477 (6" GRID) RECORD ACTUAL MATERIAL THICKNESS ON INSPECTION DRAWING Test Certification: SE121-001P-10MTM Rev: 2A Part Number: SE121-001P-2 PANEL 5 Part Description: DIE FORMED PANEL Specification: ASME B46.1 Rev: 95 Specification: ASTM A800 Specification: PP475 Rev: 2 Specification: PP476 Rev: -- Specification: PP477 Rev: -- Specification: PP479 Rev: -- | 1.00 | 1.00 | 1.00 | SE121-001P / A |

IDC Count : 3 Dwg Count: 0 Pgm Count: 0 QAP Count: 9 NDT Count: 0 WPS Count: 0

| Sub ID | Part ID | Qty | Drawing ID / Rev |
|--------|-------------------------------|-----|--------------------|
| 24 | SURFACE FINISH TESTING TEST P | 1 | / |
| | | | Parent Sub:1 Op:10 |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|-----------------------------|---|---------------|-----------------|---------------------|-------------------------|---------------|--------------------------|--------------|--|
| Sub: 24 / Seq: 10 (C) | 410-BURNOUT TABLE BURNOUT TEST PLATES PER MATERIAL CARD. DEBURR AND SAND EDGES SMOOTH (WITH UNCONTAMINATED GRINDING WHEEL ONLY). FORWARD ONE PLATE TO ENGINEERING (DOUG McCORKLE) AND PROCESS THE OTHER PER THE FOLLOWING ROUTING STEPS. | 1.00 | 1.00 | 1.00 | SE121-001P / A | | | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 | | |
| Piece # 10 (C) | Part ID INCONEL 625_670-SHEET,NICKEL ALLOY .25" THK INCONEL 625 SHEET, .25" THICK PER AMS 5599. CERT AND MILL TEST REPORT REQ'D WITH SHIPMENT. Material Certification: NONE REQ'D TEST SAMPLE | | | Qty 480.0 | Drawing ID / Rev | Vendor | Dimensions 480 | | |
| | | | | | | | | QAP Count: 1 | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|--------------|--------------|--|--|
| Sub: 24 / Seq: 20 (C) | 230-FABRICATION - WEIDNER SAND AND POLISH THE TEST PIECE (ONE SIDE) TO A 32 RA MICRO SURFACE FINISH | 1.00 | 1.00 | 1.00 | SE121-001P / A | | | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 | | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|--------------|--------------|--|--|
| Sub: 24 / Seq: 25 (C) | 260-SANDBLAST MASK THE POLISHED SIDE AND BLAST THE OTHER SIDE WITH 180-220 GRIT VIRGIN ALUMINUM OXIDE. Drw N/A | 1.00 | 1.00 | 1.00 | SE121-001P / A | | | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 | | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|--------------|--------------|--|--|
| Sub: 24 / Seq: 28 (C) | 230-FABRICATION - WEIDNER CLEAN SAMPLE MATERIAL SURFACES PER PP475, 5.7 & 5.8. WRAP THE PART IN PLASTIC FOAM. | 1.00 | 1.00 | 1.00 | PP475 / 6 | | | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 | | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|--------------------------|--|---------------|-----------------|--------------|-------------------------|--------------|--------------|--|--|
| Sub: 24 / Seq: 30 (C) | 805-INPROCESS INSPECTION - PLA VERIFY THE FOLLOWING TEST SAMPLE ATTRIBUTES: SURFACE FINISH (PER ASME B46.1-1995) POLISHED 32 MICRO ON ONE SIDE, SMOOTH BLASTED SURFACE SIDE OPPOSITE (NO PITS, SCRAPES, GOUGES, ETC...). CLEANLINESS PER PP475. MAGNETIC PERMEABILITY (1.01 MAX) REPORT RESULTS TO ENGINEERING (DOUG McCORKLE). | 1.00 | 1.00 | 1.00 | SE121-001P / A | | | | |
| | | IDC Count : 3 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 | | |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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| Sub ID 26 | Part ID SE121-001P-2 TEST PANEL NOTE: | Qty 1 | Drawing ID / Rev / | Parent Sub:1 Op:10 |
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| Operation Sub: 26 / Seq: 60 (R) | Resource 230-FABRICATION - WEIDNER | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A | | | | | |
| | OBTAIN THE DIE SET NUMBER ONE DEVELOPMENT PANEL (PRODUCED UNDER 64880/2, SUB ID 1) | | | | | | | | | |
| | SPLIT THE PANEL TO SIMULATE PRODUCTION WELD JOINT(S). | | | | | | | | | |
| | PREP, FIT AND WELD JOINTS TO DEVELOP WELDING SEQUENCES AND MINIMIZE WELDING DISTORTION. ENSURE THE PART IS RESTRAINED IN A MANNER SIMULATING PRODUCTION THROUGHOUT THE WELDING PROCESS. | | | | | | | | | |
| | MAXIMUM INTERIOR (CONCAVE) SURFACE WELD FACE: 1 BEAD WIDTH | | | | | | | | | |
| | CWI VISUAL INSPECT WELDS (CERTIFY EACH PASS) 100% UNDER 8X MAGNIFICATION PER ASME CODE ARTICLE 6, SECTION V. ACCEPTANCE PER AWS D1.6, 6.29.1. NO CERTIFICATE REQUIRED. THIS IS A TEST PIECE. | | | | | | | | | |
| | REVIEW RESULTS WITH ENGINEERING (DOUG McCORKLE) | | | | | | | | | |
| | SAND AND POLISH THE INSIDE (CONCAVE SIDE) SURFACE 100% TO ACHIEVE A 32 MICRO SURFACE FINISH. | | | | | | | | | |
| | CLEAN TEST PANEL PER CLEANING PROCEDURE PP475. | | | | | | | | | |
| | ENGINEERING / PRODUCTION REVIEW REQUIRED UPON COMPLETION. | | | | | | | | | |
| | Specification: PP475 Rev: 3 | | | | | | | | | |
| | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 1 | | | | |

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|--|---|-----------------------|-------------------------|----------------------|---|--------------|--|--|--|--|
| Operation Sub: 26 / Seq: 70 (R) | Resource 805-INPROCESS INSPECTION - PLA | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-001P / A | | | | | |
| | VERIFY PROFILE TO INSPECTION GAGE # MTMFX-2903. GAP TOLERANCE: .188" MAX. | | | | | | | | | |
| | INSPECT AND RECORD INTERIOR SIDE SURFACE FINISH. | | | | | | | | | |
| | INSPECT AND RECORD MAGNETIC PERMEABILITY. | | | | | | | | | |
| | Part Number: SE121-001P-2 TEST PANEL | | | | | | | | | |
| | Part Description: DIE FORMED PANEL | | | | | | | | | |
| | Specification: PP475 Rev: 6 | | | | | | | | | |
| | IDC Count : 3 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 3 | NDT Count: 0 | WPS Count: 0 | | | | |

