COMPANY NAME: _____

BIDDER PREQUALIFICATION CRITERIA AND RESPONSE

HANFORD TANK WASTE TREATMENT

AND

IMMOBILIZATION PLANT

BIDDER REQUEST FOR INTEREST & PRE-QUALIFICATION PACKAGE

OFFICIAL USE ONLY (*when completed)*
May be exempt from public release under the Freedom of Information Act (5 U.S.C. 552), exemption number and category: 4, Commercial/Proprietary
Department of Energy Review required before public release
Name/Org: Jose Velasquez/ P&S Date: 12/28/2023
Guidance (if applicable): N/A

Requisition No. 24590-QL-MRA-FH00-00TBD

HLW Canister Grapples and Load Cells

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COMPANY NAME: _____

BIDDER PREQUALIFICATION CRITERIA AND RESPONSE

1.0 Introduction

Bechtel National Inc., herein referred to as Contractor, intends to issue a Request for Proposal (RFP) for a Plant Material Purchase Order for the Hanford Waste Treatment and Immobilization Plant (WTP) project in Richland, WA. Companies must be pre-qualified by Contractor to be included on the bid list. To support the pre-qualification evaluation process, the prime potential bidder (1st tier subcontractor) must provide the requested information and respond to questions within this document. The Experience Statement should include relevant information for both the prime bidder and any planned lower-tier supplier or subcontractor. Additional supporting documentation such as brochures and company profiles may also be submitted.

***Additional supporting documentation will be required as part of the formal RFP process.**

2.0 Project Description and Location

The Hanford Tank Waste Treatment and Immobilization Plant (WTP) is a complex of radioactive waste treatment processing facilities designed and constructed by Bechtel National, Inc. for the Department of Energy (DOE). The facility will process the Hanford Site tank waste and convert the waste into a stable glass form.

The Project site is located in the 200 East Area of the Hanford Reservation near Richland, Washington, along the Columbia River. The site elevation varies from 662 to 684 feet above mean sea level. Ambient temperature range is -23 degrees F minimum to 113 degrees F maximum, with relative humidity of 5% minimum to 100% maximum. The project design life is 40 years.

Information about the WTP Project can be found on http://www.hanfordvitplant.com.

3.0 Scope of Work

Award Type: Firm Fixed Price Purchase Order with Economic Price Adjustment
Estimated RFP Date: ***March 2026***

Fabrication and testing of HLW Canister Grapples and Load Cells

Work to be included:

1. Work performed per ASME B30.20 – current version
2. Fabricate one Test HLW Canister Grapple from provided detailed design drawings (native drawing files available). HLW Canister is assigned quality classification Q due to having WAI Performance Attributes.
3. Perform verification and validation testing of design. Note that design changes and retesting may be required.
4. Evaluate and issue Report.
5. Fabricate eight (8) HLW Canister Grapples
6. Perform Factory Acceptance Testing (FAT) on Canister Grapples
7. Design, fabricate, assemble and test two (2) load cells depicted in provided Design Proposal Drawing.
8. Provide required documentation.
9. Minor coatings required on position indicators as depicted on drawings.
10. Welding per AWS D1.6 & AWS D14.0.
11. Material Inspections

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a) All measuring and testing equipment utilized shall be calibrated and within calibration date by an accredited ISO/IEC 17025 laboratory.

12. See section 8.0 below for details regarding:
    a) Required Equipment / Service
    b) Equipment Classifications
    c) Required Equipment for testing
    d) HLW Canister Grapple Detail Drawings (Build to Print)
    e) Load Cell Design Proposal Drawing
    f) HLW Canister Configurations
    g) Testing Sample Guidance

Equipment and Materials Required

Supplier shall provide all equipment and materials necessary to accomplish work in section above.

Codes

- ASME B30.20
- AWS D1.6 & AWS D14.0

Standards

- Various ASME and ASTMs for fasteners and materials
- ASNT SNT-TC-1A, *Recommended Practice No. SNT-TC-1A Personnel Qualification and Certification in Nondestructive Testing*

Please note that this solicitation may result in material procurements and proposals greater than $10,000 and must comply with FAR 52.225-11 Buy American Act – Construction Materials Under Trade Agreements (SEP 2010). If you cannot comply or foresee any issues with compliance, please provide a detailed explanation.

If your company is **interested** in this solicitation, please **proceed to Section 4.0** and complete the below sections as requested. The BNI Acquisition Services Purchasing group is responsible for collection, evaluation, and internal publication of potential bidders' information for the purpose of pre-qualification for all solicitations.

4.0 Response Submittal

4.1 Submission Due Date: **May 31, 2025**

Submission Method: Submissions must be received no later than the due date to the Purchasing Representative, Andrea Riste, via email at **adriste@bechtel.us**. For questions, call (509) 430-9055.

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COMPANY NAME: _____

BIDDER PREQUALIFICATION CRITERIA AND RESPONSE

5.0 Pre-Qualification Document Checklist

Companies are encouraged to use this checklist to ensure their submittals are complete.

☐ Pre-Selection Criteria and Response (section 6.0)

☐ QA Program Table of Contents and summary *or* copy of QA Plan (section 7.0)

☐ Description of directly relevant experience (section 8.0)

6.0 Pre-Selection Criteria

6.1 Company Response

Prime Subcontractor Company Name: _____

Address: _____

_____

_____

Pre-qualification Contact Name: _____

Phone Number: _____

E-mail Address: _____

DUNS No. (Dun & Bradstreet): _____

6.2 North American Industry Classification System Code (NAICS)

The NAICS (North American Industry Classification System code for this work is **332439**. The SBA size standard for this code is 600 employees. For pre-qualification purposes, you are a small business if your company's number of employees does not exceed 600 employees.

Business Size Classification (according to U.S. Small Business Administration Criteria)

☐ Small
☐ Small Disadvantaged Business
☐ Woman Owned Small Business
☐ HUBZone Business
☐ Veteran-Owned Small Business Concern
☐ Service-Disabled Veteran-Owned Small Business Concern

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BIDDER PREQUALIFICATION CRITERIA AND RESPONSE

☐ N/A – Registered as a Large Business

6.3 Commercial Data

Potential bidders are required to register on the Bechtel Supplier and Contractor Portal: https://www.Bechtel.com/supplier/ to be considered.

Date your company registered or updated its information on the Portal?

Date Updated:_____

A. Rough Order of Magnitude for Scope of Work (USD): $_____

B. Estimated Delivery Schedule:

i. Engineering/Design: _____ weeks ARO
ii. Material Procurement: _____ weeks ARO
iii. Fabrication: _____ weeks ARO
iv. Test:_____ weeks ARO
v. Delivery: _____ weeks ARO

C. Long lead items to be aware of (if yes, please specify)?

_____
_____

D. Does your company have a suggested alternate offering/product that offers an improvement, more cost effective, or offers shorter delivery (i.e. “buy what you make”)?

☐ No, we will supply an identical or similar product.

☐ Yes, we have an alternate offering. If so, please describe below or provide as an attachment.

_____
_____
_____

E. What risks do you foresee with this procurement that BNI should be aware of and possibly help mitigate?

_____
_____
_____

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7.0 Quality Assurance Program

Programmatic Quality Assurance (QA) requirements for this purchase order will be in accordance with Supplier QA program, please mark as applicable:

	Commercial Quality - Based on DOE Order 414.1C
	Nuclear Level Quality - Based on ASME NQA-1 2022

A. Does your Company have a written Quality Assurance Program?

☐ Yes ☐ No

B. Which QA standards does this program meet? _____

☐ DOE/RW/0333P ☐ ASME NQA-1 ☐ ASME Section VIII ☐ ISO-9000 ☐ Other

C. The potential bidder has the option to submit their full Quality Assurance Plan (QAP) with this Request for Interest.

8.0 Technical Criteria

A. Required Equipment / Service

No.	Component Tag Number (CTN) 24590-HLW-FH-	Description	HLW Room
1	N/A	HLW Grapple for Design Validation Testing	N/A
2	N/A	Perform Design Validation Testing & Inspections	N/A
3	HDH-TOOL-00001	CANISTER DECONTAMINATION CAVE CANISTER GRAPPLE (CLEAN)	H-0133
4	HDH-TOOL-00004	CANISTER DECONTAMINATION CAVE CANISTER GRAPPLE (DIRTY)	H-0133
5	HEH-TOOL-00001	CANISTER GRAPPLE CANISTER STORAGE CAVE	H-0132
6	HPH-TOOL-00001	THREE JAW GRAPPLE, CANISTER HANDLING CAVE, LOWER CRANE	H-0136
7	HPH-TOOL-00018	SPARE	NA
8	HRH-TOOL-00002	CANISTER IMPORT TRUCK BAY	H-0135A
9	HSH-TOOL-00004	MELTER CAVE	H-0117
10	HPH-TOOL-00017	THREE JAW GRAPPLE, CANISTER HANDLING CAVE, UPPER CRANE	H-0136
11	N/A	Test Canister & Lids for testing	N/A
12	HEH-MHAN-00013	Export Canister Grapple Load Cell	H-0132
13	HEH-MHAN-00014	Export Canister Grapple Load Cell	H-0132

B. Equipment Classifications

Description	Safety Classification	Quality Classification	Seismic Category	WAI Designation
All HLW Grapples	Non-safety	Q[1]	SC-III	WAI-Performance WAI-Passive

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Load Cells	Non-Safety	CM	SC-III	WAI-Passive
Notes: 1) WAI-Performance assigns Q quality classification.				

C. Required Equipment for Testing

No.	Description
11	Empty Test Canister Partially filled Test Canister Filled Test Canister @ 10,000 lbs Load Test Canister @ 12,500 lbs
11	Test Canister primary Lid installed on canister
11	Test Canister Secondary Lid installed on canister
11	Cask Test Canister

D. HLW Canister Grapple Design Drawings (Built to Print)

Document Number	Title
24590-HLW-MX-30-00011001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY
24590-HLW-MX-30-00011002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY DETAILS
24590-HLW-MX-30-00011003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY OPERATION MODES
24590-HLW-MX-30-00011004	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY CANISTER INTERACTION
24590-HLW-MX-30-00012001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE BASE ASSEMBLY
24590-HLW-MX-30-00016003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING CANISTER POSITION INDICATOR TOP DETAIL
24590-HLW-MX-30-00018001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING CAM FOLLOWER ASSEMBLY
24590-HLW-MX-30-00020001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING SHACKLE ASSEMBLY
24590-HLW-MX-30-00022001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING STATUS INDICATOR ASSEMBLY
24590-HLW-MX-30-00022007	HLW VITRIFICATION SYSTEM FABRICATION DRAWING STATUS INDICATOR ASSEMBLY GEAR BODY BOTTOM PLATE DETAILS
24590-HLW-MX-30-00023003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING ARM POSITION INDICATOR TOP DETAIL
24590-HLW-MX-30-00028001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE LABEL

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E. Load Cell Design Proposal Drawing

Document Number	Title
24590-HLW-M0-HEH-00031001	HLW VITRIFICATION SYSTEM HEH DESIGN PROPOSAL DRAWING CANISTER GRAPPLE LOAD CELL ASSEMBLY

F. HLW Canister Configurations

Configuration	Details
Empty	1518 lbs
Partially Filled	1518 lbs < Partial Filled < 9260 lbs
Filled	~9000 lbs, Max Weight 9260 lbs
No Lid	N/A
Primary Lid	12 lbs 3/16 in thick 0.053 inch above flange (0.178-0.125)
Secondary Lid	12.5 lbs 3/16 in thick 0.440 inch above flange
Rated Capacity	HLW Canister Grapple SWL conservatively set at 10,000 lbs

G. Testing (sample for Request for Interest reference only)

1.0 General Testing Requirements

1.1 SELLER shall submit an inspection and test plan, as per the Material Requisition (MR), for BUYER review which summarizes the manufacturing sequences, including SELLER and BUYER hold and witness points for inspection as indicated in the MR and the material acceptance plan, for each test to be performed. Procedure shall include pass/fail criteria for each test.

1.2 SELLER shall submit testing results for each test described below. Documentation shall include results of each trial performed.

1.3 SELLER shall source all materials and equipment required for performing all testing.

2.0 Design Validation Testing Performed on one (1) HLW Grapple

2.1 This is recommended after first HLW Grapple is fabricated.

2.2 The SELLER shall submit a design validation test procedure including pass/fail criteria to the BUYER for approval 8 weeks prior to acceptance testing.

2.3 The SELLER shall notify the BUYER at least three weeks prior to the tests so that the BUYER may witness.

2.4 The SELLER shall perform code required static load test in accordance with ASME B30.20, Section 1.3.9.2, 125% of 10,000 lbs Safe Working Load (SWL) + 5%/-0% held above floor for 15 minutes.

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2.5 The SELLER for one HLW Grapple shall demonstrate the ability of the HLW Grapple to withstand one impact of a transported load at a travel speed of 60 ft/min (simulating hitting a wall or an object). without releasing test load. The impact object shall remain stationary and intact throughout the test. The Grapple shall be capable of release with the double set down feature after the impact test is complete.

2.6 The SELLER for one HLW grapple shall demonstrate the ability of the HLW Grapple can be remotely engaged and disengaged with a canister, within a right circular cylinder cavity of 62.5 cm. Does not apply to manual release pins.

2.7 The SELLER for one HLW Grapple shall demonstrate the absolute reliability of the design by performing 500 cycles under SWL. One cycle shall consist of:

A. Engaging the HLW Grapple on test Canister
B. Lifting the test load
C. Lowering the test load

D. Raising Test Load
E. Lowering the test load
F. Disengaging the test load Raising HLW Grapple from Canister

Testing shall be performed using an un-lidded Test Canister, Test canister with primary lid and test canister with secondary lid.

2.8 The SELLER for one HLW grapple shall demonstrate the ability of maintaining its engagement even if the load is laid on its side and the tension on the bail is relieved. The Seller shall lower the test Canister onto its side, obtaining slack rope, and raising again confirming HLW Grapple capable of lifting the load when the hook is raised.

2.9 After each of the Design Validation Test above:

A. HLW Grapple operability of all motions of mechanisms, including emergency release, shall be verified.
B. Test load canister shall be visually inspected for deformation, cracks and other defects or damage.
C. HLW Grapple shall be visually inspected for deformation, cracks, or other defects.
D. Welds in load bearing members shall be dye-penetrant inspected.
E. No cracks, deformation, wear or other damage to load bearing or moving parts is allowed, and no stiffness or binding in any mechanism is allowed.

Any damage or degradation of function of the HLW Grapple shall be documented in SDDR for buyer resolution.

3.0 Factory Acceptance Testing (FAT)

3.1 The SELLER shall submit a factory acceptance test procedure including pass/fail criteria to the BUYER for approval 8 weeks prior to factory acceptance testing.

3.2 The SELLER shall notify the BUYER at least three weeks prior to the factory acceptance tests so that the BUYER may witness.

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3.3 Each Grapple shall be tested at the 10,000 lb SWL. Test shall include 20 complete cycles simulating actual operating conditions and consisting of:

A. Lowering the Grapple onto the designated load.
B. Engaging the load.
C. Lifting the load.
D. Moving the load to new location (total travel distance = 150 feet, achievable by an accrual of smaller consecutive runs)
E. Setting down the load twice to disengage the Grapple from the load.
F. Lifting the Grapple and moving it to its starting position

3.4 Each Grapple shall perform Code Required static load test in accordance with ASME B30.20 Section 1.3.9.2: 125% of 10,000 lb SWL + 5%/-0% held above floor for 15 minutes.

3.5 After completion of FAT above:

A. HLW Grapple operability of all motions of mechanisms, including emergency release, shall be verified.
B. Test load canister shall be visually inspected for deformation, cracks and other defects or damage.
C. HLW Grapple shall be visually inspected for deformation, cracks, or other defects.
D. Welds in load bearing members shall be dye-penetrant inspected.
E. No cracks, deformation, wear or other damage to load bearing or moving parts is allowed, and no stiffness or binding in any mechanism is allowed.

Any damage or degradation of function of the HLW Grapple shall be documented in SDDR for buyer resolution.

3.6 Dimensional and surface finish inspection.

3.7 Documentation of all post FAT Nondestructive Examination (NDE) shall be submitted to the BUYER.

4.0 Final Inspection

4.1 The SELLER shall submit final inspection procedure for BUYER review and permission to proceed. The inspection shall be performed after completion of all fabrication, cleaning and testing, and just prior to final packaging, and include, at a minimum, the following inspections: dimensional, surface, and cleaning.

4.2 The SELLER shall inspect all surfaces for contamination. Visible evidence of contamination is not acceptable.

4.3 The SELLER shall prepare a final inspection report for each item, which documents the results of the final inspection. The Seller shall include the final inspection report in the documentation package for each piece per the requirements of the MR.

H. Direct Relevant Experience Documentation: Provide a reference list of example projects over the last ten years that demonstrate direct relevant project experience to support the

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fabrication and testing of HLW Canister Grapples and Load Cells. Example projects should be detailed as to both the technical scope of the project and your participation in the project.

Column completion notes for the Experience Statement Table to be completed by the Prime contractor:

A. Customer Name, Address, Contact Name and Phone No.- So that we may contact as a reference as needed.

B. Work Description and Location- Describe work scope and location and indicate if prime or subcontract.

C. Original/Final Contract Value- Original award value and final closeout contract value.

D. Commencement/Completion Dates - Provide starting date and actual completion (or forecast if still in progress) by month/year format (e.g., Jan 2016/Sept 2017)

Customer Name, Address, Contact Name and Phone No.	Work Description and Location	Original/Final Contract Values	Commence/ Complete Dates

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RIVER PROTECTION PROJECT – WASTE TREATMENT PLANT

ENGINEERING SPECIFICATION

FOR

HLW Canister Grapple and Load Cells

Content applicable to ALARA?	☒ **Yes** ☐ **No**	**Quality Level**
ADR No. 24590-HLW-ADR-M-24-0011 24590-HLW-ADR-MH-25-0002	**Rev** 1 0	Q
Retroactive applicability:	☒ **N/A** *(alpha revision or revision 0)*	DOE Contract No. DE-AC27-01RV14136

REV	DATE	BY	CHECK	AUTHORIZATION	APPROVER
0		Shawn Elliott Shawn Elliott	Sengwai Chin	N/A	Ryan Brown Joel Evans

SPECIFICATION No. 24590-HLW-3PS-MQL0-T0005 **Rev** 0

Revision History

Revision	Reason for Revision	Q Specification Revision Only Margin Reduced?		CM Only
		YES	NO	N/A
0	Issue for Purchase	N/A	N/A	N/A
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐

Contents

Appendices

Tables

1 Scope

1.1 Project Description and Location

1.1.1 The Hanford Tank Waste Treatment and Immobilization Plant (WTP) is a complex of radioactive waste processing facilities that will be engineered, procured, and constructed by Bechtel National, Inc. (BNI) for the Department of Energy (DOE). The complex will immobilize waste that is contained in underground storage tanks at the Hanford Site. The facility will convert radioactive waste into solid glass through a process called vitrification. WTP will return vitrified waste products, intermediate waste, and secondary waste to DOE Hanford Field Office (HFO) custody.

1.1.2 The Hanford Site occupies an area of approximately 560 square miles and is located along the Columbia River, north of Richland, WA. The WTP Facility is being constructed at the east end of the 200 East Area of the Hanford Site. Benton, Franklin, and Grant counties surround the Hanford Site.

1.2 Equipment, Material, and Services Required

The High-Level Waste (HLW) Canister Grapples are mechanically actuated lifting devices, used for transporting Canisters within the HLW Facility. The Grapples are suspended from an overhead crane and attached to the hook with a lifting bail. Canisters are filled with vitrified waste. The load cell assembly is used to weigh the filled canisters.

1.2.1 This specification applies to the fabrication, assembly and testing of the Grapples and load cells for use in the HLW Facility. The SELLER is responsible for supplying the equipment identified in **Table 1-1.** The term SELLER refers to the seller and any parties subcontracted by the seller to complete any portion of the work. The BUYER is providing detailed equipment drawings (DED) for the Grapples and has performed all necessary analysis. The BUYER is also providing design proposal drawings (DPD) for the load cells. Refer to part 1 of the Purchase Order (PO) for a complete list of the PRODUCTS required. The term PRODUCTS includes equipment, services, and documentation to support the design and fabrication of equipment.

1.2.2 The Grapples are designated as Quality (Q) due to waste acceptance impacting (WAI) Performance requirements. For this reason, the quality assurance (QA) program for fabrication, assembly, testing, and supporting documentation shall be qualified under a DOE/RW-0333P, *Quality Assurance Requirements and Description* (QARD), quality assurance program (refer to Section 8.1.1). The requirements applicable to WAI are discussed in Section 3.5, WAI Requirements.

1.2.3 The load cells are designated as commercial material (CM) and must meet WAI Passive requirements. For this reason, the quality assurance (QA) program for design, fabrication, assembly, testing, and supporting documentation shall be qualified under DOE Order 414.1D contractor requirements document (CRD) Quality Assurance (refer to Section 8.1.2).

1.2.4 The SELLER shall provide the equipment/services identified in **Table 1-1** and, unless otherwise stated, any deliverables necessary to comply with the requirements identified in this specification.

Table 1-1 Required Equipment / Service

No.	Component Tag Number (CTN) 24590-HLW-	Description	HLW Room
1	N/A	HLW Grapple for Design Validation Testing[i]	N/A
2	N/A	Perform Design Validation Testing & Inspections[i]	N/A
3	FH-HDH-TOOL-00001	CANISTER DECONTAMINATION CAVE CANISTER GRAPPLE (CLEAN)	H-0133
4	FH-HDH-TOOL-00004	CANISTER DECONTAMINATION CAVE CANISTER GRAPPLE (DIRTY)	H-0133
5	FH-HEH-TOOL-00001	CANISTER GRAPPLE CANISTER STORAGE CAVE	H-0132
6	FH-HPH-TOOL-00001	THREE JAW GRAPPLE, CANISTER HANDLING CAVE, LOWER CRANE	H-0136
7	FH-HPH-TOOL-00018	THREE JAW GRAPPLE SPARE	NA
8	FH-HRH-TOOL-00002	MECHANICAL SEQUENCE GRAPPLE	H-0135A
9	FH-HSH-TOOL-00004	CANISTER GRAPPLE[ii]	H-0106 H-0117
10	FH-HPH-TOOL-00017	THREE JAW GRAPPLE, CANISTER HANDLING CAVE, UPPER CRANE	H-0136
11	N/A	Test Canister & Lids for testing	N/A
12	MH-HEH-MHAN-00013	Export Canister Grapple Load Cell	H-0132
13	MH-HEH-MHAN-00014	Export Canister Grapple Load Cell	H-0132

Notes:
i. Not required if performed by High Level Waste Mockup (HMF).
ii. HSH grapple is shared between melter caves.

1.2.5 For PRODUCTS related to equipment covered by this specification, the SELLER's scope of work includes, but is not limited to:

- Any special tools or equipment required for assembly, maintenance, installation, removal, and disassembly
- Fabrication
- Assembly
- Temporary equipment required for equipment testing
- Examinations and inspections, Design Validation Testing, and factory acceptance testing (FAT)

- Preparation of drawings and other technical supporting documents
- QA documents necessary for qualification under the QARD program (refer to Section 8.1.1)
- Preparation for shipping, including fabrication of any required shipping support frames, handling beams, and tie-down fixtures
- Shipping of equipment to BUYER facility
- Submittals as identified in this and accompanying specifications and as summarized in the MR and the PO.

1.2.6 All material, equipment, devices, and parts comprising the design specified herein shall be new and unused and of current manufacture and supplied by the SELLER.

1.2.7 The SELLER may subcontract any portion of the engineering, fabrication, manufacture, inspection, or testing, provided it meets the QA requirements of this specification (see Section 8). The SELLER is responsible for the completeness and quality of all deliverables.

1.3 Build Approach

1.3.1 Procurement Strategy

1.3.1.1 For BUYER, status of HLW Mockup facility (HMF) verification and validation of HMF canister grapple testing is a prerequisite for MR.

1.3.1.2 Although this is a Build to Print specification, SELLER is encouraged to share ideas / improvements with BUYER. We also solicit comments where criteria in this specification could be improved to result in a better product.

1.3.2 General

1.3.2.1 This specification is accompanied by DEDs and a DPD. Refer to **Table 2-2** for details on these documents.

1.3.2.2 Requirements on DEDs are mandatory dimensions or features that are necessary to ensure interface with other design features. DEDs are provided for the Grapples. The Grapples shall be build to print.

1.3.2.3 A DPD is an equipment-based drawing that demonstrates a BUYER proposed concept for the equipment that meets specific functional, performance and facility interface design constraints requirements. Selections of components depicted on the DPD is for proposal only. The design for the load cells is a proposal. The DPD can be identified by ‘Design Proposal Drawing’ being included in the document description.

1.3.2.4 Some of the information on the DPD consists of additional technical requirements and some conceptual information for a proposed design. Differentiation between technical requirements (mandatory) and conceptual design proposal information (non-mandatory) is discussed below.

1.3.2.5 Mandatory technical requirements and design constraints are typically indicated on the DPD by use of terms such as "shall", "required", "mandatory", "maximum", "minimum", or "not to exceed", or by the use of notes. Examples of mandatory technical requirements are dimensions and their associated tolerances, bounding location of center of gravity, and estimated weight not to exceed. Mandatory requirements are also invoked via requirements in the specification.

1.3.2.6 SELLER may propose design improvements, including alternate approaches and component selections. Design improvements shall result in benefits associated with safety, quality, reliability, fabrication/construction, installation, testing, maintenance/repair, performance, cost, or schedule.

1.3.2.7 The SELLER shall verify that all required information on the BUYER DPD is shown on the SELLER's drawings.

1.3.2.8 The SELLER shall coordinate significant non-mandatory changes with the BUYER.

1.3.2.9 The SELLER is responsible for all load cell design development including full validation of the proposed design. The final design shall incorporate all requirements of this specification and other referenced specifications.

1.4 Acronyms/Definitions

ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Materials
AWS	American Welding Society
BNI	Bechtel National, Inc.
BUYER	Bechtel National, Inc.
Canister	HLW vitrification canister- stainless steel container containing molten waste/glass mixture
CM	Commercial Material (quality level)
CoC	certificate of compliance / conformance (Conformance for Q)
CTN	component tag number
CRD	contractor requirements document
CWI	certified weld inspector
DFHLW	Direct Feed high-level waste / High-Level Waste Facility
DED	detailed equipment drawing
DOE	Department of Energy
DPD	design proposal drawing
FAT	factory acceptance test
Grapple	HLW Canister Grapple- mechanically actuated lifting device used to transport Canisters
HDH	HLW canister decontamination handling system
HEH	HLW canister export handling system
HFO	Hanford Field Office
HLW	high-level waste / High-Level Waste Facility
HMF	High-Level Waste Mockup Facility
HPH	HLW canister pour handling system
HRH	HLW canister receipt handling system

HSH	HLW melter cave support handling system
IGRIP	Interactive Graphics Robot Instruction Program
MTR	Material test report
MR	material requisition
NDE	nondestructive examination
NIST	National Institute of Standards and Technology
PO	purchase order
PQR	procedure qualification record
PRODUCTS	equipment, services, and documentation to support the design and fabrication of equipment
Q	Quality (quality level)
QA	Quality Assurance
QAP	Quality Assurance Program
QARD	Quality Assurance Requirements and Description
SELLER	this is a comprehensive term and includes seller, vendor, contractor, subcontractor, supplier, sub-supplier, etc.
TLM	telemanipulator
WAI	waste acceptance impacting
WPS	welding procedure specification
WTP	Hanford Tank Waste Treatment and Immobilization Plant

1.5 Safety/Quality/Seismic Classifications

1.5.1 The classification for all equipment is covered by this specification as shown in **Table 1-2**.

Table 1-2 Equipment Classifications

Description	Safety Classification	Quality Classification	Seismic Category	WAI Designation
All Grapples	Non-Safety	Q[i]	SC-III	WAI-Performance WAI-Passive
Load Cells	Non-Safety	CM	SC-III	WAI-Passive

Notes:
i. WAI-Performance assigns Q quality classification. See section 8.1.

2 Applicable Documents

2.1 General Requirements

2.1.1 The following codes and standards are applicable to the extent cited within this specification. If the SELLER finds a conflict between this specification and other requirements, the SELLER shall obtain written resolution from BUYER prior to proceeding with any work. In general, when resolving conflicts, the following order of precedence shall apply:

- PO
- MR
- This Specification
- Detailed Equipment Drawings

- Engineering General Specifications referenced by this Specification (**Table 2-1**)
- Industry Codes and Standards
- Design Proposal Drawing

2.1.2 The applicable version of all codes and standards specified shall be in effect at time of contract award, unless otherwise noted. Use of any other edition, revision, or issue of codes and standards require BUYER's written approval prior to proceeding with any work. When specific chapters, sections, parts, or paragraphs are listed following a code or industry standard, only those chapters, sections, parts, or paragraphs of the document are applicable and shall be applied.

2.1.3 For codes and standards listed below, the specific revision or effective date identified, as well as the specific revision or effective date of codes and standards that they incorporate by reference (daughter codes and standards) shall be followed. When more than one code, standard, or reference document covers the same topic, the requirements for all must be met.

2.2 Federal & State Regulations

OSHA 29 CFR 1926.251	Rigging Equipment for Material Handling

2.3 Quality Assurance

DOE/RW-0333P	Quality Assurance Requirements and Description (QARD) (refer to Section 8.1.1)
DOE Order 414.1D	Quality Assurance

2.4 Industry Codes & Standards

All equipment shall be designed and manufactured in accordance with the applicable sections of the edition in effect at the time of award of the contract of the following standards unless noted otherwise.

2.4.1 American Society of Mechanical Engineers (ASME)

2.4.1.1 Design, Fabrication, Documentation, and Operation Standards

ASME B46.1	Surface Texture (Surface Roughness, Waviness, & Lay)
ASME BTH-1	Design of Below-the-Hook Lifting Devices
ASME B30.20	Below-the-Hook Lifting Devices

2.4.1.2 Fastener Standards

ASME B18.2.1	Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series)
ASME B18.2.2	Nuts for General Applications: Machine Screw Nuts; and Hex, Square, Hex Flange, and Coupling Nuts (Inch Series)

2.4.2 American Society for Nondestructive Testing (ASNT)

ASNT SNT-TC-1A	Personnel Qualification and Certification in Nondestructive Testing

2.4.3 American Society for Testing and Materials (ASTM)

2.4.3.1 Material Standards

ASTM A240/A240M	Standard Specification for Chromium and Chromium Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A564/564M	Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes

2.4.3.2 Fastener Standards

ASTM A354	Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other External Threaded Fasteners
ASTM A449	Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use
ASTM F593	Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs

2.4.4 American Welding Society (AWS)

AWS D1.1/D1.1M	Structural Welding Code
AWS D1.6/D1.6M	Structural Welding Code – Stainless Steel
AWS D9.1/D9.1M	Sheet Metal Welding Code
AWS D14.0/D14.0M	Machinery and Equipment Welding Specification
AWS QC1	Specification for AWS Certification of Welding Inspectors

2.4.5 National Electric Manufacturers Association (NEMA)

Not Used	

2.4.6 National Fire Protection Association (NFPA)

Not Used	

2.5 Engineering Specifications

The following is a list of WTP and HLW Specifications invoked by this specification:

Table 2-1 Engineering Specifications

Document Number	Title
24590-WTP-3PS-AFPS-T0001	Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment
24590-WTP-3PS-G000-T0019	Engineering Specification for Acquisition of Commercial Items and Services for Use in Safety Applications at WTP
24590-WTP-3PS-G000-T0050	Engineering Specification for Supplier Documentation
24590-WTP-3PS-G000-T0053	Engineering Specification for QARD Supplier Quality Assurance Program Requirements
24590-WTP-3PS-G000-T0056	Engineering Specification for Packaging, Handling and Storage Requirements for HLW Equipment
24590-WTP-3PS-NW00-T0003	Engineering Specification for Chemical Requirements for Materials Used in Contact with Austenitic Stainless Steel and Nickel Based Alloys – For HLW and DFHLW
24590-WTP-3PS-SS00-T0002	Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel
24590-WTP-LIST-ESH-16-0001	Restricted Materials List Hanford Tank Waste Treatment and Immobilization Plant (WTP Project)

2.6 Drawings

2.6.1 Detailed Equipment Drawings

Table 2-2 Grapples (Build to Print)

Document Number	Title
24590-HLW-MX-30-00011001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY
24590-HLW-MX-30-00011002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY DETAILS
24590-HLW-MX-30-00011003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY OPERATION MODES
24590-HLW-MX-30-00011004	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY CANISTER INTERACTION
24590-HLW-MX-30-00011005	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY DETAILS
24590-HLW-MX-30-00011006	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY DETAILS
24590-HLW-MX-30-00012001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE BASE ASSEMBLY

Document Number	Title
24590-HLW-MX-30-00012002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE BASE ASSEMBLY CENTER BASE TUBE DETAIL
24590-HLW-MX-30-00012003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE BASE ASSEMBLY BASE GUIDE FOOT DETAIL
24590-HLW-MX-30-00012004	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE BASE ASSEMBLY BASE PLATE DETAIL
24590-HLW-MX-30-00012005	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE BASE ASSEMBLY DETAILS
24590-HLW-MX-30-00013001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING UPPER SLIDING TUBE
24590-HLW-MX-30-00013002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING UPPER SLIDING TUBE DETAIL
24590-HLW-MX-30-00013003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING UPPER SLIDING TUBE LINKAGE ATTACHMENT LUG
24590-HLW-MX-30-00014001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING UPPER LIFTING FRAME
24590-HLW-MX-30-00014002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING UPPER LIFTING FRAME MOUNT PLATE
24590-HLW-MX-30-00014003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING UPPER LIFTING FRAME CENTER TUBE
24590-HLW-MX-30-00014004	HLW VITRIFICATION SYSTEM FABRICATION DRAWING UPPER LIFTING FRAME UPPER LIFTING ARM ATTACHMENT PLATES
24590-HLW-MX-30-00014005	HLW VITRIFICATION SYSTEM FABRICATION DRAWING UPPER LIFTING FRAME UPPER POSITION INDICATOR BUSING BUNG
24590-HLW-MX-30-00015001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING ARM ASSEMBLY
24590-HLW-MX-30-00015002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING ARM ASSEMBLY LIFTING ARM PLATE DETAIL
24590-HLW-MX-30-00015003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING ARM ASSEMBLY LIFTING ARM TOOTH DETAIL
24590-HLW-MX-30-00016001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING CANISTER POSITION INDICATOR
24590-HLW-MX-30-00016002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING CANISTER POSITION INDICATOR ROD DETAIL
24590-HLW-MX-30-00016003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING CANISTER POSITION INDICATOR TOP DETAIL
24590-HLW-MX-30-00017001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING ARM LINKAGE
24590-HLW-MX-30-00018001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING CAM FOLLOWER ASSEMBLY
24590-HLW-MX-30-00018002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING CAM FOLLOWER ASSEMBLY CAM FOLLOWER HOUSING DETAIL
24590-HLW-MX-30-00018003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING CAM FOLLOWER ASSEMBLY CAM FOLLOWER DETAIL

Document Number	Title
24590-HLW-MX-30-00018004	HLW VITRIFICATION SYSTEM FABRICATION DRAWING CAM FOLLOWER ASSEMBLY CAM FOLLOWER WASHER DETAIL
24590-HLW-MX-30-00019001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING VERTICAL CAM SHAFT ASSEMBLY
24590-HLW-MX-30-00019002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING VERTICAL CAM SHAFT ASSEMBLY CAM SHAFT
24590-HLW-MX-30-00019003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING VERTICAL CAM SHAFT ASSEMBLY CAM LAYOUT - FLAT DEVELOPMENT
24590-HLW-MX-30-00019004	HLW VITRIFICATION SYSTEM FABRICATION DRAWING VERTICAL CAM SHAFT ASSEMBLY CAM KEY
24590-HLW-MX-30-00020001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING SHACKLE ASSEMBLY
24590-HLW-MX-30-00020002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING SHACKLE ASSEMBLY LIFTING SHACKLE ATTACHMENT LUG DETAIL
24590-HLW-MX-30-00020003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING SHACKLE ASSEMBLY HOOK ATTACHMENT SHACKLE DETAIL
24590-HLW-MX-30-00020004	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING SHACKLE ASSEMBLY SHACKLE PIN DETAIL
24590-HLW-MX-30-00021001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE DECON DEFLECTION SHIELD WELDMENT
24590-HLW-MX-30-00021002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE DECON DEFLECTION SHIELD WELDMENT SIDE PLATE DETAIL
24590-HLW-MX-30-00021003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE DECON DEFLECTION SHIELD WELDMENT TOP PLATE DETAIL
24590-HLW-MX-30-00022001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING STATUS INDICATOR ASSEMBLY
24590-HLW-MX-30-00022002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING STATUS INDICATOR ASSEMBLY GEAR BODY BOTTOM PLATE DETAILS
24590-HLW-MX-30-00022003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING STATUS INDICATOR ASSEMBLY GEAR BODY TOP PLATE DETAILS
24590-HLW-MX-30-00022004	HLW VITRIFICATION SYSTEM FABRICATION DRAWING STATUS INDICATOR ASSEMBLY HOUSING COVER DETAILS
24590-HLW-MX-30-00022005	HLW VITRIFICATION SYSTEM FABRICATION DRAWING STATUS INDICATOR ASSEMBLY IDLER GEAR - LONG DETAILS
24590-HLW-MX-30-00022006	HLW VITRIFICATION SYSTEM FABRICATION DRAWING STATUS INDICATOR ASSEMBLY IDLER GEAR - SHORT DETAILS

Document Number	Title
24590-HLW-MX-30-00022007	HLW VITRIFICATION SYSTEM FABRICATION DRAWING STATUS INDICATOR ASSEMBLY INDICATOR CYLINDER DETAILS
24590-HLW-MX-30-00023001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING ARM POSITION INDICATOR
24590-HLW-MX-30-00023002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING ARM POSITION INDICATOR LIFTING ARM ROD
24590-HLW-MX-30-00023003	HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING ARM POSITION INDICATOR TOP DETAIL
24590-HLW-MX-30-00025001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY SPACER ROD
24590-HLW-MX-30-00027001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING DRIVE GEAR
24590-HLW-MX-30-00028001	HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE LABEL

2.6.2 Design Proposal Drawing

Table 2-3 Load Cells (Proposal)

Document Number	Title
24590-HLW-M0-HEH-00031001	HLW VITRIFICATION SYSTEM HEH DESIGN PROPOSAL DRAWING CANISTER GRAPPLE LOAD CELL ASSEMBLY

2.6.3 Reference Drawings

Table 2-4 Reference Drawings (Sorted by Canister Sequence)

Document Number	Title	Relevant Equipment
24590-HLW-MX-30-00010001[i]	HLW Vitrification Canister Assembly Drawing (3/8” Wall)	HLW Vitrification Canister & Lids
24590-HLW-MX-30-00010002[i]	HLW Vitrification Canister Detail Drawing (3/8” Wall)	
24590-HLW-MX-30-00010003[i]	HLW Vitrification Canister Weldment Drawing (3/8” Wall)	
24590-HLW-MX-30-00010004[i]	HLW Vitrification Canister Lid Detail Drawing (3/8” Wall)	
24590-HLW-MX-30-00010005[i]	HLW Vitrification Canister Lid Welding Drawing (3/8” Wall)	
24590-QL-POA-FH00-00001-03-00001	HLW Canister Grapple - Grapple Stand Arrangement	Grapple Stands HDH-MHAN-00004 HDH-MHAN-00013 HDH-MHAN-00014 HEH-MHAN-00004

Document Number	Title	Relevant Equipment
		HPH-MHAN-00001 HSH-MHAN-00006[i]
24590-CM-POA-MJKH-00002-01-00015	5 Ton Monorail Electric Wire Rope Hoist General Arrangement	HRH-HST-00001
24590-QL-POA-MJKG-00002-08-00896	6 Ton T/R Crane Number 2797 - Hook and Nut Details	HPH-CRN-00001
24590-QL-POA-MJKG-00002-08-00791	6 Ton T/R Crane Number 2796 - Hook and Nut Details	HPH-CRN-00002
24590-QL-POA-MJKG-00002-08-01834	25 Ton T/R Crane Number 2795 Hook and Nut Details	HSH-CRN-00001
24590-QL-POA-MJKG-00002-08-00583	6 Ton T/R Crane Number 2798 Hook and Nut Details	HDH-CRN-00005
24590-QL-POA-MQTS-00002-01-148	Canister Rinse Bogie Assembly, Drawing NO. A051862A	HDH-TRLY-00003
24590-QL-POA-MQTS-00002-01-127	Decontamination Vessel Assembly	HDH-VSL-00001
24590-CM-POA-MVA0-00008-02-00001	Canister Decontamination Vessel 1 24590-HLW-MV-HDH-VSL-00002	HDH-VSL-00002
24590-CM-POA-MVA0-00008-02-00010	Canister Decontamination Vessel 2 24590-HLW-MV-HDH-VSL-00004	HDH-VSL-00004
24590-QL-POA-MJKG-00002-08-01003	6 Ton T/R Crane Number 2799 Hook and Nut Details	HEH-CRN-00003
24590-WTP-ICD-MG-01-014	ICD 14 - Interface Control Document For Immobilized High-Level Waste	NA
	TLM	
24590-HLW-M0-HSH-00083	Design Proposal Drawing MSM Hand/Tool Adapter	N/A
24590-WTP-M0-10-00014	WTP Vitrification System Design Proposal Drawing MSM Manipulator Dimension	N/A

Notes:
i. Provide to SELLER for Test Canister & Lids.

