

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE	PAGE OF PAGES	
				J	1	2
2. AMENDMENT/MODIFICATION NO. 0005	3. EFFECTIVE DATE 23-May-2003	4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO.(If applicable) 0250570		
6. ISSUED BY USA ENGINEER DISTRICT, SEATTLE ATTN: CENWS-CT P.O. BOX 3755 SEATTLE WA 98124-3755	CODE DACA67	7. ADMINISTERED BY (If other than item 6) See Item 6		CODE		
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)				X	9A. AMENDMENT OF SOLICITATION NO. DACA67-03-R-0210	
				X	9B. DATED (SEE ITEM 11) 22-Apr-2003	
					10A. MOD. OF CONTRACT/ORDER NO.	
					10B. DATED (SEE ITEM 13)	
CODE		FACILITY CODE				
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS						
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input type="checkbox"/> is extended, <input checked="" type="checkbox"/> is not extended. Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning <u>0</u> copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.						
12. ACCOUNTING AND APPROPRIATION DATA (If required)						
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.						
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.						
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).						
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:						
D. OTHER (Specify type of modification and authority)						
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.						
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) BATTLE SIMULATION CENTER, FORT LEWIS WA - SEE CONTINUATION						
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.						
15A. NAME AND TITLE OF SIGNER (Type or print)				16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
				TEL: _____ EMAIL: _____		
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)		16C. DATE SIGNED 23-May-2003		

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

A. This amendment provides for the following revisions to the solicitation:

1. Amendment R0005 consists of re-issuance of Sections 12705 Furniture Systems and 15895 Air Supply, Distribution, Ventilation and Exhaust System to include their attachments, inadvertently left out of earlier amendments.

B. The revised attached pages supersede pages of the same number and should be inserted in numerical sequence. All changes are generally identified, for your convenience, either by strikeout for deletions, and underlining of text for additions or single dark line in the margin. All portions of the revised or new pages shall apply to this contract whether or not changes have been indicated.

C. The time and date for receipt of proposals remain the same at 3:00 p.m., local time, 29 May 2003.

D. Offerors must acknowledge receipt of this amendment by number and date on the Standard Form 1442 BACK (page 00010-2) in Block 19 or by telegram.

Enclosures:

Rev. SF1442 Front and Back

Rev. 12705

Rev. 15895

SOLICITATION, OFFER, AND AWARD <i>(Construction, Alteration, or Repair)</i>	1. SOLICITATION NUMBER DACA67-03-R-0210	2. TYPE OF SOLICITATION <input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)	3. DATE ISSUED 22 April 2003	PAGE OF PAGES 1
	IMPORTANT - The "offer" section on the reverse must be fully completed by the offeror.			

4. CONTRACT NUMBER	5. REQUISITION/PURCHASE REQUEST NUMBER W68MD9-3027-6329	6. PROJECT NUMBER
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7. ISSUED BY Seattle District, Corps of Engineers ATTN: CENWS-CT-CB-MU PO Box 3755 Seattle, WA 98124-3755	CODE W68MD9	8. ADDRESS OFFER TO Seattle District, Corps of Engineers PO Box 3755 ATTN: CENWS-CT-CB-MU - Mitton Seattle, WA 98124-3755 HAND CARRY: Seattle District Corps of Engineers Contracting Division 4735 East Marginal Way South Seattle, WA 98134-2329
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9. FOR INFORMATION CALL	A. NAME See Information Page inside Front Cover	B. TELEPHONE NUMBER (Include area code) (NO COLLECT CALLS) See Information Page inside Front Cover
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SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (Title, identifying number, date):

Furnish all labor, materials and equipment and perform all work for Battle Simulation Center, Fort Lewis, WA in accordance with the attached Contract Clauses, Special Clauses, Technical Specifications and Drawings.

NOTE: Award will be made pursuant to the Small Business Competitive Demonstration Program

11. The Contractor shall begin performance within 10 calendar days and complete it within _____ calendar days after receiving award, notice to proceed. This performance period is mandatory, negotiable. (See Paragraph SC-1, 00800.)

12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE PAYMENT BONDS? <i>(If "YES," indicate within how many calendar days after award in Item 12B.)</i> <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	12B. CALENDAR DAYS 10
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13. ADDITIONAL SOLICITATION REQUIREMENTS:
- A. Sealed offers in original and 0 copies to perform the work required are due at the place specified in Item 8 by 3:00 p.m. (hour) local time 29 May 2003 (date). If this is a sealed bid solicitation, offers will be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.
 - B. An offer guarantee is, is not required.
 - C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.
 - D. Offers providing less than 90 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

OFFER (Must be fully completed by offeror)

14. NAME AND ADDRESS OF OFFEROR (Include ZIP Code) Tax ID No: _____ DUNS No: _____ eMail: _____ CODE _____ FACILITY CODE _____	15. TELEPHONE NUMBER (Include area code) Fax No.: _____ 16. REMITTANCE ADDRESS (Include only if different than Item 14) _____ _____
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17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within _____ calendar days after the date offers are due. (Insert any number equal or greater than the minimum requirement stated in 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)

AMOUNTS See Pages 00010-5 thru 00010-8

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGEMENT OF AMENDMENTS
 (The offeror acknowledges receipt of amendments to the solicitation - give number and date of each)

AMENDMENT NO.										
DATE										

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)	20B. SIGNATURE	20C. OFFER DATE
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AWARD (To be completed by Government)

21. ITEMS ACCEPTED

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA
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24. SUBMIT INVOICES TO ADDRESS SHOWN IN ITEM (4 copies unless otherwise specified)	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO <input type="checkbox"/> 10 U.S.C. 2304(c) () <input type="checkbox"/> 41 U.S.C. 253(c) ()
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26. ADMINISTERED BY CODE United States Army Corps of Engineers Seattle District Northwest Area Office PO Box 92146 Tillicum, WA 98492-0146	27. PAYMENT WILL BE MADE BY US Army Corps of Engineers Finance Center CEFC-AO-P, 5722 Integrity Drive Millington, TN 38054-5005
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CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

