Approved

ORNL WORK PLAN

Operations, Maintenance and Services

Work Plan Name / Rev: BL-15 W/O 1631936 / 0
Expiration Date: 4/17/2028

59766

WORK SCOPE/DESCRIPTION	
Requester (Name/Badge/Division):	Sexton, Randall / 00712268 / X186
Location of work (Bldg/Rm/Other):	8700 / / BL-15
Work Plan Title:	Bl-15 Remove roof panel lower equipment

Description of Service/Work Needed:

1. Remove Bl-15 roof block
2. Lower equipment
3. Install roof block

Charge Number, if required:	
Work Plan Grade/Worktype:	3 / 0
Author (Name/Badge):	Sexton, Randall / 00712268

File Attachments:

Badge	Name	Attachment Desc	File Name
00712268	Sexton, Randall	Lift plan for Heliox	SE cryostat lift plan with calculations.pdf
00712268	Sexton, Randall	Drawing of Heliox	pdf_a242526_drw System GA - 64405 Agrawal.pdf
00712268	Sexton, Randall	Cartoon pix	BOTTOM Loading.PDF

INSTRUCTIONS

Prerequisites/Precautions:
Pre job briefing

Directions:

1. Remove Bl-15 roof block
2. Lower equipment
3. Install roof block

Post Work Testing:

Closeout:

JOB HAZARD EVALUATION

HAZARDS	PERMITS / CONTROLS
Hoisting and Rigging	ı Hard hats ı Safety shoes
Radiological Work	ı Radiological Work Permit (Enter RWP no.)
Elevated Work	ı Work at unprotected heights over 4 feet - Fall Protection ı Fall Protection Training Requirements: Specify.

DOCUMENTATION REVIEW AUTHORIZATION
(Approvals are certification of hazards assessment)

Reviewer/Approver Roles	Signature	Date
Accountable Management (Service Provider, Line, Equipment Owner, or Facility Management)	Cross Jr, Bobby Lee	4/17/2023
Task Leader	Sexton, Randall	4/17/2023

Work Package Concurrence		
Facility Manager		
Operations Supervisor		
Facility Manager Approval To Start Work		
Facility Manager		
Work Start Authorization		
Task Leader		
Work Acknowledged Complete		
Task Leader		
Worker Feedback:		

WORK DETAILS - Directions			
Hazards	Permits/Controls	Resources	Dur
1) - 1. Remove Bl-15 roof block 2. Lower equipment 3. Install roof block			
Hoisting and Rigging	ı Hard hats ı Safety shoes	ı Rigger/Ironworker	1
Elevated Work	ı Work at unprotected heights over 4 feet - Fall Protection: install rails		

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PRE-JOB SAFETY REVIEW GUIDE

ID: 59766

Scope of Work: Review work package/plan to ensure all participants understand the work activity.

Hazards: Review the hazards identified in Job Hazard Evaluation (JHE) / work plan (IOP).
- Since the work package / plan was written: 1) Have conditions changed? 2) Are there new hazards? Refer to Field Notes and Focus Areas.

Hazard Controls / Permits: Review:
- Written permits for the work activity.
- Precautions, step warnings, Hold Points ...
- Personal Protective Equipment (PPE)
- Work instructions for information - e.g., steps where hazards are introduced.
- ORNL subject area requirements - e.g., non-permit hazard controls.

Performing Work:
- Discuss group/individual responsibilities for safe & effective work.
- Follow work instructions & safety procedures.
- Availability/location of materials, tools, etc.
- Any previous experiences / lessons learned?
- Response if work cannot be performed as planned.
- What is the worst thing that could happen?
- Are there *Potential error traps* with the job? → →
- Take a minute before: work start & leaving work area.
- Work Hand-off / Turnover - workers & Task Leader

→ Potential Error Traps:
- Time pressures
- Distractive environment
- High workload
- First time evolution
- First day back
- Vague guidance
- Over confidence
- Imprecise communications
- Work stress

Abnormal Situation Response:
- *Stop Work*: Observe an unsafe act, activity or condition that creates an imminent danger.
- *Emergency Response*: Discuss egress paths or other responses if problems are encountered.

Field Notes and Focus Areas: (Use this area as a work space to record notes related to new hazards identified in the field or changed conditions. Record feedback in work package/plan information systems.)

By signing below, I am indicating that I have been briefed on the potential hazards associated with completing this job.