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|---------------------|-------------------------------|-----------------|------------------------------|---------------------|
| Sub ID 30 | Part ID PQR PROCESS | Qty 1 | Drawing ID / Rev / | Parent Sub:26 Op:60 |
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| Operation Sub: 30 / Seq: 10 (C) | Resource 410-BURNOUT TABLE | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev | | | | | |
| | BURN OUT TWO TEST PLATES 6 X 15 AND CLEANUP. | | | | | | | | | |
| | NOTIFY WELDING ENGINEERING WHEN PARTS ARE AVAILABLE | | | | | | | | | |
| | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 | | | | |
| Piece # 10 | Part ID INCONEL 625_5-PLATE,NICKEL ALLOY .375" THK | Qty 338.3 | Drawing ID / Rev | Vendor 1810 | Dimensions 15.375*22 | | | | | |

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|------------------------|---------|----------|-------------------------------------|--------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|------------------------|---------|----------|-------------------------------------|--------------------------------|

(C) Vendor Part ID: INCONEL 625_5
 INCONEL 625 (UNS N06625) PER ASTM B 443-00
 ANNEALED
 MAGNETIC PERMEABILITY SHALL NOT EXCEED 1.00 (REF. ASTM A800).
 SURFACE MUST BE PROTECTED FROM CONTACT WITH IRON AND IRON ALLOY MATERIALS
 CERTS & MILL TEST REPORTS REQ'D WITH SHIPMENT.

QAP Count: 2

| | | | | | | | | | |
|--|---|-----------------------|-------------------------|----------------------|-------------------------|--------------|--------------|--------------|--|
| Operation Sub: 30 / Seq: 20 (C) | Resource 230-FABRICATION - WEIDNER WELD PQR PLATE PER WELDING ENGINEERING DIRECTION. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev | | | | |
| | IDC Count : 0 | | Dwg Count: 0 | | Pgm Count: 0 | QAP Count: 0 | NDT Count: 1 | WPS Count: 0 | |

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|--|---|-----------------------|-------------------------|----------------------|-------------------------|--------------|--------------|--------------|--|
| Operation Sub: 30 / Seq: 30 (C) | Resource 705-WELD ENGINEERING/ CWI CWI to visually inspect PQR test plate per the requirements of ASME Sect. IX, AWS D1.1, and AWS B2.1. MTM NDT certification form required | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev | | | | |
| | IDC Count : 0 | | Dwg Count: 0 | | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 | |

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|--|---|-----------------------|-------------------------|----------------------|-------------------------|--------------|--------------|--------------|--|
| Operation Sub: 30 / Seq: 40 (C) | Resource 818-MQS CONTRACTOR X-RAY Radiographically inspect PQR test plate per the requirements of ASME Sect. IX, AWS D1.1, and AWS B2.1. Reference acceptance to all three specifications on the reader sheet. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev | | | | |
| | IDC Count : 0 | | Dwg Count: 0 | | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 | |

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|--|---|-----------------------|-------------------------|----------------------|-------------------------|--------------|--------------|--------------|----------------------------------|
| Operation Sub: 30 / Seq: 50 (C) | Resource 450-SUBLET * Perform destructive testing (ref: 2 tensile tests, 2 face bend tests, and 2 root bend tests) to the requirements of the following three specifications; ASME Sect. IX, AWS D1.1, and AWS B2. * All test samples and remaining plate to be returned to Major Tool and Machine when complete. * Separate test reports are required for each specification. Test reports are to reference the PQR number and must provide the tensile failure locations/characters. * All NDT has been performed by Major Tool and Machine. A copy of the radiographic report is included with the test plate for reference. * A reference sheet with pertinent welding data is included with the test plate. * Test plate info: - One plate - 3/8" thick 304L stainless steel - One plate - 3/8" thick Inconel 625 - Both plates butt welded using filler material ERNiCrMo-3 (Inconel 625) - No post-weld heat treatment is required. - Test plate is supplied in the as-welded condition. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev | | | | Service ID TESTNG/MISC |
| | IDC Count : 0 | | Dwg Count: 0 | | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 | |

| Workorder | Part ID | Qty | Drawing ID / Rev | Engineer |
|-----------|---------|-----|------------------|--------------------|
| 64880/1.0 | | 1 | SE121-003P / -- | BLUE/DOUG MCCORKLE |

| Sub ID | Part ID | Qty | Drawing ID / Rev |
|-----------------------|-------------|-----|------------------|
| 37 | PQR PROCESS | 1 | / |
| Parent Sub: 26 Op: 60 | | | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | IDC Count | Dwg Count | Pgm Count | QAP Count | NDT Count | WPS Count |
|--------------------------|--|--------|----------|-------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sub: 37 / Seq: 20 (C) | 230-FABRICATION - WEIDNER PLASMA CUT TWO TEST PIECES 7"*18* CLEANUP, REMOVE HEAT AFFECTED ZONE. INSPECT MAGNETIC PERMEABILITY AND RECORD IDC PREP, WELD PQR PLATE PER WELDING ENGINEERING DIRECTION. | 1.00 | 1.00 | 1.00 | | 0 | 0 | 0 | 0 | 0 | 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | IDC Count | Dwg Count | Pgm Count | QAP Count | NDT Count | WPS Count |
|--------------------------|--|--------|----------|-------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sub: 37 / Seq: 30 (C) | 705-WELD ENGINEERING/ CWI CWI to visually inspect PQR test plate per the requirements of ASME Sect. IX, AWS D1.1, and AWS B2.1. MTM NDT certification form required | 1.00 | 1.00 | 1.00 | | 0 | 0 | 0 | 0 | 1 | 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | IDC Count | Dwg Count | Pgm Count | QAP Count | NDT Count | WPS Count |
|--------------------------|---|--------|----------|-------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sub: 37 / Seq: 40 (C) | 818-MQS CONTRACTOR X-RAY Radiographically inspect PQR test plate per the requirements of ASME Sect. IX, AWS D1.1, and AWS B2.1. Reader sheet to state acceptance to all three specifications. * PQR390 * Test plate material: .375" thick Inconel 625. * Butt weld using Inconel 625 filler / GTAW process. | 1.00 | 1.00 | 1.00 | | 0 | 0 | 0 | 0 | 0 | 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | Service ID |
|--------------------------|---|--------|----------|-------|------------------|-------------|
| Sub: 37 / Seq: 50 (R) | 450-SUBLET * Perform destructive testing (ref: 2 tensile tests, 2 face bend tests, and 2 root bend tests) per the requirements of the following three specifications; ASME Sect. IX, AWS D1.1, and AWS B2.1 * All test samples and remaining plate to be returned to Major Tool and Machine when complete. * Separate test reports are required for each specification. Test reports are to reference the PQR number and must provide the tensile failure locations/characteristics. * All NDT has been performed by Major Tool and Machine. A copy of the radiographic report is included with the test plate for reference. * A reference sheet with pertinent welding data is included with the test plate. * Test plate info: - Test plate number: PQR390 - One plate - 3/8" thick Inconel 625 - One plate - 3/8" thick Inconel 625 - Both plates butt welded using filler material ERNiCrMo-3 (Inconel 625) - No post-weld heat treatment is required. | 1.00 | 1.00 | 1.00 | | TESTNG/MISC |

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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- Test plate is supplied in the as-welded condition.