3 Design Requirements

3.1 Functional & Mechanical Requirements (Buyer's Use)

3.1.1 The HLW Grapples are all identical.

3.1.2 The HLW Grapples shall provide a hands-free interface between the overhead crane and all configurations of the HLW Canisters.

- The HLW Grapple shall be capable of being remotely connected or disconnected from the crane hooks (including Load Cell Hook) without external assistance.
- The Grapples shall be capable of being remotely engaged and disengaged from their designated load without external assistance.

3.1.3 The Grapple interface with the crane is designed to allow the Grapple to be centered, such that it hangs vertically, within two degrees, under its own weight.

3.1.4 The HLW Grapple shall be capable of being remotely engaged and disengaged from a Canister that is standing on its base with the Canister centerline within five (5) degrees of vertical. The Grapple shall be capable of engaging and disengaging the Canister without assistance when the Canister is in its normal upright orientation. The Grapple shall be capable of aligning itself and engaging the Canister flange when lowered such that the Grapple vertical centerline is within one inch of the Canister centerline.

3.1.5 The Grapples shall maintain secure attachment of the load while operating from the overhead crane. Maximum crane operating speed is 60 ft/min.

3.1.6 Each Grapple shall include an indexing feature that requires two fully lowered set-downs to disengage the load. The indexing feature shall be designed to prevent an inadvertent release of the suspended load during handling.

a) Unloaded Grapple, ready for operation (normally open)
b) Grapple lowered onto load (open condition)
c) Grapple lift (operates closing condition)
d) Grapple first set-down (closed condition)
e) Grapple raised (closed condition)
f) Grapple second set-down (operates opening condition)

3.1.7 The Grapple designs provides clearly visible indicators for the operator to confirm HLW Grapple status.

3.1.8 The Grapple is designed such that it is not possible to lift the load unless it is fully engaged.

3.1.9 The HLW Grapple shall be capable of engaging and disengaging the Canister flange within a right-circular cylindrical cavity with a maximum diameter of 62.5 cm.[1]

3.1.10 Each Grapple shall be equipped with manual release pins to disengage the Grapple from the load if the normal disengagement mechanism fails. The manual release pins shall be suitable for actuation by a telemanipulator (TLM); the maximum pulling force required to actuate the emergency release shall not exceed 50 lbf. The manual release pins are not expected to be operated inside casks or vessels.

3.1.11 The HLW Grapples are designed to securely lift and transport either an empty, partially filled, or full HLW Canister (Canister), as well as an open and a lidded Canister (with primary or secondary lid).

3.1.12 For specific Canister interface requirements, refer to **Table 3-1** of this Specification.

3.1.13 The Grapple design incorporates features, such as rounded corners and smooth surfaces, to minimize marking or scratching to the Canister. For this specification, defects, such as pits or scratches, **less than** 0.010 in. deep do not require rework.[2]

3.1.14 After the HLW grapple is positively engaged with the canister, the HLW Grapple shall fail safe (fingers in closed position).

3.1.15 Each HLW Grapple shall have a rated capacity of 10,000 lbs. Each Grapple shall be clearly marked with its rated capacity.

3.1.16 The HLW Grapple finger contact-areas are designed such that stresses produced in the flange of the Canister, due to Grapple engagement, do not exceed 1/3 yield strength of the Canister flange material at 600 °F.

3.2 Modular Construction (Buyer's Use)

3.2.1 Modular construction was considered in the detail design.

3.3 Performance (Buyer's Use)

3.3.1 Design Life

3.3.1.1 Equipment is designed to operate for a period of 40 years. It is recognized that some components may not have a design life of 40 years. These components are designed to facilitate remote maintenance and are designed for at least a 5-year operating life.

3.3.1.2 Maintenance was considered in the detail design.

3.4 Environmental Conditions (Buyer's Use)

3.4.1.1 All Grapples are designed to operate under the following normal environmental conditions:

a) Ambient temperature range of 50°F to 113°F. [3]
b) Humidity range of 6% to 73% [4]
c) Maximum gamma radiological dose rate of 2.59E+06 mrad/hr.[5]

3.4.1.2 HLW Grapples are designed for a finger contact with HLW Canister Flange of 600°F. [6]

3.5 WAI Requirements (Seller Use)

WAI Requirements are provided in 24590-HLW-RPT-PR-01-001 and are depicted below. Acceptance criteria will be identified in the FAT and Verification and Validation testing for maximum diameter.

3.5.1 WAI Performance Grapple[7] Requirements (QARD-Q)

a) Grapple design is capable of being remotely engaged and disengaged from the flange.
b) When attached to a suitable hoist, and when engaged with the flange, Grapple design is capable of raising and lowering a standard canistered waste form in a vertical direction
c) Grapple design is capable of engaging and disengaging the canister flange within a right circular cylindrical cavity with a maximum diameter of 62.5 cm.
d) Grapple is designed to prevent an inadvertent release of a suspended (standard) canistered waste form when the grapple is engaged with the flange.

3.5.2 WAI Passive Requirements

3.5.2.1 WAI Passive Grapple Requirements

a) The Grapple design includes passive, fixed alignment guides that assist in locating the Grapple on the canister flange. The guides are profiled and have a smooth surface finish to reduce scratches to a minimum.
b) The use of liquid lubricants in the Grapple design is minimized.
c) The use of paint in the Grapple design is minimized.

3.5.2.2 WAI Passive Load Cell[8] Requirements (CM)

3.5.2.3 The load cells shall be designed to operate under the following environmental conditions:

a) The load cell shall be suitable for the application for which it's proposed:
    a. Maximum load
    b. Accuracy
b) The load cell shall be suitable for the room environment:
    a. Ambient temperature range of 59°F to 95°F. [9]
    b. Humidity range of 6% to 73%
    c. Maximum gamma radiological dose rate of 2.59E+06 mrad/hr.[10]

3.6 Interface Requirements (Buyer's Use)

3.6.1 Interface with WTP Cranes (Buyer's Use)

3.6.1.1 The HLW Grapples are installed/uninstalled by using the Canister Handling Cave Crane(s). For this process to occur the lifting bail must be installed onto the assembly.

3.6.1.2 Grapple design of lifting points meet the crane hook design. See **Table 3-2** for drawing of Canister Handling Cave Crane hook design.

3.6.1.3 The limiting dimensions and weights identified on detailed equipment drawings ensure that the HLW Grapples are within the crane/actuator's capacity, hook's travel limits, and height travel limits.

3.6.2 Lifting Bails (Buyer's Use)

3.6.2.1 Lifting Bail requirements have been incorporated into the DEDs.

3.6.3 Canister Interface (Buyer's Use)

3.6.3.1 The canister is made of a 304L series stainless steel. Components (including tools) designed to contact (or with a high likelihood of contacting) the canister and/or canister lid are fabricated of stainless steel and have been designed to limit damage to the canister and canister lid.

3.6.3.2 The HLW Canister Grapples are designed for the following Canister configurations:

Table 3-1 HLW Canister Configurations

Configuration	Details
Empty[i]	1518 lbs,
Partially Filled	1518 lbs < Partially Filled < 9260
Filled[iv]	~9000 lbs, Max Weight 9260 lbs
No Lid	N/A
Primary Lid[i, ii, iii,]	12 lbs 3/16 in thick 0.053 inch above flange (0.178-0.125)
Secondary Lid[i, iii]	12.5 lbs 3/16 in thick 0.440 inch above flange
Rated Capacity	Safe working load conservatively set at 10,000 lbs
Notes: See Appendix G for References (BUYER'S USE) i: BNI Reference[11] ii: BNI Reference[12] iii: BNI Reference[13] iv: BNI Reference[14]	

3.6.4 TLM Interface (Buyer's Use)

3.6.4.1 TLMs are used for manual pin release. This has been incorporated into the design.

3.7 Operational Requirements (Buyer's Use)

3.7.1 Equipment is designed to be remotely operated and controlled by the HLW Grapples control system located out-cave, that is, outside the radiation area.

3.7.2 The layout of the equipment provides easy access for remote operational and maintenance requirements using TLMs and takes into consideration proposed viewing angles.

3.8 Loadings (Buyer's Use only)

3.8.1 There are no seismic requirements or loading analysis required for this specification.[15]

3.9 General Design Requirements

3.9.1 Load cells shall be designed for remote handling including setup, operation, and removal via a TLM (refer to Appendix B).

3.9.2 The load cells will be used in conjunction with the HEH grapple (HEH-TOOL-00001). The load cells shall interface with the HEH-CRN-00003 crane hook. For crane hook details refer to **Table 3-2.**

3.9.3 The canister load cells shall be designed such that they are suitable for the application and environment for which they are used. Refer to section 3.5.2.3 for environmental conditions.

3.9.4 The load cell assemblies shall not drop the grapple.

3.9.5 The maximum below the hook length of the load cell assembly shall be less than 40".

3.9.6 The load cell shall function under the max combined weight of the canister[16] and the Grapple[17] (10,000 lbs).

3.9.7 The load cell readout shall be displayed on a backlit digital display with a 1 inch minimum character height and readable through a shield window or via PTZ (pan, tilt, zoom) camera. The display shall be five digits.

3.9.8 The load cells shall have a "push to test" function in order to verify proper operation of the display.

3.9.9 The load cells shall have a "zero" function and an auto shutoff function that is activated after 15 minutes of “no load” on the grapple.

3.9.10 Minimum required calibration interval shall be 6 months or greater. The SELLER shall supply a calibration certificate and documentation establishing traceability of the load cell calibration to NIST (National Institute of Standards and Technology).

3.9.11 The load cell assembly shall have minimized cracks and crevices. Corrosive-resistant material materials shall be used. Materials and surface finishes shall be conductive to decontamination.

3.9.12 Load cells shall be sufficiently tolerant to decontamination in a 2-5 molar Nitric Acid solution (HN03), or similar.

3.10 Interfacing Equipment

3.10.1 For the Grapples, all interfaces have been addressed by the BUYER. There are not additional requirements for the SELLER. **Table 3-2** lists interfacing equipment and the associated CTN for each.

3.10.2 The SELLER shall incorporate load cell interfacing requirements for the equipment listed in **Table 3-2**, as applicable.

3.10.3 See **Table 2-3** and **Table 2-4** for drawings, datasheets, and other relevant documents for interfacing equipment.

Table 3-2 Interfacing Equipment (Sorted by Canister Sequence)

Description	CTN / Tag	Drawing
HLW Vitrification Canister & Lids	NA	24590-HLW-MX-30-00010001 24590-HLW-MX-30-00010002 24590-HLW-MX-30-00010003 24590-HLW-MX-30-00010004 24590-HLW-MX-30-00010005
Decontamination Cave Crane Maintenance Area Canister Grapple Stand	HDH-MHAN-00004	24590-QL-POA-FH00-00001-03-00001
Decontamination Cave Clean Canister Grapple Stand	HDH-MHAN-00013	
Decontamination Cave Dirty Canister Grapple Stand	HDH-MHAN-00014	
Grapple Stand Maintenance Area Canister Storage Cave	HEH-MHAN-00004	
Three Jaw Grapple Stand	HPH-MHAN-00001	
Canister Grapple Stand	HSH-MHAN-00006[i]	
5 Ton Canister Import Monorail Hoist	HRH-HST-00001	24590-CM-POA-MJKH-00002-01-00015
Lower In-Cave Crane, Canister Handling Cave Hook	HPH-CRN-00001	24590-QL-POA-MJKG-00002-08-00896
Upper In-Cave Crane, Canister Handling Cave Hook	HPH-CRN-00002	24590-QL-POA-MJKG-00002-08-00791
Main Overhead Crane Melter Cave 1 Hook	HSH-CRN-00001[i]	24590-QL-POA-MJKG-00002-08-01834
Decontamination Cave Crane Hook	HDH-CRN-00005	24590-QL-POA-MJKG-00002-08-00583
Canister Rinse Bogie	HDH-TRLY-00003	24590-QL-POA-MQTS-00002-01-148
Rinse Tunnel Canister Rinse Vessel	HDH-VSL-00001	24590-QL-POA-MQTS-00002-01-127
Canister Decontamination Vessel	HDH-VSL-00002 HDH-VSL-00004	24590-CM-POA-MVA0-00008-02-00001 24590-CM-POA-MVA0-00008-02-00010
Decontamination Cave Canister Grapple Load Cell 1, & Cell 2	HEH-MHAN-00013 HEH-MHAN-00014	24590-HLW-M0-HEH-00031001
Canister Storage Cave Crane Hook	HEH-CRN-00003	24590-QL-POA-MJKG-00002-08-01003
HLW Cask	TBD	24590-WTP-ICD-MG-01-014

Notes:
i. HSH Figure(s) do not show HSH-TOOL-00004, The melter cave canister grapple would only be introduced into the melter cave should a canister need to be recovered from a pour tunnel bogie.
ii. See Appendices for compilation of Fig 2-2s from applicable SDD

3.11 Electrical Requirements

3.11.1 There are no electrical requirements for the Grapples.

3.11.2 A connector on the crane load block provides power to the load cell. Alternatively, the load cell may be battery operated.

3.12 Instrumentation and Control Requirements

3.12.1 There are no instrumentation and control requirements for the Grapples.

3.12.2 The load cells shall meet the following requirements.

3.12.2.1 Load cells shall be strain gauge type and be provided with integral amplifiers. Signal output shall be 4 -20mA. The load cells provided shall have a range of 120% of the largest expected weight (see Table 3-1) seen by the load cell and withstand a static overload of 150% of cell capacity.

3.12.2.2 The load cell shall have the following performances:

1) The load cell shall have an accuracy of +/- 1 % of full scale.

2) The load cell shall have a repeatability of +/- 1 % of full scale.

3.12.2.3 Load cells shall be fabricated from 17-7 PH stainless steel, with connecting threads machined as an integral part of the load cells. The entire unit shall be hermetically sealed including connectors.

3.13 Computer Software

3.13.1 There are no software requirements for the Grapples or load cells.

3.14 Equipment Tagging

3.14.1 Each piece of equipment shall be tagged or labeled with its CTN in a visible location after final assembly in accordance with detailed equipment drawing(s) as applicable, and the PO.

3.15 Accessibility and Maintenance

3.15.1 Any Accessibility and/or Maintenance requirements identified during testing shall be submitted to the BUYER.

4 Materials

4.1 Fabrication / Construction

4.1.1 For Grapples, materials are specified in the DEDs.

4.1.2 For Load cells, materials are specified in the design proposal drawing.

4.2 Prohibited Materials

4.2.1 Certain chemicals and materials are restricted from use at WTP. Restricted chemicals and materials are listed in 24590-WTP-LIST-ESH-16-0001, *Restricted Materials List Hanford Tank Waste Treatment and Immobilization Plant (WTP Project).* Inclusion of these chemicals/materials requires specific authorization from the BUYER.

4.3 Stainless Steel Requirements

4.3.1 Materials and chemicals that contact stainless steel shall be in conformance with 24590-WTP-3PS-NW00-T0003, *Engineering Specification for Chemical Requirements for Materials Used in Contact with Austenitic Stainless Steel and Nickel Based Alloys – For HLW and DFHLW*. Austenitic stainless steel and nickel-base alloy materials shall not come in contact with the following:

- Materials with a leachable halogen content exceeding 200 ppm.
- Materials with a leachable sulfur content exceeding 400 ppm.
- Materials with a total of low point metals (such as lead, zinc, copper, tin, antimony, or mercury) exceeding 1 weight percent.

4.3.2 Welded stainless steel fabrications shall use low carbon content grade "L", where appropriate.

4.3.3 Plate and Sheet: Stainless steel sheet shall be type 304, 304L, 316, or 316L conforming to ASTM A240/A240M, *Standard Specification for Chromium and Chromium Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications*.

4.3.4 High tensile stainless-steel bars shall be in accordance with ASTM A564/564M, *Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes.*

4.4 Fasteners

4.4.1 Fasteners, including torque values are provided in the detailed equipment drawings. If thread sealant is required, it is depicted on the detailed equipment drawings.

4.5 General

4.5.1 All materials shall be in conformance with the BUYER-approved specifications. The SELLER shall obtain written approval for substitution from the BUYER prior to use of material.

4.5.2 Material test reports (MTR) for CM shall be available for review by BUYER upon request. MTRs for Q material or code required material shall be submitted in accordance with the MR. The MTRs shall be legible and be traceable to the material furnished by heat or lot number. All MTRs shall be report forms containing the manufacturer’s name.

4.5.3 Q Materials purchased in accordance with this specification shall be accompanied with a certificate of conformance (CoC) supplied by the manufacturer of these items and shall be available to the BUYER for inspection upon request.

5 Fabrication

5.1 General Fabrication Requirements

5.1.1 Controls are to be exercised during all stages of fabrication to minimize exposure of stainless steel to contaminants, and particularly any chloride, which might cause stress corrosion

cracking. Chloride bearing compounds shall be avoided, however, if used, they shall be completely removed by thorough cleaning.

5.1.2 SELLER shall implement controls to ensure that there are no cross-contamination effects from other metals to stainless steel, by ensuring separate storage areas and separating fabrication equipment.

5.1.3 Controls shall be in place to ensure tools that could leave residual carbon steel deposits on the stainless steel are not used. Wire brushes shall be constructed with wire of the same material as the base metal being brushed.

5.1.4 Carbon arc or iron powder cutting shall not be used during fabrication of stainless-steel components.

5.1.5 Workmanship and neat appearance shall be an important aspect of the equipment. Defective or damaged materials shall be replaced or repaired prior to final acceptance. The repair or replacement method shall be approved by the BUYER.

5.2 Radiation Area Fabrication Requirements (Buyer's Use)

5.2.1 Equipment shall be free from pockets or traps where radioactive contamination or water may lodge, or if required, any traps shall have drain holes.

5.2.2 Box sections shall be totally enclosed and leakproof, to prevent the ingress of fluid (such as water) during decontamination. Fabrications shall be designed so that they can be easily cleaned. If water traps are unavoidable, drain holes shall be provided.

5.2.3 All external exposed surfaces including castings, forgings, plate edges, and welds shall be made smooth and free from pockets and porosity, which are likely to hold contamination.

5.3 Finishing Aspects and Coating

5.3.1 All sharp edges of components shall be removed unless they are functionally sharp to serve a specific purpose of equipment.

5.3.2 Equipment shall have a surface finish of 125 microinches (or less), unless otherwise stated in the detailed design documents, in accordance with ASME B46.1, *Surface Texture (Surface Roughness, Waviness & Lay)*, as depicted on detailed equipment drawings.

5.3.3 Coatings depicted in detailed design drawings shall be coated in accordance with 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment.*

5.4 Welding

5.4.1 All stainless-steel welding and submittal of associated welding procedure specification (WPS) and procedure qualification record (PQR) shall be in accordance with 24590-WTP-3PS-SS00-T0002, *Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel.* The WPS/PQR shall be submitted for BUYER review and acceptance as detailed in MR.

5.4.2 Welding shall be in accordance with AWS D14.0/D14.0M, *Machinery and Equipment Welding Specification*, as applicable.

5.4.3 All filler materials and base metals shall be traceable to MTRs. The MTRs shall have actual test report values. All CM MTRs shall be available for inspection and SELLER shall document them via a CoC. All MTRs associated with Q material or code requirements shall be provided as directed on the MR.

5.4.4 SELLER shall inform BUYER of the first operation of each WPS at least 2 weeks prior so that the BUYER may witness. This is a witness point.

5.4.5 SELLER shall provide a weld map drawing that identifies location, weld ID, and nondestructive examination (NDE) requirement as a minimum; and complete relevant information in an Initial Weld Map/Traveler Table or equivalent (see Appendix A). Both documents shall be submitted per the MR. In addition, a Completed Weld Map/Traveler Table shall be submitted per the MR.

6 Tests and Inspections

6.1 Personnel Qualifications

6.1.1 All welders, welding operators, and tackers shall be qualified in accordance with AWS D1.6/D1.6M, *Structural Welding Code – Stainless Steel*, AWS D9.1/D9.1M, *Sheet Metal Welding Code*, or AWS D1.1/D1.1M, *Structural Welding Code – Steel*, as applicable to work being performed. SELLER shall make personnel qualifications available for BUYER review, including in the shop, upon request.

6.1.2 Alternatively, welders, welding operators, and tackers qualified in accordance with ASME BPVC IX are qualified to perform the work as allowed by 24590-WTP-3PS-SS00-T0002, *Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel.*

6.1.3 SELLER shall submit procedure for qualification of welding personnel for BUYER review and acceptance in accordance with the MR.

6.2 Non-Destructive Examinations

6.2.1 All NDE procedures and NDE of stainless-steel welds and carbon steel to stainless steel welds shall be in accordance with 24590-WTP-3PS-SS00-T0002, *Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel.*

6.2.2 NDE personnel performing liquid penetrant testing, visual examination operations, and shop tests shall be qualified and certified in accordance with ASNT SNT-TC-1A, *Recommended Practice, Personnel Qualification and Certification in Nondestructive Testing*. All test reports shall be signed by personnel holding either Level II or Level III certifications and who either performed or witnessed the test. A copy of the individual's current certification(s) shall be provided at the SELLER's shop for BUYER review upon request.

6.2.3 NDE reports shall be traceable to the item examined. Include essential examination parameters, signed and dated by the NDE examiner. NDE reports shall be provided in accordance with the MR.

6.2.4 Certified Weld Inspector (CWI) Certificates and Inspector Eye Exams

The following documents shall be made available for review upon request:

- Current AWS CWI certificates
- Current and valid visual acuity examination record.

6.2.5 SELLER shall inform BUYER of the first operation of each NDE procedure at least 2 weeks prior so that the BUYER may witness. This is a witness point.

6.3 Testing

6.3.1 General Testing Requirements

6.3.1.1 SELLER shall submit an inspection and test plan, as per the MR, for BUYER review which summarizes the manufacturing sequences, including SELLER and BUYER hold and witness points for inspection as indicated in the MR and the material acceptance plan, for each test to be performed. Procedure shall include pass/fail criteria for each test.

6.3.1.2 SELLER shall submit testing reports for each test described below. Documentation shall include the results of each trial performed.

6.3.1.3 SELLER shall source all materials and equipment required for performing all testing.

6.3.2 Design Validation Testing Performed on Test Grapple

6.3.2.1 SELLER shall perform testing on one (1) Grapple (item 1 from **Table 1-1**).

6.3.2.2 It is recommended that testing be completed after the first Grapple is fabricated.

6.3.2.3 The SELLER shall submit a design validation test procedure including pass/fail criteria to the BUYER for approval 8 weeks prior to acceptance testing.

6.3.2.4 The SELLER shall notify the BUYER at least three weeks prior to the tests so that the BUYER may witness.

6.3.2.5 The SELLER shall perform code required static load test in accordance with ASME B30.20, Section 1.3.9.2, 125% of 10,000 lbs rated capacity +5% -0% held above floor for 15 minutes.

6.3.2.6 The SELLER shall demonstrate Grapple's ability to withstand one impact of a transported load at a travel speed of 60 ft/min (simulating hitting a wall or an object) without releasing test load. The impact object shall remain stationary and intact throughout the test. The Grapple shall be capable of release with the double set down feature after the impact test is complete.

6.3.2.7 The SELLER shall demonstrate the ability for remote engagement and disengagement with a Canister (Item 11 in **Table 1-1**), within a right circular cylinder cavity of 62.5 cm. This does not apply to the manual release pins.

6.3.2.8 The SELLER for one HLW grapple shall demonstrate the absolute reliability of the design by performing 500 cycles at rated capacity. One cycle shall consist of:

a) Engaging the HLW Grapple on Test Canister

b) Raising the Test Canister

c) Lowering the Test Canister

d) Raising the Test Canister

e) Lowering the Test Canister

f) Disengaging (Raising) the HLW Grapple from Test Canister

Testing shall be performed using an un-lidded Test Canister, Test Canister with primary lid and Test Canister with secondary lid.

6.3.2.9 After each of the Design Validation Test above:

a) HLW Grapple operability of all motions of mechanisms, including emergency release, shall be verified.

b) Test Canister shall be visually inspected for deformation, cracks and other defects or damage.

c) HLW Grapple shall be visually inspected for deformation, cracks, or other defects.

d) Load bearing welds shall be dye-penetrant inspected.

e) No cracks, deformation, wear or other damage to load bearing or moving parts is allowed, and no stiffness or binding in any mechanism is allowed.

f) Any damage or degradation of function of the Grapple shall be documented and will be reviewed by the BUYER.

6.3.3 Factory Acceptance Testing

6.3.3.1 The SELLER shall submit a factory acceptance test procedure including pass/fail criteria to the BUYER for approval 8 weeks prior to factory acceptance testing. FAT shall include dimensional and surface finish inspection.

6.3.3.2 The SELLER shall notify the BUYER at least three weeks prior to the factory acceptance tests so that the BUYER may witness.

6.3.3.3 Each Grapple shall be tested at the 10,000 lb rated capacity. Test shall include 20 complete cycles simulating actual operating conditions and consisting of:

a) Lowering the Grapple onto the Test Canister.
b) Engaging the Test Canister.
c) Lifting the Test Canister.
d) Moving the Test Canister to new location (total travel distance = 150 feet, achievable by an accrual of smaller consecutive runs)
e) Setting down the Test Canister twice to disengage the Grapple from the Test Canister.
f) Lifting the Grapple and moving it to its starting position

6.3.3.4 Each Grapple shall perform Code Required static load test in accordance with ASME B30.20 Section 1.3.9.2 125% of 10,000 lb rated capacity + 5% -0% held above floor for 15 minutes.

6.3.3.5 After completion of FAT above:

a) HLW Grapple operability of all motions of mechanisms, including emergency release, shall be verified.

b) Test Canister flange shall be visually inspected for deformation, cracks and other defects or damage.

c) HLW Grapple shall be visually inspected for deformation, cracks, or other defects.

d) Load bearing welds shall be dye-penetrant inspected

e) No cracks, deformation, wear or other damage to load bearing or moving parts is allowed, and no stiffness or binding in any mechanism is allowed.

f) Any damage or degradation of function of the Grapple shall be documented and will be reviewed by BUYER.

6.3.3.6 The load cells including hardware attached to load cell shall be load tested.

6.3.3.7 Documentation of all post FAT NDE shall be submitted to the BUYER.

6.3.4 Final Inspection (Prior to Shipping)

6.3.5 The SELLER shall submit the final inspection procedure for BUYER review and permission to proceed. The inspection shall be performed after completion of all fabrication, cleaning and testing, and just prior to final packaging, and include, at a minimum, the following inspections: dimensional, surface, and cleaning.

6.3.6 The SELLER shall inspect all surfaces for contamination. Visible evidence of contamination is not acceptable.

6.3.7 The SELLER shall prepare a final inspection report for each item, which documents the results of the final inspection. The Seller shall include the final inspection report in the documentation package for each piece per the MR.

7 Preparation for Shipment

7.1 Packaging / Shipping & Storage Instructions

7.1.1 Packaging, shipping, handling, and storage of equipment, including shipment tagging, shall be in accordance with the PO and 24590-WTP-3PS-G000-T0056, *Engineering Specification for Packaging, Handling and Storage Requirements for HLW Equipment.*

8 Quality Assurance (Specific QA Strategy identified in MR)

8.1 QA Requirements Specific to Grapples

8.1.1 If SELLER has a BUYER approved QA program to QARD requirements, then QA requirements shall be in accordance with 24590-WTP-3PS-G000-T0053, *Engineering Specification for QARD Supplier Quality Assurance Program Requirements*. The SELLER shall conform to the DOE/RW-0333P QARD (Rev 20) requirements as indicated by a check mark in the Q Data Sheet of DOE/RW-0333P QARD (Rev 20), Quality Assurance Program Requirements. This data sheet is included in the MR.

8.1.2 Alternatively, when the SELLER does not have a BUYER approved QA program to QARD requirements, then the SELLER shall have an approved QA program to ASME NQA-1-2022 requirements and verify WAI performance attributes from Section 3.5 as critical characteristics within the SELLER CGD program in accordance with Engineering Specification for Acquisition of Commercial Items and Services for Use in Safety Applications at WTP 24590-WTP-3PS-G000-T0019. See the Q Datasheet of ANSI/ASME NQA-1 (2022) Quality Assurance Requirements listed in the MR.

8.1.3 Alternatively, QARD requirements will be completed by BUYER at BUYER's facility.

8.1.3.1 SELLER shall have and maintain a BUYER approved Quality Assurance Program meeting the applicable elements of DOE Order 414.1D, as shown in the attachment to the PO titled CM Datasheet of Quality Assurance Program Requirements. SELLER shall submit their Quality Assurance Manual (QAM) for review.

8.2 QA Requirements Specific to Load Cells

8.2.1 SELLER shall have and maintain a BUYER approved Quality Assurance Program meeting the applicable elements of DOE Order 414.1D, as shown in the attachment to the PO titled CM Datasheet of Quality Assurance Program Requirements. SELLER shall submit their Quality Assurance Manual (QAM) for review.

8.3 Program QA Elements

8.3.1 SELLER's Quality Assurance Program (QAP), as a minimum, shall contain the requirements detailed in the Supplier QAP Requirements Data Sheet listed in the MR.

9 Configuration Management

9.1 Configuration management shall be in accordance with 24590-WTP-3PS-G000-T0050, *Engineering Specification for Supplier Documentation.*

10 Documentation and Submittals

10.1 General

10.1.1 Documentation and submittal requirements shall be in accordance with the requirements of the MR, PO, and 24590-WTP-3PS-G000-T0050, *Engineering Specification for Supplier Documentation*.

10.1.2 The MR, drawings, and data requirements lists all documentation and submittals required by this specification.

10.1.3 Each submittal and document shall be legible and reproducible. Documents with substandard legibility or documents that can no longer be reproduced without substantial degradation to legibility are not acceptable when the legibility issue/concern applies to required technical data or information. All documents shall have a light, clear backgrounds with sharp, opaque object, definition lines, and noncrowded dimensioning and lettering. Reproducible submittals shall be black-on-white. Electronic files may include color.

10.1.4 Any changes or revisions to BUYER prepared documentation shall be submitted as per the original, unless specifically noted otherwise in the PO.

10.2 Submittals

10.2.1 Drawings

10.2.1.1 All drawings shall be in accordance with the MR.

10.2.1.2 SELLER shall prepare weld-map drawings identifying all welds and the type of NDE inspection applied to each.

10.2.1.3 SELLER shall submit a CoC stating all requirements of this specification are met.

10.2.2 Calculations

Not Required for Grapple Build to Print. It is expected that Load Cell will be assembled from commercial off-the-shelf components not requiring analysis.

10.2.3 Manuals and Training Material(s)

10.2.3.1 SELLER shall submit the following manual(s) as per the MR:

- Erection/installation manuals/instructions
- Operating manuals/instructions
- Maintenance manuals/instructions
- Site storage and handling manuals/instructions
- Emergency manuals/instructions

10.2.3.2 SELLER shall submit training material supplementing the operating and maintenance manual(s) discussed above.

10.2.4 Procedures

10.2.4.1 WPSs/PQRs, welding personnel qualification procedure, NDE personnel qualification procedure, NDE (including VT) procedures, coating and cleaning procedures (if applicable), dimensional inspection, test procedures, and final inspection procedures discussed in this specification shall be submitted to BUYER as per the MR. Procedures for the manufacture of commercial off-the-shelf items (unmodified catalog items) do not need to be submitted.

10.2.5 Inspection and Test Reports

10.2.5.1 Dimensional, cleaning and coating (if applicable), surface finish, final inspection, MTRs and all NDE inspection and test reports shall be submitted to BUYER per this specification and if included in the MR.

10.2.6 Schedules

10.2.6.1 The SELLER shall submit for review, a schedule identifying all milestones necessary to demonstrate that the equipment will be delivered in accordance with the designation project schedule.

10.2.7 Spare Parts List

10.2.7.1 If identified during Design Validation Testing, a spare parts list shall be compiled. The spare parts list shall include names of manufacturers with appropriate model numbers and special ordering instructions for replaceable parts, if required.

10.3 Design Review Meetings

10.3.1 Engineering Design Kick-off Meeting

10.3.1.1 The contract award kick-off meeting will be conducted at the BUYER's facility or virtually as determined by the BUYER to ensure the newly awarded contract is clear and that the SELLER has a clear understanding of the scope of the contract.

10.3.1.2 Interim Design Review (IDR) is not required for Grapples as the design is complete.

10.3.1.3 IDR is not required for load cells due to the simplicity of the anticipated design.

Appendix A (For Seller Use) Weld Map/Traveler

Page: _____of _____

WELD MAP (WM) / TRAVELER (T)

This document or a similar document is for use by the vendor in fulfillment of MR submittal requirements.
This document or a similar document is to be submitted as a Weld Map after the WPSs/PQRs as part of the MR submittal requirement. This document or a similar document is to be submitted as a Traveler (completed weld map) as part of the MR submittal requirement.

Job Number: _____ Vessel Number: _____ PO Number: _____

Bechtel Drawing Number (1)	Joint #	Joint Type and Extent (2)	Joint ID (3)	Nozzle # (if applicable)	Base Metal		Weld Filler		Material Thickness	Postweld Heat Treatment (5)	Welder ID	NDE		PMI Report #	Weld Repairs (6)	Other Activities (7)	WPS & Rev No.	Welding Inspector
					Spec/Type/ P-No. (4)	Heat/Lot #	Spec/Type (4)	Heat/Lot #				Method / Extent	Report #					Date/Initials
WM	WM	WM	WM	WM	WM		WM		WM	WM		WM					WM	
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T

WM - This information is required to be provided on this Weld Map document (or a similar document) and submitted after the WPSs/PQRs in fulfilment of the MR requirement before fabrication commences.
T - This information is required to be provided on the Traveler Document as material receiving, fabrication, inspection, testing, and NDE records are completed. This document (or a similar document) is to be submitted in fulfillment of the MR requirement.

(1) List only the digits of the Bechtel drawing number following the PO number (e.g. The x's in 24590-QL-POA-MKAS-00001-xx-xxxxx)
(2) e.g. Butt, T-Joint, Corner, Lap all around, intermittent weld length and pitch
(3) e.g. Head to Shell
(4) e.g. SA240-304 (base metal); SFA-5.22 E309LTX-X (Weld Filler)
(5) For (WM): List PWHT procedure #. For (T) List PWHT report #.
(6) e.g. R1 for the first repair, R2 for the second repair
(7) Other Activities: any base metal repairs exceeding 3/8" or 10% of the section thickness (whichever is smaller).

Appendix B (For Seller Use) Telemanipulator Information

When designing equipment that will interface with a telemanipulator (TLM) designs shall be made to account for the following attributes:

A TLM is a device which, through electronic, hydraulic, or mechanical linkages, allows a hand-like mechanism to be controlled by a human operator and is used for remote-handling of equipment in radiation areas too hot for human entry. Operation of an arm is manipulated by an individual standing in a low or non-radiation environment and viewing operations through a lead glass window. Operations are typically done with pairs of TLMs. The TLMs have a 50 lb. load rating and are equipped with two fingers that have a gripping area of 0.5 inches wide by 1.75 inches long with the exception of system HSH that has a finger area of 0.5 inches wide by 2.50 inches long. To assist in TLM longevity, the weight of interfacing Equipment/hardware, and push/pull forces interfacing with the TLM should be rated at or less than 40 lbs. so there is a safety factor integrated for the TLM.

TLM operability and feasibility is inversely proportional to the reach, i.e. the farther the reach, the harder the operation for the TLM and the simpler the movement should be considered. Typically, TLMs are close range remote handling equipment. TLMs are operationally limited at extended reaches and have limited basic motions, e.g. push/pull (side to side, and forward and back), and lifting and transporting items. It is not advisable to design equipment/hardware that will require complex movements at these extended reaches. In addition, consideration should be given to what is expected at the finger interface; gripping and non-gripping tasks, e.g. actually gripping an item or using closed fingers to slide an item from a position. If gripping, a milled slot or equivalent feature should be incorporated for the finger to fit into, thereby, preventing the equipment/hardware from being twisted within the grip of the TLM fingers and preventing accidental drops.

Due to the pivot design of the arm, height and location of remote equipment and operations should be considered. The operating envelope of the TLM resembles a cone shape. For instance, when the arm is positioned concentric with the encast liner in the wall, the arm does not have any side to side movements but is purely rotational. As the arm is lowered, side to side movement increases until the full operating envelope of the TLM is recognized when it is positioned vertically. See 24590-WTP-M0-10-00014, *WTP Vitrification System Design Proposal Drawing MSM Manipulator Dimensions*, for TLM envelope and dimensions.

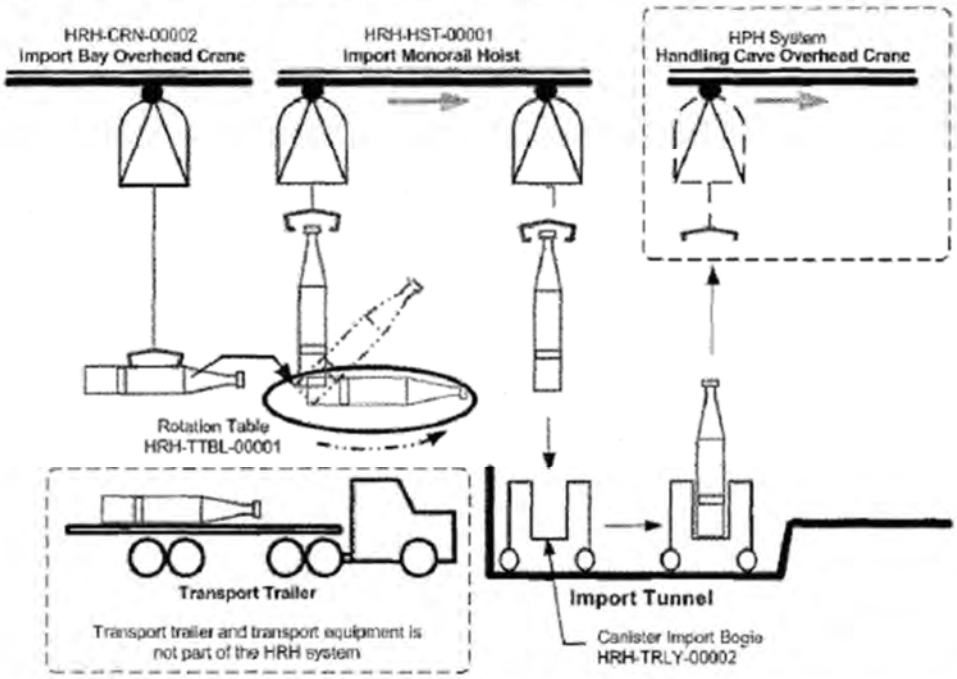
HLW has renamed master-slave manipulator (MSM) to telemanipulator (TLM). Reference documents may not reflect this update. MSM(s) shall be referred to as TLM(s).

System	Model CRL*	Power Manipulator Model PAR**	TLM Adapter Drawing	Power Manipulator Adapter Drawing ***	TLM Lifting/Power Manipulator Lifting Capacity
HEH	RE-T	N/A	24590-HLW-M0-HSH-00083	N/A	50 lbs./NA

* Seller Central Research Laboratories (CRL) with 360° wrist rotation
** Seller PAR Systems with 360° wrist rotation
*** MSM Adapter Drawing and Power Manipulator Adapter Drawing

Appendix C (Buyer's Use) HRH System Design Description

Figure 2-2 HRH System Boundary Simplified Diagram



Note: Control of crane and hoist are locally controlled by digital radio or a pendant backup. Control of inspection/rotation table is locally controlled from a panel. Control of bogie is performed through the MHJ.

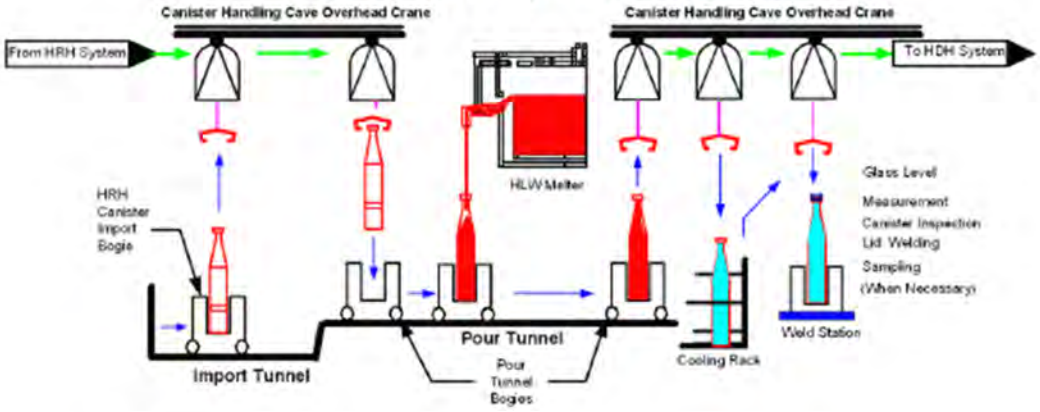
2.1 System Functions/Safety Functions

This section defines the HRH functions that need to be addressed by the system design. Figure 2-3 provides the functional block diagram for the HRH system, indicating the internal and external systems and utilities that provide the primary support or interface for that function. Section 3 provides the design requirements to meet both functional and performance expectations and demands of the HRH operations.