Signature / Badge	Date	Signature / Badge	Date

ORNL Ordinary Lift Plan

Section 1		
Work Package, Work Order, or RSS Number: RSS#8644.lastest revision	**Plan Prepared by: Cory Fletcher**	**Badge Number 702786**

Section 2

Lift Description

Hoist various sample environment equipment with or without ultra-low temperature inserts installed NOT to exceed 240lbs total. Within buildings 7900 and 7970

Verify weight does not exceed capacity of rigging equipment.
A pre-lift inspection must be completed prior to each lift.

Sample Environments covered under this lift plan includes:
CYRO-A, CRYO-B, CRYO-C, CRYO-D, CRYO-E, CRYO-F, CRYO-I, CRYO-J, CRYO-K, CRYO-L, CRYO-M, CRYO-N, CRYO-O, CRYO-P, CRYO-Q, CCRT-C, CCRT-E, ULT-L, ULT-M

Lift Information

Center of Gravity determined by:

☐ **Manufacturer** ☐ **Trial and Error** ☐ **Calculations**
☒**Other (Describe) Prior lifts**

Weight of item: up to 240 lbs.

No. of Legs: 2 for calculations but may have a third for balancing load

Size: 1 inch

Length: 20 inch or 36 inch

Hitch Type: ☒ **Vertical** ☐ **Choker** ☐ **Basket**

Sling Type/Bridle Information:

☒ **Nylon** ☒ **Wire** ☐ **Metal** ☐ **Other:**

Sling angle: 56.74 deg. or greater

Load angle factor/multiplier: 1.221

D/d ratio reduction in efficiency for wire rope slings: NA %

Sling Tension/Loading: Please see attached calculations

Limited capacity of rigging as configured: 300 lbs. min.

Section 3

Hoisting Equipment/Below the Hook/Lifting Equipment	Capacity
Monorail chain falls in 7900 Beam Room	1 ton
Jib crane w/chain fall in 7900 Beam Room	½ ton, 1 ton, 2 ton
Overhead cranes in 7970 in Cold Guide Hall	2 ton, 10 ton

Section 4

Rigging Equipment	Capacity	Rigging Hardware	Capacity
Nylon 2-leg bridle 20 inch long	**2771# @ 60 deg.**	**1/4" Shackle**	**1000#**
Nylon 2-leg bridle 36 inch long	**1385# @ 60 deg.**	**5/16" Shackles**	**1500#**
Wire rope 2-leg bridle	**1200# @ 60 deg.**	**3/8" Shackles**	**4000#**
Nylon eye to eye slings 24"	**3200# @ 90 deg.**	**3/8 Swivel Hoist Rings**	**1000#**
CERTEX Lifting Fixture Attached to ULTL &M	**440#**	**M8 Shouldered Eye Bolt**	**400# @ 60 deg.**
Cryostat Lifting Tabs NSFM HFIR-2013-134	**150# each**	**M8 Swivel Hoist Rings**	**992#**
1 1/8" Shackle	**30000#**	**M10 Swivel Hoist Rings**	**2866#**

Section 5			
Special requirements (facility requirements, communication methods, etc.):			
Pre-Lift Checklist (To be performed prior to lift):			
• Pre-Job Brief • Designated Signal Person • Annual Inspections currents on H&R equipment	• Equipment Inspected prior to lift • Center of gravity identified • capacities reduced	• Edge protectors used as needed • Attachment points identified • Load path and landing area clear	• Evacuation paths identified • Load drop zone controlled • Load will lift freely

Section 6				
Approvals – Valid for up to two (2) years				
	Print Name	Signature	Badge #	Date
Hoisting and Rigging Designated Leader or Hoisting and Rigging Competent Person				

Section 7

Pre-Lift Briefing

The following hoisting and lifting personnel have attended the pre-lift meeting, reviewed the approved lift plan, and understand the procedure and equipment to be used (sign on back as necessary)

Name/Signature	Badge #	Date

Please see attached calculations

Section 8: Additional Information (I.e. Applicable Load Travel Path/ Load Schematic and Rigging Method)
(May also be attached to back of plan)

Section 6

Approvals – Valid for up to two (2) years

	Print Name	Signature	Badge #	Date

CRYO-A, CRYO-B, CRYO-C, CRYO-D, CRYO-F, CRYO-J, CRYO-K, CRYO-L, CRYO-P, CRYO-Q

Dimensions can be in inches or feet but you have to stay consistent through the sheet!