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 0 NDT Count: 0 WPS Count: 0

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|---------------------|---------------------------------------|-----------------|--|
| Sub ID 34 | Part ID SOURCE NOTIFICATION | Qty 1 | Drawing ID / Rev / Parent Sub:1 Op:30 |
|---------------------|---------------------------------------|-----------------|--|

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|--|---|-----------------------|-------------------------|----------------------|-------------------------|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Operation Sub: 34 / Seq: 10 (U) | Resource 830-SOURCE WITNESS POINT -IN P AFTER TACK WELDING, AND PRIOR TO WELDING SOURCE NOTIFICATION IS REQUIRED. CUSTOMER DECISION WILL FOLLOW. NOTIFICATION VIA CFT. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 |
|--|---|-----------------------|-------------------------|----------------------|-------------------------|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|

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| Sub ID 19 | Part ID SE212-003P-3-PORT EXTENSION | Qty 1 | Drawing ID / Rev / Parent Sub:1 Op:70 |
|---------------------|---|-----------------|--|

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|--|---|-----------------------|-------------------------|----------------------|--|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Operation Sub: 19 / Seq: 10 (F) | Resource 230-FABRICATION - WEIDNER POSITION, INSTALL AND WELD CONFLAT FLANGE TO TUBE PER DRAWING. FIT AND TRIM THE LENGTH FOR INSTALLATION. PREP FOR WELDING IN PLACE. GRIND / BLEND THE INTERIOR WELD SMOOTH. POLISH THE ENTIRE INSIDE SURFACE SMOOTH TO ACHIEVE A 32 MICRO SURFACE FINISH. CLEAN PER PP475 CWI VISUAL INSPECT THE PORT EXTENSION TUBE TO CONFLAT FLANGE WELD 100% UNDER 8X MAGNIFICATION PER ASME CODE ARTICLE 6, SECTION V. ACCEPTANCE PER AWS D1.6, 6.29.1. Part Number: SE212-003P-3 Specification: PP475 Rev: 6 Part Description: PORT EXTENSION Certification: CWI CERTIFICATION | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-002P / -- | IDC Count : 5 | Dwg Count: 1 | Pgm Count: 0 | QAP Count: 4 | NDT Count: 0 | WPS Count: 1 |
|--|---|-----------------------|-------------------------|----------------------|--|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|

WPS328.5-PPPL Rev:2 GTAW MAN
GTAW - Manual Fillers: INCONEL625_035_GMAW / INCONEL625_062_GTAW / INCONEL625_093_GTAW
Notes:

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|--|--|-----------------------|-------------------------|----------------------|--|
| Operation Sub: 19 / Seq: 20 (F) | Resource 805-INPROCESS INSPECTION - PLA VERIFY CLEANLINESS INSPECT THE INTERIOR SURFACE FINISH OF THE PORT SUB-ASSY. INSPECT THE MAGNETIC PERMEABILITY OF THE PORT EXTENSION TO FLANGE WELD AND SURROUNDING AREA. RECORD IDC DATA Part Number: SE212-003P-3 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-002P / -- |
|--|--|-----------------------|-------------------------|----------------------|--|

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|-------------------------------|----------------|-----------------|--|---------------------------------------|

Part Description: PORT EXTENSION
 Customer: PPPL
 Specification: ASME B46.1 Rev: 95
 Specification: A800 Rev: 2001
 Specification: PP476 Rev: 2
 Specification: PP477 Rev: 2
 Specification: PP475 Rev: 6

IDC Count : 2 Dwg Count: 1 Pgm Count: 0 QAP Count: 8 NDT Count: 0 WPS Count: 0

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|---------------------|----------------------------------|-----------------|---|
| Sub ID 20 | Part ID CONFLAT FLANGE | Qty 1 | Drawing ID / Rev / Parent Sub:19 Op:10 |
|---------------------|----------------------------------|-----------------|---|

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|--|---|-----------------------|-------------------------|----------------------|--|
| Operation Sub: 20 / Seq: 10 (C) | Resource 820-RECEIVING INSPECTION RECEIVING INSPECTION RECEIVE AND INSPECT THE FOLLOWING PARTS: (THEY SHOULD ALL ARRIVE TOGETHER) F10000000NC4 FG1000CI FG1000VU FB1000C12S GC0275S CONTACT ENGINEERING (DOUG McCORKLE) WHEN PARTS ARRIVE. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-002P / -- |
|--|---|-----------------------|-------------------------|----------------------|--|

 IDC N/A IDC Count : 0 Dwg Count: 1 Pgm Count: 0 QAP Count: 0 NDT Count: 0 WPS Count: 0

| | | | | | |
|-----------------------------|---|-------------------|-------------------------|---------------|-------------------|
| Piece # 10 (C) | Part ID F10000000NC4-FLANGE, CONFLAT, NON-ROTATE, 10.00" FLANGE, CONFLAT, NON-ROTATABLE 10.00 X BLANK X 0.97", CLEAR BOLT HOLES, 304L | Qty 1.0 | Drawing ID / Rev | Vendor | Dimensions |
|-----------------------------|---|-------------------|-------------------------|---------------|-------------------|

Material Certification:
 Part Number: F10000000NC4

QAP Count: 2

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|-----------------------------|---|-------------------|-------------------------|---------------|-------------------|
| Piece # 20 (C) | Part ID FG1000CI-GASKET KIT (10/PK), COPPER, FOR 10" CFF GASKET KIT (10/PACK), COPPER, INDIVIDUAL SEAL, FOR 10" CONFLAT FLANGE VARIAN VACUUM TECHNOLOGIES | Qty 1.0 | Drawing ID / Rev | Vendor | Dimensions |
|-----------------------------|---|-------------------|-------------------------|---------------|-------------------|

