

DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION FACILITIES DEVELOPMENT DIVISION

| APPLICATION FOR HCAI PREAPPROVAL OF | OFFICE USE ONLY |
|---|-------------------------|
| MANUFACTURER'S CERTIFICATION (OPM) | APPLICATION #: OPM-0668 |
| HCAI Preapproval of Manufacturer's Certification (OPM) | |
| Type: X New Renewal/Update | |
| Manufacturer Information | |
| Manufacturer: Herman Miller, Inc. | |
| Manufacturer's Technical Representative: Nathan Sweeney | |
| Mailing Address: 855 E Main Ave, Mail Stop 441, PO Box 30, Zeeland, MI 4946 | 41366 |
| Telephone: (123) 456-7890 Email: nathan_sweeney@he | ermanmiller.com |
| LED MAN | |
| Product Information | P. |
| Product Name: Herman Miller Canvas Wall System OPM-0668 | C |
| Product Type: Floor-Mounted Workstation | |
| Product Model Number: Canvas Wall System BY: Mohammad Aliaari | |
| General Description: Floor-Mounted Workstation | |
| P DATE: 3/10/2023 | 01/0 |
| | 2 |
| Applicant Information | <u><>></u> |
| Applicant Company Name: Herman Miller, Inc. | |
| Contact Person: Nathan Sweeney | |
| | |

"Access to Safe, Quality Healthcare Environments that Meet California's Diverse and Dynamic Needs"

Mailing Address: 855 E Main St., Mail Stop 441, PO Box 30, Zeeland, MI 494641366

Title: Codes & Standards Senior Engineer Building Codes and Product Conformance



Email: nathan_sweeney@hermanmiller.com



Telephone: (616) 260-5532



DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION FACILITIES DEVELOPMENT DIVISION

| Registered Design Professonal Preparing Engineering Recommendations |
|---|
| Company Name: CRITICAL STRUCTURES |
| Name: Eric Stovner California License Number: S4204 |
| Mailing Address: 1350 Coronado Ave., Long Beach, CA 90804 |
| Telephone: (310) 530-3050 Email: estovner@critical-structures.com |
| |
| HCAI Special Seismic Certification Preapproval (OSP) |
| Special Seismic Certification is preapproved under OSP OSP Number: |
| -2CODE |
| Contistantian Mathed |
| Certification Method |
| Testing in accordance with: ICC-ES AC156 FM 1950-16 |
| Other(s) (Please Specify): |
| *Use of criteria other than those adopted by the California Building Standards Code, 2019 (CBSC 2019) for component supports and attachments are not permitted. For distribution system, interior partition wall, and suspended ceiling seismic bracings, test criteria other than those adopted in the CBSC 2019 may be used when approved by HCAI prior to testing. |
| X Analysis |
| Experience Data CDATE: 3/10/2023 |
| Combination of Testing, Analysis, and/or Experience Data (Please Specify): |
| CANTA COSE. |
| HCAI Approval |
| Date: 3/10/2023 |
| Name: Mohammad Aliaari Title: Senior Structural Engineer |
| Condition of Approval (if applicable): |

"Access to Safe, Quality Healthcare Environments that Meet California's Diverse and Dynamic Needs"





SUPPORTS & ATTACHMENTS PRE-APPROVAL OPM-0668

THIS PRE-APPROVAL CONFORMS TO THE 2019 CALIFORNIA BUILDING CODE (CBC)

EQUIPMENT MANUFACTURER: MILLERKNOLL EQUIPMENT TYPE: CANVAS WALLTM SYSTEM

GENERAL NOTES:

- 1. THIS HCAI PRE-APPROVAL OF MANUFACTURER'S CERTIFICATION (OPM) IS BASED ON THE CBC 2019. THE DEMAND (DESIGN FORCES) FOR USE WITH THIS OPM SHALL BE BASED ON THE CBC 2019 AND ASCE 7-16.
- 2. WORKSTATION ANCHORS:
 - 2.a. EXPANSION ANCHORS: ATTACHMENT IS TO BE MADE WITH THE ANCHORS LISTED BELOW AND INSTALLED AS DESCRIBED IN THE CORRESPONDING ICC REPORT

| ANCHO | CONCRETE TYPE | MIN. f'c (PSI) | ANCHOR TYPE | ICC REPORT No. | MIN. NOMINAL EMBED. | MIN. CONC. THICK | INSTALLATION TORQUE |
|-------|----------------------------------|-------------------|---------------------------|-------------------|---------------------------|------------------------|------------------------|
| 3/8" | NORMAL WEIGHT OVER METAL DECK | 5,000 | HILTI KWIK BOLT TZ2-CS | ESR-4266 | 2" | 4½" | 30 FT-LBS |
| 5/8" | NORMAL WEIGHT | 4,000 | HILTI KWIK BOLT TZ2-CS | ESR-4266 | 31/4" | 5½" | 40 FT-LBS |