Lift Specifics	Required
Weight of object (lbs.):	200
Distance (in. or ft.) between lift points (D):	17
Known Sling Length (in. or ft.) (L):	20

Calculate Angle and H by Using d and L:	Calculated
Calculated center point between the 2 lift pts.	8.5
Calculated headroom required (h):	18.10
Calculated Angle Horizontal:	64.85

Calculated Load Angle Factor/Multiplier and Tension Factor	
Load Angle Factor/Tension Factor:	1.155
Tension Per Leg:	116

CRYO-N, CRYO-M, CRYO, O

Dimensions can be in inches or feet but you have to stay consistent through the sheet!

Lift Specifics	Required
Weight of object (lbs.):	240
Distance (in. or ft.) between lift points (D):	18
Known Sling Length (in. or ft.) (L):	20

Calculate Angle and H by Using d and L:	Calculated
Calculated center point between the 2 lift pts.	9
Calculated headroom required (h):	17.86
Calculated Angle Horizontal:	63.26

Calculated Load Angle Factor/Multiplier and Tension Factor	
Load Angle Factor/Tension Factor:	1.155
Tension Per Leg:	139

CRYO-E, CRYO-I

Dimensions can be in inches or feet but you have to stay consistent through the sheet!

Lift Specifics	Required
Weight of object (lbs.):	250
Distance (in. or ft.) between lift points (D):	19
Known Sling Length (in. or ft.) (L):	20

Calculate Angle and H by Using d and L:	Calculated
Calculated center point between the 2 lift pts.	9.5
Calculated headroom required (h):	17.60
Calculated Angle Horizontal:	61.64

Calculated Load Angle Factor/Multiplier and Tension Factor	
Load Angle Factor/Tension Factor:	1.155
Tension Per Leg:	144

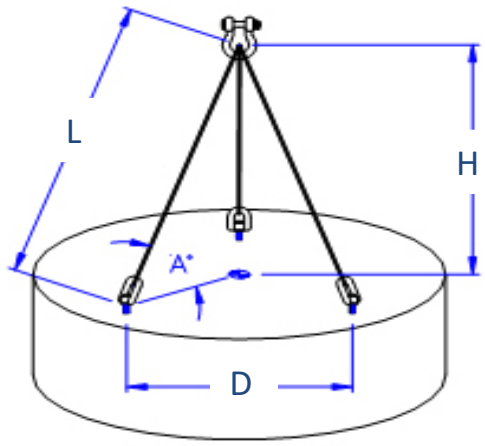
ULT-L & ULT-M

Dimensions can be in inches or feet but you have to stay consistent through the sheet!

Lift Specifics	Required
Weight of object (lbs.):	240
Distance (in. or ft.) between lift points (D):	13
Known Sling Length (in. or ft.) (L):	24

Calculate Angle and H by Using d and L:	Calculated
Calculated center point between a lift point	7.51
Calculated headroom required (h):	22.80
Calculated Angle Horizontal:	71.78

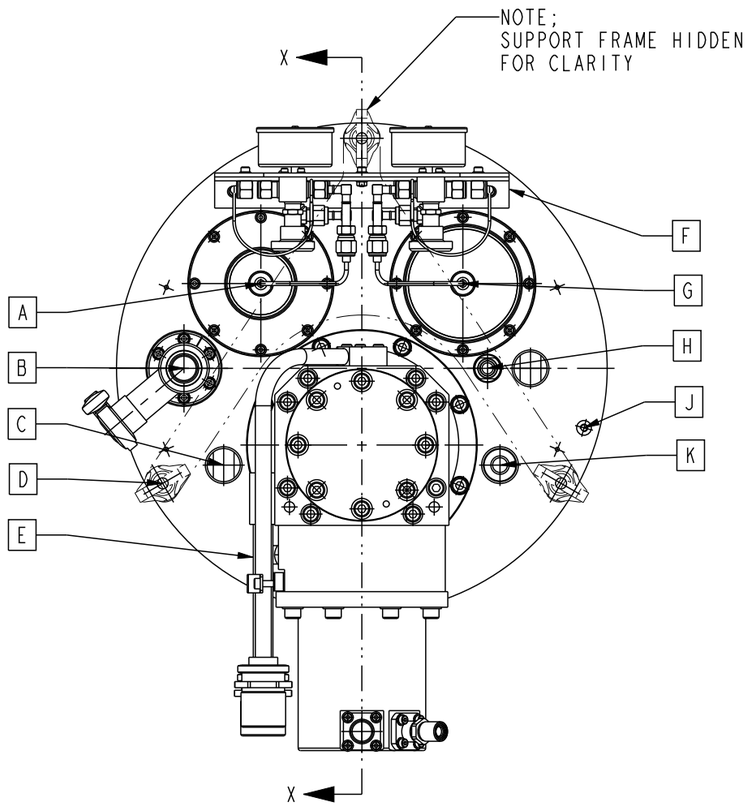
Calculated Load Angle Factor/Multiplier and Tension Factor	
Load Angle Factor/Tension Factor:	1.064
Tension Per Leg(assuming 2 legs carry the weight:	128