System interfaces are provided for reference only. See Section 1.5 for the list of relevant system designators. Except where a level of interface needs to be defined, no attempt is made in this document to define functions, performance, or design requirements for interfacing systems.

Appendix D (Buyer's Use) HPH System Design Documents

Figure 2-2 HPH Simplified System Diagram

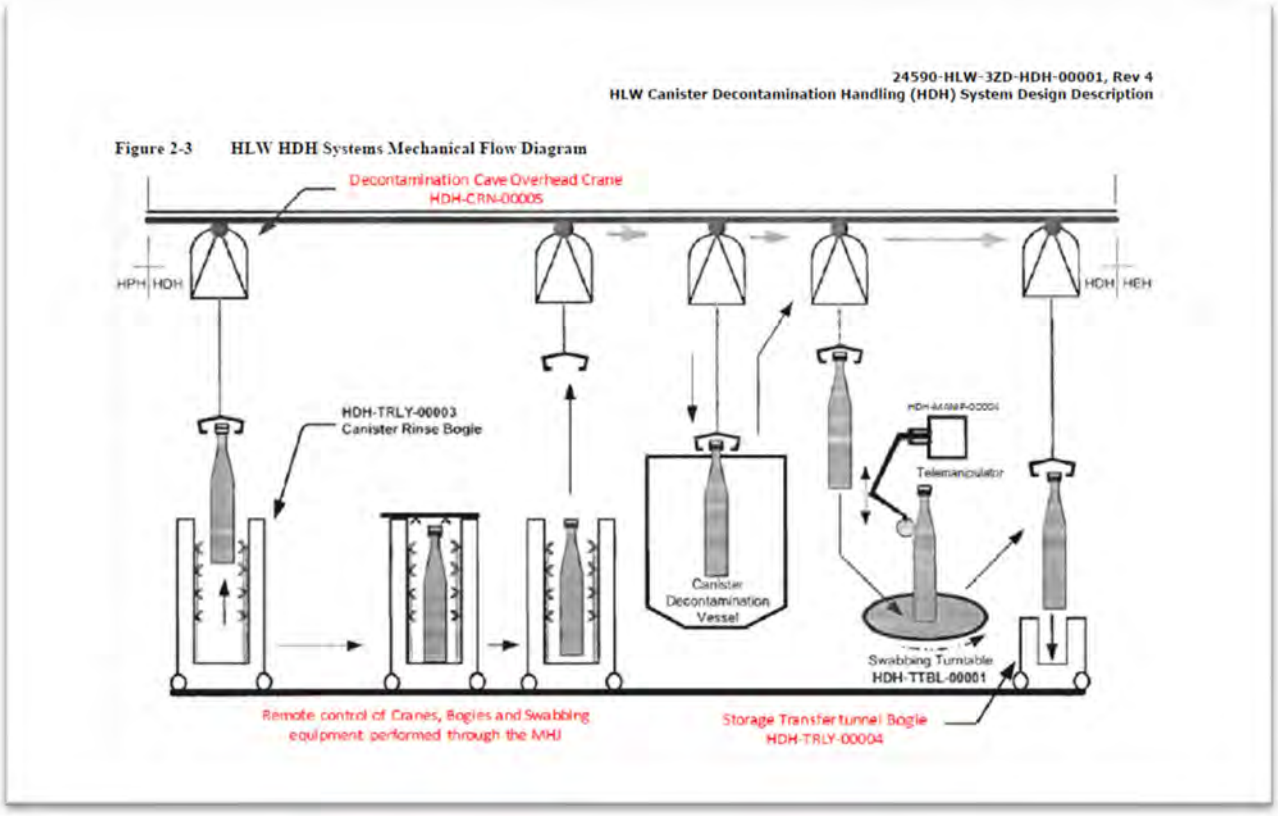


2.1 System Functions/Safety Functions

This section defines the HPH system functions and attributes that need to be addressed by the system design. Figure 2-3 provides the functional block diagrams for the HPH system, indicating the internal and external systems and utilities that provide the primary support or interface for that function. Section 3 provides the design requirements to meet both functional and other requirements. System interfaces are provided for reference only. Except where a level of interface needs to be defined, no attempt is made in this document to define functions, performance, or design requirements for interfacing systems.

Note:
HSH Figure(s) do not show HSH-TOOL-00004,
The melter cave canister grapple would only be introduced into the melter cave should a canister need to be recovered from a pour tunnel bogie.

Appendix E (Buyer's Use) HDH System Design Documents.

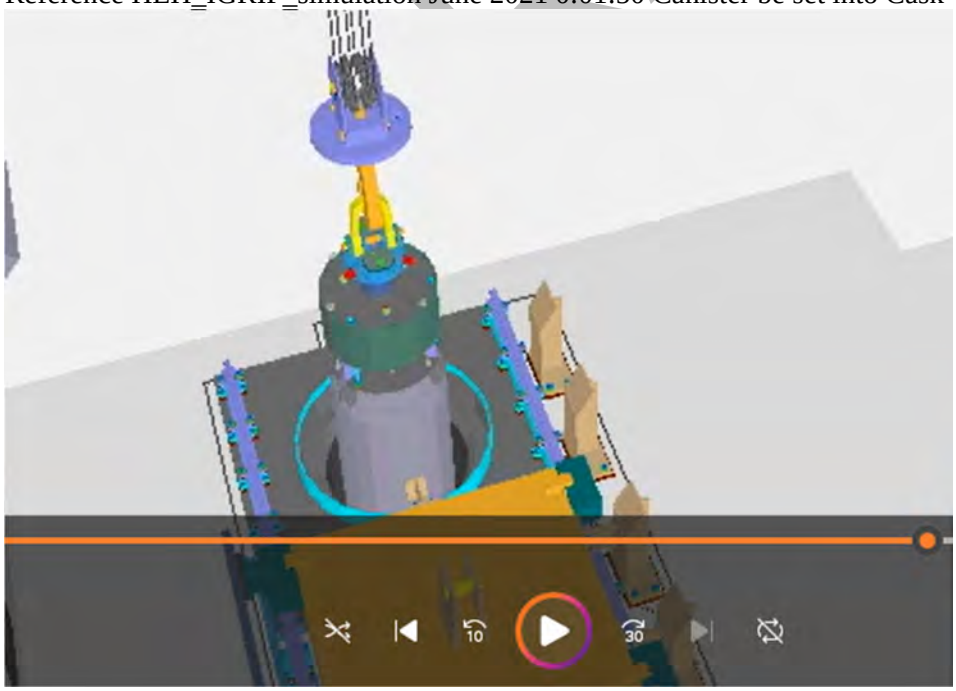


Note:
Operation of manual release pins is not necessary when canister is inside any vessel or cask

Appendix F (Buyer's Use) HEH IGRIP

Reference HEH_IGRIP_simulation June 2021 0:01:29 Canister being set into Storage Rack

Reference HEH_IGRIP_simulation June 2021 0:01:50 Canister be set into Cask



Appendix G (Buyer's Use) Requirement Source References

[1]24590-WTP-DB-ENG-18-001, Rev 4, *Basis of Design for the High-Level Waste (HLW) Facility and DFHLW Supporting Facilities*, Section 11.7.2.1
[2] 24590-HLW-3PS-MT00-T0003, Rev 0, *Engineering Specification for HLW*, section 5.2.7.2
[3] 24590-HLW-U0D-W16T-00001, Rev. 5, *HLW Room Environment Data Sheet*, PDF Page 23 of 31
[4] 24590-HLW-U0D-W16T-00001, Rev. 5, *HLW Room Environment Data Sheet*, PDF Page 23 of 31
[5] 24590-HLW-M6C-30-00033, Rev 0, *Room Ambient Dose Rates for The HLW Facility*, Section 2.6 Unshielded Dose Rates, High values for rooms H-0132 & H-0136
[6] 24590-HLW-PL-RT-07-0001 Rev 3, 0, *IHLW WASTE FORM COMPLIANCE PLAN FOR THE HANFORD TANK WASTE TREATMENT AND IMMOBILIZATION PLANT*, Section 4.1, WAPS 1.4.2 Lifting flange temperature drops below 375 °C. Calculation 24590-HLW-M0C-M37T-00010 Rev 0 section 2.8 uses 600 °F.
[7] 24590-HLW-RPT-PR-01-001, Rev 16, *Waste Acceptance Impacting Items and Activities*, Pg 55 of 65
[8] 24590-HLW-RPT-PR-01-001, Rev 16, *Waste Acceptance Impacting Items and Activities*, Pg 48 of 65
[9] 24590-HLW-U0D-W16T-00001, Rev. 5, *HLW Room Environment Data Sheet*, PDF Page 23 of 31,
[10] 24590-HLW-M6C-30-00033, Rev 0, *Room Ambient Dose Rates for The HLW Facility*, Section 2.6 Unshielded Dose Rates, High values for rooms H-0132 & H-0136
[11] 24590-HLW-MX-30-00010001, Rev 0, *HLW Vitrification Canister Assembly Drawing (3/8 In Wall)* Note 5
[12] 24590-HLW-MX-30-00010002, Rev 0, *HLW Vitrification Canister Assembly Drawing (3/8 In Wall)* Detail E
[13] 24590-HLW-MX-30-00010004, Rev 0, *HLW Vitrification Canister Assembly Drawing (3/8 In Wall)* Detail F, H
[14] 24590-HLW-3ZD-HPH-00001, Rev 3, *HLW Canister Pour Handling (HPH) System Design Description* Section 4.1.3.2
[15] CCN 343268
[16] 24590-HLW-M0C-30-00003, Rev 0, *HLW Canister Weight and Volume Calculations*, Attachment C- Weight, Volume, and Glass Fill Height Calculations Based on Nominal Dimensions
[17] 24590-HLW-MX-30-00011001, Rev 0, *HLW Vitrification System Fabrication Drawing Grapple Assembly*

RIVER PROTECTION PROJECT – WASTE TREATMENT PLANT

ENGINEERING SPECIFICATION

FOR

HLW Drum and Filter Grapples

Content applicable to ALARA? ☒ **Yes** ☐ **No** **ADR No.** 24590-HLW-ADR-M-24-0011 **Retroactive applicability:** ☒ **N/A** *(alpha revision or revision 0)*		**Quality Level** CM DOE Contract No. DE-AC27-01RV14136

REV	DATE	BY	CHECK	AUTHORIZATION	APPROVER
0		Shawn Elliott Shawn Elliott	Elvis Le	N/A	Ryan Brown Joel Evans

SPECIFICATION No. 24590-HLW-3PS-MQL0-T0006	**Rev** 0

Revision History

Revision	Reason for Revision	Q Specification Revision Only Margin Reduced?		CM Only
		YES	NO	N/A
0	Issue for Purchase	N/A	N/A	N/A
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐

Contents

Appendices

Tables

1 Scope

1.1 Project Description and Location

1.1.1 The River Protection Project-Waste Treatment Plant (RPP-WTP) is a complex of radioactive waste processing facilities that will be engineered, procured, and constructed by Bechtel National, Inc. (BNI) for the Department of Energy (DOE). The complex will immobilize waste that is contained in underground storage tanks at the Hanford Site. The facility will convert radioactive waste into solid glass through a process called vitrification. RPP-WTP will return vitrified waste products, intermediate waste, and secondary waste to DOE Hanford Field Office (HFO) custody.

1.1.2 The Hanford Site occupies an area of approximately 560 square miles and is located along the Columbia River, north of Richland, WA. The Waste Treatment Plant (WTP) Facility is being constructed at the east end of the 200 East Area of the Hanford Site. Benton, Franklin, and Grant counties surround the Hanford Site.

1.2 Equipment, Material, and Services Required

1.2.1 The High Level Waste (HLW) Drum and Filter Grapples (Grapples) are mechanical devices that use a combination of cams, linkages, and slides to operate three (3) lifting arms that remotely engage and disengage with the specific components. The raising and lowering of the Grapple actuates three (3) lifting arms by driving a rotating ratchet assembly. Lowering the Grapple until seated on top of a component and then lifting the Grapple causes the lifting arm fingers to engage with the component. The design of the Grapple ensures that it is not possible to lift the component unless all three lifting arms are fully engaged. The Grapple must be set down twice to release the component. This design feature prevents accidental drops; thus to disengage the lifting arms, the Grapple must be lowered until seated, raised, and then lowered again until seated. This double set down to release prevents inadvertent disengagement of a component should it land on an obstacle before being fully seated. The Grapple is provided with three visual indications for grapple position:

1. Three (3) Position Indicators located on the base,

2. Three (3) Lifting Arm Position Indicating Grooves (located on each arm) and

3. Two (2) Visual Sequence Indicators located on the top of the grapple.

The Grapple is equipped with a means to retract the fingers from the container should the normal disengagement mechanism fail. The quick release pins are removed detaching the lifting arms from the Upper Sliding Tube Assembly resulting in disengagement of the grapple from the component. The Grapple is mainly fabricated of stainless steel with external surfaces having a smooth finish to aid in decontamination and improve durability during the decontamination process.

The Drum Grapples are mechanically actuated lifting devices, used for transporting 55 gallon drums within the HLW Facility through the drum lidding and swabbing process.

The filter grapple is mechanically actuated lifting devices that facilitates high efficiency particulate air (HEPA) filter service / replacement.

Both the HLW Drum and Filter Grapples are suspended from overhead cranes RWH-CRN-00001 and HFH-CRN-00002 respectively.

1.2.2 This build to print specification applies to the fabrication, assembly and testing of the HLW Drum and Filter Grapples for use in the High-Level Waste (HLW) Facility. The SELLER is responsible for supplying the HLW Drum and Filter Grapples identified in **Table 1-1**. The BUYER is providing detailed equipment drawings (DED) and has performed all necessary analysis. The term SELLER refers to the seller and any parties subcontracted by the seller to complete any portion of the work. Refer to part 1 of the Purchase Order (PO) for a complete list of the PRODUCTS required. The term PRODUCTS includes equipment, services, and documentation to support the design and fabrication and testing of equipment.

1.2.3 The SELLER shall provide the equipment/services identified in **Table 1-1** and, unless otherwise stated, any deliverables necessary to comply with the requirements identified in this specification. Refer to the material requisition (MR) for a complete list of the PRODUCTS required.

Table 1-1 Required Equipment / Service

Required Equipment / Service **No.**	**Component Tag Number (CTN) 24590-HLW-FH-**	**Description**	**HLW Room**
1	N/A	HLW Drum Grapple for Design Validation Testing[i]	N/A
2	N/A	HLW Filter Grapple for Design Validation Testing[i]	N/A
3	N/A	Perform Design Validation Testing & Inspections[i]	N/A
4	HFH-TOOL-00005	Filter Grapple	H-0104
5	RWH-TOOL-00002	Drum Grapple (Dirty)	H-0126B
6	RWH-TOOL-00004	Drum Grapple (Clean)	H-0126B
7	N/A	Test filter bank including door, test filter, test filter disposal basket with lid, for testing filter grapple and test 55 gallon drum for testing filter & drum grapples.	N/A

Notes:
i. May have been performed by HLW Mockup facility.

1.2.4 For PRODUCTS related to equipment covered by this specification, the SELLER's scope of work includes, but is not limited to:

- Any special tools or equipment required for assembly, maintenance, installation, removal, and disassembly
- Fabrication
- Assembly
- Temporary equipment required for equipment testing

- Examinations and inspections, Design Validation Testing, and factory acceptance testing (FAT)
- Preparation of drawings and other technical supporting documents
- Quality Assurance (QA) documents necessary for qualification under the Commercial (CM) QA program (refer to Section 8.1.1)
- Preparation for shipping, including fabrication of any required shipping support frames, handling beams, and tie-down fixtures
- Shipping of equipment to BUYER facility
- Submittals as identified in this and accompanying specifications and as summarized in the material requisition (MR) and the purchase order (PO)

1.2.5 All material, equipment, devices, and parts comprising the design specified herein shall be new and unused and of current manufacture and supplied by the SELLER.

1.2.6 The SELLER may subcontract any portion of the engineering, fabrication, manufacture, inspection, or testing, provided it meets the QA requirements of this specification (see Section 8.1.1). The SELLER is responsible for the completeness and quality of all deliverables.

1.3 Build Approach

1.3.1 Procurement Strategy

1.3.1.1 For BUYER, status of HLW Mockup facility (HMF) verification and validation testing of HMF drum and filter grapple is a prerequisite for MR.

1.3.1.2 Although this is a build to Print specification, SELLER is encouraged to share ideas / improvements with BUYER. We also solicit comments where criteria in this specification could be improved to result in a better product.

1.3.2 General

1.3.2.1 This specification is accompanied by Detailed Equipment Drawings (DEDs). Refer to **Table 2-2 and Table 2-3** for list of these documents.

1.3.2.2 Requirements on DEDs are mandatory dimensions or features that are necessary to ensure interface with other design features.

1.3.2.3 Deviations of mandatory technical requirements or design features shall be submitted to obtain BUYER for approval.

1.3.2.4 The SELLER is responsible for producing a definitive design of equipment as described in this specification and the accompanying PO. The SELLER is responsible for all design development including full validation of the proposed design, and for ensuring that the final design incorporates all requirements of this specification, and other referenced specifications.

1.4 Acronyms/Definitions

ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Materials
AWS	American Welding Society
BNI	Bechtel National, Inc.
BUYER	Bechtel National, Inc.
CM	Commercial Material (quality level)
CoC	certificate of compliance
CTN	component tag number
CWI	certified weld inspector
DED	detailed equipment drawing
DFHLW	Direct Feed high-level waste / High-Level Waste Facility
DOE	Department of Energy
FAT	factory acceptance testing
Grapple	HLW Drum / Filter Grapple- mechanically actuated lifting device
HEPA	high efficiency particulate air (filter)
HFH	HLW filter cave handling system
HFO	Hanford Field Office
HLW	high-level waste / High-Level Waste Facility
HMF	HLW Mockup facility
MR	material requisition
NDE	nondestructive examination
PO	purchase order
PQR	procedure qualification record
PRODUCTS	equipment, services, and documentation to support the design and fabrication of equipment
QA	quality assurance
QAP	Quality Assurance Program
rated capacity	the maximum load for which the lifting device is designated by the manufacturer aka rated load, safe working load
RPP-WTP	River Protection Project-Waste Treatment Plant
RWH	radioactive solid waste handling system
SELLER	this is a comprehensive term and includes seller, vendor, contractor, subcontractor, supplier, sub-supplier, etc.
TLM	telemanipulator
WPS	welding procedure specification
WTP	Hanford Tank Waste Treatment and Immobilization Plant

1.5 Safety/Quality/Seismic Classifications

Table 1-2 Equipment Classifications

Description	Safety Classification	Quality Classification	Seismic Category
HLW Drum Grapples	Non-safety	CM	SC-III
HLW Filter Grapple	Non-safety	CM	SC-III

2 Applicable Documents

2.1 General Requirements

2.1.1 The following codes and standards are applicable to the extent cited within this specification. If the SELLER finds a conflict between this specification and other requirements, the SELLER shall obtain written resolution from BUYER, prior to proceeding with any work. In general, when resolving conflicts, the following order of precedence shall apply:

- PO
- MR
- This Specification
- Detailed Equipment Drawings
- Engineering General Specifications referenced by this Specification (**Table 2-1**)
- Industry Codes and Standards

2.1.2 The applicable version of all codes and standards specified shall be that in effect at time of contract award, unless otherwise noted. Use of any other edition, revision, or issue of codes and standards require BUYER's written approval prior to proceeding with any work. When specific chapters, sections, parts, or paragraphs are listed following a code or industry standard, only those chapters, sections, parts, or paragraphs of the document are applicable and shall be applied.

2.1.3 For codes and standards listed below, the specific revision or effective date identified, as well as the specific revision or effective date of codes and standards that they incorporate by reference (daughter codes and standards) shall be followed. When more than one code, standard, or reference document covers the same topic, the requirements for all must be met.

2.2 Federal & State Regulations

OSHA 29 CFR 1926.251	Rigging Equipment for Material Handling

2.3 Quality Assurance

DOE Order 414.1D (CRD)	Quality Assurance

2.4 Industry Codes & Standards

All equipment shall be manufactured in accordance with the applicable sections of the edition in effect at the time of award of the contract of the following standards unless noted otherwise. If an industry code/standard is necessary for fabrication and testing is not listed in this specification, SELLER must receive approval for code/standard usage before proceeding with work.

2.4.1 American Society of Mechanical Engineers (ASME)

2.4.1.1 Design, Fabrication, Documentation, and Operation Standards

ASME B46.1	Surface Texture (Surface Roughness, Waviness, & Lay)
ASME BTH-1	Design of Below-the-Hook Lifting Devices
ASME B30.20	Below-the-Hook Lifting Devices

2.4.1.2 Fastener Standards

ASME B18.2.1	Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series)
ASME B18.2.2	Nuts for General Applications: Machine Screw Nuts; and Hex, Square, Hex Flange, and Coupling Nuts (Inch Series)

2.4.2 American Society for Nondestructive Testing (ASNT)

ASNT SNT-TC-1A	Personnel Qualification and Certification in Nondestructive Testing

2.4.3 American Society for Testing and Materials (ASTM)

2.4.3.1 Material Standards

ASTM A240/A240M	Standard Specification for Chromium and Chromium Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A564/564M	Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes

2.4.3.2 Fastener Standards

ASTM A354	Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other External Threaded Fasteners
ASTM A449	Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use
ASTM F593	Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs

2.4.4 American Welding Society (AWS)

AWS D1.6/D1.6M	Structural Welding Code – Stainless Steel
AWS D1.1/D1.1M	Structural Welding Code
AWS D14.0/D14.0M	Machinery and Equipment Welding Specification
AWS D9.1/D9.1M	Sheet Metal Welding Code
AWS QC1	Specification for AWS Certification of Welding Inspectors

2.4.5 National Electric Manufacturers Association (NEMA)

Not Used	

2.4.6 National Fire Protection Association (NFPA)

Not Used	

2.5 Engineering Specifications

The following is a list of WTP Specifications invoked by this specification:

Table 2-1 Engineering Specifications

Document Number	Title
24590-WTP-3PS-AFPS-T0001	Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment
24590-WTP-3PS-SS00-T0002	Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel
24590-WTP-3PS-G000-T0050	Engineering Specification for Supplier Documentation
24590-WTP-3PS-G000-T0056	Engineering Specification for Packaging, Handling and Storage Requirements for HLW Equipment
24590-WTP-3PS-NW00-T0003	Engineering Specification for Chemical Requirements for Materials Used in Contact with Austenitic Stainless Steel and Nickel Based Alloys – For HLW and DFHLW
24590-WTP-LIST-ESH-16-0001	Restricted Materials List Hanford Tank Waste Treatment and Immobilization Plant (WTP Project)

2.6 Detailed Equipment Drawings

2.6.1 Drum & Filter Grapples(s) Detailed Equipment Drawings

Table 2-2 Detailed Equipment Drawings Drum Grapple

Document Number	Title
24590-HLW-MX-RWH-00001	HLW VITRIFICATION SYSTEM RWH FABRICATION DRAWING DRUM GRAPPLE TOP LEVEL ASSEMBLY
24590-HLW-MX-RWH-00002	HLW VITRIFICATION SYSTEM FABRICATION DRAWING DRUM GRAPPLE LIFTING SHACKLE ASSEMBLY
24590-HLW-MX-RWH-00003	HLW VITRIFICATION SYSTEM RWH FABRICATION DRAWING DRUM GRAPPLE LIFTING SHACKLE WELDMENT
24590-HLW-MX-RWH-00004	HLW VITRIFICATION SYSTEM RWH FABRICATION DRAWING DRUM GRAPPLE CAM FOLLOWER ASSEMBLY
24590-HLW-MX-RWH-00005	HLW VITRIFICATION SYSTEM RWH FABRICATION DRAWING DRUM GRAPPLE CAM INDICATOR ASSEMBLY
24590-HLW-MX-RWH-00006	HLW VITRIFICATION SYSTEM RWH FABRICATION DRAWING DRUM GRAPPLE CAM INDICATOR WELDMENT
24590-HLW-MX-RWH-00007	HLW VITRIFICATION SYSTEM RWH FABRICATION DRAWING DRUM GRAPPLE LID POSITION ASSEMBLY
24590-HLW-MX-RWH-00008	HLW VITRIFICATION SYSTEM RWH FABRICATION DRAWING DRUM GRAPPLE POSITION INDICATOR WELDMENT

Document Number	Title
24590-HLW-MX-RWH-00009	HLW VITRIFICATION SYSTEM FABRICATION DRAWING DRUM GRAPPLE VERTICAL SHAFT CAM ASSEMBLY
24590-HLW-MX-RWH-00010	HLW VITRIFICATION SYSTEM RWH FABRICATION DRAWING DRUM GRAPPLE UPPER SLIDING TUBE WELDMENT
24590-HLW-MX-RWH-00011	HLW VITRIFICATION SYSTEM RWH FABRICATION DRAWING DRUM GRAPPLE LOWER LINKAGE WELDMENT

Table 2-3 Detailed Equipment Drawings Filter Grapple

Document Number	Title
24590-HLW-MX-HFH-00002	HLW VITRIFICATION SYSTEM HFH FABRICATION DRAWING FILTER GRAPPLE ASSEMBLY
24590-HLW-MX-HFH-00003	HLW VITRIFICATION SYSTEM HFH FABRICATION DRAWING FILTER GRAPPLE LOWER BASE WELDMENT
24590-HLW-MX-HFH-00004	HLW VITRIFICATION SYSTEM HFH FABRICATION DRAWING HFH FILTER GRAPPLE CAM FOLLOWER ASSEMBLY
24590-HLW-MX-HFH-00005	HLW VITRIFICATION SYSTEM HFH FABRICATION DRAWING FILTER GRAPPLE POSITION INDICATOR PLUNGER ASSEMBLY
24590-HLW-MX-HFH-00006	HLW VITRIFICATION SYSTEM HFH FABRICATION DRAWING FILTER GRAPPLE SLIDING ASSEMBLY
24590-HLW-MX-HFH-00007	HLW VITRIFICATION SYSTEM HFH FABRICATION DRAWING FILTER GRAPPLE UPPER SLIDING TUBE WELDMENT
24590-HLW-MX-HFH-00008	HLW VITRIFICATION SYSTEM HFH FABRICATION DRAWING FILTER GRAPPLE LIFTING LUG AND INDICATOR ASSEMBLY
24590-HLW-MX-HFH-00009	HLW VITRIFICATION SYSTEM HFH FABRICATION DRAWING FILTER GRAPPLE LOWER INDICATOR GUARD WELDMENT
24590-HLW-MX-HFH-00010	HLW VITRIFICATION SYSTEM HFH FABRICATION DRAWING FILTER GRAPPLE UPPER INDICATOR GUARD WELDMENT
Notes: 1. Upon request, native files can be provided for above detailed drawings	

2.6.2 Reference Drawings

Table 2-4 Drum Grapple Reference Drawings

Document Number	Title	CTN / Tag Equipment
24590-QL-POA-FH00-00001-03-00003	DRAWING - DRUM GRAPPLE - GRAPPLE STAND ARRANGEMENT	RWH-MHAN-00013 RWH-MHAN-00014
24590-QL-POA-MJKG-00002-08-00333 24590-QL-POA-MJKG-00002-08-00334	DRAWING - 3 TON T / R CRANE NUMBER 2800 HOOK AND NUT DETAILS DRAWING - 3 TON T / R CRANE NUMBER 2800 HOOK LATCH ARRANGEMENT AND DETAILS	RWH-CRN-00001
24590-QL-POA-MJW0-00003-03-00036 24590-QL-POA-MJW0-00003-03-00862	DRAWING - LAYOUT FOR RPP-WTP HLW FACILITY RWH SYSTEM DRAWING - FILE FAE JAW ASSEMBLY[i]	Multiple

Document Number	Title	CTN / Tag Equipment
24590-QL-POA-HCYT-00001-03-00026 24590-QL-POA-HCYT-00001-03-00040	DRAWING - HANFORD HLW CONTAINERS 55 GALLON DRUM AND CLOSURE RING	RWH-MHAN-00006 RWH-MHAN-00011
24590-QL-POA-HCYT-00001-03-00015	DRAWING - HANFORD HLW CONTAINERS 55 GALLON DRUM SHIELDING CASK GENERAL ARRANGEMENT	RWH-CASK-00002
i. Tele manipulator reference is for manual pin release. Installing drum lid is not within this scope.		

Table 2-5 Filter Grapple Reference Drawings

Document Number	Title	CTN / Tag Equipment
24590-CM-HC1-MKH0-00001-02-00105	DRAWING - FLANGE	HEPA Filter
24590-HLW-M0-HFH-00016001	HLW VITRIFICATION SYSTEM HFH DESIGN PROPOSAL DRAWING FILTER CAVE TOOL RACK	HFH-MHAN-00006
24590-QL-POA-HCYT-00001-03-00026 24590-QL-POA-HCYT-00001-03-00040	HANFORD HLW CONTAINERS 55 GALLON DRUM AND CLOSURE RING	RWH-MHAN-00006 RWH-MHAN-00011
24590-QL-POA-HDYR-00001-05-00086 24590-QL-POA-HDYR-00001-05-00178	DRAWING - FILTER BASKET - LIFTING BRACKET	30-MHAN-00019
24590-QL-POA-MJW0-00003-03-00037 224590-QL-POA-MJW0-00003-03-00862	DRAWING - LAYOUT FOR RPP-WTP HLW FACILITY HFH-HSH SYSTEM DRAWING - FILE FAE JAW ASSEMBLY[i]	Multiple
24590-QL-POA-MJW0-00005-07-00430	DRAWING - 6 TON LOWER BLOCK HOOK	HFH-CRN-00002
24590-CM-HC1-MKH0-00001-02-00114 24590-QL-POA-MKH0-00002-07-00079	DRAWING - REMOTE CHANGE HEPA FILTER ASSEMBLY DRAWING - REMOTE CHANGE HEPA FILTER HOUSING DOOR DETAILS	MULTIPLE C5V-HEPA-XXXXX
Notes: i. Telemanipulator reference is for manual pin release.		

3 Design Requirements

3.1 Common Functional & Mechanical Requirements Drum & Filter (BUYER Use)

3.1.1 The HLW Drum and Filter Grapples provide a hands-free interface between the overhead crane and all configurations.

- The Grapples are capable of being remotely engaged or released from the crane hooks without external assistance.
- The Grapples are capable of being remotely engaged and released from their designated load without external assistance.
- The Grapples are capable of being remotely engaged and released from their designated load without external assistance inside their applicable interface Drum Cask and Filter Basket & Filter Bank respectively.

3.1.2 The Grapple interface with the crane is designed to allow the Grapple to be centered, such that it hangs vertically, within two degrees, under its own weight.

3.1.3 The Grapples shall maintain secure attachment of the load while operating from the overhead crane. Maximum crane operating speed shall be 60 ft/min.

3.1.4 Each Grapple is designed to include an indexing feature that requires two fully lowered set-downs to disengage the load. The indexing feature prevents an inadvertent release of the suspended load during handling.

Table 3-1 HLW Drum Grapple Positions

Specification	Drawing
Unloaded Grapple, ready for operation (normally open)	POSITION 3: RED - LIFTED AFTER SECOND SETDOWN, GRAPPLE DISENGAGED
Grapple lowered onto load (open condition)	POSITION 3.5: RED/GREEN - THIRD SETDOWN, GRAPPLE DISENGAGED
Grapple lift (operates closing condition)	POSITION 1: GREEN - LIFTING, GRAPPLE ENGAGED
Grapple first set-down (closed condition)	POSITION 1.5: GREEN/YELLOW - FIRST SETDOWN, GRAPPLE ENGAGED
Grapple raised (closed condition)	POSITION 2: YELLOW -LIFTING AFTER FIRST SETDOWN, GRAPPLE ENGAGED
Grapple second set-down (operates opening condition)	POSITION 2.5: YELLOW/RED - SECOND SETDOWN, GRAPPLE DISENGAGED

3.1.5 The Grapple designs provides clear visible indicators for the operator to confirm Grapple status.

3.1.6 The Grapple is designed such that it is not possible to lift the load unless it is fully engaged.

3.1.7 Each Grapple is equipped with manual release pins to disengage the Grapple from the load if the normal disengagement mechanism fails. The manual release pins are suitable for actuation by a telemanipulator (TLM); the maximum pulling force required to actuate the emergency

release shall not exceed 50 lbf. The manual release pins are **NOT** operated inside casks, baskets, drum or housings..

3.1.8 After the Grapple is positively engaged with the load, the Grapple shall fail safe (fingers in closed position).

3.1.9 Drum Grapple is designed with a rated capacity of 1200 lbs and Filter Grapple is designed with a rated capacity of 300 lbs. Note that the Drum weight is limited to 1000 lbs.

3.2 Functional & Mechanical Requirements Drum Grapples (BUYER Use)

3.2.1 For specific Drum Grapple interface requirements, refer to **Table 3-2** of this Specification.

3.3 Functional & Mechanical Requirements Filter Grapple (BUYER Use)

3.3.1 For specific Filter Grapple interface requirements, refer to **Table 3-3** of this Specification.

3.4 Modular Construction (BUYER Use)

3.4.1 Detailed Design provided considered Modular Construction.

3.5 Performance (BUYER Use)

3.5.1 Design Life

3.5.1.1 Grapples are designed to operate for a period of 40 years. It is recognized that some components may not have a design life of 40 years. These components shall be designed to facilitate remote maintenance and be designed for at least a 5-year operating life.

3.5.1.2 Detailed Design provided considers maintenance.

3.6 Environmental Conditions (BUYER Use, Rooms H-0126B & H-0104)

3.6.1.1 Grapples are designed to operate under the following normal environmental conditions[1]:

Table 3-2 Environmental Conditions

Room	Max Temp (F)	Min Temp	Max Humidity (% RH)	Min Humidity (% RH)	Radiation (mRad/hr)
H-0126B	95	59	73	6	176,000
H-0104	113	59	73	6	14,700
Limiting Value	113	59	73	6	176,000

3.7 Waste Acceptance Impacting (WAI) Requirements (BUYER Use)

There are no WAI Requirements for the Drum and Filter Grapples.

3.8 Interfacing Equipment (BUYER Use)

3.8.1 All interfaces have been addressed by BUYER. **Table 3-2** and **Table 3-3** lists interfacing equipment and the associated drum and filter grapples respectively.

Table 3-3 Interfacing Equipment (Drum Grapple)

Interface Description	CTN / Tag	Drawing
Drum grapple resting on drum grapple stands	RWH-MHAN-00013 RWH-MHAN-00014	24590-QL-POA-FH00-00001-03-00003
Drum grapple bail to Swabbing and Monitoring 3 Ton Overhead Bridge Crane hook	RWH-CRN-00001	24590-QL-POA-MJKG-00002-08-00333 24590-QL-POA-MJKG-00002-08-00334
Drum grapple to lidded 55 gallon drum	N/A	24590-QL-POA-HCYT-00001-03-00026 24590-HLW-MX-RWH-00001 Sht 3 of 4, Detail C
Drum grapple to un-lidded 55 gallon drum	N/A	24590-HLW-MX-RWH-00001 Sht 3 of 4, Detail F
Drum grapple and 55 gallon drum being engaged and released inside cask	N/A	24590-QL-POA-HCYT-00001-03-00015
Telemanipulator[i]	Multiple	24590-QL-POA-MJW0-00003-01-00004 24590-QL-POA-MJW0-00003-03-00036 24590-QL-POA-MJW0-00003-03-00862
i. See appendix B for information		

Table 3-4 Filter Grapple Interface Drawings

Interface Description	CTN / Tag	Drawing
Filter grapple on Filter Cave Tool Rack	HFH-MHAN-00006	24590-HLW-M0-HFH-00016001
Filter grapple bail to Filter Cave Crane/ Power Manipulator Hook	HFH-CRN-00002	24590-QL-POA-MJW0-00005-07-00430
Filter grapple to Filter basket lid (Waste Basket For 55 gallon Drum Filters)	30-MHAN-00019	24590-QL-POA-HDYR-00001-05-00178
Filter grapple to Filter bank door	MULTIPLE C5V-HEPA-XXXXX	24590-QL-POA-MKH0-00002-07-00079

Interface Description	CTN / Tag	Drawing
Filter grapple to new filter / spent filter	N/A	24590-CM-HC1-MKH0-00001-02-00105 24590-CM-HC1-MKH0-00001-02-00113 24590-CM-HC1-MKH0-00001-02-00114
Filter grapple + Filter being installed or removed from inside filter basket	N/A	24590-QL-POA-HDYR-00001-05-00086
Filter grapple + Filter being installed or removed from inside filter bank	MULTIPLE C5V-HEPA-XXXXX	24590-QL-POA-MKH0-00002-07-00079
55 gallon drum	RWH-MHAN-00006 RWH-MHAN-00011	24590-QL-POA-HCYT-00001-03-00026
Telemanipulator to remove manual pin	Multiple	24590-QL-POA-MJW0-00003-01-00004 24590-QL-POA-MJW0-00003-03-00036 24590-QL-POA-MJW0-00003-03-00862

3.8.1.1 See **Table 2-3** and **Table 2-4** for drawings, datasheets, and other relevant documents for interfacing equipment.

3.9 Interface Requirements (BUYER Use)

Interface requirements are depicted above and have been considered in the HLW Drum and Filter Grapple designs. Interface requirements are validated in testing.

3.9.1 Lifting Bails (BUYER Use)

3.9.1.1 Lifting Bail requirements are incorporated into the detailed design documents.

3.9.2 Drum and Filter Configurations (BUYER Use)

3.9.2.1 The HLW Drum Grapple has been designed for the following configurations:

Table 3-5 HLW Drum Grapple Configurations

Configuration	Details
Empty Lidded and no Lid	~60 lbs
Partially Filled	60 lbs < Partially Filled < 1000 lbs
Filled	Max Weight 1060 lbs
Rated Capacity	Conservatively set at 1,200 lbs

3.9.2.2 The HLW Filter Grappler has been designed for the following configurations:

Table 3-6 HLW Filter Grapple Configurations

Configuration	Details
Filter, Clean Filter, Dirty / wet	~86 lbs ~102 / 112 lbs
Filter basket lid Filter basket + Lid Filter basket + lid, Filled	TBD lbs < 188 lbs TBD lbs
Filter bank door	~105 lbs
Rated Capacity	300 lbs

3.9.3 TLM Interface (BUYER Use)

3.9.3.1 TLMs are used for manual pin release. This has been incorporated into the design. Manual pin release is not required while grapple and load is inside of Drum Cask, Filter Basket, Filter Housing or Drum.

3.10 Operational Requirements (BUYER Use)

3.10.1 Grapples are remotely operated and controlled by the respective crane control system located out-cave, that is, outside the radiation area.[2]

3.10.2 The layout of the equipment affords easy access for remote operational and maintenance requirements using TLMs and takes into consideration proposed viewing angles.[2]

3.11 Loadings

Not required for Built to Print Specification

3.12 Electrical Requirements

Not Required for HLW Drum and Filter Grapples

3.13 Instrumentation and Control Requirements

Not Required for HLW Drum and Filter Grapples

3.13.1 Software

Not Required for HLW Drum and Filter Grapples

3.14 Equipment Tagging

3.14.1 Each piece of equipment shall be tagged or labeled with its CTN in a visible location after final assembly in accordance with detailed equipment drawing(s).

3.15 Accessibility and Maintenance

3.15.1 Any Accessibility and/or Maintenance requirements identified during testing shall be submitted to the BUYER.

4 Materials

4.1 Fabrication / Construction (BUYER Use)

4.1.1 Materials are provided on the DED.

4.2 Prohibited Materials

4.2.1 Certain chemicals and materials are restricted from use at WTP. Restricted chemicals and materials are listed in 24590-WTP-LIST-ESH-16-0001, *Restricted Materials List Hanford Tank Waste Treatment and Immobilization Plant (WTP Project).* Inclusion of these chemicals/materials requires specific authorization from the BUYER.

4.2.2 Seller shall not use fasteners and material that are counterfeit or are of suspect origin. See procurement document(s) for further definition.

4.3 Stainless Steel Requirements

4.3.1 Materials and chemicals that contact stainless steel shall be in conformance with 24590-WTP-3PS-NW00-T0003, *Engineering Specification for Chemical Requirements for Materials Used in Contact with Austenitic Stainless Steel and Nickel Based Alloys – For HLW and DFHLW*. Austenitic stainless steel and nickel-base alloy materials shall not come in contact with the following:

- Materials with a leachable halogen content exceeding 200 ppm.
- Materials with a leachable sulfur content exceeding 400 ppm.
- Materials with a leachable chloride content exceeding 200 ppm.
- Materials with a total of low point metals (such as lead, zinc, copper, tin, antimony, or mercury) exceeding 1 weight percent.

4.3.2 Plate and Sheet: Stainless steel sheet shall be type 304, 304L, 316, or 316L conforming to ASTM A240/A240M, *Standard Specification for Chromium and Chromium Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications*.

4.3.3 High tensile stainless-steel bars shall be in accordance with ASTM A564/564M, *Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes.*

4.4 Fasteners

4.4.1 Fasteners including torque values are provided in the DED. If thread sealant is required, it is depicted on the DED.

4.5 General

4.5.1 All materials shall be in conformance with the BUYER-approved specifications. The SELLER shall obtain written approval for substitution from the BUYER prior to use of material.