- 3. TESTING AND SPECIAL INSPECTION OF EXPANSION ANCHORS SHALL BE PERFORMED BY AN APPROVED INDEPENDENT AGENCY EMPLOYED BY THE FACILITY OWNER PER CBC 1704A & 1910A.5 AND CAC 7-149. ALL REPORTS SHALL BE SENT TO THE INSPECTOR OF RECORD, OWNER, AND THE ARCHITECT OR ENGINEER IN RESPONSIBLE CHARGE. AT LEAST 50% OF THE ANCHORS SHALL BE TESTED BY EITHER TORQUE BASED OR DIRECT PULL TENSION. IF ANY ANCHOR FAILS, TEST UNTIL TWENTY (20) CONSECUTIVE ANCHORS PASS, THEN RESUME THE INITIAL TEST FREQUENCY.
 - 3.a. TEST LOADS:
 - TORQUE BASED: 30 FT.-LBS. FOR 3/8" Ø BOLT, 40 FT.-LB. FOR 5/8" Ø BOLT.
 - DIRECT PULL TEST: 3,053 LB. TENSION LOAD ($\frac{3}{8}$ " Ø BOLT), 4,999 LB. TENSION LOAD ($\frac{5}{8}$ " Ø BOLT).
 - 3.b. ACCEPTANCE CRITERIA:
 - TORQUE BASED: ANCHORS TESTED WITH A CALIBRATED TORQUE WRENCH SHALL ATTAIN THE SPECIFIED TORQUE WITHIN 1/2 TURN OF THE NUT.
 - DIRECT PULL TEST: ANCHORS TESTED SHALL MAINTAIN THE TEST LOAD FOR A MINIMUM OF 15 SECONDS AND SHALL EXHIBIT NO DISCERNIBLE MOVEMENT DURING THE TENSION TEST, E.G. AS EVIDENCED BY LOOSENING OF THE WASHER UNDER THE NUT.
- 4. FORCES PER ASCE 7-16 SECTION 13.3.1, EQUATIONS 13.3-1, 13.3-2 & 13.3-3, WHERE
- 4.a. $a_p=1.0$, $R_p=2.5$, $\Omega_0=2.0$, AND S_{DS} AND z/h DETERMINED PER APPROPRIATE TABLE
- 5. MAXIMUM SDS IS DETERMINED FOR CONCRETE SLAB AND CONCRETE OVER METAL DECK (SEE APPROPRIATE TABLE)
- 6. THIS PRE-APPROVAL COVERS ONLY THE ANCHORAGE OF THE WORKSTATION TO THE BUILDING'S STRUCTURE.
- 7. ALL ANCHOR FORCES SHOWN ON THE DRAWINGS ARE FACTORED LOADS THAT SHALL BE USED FOR STRENGTH DESIGN.
- 8. WORK SURFACE LIVE LOADS PER BIFMA NOT CONSIDERED IN GLOBAL OVERTURNING / SLIDING ANALYSIS. EXCLUSION OF LIVE LOADS RESULTED IN WORST-CASE CONDITION.
- 9. 7 GA. CRS BRACKETS TO BE GRADE 50 CLASS 1 MINIMUM PER ASTM A653 (Fy=50 KSI, Fu=65 KSI).
- 10. INSTALLER TO AVOID DAMAGING EXISTING STEEL REINFORCEMENT IN CONCRETE.





| | REVISIONS | DATE |
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| | | |
| 1 | DATE: 02-09-2023 | |
| | PROJECT: 21-613 | |
| | ENGINEER: JG | |
| | DRAFTER: MC | |