Material Certification:
 Part Number: FG1000CI

QAP Count: 2

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|----------------|----------------|------------|-------------------------|---------------|-------------------|
| Piece # | Part ID | Qty | Drawing ID / Rev | Vendor | Dimensions |
|----------------|----------------|------------|-------------------------|---------------|-------------------|

| Workorder | Part ID | Qty | Drawing ID / Rev | Engineer |
|--|--|-----|------------------|--------------------|
| 64880/1.0 | | 1 | SE121-003P / -- | BLUE/DOUG MCCORKLE |
| 30 (C) | FG1000VU-GASKET, VITON, FOR 10" CFF GASKET, VITON, FOR 10" CONFLAT FLANGE VARIAN VACUUM TECHNOLOGIES | 1.0 | | |
| Material Certification: Part Number: FG1000VU | | | | QAP Count: 2 |

| Piece # | Part ID | Qty | Drawing ID / Rev | Vendor | Dimensions |
|--|---|-----|------------------|--------------|------------|
| 40 (C) | FB1000C12S-BOLT AND NUT KIT, 12 PT, SILVER PLATED BOLT AND NUT KIT (25/PACK), 12 POINT, ASTM A193 GR. B8 SILVER PLATED, FOR 10" CONFLAT FLANGE VARIAN VACUUM TECHNOLOGIES | 1.0 | | | |
| Material Certification: Part Number: FB1000C12S | | | | QAP Count: 2 | |

| Piece # | Part ID | Qty | Drawing ID / Rev | Vendor | Dimensions |
|---|---|-----|------------------|--------------|------------|
| 50 (C) | GC0275S-GASKET CLIP KIT (10/PK), FOR 10" CFF GASKET CLIP KIT (10/PACK) FOR 10" CONFLAT FLANGE VARIAN VACUUM TECHNOLOGIES | 1.0 | | | |
| Material Certification: Part Number: GC0275S | | | | QAP Count: 2 | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | IDC Count | Dwg Count | Pgm Count | QAP Count | NDT Count | WPS Count |
|--------------------------|---|--------|----------|-------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sub: 20 / Seq: 20 (F) | 108-TOOL ROOM - PLANT 1 **HOLD FOR ENGINEERING PROCESS DRAWING. MACHINE SPECIAL PORT FEATURE FOR VACUUM TESTING. SPOTFACE, DRILL A CENTER DRILL SPOT IN THE CENTER OF THE FLANGE (FOR INSTALLATION / POSITIONING AID). | 1.00 | 1.00 | 1.00 | SE121-002P / -- | 0 | 1 | 0 | 0 | 0 | 0 |

| Sub ID | Part ID | Qty | Drawing ID / Rev |
|-----------------------|---------------------|-----|------------------|
| 21 | PORT EXTENSION TUBE | 1 | / |
| Parent Sub: 19 Op: 10 | | | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|--------------------------|---|--------|----------|-------|------------------|
| Sub: 21 / Seq: 10 (C) | 230-FABRICATION - WEIDNER INSPECT DIAMETERS AND LENGTH RECORD IDC INFORMATION | 1.00 | 1.00 | 1.00 | SE121-002P / -- |

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|-------------------------------|----------------|-----------------|--|---------------------------------------|

NOTIFY ENGINEERING (DOUG McCORKLE) OF RESULTS
WELD / BLEND MIS-ALIGNMENT OF MANUFACTURERS WELDS
POLISH THE ENTIRE INSIDE SURFACE TO A 32 MICRO-INCH SURFACE FINISH.
LAYOUT ONE AND CUT ONE END SQUARE FOR FLANGE INSTALLATION (REMOVE MINIMAL MATERIAL FOR LATER INSTALLATION 16" MINIMUM LENGTH)

| | | | | | | |
|--|---------------|--------------|--------------|--------------|--------------|--------------|
| | IDC Count : 0 | Dwg Count: 1 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 1 |
|--|---------------|--------------|--------------|--------------|--------------|--------------|

Piece # **Part ID** **Qty** **Drawing ID / Rev** **Vendor** **Dimensions**

10 SE121-001P-5-INCO 625 TUBE 8.0" OD X .12" WA. X 18.0" 1.0 SE121-001P-5 5647

Vendor Part ID: SE121-001P-5

(C) TUBE, ROUND, INCONEL 625, SEAMLESS OR WELDED. ASTM B444 OR ASTM B705
MTM AUTHORIZATION OF WELDING PROCEDURE REQUIRED PRIOR TO STARTING WORK.
NOTE THAT THE FOLLOWING REQUIREMENTS WILL BE PERFORMED / TESTED BY MAJOR TOOL & MACHINE AFTER DELIVERY. ALL EFFORTS TO ACCOMODATE / ENSURE SUCESS MUST BE MAINTAINED:
MAGNETIC PERMEABILITY REQUIREMENT: 1.01 MAX.
VACUUM INTEGRITY REQUIREMENT: TOTAL HELIUM LEAK RATE FOR THE TUBE SHALL BE LESS THAN OR EQUAL TO 1.7 X 10(-9) TORR-L/S
INTERIOR SURFACE FINISH REQUIREMENT: INTERIOR WELD BEADS WILL BE GROUND FLUSH. THE ENTIRE INTERIOR SURFACE WILL BE POLISHED TO A 32 MICRO SURFACE FINISH AND VERIFIED PER ASME B46.1.
EXTERIOR SURFACE FINISH: MILL SURFACE ACCEPTABLE. NO PITS, SCRAPES OR GOUGES.
MATERIAL CERTIFICATION AND TEST REPORTS REQ'D WITH SHIPMENT.

QAP Count: 3

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|---------------------|--|-----------------|---|
| Sub ID 29 | Part ID PORT EXTENSION TUBE (TAKE 2) | Qty 1 | Drawing ID / Rev SE121-002P / -- Parent Sub:19 Op:10 |
|---------------------|--|-----------------|---|

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|--|---|-----------------------|-------------------------|----------------------|--|
| Operation Sub: 29 / Seq: 10 (C) | Resource 805-INPROCESS INSPECTION - PLA PRIOR TO CUTTING / FORMING, INSPECT AND RECORD THE MAGNETIC PERMEABILITY OF THE SHEET (COORDINATE WITH MATERIALS DEPT. AND INSPECT THE APPROXIMATE PART ENVELOPE WITHIN THE STOCK SHEET) Part Number: SE121-001P-3 Part Description: PVVS PORT EXTENSION TUBE Specification: PP476 Rev: 2 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-002P / -- |
|--|---|-----------------------|-------------------------|----------------------|--|