4.5.2 Material Test Report (MTR)s for CM materials shall be available for review by BUYER upon request. The MTRs shall be legible and be traceable to the material furnished by heat or lot number. All MTRs shall be report forms containing the manufacturer's name.

4.5.3 Materials purchased in accordance with this specification shall be accompanied with a certificate of compliance (CoC, CM material) supplied by the manufacturer of these items and shall be available to the BUYER for inspection upon request.

5 Fabrication

5.1 General Fabrication Requirements

5.1.1 Controls are to be exercised during all stages of fabrication to minimize exposure of stainless steel to contaminants, and particularly any chloride, which might cause stress corrosion cracking. Chloride bearing compounds shall be avoided, however, if used, they shall be completely removed by thorough cleaning.

5.1.2 SELLER shall implement controls to ensure that there are no cross-contamination effects from other metals to stainless steel, by ensuring separate storage areas and separating fabrication equipment.

5.1.3 Controls shall be in place to ensure tools that could leave residual carbon steel deposits on the stainless steel are not used. Wire brushes shall be constructed with wire of the same material as the base metal being brushed.

5.1.4 Carbon arc or iron powder cutting shall not be used during fabrication of stainless-steel components.

5.1.5 Workmanship and neat appearance shall be an important aspect of the equipment. Defective or damaged materials shall be replaced or repaired prior to final acceptance. The repair or replacement method shall be approved by the BUYER.

5.2 Radiation Area Fabrication Requirements (BUYER Use)

5.2.1 Equipment is free from pockets or traps where radioactive contamination or water may lodge, or if required, any traps shall have drain holes. The area behind CTN tag is acceptable.

5.2.2 Grapples are designed so that they can be easily cleaned.

5.2.3 All external exposed surfaces are smooth and free from pockets and porosity, which are likely to hold contamination.

5.3 Finishing Aspects and Coating

5.3.1 All sharp edges of components shall be removed unless they are functionally sharp to serve a specific purpose of equipment.

5.3.2 Equipment shall have a surface finish of 125 microinches (or less), unless otherwise stated in the detailed design documents, in accordance with ASME B46.1, *Surface Texture (Surface Roughness, Waviness & Lay)*, as depicted on DED.

5.3.3 Coatings depicted in DED shall be coated in accordance with 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment.*

5.4 Welding

5.4.1 All stainless-steel welding and submittal of associated welding procedure specification (WPS) and procedure qualification record (PQR) shall be in accordance with 24590-WTP-3PS-SS00-T0002, *Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel.* The WPS/PQR shall be submitted for BUYER review and acceptance as detailed in MR.

5.4.2 Welding shall be in accordance with American Welding Society (AWS) standard AWS D14.0, *Machinery and Equipment Welding Specification*, as applicable.

5.4.3 All filler materials and base metals shall be traceable to MTRs. The MTRs shall have actual test report values. All CM MTRs shall be available for inspection and SELLER shall document them via a CoC. All MTRs associated with code requirements shall be provided as directed on the MR.

5.4.4 SELLER shall inform BUYER of the first operation of each WPS at least 2 weeks prior so that the BUYER may witness. This is a witness point.

5.4.5 SELLER shall provide a weld map drawing that identifies location, weld identification, and nondestructive examination (NDE) requirement as a minimum; and complete relevant information in an Initial Weld Map/Traveler Table or equivalent (see **Appendix A**). Both documents shall be submitted per the MR. In addition, a Completed Weld Map/Traveler Table shall be submitted per the MR.

6 Tests and Inspections

6.1 Personnel Qualifications

6.1.1 All welders, welding operators, and tackers shall be qualified in accordance with AWS D1.6, *Structural Welding Code – Stainless Steel*, AWS D9.1/D9.1M, *Sheet Metal Welding Code*, or AWS D1.1/D1.1M, *Structural Welding Code – Steel*, as applicable to work being performed. SELLER shall make current personnel qualifications available for BUYER review, including in the shop, upon request.

6.1.2 Alternatively, welders, welding operators, and tackers qualified in accordance with ASME BPVC IX are qualified to perform the work as allowed by 24590-WTP-3PS-SS00-T0002, *Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel.*

6.1.3 SELLER shall submit procedure for qualification of welding personnel for BUYER review and acceptance in accordance with the MR.

6.2 Non-Destructive Examinations

6.2.1 All NDE procedures and NDE of stainless-steel welds and carbon steel to stainless steel welds shall be in accordance with 24590-WTP-3PS-SS00-T0002, *Engineering Specification for*

Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel.

6.2.2 NDE personnel performing liquid penetrant testing, visual examination operations, and shop tests shall be qualified and certified in accordance with ASNT SNT-TC-1A, *Recommended Practice, Personnel Qualification and Certification in Nondestructive Testing*. All test reports shall be signed by personnel holding either Level II or Level III certifications and who either performed or witnessed the test. A copy of the individual's current certification(s) shall be provided at the SELLER's shop for BUYER review upon request.

6.2.3 NDE reports shall be traceable to the item examined. Include essential examination parameters, signed and dated by the NDE examiner. NDE reports shall be provided in accordance with the MR.

6.2.4 Certified Weld Inspector (CWI) Certificates and Inspector Eye Exams

The following documents shall be made available for review upon request:

- Current AWS CWI certificates
- Current and valid visual acuity examination. The examination must be performed annually

6.2.5 SELLER shall inform BUYER of the first operation of each NDE procedure at least 2 weeks prior so that the BUYER may witness. This is a witness point.

6.2.6 NDE Load test reports shall be provided to BUYER in accordance with the MR

6.3 Testing

6.3.1 General Testing Requirements

6.3.1.1 SELLER shall submit an inspection and test plan, as per the MR, for BUYER review which summarizes the manufacturing sequences, including SELLER and BUYER hold and witness points for inspection as indicated in the MR and the material acceptance plan, for each test to be performed. Procedure shall include pass/fail criteria for each test.

6.3.1.2 SELLER shall submit testing results for each test described below. Documentation shall include results of each test performed.

6.3.1.3 SELLER shall source all materials and equipment required for performing all testing.

6.3.2 Design Validation Testing Performed on one (1) HLW Drum and (1) Filter Grapple

6.3.2.1 This is recommended after first HLW Drum and Filter Grapple is fabricated.

6.3.2.2 The SELLER shall submit a separate (drum and filter) design validation test procedure including pass/fail criteria to the BUYER for approval 8 weeks prior to acceptance testing.

6.3.2.3 The SELLER shall notify the BUYER at least three weeks prior to the tests so that the BUYER may witness.

6.3.2.4 The SELLER shall perform code required static load test in accordance with ASME B30.20, Section 1.3.9.2, 125% of rated capacity + 5% -0% held above floor for 15 minutes.

6.3.2.5 The SELLER for one HLW drum and one filter grapple shall demonstrate the ability of the HLW drum and filter Grapple to withstand one impact of a transported rated capacity at a travel speed of 60 ft/min (simulating hitting a wall or an object), without releasing test load. The impact object shall remain stationary and intact throughout the test. The Grapple shall be capable of release with the double set down feature after the impact test is complete.

6.3.2.6 The SELLER for one HLW Drum Grapple shall demonstrate that the HLW Drum Grapple can remotely engage and release a drum inside a drum cask. Operation of drum grapple manual release pins inside of drum cask is not required.

6.3.2.7 The SELLER for one HLW Filter Grapple shall demonstrate that the HLW Filter Grapple can be remotely engaged and released inside a filter bank and inside filter basket. Operation of filter grapple manual release pins inside of drum is not required

6.3.2.8 The SELLER for one HLW Drum and Filter Grapple shall demonstrate that the Grapple can be remotely engaged and disengaged for all configurations.

6.3.2.9 The SELLER for one HLW Drum & Filter grapple shall demonstrate the absolute reliability of the design by performing 500 cycles times under rated capacity. One cycle shall consist of:

a) Engaging the HLW Drum and Filter Grapple on test load.
b) Lifting the test load
c) Lowering the test load
d) Raising the test load
e) Lowering the test load
f) Releasing the test load raising HLW Drum and Filter Grapple from test load

6.3.2.10 The SELLER for one HLW Drum Grapple and Filter Grapple shall demonstrate the functionality by simulating each configuration / interface. See Table 3-5 and 3-6.

6.3.2.11 After the Design Validation Test above:

a) HLW Grapple operability of all motions of mechanisms, including emergency release, shall be verified.
b) Equipment interfacing with Filter and Drum Grapple shall be visually inspected for deformation, cracks and other defects or damage.
c) Filter and Drum Grapple shall be visually inspected for deformation, cracks, or other defects.
d) Welds in load bearing members shall be dye-penetrant inspected.
e) No cracks, deformation, wear or other damage to load bearing or moving parts is allowed, and no stiffness or binding in any mechanism is allowed.
f) Any damage or degradation of function of the HLW Filter and Drum Grapple shall be documented and will be reviewed by the BUYER.

6.3.3 Factory Acceptance Testing (FAT) - (For each Grapple)

6.3.3.1 The SELLER shall submit a factory acceptance test procedure including pass/fail criteria to the BUYER for approval eight (8) weeks prior to factory acceptance testing.

6.3.3.2 The SELLER shall notify the BUYER at least three (3) weeks prior to the factory acceptance tests so that the BUYER may witness.

6.3.3.3 Each HLW Filter Grapple and Drum Grapple shall be tested at the rated capacity. Test shall include 20 complete cycles simulating actual operating conditions and consisting of:

a) Lowering the Grapple onto the designated load. Each Drum grapple will split between lidded and unlidded drum.
b) Engaging the load.
c) Lifting the load.
d) Moving the load to new location (total travel distance = 150 feet, achievable by an accrual of smaller consecutive runs)
e) Setting down the load twice to disengage the Grapple from the load.
f) Lifting the Grapple and moving it to its starting position

6.3.3.4 Each Grapple shall perform Code Required static load test in accordance with ASME B30.20 Section 1.3.9.2 125% of rated capacity + 5% -0% held above floor for 15 minutes.

6.3.3.5 After completion of FAT above:

a) HLW Drum and Filter Grapple operability of all motions of mechanisms, including emergency release, shall be verified.
b) Test loads shall be visually inspected for deformation, cracks and other defects or damage.
c) HLW Drum and Filter Grapple shall be visually inspected for deformation, cracks, or other defects.
d) Welds in load bearing members shall be dye-penetrant inspected.
e) No cracks, deformation, wear or other damage to load bearing or moving parts is allowed, and no stiffness or binding in any mechanism is allowed.
f) Any damage or degradation of function of the Grapple document shall be documented and will be reviewed by the BUYER.

6.3.3.6 Dimensional and surface finish inspection.

6.3.3.7 Documentation of all post FAT NDE shall be submitted to the BUYER per MR.

6.3.4 Final Inspection prior to Shipment

6.3.5 The SELLER shall submit final inspection procedure for BUYER review and permission to proceed. The inspection shall be performed after completion of all fabrication, cleaning and testing, and just prior to final packaging, and include, at a minimum, the following inspections: dimensional, surface, and cleaning.

6.3.6 The SELLER shall inspect all surfaces for contamination. Visible evidence of contamination is not acceptable.

6.3.7 The SELLER shall prepare a final inspection report for each item, which documents the results of the final inspection. The SELLER shall include the final inspection report in the documentation package for each piece per the MR.

7 Preparation for Shipment

7.1 Packaging / Shipping & Storage Instructions

7.1.1 Packaging, shipping, handling, and storage of equipment, including shipment tagging, shall be in accordance with the PO and 24590-WTP-3PS-G000-T0056, *Engineering Specification for Packaging, Handling and Storage Requirements for HLW Equipment.*

8 Quality Assurance

8.1 QA Requirements Specific to Item(s) or Service

8.1.1 QA requirements for the drum and filter grapples the SELLER shall have and maintain a BUYER approved Quality Assurance Program meeting the applicable elements of DOE Order 414.1D (CRD), as shown in the attachment to the PO titled CM Datasheet of Quality Assurance Program Requirements. SELLER shall submit their Quality Assurance Manual (QAM) for review.

8.2 Program QA Elements

8.2.1 SELLER's Quality Assurance Program (QAP), as a minimum, shall contain the requirements detailed in the Supplier QAP Requirements Data Sheet listed in the MR.

9 Configuration Management

9.1 Configuration management shall be in accordance with 24590-WTP-3PS-G000-T0050, *Engineering Specification for Supplier Documentation.*

10 Documentation and Submittals

10.1 General

10.1.1 Documentation and submittal requirements shall be in accordance with the requirements of the MR, PO, and 24590-WTP-3PS-G000-T0050, *Engineering Specification for Supplier Documentation*.

10.1.2 The MR, drawings, and data requirements lists all documentation and submittals required by this specification.

10.1.3 Each submittal and document shall be legible and reproducible. Documents with substandard legibility or documents that can no longer be reproduced without substantial degradation to legibility are not acceptable when the legibility issue/concern applies to required technical data or information. All documents shall have a light, clear backgrounds with sharp, opaque object, definition lines, and noncrowded dimensioning and lettering. Reproducible submittals shall be black-on-white. (Electronic native files may include color).

10.1.4 Any changes or revisions to BUYER prepared documentation shall be submitted as per the original, unless specifically noted otherwise in the PO.

10.2 Submittals

10.2.1 General

10.2.2 All submittals shall be in accordance with the MR and in accordance with 24590-WTP-3PS-G000-T0050, *Engineering Specification for Supplier Documentation.*

10.2.3 Drawings

10.2.3.1 All drawings shall be in accordance with the MR.

10.2.3.2 SELLER shall prepare weld-map drawings identifying all welds and the type of NDE inspection applied to each.

10.2.3.3 SELLER shall submit a CoC stating all requirements of this specification are met.

10.2.4 Calculations

Not Required for Build to Print.

10.2.5 Manuals and Training Material(s)

10.2.5.1 SELLER shall submit the following manual(s) as per the MR:

- Erection/installation manuals/instructions
- Operating manuals/instructions
- Maintenance manuals/instructions

- Site storage and handling manuals/instructions
- Emergency manuals/instructions

10.2.5.2 SELLER shall submit training material supplementing the operating and maintenance manual(s) discussed above.

10.2.6 Procedures

10.2.6.1 WPSs/PQRs, welding personnel qualification procedure, NDE personnel qualification procedure, NDE (including visual testing (VT)) procedures, coating and cleaning procedures (if applicable), dimensional inspection, Testing (Verification and FAT) procedures, and final inspection procedures discussed in this specification shall be submitted to BUYER as per the MR. Procedures for the manufacture of commercial off-the-shelf items (unmodified catalog items) do not need to be submitted.

10.2.7 Inspection and Test Reports

10.2.7.1 Dimensional, cleaning and coating (if applicable), surface finish, final inspection, MTRs and all NDE inspection and test reports shall be submitted to BUYER per this specification and if included in the MR.

10.2.8 Schedules

10.2.8.1 The SELLER shall submit for review, a schedule identifying all milestones necessary to demonstrate that the equipment will be delivered in accordance with the designation project schedule.

10.2.9 Spare Parts List

10.2.9.1 If identified during Design Validation Testing, a spare parts list shall be compiled. The spare parts list shall include names of manufacturers with appropriate model numbers and special ordering instructions for replaceable parts, if required.

10.3 Design Review Meetings

10.3.1 Engineering Design Kick-off Meeting

10.3.1.1 The contract award kick-off meeting will be conducted at the BUYER's facility or virtually at the control/request of the BUYER to ensure the newly awarded contract is clear and concise and that the SELLER has a clear understanding of the scope of the contract.

10.3.1.2 Interim Design Reviews not required for Build to Print Specification.

Appendix A Example Weld Map/Traveler (SELLER Use)

Page: _____of _____

WELD MAP (WM) / TRAVELER (T)

This document or a similar document is for use by the vendor in fulfillment of MR submittal requirements.
This document or a similar document is to be submitted as a Weld Map after the WPSs/PQRs as part of the MR submittal requirement. This document or a similar document is to be submitted as a Traveler (completed weld map) as part of the MR submittal requirement.

Job Number: _____ Vessel Number: _____ PO Number: _____

Bechtel Drawing Number (1)	Joint #	Joint Type and Extent (2)	Joint ID (3)	Nozzle # (if applicable)	Base Metal		Weld Filler		Material Thickness	Postweld Heat Treatment (5)	Welder ID	NDE		PMI Report #	Weld Repairs (6)	Other Activities (7)	WPS & Rev No.	Welding Inspector
					Spec/Type/ P-No. (4)	Heat/Lot #	Spec/Type (4)	Heat/Lot #				Method / Extent	Report #					Date/Initials
WM	WM	WM	WM	WM	WM		WM		WM	WM		WM					WM	
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T

WM - This information is required to be provided on this Weld Map document (or a similar document) and submitted after the WPSs/PQRs in fulfilment of the MR requirement before fabrication commences.
T - This information is required to be provided on the Traveler Document as material receiving, fabrication, inspection, testing, and NDE records are completed. This document (or a similar document) is to be submitted in fulfillment of the MR requirement.

(1) List only the digits of the Bechtel drawing number following the PO number (e.g. The x's in 24590-QL-POA-MKAS-00001-xx-xxxxx)
(2) e.g. Butt, T-Joint, Corner, Lap all around, intermittent weld length and pitch
(3) e.g. Head to Shell
(4) e.g. SA240-304 (base metal); SFA-5.22 E309LTX-X (Weld Filler)
(5) For (WM): List PWHT procedure #. For (T) List PWHT report #.
(6) e.g. R1 for the first repair, R2 for the second repair
(7) Other Activities: any base metal repairs exceeding 3/8" or 10% of the section thickness (whichever is smaller).

Appendix B Telemanipulator Information (BUYER Use)

When designing equipment that will interface with a telemanipulator (TLM) designs shall be made to account for the following attributes:

A TLM is a device which, through electronic, hydraulic, or mechanical linkages, allows a hand-like mechanism to be controlled by a human operator and is used for remote-handling of equipment in radiation areas too hot for human entry. Operation of an arm is manipulated by an individual standing in a low or non-radiation environment and viewing operations through a lead glass. Operations are typically done with pairs of TLMs. The TLMs have a 50 lb. load rating and are equipped with two fingers that have a gripping area of 0.5 inches wide by 1.75 inches long with the exception of system HSH that has a finger area of 0.5 inches wide by 2.50 inches long. To assist in TLM longevity, the weight of interfacing Equipment/hardware, and push/pull forces interfacing with the TLM should be rated at or less than 40 lbs. so there is a safety factor integrated for the TLM.

TLM operability and feasibility is proportional to the reach, i.e. the farther the reach, the harder the operation for the TLM and the simpler the movement should be considered. Typically, TLMs are close range remote handling equipment. TLMs are operationally limited at extended reaches and have limited basic motions, e.g. push/pull (side to side, and forward and back), and lifting and transporting items. It is not advisable to design equipment/hardware that will require complex movements at these extended reaches. In addition, consideration should be given to what is expected at the finger interface; gripping and non-gripping tasks, e.g. actually gripping an item or using closed fingers to slide an item from a position. If gripping, a milled slot or equivalent feature should be incorporated for the finger to fit into, thereby, preventing the equipment/hardware from being twisted within the grip of the TLM fingers and preventing accidental drops.

Due to the pivot design of the arm, height and location of remote equipment and operations should be considered. The operating envelope of the TLM resembles a cone shape. For instance, when the arm is positioned concentric with the encast liner in the wall, the arm does not have any side to side movements but is purely rotational. As the arm is lowered, side to side movement increases until the full operating envelope of the TLM is recognized when it is positioned vertically. See 24590-WTP-M0-10-00014, *WTP Vitrification System Design Proposal Drawing MSM Manipulator Dimensions*, for TLM envelope and dimensions.

HLW has renamed master-slave manipulator (MSM) to telemanipulator (TLM). Reference documents may not reflect this update. MSM(s) shall be referred to as TLM(s).

System	Model CRL*	Power Manipulator Model PAR**	TLM Adapter Drawing	Power Manipulator Adapter Drawing ***	TLM Lifting/Power Manipulator Lifting Capacity
HFH	RE-T	N/A	24590-HLW-M0-HSH-00083	N/A	50 lbs./NA
RWH	RE-T	N/A	24590-HLW-M0-HSH-00083	N/A	50 lbs./NA

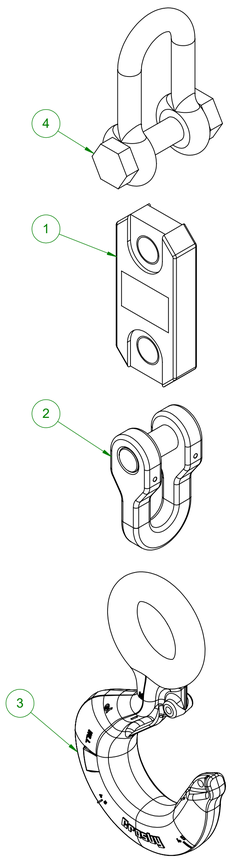
* Seller Central Research Laboratories (CRL) with 360° wrist rotation
** Seller PAR Systems with 360° wrist rotation
*** MSM Adapter Drawing and Power Manipulator Adapter Drawing

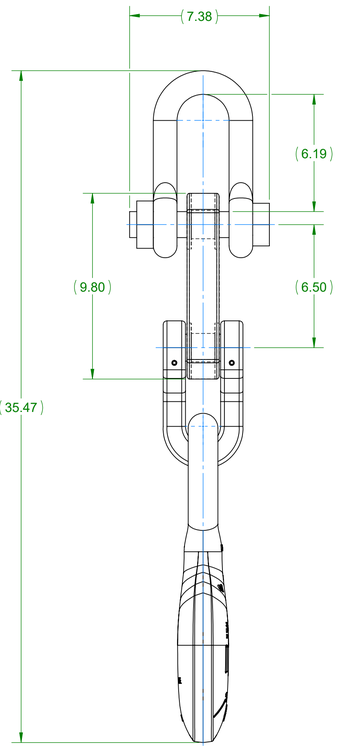
Appendix C (BUYER Use) Requirement Source References

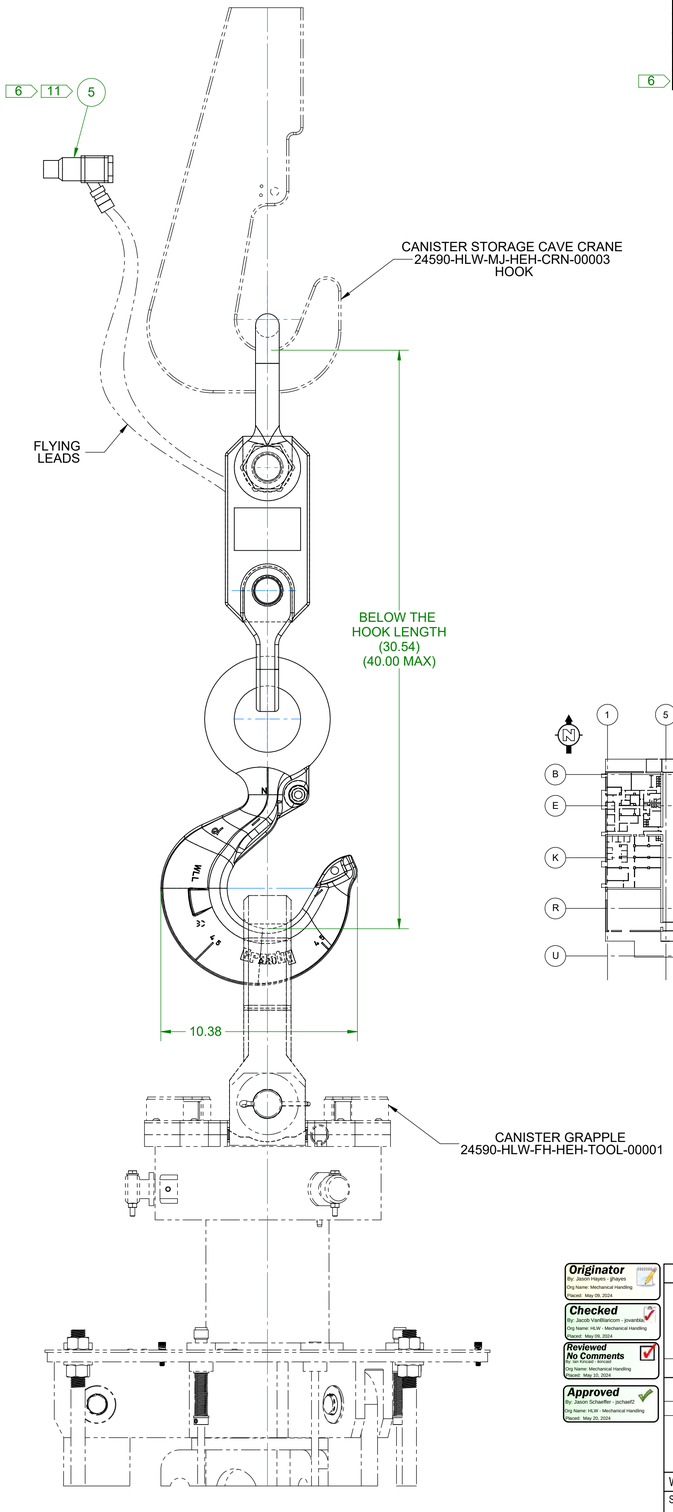
[1]24590-HLW-M6C-30-00033, Rev 0, ROOM AMBIENT DOSE RATES FOR THE HLW FACILITY, Section 2.6 Unshielded Dose Rates, High values for rooms H-0132 & H-0136

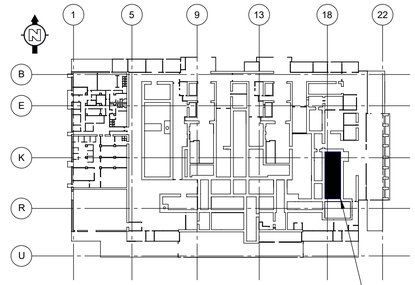
BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	CROSBY|STRAIGHTPOINT LLP6T5 LOADLINK PLUS	-	-	5.3
2	1	MCMASTER CARR 3812T32 FLUSH PIN SHACKLE	-	-	10.00
3	1	CROSBY ALLOY EYE HOOK 22 TON			39.5
4	1	COLUMBUS MCKINNON M9156P LONG REACH SHACKLE	-	-	12.9
6 5	1	LEMO R/H CONNECTOR FMG.4N.312.TLCY12	-	-	1.1









NOTES:

1. THIS DRAWING PROVIDES BASIC OUTLINES, DESIGN OBJECTIVES AND BOUNDING DIMENSIONS TO CONTRACTED DESIGN OR FABRICATION SUPPLIER(S) AND SHALL NOT BE USED TO CONFIRM THE AS BUILT WTP STRUCTURE, SYSTEM OR COMPONENT IDENTIFIED HEREIN. SEE SELLER INFORMATION FOR FINAL CONFIGURATION PROVIDED IN CONFORMANCE TO PURCHASE ORDER.
2. SELECTION OF COMPONENTS ON THIS DRAWING IS A PROPOSAL ONLY. THE SELLER SHALL BE RESPONSIBLE FOR FULL VALIDATION OF THE COMPONENTS SELECTED FOR THE CONTRACTED APPLICATION, WHETHER IDENTICAL TO THE BUYER PROPOSAL OR OTHERWISE.
3. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018.
4. THIS DRAWING IS TO BE READ IN CONJUCTION WITH ENGINEERING SPECIFICATION TBD.
5. THE LOAD CELL ASSEMBLY SHALL INCLUDE THE MINIMUM POSSIBLE NUMBER OF OPERATIONAL BEARING SURFACES.

6 CRITICAL ITEM. VENDOR SHALL MAINTAIN AS REQUIREMENT.

7. LOAD CELL SHALL INTERFACE WITH 24590-HLW-MJ-HEH-CRN-00003 CRANE HOOK 24590-QL-POA-MJKG-00002-08-01003.
8. LOAD CELL SHALL BE DESIGNED IN ACCORDANCE WITH ASME B30.26.
9. THE LOAD CELL READOUT SHALL BE DISPLAYED ON A BACKLIT DIGITAL DISPLAY WITH A 1 INCH MINIMUM CHARACTER HEIGHT AND READABLE VIA THE PTZ-XT-3018 AND/OR PTZ-XT-3020 CRANE MOUNTED CAMERA. THE DISPLAY SHALL BE FIVE DIGITS.
10. THE SELLER SHALL SUPPLY A CALIBRATION CERTIFICATE AND DOCUMENTATION ESTABLISHING TRACEABILITY OF THE LOAD CELL CALIBRATION TO NIST (NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.

11 ITEM 5 CONNECTS ABOVE TO THE CRANE HOIST BLOCK POWER CONNECTOR VIA TLM TO SUPPLY POWER TO THE LOAD CELL.

COMPONENT TAG NUMBER: 24590-HLW-MH-HEH-MHAN-00013
COMPONENT TAG NUMBER: 24590-HLW-MH-HEH-MHAN-00014

DRAWING INDEX	
DWG NO.	TITLE
24590-HLW-M0-HEH-00031001	HLW VIT SYS HEH DPD CANISTER GRAPPLE LOAD CELL ASSEMBLY
REFERENCE DRAWINGS	
DWG NO.	TITLE
24590-QL-POA-MJKG-00002-08-01003	DRAWING - 6 TON T/R CRANE NUMBER 2799 HOOK AND NUT DETAILS
24590-QL-POA-FH00-00001-03-00007	HLW VITRIFICATION DESIGN PROPOSAL DRAWING MECHANICAL SEQUENCE CANISTER GRAPPLE
24590-QL-POA-MJKG-00002-08-01026	DRAWING - 6 TON T/R CRANE NUMBER 2799 - LOWER BLOCK ASSEMBLY

CM
QUALITY DESIGNATOR

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	JJH	JOV	IMK	JES	5/13/2024

REVISION HISTORY

Originator
By: Jacob Hayes - jjhayes
Org Name: Mechanical Handling
Dated: May 09, 2024

Checked
By: Jacob VanBlaricom - jvanbla
Org Name: HLW - Mechanical Handling
Dated: May 09, 2024

Reviewed
No Comments
By: Ian Kincaid - ikincaid
Org Name: Mechanical Handling
Dated: May 10, 2024

Approved
By: Jason Schaeffer - jschaeff2
Org Name: HLW - Mechanical Handling
Dated: May 20, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

NO TOLERANCES ARE APPLIED TO DIMENSIONS UNLESS NOTED

WEIGHT 64.4 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

		BY	DATE
PROJECT No.	24590		
SITE	HANFORD		
AREA	200E		
BUILDING No.	30 (HLW)		
ORIGINATOR		J. HAYES	5/9/2024
CHECKER		J. VANBLARICOM	5/9/2024
REVIEWER		I. KINCAID	5/10/2024
APPROVER		J. SCHAEFFER	5/13/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. N/A REV:

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM HEH DESIGN PROPOSAL DRAWING CANISTER GRAPPLE LOAD CELL ASSEMBLY

SCALE: 1:4

24590-HLW-M0-HEH-00031001

REV 0

LAST SAVED BY: jjhayes
FILE NAME: 24590-HLW-M0-HEH-00031001
DATE: 5/9/2024 2:34:06 PM

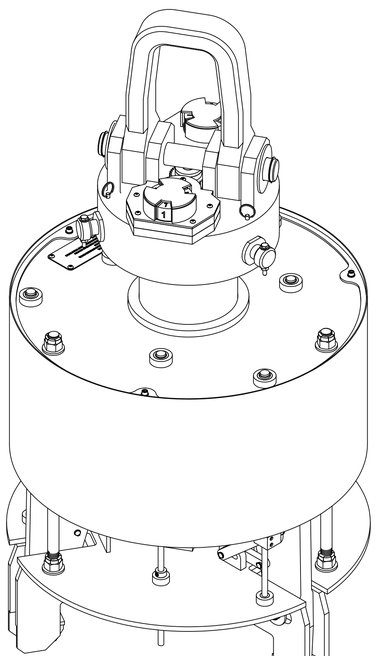
FORMAT WTP ANSI INCH SIZE D (22x34)

"D" SIZE - 22in*34in

NOTES:

1. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
2. THE GRAPPLE SHALL OPERATE BY MECHANICAL MEANS ONLY. DESIGN SHALL REQUIRE (2) SETDOWNS TO ALLOW COMPLETE RELEASE OF THE LOAD.
3. THE GRAPPLE SHALL HAVE A CLEARLY VISIBLE SEQUENCE INDICATOR. THE INDICATOR WILL SHOW THE FOLLOWING STATUS:
   A. GRAPPLE ENGAGED
   B. GRAPPLE FIRST SET DOWN
   C. GRAPPLE SECOND SET DOWN
4. MARKINGS PER DOE/RL-92-36 HOISTING AND RIGGING MANUAL.
5. DESIGN AND TESTING SHALL BE IN ACCORDANCE WITH ASME NQA-1.
6. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
7. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.
8. WELD IN ACCORDANCE WITH AWS D1.6.
9. DESIGN AS A BELOW THE HOOK LIFTING DEVICE PER ASME B30.20 AND BTH-1 WITH A DESIGN CATEGORY OF "B" AND SERVICE CLASS 0
10. THIS DRAWING IS TO BE READ IN CONJUCTION WITH ENGINEERING SPECIFICATION PROVIDED IN PURCHASE ORDER.
11. TORQUE ALL FASTENERS ACCORDING TO THE SUPPLIED TORQUE TABLE. IF A SIZE USED IS NOT AVAILABLE IN THE TABLE, USE AN ACCEPTED TORQUE-TIGHTENING FORMULA AND VERIFY WITH BUYER.
12. FOR CALCULATIONS OF EQUIPMENT WEIGHT, CENTER OF GRAVITY, AND WHEEL LOADS, SEE CALCULATION NO. 24590-HLW-M0C-M37T-00010.
13. THE CONTENTS OF THIS DRAWING IS WASTE ACCEPTANCE IMPACTING (WAI). REFER TO 24590-HLW-RPT-PR-01-001 AND 24590-HLW-WIQP-MH-09-0006.

DESCRIPTION	GRAPPLE PLANT ITEM NUMBER	CRANE PLANT ITEM NUMBER	ROOM NUMBER
CANISTER DECONTAMINATION CAVE CANISTER GRAPPLE (CLEAN)	24590-HLW-FH-HDH-TOOL-00001	24590-HLW-MJ-HDH-CRN-00005	H-0133
CANISTER DECONTAMINATION CAVE CANISTER GRAPPLE (DIRTY)	24590-HLW-FH-HDH-TOOL-00004	24590-HLW-MJ-HDH-CRN-00005	H-0133
CANISTER GRAPPLE CANISTER STORAGE CAVE	24590-HLW-FH-HEH-TOOL-00001	24590-HLW-MJ-HEH-CRN-00003	H-0132
THREE JAW GRAPPLE, CANISTER HANDLING CAVE, LOWER CRANE	24590-HLW-FH-HPH-TOOL-00001	24590-HLW-MJ-HPH-CRN-00001	H-0136
THREE JAW GRAPPLE, SPARE	24590-HLW-FH-HPH-TOOL-00018	N/A	H-0329A
MECHANICAL SEQUENCE GRAPPLE	24590-HLW-FH-HRH-TOOL-00002	24590-HLW-MJ-HRH-HST-00002	H-0135A
CANISTER GRAPPLE	24590-HLW-FH-HSH-TOOL-00004	24590-HLW-MJ-HSH-CRN-00001	H-0117
THREE JAW GRAPPLE, CANISTER HANDLING CAVE, UPPER CRANE	24590-HLW-FH-HPH-TOOL-00017	24590-HLW-MJ-HPH-CRN-00002	H-0136



STAINLESS STEEL TORQUE VALUES		
BOLT SIZE	18-8 STAINLESS STEEL	316 STAINLESS STEEL
2-56	2.1 IN-LBS	2.2 IN-LBS
2-64	2.6 IN-LBS	2.7 IN-LBS
4-40	4.4 IN-LBS	4.7 IN-LBS
4-48	5.6 IN-LBS	5.9 IN-LBS
5-40	6.5 IN-LBS	6.9 IN-LBS
5-44	8.0 IN-LBS	8.3 IN-LBS
6-32	8.2 IN-LBS	8.6 IN-LBS
6-40	10.3 IN-LBS	10.8 IN-LBS
8-32	16.8 IN-LBS	17.6 IN-LBS
8-36	18.7 IN-LBS	19.6 IN-LBS
10-24	19.4 IN-LBS	20.2 IN-LBS
10-32	26.9 IN-LBS	28.1 IN-LBS
1/4-20	63.9 IN-LBS	67 IN-LBS
1/4-28	80 IN-LBS	84 IN-LBS
5/16-18	112 IN-LBS	117 IN-LBS
5/16-24	121 IN-LBS	125 IN-LBS
3/8-16	201 IN-LBS	210 IN-LBS
3/8-24	220 IN-LBS	230 IN-LBS
7/16-14	320 IN-LBS	334 IN-LBS
7/16-20	340 IN-LBS	355 IN-LBS
1/2-13	37 FT-LBS	38 FT-LBS
1/2-20	38 FT-LBS	40 FT-LBS
9/16-12	48 FT-LBS	50 FT-LBS
9/16-18	53 FT-LBS	55 FT-LBS
5/8-11	78 FT-LBS	82 FT-LBS
5/8-18	88 FT-LBS	92 FT-LBS
3/4-10	108 FT-LBS	111 FT-LBS
3/4-16	105 FT-LBS	110 FT-LBS
7/8-9	165 FT-LBS	172 FT-LBS
7/8-14	164 FT-LBS	171 FT-LBS
1-8	243 FT-LBS	254 FT-LBS
1-14	220 FT-LBS	230 FT-LBS
1 1/8-7	351 FT-LBS	367 FT-LBS
1 1/8-12	332 FT-LBS	347 FT-LBS
1 1/4-7	445 FT-LBS	464 FT-LBS
1 1/4-12	408 FT-LBS	428 FT-LBS
1 1/2-6	755 FT-LBS	791 FT-LBS
1 1/2-12	598 FT-LBS	622 FT-LBS

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	3	LIFTING ARM POSITION INDICATOR - UPPER LINKAGE	PLT .50 X 7.250 X .750	24590-HLW-MX-30-00011005	AISI 316L	0.7
2	3	LOWER LINKAGE PIN	RD BAR Ø.375 X 1.44	24590-HLW-MX-30-00011005	AISI 316L	0.0
3	3	LIFTING ARM LINKAGE PIN	RD BAR Ø.375 X 1.75	24590-HLW-MX-30-00011005	AISI 316L	0.1
4	3	LIFTING ARM POSITION INDICATOR - LOWER LINKAGE	PLT .500 X 2.625 X .750	24590-HLW-MX-30-00011005	AISI 316L	0.3
5	6	2 3/4" LINKAGE PIN	RD BAR Ø1.000 X 2.750	24590-HLW-MX-30-00011005	17-4 PH H1150	0.6
6	3	LIFTING ARM POSITION INDICATOR - CLAMP	SQ BAR 1.25 X 1.000	24590-HLW-MX-30-00011006	AISI 316L	0.4
7	6	3" LINKAGE PIN	RD BAR Ø1.000 X 3.000	24590-HLW-MX-30-00011006	17-4 PH H1150	0.7
8	3	MANUAL RELEASE PINS	RD BAR Ø2.000X 6.000	24590-HLW-MX-30-00011006	17-4 PH H1150	1.6
9	1	CAM GEAR BUSHING	RD BAR Ø2.000 X .350	24590-HLW-MX-30-00011006	SAE 660 BRONZE	0.2
10	1	CAM KEEPER PLATE	RD BAR Ø1.750 X .219	24590-HLW-MX-30-00011006	AISI 316L	0.1
11	1	GRAPPLE BASE ASSEMBLY		24590-HLW-MX-30-00012001		146.4
12	1	UPPER SLIDING TUBE		24590-HLW-MX-30-00013001		79.6
13	1	UPPER LIFTING FRAME		24590-HLW-MX-30-00014001		130.4
14	3	LIFTING ARM ASSEMBLY		24590-HLW-MX-30-00015001		22.6
15	3	CANISTER POSITION INDICATOR		24590-HLW-MX-30-00016001		0.9
16	6	LIFTING ARM LINKAGE	PLT .500 X 4.469 X 2.000	24590-HLW-MX-30-00017001	AISI 316L	1.4
17	3	CAM FOLLOWER ASSEMBLY		24590-HLW-MX-30-00018001		0.9
18	1	VERTICAL CAM SHAFT ASSEMBLY		24590-HLW-MX-30-00019001		59.1
19	1	LIFTING SHACKLE ASSEMBLY		24590-HLW-MX-30-00020001		155.2
20	1	GRAPPLE DECON DEFLECTION SHIELD WELDMENT		24590-HLW-MX-30-00021001		17.2
21	2	STATUS INDICATOR ASSEMBLY		24590-HLW-MX-30-00022001		11.0
22	3	LIFTING ARM POSITION INDICATOR		24590-HLW-MX-30-00023001		0.7
23	3	GRAPPLE ASSEMBLY SPACER ROD	RD BAR Ø.750 X 20.500	24590-HLW-MX-30-00025001	AISI 316L	2.5
24	1	DRIVE GEAR	RD BAR Ø2.500 X .875	24590-HLW-MX-30-00027001	AISI 303	0.6
25	1	GRAPPLE LABEL	SHT .063 X 6.000 X 2.250	24590-HLW-MX-30-00028001	AISI 316L	0.2
26	6	SHAFT COLLAR: 3/8" DIA			AISI 316	0.04
27	24	EXTERNAL RETAINING RING SH-100ST			STAINLESS STEEL	0.0
28	12	EXTERNAL RETAINING RING SH-37ST			STAINLESS STEEL	0.0
29	24	FLAT WASHER 1 TYPE A NARROW 18-8 SS		-	18-8 STAINLESS STEEL	0.1
30	12	FLAT WASHER 3/4 TYPE A NARROW 18-8 SS		-	18-8 STAINLESS STEEL	0.0
31	9	FLAT WASHER 3/8 TYPE A NARROW 18-8 SS		-	18-8 STAINLESS STEEL	0.0
32	3	FLAT WASHER 1/4 TYPE A NARROW 18-8 SS		-	18-8 STAINLESS STEEL	0.0
33	12	SPRING LOCK WASHER 1/4 REGULAR SS 316			AISI 316	0.0
34	12	SHCS 1/4-20 UNC X 1.00 LG F837 SS 316 PLAIN		-	AISI 316	0.0
35	12	FLEX LOCK HEX NUT 3/4-10 UNC SS 18-8 PLAIN			18-8 STAINLESS STEEL	0.2
36	3	SHSB 0.38 DIA X 0.63 LG X .313-18 UNC F837 SS 304 PLAIN		-	AISI 304	0.0
37	6	HSSS-CUP 5/16-18 UNC X 0.38 LG F880 SS 304 PLAIN			AISI 304	0.0
38	3	COMPRESSION SPRING: 3" X 0.688" OD X 0.594" ID			302 STAINLESS STEEL	0.04
39	4	QUICK-RELEASE PIN: 1/4" DIA. X 4", RING-GRIP			18-8 STAINLESS STEEL	0.067
40	3	HHCS 1/4-20 UNC X 2.25 LG SS 304 PLAIN		-	AISI 304	0.0
41	3	HEX NUT 1/4-20 UNC 18-8 SS			18-8 STAINLESS STEEL	0.0
42	1	SCREW: 3/8"-16 X 1" 82º COUNTERSUNK HEX DRIVE FLAT HEAD			18-8 STAINLESS STEEL	0.00
43	4	BHCS #10-24 UNC X 0.38 LG F879 SS 304 PLAIN			AISI 304	0.0

DRAWING INDEX	
DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSY
24590-HLW-MX-30-00011002	HLW VIT SYS FAB DWG GRAPPLE ASSY DETAILS
24590-HLW-MX-30-00011003	HLW VIT SYS FAB DWG GRAPPLE ASSY OPERATION MODES
24590-HLW-MX-30-00011004	HLW VIT SYS FAB DWG GRAPPLE ASSY CANISTER INTERACTION
24590-HLW-MX-30-00011005	HLW VIT SYS FAB DWG GRAPPLE ASSY DETAILS
24590-HLW-MX-30-00011006	HLW VIT SYS FAB DWG GRAPPLE ASSY DETAILS

REFERENCE DRAWINGS	
DWG NO.	TITLE
24590-HLW-MX-30-00010001	HLW VIT CANISTER ASSY DWG (3/8" WALL)
24590-QL-POA-MJKG-00002-08-00896	6 TON T/R CRANE NUMBER 2797 - HOOK AND NUT DETAILS
24590-QL-POA-MJKG-00002-08-00791	6 TON T/R CRANE NUMBER 2796 - HOOK AND NUT DETAILS
24590-QL-POA-MJKG-00002-08-00583	6 TON T/R CRANE NUMBER 2798 HOOK AND NUT DETAILS
24590-QL-POA-MJKG-00002-08-01003	6 TON T/R CRANE NUMBER 2799 HOOK AND NUT DETAILS
24590-QL-POA-MJKG-00002-08-01834	25 TON T/R CRANE NUMBER 2795 HOOK AND NUT DETAILS
24590-HLW-M0-30-00013001	HLW VITRIFICATION DESIGN PROPOSAL DRAWING HLW CANISTER GRAPPLE STAND DETAIL

Reviewed No Comments — By: Name HLW - Mechanical Handling — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Placed: Sep 06, 2024

Originator — By: Lanny Lancaster - llancast — Org Name: HLW Mechanical Handling — Placed: Sep 06, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 725.4 LBS

SUPPLIER DWG NO.