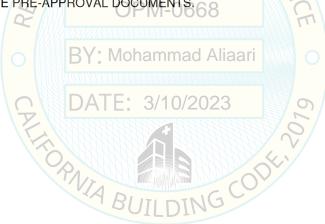
ANCHORAGE PRE-APPROVAL

THIS PRE-APPROVAL CONFORMS TO THE 2019 CALIFORNIA BUILDING CODE (CBC)

EQUIPMENT MANUFACTURER: MILLERKNOLL EQUIPMENT TYPE: CANVAS WALLTM SYSTEM

RESPONSIBILITIES OF THE STRUCTURAL ENGINEER:

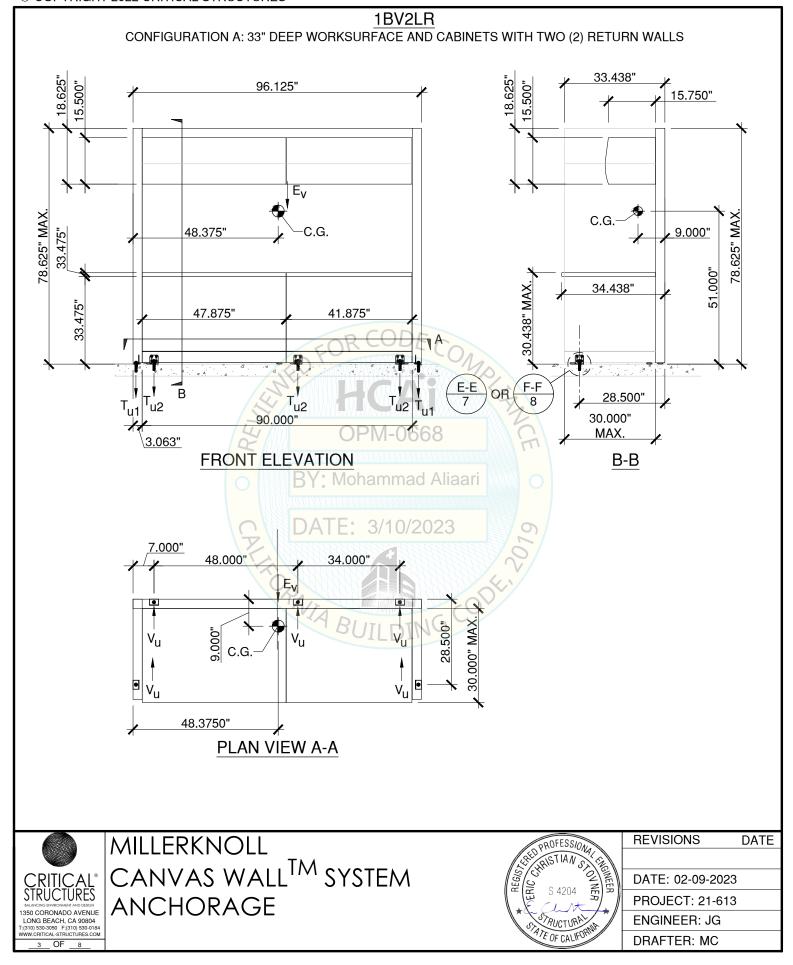
- 1. VERIFY THAT PROJECT SPECIFIC VALUES OF S_{DS} & z/h RESULT IN SEISMIC FORCES (Eh, Ev) THAT DO NOT EXCEED THE VALUES ON THE DETAILS.
- VERIFY THAT THE CONCRETE SLAB TO WHICH THE EQUIPMENT IS ANCHORED MEETS THE REQUIREMENTS OF THE APPLICABLE ICC ESR AND SPECIFICATIONS ON SHEET 1.
- 3. VERIFY THAT THE ANCHORS ARE AN ADEQUATE DISTANCE FROM ANY SLAB EDGES OR OPENINGS (SEE SPECIFICATIONS ON SHEET 1).
- 4. VERIFY THAT ALL NEW OR EXISTING ANCHORS ARE AN ADEQUATE DISTANCE FROM THE ANCHORS SHOWN IN THIS PRE-APPROVAL. SEOR SHALL VERIFY THAT THERE IS NO ADVERSE INTERACTION WHERE OTHER ANCHORS ARE WITHIN 18" OR 6hef FROM THIS UNIT'S ANCHORS.
- 5. PROVIDE SUPPORTING STRUCTURE TO SUPPORT WEIGHTS AND FORCES SHOWN, IN ADDITION TO ALL OTHER LOADS. VERIFY THE ADEQUACY OF THE STRUCTURES (SUCH AS WALLS AND FLOORS) WHICH SUPPORT THE EQUIPMENT FOR THE LOADS IMPOSED ON THEM BY THE EQUIPMENT IN ADDITION TO ALL OTHER LOADS.
- 6. VERIFY THAT THE INSTALLATION IS IN CONFORMANCE WITH THE 2019 CBC, AND WITH THE DETAILS SHOWN IN THIS PRE-APPROVAL. VERIFY THAT THE ACTUAL EQUIPMENT'S WEIGHT, CG LOCATION, ANCHOR LOCATIONS, ANCHOR DETAILS, AND THE MATERIAL AND GAGE OF THE UNIT WHERE ATTACHMENTS ARE MADE AGREE WITH THE INFORMATION SHOWN ON THE PRE-APPROVAL DOCUMENTS.

