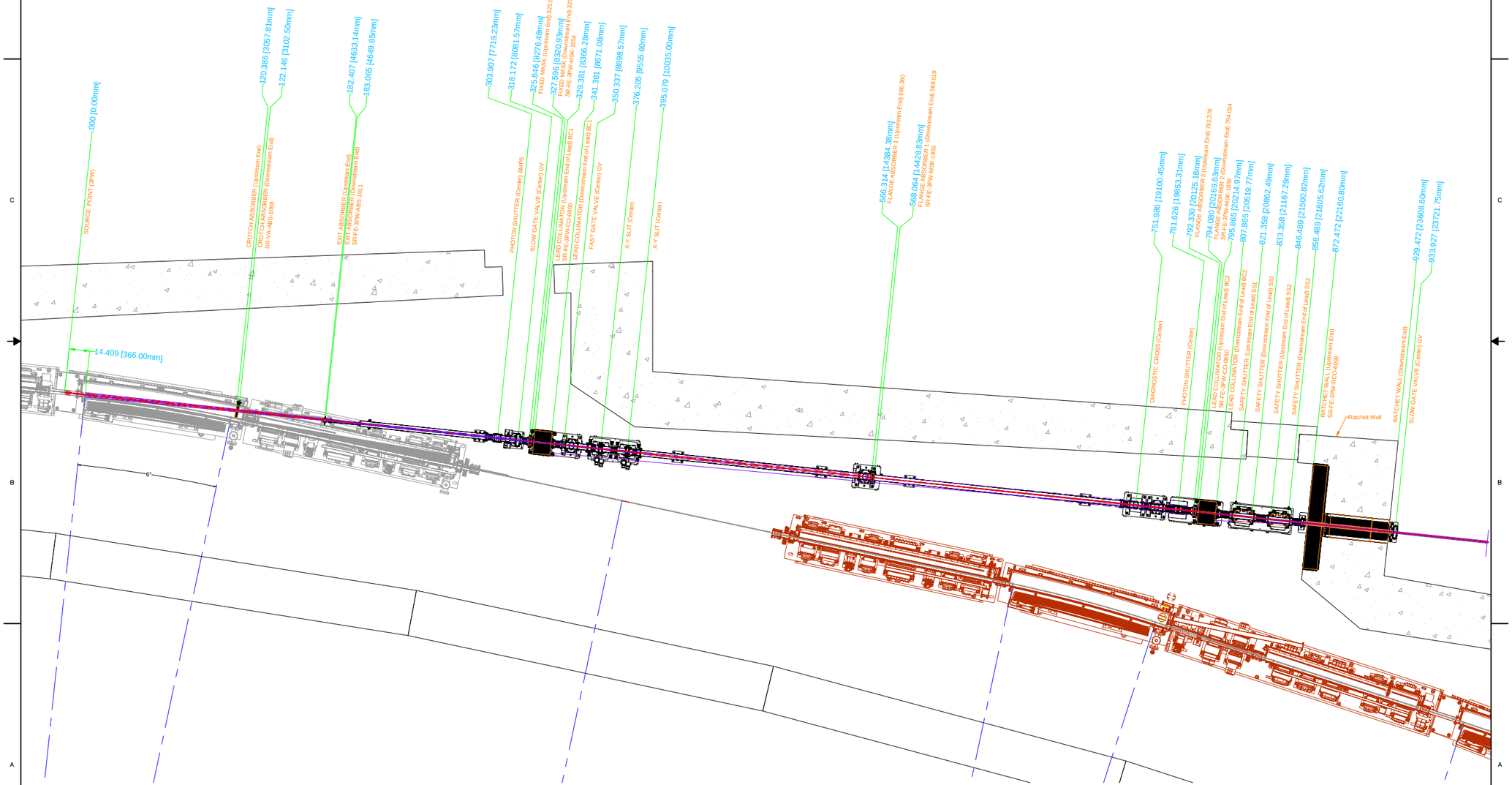
| REVISION HISTORY | | | | | |
|---|---|---|---|---|---|
| REV | DESCRIPTION | DATE | DESIGNER | CHECKED BY | ENGINEER |
| A | RELEASE PER ECO-002768 | 12/2014 | J. TUOZZOLO | C. AMARITO | A. HUSSAIN |
| B | REVISED PER ECO-003264 | 11/2016 | R. GAMBELLA | C. STELMACH | M. BREITFELLER |