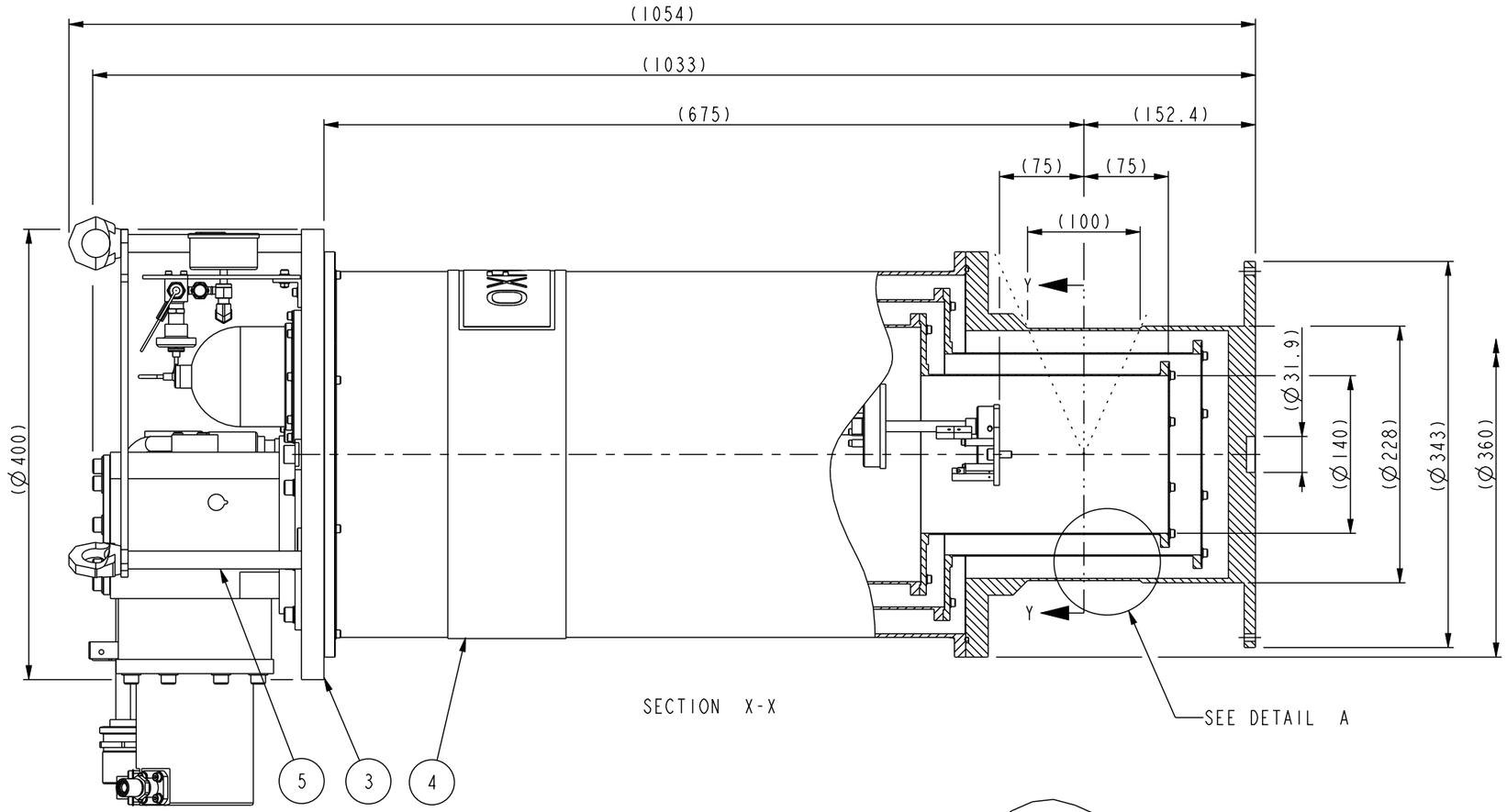


A3 ORIGINAL SIZE

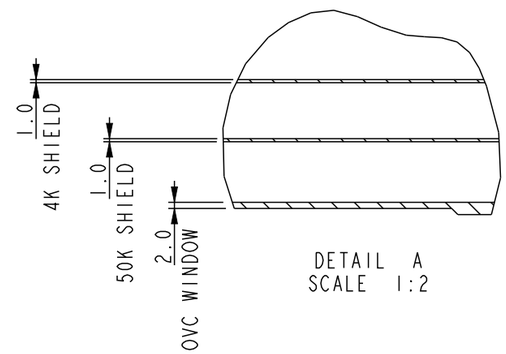
Model Version 2+

THIRD ANGLE PROJECTION





SECTION X-X



DETAIL A
SCALE 1:2

02 GA REV UPDATED TO REFLECT MINOR ENGINEERING CHANGES

ITEM	Io 1k SYSTEM LEGEND	NOTE
A	He3 CHARGE DUMP TANK	N/A
B	CRYOSTAT VACUUM PUMPOUT PORT/RELEIF VALVE	NW25
C	SPARE 105 FISCHER WIRING PORT ACCESS	2 x BLANKED
D	ROTATING LIFTING EYE (HIDDEN FOR CLARITY)	3 x M8
E	SHI PULSE TUBE COOLER WITH INTEGRAL MOTOR	1 WATT
F	He3 AND He4 CHARGE CONTROL VALVE ASSEMBLY	0.25" SWAGELOK
G	He4 CHARGE DUMP TANK	N/A
H	SYSTEM CONTROL DIAGNOSTIC WIRING	16 PIN 104A FISCHER
J	SYSTEM EARTHING POINT	M6
K	SYSTEM CONTROL DIAGNOSTIC WIRING	27 PIN 105A FISCHER

HEIGHT REQUIRMENTS

MINIMUM HEIGHT REQUIRED TO REMOVE TAIL SECTIONS FROM INSERT

: 2m FROM FLOOR TO CRANE.