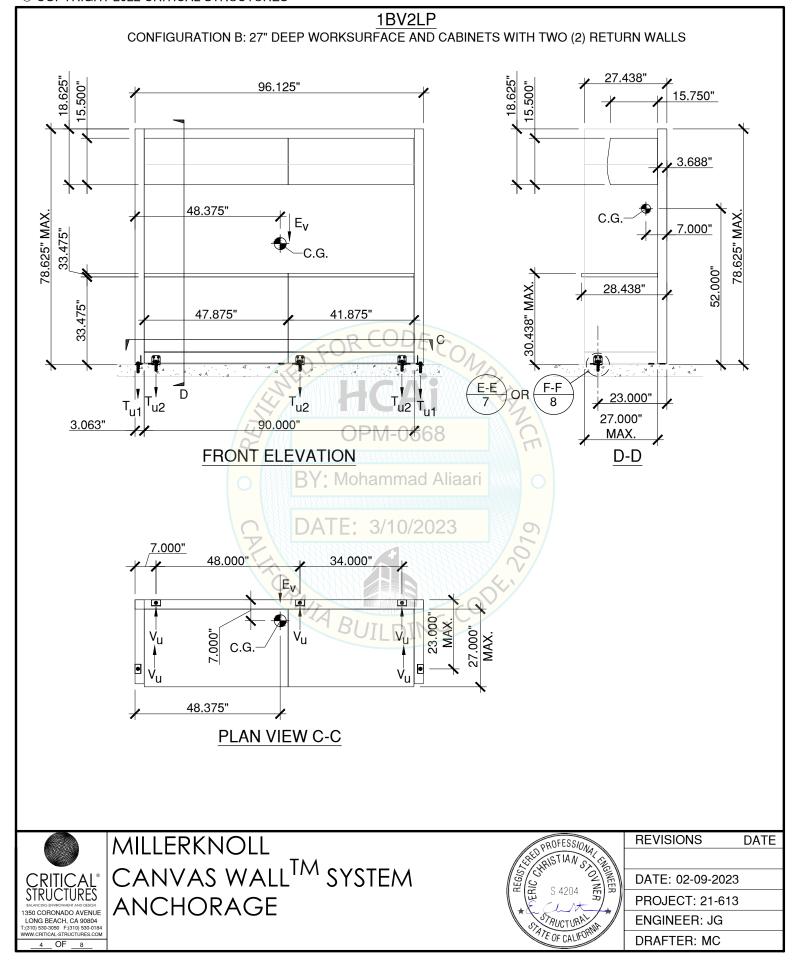






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CONFIGURATION A: 33" DEEP WORKSURFACE AND CABINETS WITH TWO (2) RETURN WALLS

SETTING A - MODULE SUMMARY:

| LABEL | DECODIDATION | DADTNo | WEIGHT |
|-------|-------------------|-------------|--------|
| LABEL | DESCRIPTION | PART No. | (LBS.) |
| F1A | FRAME ASSEMBLY | IBV2LR | 764 |
| S1A | 48" SHELF CABINET | X3730.48 | 21 |
| S2A | 42" SHELF CABINET | X3730.42 | 19 |
| W1A | 48" WORK STATION | FTS10_3048L | 43 |
| W2A | 42" WORK STATION | FTS10_3042L | 37 |

| | WORKSTATION ASSEMBLY | | | | | | | | |
|-------|-------------------------|---------------|--|-------------------|-------------------|--------------------|--------------------|--|--|
| LABEL | ASSEMBLY | WEIGHT (LBS.) | MODULE WEIGHT ¹ , W _w (LBS.) | WIDTH, W (IN.) | DEPTH, D (IN.) | HEIGHT, H (IN.) | No. OF BRACKETS | | |
| A1 | F1A+S1A +S2A+W1A+W2A | 884 | 1180 | ODF | 33 | 79 | 5 | | |