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|---------------|--------------|--------------|--------------|--------------|--------------|
| IDC Count : 1 | Dwg Count: 1 | Pgm Count: 0 | QAP Count: 3 | NDT Count: 0 | WPS Count: 0 |
|---------------|--------------|--------------|--------------|--------------|--------------|

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|--|---|-----------------------|-------------------------|----------------------|--|
| Operation Sub: 29 / Seq: 20 (C) | Resource 415-ROLLING/SHEAR/BRAKE PRESS 1. SHEAR RECTANGLE PER MATERIAL CARD DIMENSIONS 2. ROLL TO 8" O.D. +/-0.03" X 20" LONG. LEAVE TRIM STOCK OVERLAPPED (FABRICATOR WILL TRIM). ENSURE OVERLAP IS ADEQUATE TO TRIM AND FIT THE DIAMETER REMOVING ANY ROLL FLATS RESULTANT FROM STARTING AND FINISHING THE ROLLING SEQUENCE. 3. NOTIFY Q/A FOR DIMENSIONAL / MAGNETIC PERMEABILITY VERIFICATION. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-002P / -- |
|--|---|-----------------------|-------------------------|----------------------|--|

| | | | | | |
|---------------|--------------|--------------|--------------|--------------|--------------|
| IDC Count : 0 | Dwg Count: 1 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 |
|---------------|--------------|--------------|--------------|--------------|--------------|

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|----------------------|--|---------------------|-------------------------|---------------|----------------------------|
| Piece # 10 | Part ID INCONEL 625_660-SHEET,NICKEL ALLOY .125" THK | Qty 760.0 | Drawing ID / Rev | Vendor | Dimensions 20*38 |
|----------------------|--|---------------------|-------------------------|---------------|----------------------------|

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|-------------------------------|----------------|-----------------|--|---------------------------------------|

(C) INCONEL 625 SHEET, .125" THICK PER
AMS 5599 / ASTM B443 (UNS N06625).
CERT AND MILL TEST REPORT REQ'D WITH SHIPMENT.

Material Certification:
Part Number: SE121-001P-3
Part Description: PORT EXTENSION TUBE

QAP Count: 3

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | IDC Count | Dwg Count | Pgm Count | QAP Count | NDT Count | WPS Count |
|--------------------------|--|--------|----------|-------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sub: 29 / Seq: 30 (C) | 805-INPROCESS INSPECTION - PLA INSPECT AND RECORD MAGNETIC PERMEABILITY (AFTER ROLLING) Part Number: SE121-001P-3 Part Description: PVVS PORT EXTENSION TUBE Specification: PP476 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-002P / -- | 1 | 1 | 0 | 3 | 0 | 0 |

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|--------------------------|---|------|------|------|-----------------|---|---|---|---|---|---|
| Sub: 29 / Seq: 40 (C) | 230-FABRICATION - WEIDNER TRIM, FIT, (PURGE WELD JOINT WITH 100% ARGON. PURGE DAM MATERIAL MUST BE MADE FROM EITHER 625 INCONEL OR 300 SERIES STAINLESS STEEL) AND TACK WELD INTO 8" O.D. TUBE. CLEAN AND PREPARE FOR PLASMA ARC WELDING Specification: PP475 Rev: 6 | 1.00 | 1.00 | 1.00 | SE121-002P / -- | 0 | 1 | 0 | 1 | 0 | 1 |
|--------------------------|---|------|------|------|-----------------|---|---|---|---|---|---|

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|--------------------------|--|------|------|------|-----------------|---|---|---|---|---|---|
| Sub: 29 / Seq: 50 (F) | 205-PLASMA WORKCENTER SETUP, PURGE WELD JOINT WITH 100% ARGON. PURGE DAM MATERIAL MUST BE MADE FROM EITHER 625 INCONEL OR 300 SERIES STAINLESS STEEL. PLASMA ARC WELD THE AXIAL JOINT PER DRAWING. CWI VISUAL INSPECT THE PORT EXTENSION TUBE AXIAL WELD 100% UNDER 8X MAGNIFICATION PER ASME CODE ARTICLE 6, SECTION V. ACCEPTANCE PER AWS D1.6, 6.29.1. Test Certification: CWI CERTIFICATE Rev: Part Number: SE121-001P-3 Part Description: PORT EXTENSION TUBE WPS380-PPPL Rev:2 PAW MAC PAW - Machine Fillers: INCONEL625_035_GMAW / INCONEL625_062_GTAW / INCONEL625_093_GTAW Notes: PLASMA WELDING | 1.00 | 1.00 | 1.00 | SE121-002P / -- | 5 | 1 | 0 | 3 | 0 | 1 |
|--------------------------|--|------|------|------|-----------------|---|---|---|---|---|---|

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev |
|-----------|----------|--------|----------|-------|------------------|
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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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|--------------------------|--|------|------|------|-----------------|
| Sub: 29 / Seq: 60 (F) | 230-FABRICATION - WEIDNER BLEND THE INTERIOR WELD SURFACE FLUSH TO THE BASE MATERIAL. POLISH THE ENTIRE INTERIOR OF THE TUBE TO ACHIEVE A 32 MICRO-INCH RA SURFACE FINISH. CLEAN PER PP475 Specification: PP475 Rev: 6 | 1.00 | 1.00 | 1.00 | SE121-002P / -- |
|--------------------------|--|------|------|------|-----------------|

IDC Count : 0 Dwg Count: 1 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 1

| | | | | | |
|--|--|-----------------------|-------------------------|----------------------|--|
| Operation Sub: 29 / Seq: 70 (F) | Resource 805-INPROCESS INSPECTION - PLA INSPECT DIAMETER, ROUNDNESS, WELDING DISTORTION, MAGNETIC PERMEABILITY, AND INTERIOR SURFACE FINISH. RECORD IDC DATA Part Number: SE121-001P-3 Part Description: PVVS PORT EXTENSION TUBE Specification: PP475 Rev: 6 Specification: PP476 Rev: 2 Specification: PP477 Rev: 2 Specification: ASME B46.1 Rev: 95 Specification: A800 Rev: 2001 | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121-002P / -- |
|--|--|-----------------------|-------------------------|----------------------|--|

IDC Count : 2 Dwg Count: 1 Pgm Count: 0 QAP Count: 7 NDT Count: 0 WPS Count: 0

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|---------------------|------------------------------|-----------------|------------------------------|---------------------|
| Sub ID 32 | Part ID PLASMA PQR | Qty 1 | Drawing ID / Rev / | Parent Sub:29 Op:50 |
|---------------------|------------------------------|-----------------|------------------------------|---------------------|