## XFM, CELL 4-BM, COMPONENT LAYOUT

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
DIMENSIONS IN BRACKETS [mm] ARE FOR REFERENCE ONLY
ARE CALCULATED AND ARE FOR REFERENCE ONLY
REQUIRED DRAWING IN PDF AND TIFF FILES ON FILE-SFS

DIMENSIONAL TOLERANCE: X ± 0.060, .X ± 0.030, .XX ± 0.015, .XXX ± 0.005
ANGULAR TOLERANCE: ± .5°
FINISH: 125

DRAWING REQUIRS A SHARP CORNERS ALSO MFG. TO 0.005 R MAX

| | | |
|---|---|---|
| DRAWN BY: | J. TUOZZOLO | 12/2014 |
| CHECKED BY: | C. AMARITO | 12/2014 |
| APPROVED BY: | Z. ZHONG | 12/2014 |
| DESIGNER: | A. HUSSAIN | 12/2014 |
| APPROVED BY: | S. SHARMA | 12/2014 |
| ENGINEER: | A. HUSSAIN | 12/2014 |
| APPROVED BY: | J. GUSSMAN | 12/2014 |
| ISM ACTIVITY: | J. CARBINE | 12/2014 |

BROOKHAVEN NATIONAL LABORATORY
Exploring Life's Mysteries, Powering the Future

BROOKHAVEN NATIONAL LABORATORY
NSLS-II NATIONAL SYNCHROTRON LIGHT SOURCE II
UPTON, NEW YORK 11973

STORAGE RING
FRONT END, XFM, CELL 4
RAY TRACING

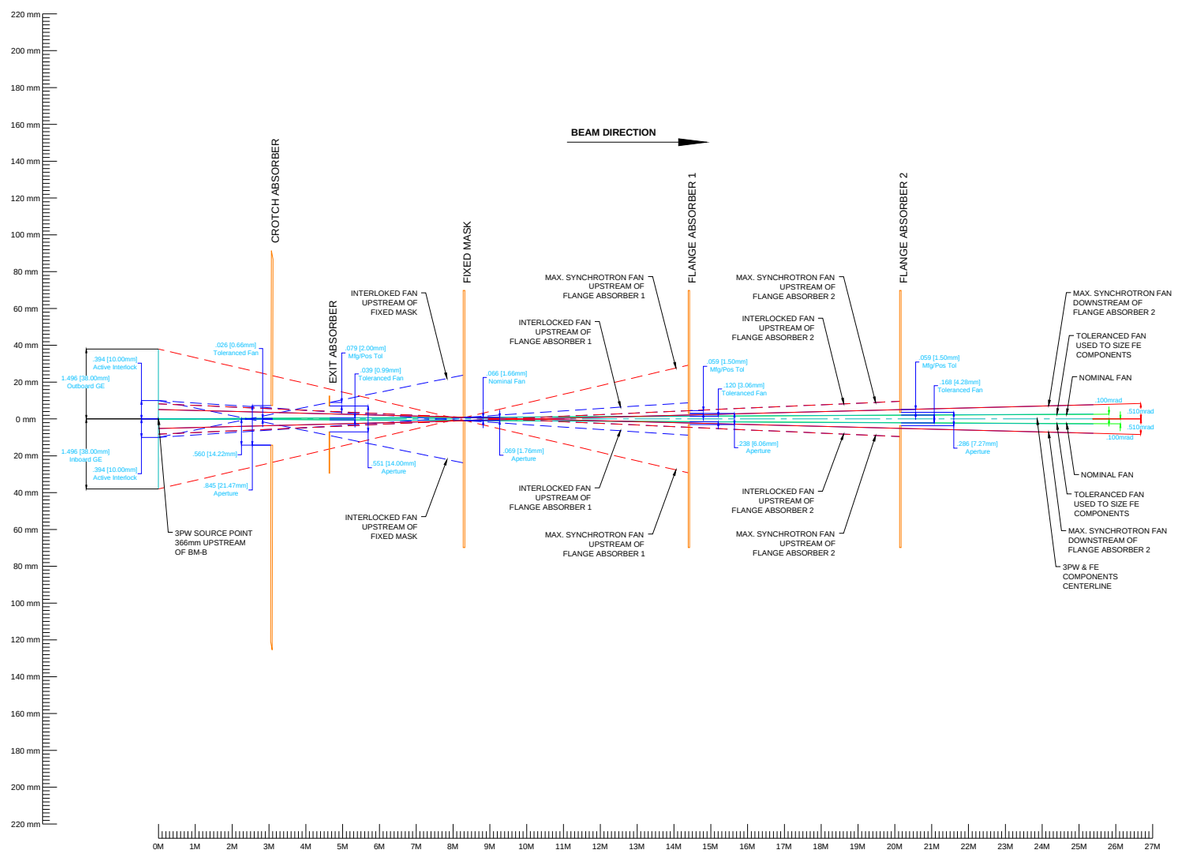
SR-FE-3PW-6001

SIZE: E — SHEET SIZE
DRAWING/PART NUMBER
REVISION: B

ESH&Q RISK LEVEL: A-1
SHEET 1 OF 7

NEXT ASSY: N/A
PROJECT: NSLS-II
THIRD ANGLE PROJECTION
SCALE: SEE DWG VIEW
WBS# 6.12

RELEASED → EFFECTIVE