Issued By RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	9/6/2024
CHECKER	K. DRAPER	9/6/2024
REVIEWER	I. KINCAID	9/6/2024
APPROVER	J. SCHAEFFER	9/6/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

QUALITY DESIGNATOR: Q

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/6/2024

REVISION HISTORY

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY

SCALE: 1:5

24590-HLW-MX-30-00011001

REV 0

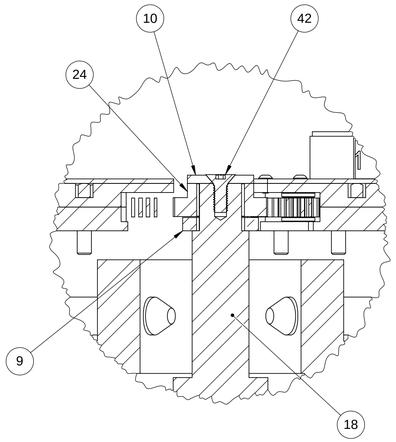
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00011
DATE: 8/23/2024 1:22:20 PM

FORMAT WTP ANSI INCH SIZE D (22x34)

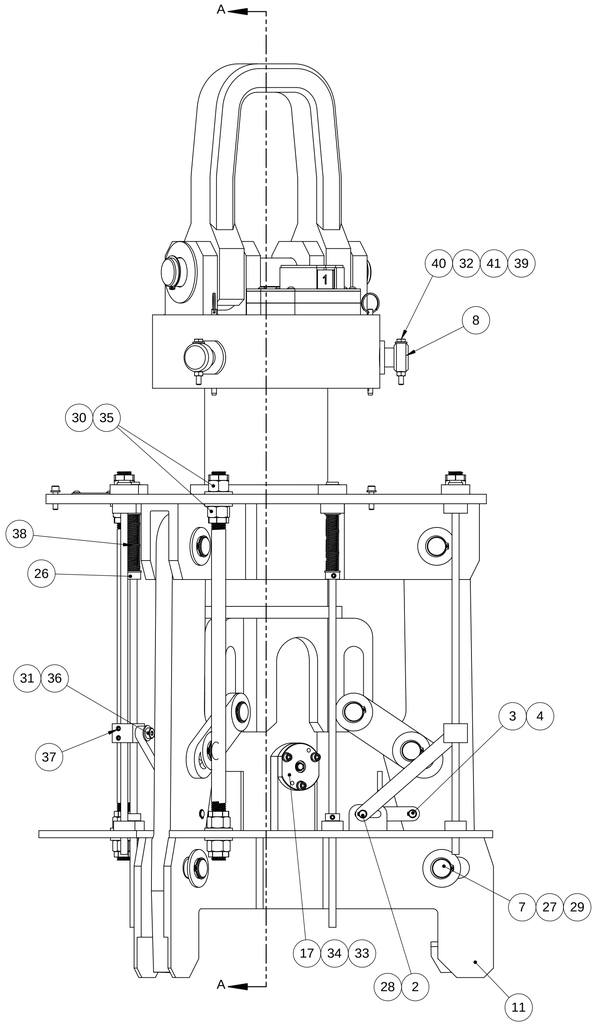
'D' SIZE - 22in*34in
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

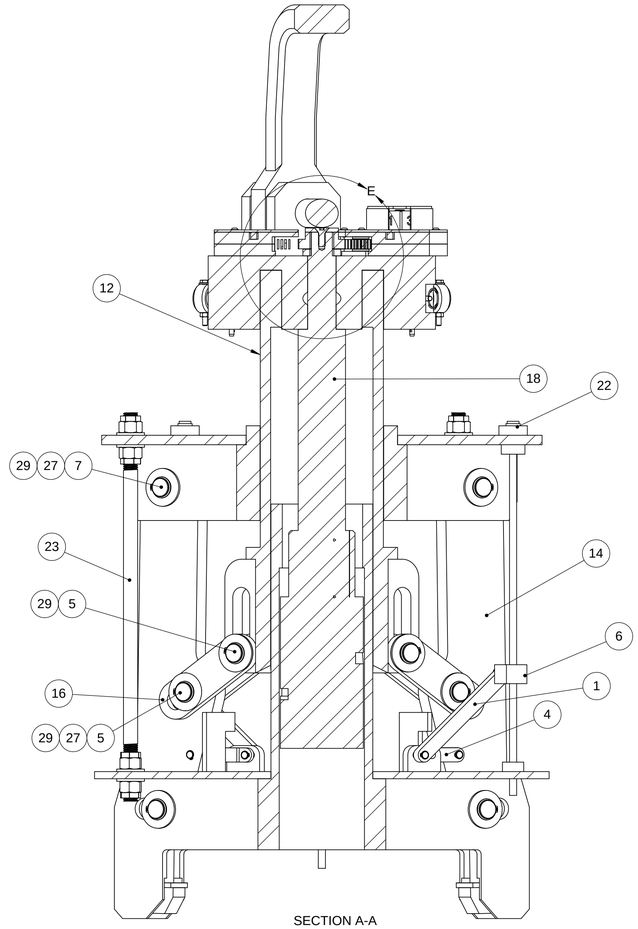
NOTES:

FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00011001.

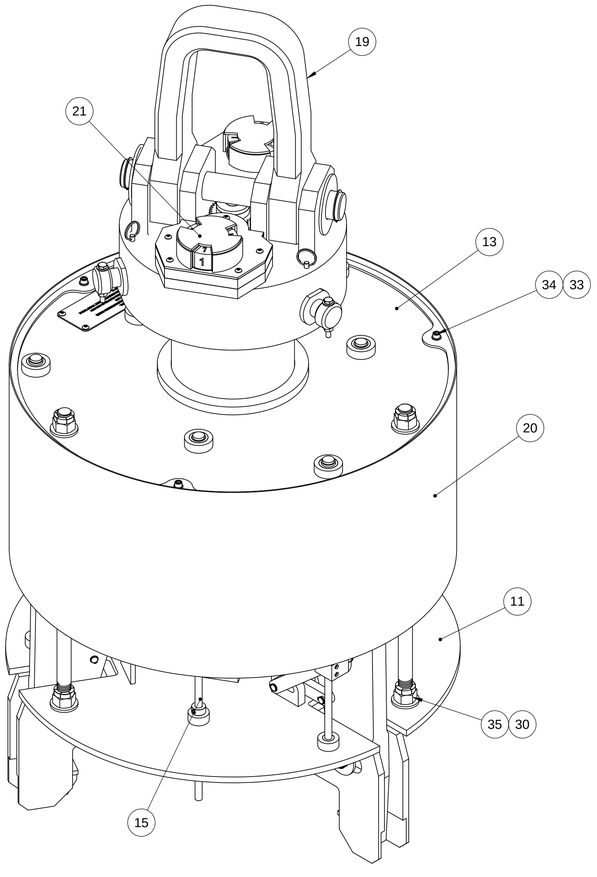


DETAIL E
SCALE 1 : 2





SECTION A-A



REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/6/2024

REVISION HISTORY

QUALITY DESIGNATOR: Q

Originator — By: Lacey Lancaster - llancast — Org Name: HLW Mechanical Handling — Placed: Sep 06, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Placed: Sep 06, 2024

Reviewed No Comments — By: Ian Kincaid - ikincaid — Org Name: HLW Mechanical Handling — Placed: Sep 05, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5˚

WEIGHT 725.4 LBS

SUPPLIER DWG NO.

Issued By
RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	9/6/2024
CHECKER	K. DRAPER	9/6/2024
REVIEWER	I. KINCAID	9/6/2024
APPROVER	J. SCHAEFFER	9/6/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY DETAILS

SCALE: 1:5

24590-HLW-MX-30-00011002

REV 0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00011
DATE: 8/23/2024 1:22:20 PM

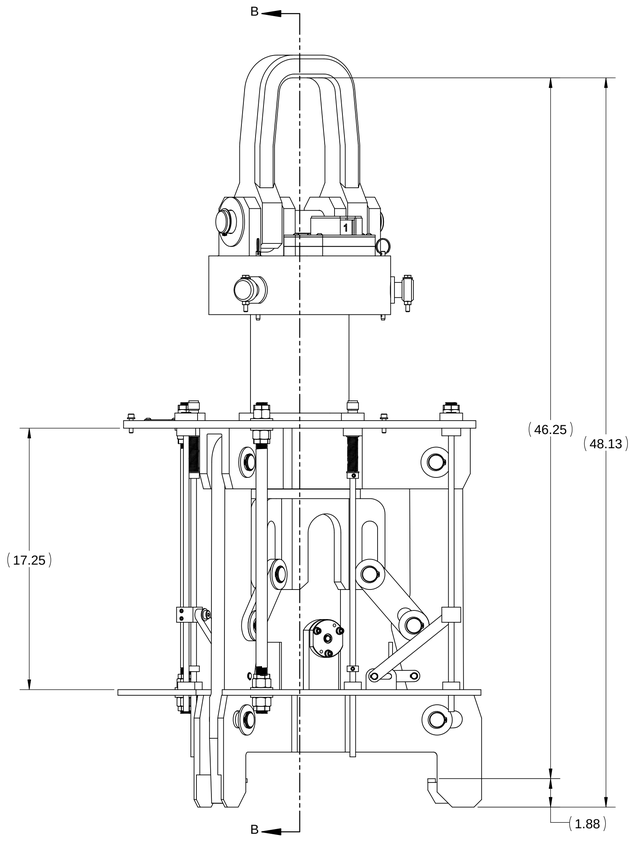
FORMAT WTP ANSI INCH SIZE D (22x34)

'D' SIZE - 22in*34in

COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

NOTES:

FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00011001.



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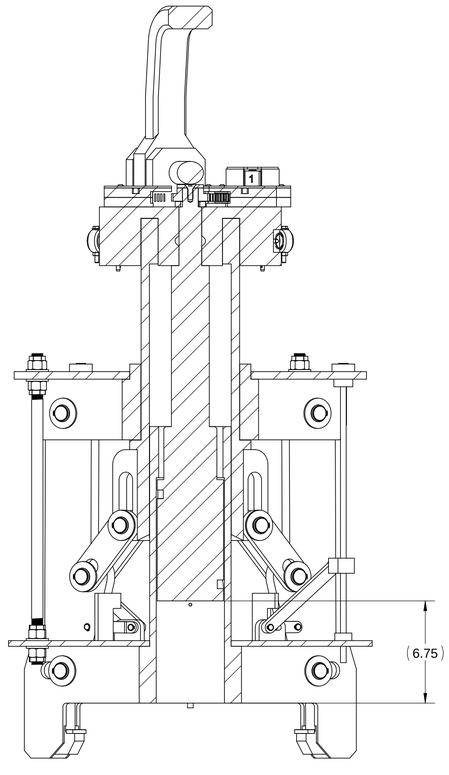
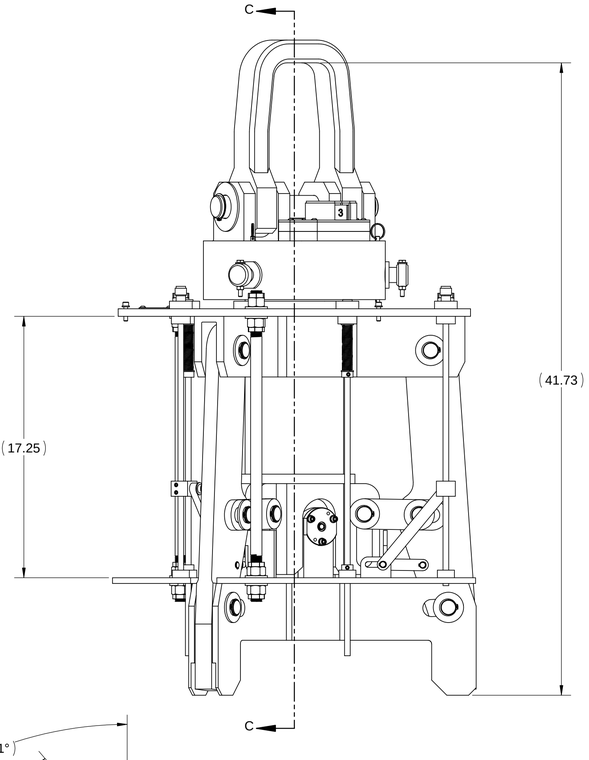
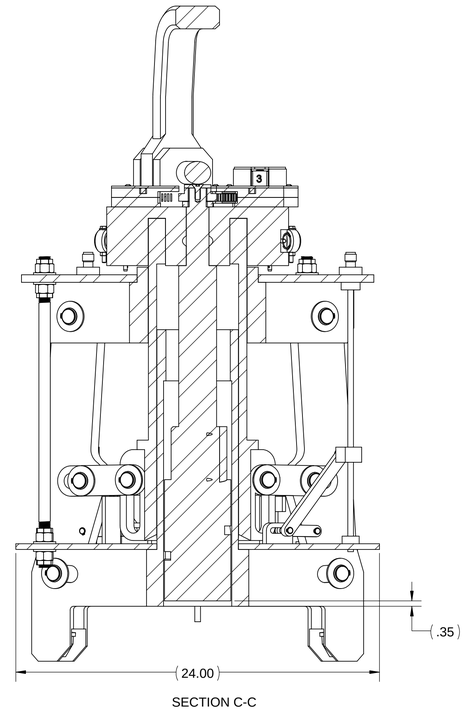


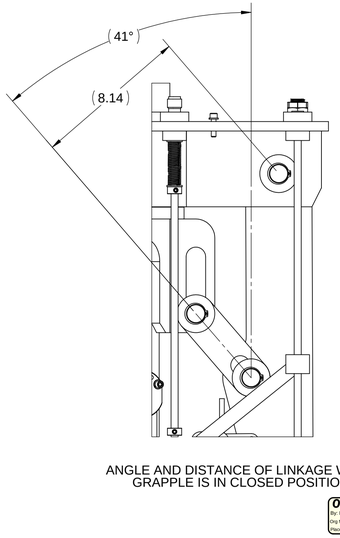
SECTION B-B



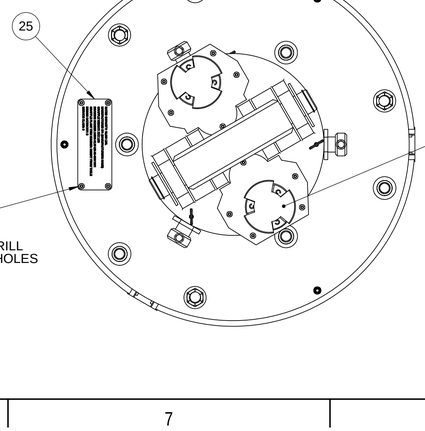
OPERATION: OPEN



SECTION C-C



ANGLE AND DISTANCE OF LINKAGE WHEN GRAPPLE IS IN CLOSED POSITION



MATCH AND DRILL
(4) #10-32 THRU HOLES

GRAPPLE STATUS INDICATOR - EACH TOP FACE AND SIDE FACE OF CYLINDER SHALL BE PAINTED AND ENGRAVED WITH A CORRESPONDING NUMBER WHICH WILL PROVIDE VISUAL INDICATION OF GRAPPLE STATUS WHEN ALIGNED WITH CUT OUT IN HOUSING COVER CAP

GRAPPLE STATUS INDICATION INFORMATION:

GREEN (1) = GRAPPLE ENGAGED
YELLOW (2) = FIRST SET-DOWN
RED (3) = SECOND SET DOWN (FULLY RELEASED)

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/6/2024

Q QUALITY DESIGNATOR

REVISION HISTORY

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 708.2 LBS

SUPPLIER DWG NO.

Issued By RPP-WTP PDC

ISSUE STAMP

		BY	DATE
ORIGINATOR	L. LANCASTER		9/6/2024
CHECKER	K. DRAPER		9/6/2024
REVIEWER	I. KINCAID		9/6/2024
APPROVER	J. SCHAEFFER		9/6/2024

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

Originator By: Lanny Lancaster - llancast Org Name: HLW Mechanical Handling Placed: Sep 06, 2024

Checked By: Kenneth D. Draper - kddraper Org Name: HLW Mechanical Handling Placed: Sep 06, 2024

Reviewed No Comments By: Ian Kincaid - ikincaid Org Name: HLW - Mechanical Handling Placed: Sep 06, 2024

Approved By: Jason Schaeffer - jschaef2 Org Name: HLW - Mechanical Handling Placed: Sep 06, 2024

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY OPERATION MODES

SCALE: 1:5

24590-HLW-MX-30-00011003

REV 0

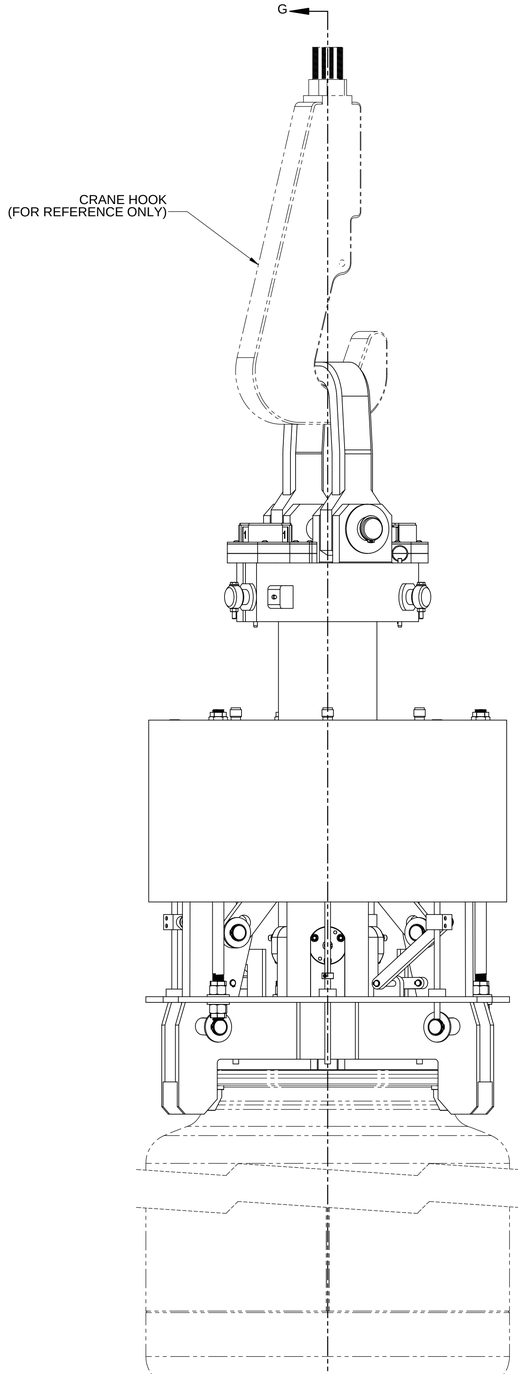
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00011
DATE: 9/23/2024 1:22:20 PM

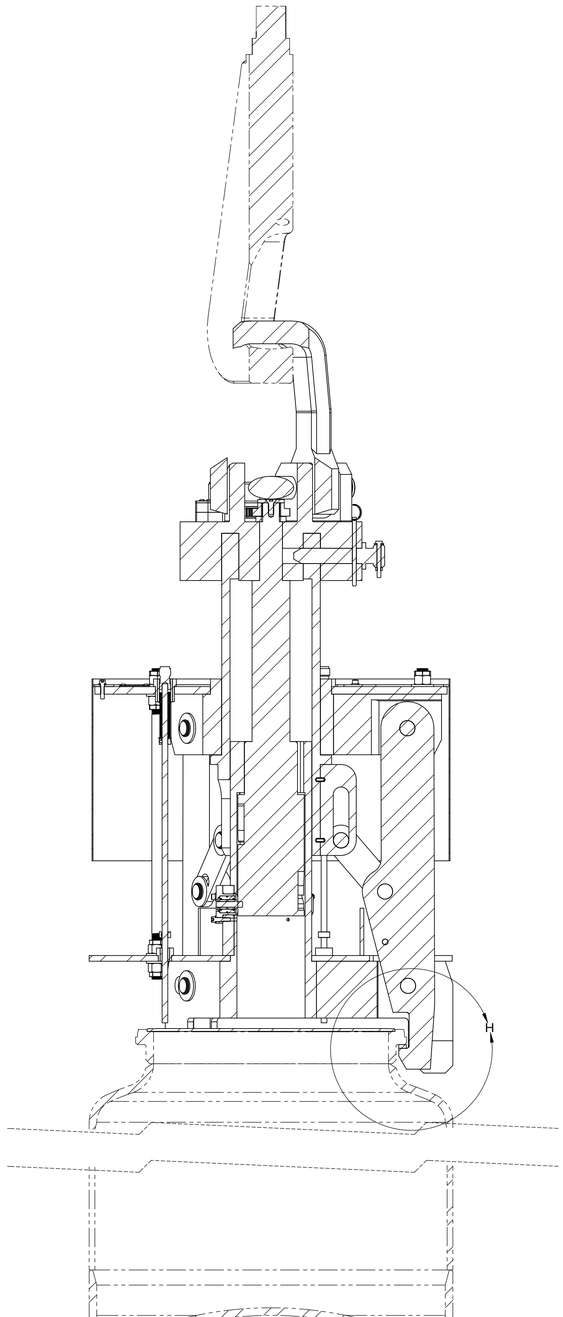
FORMAT WTP ANSI INCH SIZE D (22x34)

'D' SIZE - 22in*34in
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

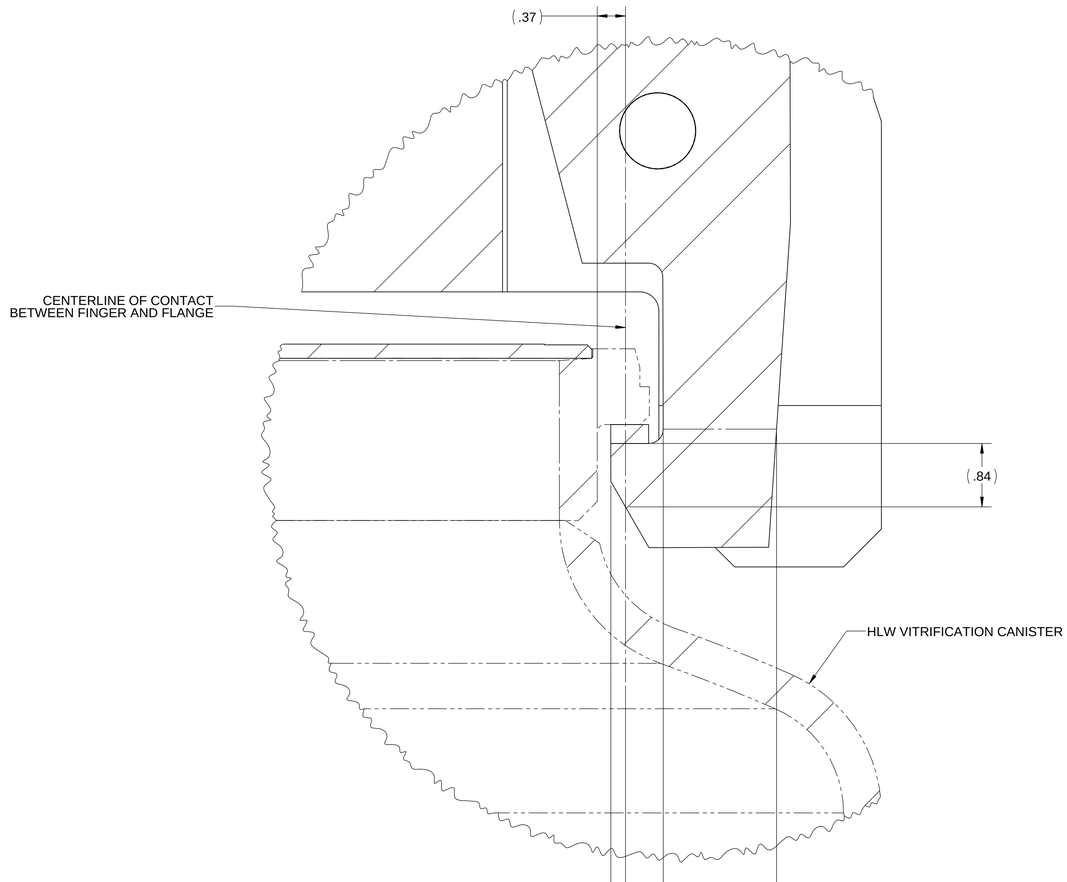
NOTES:

FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00011001.





SECTION G-G



DETAIL H
SCALE 1 : 1

Reviewed
No Comments
By: Ian Kidwell - ikidwell
Org Name: HLW - Mechanical Handling
Record: Aug 23, 2024

Approved
By: Jason Schaeffer - jschaef2
Org Name: HLW - Mechanical Handling
Record: Sep 06, 2024

Checked
By: Kenneth D. Draper - kddraper
Org Name: HLW Mechanical Handling
Record: Aug 22, 2024

Originator
By: Lanny Lancaster - llancast
Org Name: HLW Mechanical Handling
Record: Aug 22, 2024

QUALITY DESIGNATOR: Q

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 725.4 LBS

SUPPLIER DWG NO.

Issued By
RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY CANISTER INTERACTION

SCALE: 1:5

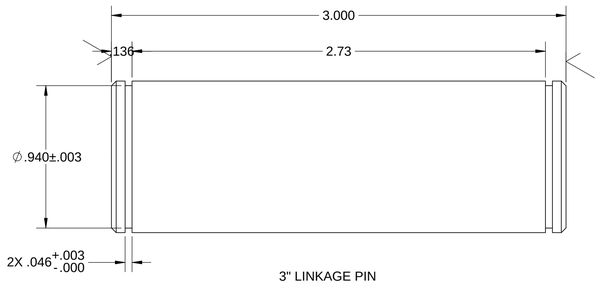
24590-HLW-MX-30-00011004

REV 0

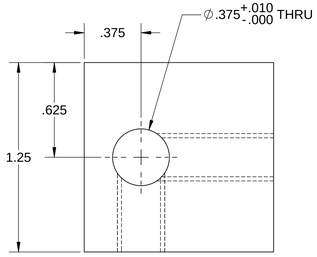
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00011
DATE: 8/21/2024 12:29:07 PM

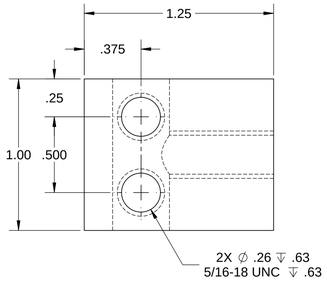
FORMAT WTP ANSI INCH SIZE D (22x34)

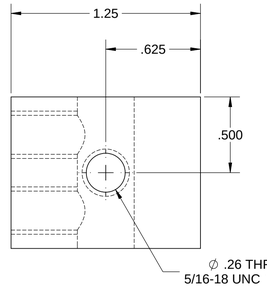
'D' SIZE - 22in*34in



3" LINKAGE PIN
SCALE 2:1

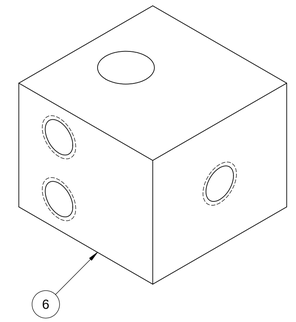




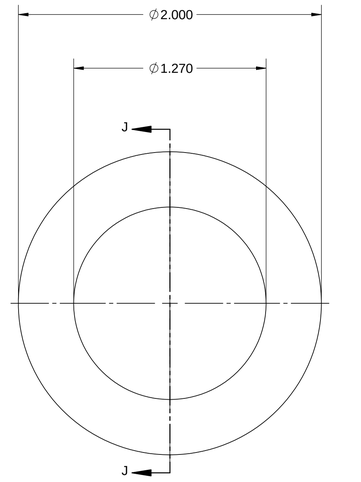


NOTES:

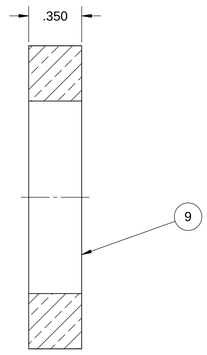
FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00011001.



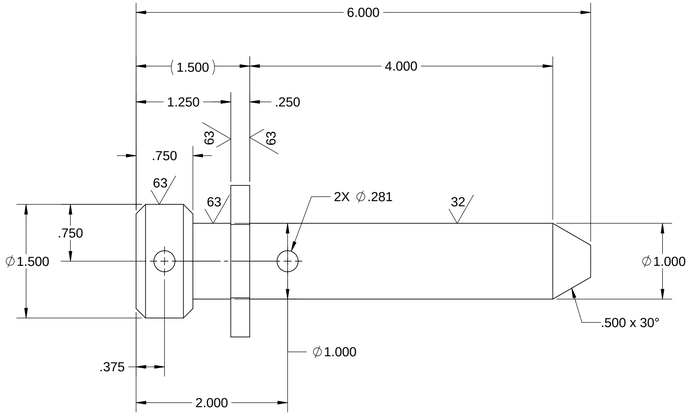
LIFTING ARM POSITION INDICATOR - CLAMP
SCALE 2:1

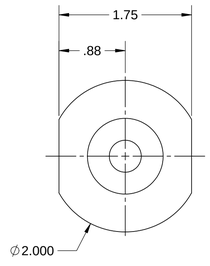


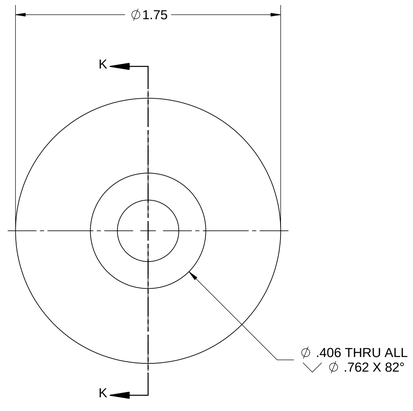
CAM GEAR BUSHING
SCALE 2:1



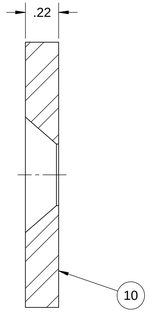
SECTION J-J
SCALE 2 : 1



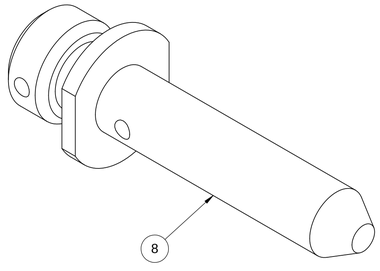




CAM KEEPER PLATE
SCALE 2:1



SECTION K-K
SCALE 2 : 1



MANUAL RELEASE PINS
SCALE 1 : 1

Reviewed No Comments — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Dated: Aug 23, 2024
Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Dated: Sep 06, 2024
Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Dated: Aug 22, 2024
Originator — By: Lanny Lancaster - llancast — Org Name: HLW Mechanical Handling — Dated: Aug 22, 2024

Q — QUALITY DESIGNATOR

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 725.4 LBS

SUPPLIER DWG NO.

Issued By RPP-WTP PDC

ISSUE STAMP

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE ASSEMBLY DETAILS

SCALE: 1:1

24590-HLW-MX-30-00011006

REV 0

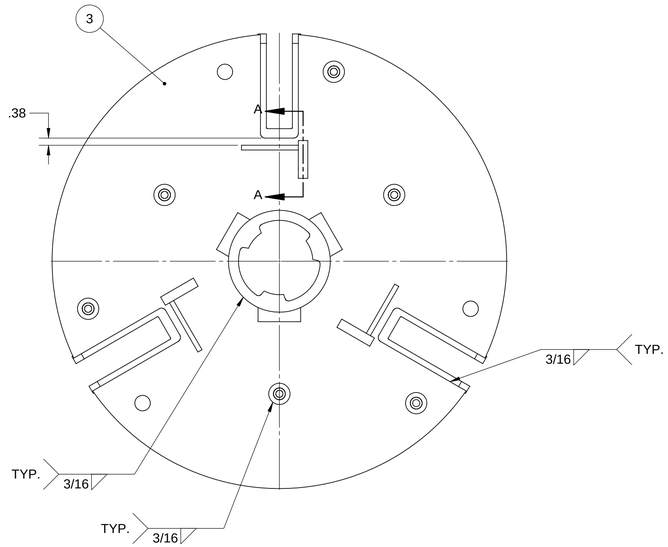
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00011
DATE: 8/21/2024 12:29:07 PM

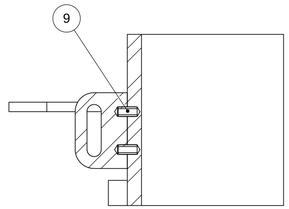
FORMAT WTP ANSI INCH SIZE D (22x34)

'D' SIZE - 22in*34in

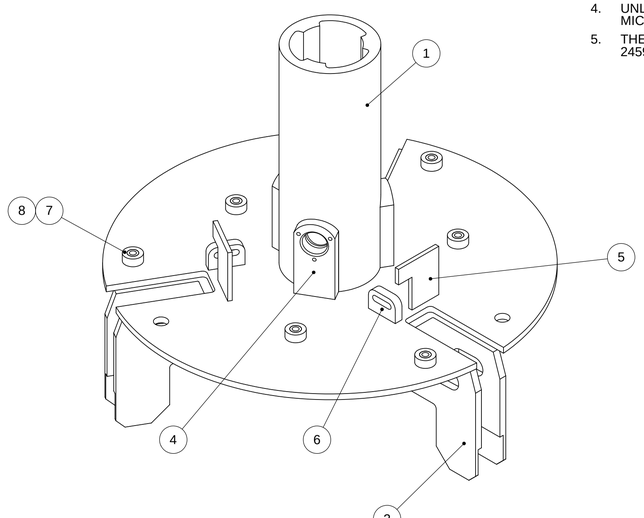
BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	CENTER BASE TUBE DETAIL	CORED BAR 6.750 OD X 3.000 ID X 18.250	24590-HLW-MX-30-00012002	AISI 316L	48.4
2	3	BASE GUIDE FOOT	PLT 2.250 X 9.000 X 7.380	24590-HLW-MX-30-00012003	AISI 316L	15.5
3	1	BASE PLATE	PLT .375 X 24.000 X 24.000	24590-HLW-MX-30-00012004	AISI 316L	42.4
4	3	CAM GUIDE MOUNTING REINF.	PLT .750 X 2.250 X 4.625	24590-HLW-MX-30-00012005	AISI 316L	1.8
5	3	LIFTING ARM LINKAGE SUPPORT	PLT .250 X 3.125 X 3.000	24590-HLW-MX-30-00012005	AISI 316L	0.5
6	3	LINKAGE MOUNT PLATE	PLT .500 X 2.000 X 1.375	24590-HLW-MX-30-00012005	AISI 316L	0.3
7	6	UPPER POSITION INDICATOR BUSING BUNG	RD BAR 1.125 X .875	24590-HLW-MX-30-00012005	AISI 316L	0.1
8	6	BUSHING, .375 ID X .625 OD X .875 LG		-	SAE 841 BRONZE	0.1
9	12	SPRING PIN, 1/4" X 1/2" LG			18-8 STAINLESS STEEL	0.00



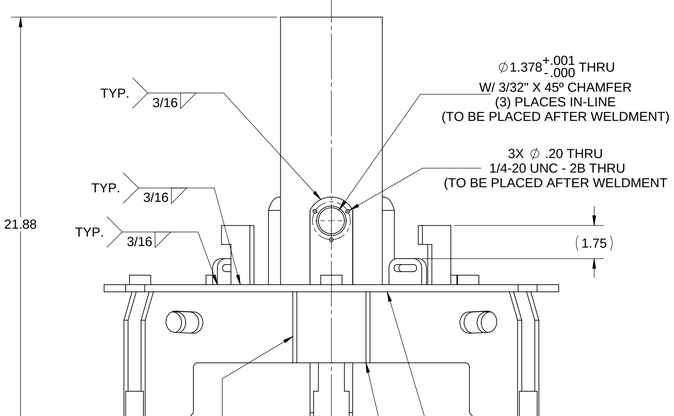


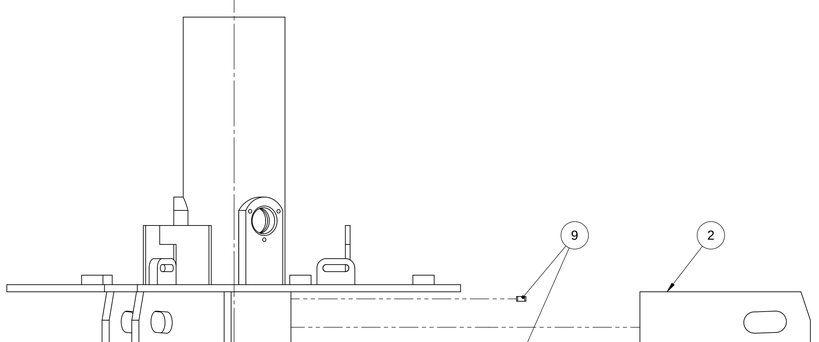
SECTION A-A
SCALE 1 : 2



NOTES:

1. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
2. WELD IN ACCORDANCE WITH AWS D1.6.
3. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
4. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.
5. THE CONTENTS OF THIS DRAWING IS WASTE ACCEPTANCE IMPACTING (WAI). REFER TO 24590-HLW-RPT-PR-01-001 AND 24590-HLW-WIQP-MH-09-0006.