<input type="checkbox"/> 28. NEGOTIATED AGREEMENT (Contractor is required to sign this document and return _____ copies to the issuing office.) Contractor agrees to furnish and deliver all items or perform all work requirements identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract.	<input type="checkbox"/> 29. AWARD. (Contractor is not required to sign this document.) Your offer on this solicitation is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.
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30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN (Type or print)	31A. NAME OF CONTRACTING OFFICER (Type or print)	
30B. SIGNATURE	30C. DATE	31B. UNITED STATES OF AMERICA
		BY _____
		31C. AWARD DATE

Reissued to include attachment missing in R0003

SECTION 12705

FURNITURE SYSTEMS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- | | |
|------------|---|
| ASTM C 423 | (1999a) Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method |
| ASTM E 84 | (2000a) Surface Burning Characteristics of Building Materials |
| ASTM E 290 | (1997a) Bend Testing of Material for Ductility |

BIFMA INTERNATIONAL (BIFMA)

- | | |
|------------|------------------------------|
| BIFMA X5.5 | (1989) Desk Products - Tests |
| BIFMA X5.6 | (1993) Panel Systems - Tests |

CALIFORNIA AIR RESOURCES BOARD

- | | |
|-----------|---|
| AQMD 8-51 | (2001) Bay Area Air Quality Management District Regulation 8, Rule 51 Adhesive and Sealant Products |
|-----------|---|

ELECTRONIC INDUSTRIES ALLIANCE (EIA)

- | | |
|------------------------|--|
| EIA ANSI/TIA/EIA-569-A | (1998) Commercial Building Standard for Telecommunications Pathways and Spaces |
|------------------------|--|

FOREST STEWARDSHIP COUNCIL

- | | |
|-----------|---|
| FSC 1.2 | (2000) FSC Principles and Criteria of Forest Stewardship |
| FSC 5.3.5 | (2003) Forests Certified by FSC-Accredited Certification Bodies |

GREEN SEAL

- | | |
|-------|---|
| GS-11 | (1993) Standard Establishes Environmental Requirements for Paints |
|-------|---|

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA WD 1 (1999) General Color Requirements for Wiring Devices

NEMA WD 6 (1997) Wiring Devices - Dimensional Requirements

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1999) National Electrical Code

NFPA 101 (2000) Life Safety Code

NFPA 255 (2000) Method of Test of Surface Burning Characteristics of Building Materials

NFPA 265 (1998) Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Wall Coverings

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

AQMD Rule 1168 (2002) Regulation XI, Rule 1168 Adhesive and Sealant Applications

UNDERWRITERS LABORATORIES (UL)

UL 723 (1996; Rev thru Dec 1998) Test for Surface Burning Characteristics of Building Materials

UL 1286 (1999) Office Furnishings

1.2 GENERAL

This specification establishes the minimum requirements for the acquisition and installation of a complete and usable system of workstations composed of stacking privacy screens, storage components, freestanding desk modules, supporting components, electrical hardware, communications, special electrical features, and accessories. Workstation requirements and configurations shall be in accordance with the furniture layout and typical workstation types shown in drawings and specified herein. Components and hardware shall be provided by a single manufacturer and shall be a standard product as shown in the most recent published price lists or amendments. Electrical components shall be products of a single manufacturer to the extent practicable (different types of components may be of different manufacturers, but all units of a given component shall be from a single source). The completed installation shall comply with NFPA 70 and NFPA 101. The Contractor shall coordinate the work of this section with that to be performed under other sections. This specification may include items which are not manufactured by the furniture manufacturer; any such items shall be furnished by the Contractor under this section.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that

will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Approved Detail Drawings; G, RO
Installation; G, RO

Drawings showing the proposed workstation installation at a scale of 1/4 inch = 1 foot (1:100), unless otherwise specified. Drawings showing communications, electronic data processing (EDP) and local area network (LAN) locations may be provided as a separate submittal from remaining workstation drawings. Drawing requirements, which are the furniture manufacturer's responsibility, shall be provided as a single submittal. Electronic drawings shall be provided to the user for future re-configuration in the software package requested by the user. The electronic drawings shall include all modifications made during installation.

a. Overall reference drawings: Drawings showing workstation locations and overall plan view within each floor. The scale shall be 1/8 inch = 1 foot (1:200) scale. Layouts shall reflect field verified conditions.

b. Installation drawings: Drawings showing workstations, panels, spine walls, components, and plan view within each floor. Workstations shall be identified by workstation type. Scale of drawings shall be identical to Architectural plans. Installation drawings shall reflect field verified conditions.

c. Workstation elevations: Dimensioned workstation elevations showing each type of workstation with panel frame configurations and all components identified with manufacturer's catalog numbers. Elevations shall be drawn at 1/2 inch = 1 foot (1:50) scale.

d. Layout drawings: Drawings showing workstation locations and critical dimensions from finished face of walls, columns, panels, including clearances and aisle widths. Typical workstations shall be keyed to a legend which shall include width, height, configuration, power or nonpower, connectors and wall mount hardware. Drawings shall reflect field verified conditions.

e. Electrical drawings: Drawings showing power provisions including type and location of feeder components (service entry poles, base or ceiling feeds), activated outlets and other electrical components. Wiring configuration (circuiting, switching, internal and external connections) shall be identified and a legend provided as applicable.

f. Wire management capacity drawings.

g. Communication drawings showing telephone provisions: Drawings indicating the type and location of feeder components and outlets with wiring configuration identified where applicable.

h. Communication drawings showing electronic data processing provisions: Drawings indicating the type and location of feeder components, outlets, or accessories with wiring configuration identified where applicable.

i. Communication drawings showing local area network provisions: Drawings indicating the type and location of feeder components and data outlets with extra ports for future expansion with wiring configuration identified where applicable.

j. Typical workstation drawings including isometric and plan views, components list, finishes, fabrics and keyed to overall plans.

SD-03 Product Data

Installation Instructions; G, RO

Manufacturer's product and construction specifications which provide technical data for furniture system and components specified, including task lighting and illumination performance information. Literature shall include adequate information to verify that the proposed product meets the specification.

Warranty; G, RO

Two copies of the warranty

Workstation Components; G, RO

Complete listing of part/model numbers for all components to be furnished, including names and codes of components referenced on updated drawings.