He7 SYSTEM PERFORMANCE

POWER 100 µW	6Hrs @ 350mK
BASE TEMPERATURE	50Hrs @ 300mK

Item	Part No	Description	Length	Qty.	REMARKS
5	A242540	He7 INSERT LIFTING FRAME		1	
4	A242528	He7 TAIL ASSY-64405 AGRAWAL		1	
3	A242527	He7 WIRED INSERT-64405 AGRAWAL		1	
2	64405MISCE_B	ELECTRONICS FOR AGRAWAL		1	
1	64405MISCA_B	ACCESSORIES FOR AGRAWAL		1	

OXFORD INSTRUMENTS
TUBNEY WOODS
ABINGDON, OXON, OX13 5QX, ENGLAND

A3A REVISION : 11

DO NOT SCALE IF IN DOUBT ASK

REMOVE ALL BURRS AND SHARP EDGES

TOLERANCES UNLESS STATED FOR:

MACHINING	ASSEMBLY
X ± 0.5mm X.X ± 0.3mm X.XX ± 0.1mm ANGLE ± 0°15′	LINEAR ± 1mm ANGULAR ± 1°

SURFACE FINISH

UNLESS STATED

mm UNLESS STATED

DESCRIPTION
SYSTEM GA - 64405/7 AGRAWAL

OXFORD INSTRUMENTS

SCALE	DATE	DRAWN	RELEASE LEVEL	DRAWING NUMBER	REV
1:5	11-Oct-18	C.Wilkinson	Production	A242526	02