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|--|---|-----------------------|-------------------------|----------------------|-------------------------|
| Operation Sub: 32 / Seq: 10 (C) | Resource 705-WELD ENGINEERING/ CWI CWI to visually inspect PQR test plate per the requirements of ASME Sect. IX, AWS D1.1, and AWS B2.1. MTM NDT certification form required | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev |
|--|---|-----------------------|-------------------------|----------------------|-------------------------|

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 0 NDT Count: 1 WPS Count: 0

| | | | | | |
|--|---|-----------------------|-------------------------|----------------------|-------------------------|
| Operation Sub: 32 / Seq: 20 (C) | Resource 818-MQS CONTRACTOR X-RAY Radiographically inspect PQR test plate per the requirements of ASME Sect. IX, AWS D1.1, and AWS B2.1. Reference acceptance to all three specifications on the reader sheet. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev |
|--|---|-----------------------|-------------------------|----------------------|-------------------------|

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 0 NDT Count: 0 WPS Count: 0

| | | | | | | |
|--|--|-----------------------|-------------------------|----------------------|-------------------------|----------------------------------|
| Operation Sub: 32 / Seq: 30 (C) | Resource 450-SUBLET * Perform destructive testing (ref: 2 tensile tests, 2 face bend tests, and 2 root bend tests) to the requirements of the following three specifications; ASME Sect. IX, AWS D1.1, and AWS B2. * All test samples and remaining plate to be returned to Major Tool and Machine when complete. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev | Service ID TESTNG/MISC |
|--|--|-----------------------|-------------------------|----------------------|-------------------------|----------------------------------|

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|-------------------------------|----------------|-----------------|--|---------------------------------------|

- * Separate test reports are required for each specification. Test reports are to reference the PQR number and must provide the tensile failure locations/characters.
- * All NDT has been performed by Major Tool and Machine. A copy of the radiographic report is included with the test plate for reference.
- * A reference sheet with pertinent welding data is included with the test plate.
- * Test plate info:
 - One plate - 3/8" thick Inconel 625
 - One plate - 3/8" thick Inconel 625
 - Both plates butt welded using filler material ERNiCrMo-3 (Inconel 625)
 - No post-weld heat treatment is required.
 - Test plate is supplied in the as-welded condition.

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 0 NDT Count: 0 WPS Count: 0

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|---------------------|--|-----------------|------------------------------|---------------------|--|--|
| Sub ID 33 | Part ID ASTM B 705 MECHANICAL TEST PIE | Qty 1 | Drawing ID / Rev / | | | |
| | | | | Parent Sub:19 Op:10 | | |

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|--|--|-----------------------|-------------------------|----------------------|-------------------------|
| Operation Sub: 33 / Seq: 10 (F) | Resource 415-ROLLING/SHEAR/BRAKE PRESS | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev |
| 1. SHEAR RECTANGLE PER MATERIAL CARD DIMENSIONS | | | | | |
| 2. ROLL TO 8" O.D. +/-0.03" X 6" LONG. LEAVE TRIM STOCK OVERLAPPED (FABRICATOR WILL TRIM). ENSURE OVERLAP IS ADEQUATE TO TRIM AND FIT THE DIAMETER REMOVING ANY ROLL FLATS RESULTANT FROM STARTING AND FINISHING THE ROLLING SEQUENCE. | | | | | |

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 0 NDT Count: 0 WPS Count: 0

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|-----------------------------|--|---------------------|-------------------------|---------------|---------------------------|
| Piece # 10 (F) | Part ID INCONEL 625_660-SHEET,NICKEL ALLOY .125" THK INCONEL 625 SHEET, .125" THICK PER AMS 5599 / ASTM B443 (UNS N06625). CERT AND MILL TEST REPORT REQ'D WITH SHIPMENT. | Qty 180.0 | Drawing ID / Rev | Vendor | Dimensions 6*30 |
|-----------------------------|--|---------------------|-------------------------|---------------|---------------------------|

Material Certification:
Part Number: SE121-001P-3
Part Description: PORT EXTENSION TUBE

QAP Count: 0

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|--|---|-----------------------|-------------------------|----------------------|---------------------------------------|
| Operation Sub: 33 / Seq: 20 (F) | Resource 205-PLASMA WORKCENTER TRIM FIT AND TACK WELD CYLINDER. SETUP, PURGE WELD JOINT WITH 100% ARGON. PURGE DAM MATERIAL MUST BE MADE FROM EITHER 625 INCONEL OR 300 SERIES STAINLESS STEEL, AND PLASMA ARC WELD THE JOINT | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121 / -- |
|--|---|-----------------------|-------------------------|----------------------|---------------------------------------|

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 0 NDT Count: 0 WPS Count: 1

WPS380-PPPL Rev:2 PAW MAC
PAW - Machine Fillers: INCONEL625_035_GMAW / INCONEL625_062_GTAW / INCONEL625_093_GTAW
Notes: PLASMA WELDING

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|-------------------------------|----------------|-----------------|--|---------------------------------------|
| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|--------------------------|--|---------------|--------------|--------------|------------------|--------------|--------------|--|--|
| Sub: 33 / Seq: 30 (F) | 230-FABRICATION - WEIDNER TRIM BOTH ENDS TO PRODUCE A TEST PIECE 4" MINIMUM LENGTH PERFORM A FLATTENING TEST PER ASTM B 705, 7.2 (ENGINEERING WITNESS REQUIRED) FILL OUT VISUAL TEST CERTIFICATE Specification: ASTM B705 Rev: 94 Test Certification: VISUAL INSPECTION CERT Part Number: ASTM B 705 MECH. TEST PIECE | 1.00 | 1.00 | 1.00 | | | | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 3 | NDT Count: 0 | WPS Count: 0 | | |

| Sub ID | Part ID | Qty | Drawing ID / Rev |
|--------|---------------------|-----|--------------------|
| 35 | SOURCE NOTIFICATION | 1 | / |
| | | | Parent Sub:1 Op:72 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|--------------------------|---|---------------|--------------|--------------|------------------|--------------|--------------|--|--|
| Sub: 35 / Seq: 10 (U) | 830-SOURCE WITNESS POINT -IN P SOURCE NOTIFICATION REQUIRED ONE TO TWO WEEKS PRIOR TO VACUUM TESTING PORT SUB-ASSEMBLY. CUSTOMER DECISION WILL FOLLOW. NOTIFICATION VIA CFT | 1.00 | 1.00 | 1.00 | | | | | |
| | Drw N/A IDC N/A | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 | | |