**HORIZONTAL**
**SCALE: X:Z = 1:50**

**TABLE 1**

**XFM BEAMLINE RAYTRACE TOLERANCE**

| | STANDARD TOLERANCE | | | | |
|---|---|---|---|---|---|
| | mm | | inches | | Comments |
| | + | - | + | - | |
| Crotch Absorber | 2.0 | 2.0 | 0.079 | 0.079 | Manufacturing & Position |
| Exit Absorber | 2.0 | 2.0 | 0.079 | 0.079 | Manufacturing & Position |
| FM at LCO1 (beam defining Mask) | 0.1 | 0.0 | 0.004 | 0.000 | Manufacturing |
| Flange Absorber | 1.5 | 1.5 | 0.059 | 0.059 | Manufacturing & Position |
| LCO tube | 1.5 | 1.5 | 0.059 | 0.059 | Manufacturing & Position |
| Collimator lead Horizontal | 1.5 | N/A | 0.059 | N/A | Manufacturing, Assembly, & Tube Clearance |
| Collimator lead Vertical | 2.5 | N/A | 0.098 | N/A | Manufacturing, Assembly, & Tube Clearance |
| Shadow Shield | 3.0 | 3.0 | 0.118 | 0.118 | Manufacturing & Position |
| RCO upstream lead Horizontal and Vertical | 8.5 | N/A | .335 | N/A | Manufacturing, Assembly, & Tube Clearance |
| RCO downstream lead Horizontal | 4.0 | N/A | .157 | N/A | Manufacturing, Assembly, & Tube Clearance |
| RCO downstream lead Vertical | 4.5 | N/A | .177 | N/A | Manufacturing, Assembly, & Tube Clearance |
| RCO tube (minimum) | 4.0 | | 0.157 | | Manufacturing & Position |