CONFIGURATION B: 27" DEEP WORKSURFACE AND CABINETS WITH TWO (2) RETURN WALLS

SETTING B - MODULE SUMMARY:

| LABEL | DESCRIPTION | PART No. | 6 WEIGHT |
|-------|-------------------|-------------|------------------------|
| LADEL | DESCRIPTION | PARTINO. | (LBS.) |
| F1B | FRAME ASSEMBLY | . MBV2LP | Δ i ⁷ 05 ri |
| S1B | 48" SHELF CABINET | X3730.48 | 21 |
| S2B | 42" SHELF CABINET | X3730.42 | 19 |
| W1B | 48" WORK STATION | FTS10_2448L | 023 ₃₄ |
| W2B | 42" WORK STATION | FTS10_2442L | 30 |

| | WORKSTATION ASSEMBLY | | | | | | | | |
|-------|-------------------------|--|--|-------------------|-------------------|--------------------|--------------------|--|--|
| LABEL | ASSEMBLY | UNLOADED MODULE WEIGHT (LBS.) | MODULE WEIGHT ¹ , W _w (LBS.) | WIDTH, W (IN.) | DÉPTH, D (IN.) | HEIGHT, H (IN.) | No. OF BRACKETS | | |
| B1 | F1B+S1B +S2B+W1B+W2B | 809 | 1127 | 96 | 27 | 79 | 5 | | |

NOTES:

 THIS PRE-APPROVAL ENCOMPASSES ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN. STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS SHOWN IN ADDITION TO ALL OTHER LOADS.



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| , | ENGINEER: JG | |
| | DRAFTER: MC | |

| CONFIGURATION A: MAXIMUM ANCHORAGE FORCES | | | | | | | |
|---|---|------|-----|------|------|-----|------|
| | ANCHORAGE INTO CONCRETE SLAB | | | | | | |
| | BRACKET TO CONCRETE FLOOR BRACKET TO MODULE BASE ² | | | | | | |
| $ z/h \text{MAX. S}_{\text{DS}} \text{MIN. THICKNESS, t}_{3} \left(\text{IN.}\right)^{4} \text{SHEAR}^{1}, V_{\text{U}} \left(\text{LB.}\right) T_{\text{U}}^{1} \left(\text{LB.}\right)^{1} T_{\text{U}}^{2} \left(\text{LB.}\right)^{1} V \left(\text{LB.}\right) T \left(\text{LB.}\right) $ | | | | | | | |
| 1.00 | 2.00 | 5.50 | 680 | 4306 | 3464 | 340 | 1519 |

ANCHORAGE INTO TOPSIDE OF CONCRETE OVER METAL DECK

| | | | | BRACKET TO CONCRETE FLOOR | | | BRACKET TO MODULE BASE ² | |
|-----------------------|----------------------|---|--|--|-------------------------------------|-------------------------------------|--|---------|
| z/h | MAX. S _{DS} | MIN. SLAB THICKNESS, t ₁ (IN.) ³ | MIN. UPPER FLUTE, t ₂ (IN.) ³ | SHEAR ¹ , V _U (LB.) | T _U 1 (LB.) ¹ | T _U 2 (LB.) ¹ | V (LB.) | T (LB.) |
| $0.9 \le z/h \le 1.0$ | 1.10 | | | 374 | 2304 | 2022 | 187 | 781 |
| $0.8 \le z/h < 0.9$ | 1.15 | | 3.00 | 365 | 2247 | 1975 | 182 | 764 |
| $0.7 \le z/h < 0.8$ | 1.25 | | | 368 | 2272 | 1985 | 184 | 764 |
| $0.6 \le z/h < 0.7$ | 1.35 | 4.50 | | 367 | 2268 | 1974 | 184 | 763 |
| $0.5 \le z/h < 0.6$ | 1.45 | 4.30 | | 361 | 2235 | 1941 | 181 | 753 |
| $0.4 \le z/h < 0.5$ | 1.60 | | | 363 | 2247 | 1938 | 181 | 760 |
| $0.3 \le z/h < 0.4$ | 1.80 | | | 367 | 2282 | 1948 | 184 | 777 |
| z/h < 0.3 | 2.00 | | | 367 | 2260 | 1915 | 181 | 773 |