| Sub ID | Part ID | Qty | Drawing ID / Rev |
|--------|---|-----|--------------------|
| 25 | SE121-003P-4-PORT EXTENSION WELD BACKING RING | 1 | / |
| | | | Parent Sub:1 Op:90 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | | | | |
|--------------------------|---|---------------|-------------------------|---------------|-------------------|--------------|--------------|--|--|
| Sub: 25 / Seq: 10 (C) | 415-ROLLING/SHEAR/BRAKE PRESS 1. SHEAR STRIP PER MATERIAL CARD AND DEBURR. 2. ROLL THE EASY WAY TO A 8.093" I.D. OBJ (0.031" WELD SHRINKAGE ALLOWANCE). 3. NOTIFY Q/A FOR DIMENSIONAL / MAGNETIC PERMEABILITY VERIFICATION. Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121-003P / 0 | | | | |
| | | IDC Count : 0 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 1 | NDT Count: 0 | WPS Count: 0 | | |
| Piece # | Part ID | Qty | Drawing ID / Rev | Vendor | Dimensions | | | | |
| 10 | INCONEL 625_660-SHEET,NICKEL ALLOY .125" THK | 162.0 | | | 4.5*36 | | | | |
| (C) | INCONEL 625 SHEET, .125" THICK PER AMS 5599 / ASTM B443 (UNS N06625). CERT AND MILL TEST REPORT REQ'D WITH SHIPMENT. | | | | | | | | |

Material Certification:
Part Number: SE121-003P-4

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
|-------------------------------|----------------|-----------------|--|---------------------------------------|

Part Description: WELD BACKING RING

QAP Count: 3

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | IDC Count | Dwg Count | Pgm Count | QAP Count | NDT Count | WPS Count |
|--------------------------|---|--------|----------|-------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sub: 25 / Seq: 15 (C) | 805-INPROCESS INSPECTION - PLA INSPECT AND RECORD MAGNETIC PERMEABILITY (AFTER ROLLING) Part Number: SE121-001P-4 Part Description: PVVS PORT EXTENSION WELD RING Specification: PP475 Rev: 2 Specification: PP476 Rev: -- | 1.00 | 1.00 | 1.00 | SE121 / -- | 1 | 0 | 0 | 4 | 0 | 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | IDC Count | Dwg Count | Pgm Count | QAP Count | NDT Count | WPS Count |
|--------------------------|--|--------|----------|-------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sub: 25 / Seq: 20 (F) | 230-FABRICATION - WEIDNER 1. TRIM AND FIT TO VESSEL CONTOUR, CUT WIDTH, PREP 2. WELD PER DRAWING (SIZE TO EXISTING PORT TUBE) 3. BLEND WELD FLUSH TO BASE METAL 4. CWI VISUAL INSPECT WELD 100% UNDER 8X MAGNIFICATION PER ASME CODE ARTICLE 6, SECTION V. ACCEPTANCE PER AWS D1.6, 6.29.1. Specification: PP475 Rev: 5 Part Number: SE121-003P-4 Part Description: WELD BACKING RING Certification: CWI CERTIFICATE | 1.00 | 1.00 | 1.00 | SE121-003P / 0 | 5 | 0 | 0 | 4 | 0 | 1 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | IDC Count | Dwg Count | Pgm Count | QAP Count | NDT Count | WPS Count |
|--------------------------|--|--------|----------|-------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sub: 25 / Seq: 30 (F) | 415-ROLLING/SHEAR/BRAKE PRESS RE-ROLL / ROUND UP BAND (IF NECESSARY) Specification: PP475 Rev: 2 | 1.00 | 1.00 | 1.00 | SE121 / A | 0 | 5 | 0 | 1 | 0 | 0 |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | IDC Count | Dwg Count | Pgm Count | QAP Count | NDT Count | WPS Count |
|--------------------------|---|--------|----------|-------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sub: 25 / Seq: 40 (F) | 805-INPROCESS INSPECTION - PLA VERIFY DIMENSIONAL CONDITION VERIFY MAGNETIC PERMEABILITY VERIFY CLEANLINESS RECORD I.D.C. DATA Part Number: SE121-003P-4 Specification: ASTM A800 Rev: 2001 Specification: PP476 Rev: 2 Specification: PP475 Rev: 6 | 1.00 | 1.00 | 1.00 | SE121-003P / -- | | | | | | |

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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Part Description: WELD BACKING RING

IDC Count : 2 Dwg Count: 1 Pgm Count: 0 QAP Count: 5 NDT Count: 0 WPS Count: 0

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|---------------------|--|-----------------|------------------------------|---------------------|
| Sub ID 28 | Part ID STORAGE / SHIPPING CRATE | Qty 1 | Drawing ID / Rev / | Parent Sub:1 Op:115 |
|---------------------|--|-----------------|------------------------------|---------------------|

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|--|--|-----------------------|-------------------------|----------------------|--------------------------------------|---------------|--------------|--------------|--------------|--------------|--------------|
| Operation Sub: 28 / Seq: 10 (F) | Resource 425-SHIPPING - PLANTS 1 & 2 BUILD A CUSTOM STORAGE / SHIPPING CRATE PER ENGINEERING DIRECTION TO SUIT THE FOLLOWING REQUIREMENTS: 1. THE CONTAINER MUST PROTECT THE PART FROM DAMAGE AND CONTAMINATION DURING STORAGE / HANDLING DURING THE MANUFACTURING PROCESS AT MTM. 2. THE PART RESTS / SUPPORTS MUST BE HARDWOOD AND CONFIGURED SO NO NAILS OR SCREWS COME INTO CONTACT WITH THE PART. 3. THE CONTAINER MUST HAVE PROVISIONS TO BE LIFTED AND HANDLED BY EITHER A FORKLIFT, OR CRANE / LIFTING STRAPS. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev SE121 / A | IDC Count : 0 | Dwg Count: 5 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 |
|--|--|-----------------------|-------------------------|----------------------|--------------------------------------|---------------|--------------|--------------|--------------|--------------|--------------|

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| Sub ID 31 | Part ID NAMEPLATE | Qty 1 | Drawing ID / Rev / | Parent Sub:1 Op:115 |
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| Operation Sub: 31 / Seq: 10 (C) | Resource 415-ROLLING/SHEAR/BRAKE PRESS SHEAR RECTANGLE PER MATERIAL CARD DEBURR EDGES AND CLEANUP NOTIFY Q/A AND HAVE THE MAGNETIC PERMEABILITY CHECKED (AND RECORDED) PRIOR TO SUBCONTRACTING. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev | IDC Count : 1 | Dwg Count: 0 | Pgm Count: 0 | QAP Count: 0 | NDT Count: 0 | WPS Count: 0 |
|--|--|-----------------------|-------------------------|----------------------|-------------------------|---------------|--------------|--------------|--------------|--------------|--------------|