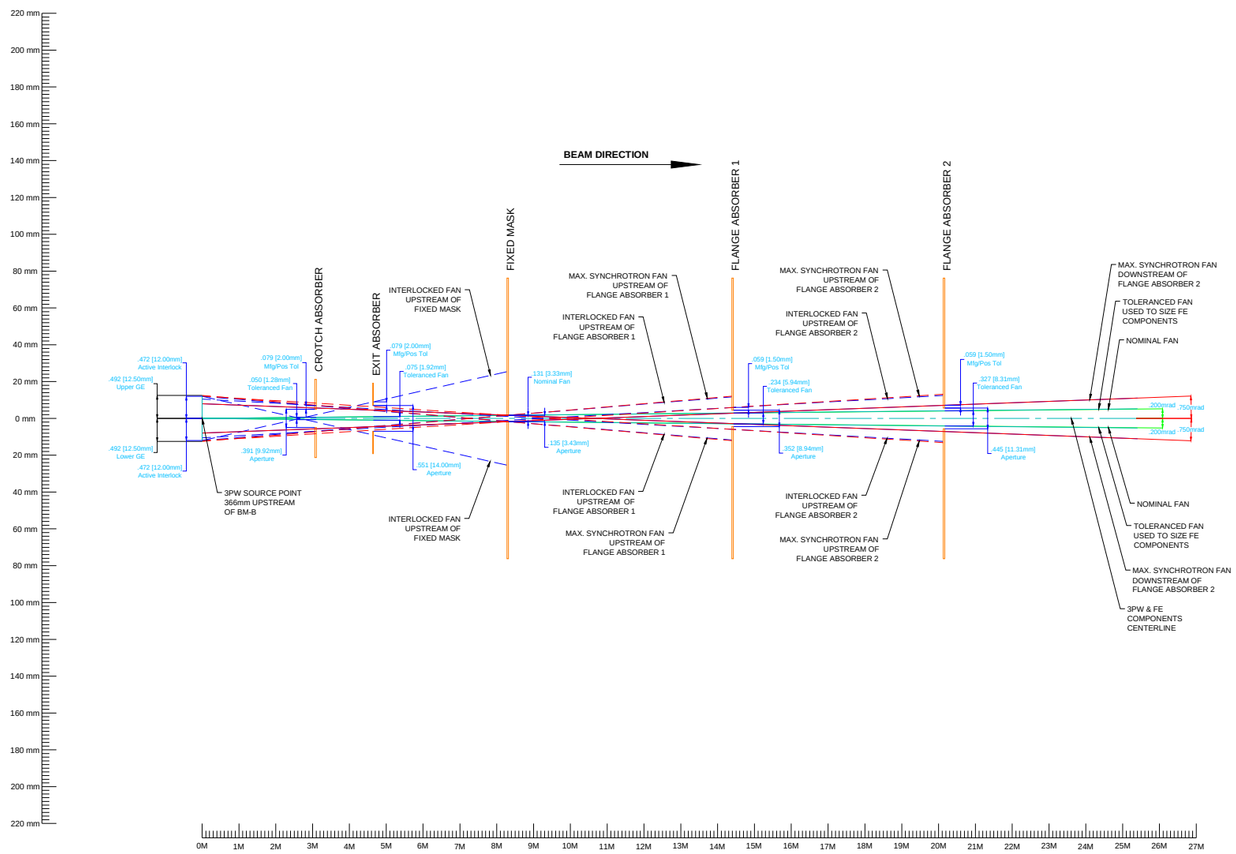
**NOTE:**

1. 3PW SOURCE POINT (ORIGIN) IS 366mm UPSTREAM OF BM-B.
2. MAX SYNCHROTRON FAN USES GEOMETRIC ENVELOPE AS ITS SOURCE AND IS INTERCEPTED ONLY BY AIR COOLED FIXED MASKS.
3. TRIMMED SYNCHROTRON FAN USES ACTIVE INTERLOCK ENVELOPE AS ITS SOURCE AND IS INTERCEPTED BY CROTCH ABSORBER, EXIT ABSORBER AND FIXED MASKS.
4. ALL MASK APERTURES SHOWN ARE NOMINAL VALUES WITH TOLERANCES SHOWN.
5. ALL APERTURES & TOLERANCES ARE ASSUMED TO BE SYMMETRIC ABOUT THE COMPONENT CENTERLINE UNLESS OTHERWISE SHOWN.