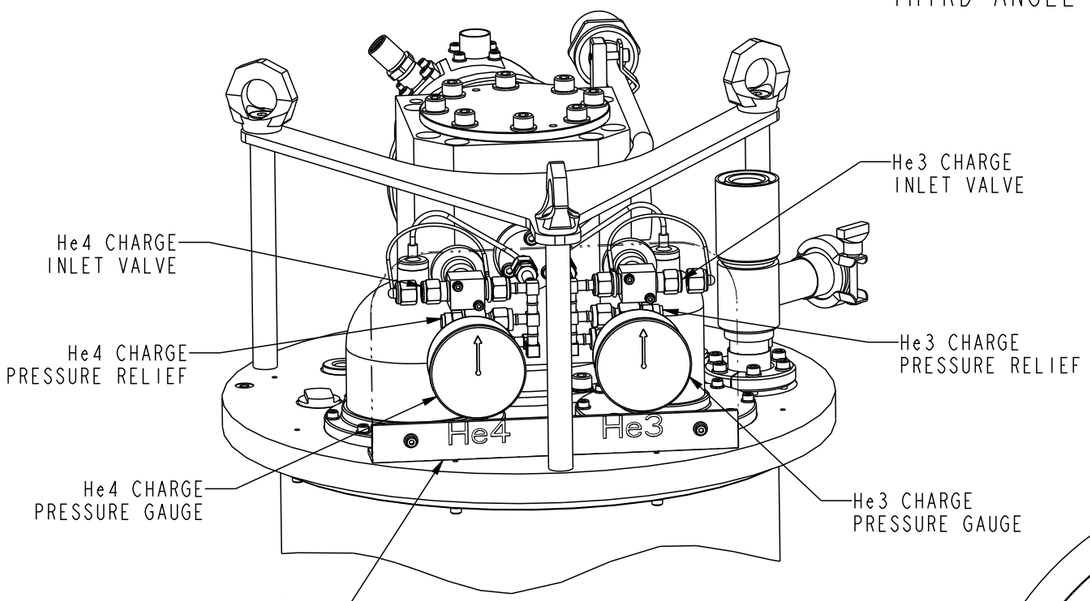
ONLY MANUFACTURE DRAWINGS WHEN RELEASE LEVEL IS SET TO "PRODUCTION"