SD-04 Samples

Workstations; G, RO

Four sets of the following finish samples. The Government reserves the right to reject any finish samples that do not satisfy the construction or color requirements. The Contractor shall submit additional samples as required to obtain final approval. Work shall not proceed without sample approval in writing from the Contracting Officer.

a. Panel tackboard and flipper door fabric. Minimum 6 x 6 inches (150 x 150 mm) with label designating the manufacturer, color, fiber content, fabric weight, fire rating, and use for this project (panel and/or tackboard).

b. Panel, work surface, modesty panel, and component finish. Minimum 2 x 3 inches (51 x 76 mm) with label designating the manufacturer, material composition, thickness, color, finish and use for this project.

c. Task lights.

d. Veneer wood samples, minimum 2 x 3 inches (51 x 76 mm) with label designating manufacturer, species, veneer cut, thickness, color, finish and use for this project.

SD-06 Test Reports

Selected Components; G, RO
Panel Acoustics; G, RO
Fire Safety; G, RO
Electrical System; G, RO

One complete set of test reports for the proposed system.

SD-07 Certificates

Workstations; G, RO

Two complete sets of certificates attesting that the proposed workstation meets specified requirements. The certificate shall be dated after the award of contract, shall name the project, and shall list specific requirements being certified.

SD-10 Operation and Maintenance Data

Product Assembly Manual; G, RO

Three sets of assembly manuals describing assembly and reconfiguration procedures

Product Maintenance Manuals; G, RO
Cleaning; G, RO

Three sets of maintenance manuals describing proper cleaning and minor repair procedures

Electrical System; G, RO

Three sets of electrical system manuals describing the functions, configuration, and maintenance of the electrical system (power, communications, data). This material may be included in the above 2 manuals at the Contractor's option.

1.4 QUALIFICATIONS

The manufacturer shall be a company specializing in the production of prewired workstations for a minimum of 10 years and shall have a proven record of sustainable goals for manufacturing processes and use of sustainable materials in their products.

1.5 DELIVERY, STORAGE, AND HANDLING

Components shall be delivered to the jobsite in the manufacturer's original packaging with the brand, item identification, and project reference clearly marked thereon. Components shall be stored in a dry location that is adequately ventilated and free from dirt and dust, water, and other contaminants, and in a manner that permits easy access for inspection and handling.

1.6 PATTERN AND COLOR

Pattern and color of finishes and fabrics for panels, work surfaces, components, and trim shall be in accordance with Section 09915 COLOR SCHEDULE.

1.7 ALTERNATE DESIGN

Manufacturers who are unable to provide workstations that conform exactly to the furniture layouts and typical workstation types shown in the contract drawings, may submit alternate designs for consideration by the Contracting Officer. Alternate designs must meet or exceed the following criteria. Alternate designs that are submitted but do not meet these criteria will be rejected.

1.7.1 Workstation Size and Configuration

The alternate design shall provide workstations and components of the same basic size and configuration shown, with only the sizes of the individual components within the workstation changed to meet the standard product of the manufacturer. Small variations of dimensions will be allowed which do not significantly affect the layout, shape or square footage of each workstation.

1.7.2 Component Requirements

The types of components or elements utilized shall be as shown on the drawings and as specified in PART 2 PRODUCTS of this specification.

1.7.3 Layout

The storage capacity, number of workstations accommodated, width of aisles, accessories or workstation configuration shall not be reduced.

1.7.4 Wiring Configuration

Alternate configurations must support the circuiting and connection capabilities identified under the provisions pertaining to power distribution of paragraph ELECTRICAL. Alternates may be acceptable which exceed the specified configuration in size or quantity.

1.8 WARRANTY

The Contractor shall warrant the furniture systems for a period of 12 years with the following exceptions: fabrics shall be warranted for 3 years. Electronic ballasts shall be warranted for 3 years. Warranties shall be signed by the authorized representative of the manufacturer. Warranties accompanied by document authenticating the signer as an authorized representative of the guarantor, shall be presented to the Contracting Officer upon the completion of the project. The Contractor shall guarantee that the workstation products and installation are free from any defects in material and workmanship from the date of delivery.

PART 2 PRODUCTS

2.1 PERFORMANCE AND SAFETY REQUIREMENTS

Recyclable materials shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS. Panels, spine walls, frames and frame covers, connection system, work surfaces, pedestals, shelf units, flipper door units, lateral files, locks, accessories, and miscellaneous hardware shall meet testing as specified. ISO 9001 certified manufacturers may perform in-house testing. Manufacturers not ISO 9001 qualified shall be required to produce testing by an independent testing laboratory. Component specific requirements are listed in appropriate paragraphs.

2.1.1 Selected Components

Workstations shall conform to the requirements of BIFMA X5.5 and BIFMA X5.6 with the following exceptions: Panels, spine walls and panel, or spine wall supported components shall be tested and pass in accordance with the requirements of BIFMA X5.6 and representative items shall be selected for testing based on worst case situations (i.e., the deepest and widest work surface or shelf). The keyboard drawer or shelf test shall be performed applying a 50 lb (19 kg) load to the center of the keyboard shelf for a period of 5 minutes. Any loosening of attachments, permanent deflection or damage to the operation of the drawer or shelf will be cause for rejection.

2.1.2 Panel Acoustics

Acoustical panels shall have a minimum noise reduction coefficient (NRC) of 0.65 when tested in accordance with ASTM C 423 and a minimum sound transfer coefficient (STC) of 14 when tested in accordance with ASTM E 290. The test shall be conducted on the entire assembled panel, full face area (the complete core, adhesive, decorative fabric, frame and joining components).

2.1.3 Fire Safety

Components shall meet requirements for flame spread and smoke development as specified by NFPA 101 except as follows. Testing shall have been conducted in accordance with either ASTM E 84, UL 723, or NFPA 255 on the entire assembled panel and each different combination of fabric and interior construction. In addition, fabric shall meet the requirements of NFPA 265. Panel flame spread shall not exceed 25 for Class A and panel smoke development shall not exceed 450 for Class A, B and C.

2.1.4 General Safety

Workstation products shall be free of rough or sharp edges. Desk-based workstation components shall have the option for a positive, integral locking device that secures components to the base units.

2.1.5 Electrical System

Task lights shall be UL approved and shall meet the requirements of NFPA 70. The electrical system shall meet the requirements of UL 1286.