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|-----------------------------|--|--------------------|-------------------------|---------------|--------------------------|
| Piece # 10 (C) | Part ID INCONEL 625_660-SHEET,NICKEL ALLOY .125" THK INCONEL 625 SHEET, .125" THICK PER AMS 5599 / ASTM B443 (UNS N06625). CERT AND MILL TEST REPORT REQ'D WITH SHIPMENT. | Qty 24.0 | Drawing ID / Rev | Vendor | Dimensions 4*6 |
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Material Certification: TRACE ID: 92220
Part Number: NAMEPLATE

QAP Count: 2

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|--|--|-----------------------|-------------------------|----------------------|-------------------------|
| Operation Sub: 31 / Seq: 11 (C) | Resource 260-SANDBLAST BLAST 100% WITH 180-220 VIRGIN ALUMINUM OXIDE MEDIA CLEANUP AND WIPE DOWN WITH ISOPROPANOL USING LINT FREE WIPES (AVAILABLE IN Q/A) CONTACT ENGINEERING (DOUG MCCORKLE) FOR VISUAL INSPECTION. | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev |
|--|--|-----------------------|-------------------------|----------------------|-------------------------|

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| Workorder 64880/1.0 | Part ID | Qty 1 | Drawing ID / Rev SE121-003P / -- | Engineer BLUE/DOUG MCCORKLE |
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AFTER ACCEPTED, WRAP AND TAPE WITH FOAM PROTECTION.

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 0 NDT Count: 0 WPS Count: 0

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|--|-------------------------------|-----------------------|-------------------------|----------------------|-------------------------|-------------------------------------|
| Operation Sub: 31 / Seq: 15 (F) | Resource 450-SUBLET | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev | Service ID ENGRVNG/ETCHNG |
|--|-------------------------------|-----------------------|-------------------------|----------------------|-------------------------|-------------------------------------|

ETCH THE FOLLOWING INFORMATION PER PROVIDED DRAWING:
 MAJOR TOOL & MACHINE, INC. LOGO (USE FURNISHED ARTWORK)
 PPPL LOGO (USE FURNISHED ARTWORK)

SE121-01
 NATIONAL COMPACT STELLARATOR EXPERIMENT
 PROTOTYPE VACUUM VESSEL SEGMENT
 PRIME-CONTRACT: DE-AC02-76-CH03073
 SUB-CONTRACT: S-04344-F
 SCOPE: NCSX-SOW-121-01-02
 SPECIFICATION: NCSX-CSPEC-121-01-01
 MANUFACTURER: MAJOR TOOL AND MACHINE, INC.
 MTM #: 64880

NOTES:

THE SUPPLIED DRAWING IS ONLY A CONCEPT AND IS PROVIDED TO DEFINE THE NECESSARY IDENTIFICATION INFORMATION. THE FINAL COMPOSITION IS TO BE DETERMINED BY THE MANUFACTURER.
 VENDOR IS TO PROVIDE PROTOTYPE SAMPLES (EITHER A PHYSICAL SAMPLE OR RENDERING) OF I.D. TAG DESIGN / COMPOSITION FOR MTM APPROVAL PRIOR TO PRODUCING THE FINAL ARTICLE.
 THE MATERIAL OF THE TAG (625 INCONEL, OR 316L STAINLESS) HAS BEEN SELECTED BASED ON IT'S LOW MAGNETIC PERMEABILITY PROPERTIES. EXTREME CARE MUST BE MAINTAINED DURING THE PROCESSING AND HANDLING OF THE TAG. ALL EFFORTS MUST BE MADE TO AVOID THE INDUCTION OF MAGNETIC PROPERTIES BY MEANS OF CONTAMINATION FROM CONTACT WITH IRON BASED MATERIALS (EG PLATTENS, WORK TABLES, HAND TOOLS, ETC....) THE METHOD OF PART MARKING ALSO MUST NOT AFFECT MAGNETIC PERMEABILITY. REFERENCE MTM CLEANLINESS CONTROL PROCEDURE PP475

Specification: PP475 Rev: 2
 Part Number: PVVS NAMEPLATE

IDC Count : 0 Dwg Count: 0 Pgm Count: 0 QAP Count: 2 NDT Count: 0 WPS Count: 0

| | | | | | | |
|--|---|-----------------------|-------------------------|----------------------|-------------------------|--|
| Operation Sub: 31 / Seq: 20 (F) | Resource 820-RECEIVING INSPECTION | QtyPer 1.00 | StartQty 1.00 | EndQt 1.00 | Drawing ID / Rev | |
|--|---|-----------------------|-------------------------|----------------------|-------------------------|--|

RECEIVE AND INSPECT NAMEPLATE PER MTM PURCHASE ORDER
 INSPECT MAGNETIC PERMEABLITY AND RECORD IDC DATA

Specification: PP476 Rev: --

IDC Count : 1 Dwg Count: 0 Pgm Count: 0 QAP Count: 1 NDT Count: 0 WPS Count: 0

| | | | |
|---------------|----------------|------------|-------------------------|
| Sub ID | Part ID | Qty | Drawing ID / Rev |
|---------------|----------------|------------|-------------------------|

| Workorder | Part ID | Qty | Drawing ID / Rev | Engineer |
|---------------------|--------------------------------|-----|------------------|--------------------|
| 64880/1.0 | | 1 | SE121-003P / -- | BLUE/DOUG MCCORKLE |
| 38 | FIXED DATUM TARGETS FOR PROFIL | 1 | / | |
| Parent Sub:1 Op:115 | | | | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | IDC Count | Dwg Count | Pgm Count | QAP Count | NDT Count | WPS Count |
|--------------------------|---|--------|----------|-------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sub: 38 / Seq: 10 (U) | 820-RECEIVING INSPECTION RECEIVE AND INSPECT | 1.00 | 1.00 | 1.00 | | 0 | 0 | 0 | 0 | 0 | 0 |

| Sub ID | Part ID | Qty | Drawing ID / Rev |
|---------------------|---------------------|-----|------------------|
| 36 | SOURCE NOTIFICATION | 1 | / |
| Parent Sub:1 Op:120 | | | |

| Operation | Resource | QtyPer | StartQty | EndQt | Drawing ID / Rev | IDC Count | Dwg Count | Pgm Count | QAP Count | NDT Count | WPS Count |
|--------------------------|--|--------|----------|-------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sub: 36 / Seq: 10 (U) | 831-SOURCE INSPECTION - FINAL FINAL SOURCE INSPECTION NOTIFICATION REQUIRED ONE TO TWO WEEKS PRIOR TO FINAL INSPECTION. CUSTOMER DECISION WILL FOLLOW. NOTIFICATION VIA CFT. | 1.00 | 1.00 | 1.00 | | 0 | 0 | 0 | 0 | 0 | 0 |