**XFM, CELL 4-BM, SYNCHROTRON RAY TRACING HORIZONTAL**

| | | |
|---|---|---|
| E | SR-FE-3PW-6001 | B |
| | DRAWING/LIST NUMBER | REVISION |
| ESH&Q RISK LEVEL A-1 | | SHEET 2 OF 7 |

RELEASED – EFFECTIVE




**VERTICAL**
**SCALE: Y:Z = 1:50**

**TABLE 1**

**XFM BEAMLINE RAYTRACE TOLERANCE**

| | STANDARD TOLERANCE | | | | Comments |
|---|---|---|---|---|---|
| | mm | | inches | | |
| | + | - | + | - | |
| Crotch Absorber | 2.0 | 2.0 | 0.079 | 0.079 | Manufacturing & Position |
| Exit Absorber | 2.0 | 2.0 | 0.079 | 0.079 | Manufacturing & Position |
| FM at LCO1 (Beam defining Mask) | 0.1 | 0.0 | 0.004 | 0.000 | Manufacturing |
| Flange Absorber | 1.5 | 1.5 | 0.059 | 0.059 | Manufacturing & Position |
| LCO tube | 1.5 | 1.5 | 0.059 | 0.059 | Manufacturing & Position |
| Collimator lead Horizontal | 1.5 | N/A | 0.059 | N/A | Manufacturing, Assembly, & Tube Clearance |
| Collimator lead Vertical | 2.5 | N/A | 0.098 | N/A | Manufacturing, Assembly, & Tube Clearance |
| Shadow Shield | 3.0 | 3.0 | 0.118 | 0.118 | Manufacturing & Position |
| RCO upstream lead Horizontal and Vertical | 8.5 | N/A | .335 | N/A | Manufacturing, Assembly, & Tube Clearance |
| RCO downstream lead Horizontal | 4.0 | N/A | .157 | N/A | Manufacturing, Assembly, & Tube Clearance |
| RCO downstream lead Vertical | 4.5 | N/A | .177 | N/A | Manufacturing, Assembly, & Tube Clearance |
| RCO tube (minimum) | 4.0 | - | 0.157 | - | Manufacturing & Position |

**NOTE:**

1. 3PW SOURCE POINT (ORIGIN) IS 366mm UPSTREAM OF BM-B.
2. MAX SYNCHROTRON FAN USES GEOMETRIC ENVELOPE AS ITS SOURCE AND IS INTERCEPTED ONLY BY AIR COOLED FIXED MASKS.
3. TRIMMED SYNCHROTRON FAN USES ACTIVE INTERLOCK ENVELOPE AS ITS SOURCE AND IS INTERCEPTED BY CROTCH ABSORBER, EXIT ABSORBER AND FIXED MASKS.
4. ALL MASK APERTURES SHOWN ARE NOMINAL VALUES WITH TOLERANCES SHOWN.
5. ALL APERTURES & TOLERANCES ARE ASSUMED TO BE SYMMETRIC ABOUT THE COMPONENT CENTERLINE UNLESS OTHERWISE SHOWN.

**XFM, CELL 4-BM, SYNCHROTRON RAY TRACING VERTICAL**

| | | |
|---|---|---|
| E | SR-FE-3PW-6001 | B |
| | DRAWING/DRAFT NUMBER | REVISION |
| ESH&Q RISK LEVEL A-1 | SHEET 3 OF 7 | |