SHEET 1 OF 2

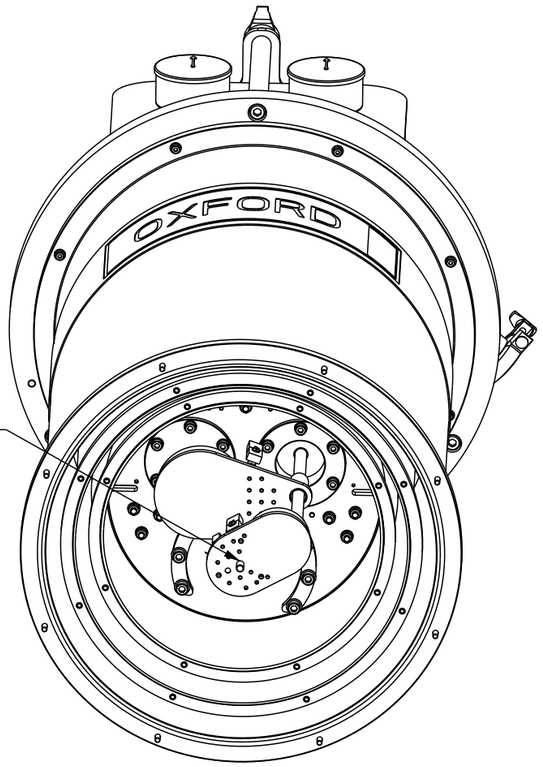
A3 ORIGINAL SIZE

Model Version 2+

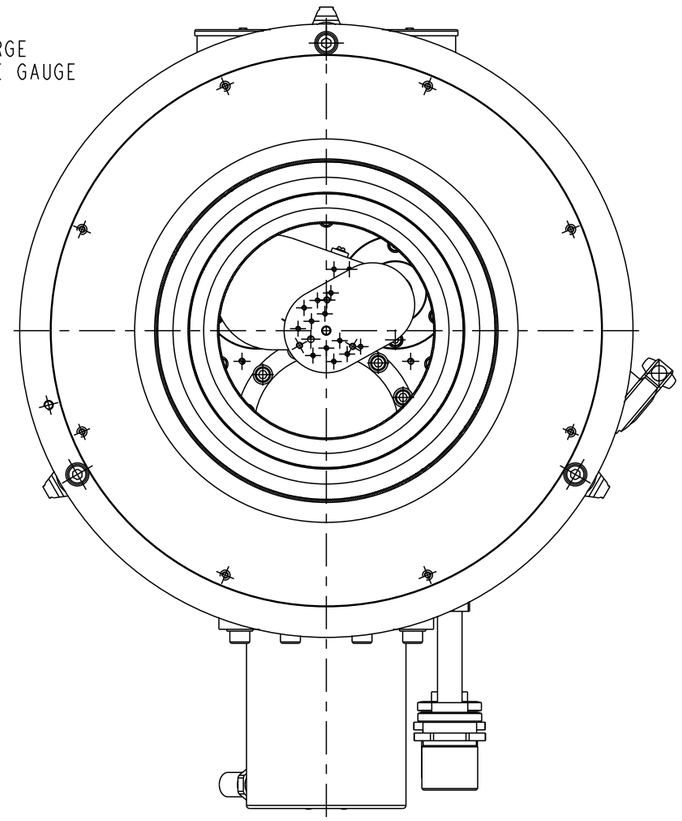
THIRD ANGLE PROJECTION



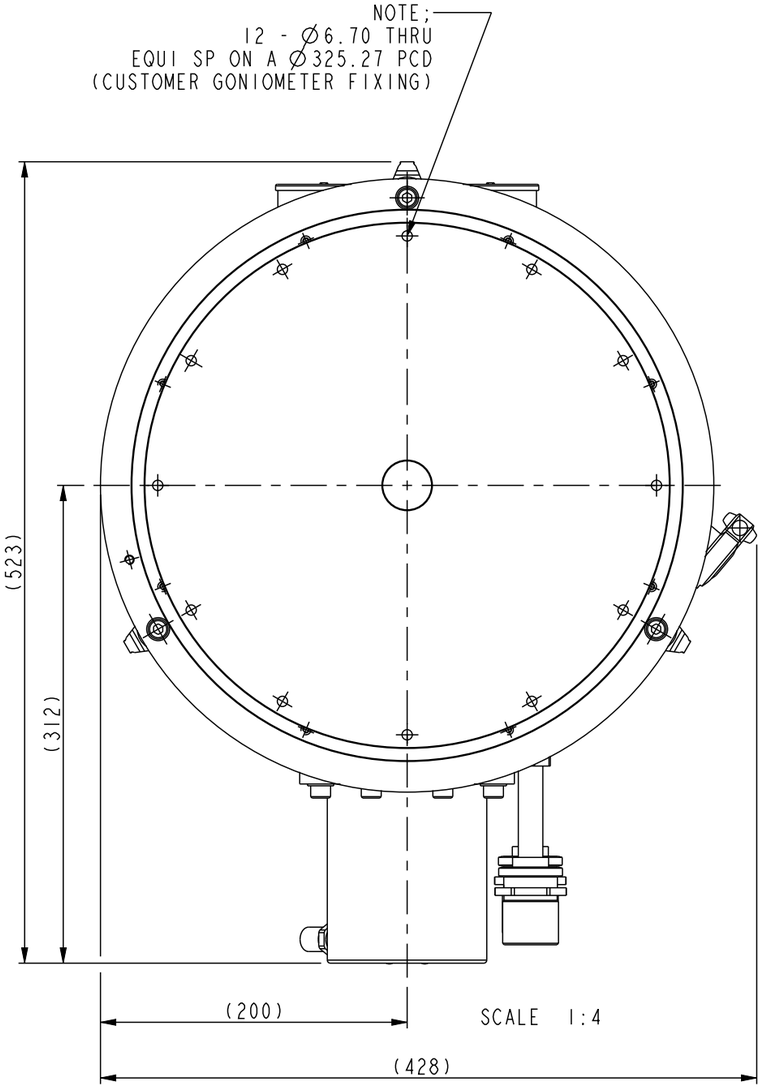
SCALE 1:4



SCALE 1:5
WITH LOWER TAIL REMOVED



SECTION Y-Y
SCALE 1:4



SCALE 1:4

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A3A REVISION : 11

DO NOT SCALE IF IN DOUBT ASK

REMOVE ALL BURRS AND SHARP EDGES

TOLERANCES UNLESS STATED FOR:

MACHINING	ASSEMBLY
X ± 0.5mm X.X ± 0.3mm X.XX ± 0.1mm ANGLE ± 0°15′	LINEAR ± 1mm ANGULAR ± 1°

SURFACE FINISH

-

UNLESS STATED

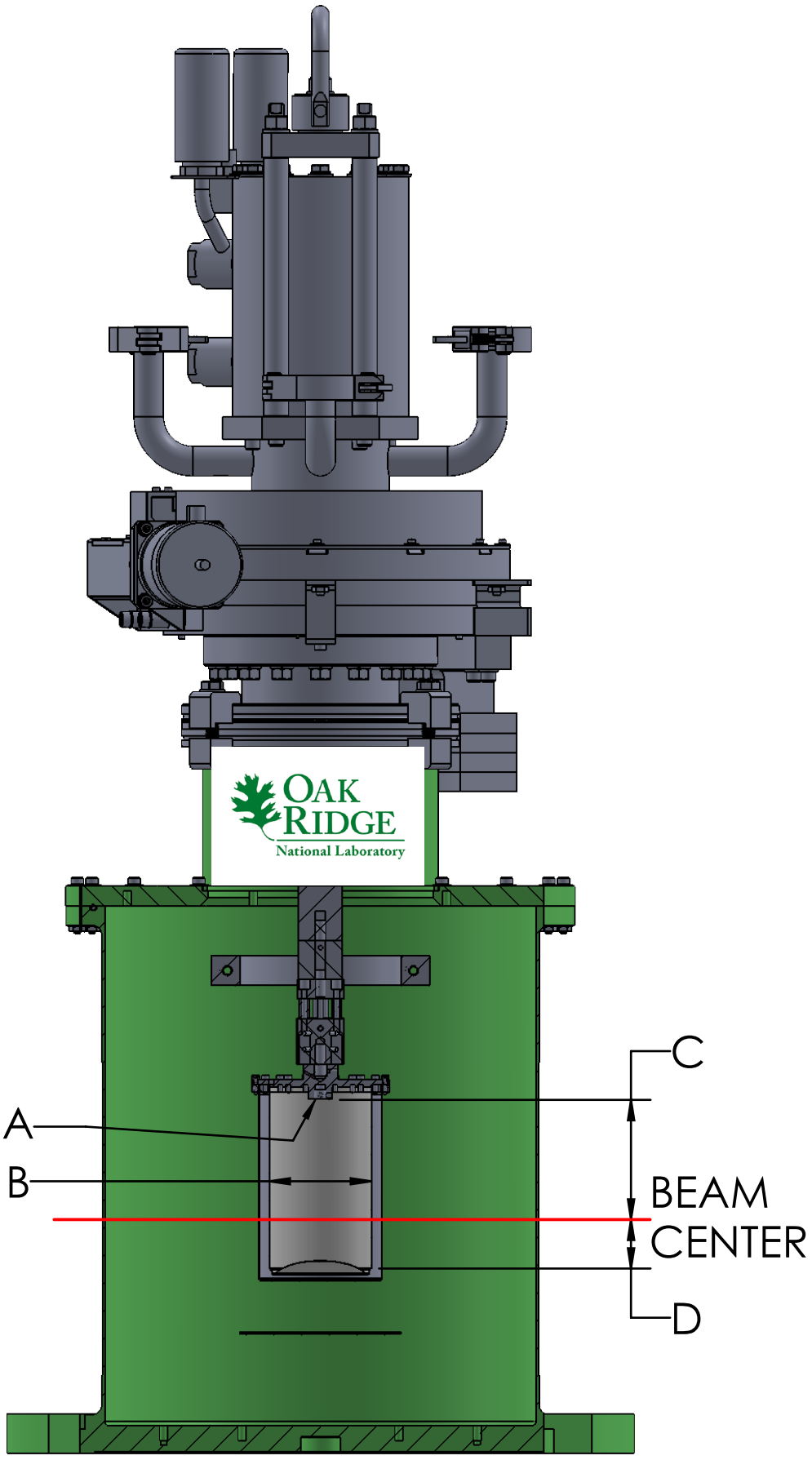
mm
UNLESS STATED

DESCRIPTION
SYSTEM GA - 64405/7 AGRAWAL

OXFORD INSTRUMENTS

SCALE	DATE	DRAWN	RELEASE LEVEL	DRAWING NUMBER	REV
1:5	11-Oct-18	C.Wilkinson	Production ONLY MANUFACTURE DRAWINGS WHEN RELEASE LEVEL IS SET TO "PRODUCTION"	A242526	02

SHEET 2 OF 2


OAK RIDGE
National Laboratory
A
B
C
BEAM
CENTER
D