2.1.6 Wood Components

Wood veneers and solids shall be from sustainable forests as certified by the Forest Stewardship Council. Wood composite materials shall contain no urea formaldehyde.

2.1.7 Indoor Environmental Quality

All adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule AQMD #1168. All sealants used as a filler must meet or exceed California Air Resources Board AQMD 8-51. Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal.

2.2 DESK-BASED SYSTEMS

2.2.1 Desk-Based Systems

Accessories and appurtenances for a completely finished desk-based assembly shall be supplied complete with the system. The desk-based system shall be free-standing and independent of panel system support. It shall be capable of structurally supporting work surfaces, privacy screens, overhead storage, shelves, pedestals and other components in the configurations shown on the drawings. A fully constructed workstation can be moved nominal distances across the floor while intact. The system shall be available in a variety of nominal widths as defined on drawings. The back panel shall be open to 18" (45.72 cm) clear from the floor. All components shall be finished on all sides, including concealed and semi-concealed surfaces.

2.2.2 Finishes

a. The privacy screens shall be available in the following options: acoustical. Exposed panel trim shall have a factory baked enamel or powder coated finish. Each fabric-faced screen shall have a seamless width of fabric stretched over the entire face of the panel and the color of each fabric utilized shall be consistent throughout the installation. Curved panels may use adhesives on curved sections. The fabric shall be attached securely and continuously along the entire perimeter of the screen and shall allow for easy removal and replacement in the field. Fabric shall be factory installed.

2.2.3 Raceways

The cable management and electrical raceways shall be an integral part of the desk unit. The desk unit shall be available in a powered and a non-powered version. Raceways, whether powered or nonpowered, shall be provided with a raceway cover. Magnet held raceway covers will not be accepted.

2.2.4 Leveling Glides

The system shall provide precise alignment of adjacent and shall include leveling glides to compensate for uneven floors. Each supporting shall have 2 leveling glides. A minimum 3/4 inch (20 mm) adjustment range is required for all systems.

2.2.5 Wall Mounted Components

Wall-mount accessories shall be used when it is necessary to attach components or assemblies to the building walls.

2.3 WORK SURFACES AND FREESTANDING DESK UNITS

2.3.1 Free standing Desk Units

Freestanding desk units shall consist of two stanchions, two end supports, a back panel, two cable management raceways, an electrical raceway and a worksurface. The end support choices shall include the following options: a full-end panel, a C-leg or a recessed leg. The C-leg and recessed leg shall be of 12-gauge steel and the full-end panel shall consist of 22-gauge steel. The back panel option shall be constructed of 18-gauge steel. The cable management and electrical components shall be an integral part of the desk unit design, and engineered as a part of the furniture system. The desk unit shall be available in a powered and a non-powered version.

2.3.2 Work Surfaces

Work surfaces shall be constructed to prevent warpage. Work surfaces shall be fully floor-supported with legs, pedestals or furniture end panels as shown in the drawings. Abutting work surfaces shall mate closely and be at equal heights when used in side-by-side configurations in order to provide a continuous and level work surface. Work surfaces shall either have pre-drilled holes to accommodate storage components, pedestals and additional supports, or holes shall be able to be drilled at the job site to accommodate these items. Work surfaces shall be available in multiple shapes that include rectangular, curvilinear corners and curvilinear p- and d-shaped peninsulas. Work surfaces shall be provided in sizes, shapes and configurations shown on the drawings. Work surfaces shall be available in nominal depths of 24 inches (610 mm), and 30 inches (760 mm), nominal lengths from 24 to 72 inches (610 to 1830 mm), and a nominal thickness from 1 to 1-3/4 inches (25 to 45 mm). Work surfaces, legs or other components shall be height adjustable in 1 inch (25 mm) increments to achieve work surface height adjustability. The worksurfaces on a desk module shall be height adjustable in the field from 26 to 31 inches (66 to 79 cm) at one-inch (25 mm) increments. Work surfaces abutting at equal heights shall provide a continuous and level work surface. Corner work surfaces, peninsula work surfaces and counter/transaction work surfaces shall be provided as shown on the drawings and shall include hardware necessary to provide firm and rigid support.

2.3.3 Finishes

Metal components of freestanding desk modules shall have a factory baked enamel or powder coated finish. The work surfaces shall have a finished top surface of high pressure plastic laminate, or wood veneer and shall have a smoothly finished underside. The work surface shall not be affected by ordinary household solvents, acids, alcohols or salt solutions, and shall be capable of being cleaned with ordinary household cleaning solutions. Metal support brackets shall match the color and finish of trim. Edges shall be vinyl molding, solid wood or wood composite, as shown in drawings.

2.4 PEDESTAL AND LATERAL FILE CABINETS

The deepest possible file shall be provided for each work surface size specified. Pedestals shall be field interchangeable from left to right, and right to left, and shall retain the pedestal locking system capability. Pedestals shall be designed to protect wires from being damaged by drawer operation. File cabinets shall be work surface hung, or shall support work surfaces, or shall be free standing; as shown in drawings.

2.4.1 Construction

With the exception of drawer fronts, file cabinets and drawers shall be of steel construction. Drawer faces shall be securely attached to the drawer front.

2.4.2 Finishes

The finish of steel surfaces shall be a factory baked enamel finish or powder coated. Drawer fronts shall be either steel or veneer wood, as shown in drawings.

2.4.3 Drawer Requirements

Drawer configurations and height shall be as shown in drawings. Drawers shall stay securely closed when in the closed position and each drawer shall contain a safety catch to prevent accidental removal when fully open. File drawers shall have either a cradle type or full extension ball bearing suspension with hanging folder frames or compressor dividers. File drawers shall be minimum 12 inch (305 mm) high.

2.5 STORAGE

Flipper door cabinets, shelf units, tall cabinets and lateral files shall be provided in the sizes and configurations shown on the drawings. Flipper door and shelf unit cabinets shall accommodate task lighting and shall have a depth to accommodate a standard three ring binder. All storage units shall be able to be keyed-alike within the workstation.