REFERENCE DRAWINGS	
DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSEMBLY

DRAWING INDEX	
DWG NO.	TITLE
24590-HLW-MX-30-00012001	HLW VIT SYS FAB DWG GRAPPLE BASE ASSEMBLY
24590-HLW-MX-30-00012002	HLW VIT SYS FAB DWG GRAPPLE BASE ASSY CENTER BASE TUBE DETAIL
24590-HLW-MX-30-00012003	HLW VIT SYS FAB DWG GRAPPLE BASE ASSY BASE GUIDE FOOT DETAIL
24590-HLW-MX-30-00012004	HLW VIT SYS FAB DWG GRAPPLE BASE ASSY BASE PLATE DETAIL
24590-HLW-MX-30-00012005	HLW VIT SYS FAB DWG GRAPPLE BASE ASSY DETAILS

Reviewed No Comments — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Dated: Aug 23, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Dated: Aug 22, 2024

Originator — By: Lanny Lancaster - llancast — Org Name: HLW Mechanical Handling — Dated: Aug 22, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Dated: Sep 06, 2024

QUALITY DESIGNATOR: Q

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 146.4 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/042024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE BASE ASSEMBLY

SCALE: 1:3

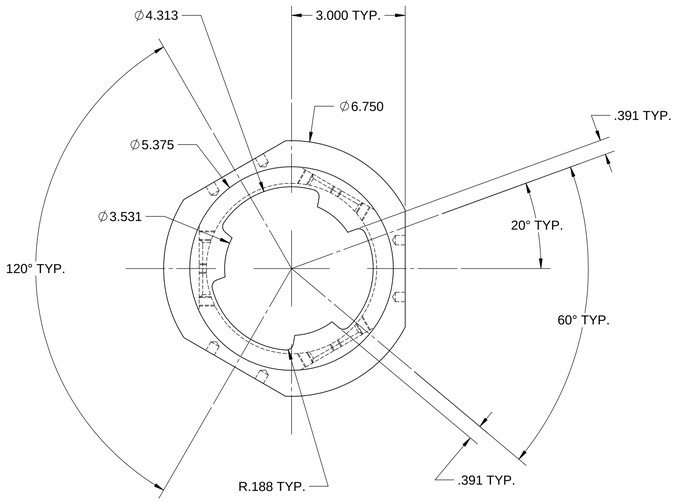
24590-HLW-MX-30-00012001

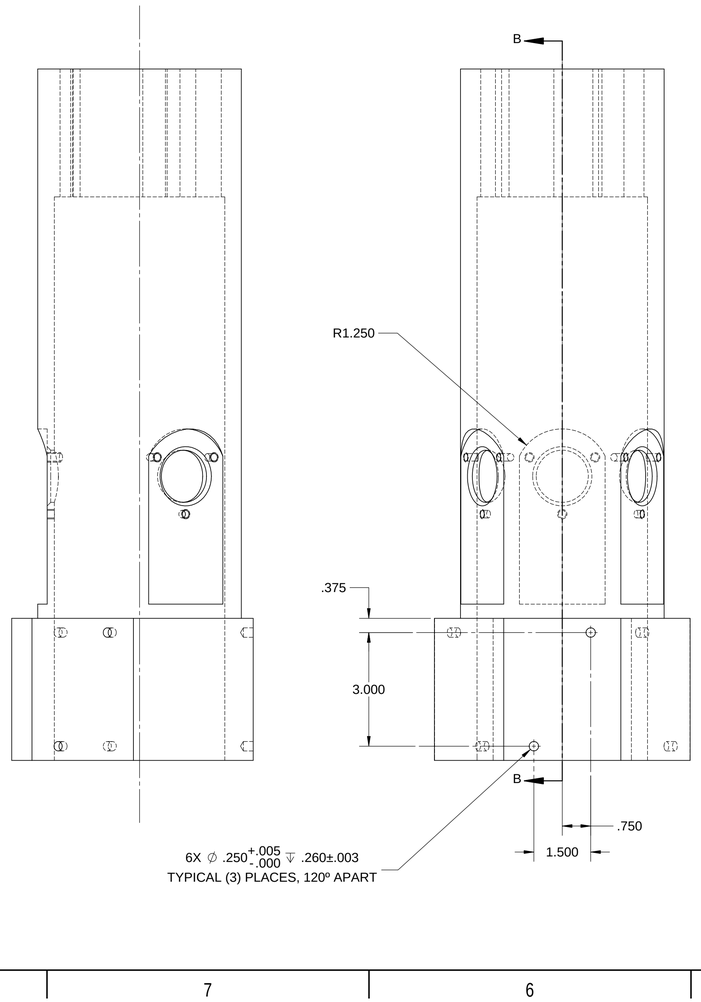
REV 0

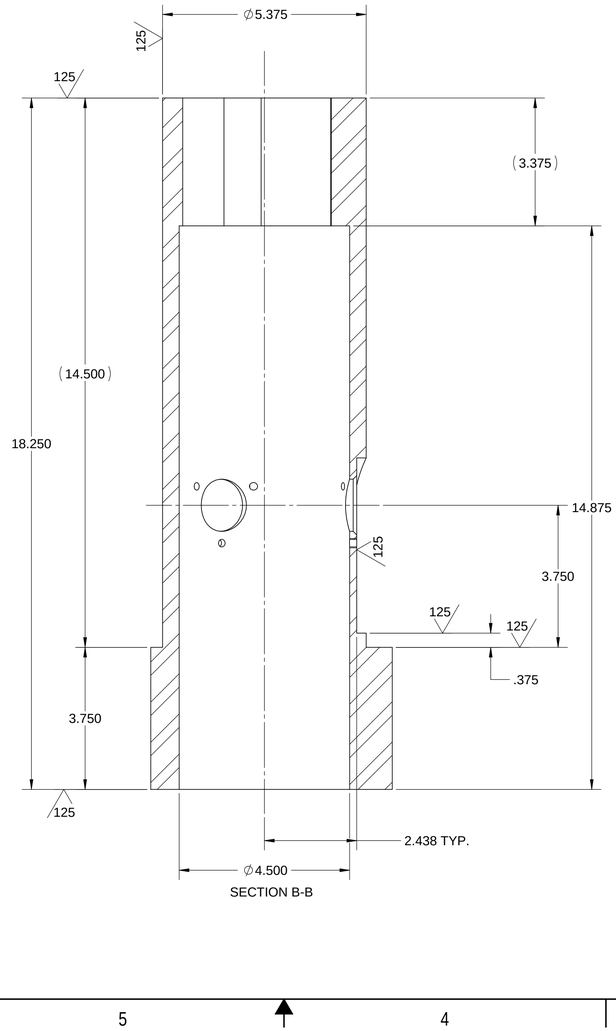
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00012001
DATE: 8/15/2024 12:30:28 PM

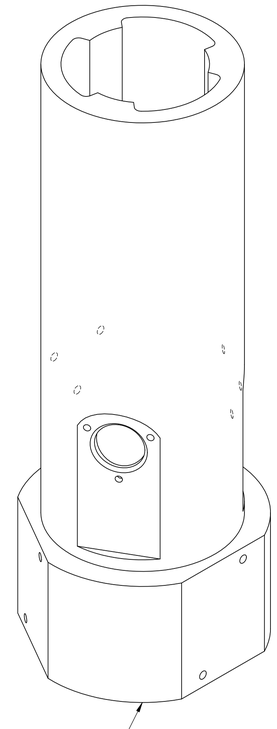
NOTES:

FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00012001.









QUALITY DESIGNATOR	REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
Q	0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

Reviewed No Comments — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Placed: Aug 23, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Originator — By: Lanny Lancaster - llancast — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 146.4 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE BASE ASSEMBLY CENTER BASE TUBE DETAIL

SCALE: 1:2

24590-HLW-MX-30-00012002

REV 0

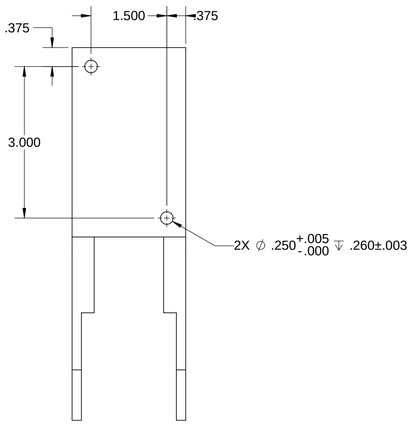
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00012
DATE: 8/15/2024 12:30:28 PM

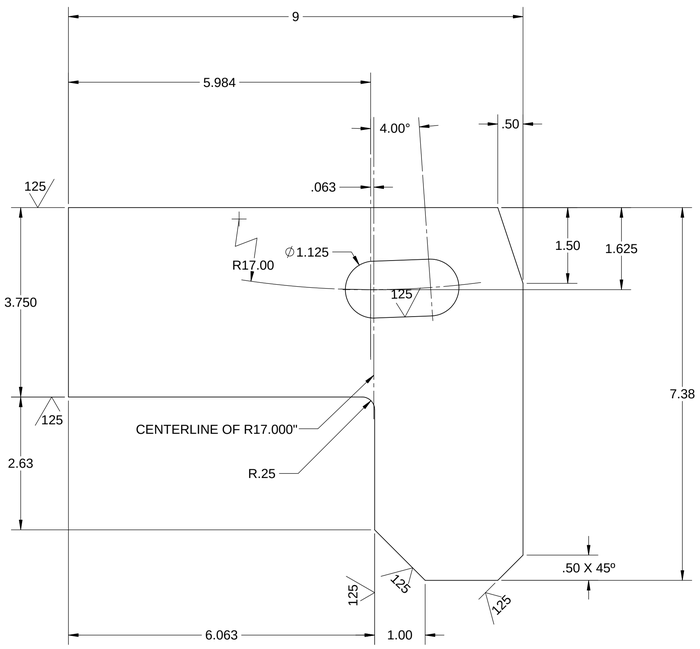
FORMAT WTP ANSI INCH SIZE D (22x34)

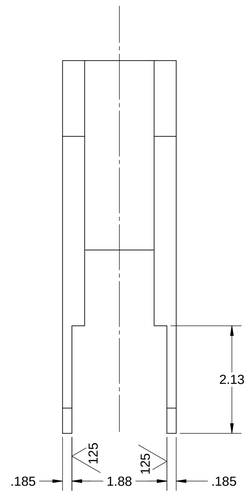
'D' SIZE - 22in*34in

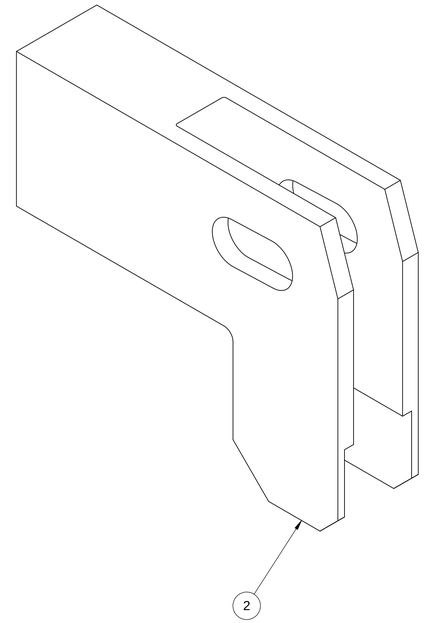
NOTES:

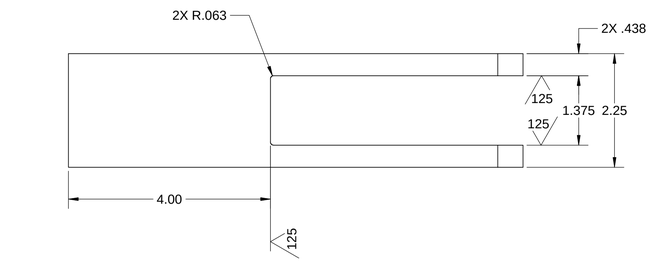
FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00012001.











Q	0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024
QUALITY DESIGNATOR	REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE

REVISION HISTORY

Reviewed No Comments — By: Ian Kincaid - ikincaid — Org Name: HLW - Mechanical Handling — Placed: Aug 23, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Originator — By: Lanny Lancaster - llancast — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Approved — By: Jason Schaeffer - jschaeff — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 146.4 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE BASE ASSEMBLY BASE GUIDE FOOT DETAIL

SCALE: 1:1.5

24590-HLW-MX-30-00012003

REV 0

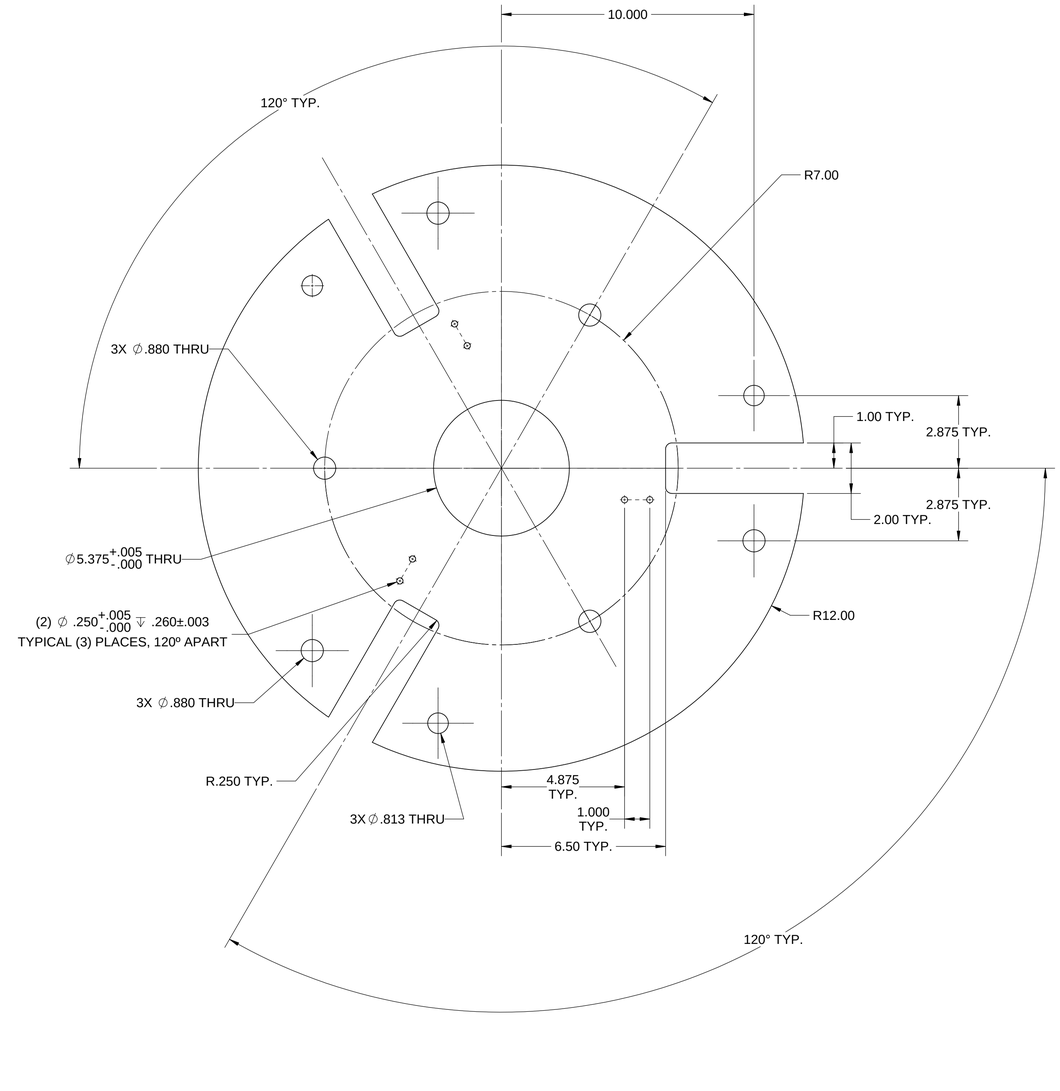
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00012
DATE: 9/15/2024 12:30:28 PM

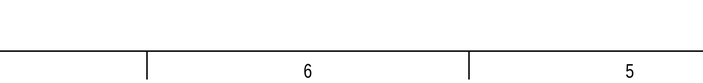
FORMAT WTP ANSI INCH SIZE D (22x34)

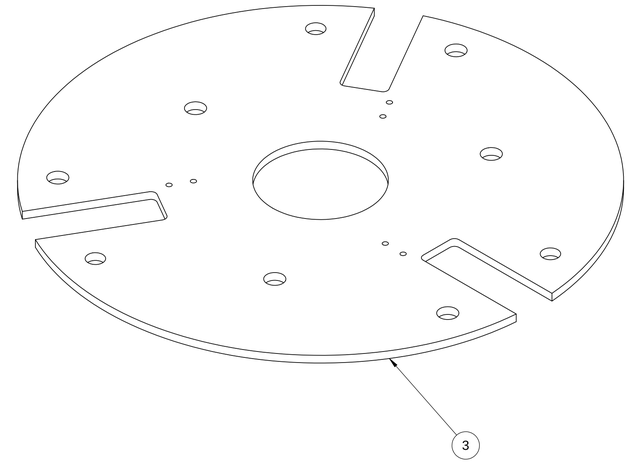
'D' SIZE - 22in*34in

NOTES:

FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00012001.







Reviewed
No Comments
By: Jason Schaeffer - jschaef2
Org Name: HLW - Mechanical Handling
Placed: Aug 23, 2024

Checked
By: Kenneth D. Draper - Kdraper
Org Name: HLW Mechanical Handling
Placed: Aug 22, 2024

Approved
By: Jason Schaeffer - jschaef2
Org Name: HLW - Mechanical Handling
Placed: Sep 06, 2024

Originator
By: Lanny Lancaster - llancast
Org Name: HLW Mechanical Handling
Placed: Aug 22, 2024

Q
QUALITY DESIGNATOR

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

DO NOT SCALE DRAWING

ISSUED BY
RPP-WTP PDC

ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	30 (HLW)	

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/042024

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 146.4 LBS

SUPPLIER DWG NO.

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE BASE ASSEMBLY BASE PLATE DETAIL

SCALE: 1:3

24590-HLW-MX-30-00012004

REV 0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00012
DATE: 9/5/2024 12:30:28 PM

FORMAT WTP ANSI INCH SIZE D (22x34)

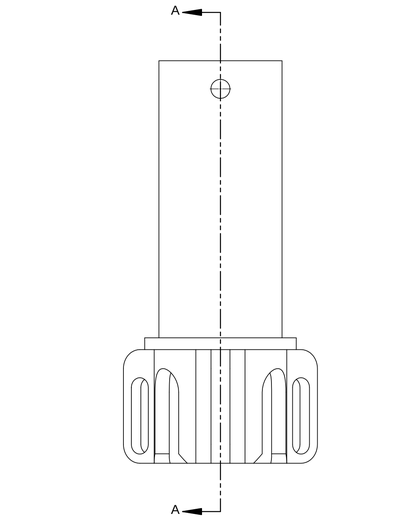
'D' SIZE - 22in*34in
COMPUTER GENERATED - MANUAL
DESIGN CHANGES NOT PERMITTED

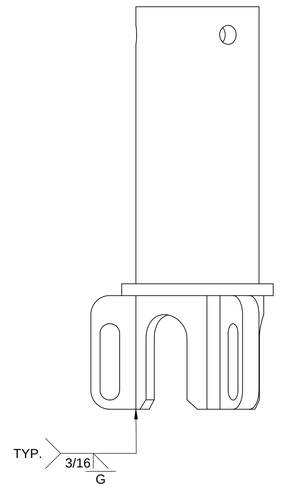
BILL OF MATERIALS

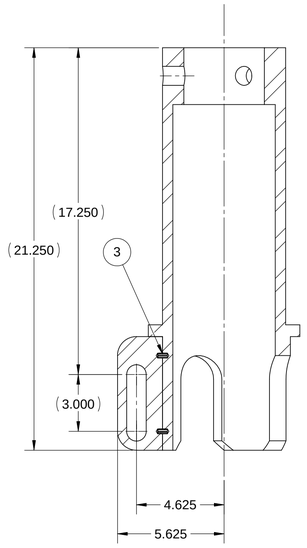
ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	UPPER SLIDING TUBE DETAIL	CORED BAR 8.000 OD X 4.250 ID X 21.250	24590-HLW-MX-30-00013002	AISI 316L	71.0
2	3	UPPER SLIDING TUBE LINKAGE ATTACHMENT LUG	PLT 1.000 X 2.375 X 6.000	24590-HLW-MX-30-00013003	AISI 316L	2.9
3	6	SPRING PIN, 1/4" X 1/2" LG			18-8 STAINLESS STEEL	0.00

NOTES:

1. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
2. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
3. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.
4. WELD IN ACCORDANCE WITH AWS D1.6.







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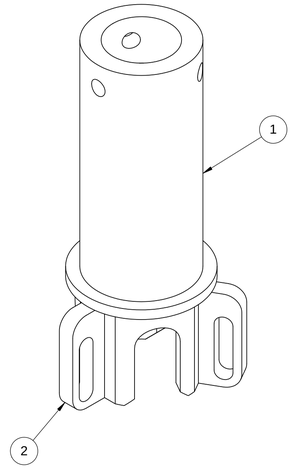
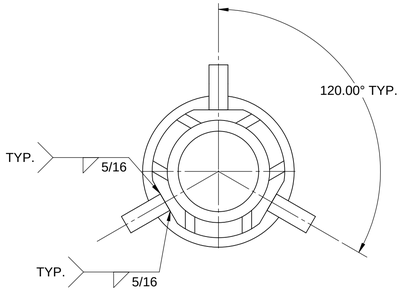




REFERENCE DRAWINGS

DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSEMBLY

DRAWING INDEX

DWG NO.	TITLE
24590-HLW-MX-30-00013001	HLW VIT SYS FAB DWG UPPER SLIDING TUBE
24590-HLW-MX-30-00013002	HLW VIT SYS FAB DWG UPPER SLIDING TUBE DETAIL
24590-HLW-MX-30-00013003	HLW VIT SYS FAB DWG UPPER SLIDING TUBE LINKAGE ATTACHMENT LUG

Q
QUALITY DESIGNATOR

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

Originator By: Lacey Lancaster - llancast, Org Name: HLW Mechanical Handling, Placed: Aug 22, 2024

Checked By: Kenneth D. Draper - kddraper, Org Name: HLW Mechanical Handling, Placed: Aug 23, 2024

Reviewed No Comments By: Ian Kincaid - ikincaid, Org Name: HLW - Mechanical Handling, Placed: Aug 23, 2024

Approved By: Jason Schaeffer - jschaef2, Org Name: HLW - Mechanical Handling, Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 79.6 LBS

SUPPLIER DWG NO.

Issued By RPP-WTP PDC

ISSUE STAMP

PROJECT No.	24590		
SITE	HANFORD		
AREA	200E		
BUILDING No.	30 (HLW)		
		BY	DATE
ORIGINATOR		L. LANCASTER	8/22/2024
CHECKER		K. DRAPER	8/22/2024
REVIEWER		I. KINCAID	8/23/2024
APPROVER		J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING UPPER SLIDING TUBE

SCALE: 1:4

24590-HLW-MX-30-00013001

REV 0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00013
DATE: 9/19/2024 12:32:15 PM

FORMAT WTP ANSI INCH SIZE D (22x34)

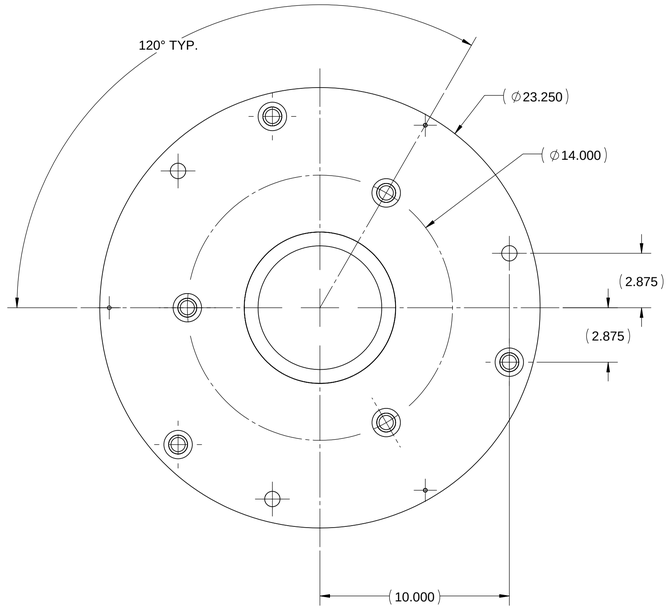
'D' SIZE - 22in*34in

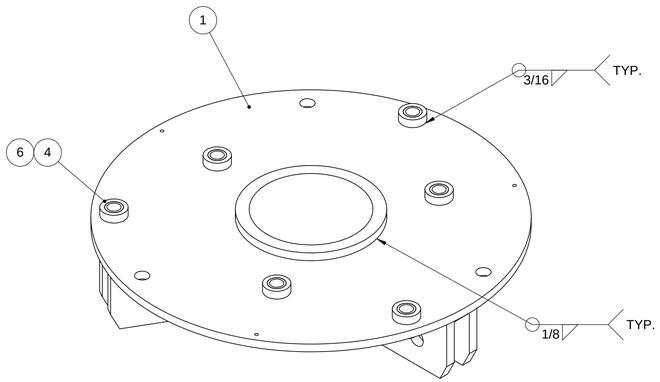
BILL OF MATERIALS

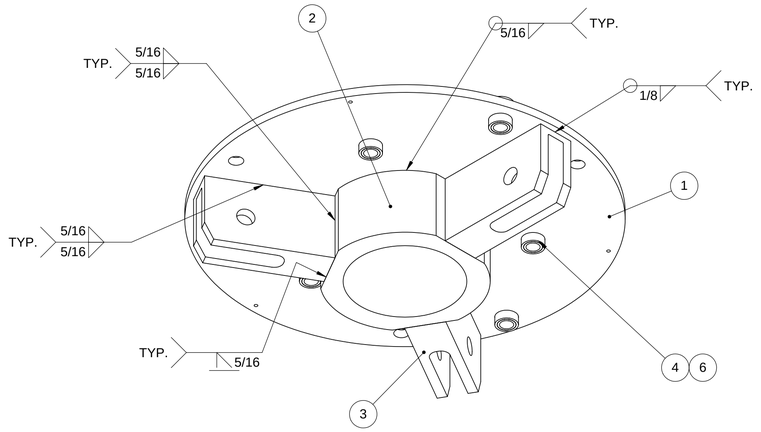
ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	MOUNT PLATE	PLT .500 X 23.250 X 23.250	24590-HLW-MX-30-00014002	AISI 316L	52.8
2	1	CENTER TUBE	RD BAR Ø9.000 X 5.000	24590-HLW-MX-30-00014003	AISI 316L	36.5
3	3	UPPER LIFTING ARM ATTACHMENT PLATES	PLT 2.250 X 7.130 X 4.000	24590-HLW-MX-30-00014004	AISI 316L	12.9
4	6	UPPER POSITION INDICATOR BUSING BUNG	RD BAR Ø1.500 X 1.500	24590-HLW-MX-30-00014005	AISI 316L	0.3
5	6	SPRING PIN, 1/4" X 1/2" LG			18-8 STAINLESS STEEL	0.00
6	6	BUSHING, .75 ID X 1 OD X 1.5 LG		-	SAE 841 BRONZE	0.2

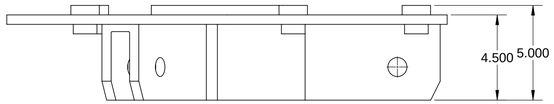
NOTES

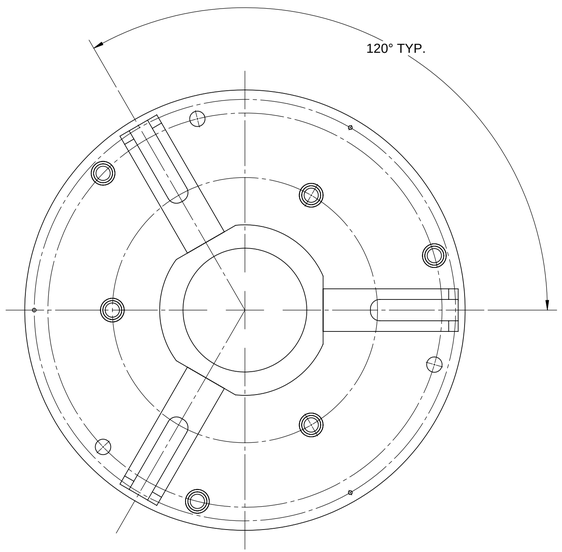
1. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
2. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
3. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.
4. WELD IN ACCORDANCE WITH AWS D1.6.

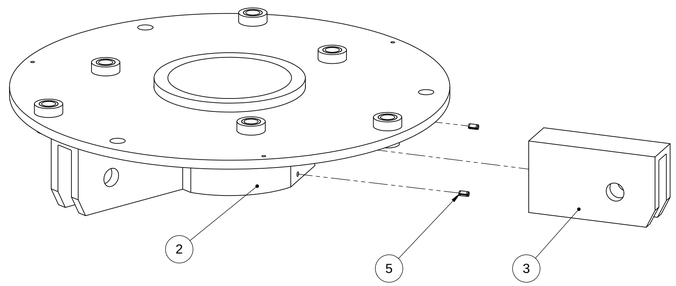












REFERENCE DRAWINGS

DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSEMBLY

DRAWING INDEX

DWG NO.	TITLE
24590-HLW-MX-30-00014001	HLW VIT SYS FAB DWG UPPER LIFTING FRAME
24590-HLW-MX-30-00014002	HLW VIT SYS FAB DWG UPPER LIFTING FRAME MOUNT PLATE
24590-HLW-MX-30-00014003	HLW VIT SYS FAB DWG UPPER LIFTING FRAME CENTER TUBE
24590-HLW-MX-30-00014004	HLW VIT SYS FAB DWG UPPER LIFTING FRAME UPPER LIFTING ARM ATTACHMENT PLATES
24590-HLW-MX-30-00014005	HLW VIT SYS FAB DWG UPPER LIFTING FRAME UPPER POSITION INDICATOR BUSING BUNG

QUALITY DESIGNATOR: Q

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

Originator — By: Lacey Lancaster - llancast — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Reviewed No Comments — By: Ian Kincaid - ikincaid — Org Name: HLW - Mechanical Handling — Placed: Aug 23, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 130.4 LBS

SUPPLIER DWG NO.

Issued By RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING UPPER LIFTING FRAME

SCALE: 1:4

24590-HLW-MX-30-00014001

REV 0

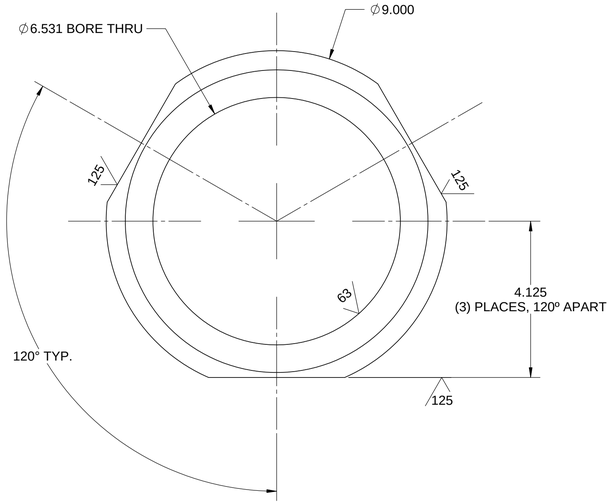
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00014
DATE: 8/15/2024 12:34:17 PM

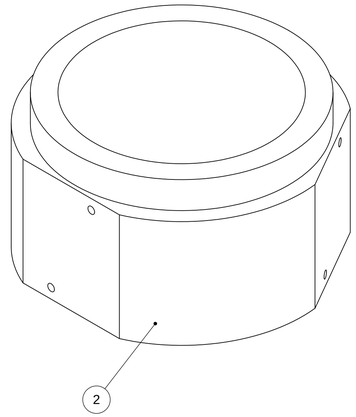
FORMAT WTP ANSI INCH SIZE D (22x34)

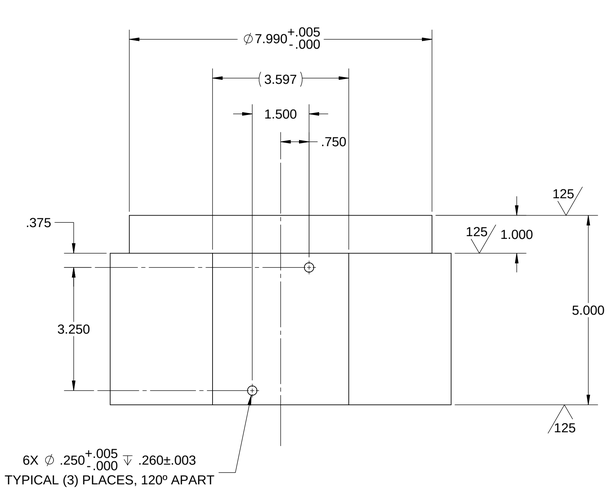
'D' SIZE - 22in*34in

NOTES:

FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00014001.







REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

QUALITY DESIGNATOR: Q

Originator — By: Lanny Lancaster - llancast — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Reviewed No Comments — By: Ian Kincaid - ikincaid — Org Name: HLW - Mechanical Handling — Placed: Aug 23, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 130.4 LBS

SUPPLIER DWG NO.

Issued By RPP-WTP PDC

ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	30 (HLW)	
	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING UPPER LIFTING FRAME CENTER TUBE

SCALE: 1:2

24590-HLW-MX-30-00014003

REV 0

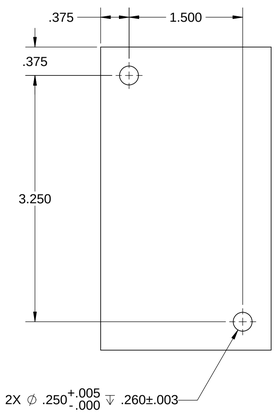
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00014
DATE: 8/15/2024 12:34:17 PM

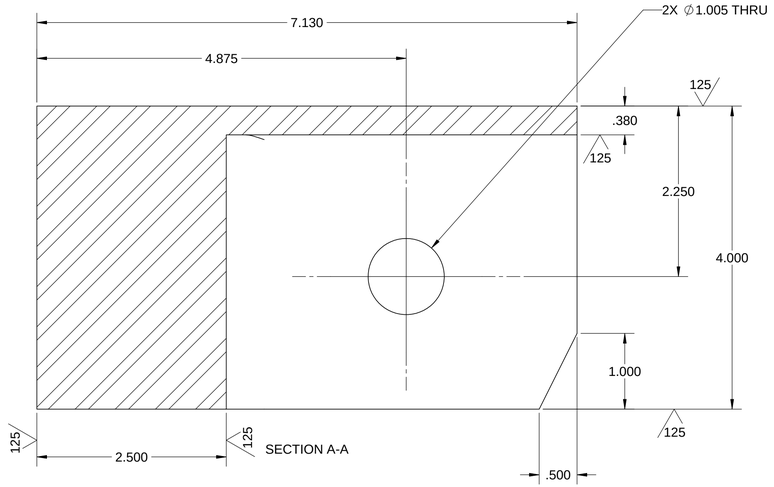
FORMAT WTP ANSI INCH SIZE D (22x34)

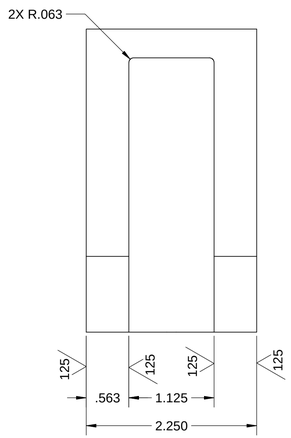
'D' SIZE - 22in*34in
COMPUTER GENERATED - MANUAL
DESIGN CHANGES NOT PERMITTED

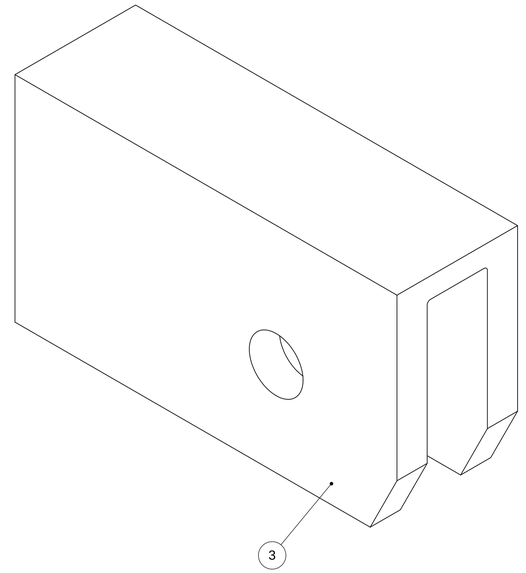
NOTES:

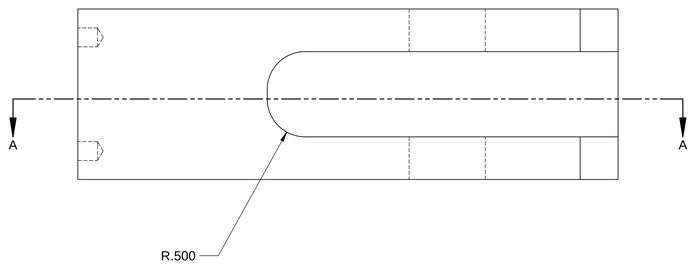
FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00014001.











QUALITY DESIGNATOR	REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
Q	0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

Originator — By: Laura Lancaster - llancast — Org Name: HLW Mechanical Handling — Dated: Aug 22, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Dated: Aug 22, 2024

Reviewed No Comments — By: Ian Kincaid - ikincaid — Org Name: HLW - Mechanical Handling — Dated: Aug 23, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Dated: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5˚

WEIGHT 130.4 LBS

SUPPLIER DWG NO.

Issued By RPP-WTP PDC

ISSUE STAMP

PROJECT No.	24590		
SITE	HANFORD		
AREA	200E		
BUILDING No.	30 (HLW)		
	BY		DATE
ORIGINATOR	L. LANCASTER		8/22/2024
CHECKER	K. DRAPER		8/22/2024
REVIEWER	I. KINCAID		8/23/2024
APPROVER	J. SCHAEFFER		9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING UPPER LIFTING FRAME UPPER LIFTING ARM ATTACHMENT PLATES

SCALE:		REV
1:1	24590-HLW-MX-30-00014004	0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00014004
DATE: 8/15/2024 12:34:17 PM

FORMAT WTP ANSI INCH SIZE D (22x34)

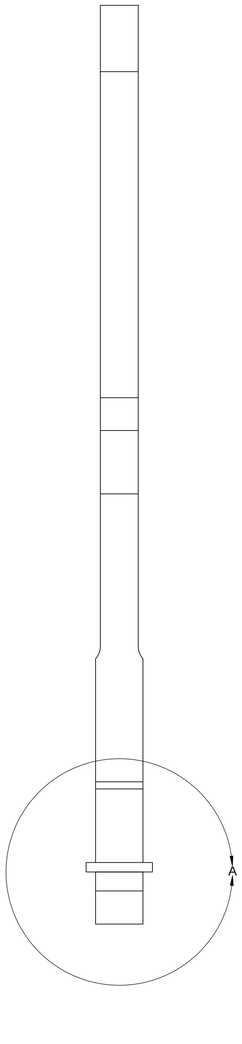
'D' SIZE - 22in*34in

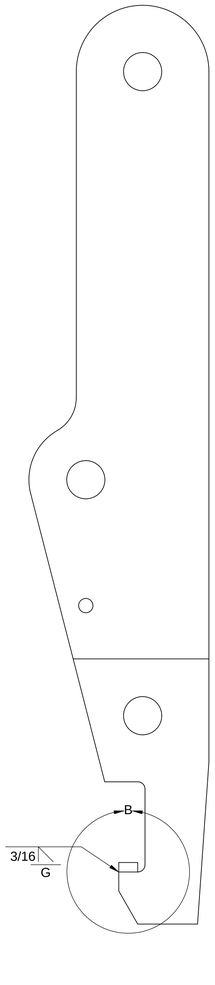
BILL OF MATERIALS

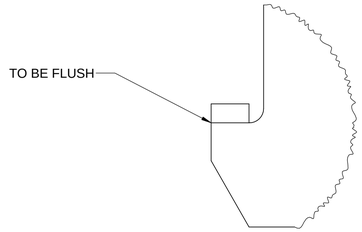
ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	LIFTING ARM PLATE	PLT 1.250 X 24.250 X 4.750	24590-HLW-MX-30-00015002	NITRONIC 50 (XM-19) (UNS S20910)	22.6
2	1	LIFTING ARM TOOTH	PLT .250 X 1.750 X .500	24590-HLW-MX-30-00015003	AISI 316L	0.1

NOTES:

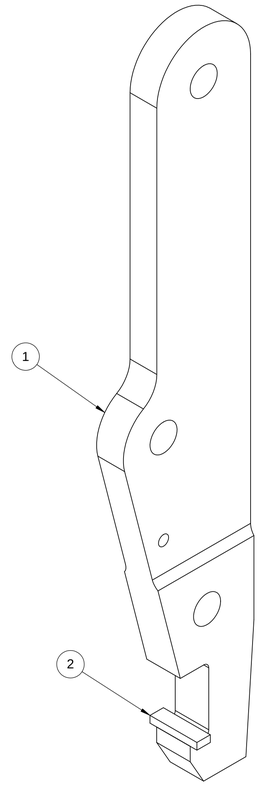
1. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
2. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
3. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.
4. WELD IN ACCORDANCE WITH AWS D1.6.
5. THE CONTENTS OF THIS DRAWING IS WASTE ACCEPTANCE IMPACTING (WAI). REFER TO 24590-HLW-RPT-PR-01-001 AND 24590-HLW-WIQP-MH-09-0006.