CONFIGURATION B: MAXIMUM ANCHORAGE FORCES

ANCHORAGE INTO CONCRETE SLAB

| W. | | | BRACKET T | O CONCRETE FLOOR | BRACKET TO MODULE BASE ² | | |
|------|----------------------|---|---|---|-------------------------------------|---------|--|
| z/h | MAX. S _{DS} | MIN. THICKNESS, t ₃ (IN.) ⁴ | SHEAR ¹ , V _U (LB.) | $T_{U}^{1} (LB.)^{1}$ $T_{U}^{2} (LB.)^{1}$ | V (LB.) | T (LB.) | |
| 1.00 | 2.00 | 5.50 | 646 | 5000 3893 | 323 | 1734 | |

ANCHORAGE INTO TOPSIDE OF CONCRETE OVER METAL DECK

| | BRACKE BRACKE | | | BRACKET TO | O CO <mark>NCRE</mark> TE FLOOR | | BRACKET TO MODULE BASE ² | |
|-----------------------|----------------------|--|--|--|-------------------------------------|-------------------------------------|--|---------|
| z/h | MAX. S _{DS} | MIN. SLAB THICKNESS, t ₁ (IN.) ³ | MIN. UPPER FLUTE, t ₂ (IN.) ³ | SHEAR ¹ , V _U (LB.) | T _U 1 (LB.) ¹ | T _U 2 (LB.) ¹ | V (LB.) | T (LB.) |
| $0.9 \le z/h \le 1.0$ | 1.10 | | ATF: 3/10 | 202355 | 2689 | 2254 | 178 | 893 |
| $0.8 \le z/h < 0.9$ | 1.15 | | MANAGES SANGES S | 347 | 2623 | 2201 | 173 | 870 |
| 0.7 ≤ z/h < 0.8 | 1.25 | | | 350 | 2652 | 2215 | 175 | 882 |
| 0.6 ≤ z/h < 0.7 | 1.35 | 4.50 | 3.00 | 349 | 2647 | 2203 | 174 | 882 |
| $0.5 \le z/h < 0.6$ | 1.45 | 4.50 | 3.00 | 343 | 2608 | 2167 | 172 | 870 |
| $0.4 \le z/h < 0.5$ | 1.60 | 71 | | 344 | 2621 | 2165 | 172 | 878 |
| $0.3 \le z/h < 0.4$ | 1.80 | | A D. | 349 | 2661 | 2180 | 174 | 896 |
| z/h < 0.3 | 2.00 | | RITID | 344 | 2634 | 2144 | 172 | 890 |

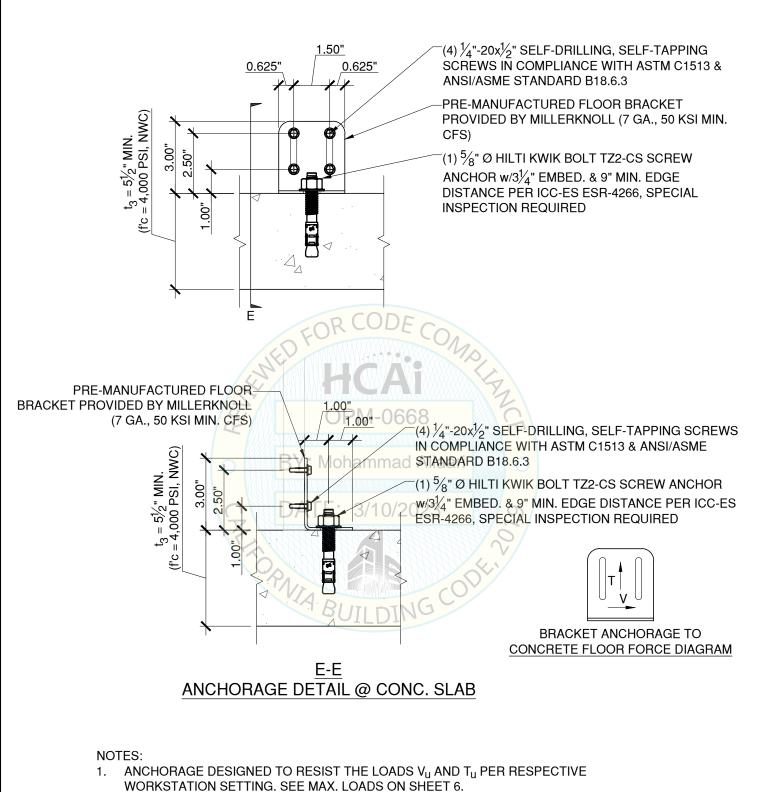
NOTES:

- SUPPORTS & ATTACHMENTS DESIGN PER 2019 CBC AND ASCE 7-16. STRENGTH DESIGN IS USED. FORCES PER ASCE 7-16 SECTION 13.3.1, EQUATIONS 13.3-1, 13.3-2 & 13.3-3, WHERE $a_{\rm p}\text{=}1.0,\,R_{\rm P}\text{=}2.5$ AND $\Omega_0\text{=}2.0$ FOR ANCHORAGE INTO CONCRETE.
 - HORIZONTAL FORCE (Eh) = $\Omega_{O}^{*}[0.4^{*}a_{P}^{*}S_{DS}^{*}(1+2^{*}(z/h)) / (R_{P}/I_{P})]$ VERTICAL FORCE (Ev) = $\Omega_{O}^{*}(0.2^{*}S_{DS})$
- SUPPORTS & ATTACHMENTS DESIGN PER 2019 CBC AND SCE 7-16, STRENGTH DESIGN IS USED. FORCES PER ASCE 7-16 SECTION 13.3.1, EQUATIONS 13.3-1. 13.3-2, & 13.3-3, WHERE a_0 =1.0, R_P =2.5 AND Ω_0 DOES NOT APPLY FOR ANCHORAGE INTO STEEL.
 - HORIZONTAL FORCE (Eh) = $0.4*a_P*S_{DS}*(1+2*(z/h)) / (R_P/I_P)$ VERTICAL FORCE (Ev) = 0.2*S_{DS}
- 3. FOR DESCRIPTION OF t₁ AND t₂, SEE DETAIL E-E/7.
- FOR DESCRIPTION OF t₃, SEE DETAIL F-F/8.
 STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT FORCES SHOWN, IN ADDITION TO ALL OTHER LOADS.





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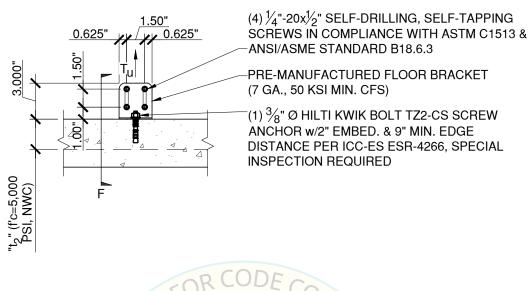


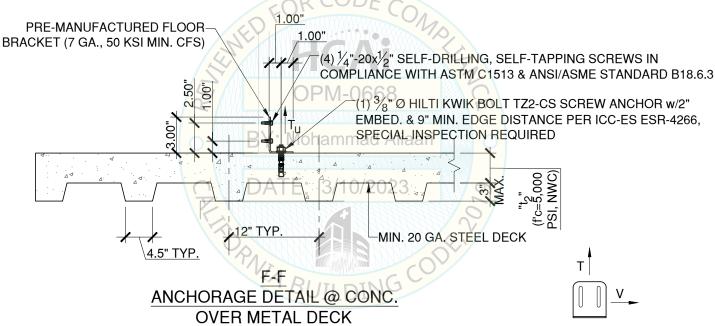
WORKSTATION SETTING. SEE MAX. LOADS ON SHEET 6.





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BRACKET ANCHORAGE TO CONCRETE FLOOR FORCE DIAGRAM

NOTES:

- 1. ANCHORAGE DESIGNED TO RESIST THE LOADS Vu AND Tu PER RESPECTIVE WORKSTATION SETTING. SEE MAX. LOADS ON SHEET 6.
- 2. INSTALLATION INTO CONCRETE OVER METAL DECK LIMITED TO COMBINATIONS OF z/h AND MAXIMUM S_{DS} PER MAXIMUM ANCHORAGE FORCES TABLE.