2.5.1 Shelf Unit Construction

The shelf pan shall be of metal construction with formed edges. Shelf supporting end panels shall be constructed of metal. The vertical clearance under the flipper door unit or shelf shall be 20" (50.8 cm) when used with a 29" (73.66 cm)-high work surface. Overhead storage products shall be supported at each end by uprights that stack onto the leg stanchions of the desk module and are available in modular dimensions compatible with the desk modules.

2.5.2 Flipper Door Unit Construction

Flipper door unit shall be of equal construction to shelf units. Units shall remain securely fastened when in the locked position. Doors shall utilize a suspension system. The vertical clearance under the flipper door unit or shelf shall be 20" (50.8 cm) when used with a 29" (73.66 cm)-high work surface. Overhead storage products shall be supported at each end by uprights that stack onto the leg stanchions of the desk module and are available in modular dimensions compatible with the desk modules.

2.5.3 Lateral File and Tall Cabinet Unit Construction

Lateral files shall be of steel construction. File fronts, top and end panels shall be of equal construction to shelf units. File drawers shall have full extension ball bearing drawer slides or rack and pinion suspension. File drawers shall have hanging folder frames, compressor dividers or rails and shall be capable of hanging side-to-side or front-to-back.

2.5.4 Finish

Shelves and dividers and top dust cover shall have a factory baked enamel or powder coated finish. Shelf supporting end panels shall have either a factory baked enamel, powder coated or laminate finish. Shelf bottom shall match end panel color. Metal doors shall have an exterior finish of factory baked enamel, powder coated or a factory installed fabric covering and an interior finish of factory baked enamel or powder coated. Metal drawers shall have a factory baked enamel finish or powder coated. Flipper doors shall have a wood veneer surface or fabric covering. Lateral files, tall cabinets and pedestals shall have a factory baked enamel finish, powder coated finish or a wood veneer finish.

2.6 PRIVACY SCREENS

Desk-mounted screens shall be available in fabric rectangular and fabric arc surface materials. The fabric screen shall be tackable on both sides. Desk-mounted privacy screens shall be able to be stacked two-high and provide both seated-and standing-height privacy. When stacked two high atop a desk module, stackable screens shall be able to reach a total of 67" high. Fabric shall be factory installed. Location and size shall be as shown on drawings.

2.7 ACCESSORIES

2.7.1 Keyboard Tray

Work surfaces shall be capable of accepting an articulating keyboard on workstations as shown on the drawings. The keyboard tray shall have the capability to be fully recessed under the work surface and extend to give the user full access to the keyboard. Side travel rotation shall be a 180-degree swing. The keyboard tray shall have tilting capability and shall contain a wrist support. It should also include a mouse pad at the same level as the keyboard, and accommodate either right or left-handed users.

2.8 MISCELLANEOUS HARDWARE

Brackets, supports, hangers, clips, panel supported legs, connectors, adjustable feet, cover plates, stabilizers, and other miscellaneous hardware shall be provided.

2.9 LOCKS AND KEYING

Drawers, flipper door cabinets, tall cabinets and lateral files shall have keyed locks, unless otherwise noted. Field changeable lock cylinders shall be provided with a minimum of 100 different key options. Each workstation shall be individually keyed and locks within a workstation shall be keyed alike. Drawers within a pedestal shall be lockable either by a central lock

that controls all pedestals under one work surface or an individual keyed lock in each pedestal. Central file and storage units which are grouped together but are not a part of a workstation shall be keyed alike unless otherwise specified. Two keys shall be provided for each lock or 2 keys per workstation when keyed alike, and 3 master keys shall be provided per area. Keys and lock cylinders shall be numbered for ease of replacement. Locks shall be clearly labeled with a key number, except for those manufacturers who have removal format locks.

2.10 ELECTRICAL

Both powered and nonpowered units shall have raceways capable of distributing power circuits, communication cables and data lines. Nonpowered bases shall be capable of easy field conversion to powered base without requiring the unit to be dismantled or removed from the workstation. The system shall use copper cable assemblies, wiring harnesses or electrified bus and shall meet requirements of UL 1286 and NFPA 70, Article 605. Conductors shall consist of 20 amp, #12 AWG wires (unless indicated otherwise) or the equivalent in the bus configuration. The label or listing of Underwriter's Laboratories, Inc. will be accepted as evidence that the material or equipment conforms to the applicable standards of that agency. In lieu of this label or listing, a statement from a nationally recognized, adequately equipped testing agency shall be submitted indicating that the items have been tested in accordance with required procedures of UL and that the materials and equipment comply with contract requirements. Electrical work not addressed in this section shall conform to the requirements of Section 16415 ELECTRICAL WORK, INTERIOR.

2.10.1 Panel Raceways

Panels shall have hinged or removable covers that permit easy access to the raceway when required but are securely mounted and cannot be accidentally dislodged under normal conditions. Metal or plastic covers which attach securely to the raceway shall be provided as required and shall match the finish and color of the trim. Raceways shall have a minimum of 2 knockouts (doors) per side.

2.10.2 Power Distribution

Power distribution shall be provided as indicated on the drawings. The desk units shall have an internal power and separate internal communications raceway and the capability of disconnecting and connecting external circuits to the electrified raceway. The communications receiving raceway shall have capacity for at least twenty 4-pair category 5 cables. Power and communications wiring may share a common wireway if a metal divider is included to ensure electrical isolation. Doors or access openings shall be included for entry of communications cable. The electrified power raceway shall be of the 8-wire configuration indicated. Unless otherwise indicated, conductors of the 8-wire system shall be allocated as follows: the three-phase system shall have one shared ground, one isolated ground, and one dedicated neutral per phase.

2.10.2.1 Receptacles

Power receptacles shall be provided in the raceway as well as a minimum of two duplex receptacles above work surface. Devices shall be placed at the locations indicated on the plans and shall be connected to the designated

circuits. 15 amp (NEMA 5-15R) commercial grade conforming to NEMA WD 1 and NEMA WD 6. If receptacles are not interchangeable or will not permit field adjustment of phase and circuit selection, 10 percent spare devices of each type shown on these plans shall be furnished. General use receptacles shall be of the duplex configuration; unless otherwise indicated, special use receptacles shall be of the simplex configuration. The color of receptacle bodies shall match the color of the furniture trim. Field applied identification shall be permanent; stick-on or non-setting adhesives shall not be used. A minimum of 5 receptacle removal tools shall be provided for systems that require special tools for proper receptacle removal.