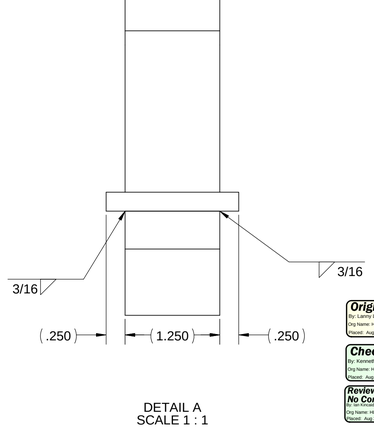






DETAIL B
SCALE 1 : 1





DETAIL A
SCALE 1 : 1

REFERENCE DRAWINGS

DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSEMBLY

DRAWING INDEX

DWG NO.	TITLE
24590-HLW-MX-30-00015001	HLW VIT SYS FAB DWG LIFTING ARM ASSY
24590-HLW-MX-30-00015002	HLW VIT SYS FAB DWG LIFTING ARM ASSY LIFTING ARM PLATE DETAIL
24590-HLW-MX-30-00015003	HLW VIT SYS FAB DWG LIFTING ARM ASSY LIFTING ARM TOOTH DETAIL

Q
QUALITY DESIGNATOR

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

Originator
By: Lanny Lancaster - llancast
Org Name: HLW Mechanical Handling
Razed: Aug 22, 2024

Checked
By: Kenneth D. Draper - kddraper
Org Name: HLW Mechanical Handling
Razed: Aug 22, 2024

Reviewed
No Comments
By: Ian Kincaid - ikincaid
Org Name: HLW - Mechanical Handling
Razed: Aug 23, 2024

Approved
By: Jason Schaeffer - jschaef2
Org Name: HLW - Mechanical Handling
Razed: Sep 09, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5˚

WEIGHT 22.6 LBS

SUPPLIER DWG NO.

Issued By
RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING ARM ASSEMBLY

SCALE: 1:2

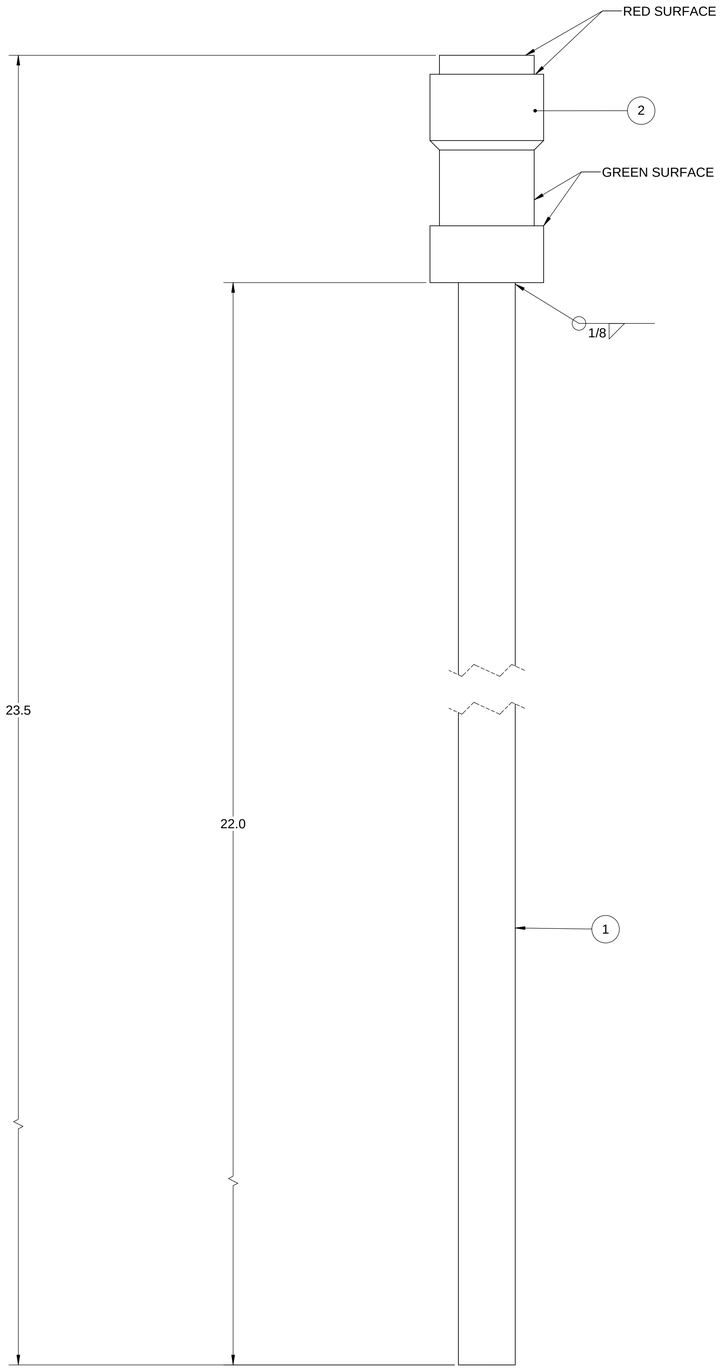
24590-HLW-MX-30-00015001

REV 0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00015
DATE: 8/15/2024 12:36:31 PM

FORMAT WTP ANSI INCH SIZE D (22x34)

'D' SIZE - 22in*34in
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED



COLOR CODE EXPLANATION:
DISENGAGED:
-WHEN GRAPPLE IS DISENGAGED FROM THE CANISTER THE ROD IS POSITIONED DOWN EXPOSING ONLY RED, INDICATING THERE IS NOT A CANISTER PROPERLY LOCATED UNDER THE GRAPPLE.
ENGAGED:
-WHEN GRAPPLE IS ENGAGED TO A CANISTER THE ROD IS PUSHED UPWARD EXPOSING GREEN, INDICATING THERE IS A CANISTER PROPERLY LOCATED UNDER THE GRAPPLE.
(THE MOVEMENT OF THIS ROD IS OPPOSITE OF THE LIFTING ARM ROD)

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	CANISTER POSITION INDICATOR ROD	RD BAR Ø.375 X 22.375	24590-HLW-MX-30-00016002	AISI 316L	0.7
2	1	CANISTER POSITION INDICATOR TOP	RD BAR Ø.750 X 1.500	24590-HLW-MX-30-00016003	AISI 316L	0.2

NOTES:
1. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
2. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
3. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.
4. WELD IN ACCORDANCE WITH AWS D1.6.
5. THE CONTENTS OF THIS DRAWING IS WASTE ACCEPTANCE IMPACTING (WAI). REFER TO 24590-HLW-RPT-PR-01-001 AND 24590-HLW-WIQP-MH-09-0006.

REFERENCE DRAWINGS

DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSEMBLY

DRAWING INDEX

DWG NO.	TITLE
24590-HLW-MX-30-00016001	HLW VIT SYS FAB DWG CANISTER POSITION INDICATOR
24590-HLW-MX-30-00016002	HLW VIT SYS FAB DWG CANISTER POSITION INDICATOR ROD DETAIL
24590-HLW-MX-30-00016003	HLW VIT SYS FAB DWG CANISTER POSITION INDICATOR TOP DETAIL

QUALITY DESIGNATOR: Q

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

Originator — By: Lance Lancaster - llancast — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024
Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024
Reviewed No Comments — By: Ian Kincaid - ikincaid — Org Name: HLW - Mechanical Handling — Placed: Aug 23, 2024
Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5˚

WEIGHT 0.9 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC
ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING CANISTER POSITION INDICATOR

SCALE: 2:1

24590-HLW-MX-30-00016001

REV 0

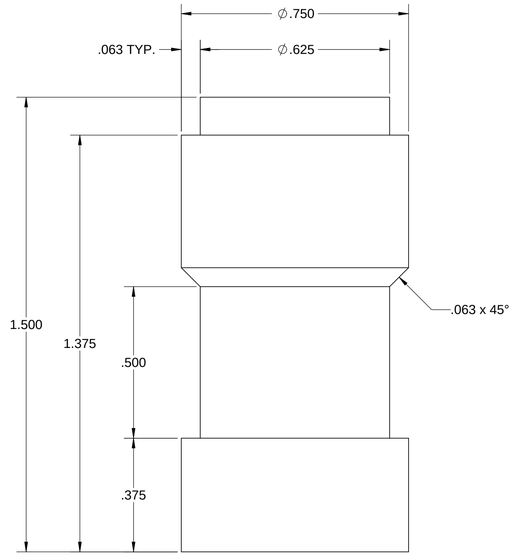
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00016
DATE: 8/21/2024 6:42:41 AM

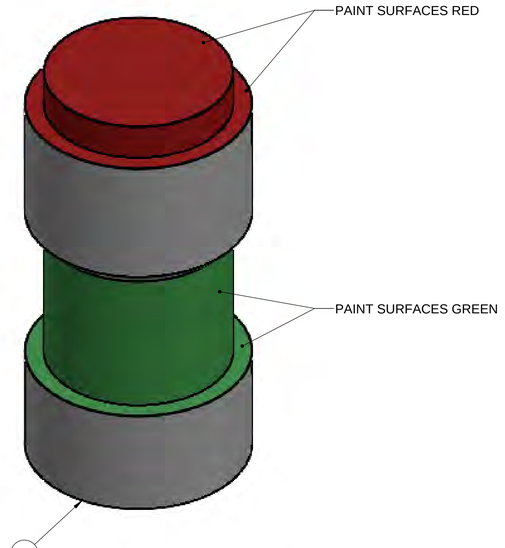
FORMAT WTP ANSI INCH SIZE D (22x34)

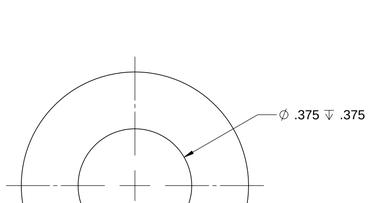
'D' SIZE - 22in*34in

NOTES:

FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00016001.







REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

QUALITY DESIGNATOR: Q

Originator — By: Lundy Lancaster - llancast — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Reviewed No Comments — By: Ian Kincaid - imkincaid — Org Name: HLW - Mechanical Handling — Placed: Aug 23, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 0.9 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING CANISTER POSITION INDICATOR TOP DETAIL

SCALE: 4:1

24590-HLW-MX-30-00016003

REV 0

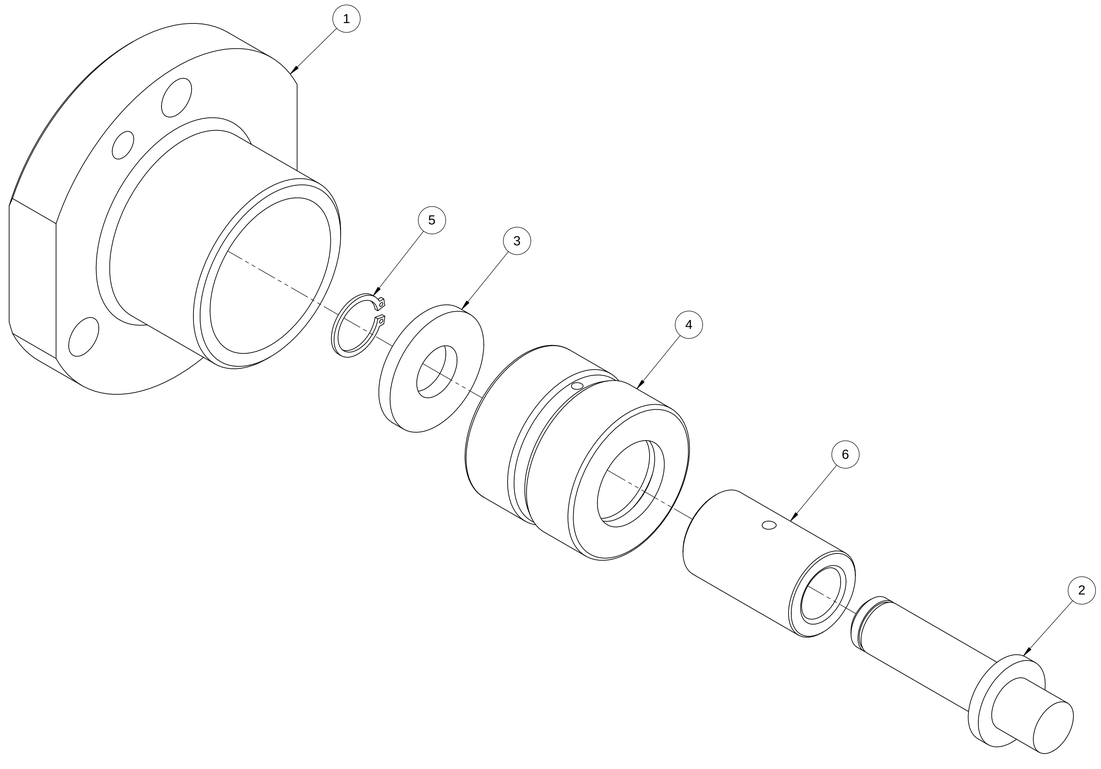
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00016
DATE: 8/21/2024 6:42:41 AM

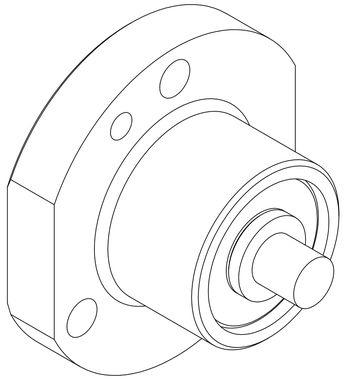
FORMAT WTP ANSI INCH SIZE D (22x34)

"D" SIZE - 22in*34in

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	CAM FOLLOWER HOUSING	RD BAR 2.500 X 1.313	24590-HLW-MX-30-00018002	AISI 316L	0.6
4 2	1	CAM FOLLOWER	RD BAR .625 X 1.750	24590-HLW-MX-30-00018003	17-4 PH H1150	0.1
3	1	CAM FOLLOWER WASHER	RD BAR .875 X .105	24590-HLW-MX-30-00018004	AISI 316L	0.0
4	1	BEARING, .375 SHAFT X 1.125 OD X 1" WIDE		-	STAINLESS STEEL	0.2
5	1	RETAINING RING FOR .375 SHAFT		-	STAINLESS STEEL	0.0
6	1	BEARING, INNER RACE, .375" BORE X 1.2490" O.D. X 1.010" WIDE		-	AISI 316	0.1

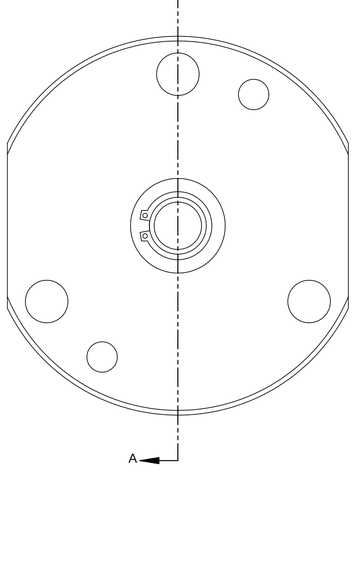


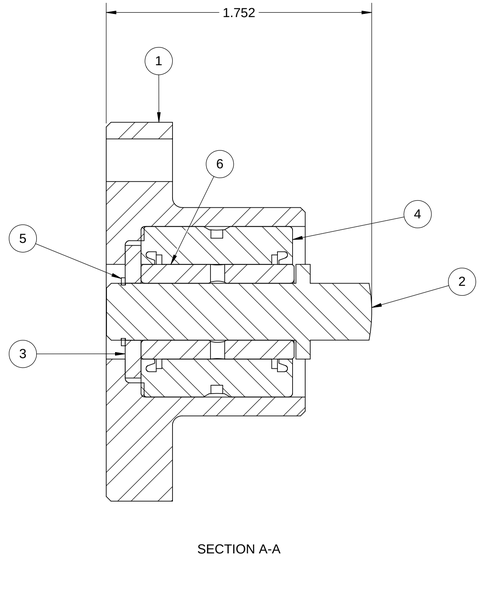


NOTES:

1. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
2. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
3. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.

4 DICRONITE DRY LUBRICANT APPLIED TO PART.





SECTION A-A

REFERENCE DRAWINGS	
DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSEMBLY

DRAWING INDEX	
DWG NO.	TITLE
24590-HLW-MX-30-00018001	HLW VIT SYS FAB DWG CAM FOLLOWER ASSY
24590-HLW-MX-30-00018002	HLW VIT SYS FAB DWG CAM FOLLOWER ASSY CAM FOLLOWER HOUSING DETAIL
24590-HLW-MX-30-00018003	HLW VIT SYS FAB DWG CAM FOLLOWER ASSY CAM FOLLOWER DETAIL
24590-HLW-MX-30-00018004	HLW VIT SYS FAB DWG CAM FOLLOWER ASSY CAM FOLLOWER WASHER DETAIL

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

QUALITY DESIGNATOR: Q

Originator — By: Larry Lancaster - llancast — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Reviewed No Comments — By: Ian Kincaid - ikincaid — Org Name: HLW - Mechanical Handling — Placed: Aug 23, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 0.9 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	30 (HLW)	
	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING CAM FOLLOWER ASSEMBLY

SCALE: 2:1

24590-HLW-MX-30-00018001

REV 0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00018
DATE: 8/21/2024 12:42:29 PM

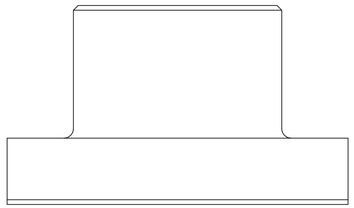
FORMAT WTP ANSI INCH SIZE D (22x34)

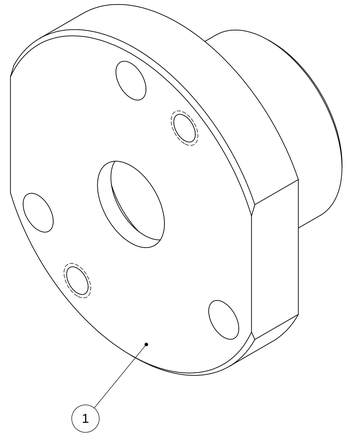
'D' SIZE - 22in*34in

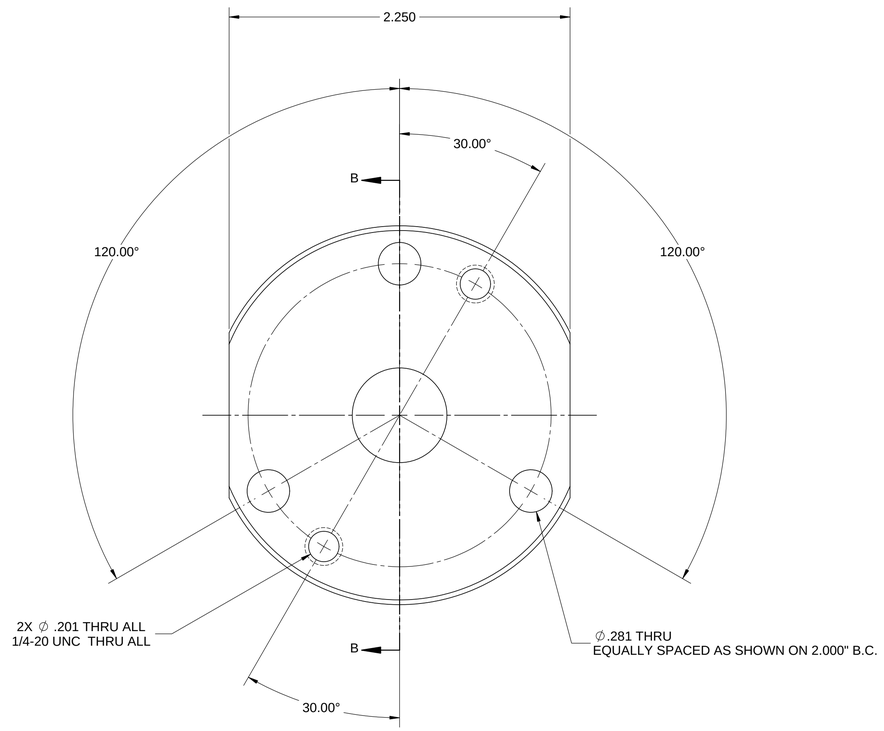
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

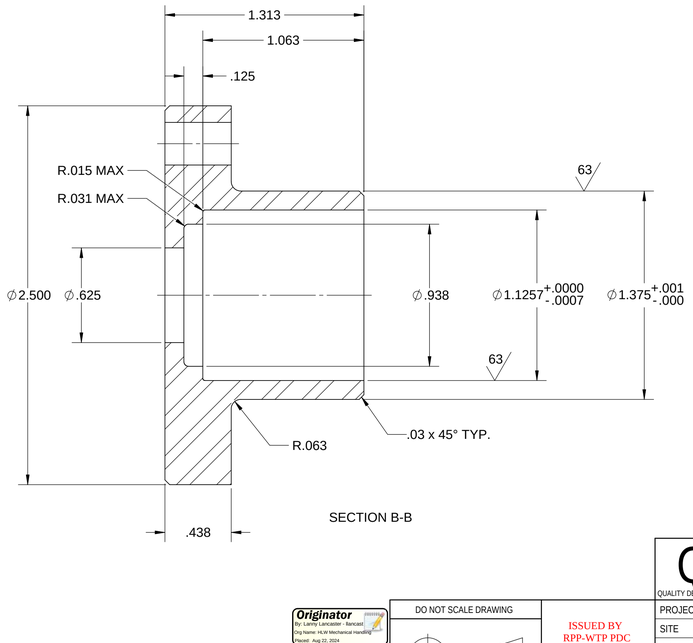
NOTES:

FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00018001.









SECTION B-B

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

QUALITY DESIGNATOR: Q

Originator — By: Lancaster - llancast — Org Name: HLW Mechanical Handling — Dated: Aug 22, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Dated: Aug 22, 2024

Reviewed No Comments — By: Incaid - IKincaid — Org Name: HLW - Mechanical Handling — Dated: Aug 23, 2024

Approved — By: Jayden Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Dated: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 0.9 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING CAM FOLLOWER ASSEMBLY CAM FOLLOWER HOUSING DETAIL

SCALE: 2:1

24590-HLW-MX-30-00018002

REV 0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00018
DATE: 8/21/2024 12:42:29 PM

FORMAT WTP ANSI INCH SIZE D (22x34)

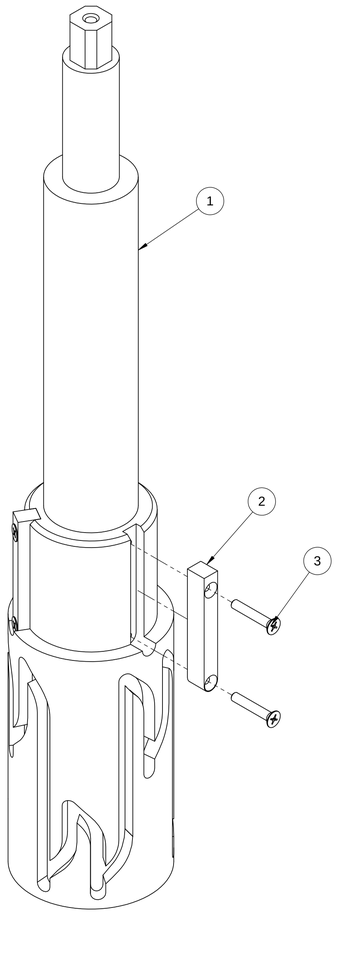
'D' SIZE - 22in*34in

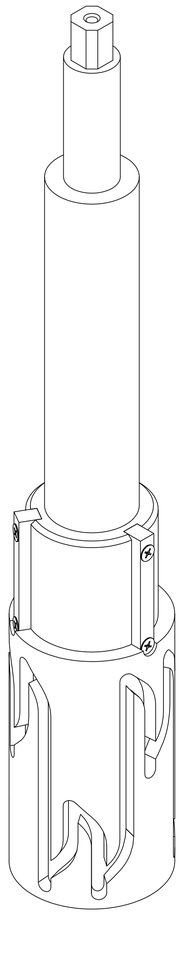
BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	CAM SHAFT	RD BAR 4.375 X 27.250	24590-HLW-MX-30-00019002	AISI 316L	58.0
2	3	CAM KEY	SQ BAR .625 X 3.500	24590-HLW-MX-30-00019004	AISI 316L	0.3
3	6	FLAT HEAD MACHINE SCREW (PH) UNC SS 304 PLAIN		-	AISI 304	0.0

NOTES:

1. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
2. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
3. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.
4. THE CONTENTS OF THIS DRAWING IS WASTE ACCEPTANCE IMPACTING (WAI). REFER TO 24590-HLW-RPT-PR-01-001 AND 24590-HLW-WIQP-MH-09-0006.





REFERENCE DRAWINGS

DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSEMBLY

DRAWING INDEX

DWG NO.	TITLE
24590-HLW-MX-30-00019001	HLW VIT SYS FAB DWG VERTICAL CAM SHAFT ASSY
24590-HLW-MX-30-00019002	HLW VIT SYS FAB DWG VERTICAL CAM SHAFT ASSY CAM SHAFT
24590-HLW-MX-30-00019003	HLW VIT SYS FAB DWG VERTICAL CAM SHAFT ASSY CAM LAYOUT - FLAT DEVELOPMENT
24590-HLW-MX-30-00019004	HLW VIT SYS FAB DWG VERTICAL CAM SHAFT ASSY CAM KEY

QUALITY DESIGNATOR: Q

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

Originator
By: Lanny Lancaster - llancast
Org Name: HLW Mechanical Handling
Dated: Aug 22, 2024

Checked
By: Kenneth D. Draper - kddraper
Org Name: HLW Mechanical Handling
Dated: Aug 22, 2024

Reviewed
No Comments
By: Isaac Kincaid - ikincaid
Org Name: HLW - Mechanical Handling
Dated: Aug 23, 2024

Approved
By: Jason Schaeffer - jschaef2
Org Name: HLW - Mechanical Handling
Dated: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 59.1 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

		BY	DATE
ORIGINATOR		L. LANCASTER	8/22/2024
CHECKER		K. DRAPER	8/22/2024
REVIEWER		I. KINCAID	8/23/2024
APPROVER		J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING VERTICAL CAM SHAFT ASSEMBLY

SCALE: 1:2

24590-HLW-MX-30-00019001

REV 0

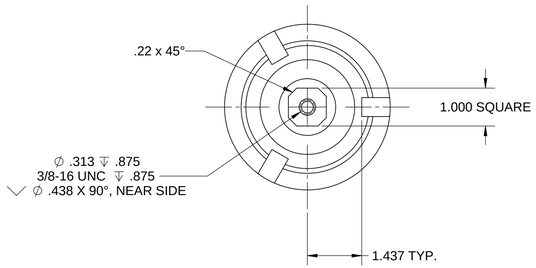
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00019
DATE: 9/19/2024 1:04:25 PM

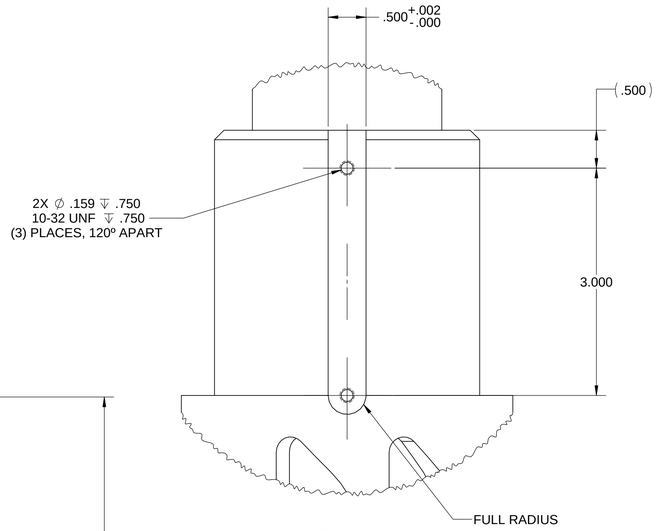
FORMAT WTP ANSI INCH SIZE D (22x34)

'D' SIZE - 22in*34in

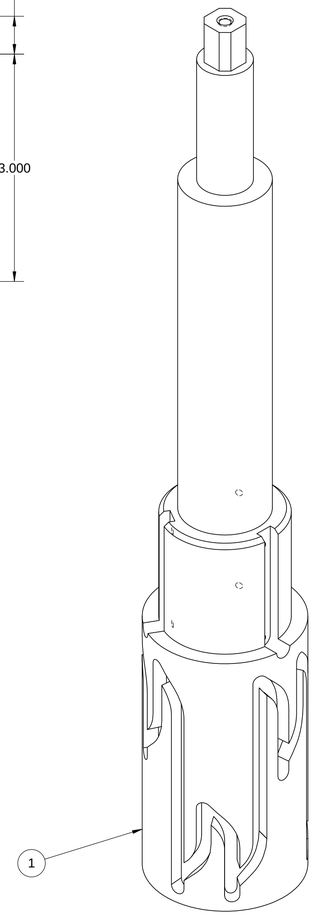
NOTES:

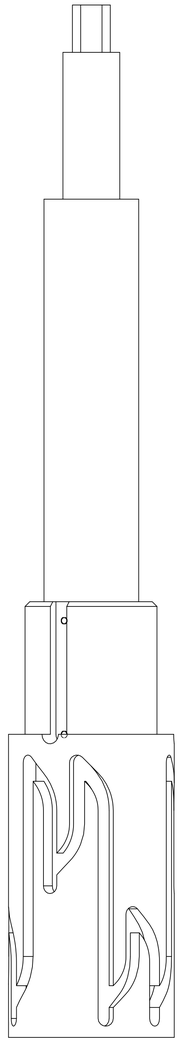
FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00019001.

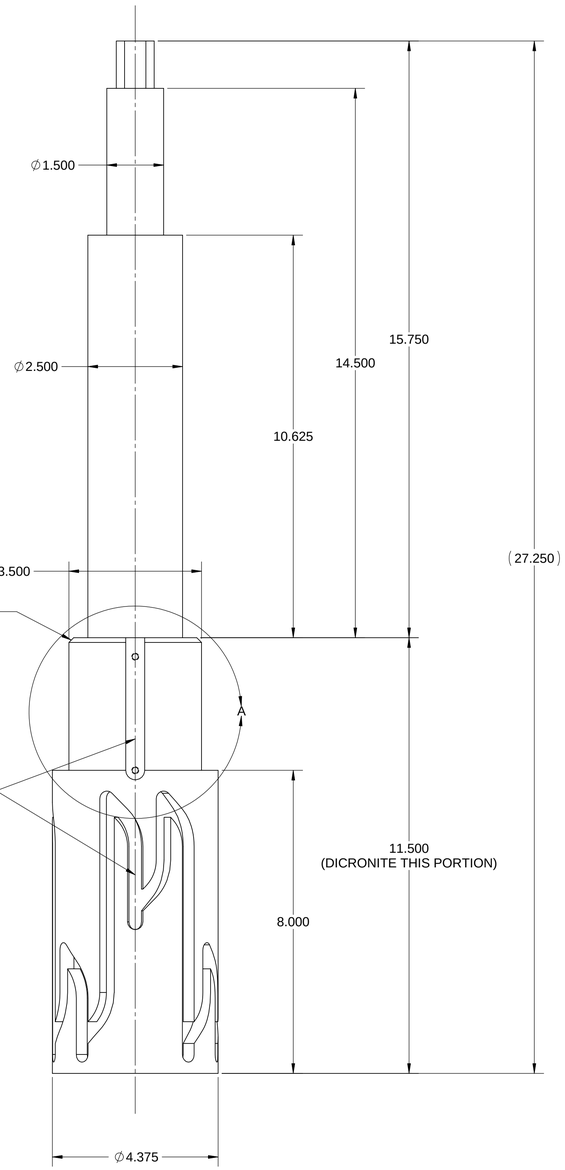




DETAIL A
SCALE 1 : 1







REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

QUALITY DESIGNATOR: Q

Originator — By: Lamia Lancaster - llancast — Org Name: HLW Mechanical Handling — Signed: Aug 22, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Signed: Aug 22, 2024

Reviewed — No Comments — By: Ian Kincaid - ikincaid — Org Name: HLW - Mechanical Handling — Signed: Aug 23, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Signed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 59.1 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	30 (HLW)	
	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING VERTICAL CAM SHAFT ASSEMBLY CAM SHAFT

SCALE: 1:2

24590-HLW-MX-30-00019002

REV 0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00019
DATE: 8/15/2024 1:04:25 PM

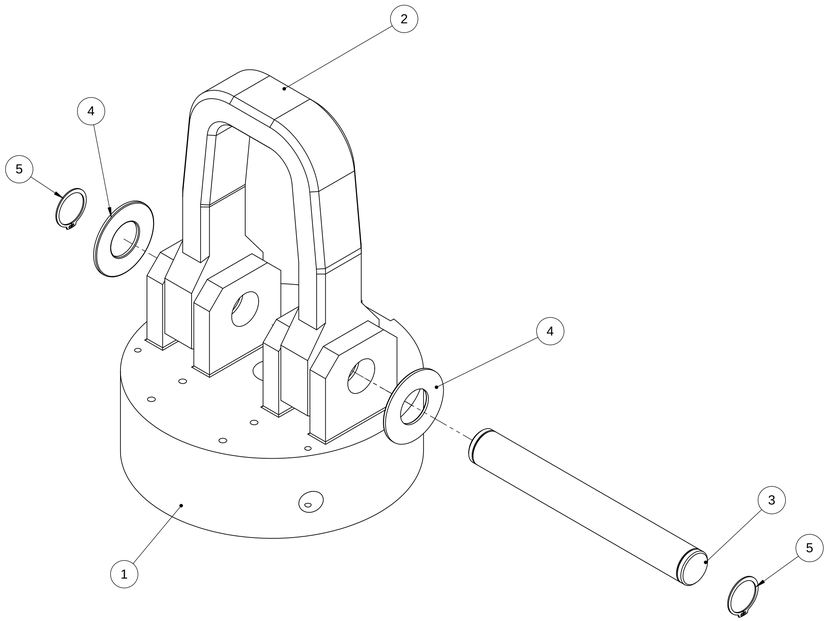
FORMAT WTP ANSI INCH SIZE D (22x34)

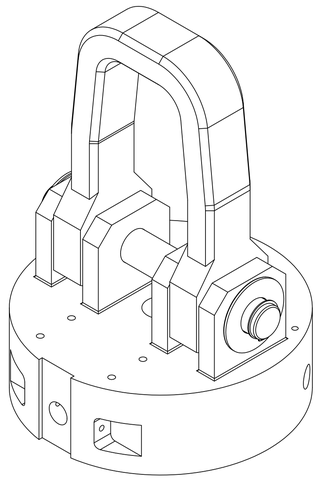
"D" SIZE - 22in*34in

COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

BILL OF MATERIALS

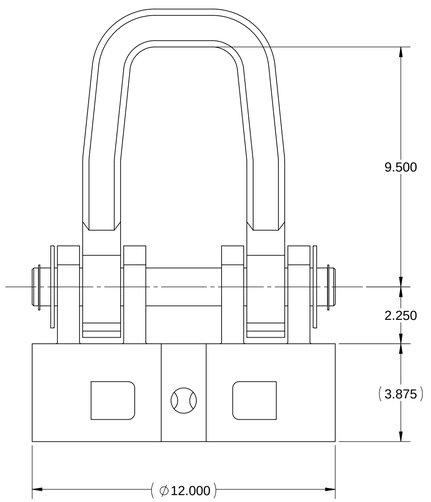
ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	LIFTING SHACKLE ATTACHMENT LUG	RD BAR Ø12.000 X 7.750	24590-HLW-MX-30-00020002	AISI 316L	116.2
2	1	HOOK ATTACHMENT SHACKLE	PLT 4.000 X 8.000 X 13.000	24590-HLW-MX-30-00020003	17-4 PH H1150	32.4
3	1	SHACKLE PIN	RD BAR Ø1.500 X 12.000	24590-HLW-MX-30-00020004	17-4 PH H1150	6.0
4	2	WASHER: OVERSIZED, 1 1/2" SCREW SIZE, 1.562" ID, 3.25" OD			AISI 316	
5	2	EXTERNAL RETAINING RING SH-150ST			STAINLESS STEEL	0.0

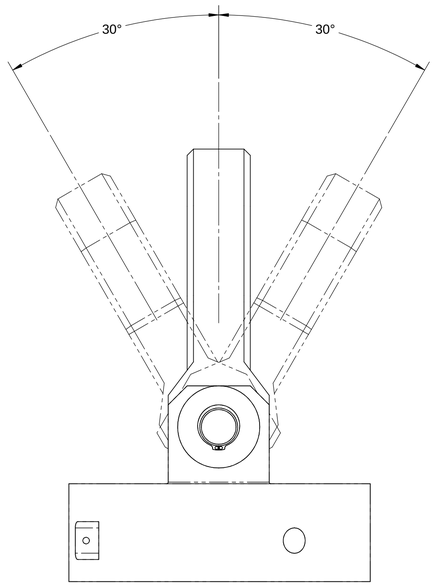




NOTES:

1. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
2. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
3. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.
4. THE CONTENTS OF THIS DRAWING IS WASTE ACCEPTANCE IMPACTING (WAI). REFER TO 24590-HLW-RPT-PR-01-001 AND 24590-HLW-WIQP-MH-09-0006.





REFERENCE DRAWINGS

DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSEMBLY

DRAWING INDEX

DWG NO.	TITLE
24590-HLW-MX-30-00020001	HLW VIT SYS FAB DWG LIFTING SHACKLE ASSY
24590-HLW-MX-30-00020002	HLW VIT SYS FAB DWG LIFTING SHACKLE ASSY LIFTING SHACKLE ATTACHMENT LUG DETAIL
24590-HLW-MX-30-00020003	HLW VIT SYS FAB DWG LIFTING SHACKLE ASSY HOOK ATTACHMENT SHACKLE DETAIL
24590-HLW-MX-30-00020004	HLW VIT SYS FAB DWG LIFTING SHACKLE ASSY SHACKLE PIN DETAIL

QUALITY DESIGNATOR: Q

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

Originator — By: Lance Lancaster - llancast — Org Name: HLW Mechanical Handling — Signed: Aug 22, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Signed: Aug 22, 2024

Reviewed No Comments — By: Ian Kincaid - ikincaid — Org Name: HLW - Mechanical Handling — Signed: Aug 23, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Signed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5˚

WEIGHT 155.2 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING SHACKLE ASSEMBLY

SCALE: 1:3

24590-HLW-MX-30-00020001

REV 0

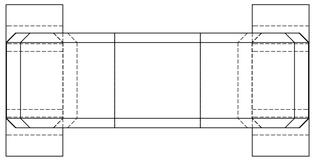
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00020001
DATE: 8/15/2024 1:05:55 PM

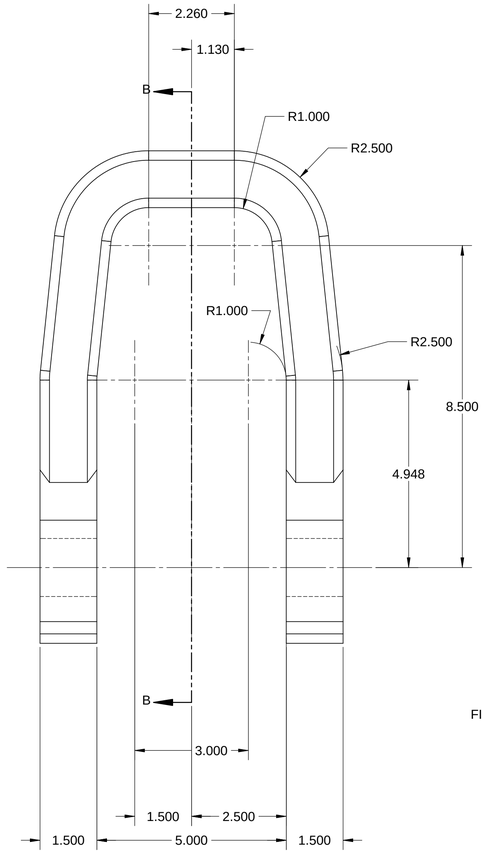
FORMAT WTP ANSI INCH SIZE D (22x34)

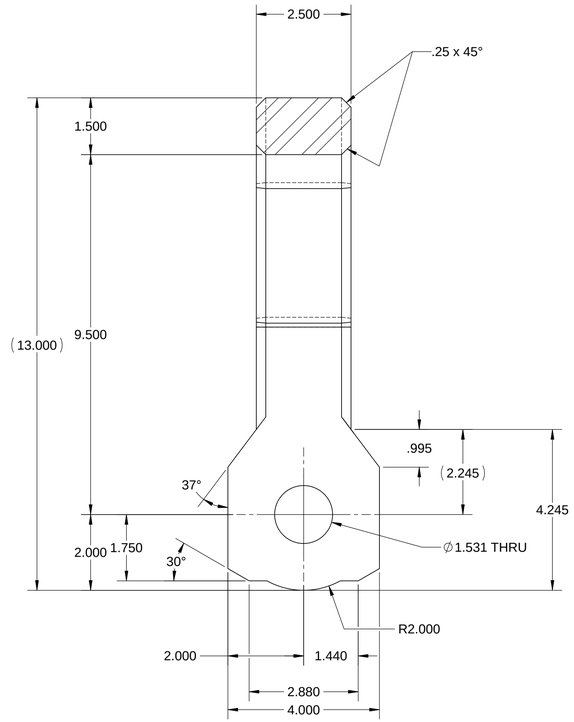
'D' SIZE - 22in*34in

NOTES:

FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00020001.