RELEASED – EFFECTIVE

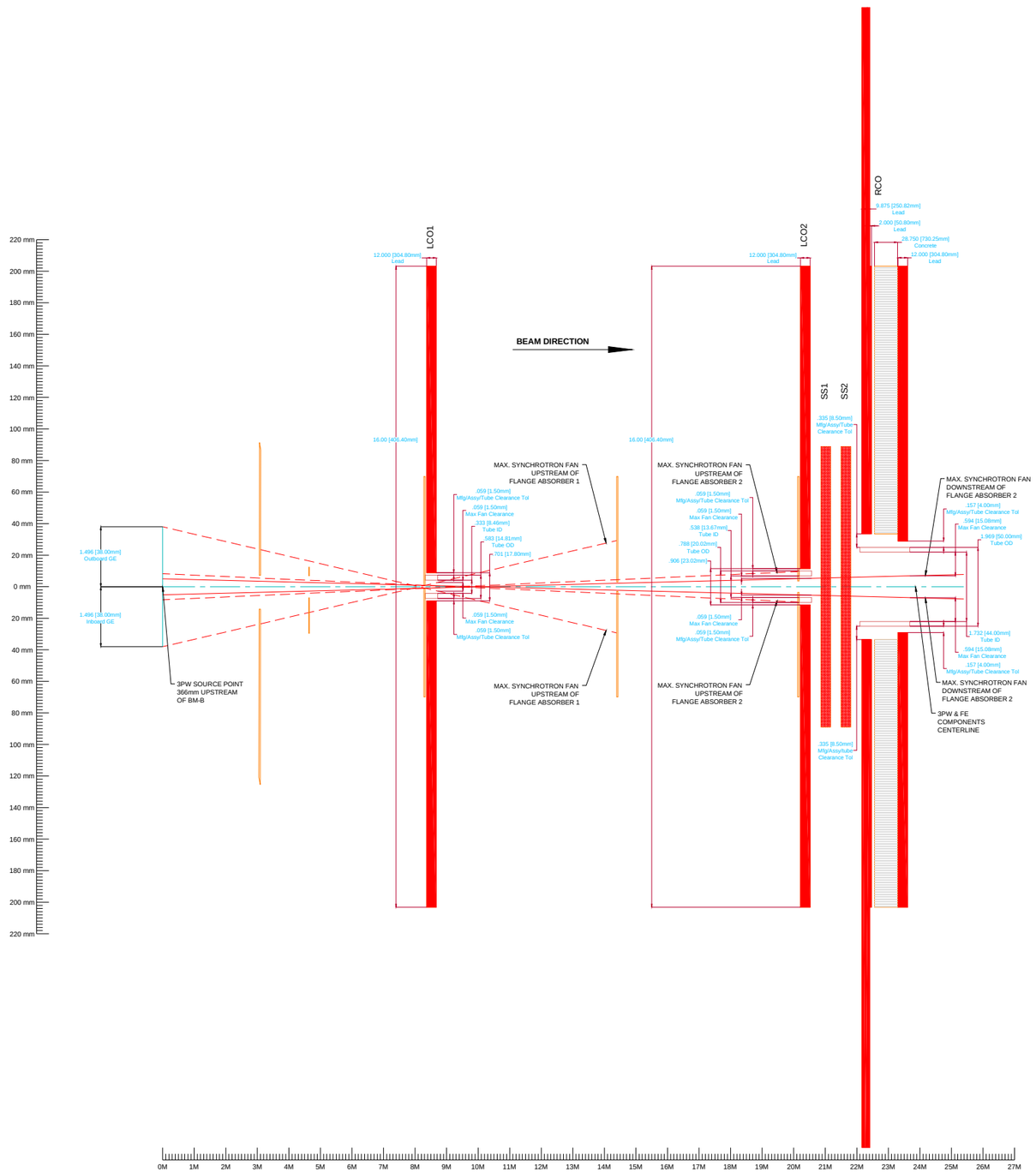



**TABLE 1**

**XFM BEAMLINE RAYTRACE TOLERANCE**

| | STANDARD TOLERANCE | | | | |
|---|---|---|---|---|---|
| | mm | | inches | | Comments |
| | + | - | + | - | |
| Crotch Absorber | 2.0 | 2.0 | 0.079 | 0.079 | Manufacturing & Position |
| Exit Absorber | 2.0 | 2.0 | 0.079 | 0.079 | Manufacturing & Position |
| FM at LCO1 (Beam defining Mask) | 0.1 | 0.0 | 0.004 | 0.000 | Manufacturing |
| Flange Absorber | 1.5 | 1.5 | 0.059 | 0.059 | Manufacturing & Position |
| LCO tube | 1.5 | 1.5 | 0.059 | 0.059 | Manufacturing & Position |
| Collimator lead Horizontal | 1.5 | N/A | 0.059 | N/A | Manufacturing, Assembly, & Tube Clearance |
| Collimator lead Vertical | 2.5 | N/A | 0.098 | N/A | Manufacturing, Assembly, & Tube Clearance |
| Shadow Shield | 3.0 | 3.0 | 0.118 | 0.118 | Manufacturing & Position |
| RCO upstream lead Horizontal and Vertical | 8.5 | N/A | .335 | N/A | Manufacturing, Assembly, & Tube Clearance |
| RCO downstream lead Horizontal | 4.0 | N/A | .157 | N/A | Manufacturing, Assembly, & Tube Clearance |
| RCO downstream lead Vertical | 4.5 | N/A | .177 | N/A | Manufacturing, Assembly, & Tube Clearance |
| RCO tube (minimum) | 4.0 | - | 0.157 | - | Manufacturing & Position |