2.10.3 Electrical Connections

2.10.3.1 Internal Connections

Internal panel-to-panel power connections shall utilize straight or flexible plug/receptacle connector assemblies and shall be installed to provide the powered configurations shown on the drawings.

2.10.3.2 Connections to Building Services

External power services shall be supplied to the panels via hard wired entry junction box assemblies. Wiring from building services shall be extended to the entry modules or panel bases in metal conduit or flexible tubing 6 foot (1830 mm) maximum. Cord and plug assemblies shall not be used for any portion of external links. Base feed modules shall plug into the end or either side of the raceway at receptacle doors. External wiring shall conform to Section 16415 ELECTRICAL WORK, INTERIOR.

2.10.4 Wire Management

Wire management capability shall be provided at all workstations. Actual wire management capacity shall accommodate all cable types specified, including the applicable manufacturer required bending radius at corners. Raceways and interfaces to the raceways shall be designed to accommodate the bend radius as shown in EIA ANSI/TIA/EIA-569-A for Category 5 and fiber optic cables communication wiring whichever is greater. The capability may be accomplished by cable access cutouts (1 minimum per work surface), covered wire management troughs in vertical end panels, horizontal wiring troughs, internal midpanel (beltline) raceways, or rear gaps (between the back edge of the work surface and the facing support panel). Grommet kits or another suitable finish arrangement shall be provided for all cable cutouts. Accessories for an externally mounted vertical and horizontal wire management and concealment system shall be provided as recommended by the manufacturer. Horizontal wire managers shall be supplied for mounting under all work surfaces. The wire managers shall be attached either to the underside of the work surface or to the vertical panel without damaging the face. Exposed or loose wiring will not be acceptable. Wire managers shall be prefinished and shall secure, conceal, and accommodate outlet cords as well as electrical and communications wiring. Wire channels shall match color of trim, attach by means of clip-on attachment, and shall conceal wires routed vertically. Power wiring shall be separated from communication wiring by use of separate raceways or by placement of channels in joint use troughs or wireways.

2.10.5 Circuit Layout

The circuit layout for workstations shall be as shown on the drawings. Devices shall be connected to the designated circuits in the neutral and ground configurations indicated. Connections shall be made to the building electrical distribution system as shown on the contract drawings and in accordance with Section 16415 ELECTRICAL WORK, INTERIOR.

2.10.6 Task Lighting

Task light size and placement shall be provided as indicated on the contract drawings. Such lights shall be a standard component of the manufacturer's workstation products. The ends of the task light length shall not extend beyond the edges of the overhead unit. Task lights shall have structurally sound mounting devices which will prevent accidental displacement, but will allow easy removal and replacement when necessary. Fixtures shall be UL approved for use in the configurations indicated on the drawings.

2.10.6.1 Luminaire Configuration

Luminaires shall be the fluorescent type and shall have prismatic lenses, baffles, or reflector systems configured to minimize glare by shielding the lamp from the view of a seated user. Task lights for each workstation shall provide a minimum of 75 foot candles (810 lx) of light (horizontally measured), without veiling reflections, on the work surface directly below and a maximum of 20 inches (500 mm) from the fixture. All diffusers, grilles or other coverings shall be easily removable to permit cleaning and relamping. Fixtures shall be provided with energy efficient ballasts and lamps as indicated. Each luminaire shall have an easily accessible on-off switch and one rapid-start ballast. A variable intensity control is acceptable if the low setting is equivalent to "off" with zero energy consumption. Multiple switching is also acceptable. Ganged fixtures or shared ballasts shall not be used. Lamps and ballasts shall conform to the requirements of Section 16415 ELECTRICAL WORK, INTERIOR.

2.10.6.2 Wiring

Each fixture shall have a 6 foot (1830 mm) minimum, factory installed, heavy duty electrical cordset with a grounded plug. Direct or hard wire connections are not acceptable. Unless otherwise indicated, cords shall be concealed. Cord concealment shall be built-in within panels or shall utilize field installed, manufacturer approved accessories. Cords may be extended through dedicated channels located at any point within panels or may be placed in vertical slots or in the space between panels if held in place by retainers and concealed by a cover plate. Vertical wire managers shall be prefinished and cut to size and shall extend from the task light level down to the top of the work surface below the task light. Each manager shall be attached to a panel vertical edge or connector strip without damage to the surfaces.

2.10.7 Communications

Communications wiring shall be extended to, and installed in, the panels as shown on the plans. Communications outlets shall be installed at designated locations. Communications work may be performed in conjunction with the installation of workstations or may be separately executed at the Contractor's option; however, equipment, materials, and installation shall conform to the requirements of Section 16415 ELECTRICAL WORK, INTERIOR and all interfaces must be properly coordinated.