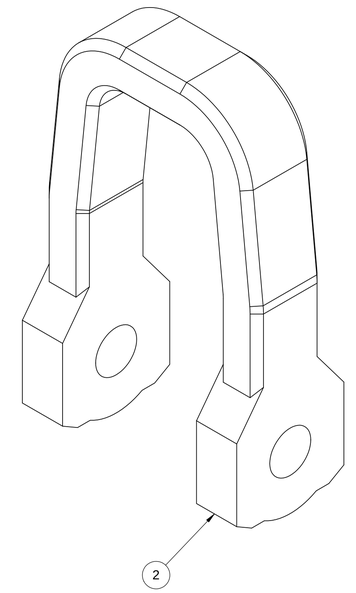






FINISH ALL OVER - 125

SECTION B-B



REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

Q QUALITY DESIGNATOR

Originator By: Kathy Lancaster - lancast Org Name: HLW Mechanical Handling Dated: Aug 22, 2024

Checked By: Kenneth D. Draper - kddraper Org Name: HLW Mechanical Handling Dated: Aug 22, 2024

Reviewed No Comments By: Isaac Kincaid - ikincaid Org Name: HLW - Mechanical Handling Dated: Aug 23, 2024

Approved By: Jason Schaeffer - jschaef2 Org Name: HLW - Mechanical Handling Dated: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 155.2 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING SHACKLE ASSEMBLY HOOK ATTACHMENT SHACKLE DETAIL

SCALE: 1:2

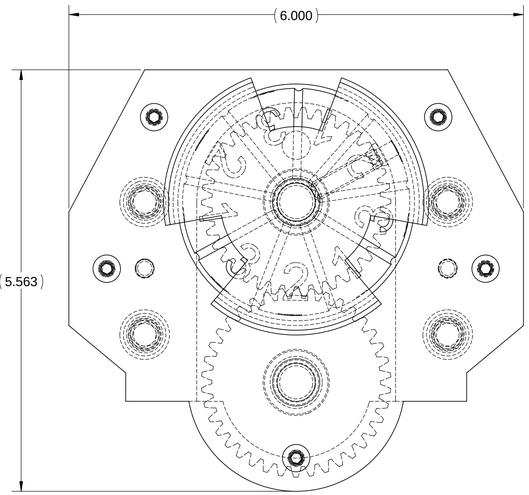
24590-HLW-MX-30-00020003

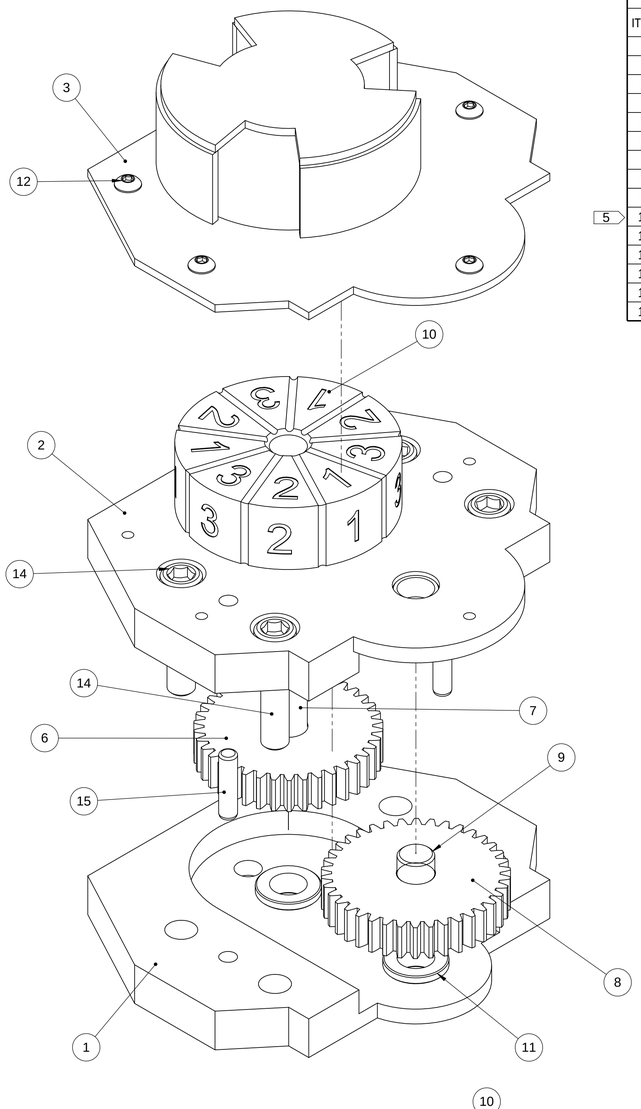
REV 0

LAST SAVED BY: lancast
FILE NAME: 24590-HLW-MX-30-00020003.dgn
DATE: 8/15/2024 1:09:55 PM

FORMAT WTP ANSI INCH SIZE D (22x34)

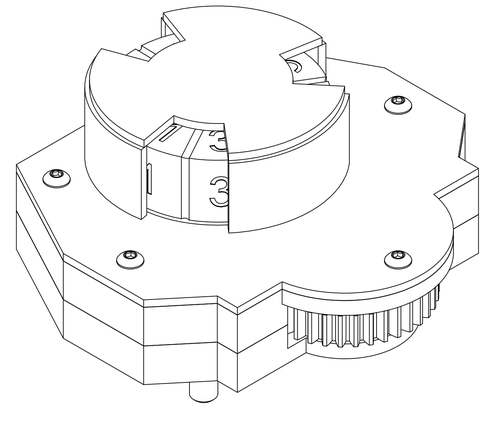
'D' SIZE - 22in*34in





BILL OF MATERIALS

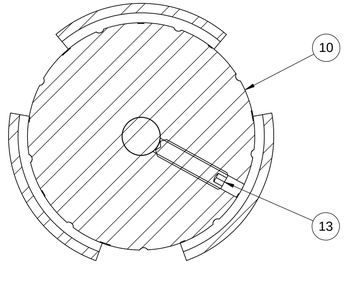
ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	GEAR BODY BOTTOM PLATE	PLT .625 X 5.125 X 6.000	24590-HLW-MX-30-00022002	AISI 316L	3.0
2	1	GEAR BODY TOP PLATE	PLT .625 X 5.563 X 6.000	24590-HLW-MX-30-00022003	AISI 316L	3.1
3	1	HOUSING COVER BASE PLATE	SHT 11GA X 5.563 X 6.000	24590-HLW-MX-30-00022004	AISI 316L	0.6
4	1	HOUSING COVER TOP PLATE	SHT 11GA X 3.375 X 3.375	24590-HLW-MX-30-00022004	AISI 316L	0.2
5	3	HOUSING COVER VERTICAL LEG	PIPE 3.500 OD X 3.250 ID X 1.125	24590-HLW-MX-30-00022004	AISI 316L	0.1
6	1	IDLER GEAR - LONG	PLT .500 X 2.500	24590-HLW-MX-30-00022005	AISI 303	0.6
7	1	IDLER GEAR ROD - LONG	RD BAR Ø.500 X 2.375	24590-HLW-MX-30-00022005	AISI 316L	0.1
8	1	IDLER GEAR - SHORT	PLT .500 X 2.500	24590-HLW-MX-30-00022006	AISI 303	0.6
9	1	IDLER GEAR ROD - SHORT	RD BAR Ø.500 X 1.125	24590-HLW-MX-30-00022006	AISI 316L	0.1
5	10	1	INDICATION CYLINDER	RD BAR Ø3.000 X 1.000	24590-HLW-MX-30-00022007	AISI 316L	2.0
11	4	FLANGED BEARING: 1/2" X 5/8" NOMINAL, 7/8" X 1/8" FLANGE, 5/16" OAL			SAE 841 BRONZE	0.0
12	5	BHCS #10-24 UNC x 0.38 LG F879 SS 304 PLAIN			AISI 304	0.0
13	1	HSSS-CUP 1/4-20 UNC x 1.00 LG F880 SS 304 PLAIN			AISI 304	0.0
14	4	SHCS 3/8-16 UNC x 1.50 LG F837 SS 316 PLAIN		-	AISI 316	0.1
15	2	STD DOWEL PIN 1/4" DIA x 1.000 LG SS 304 PLAIN		-	AISI 304	0.0



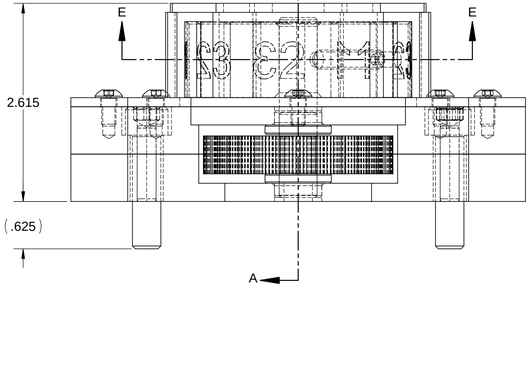
NOTES:

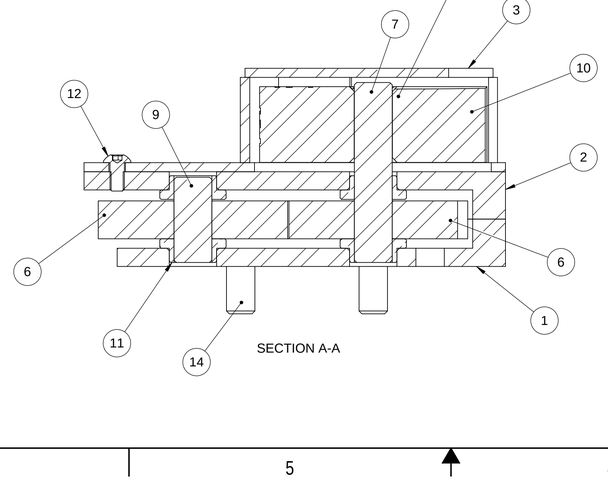
1. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
2. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
3. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.
4. WELD IN ACCORDANCE WITH AWS D1.6.

5 TO BE ANNEALED (CONDITION A).



SECTION E-E





SECTION A-A

REFERENCE DRAWINGS

DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSEMBLY

DRAWING INDEX

DWG NO.	TITLE
24590-HLW-MX-30-00022001	HLW VIT SYS FAB DWG STATUS INDICATOR ASSY
24590-HLW-MX-30-00022002	HLW VIT SYS FAB DWG STATUS INDICATOR ASSY GEAR BODY BOTTOM PLATE DETAILS
24590-HLW-MX-30-00022003	HLW VIT SYS FAB DWG STATUS INDICATOR ASSY GEAR BODY TOP PLATE DETAILS
24590-HLW-MX-30-00022004	HLW VIT SYS FAB DWG STATUS INDICATOR ASSY HOUSING COVER DETAILS
24590-HLW-MX-30-00022005	HLW VIT SYS FAB DWG STATUS INDICATOR ASSY IDLER GEAR - LONG DETAILS
24590-HLW-MX-30-00022006	HLW VIT SYS FAB DWG STATUS INDICATOR ASSY IDLER GEAR - SHORT DETAILS
24590-HLW-MX-30-00022007	HLW VIT SYS FAB DWG STATUS INDICATOR ASSY INDICATOR CYLINDER DETAILS

Q QUALITY DESIGNATOR

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

Originator By: Lanny Lancaster - llancast Org Name: HLW Mechanical Handling Placed: Aug 22, 2024

Checked By: Kenneth D. Draper - kddraper Org Name: HLW Mechanical Handling Placed: Aug 22, 2024

Reviewed No Comments By: Ian Kincaid - ikincaid Org Name: HLW - Mechanical Handling Placed: Aug 23, 2024

Approved By: Jason Schaeffer - jschaef2 Org Name: HLW - Mechanical Handling Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 11.0 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

		BY	DATE
	ORIGINATOR	L. LANCASTER	8/22/2024
	CHECKER	K. DRAPER	8/22/2024
	REVIEWER	I. KINCAID	8/23/2024
	APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING STATUS INDICATOR ASSEMBLY

SCALE: 1:1

24590-HLW-MX-30-00022001

REV 0

LAST SAVED BY: llancast
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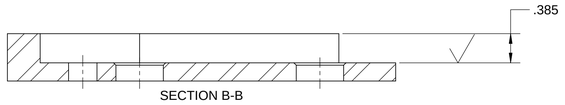
DATE: 8/13/2024 11:12:38 PM

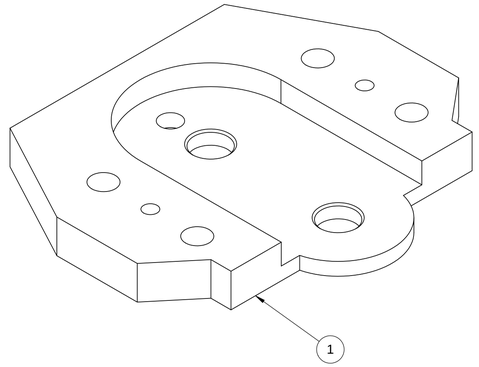
FORMAT WTP ANSI INCH SIZE D (22x34)

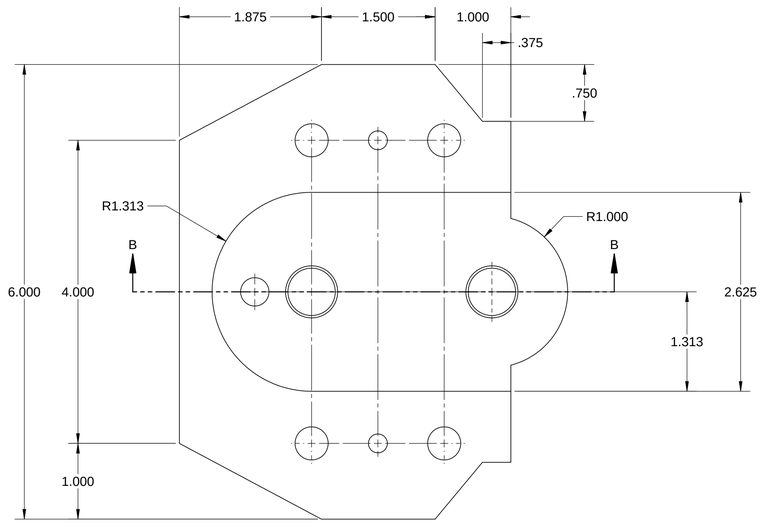
'D' SIZE - 22in*34in
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

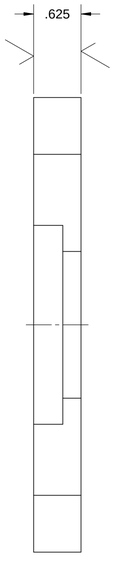
NOTES:

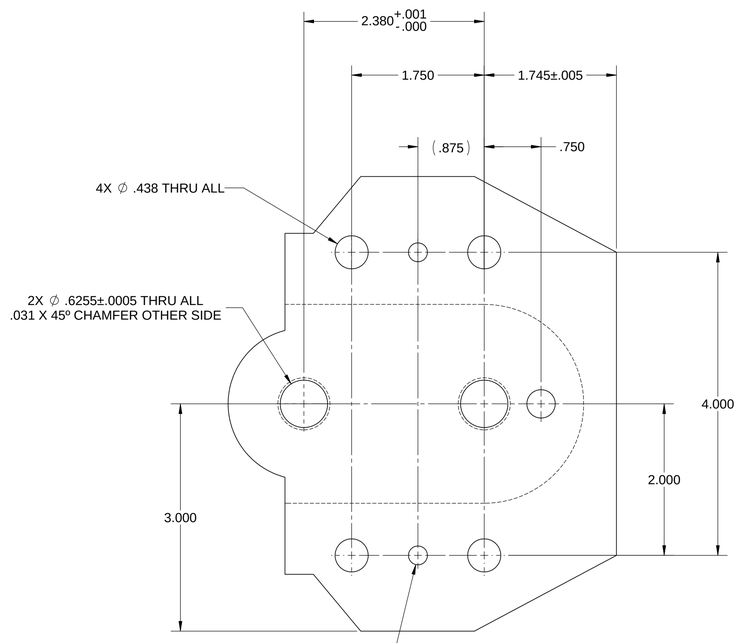
FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00022001.











Q	REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
QUALITY DESIGNATOR	0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

Originator — By: Lacey Lancaster - llancast — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Placed: Aug 22, 2024

Reviewed No Comments — By: Ian Kincaid - ikincaid — Org Name: HLW - Mechanical Handling — Placed: Aug 23, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5˚

WEIGHT 11.0 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING STATUS INDICATOR ASSEMBLY GEAR BODY BOTTOM PLATE DETAILS

SCALE: 1:1

24590-HLW-MX-30-00022002

REV 0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00022002
DATE: 8/15/2024 1:12:38 PM

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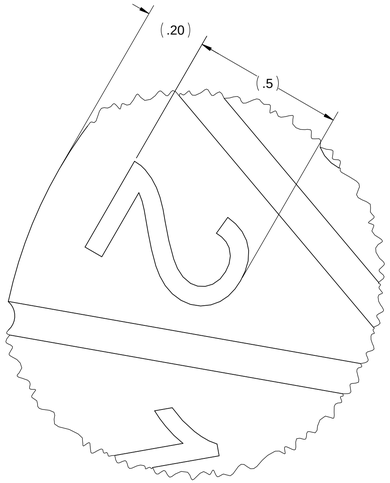
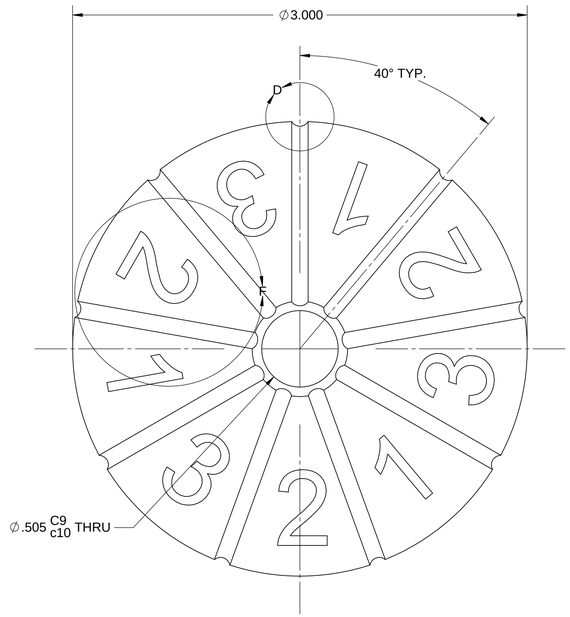
'D' SIZE - 22in*34in



DETAIL F
SCALE 4 : 1

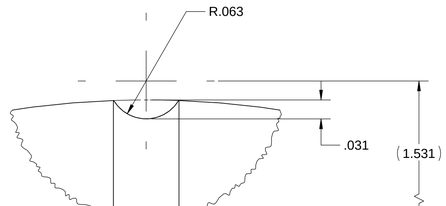


NOTES:

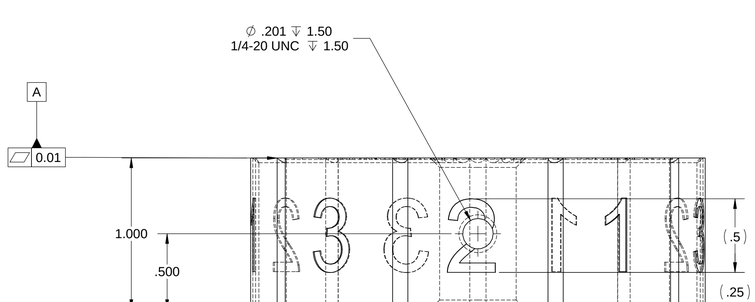
FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00022001.

GRAPPLE STATUS INDICATOR - EACH TOP FACE AND SIDE FACE OF CYLINDER SHALL BE PAINTED AND ENGRAVED WITH A CORRESPONDING NUMBER (SEE VISUAL INDICATOR TABLE) WHICH WILL PROVIDE VISUAL INDICATION OF GRAPPLE STATUS WHEN ALIGNED WITH CUT OUT IN HOUSING COVER CAP.

ENGRAVE TO A DEPTH OF .01 AND REMOVE ALL BURRS AND SHAVINGS.



DETAIL D
SCALE 8 : 1



VISUAL INDICATION TABLE		
STATUS	PAINT COLOR	ENGRAVING
GRAPPLE ENGAGED (CLOSED)	GREEN	1
FIRST SET-DOWN (CLOSED)	YELLOW	2
SECOND SET-DOWN (OPEN)	RED	3

QUALITY DESIGNATOR	REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
Q	0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

Originator — By: Lacey Lancaster - llancast — Org Name: HLW Mechanical Handling — Dated: Aug 22, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Dated: Aug 22, 2024

Reviewed No Comments — By: Ian McKid - IMCKID — Org Name: HLW - Mechanical Handling — Dated: Aug 23, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Dated: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 11.0 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No.	24590
SITE	HANFORD
AREA	200E
BUILDING No.	30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING STATUS INDICATOR ASSEMBLY INDICATOR CYLINDER DETAILS

SCALE: 2:1

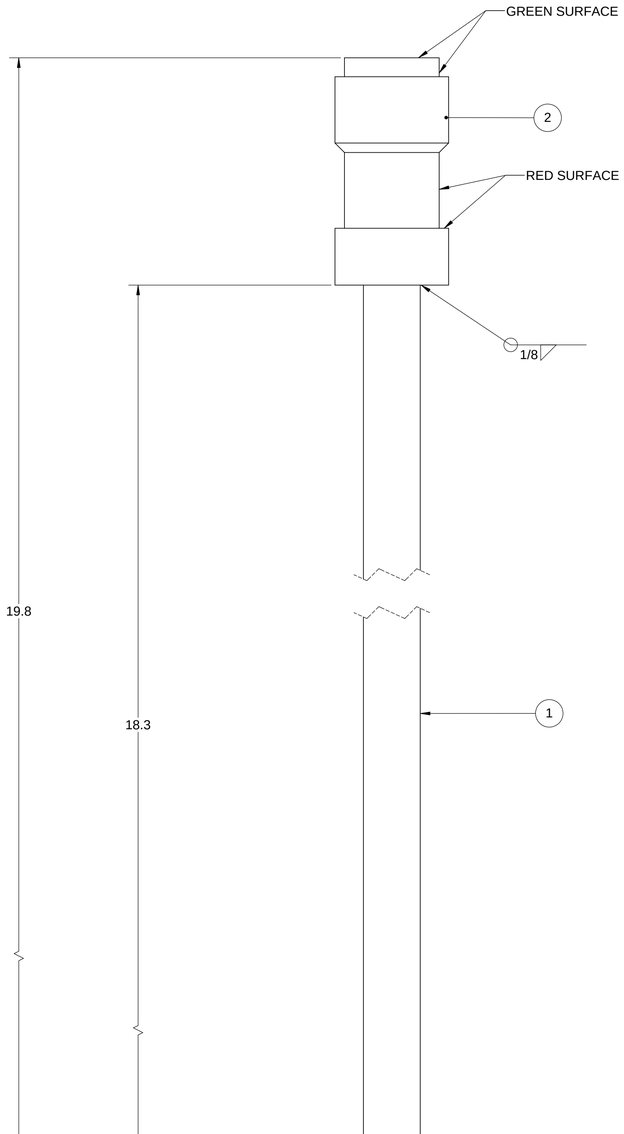
24590-HLW-MX-30-00022007

REV 0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00022
DATE: 8/15/2024 1:12:38 PM

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	LIFTING ARM POSITION INDICATOR ROD	RD BAR Ø.375 X 18.625	24590-HLW-MX-30-00023002	AISI 316L	0.6
2	1	LIFTING ARM POSITION INDICATOR TOP	RD BAR Ø.750 X 1.500	24590-HLW-MX-30-00023003	AISI 316L	0.2



COLOR CODE EXPLANATION:

DISENGAGED:
-WHEN GRAPPLE IS DISENGAGED FROM THE CANISTER THE ROD IS POSITIONED UP EXPOSING RED, INDICATING THERE IS NOT A CANISTER PROPERLY ENGAGED UNDER THE GRAPPLE.

ENGAGED:
-WHEN GRAPPLE IS ENGAGED TO THE CANISTER THE ROD IS PULLED DOWNWARD EXPOSING ONLY GREEN, INDICATING THERE IS A CANISTER PROPERLY ENGAGED UNDER THE GRAPPE.

(THE MOVEMENT OF THIS ROD IS OPPOSITE OF THE CANSITER ROD)

NOTES:

1. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
2. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
3. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.
4. WELD IN ACCORDANCE WITH AWS D1.6.

REFERENCE DRAWINGS

DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSEMBLY

DRAWING INDEX

DWG NO.	TITLE
24590-HLW-MX-30-00023001	HLW VIT SYS FAB DWG LIFTING ARM POSITION INDICATOR
24590-HLW-MX-30-00023002	HLW VIT SYS FAB DWG LIFTING ARM POSITION INDICATOR ROD DETAILS
24590-HLW-MX-30-00023003	HLW VIT SYS FAB DWG LIFTING ARM POSITION INDICATOR TOP DETAILS

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

QUALITY DESIGNATOR: Q

Originator By: Lanny Lancaster - llancast Org Name: HLW Mechanical Handling Dated: Aug 22, 2024

Checked By: Kenneth D. Draper - kddraper Org Name: HLW Mechanical Handling Dated: Aug 22, 2024

Reviewed No Comments By: Ian Kincaid - ikincaid Org Name: HLW - Mechanical Handling Dated: Aug 23, 2024

Approved By: Jason Schaeffer - jschaef2 Org Name: HLW - Mechanical Handling Dated: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 0.7 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	30 (HLW)	
	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING ARM POSITION INDICATOR

SCALE: 2:1

24590-HLW-MX-30-00023001

REV 0

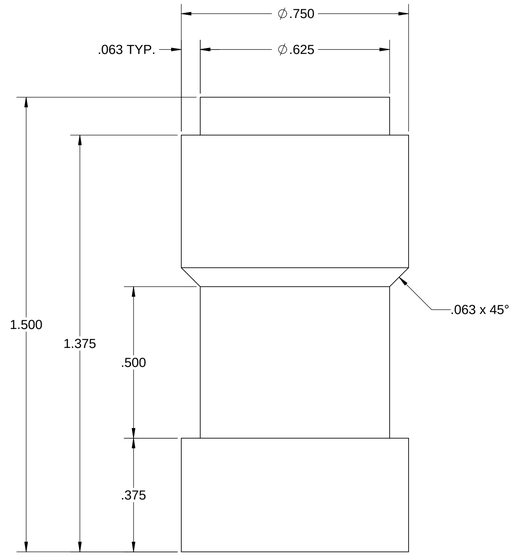
LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00023
DATE: 8/15/2024 1:13:45 PM

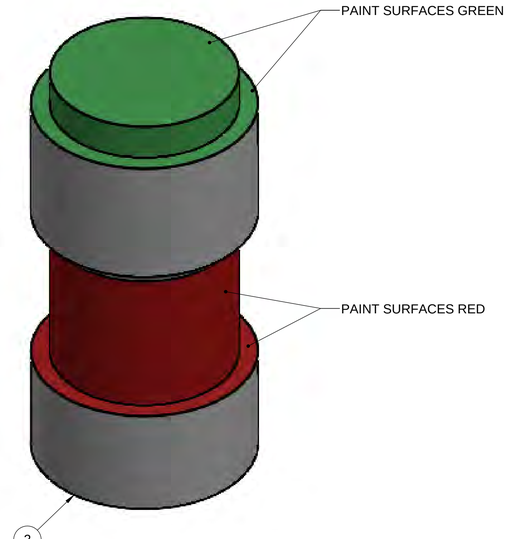
FORMAT WTP ANSI INCH SIZE D (22x34)

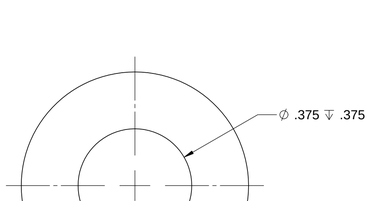
'D' SIZE - 22in*34in
COMPUTER GENERATED - MANUAL
DESIGN CHANGES NOT PERMITTED

NOTES:

FOR NOTES, DRAWING INDEX, REFERENCE DRAWINGS AND PART/MATERIAL LISTS, SEE 24590-HLW-MX-30-00023001.







REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

QUALITY DESIGNATOR: Q

Originator — By: Lance Lancaster - llancast — Org Name: HLW Mechanical Handling — Record: Aug 22, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Record: Aug 22, 2024

Reviewed No Comments — By: Ian Kincaid - ikincaid — Org Name: HLW - Mechanical Handling — Record: Aug 23, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Record: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 0.7 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	30 (HLW)	
	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING LIFTING ARM POSITION INDICATOR TOP DETAIL

SCALE: 4:1

24590-HLW-MX-30-00023003

REV 0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00023
DATE: 8/15/2024 1:13:45 PM

FORMAT WTP ANSI INCH SIZE D (22x34)

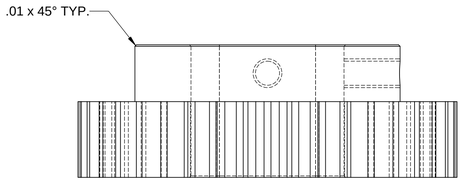
'D' SIZE - 22in*34in

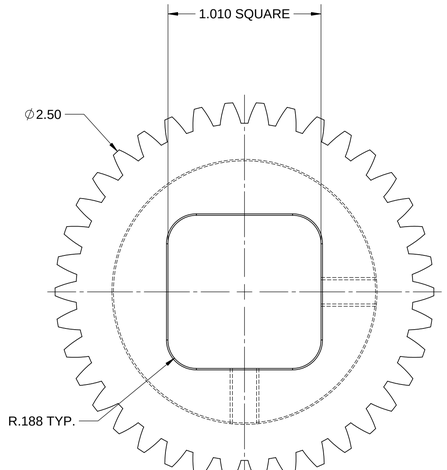
BILL OF MATERIALS

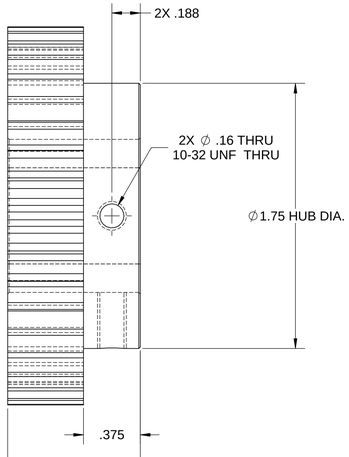
ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	DRIVE GEAR	RD BAR Ø2.500 X .875	24590-HLW-MX-30-00027001	AISI 303	0.6

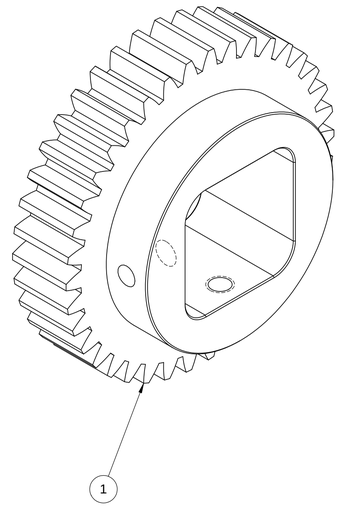
NOTES:

1. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
2. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
3. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.









SPUR GEAR DATA	
PITCH	16
PRESSURE ANGLE	20
NUMBER OF TEETH	38
PITCH DIA.	2.375
OUTSIDE DIA.	2.500
ROOT DIA.	2.230

DRAWING INDEX	
DWG NO.	TITLE
24590-HLW-MX-30-00027001	HLW VIT SYS FAB DWG DRIVE GEAR

REFERENCE DRAWINGS	
DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSEMBLY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/04/2024

REVISION HISTORY

QUALITY DESIGNATOR: Q

Originator By: Larry Lancaster - llancast, Org Name: HLW Mechanical Handling, Placed: Aug 22, 2024

Checked By: Kenneth D. Draper - kddraper, Org Name: HLW Mechanical Handling, Placed: Aug 22, 2024

Reviewed No Comments By: Ian Kincaid - ikincaid, Org Name: HLW - Mechanical Handling, Placed: Aug 23, 2024

Approved By: Jason Schaeffer - jschaeff2, Org Name: HLW - Mechanical Handling, Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 0.6 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	L. LANCASTER	8/22/2024
CHECKER	K. DRAPER	8/22/2024
REVIEWER	I. KINCAID	8/23/2024
APPROVER	J. SCHAEFFER	9/04/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

PROJECT No. 24590
SITE HANFORD
AREA 200E
BUILDING No. 30 (HLW)

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING DRIVE GEAR

SCALE: 1:2

24590-HLW-MX-30-00027001

REV 0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00027
DATE: 8/15/2024 1:27:44 PM

FORMAT WTP ANSI INCH SIZE D (22x34)

'D' SIZE - 22in*34in

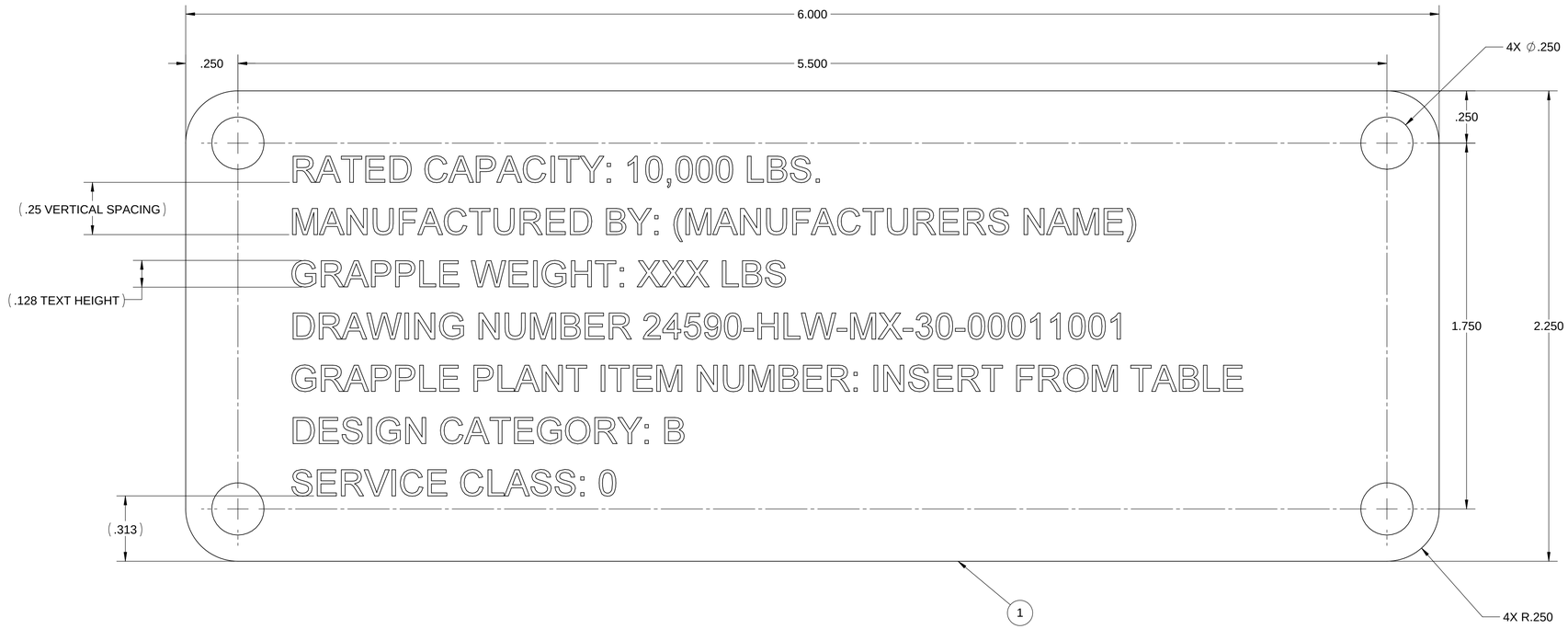
DESCRIPTION	GRAPPLE PLANT ITEM NUMBER	CRANE PLANT ITEM NUMBER	ROOM NUMBER
CANISTER DECONTAMINATION CAVE CANISTER GRAPPLE (CLEAN)	24590-HLW-FH-HDH-TOOL-00001	24590-HLW-MJ-HDH-CRN-00005	H-0133
CANISTER DECONTAMINATION CAVE CANISTER GRAPPLE (DIRTY)	24590-HLW-FH-HDH-TOOL-00004	24590-HLW-MJ-HDH-CRN-00005	H-0133
CANISTER GRAPPLE CANISTER STORAGE CAVE	24590-HLW-FH-HEH-TOOL-00001	24590-HLW-MJ-HEH-CRN-00003	H-0132
THREE JAW GRAPPLE, CANISTER HANDLING CAVE, LOWER CRANE	24590-HLW-FH-HPH-TOOL-00001	24590-HLW-MJ-HPH-CRN-00001	H-0136
THREE JAW GRAPPLE, SPARE	24590-HLW-FH-HPH-TOOL-00018	N/A	H-0329A
MECHANICAL SEQUENCE GRAPPLE	24590-HLW-FH-HRH-TOOL-00002	24590-HLW-MJ-HRH-HST-00002	H-0135A
CANISTER GRAPPLE	24590-HLW-FH-HSH-TOOL-00004	24590-HLW-MJ-HSH-CRN-00001	H-0117
THREE JAW GRAPPLE, CANISTER HANDLING CAVE, UPPER CRANE	24590-HLW-FH-HPH-TOOL-00017	24590-HLW-MJ-HPH-CRN-00002	H-0136

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	RAW MATERIAL	DOCUMENT NUMBER	MATERIAL	WEIGHT (LBS)
1	1	GRAPPLE LABEL	SHT .063 X 6.000 X 2.250	24590-HLW-MX-30-00028001	AISI 316L	0.2

NOTES:

1. MAKE ONE LABEL FOR EACH GRAPPLE PLANT ITEM NUMBER, (8) TOTAL.
2. ALL DIMENSIONS, TOLERANCES, LIMITS OF SIZE, FORM, LOCATION AND RELATED TERMINOLOGY AND SYMBOLS SHALL BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5-2018
3. BREAK ALL SHARP EDGES AND REMOVE ALL BURRS.
4. UNLESS OTHERWISE SPECIFIED, MACHINED SURFACE FINISH SHALL BE 125 MICROINCHES.
5. MANUFACTURER TO INSERT NAME IN PLACE OF "(MANUFACTURERS NAME)".
6. MANUFACTERER TO INSERT TOTAL WEIGHT, AFTER FULL ASSEMLBY, INTO "GRAPPLE WIEIGHT: XXX LBS", WHERE XXX IS TOTAL WEIGHT IN POUNDS.



DRAWING INDEX	
DWG NO.	TITLE
24590-HLW-MX-30-00028001	HLW VIT SYS FAB DWG GRAPPLE LABEL

REFERENCE DRAWINGS	
DWG NO.	TITLE
24590-HLW-MX-30-00011001	HLW VIT SYS FAB DWG GRAPPLE ASSEMBLY

QUALITY DESIGNATOR: Q

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR PROCUREMENT	LPL	KDD	IMK	JES	9/6/2024

REVISION HISTORY

Originator — By: Lance Lancaster - llancast — Org Name: HLW Mechanical Handling — Placed: Sep 06, 2024

Checked — By: Kenneth D. Draper - kddraper — Org Name: HLW Mechanical Handling — Placed: Sep 06, 2024

Reviewed No Comments — By: Ian K. Kincaid - ikincaid — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

Approved — By: Jason Schaeffer - jschaef2 — Org Name: HLW - Mechanical Handling — Placed: Sep 06, 2024

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS SPECIFIED

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONS	± 1/16"
ANGLES	± .5°

WEIGHT 0.2 LBS

SUPPLIER DWG NO.

ISSUED BY RPP-WTP PDC

ISSUE STAMP

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	30 (HLW)	
	BY	DATE
ORIGINATOR	L. LANCASTER	9/6/2024
CHECKER	K. DRAPER	9/6/2024
REVIEWER	I. KINCAID	9/6/2024
APPROVER	J. SCHAEFFER	9/6/2024

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO

ADR NO. 24590-HLW-ADR-M-24-0011 REV: 0

BECHTEL

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
450 HILLS STREET
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136 WTP SUBCONTRACT No:

HLW VITRIFICATION SYSTEM FABRICATION DRAWING GRAPPLE LABEL

SCALE: 3:1

24590-HLW-MX-30-00028001

REV 0

LAST SAVED BY: llancast
FILE NAME: 24590-HLW-MX-30-00028
DATE: 8/23/2024 1:43:52 PM

FORMAT WTP ANSI INCH SIZE D (22x34)

'D' SIZE - 22in*34in
COMPUTER GENERATED - MANUAL
DESIGN CHANGES NOT PERMITTED