**NOTE:**

1. BREMSSTRAHLUNG SOURCE POINT (ORIGIN) IS UPSTREAM END OF BM-B.
2. ALL APERTURES & TOLERANCES ARE ASSUMED TO BE SYMMETRIC ABOUT THE COMPONENT CENTERLINE UNLESS OTHERWISE SHOWN.

**HORIZONTAL**
**SCALE: X:Z = 1:50**

| HATCH LEGEND |
|---|
| Lead |
| Concrete |
| Lead (Safety Shutter) |

**XFM, CELL 4-BM, MAX SYNCHROTRON COLLIMATOR LAYOUT HORIZONTAL**

| | | |
|---|---|---|
| E | SR-FE-3PW-6001 (DRAWING/PART NUMBER) | B (REVISION) |
| ESH&Q RISK LEVEL A-1 | SHEET 4 OF 7 | |

RELEASED – EFFECTIVE

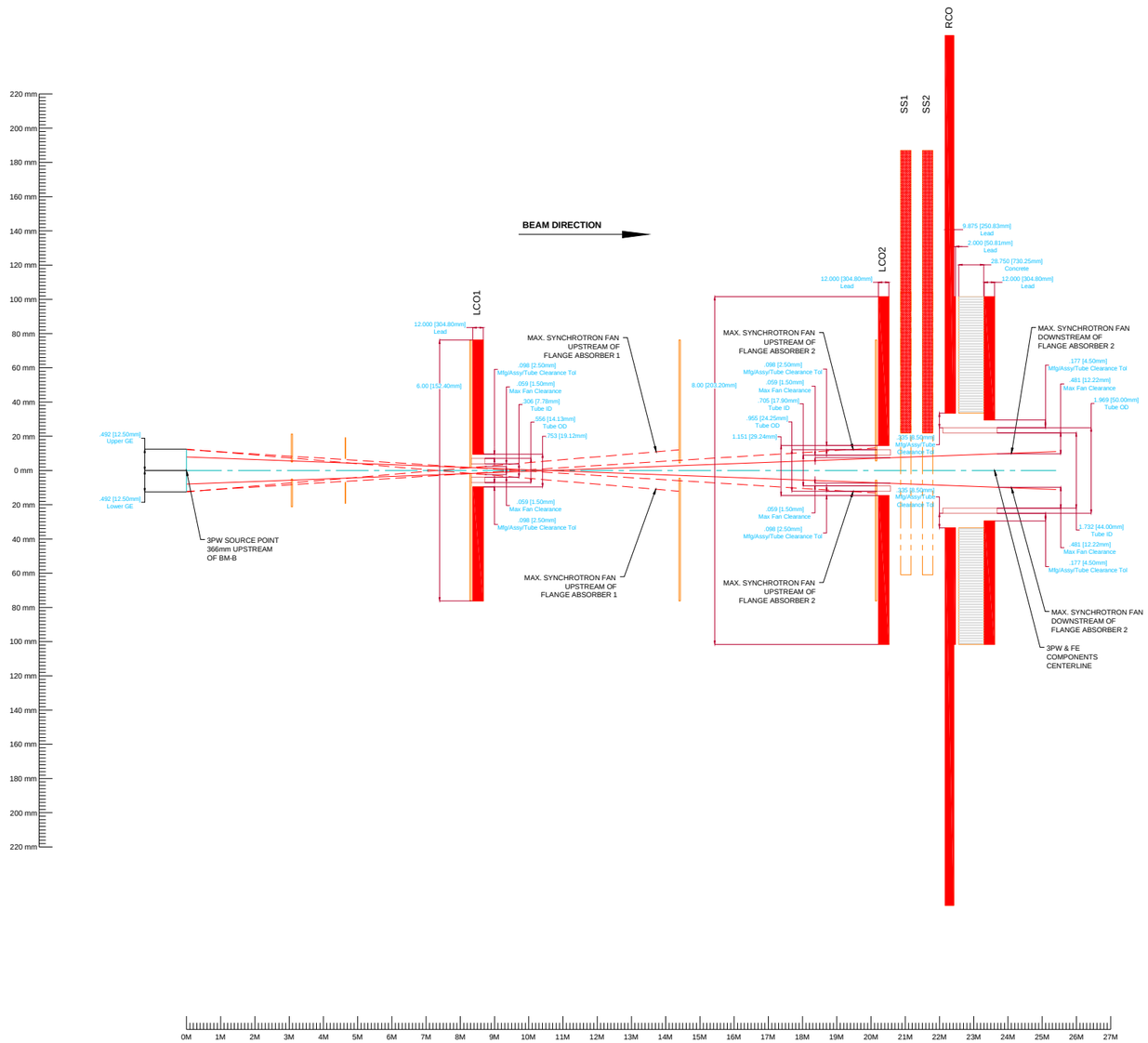



**TABLE 1**

**XFM BEAMLINE RAYTRACE TOLERANCE**

| | STANDARD TOLERANCE | | | | |
|---|---|---|---|---|---|
| | mm | | inches | | Comments |
| | + | - | + | - | |
| Crotch Absorber | 2.0 | 2.0 | 0.079 | 0.079 | Manufacturing & Position |
| Exit Absorber | 2.0 | 2.0 | 0.079 | 0.079 | Manufacturing & Position |
| I M at LCO1 (beam defining Mask) | 0.1 | 0.0 | 0.004 | 0.000 | Manufacturing |
| Flange Absorber | 1.5 | 1.5 | 0.059 | 0.059 | Manufacturing & Position |
| LCO tube | 1.5 | 1.5 | 0.059 | 0.059 | Manufacturing & Position |