PART 3 EXECUTION

3.1 INSTALLATION

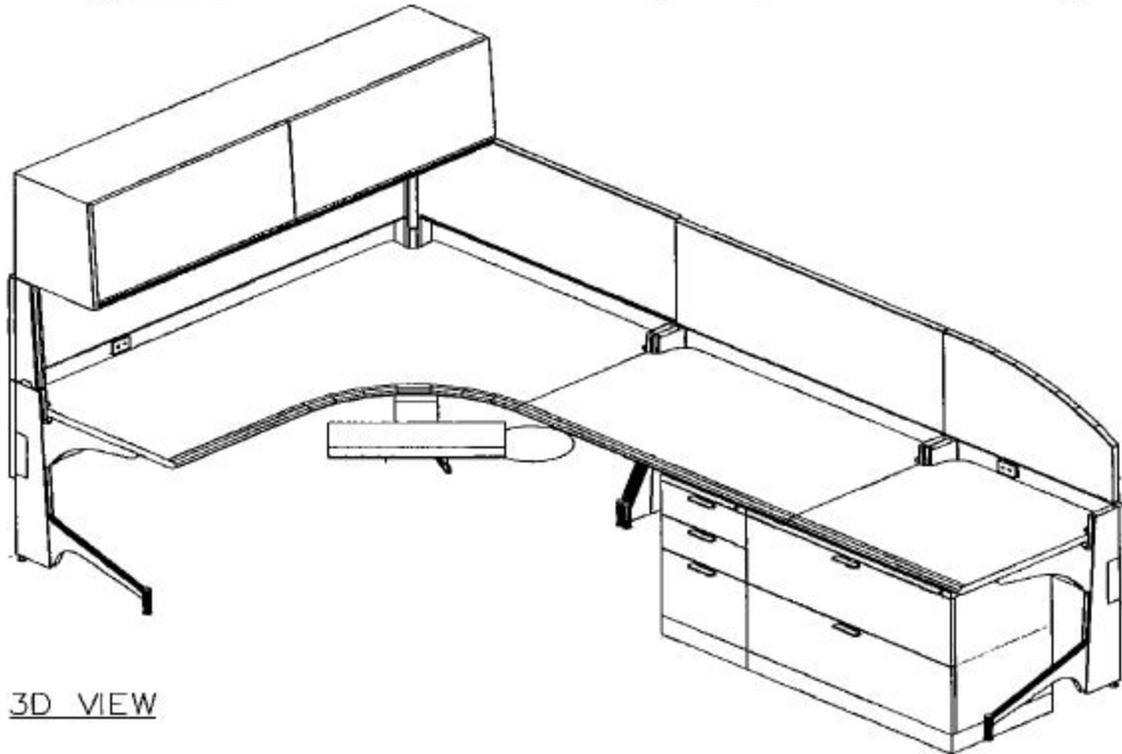
The workstations shall be installed by certified installers in accordance with manufacturer's recommended installation instructions. Workstation components shall be installed level, plumb, square, and with proper alignment with adjoining furniture. The components shall be securely interconnected and securely attached to the building where required. Three sets of special tools and equipment necessary for the relocation of panels and other components shall be furnished.

3.2 CLEANING

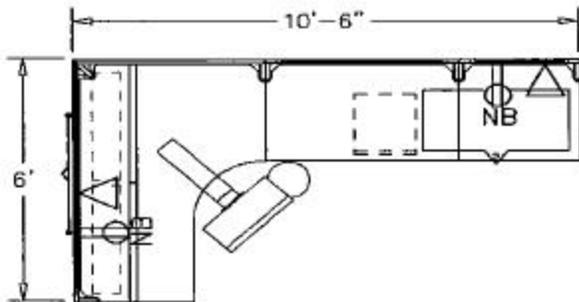
Upon completion of installation, all products shall be cleaned and polished and the area shall be left in a clean and neat condition. Any defects in material and installation shall be repaired, and damaged products that cannot be satisfactorily repaired shall be replaced.

3.3 SEE FOLLOWING ATTACHMENT

~~End of Section~~



3D VIEW



PLAN VIEW

SCALE

NTS

SYSTEMS FURNITURE TYPICAL #1
HERMAN MILLER "PASSAGE"
VENEER WORKSURFACES
VENEER STORAGE DOORS
FABRIC TACK PANELS
PAINTED METAL COMPONENTS
LOCATIONS:
DIECTOR'S OFFICE 101F

NOTE: COORDINATE WITH ELECTRICAL
AND TELECOM DRAWINGS.

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 1, REV

REV. DATE
03-26-03.24.03

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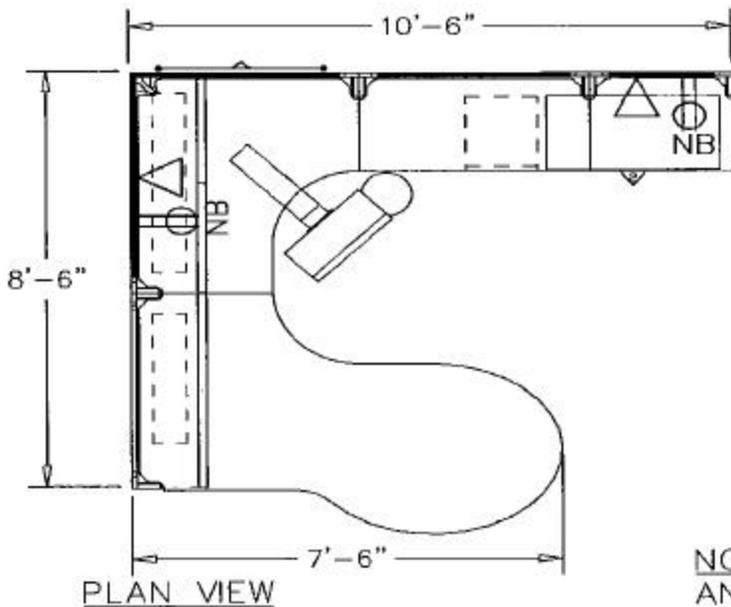
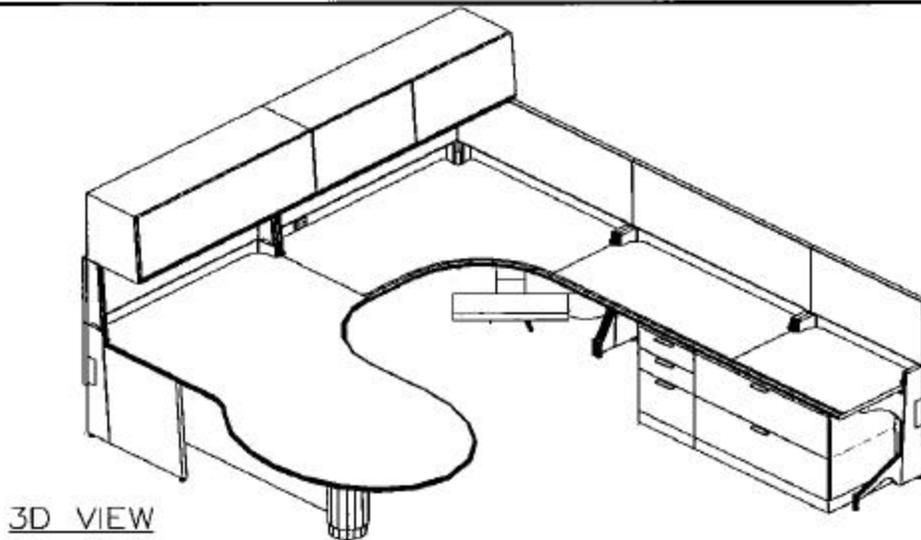
FORT LEWIS, WA
BATTLE SIMULATION CENTER