| Collimator lead Horizontal | 1.5 | N/A | 0.059 | N/A | Manufacturing, Assembly, & Tube Clearance |
| Collimator lead Vertical | 2.5 | N/A | 0.098 | N/A | Manufacturing, Assembly, & Tube Clearance |
| Shadow Shield | 3.0 | 3.0 | 0.118 | 0.118 | Manufacturing & Position |
| RCO upstream lead Horizontal and Vertical | 8.5 | N/A | .335 | N/A | Manufacturing, Assembly, & Tube Clearance |
| RCO downstream lead Horizontal | 4.0 | N/A | .157 | N/A | Manufacturing, Assembly, & Tube Clearance |
| RCO downstream lead Vertical | 4.5 | N/A | .177 | N/A | Manufacturing, Assembly, & Tube Clearance |
| RCO tube (minimum) | 4.0 | - | 0.157 | - | Manufacturing & Position |

**VERTICAL**
**SCALE: Y:Z = 1:50**

| HATCH LEGEND | |
|---|---|
| | Lead |
| | Concrete |
| | Lead (Safety Shutter) |

**NOTE:**

1. BREMSSTRAHLUNG SOURCE POINT (ORIGIN) IS UPSTREAM END OF BM-B.
2. ALL APERTURES & TOLERANCES ARE ASSUMED TO BE SYMMETRIC ABOUT THE COMPONENT CENTERLINE UNLESS OTHERWISE SHOWN.

**XFM, CELL 4-BM, MAX SYNCHROTRON COLLIMATOR LAYOUT VERTICAL**

| | | |
|---|---|---|
| E | SR-FE-3PW-6001 (DOCUMENT NUMBER) | B (REVISION) |
| ESH&Q RISK LEVEL A-1 | | SHEET 5 OF 7 |

RELEASED – EFFECTIVE