TYPICAL WORKSTATION COMPONENTS LIST
HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP.1	
29V-3618G-2N	@File,FS Lat Slpd Pull,2 Dwr	1
M19V-1518G- BBF	@Ped,Mobile,Slpd Pull,B/B/F	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
PA2VC.AZ32P	+Crn,Ext,30x72x48x30,Ven Top/Wd Cmp Ed,L C-Leg/R Rec Leg,Pwr	1
PB1VC.DM23P	@Rec,30x30,Ven Top/Wd Cmp Ed,L Rec Leg/R C-Leg,Pwr	1
PB1VC.DQ22P	@Rec,30x48,Ven Top/Wd Cmp Ed,L Rec Leg/R Rec Leg,Pwr	1
PH211.30S	+Screen, Arc, 18In H Lx10In H Rm Straight End	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PH200.1848S	+Screen,Stack,Straight End	1
PH200.1872L	+Screen,Stack,Bev R End for L Side of Corner	1
PJ111.71V	@Flipper Door Unit,Cnr,Wt-Red,Veneer Front	1
PM130.36M	+Task Light,Basic,Can/NY,3500K	2
PG210.06	+Pwr Entry,Dir Conn 6Ft L	1
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

PRINT DATE: 4/4/2003



SYSTEMS FURNITURE TYPICAL #2A
HERMAN MILLER "PASSAGE"
FIBER LAMINATE WORKSURFACES
VENEER STORAGE DOORS
FABRIC TACK PANELS
PAINTED METAL COMPONENTS
LOCATIONS:
OFFICE 101C, OFFICE 101D,
OFFICE 101E, OFFICE 101I,
OFFICE 101J, OFFICE 101K

NOTE: COORDINATE WITH ELECTRICAL
AND TELECOM DRAWINGS.

SCALE
NTS

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 2A, REV

REV. DATE
03-26-03, 23.03

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BATTLE SIMULATION CENTER

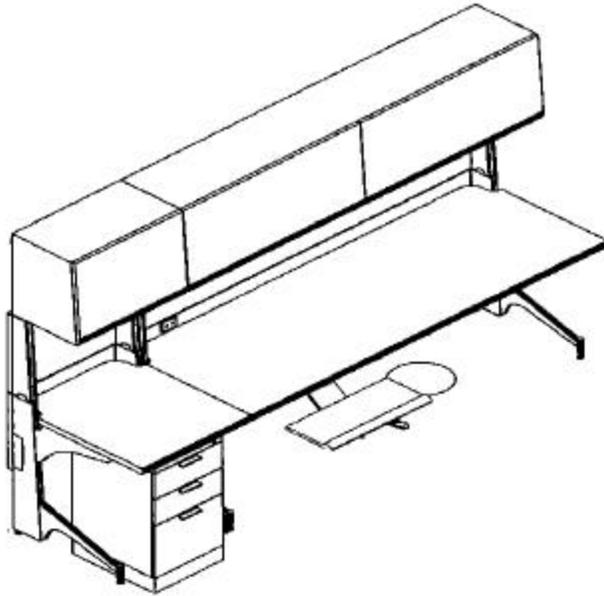
TYPICAL WORKSTATION COMPONENTS LIST

HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

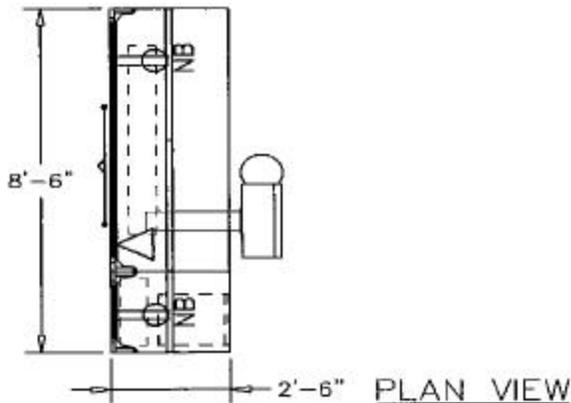
DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 2A	
29V-3618G-2N	@File,FS Lat Slpd Pull,2 Dwr	1
M19V-1518G-BBF	@Ped,Mobile,Slpd Pull,B/B/F	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
PA2LC.CM22P	+Crn,Ext,30x54x48x24,Lam Top/Vin Ed,L Rec Leg/R Rec Leg,Pwr	1
PB1LC.DB23P	+Rec,24x30,Lam Top/Vin Ed,L Rec Leg/R C-Leg,Pwr	1
PB1LC.DE22P	+Rec,24x48,Lam Top/Vin Ed,L Rec Leg/R Rec Leg,Pwr	1
PC3LC.HB42N	+Obl Pen,90x30,Lam Top/Vin Ed,L Full End/R Rec Leg,Nonpwr	1
PH200.1830S	+Screen,Stack,Straight End	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PH200.1848S	+Screen,Stack,Straight End	2
PH200.1854L	+Screen,Stack,Bev R End for L Side of Corner	1
PJ101.48V	@Flipper Door Unit,Wt-Red,Veneer Front	1
PJ101.54V	@Flipper Door Unit,Wt-Red,Veneer Front	1
PM130.36M	+Task Light,Basic,Can/NY,3500K	1
PG210.06	+Pwr Entry,Dir Conn 6Ft L	1
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PM130.48M	+Task Light,Basic,Can/NY,3500K	1
G7740.T	+Mouse Tray,Keybd Tray Alt	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

PRINT DATE: 4/4/2003



3D VIEW



SCALE
NTS

SYSTEMS FURNITURE TYPICAL #2B
HERMAN MILLER "PASSAGE"
FIBER LAMINATE WORKSURFACES
VENEER STORAGE DOORS
FABRIC TACK PANELS
PAINTED METAL COMPONENTS

LOCATIONS:

OFFICE 101R, SCIF 105A

NOTE: COORDINATE WITH ELECTRICAL
AND TELECOM DRAWINGS.

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 2B
REV. DATE
03-26-03

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BATTLE SIMULATION CENTER

TYPICAL WORKSTATION COMPONENTS LIST

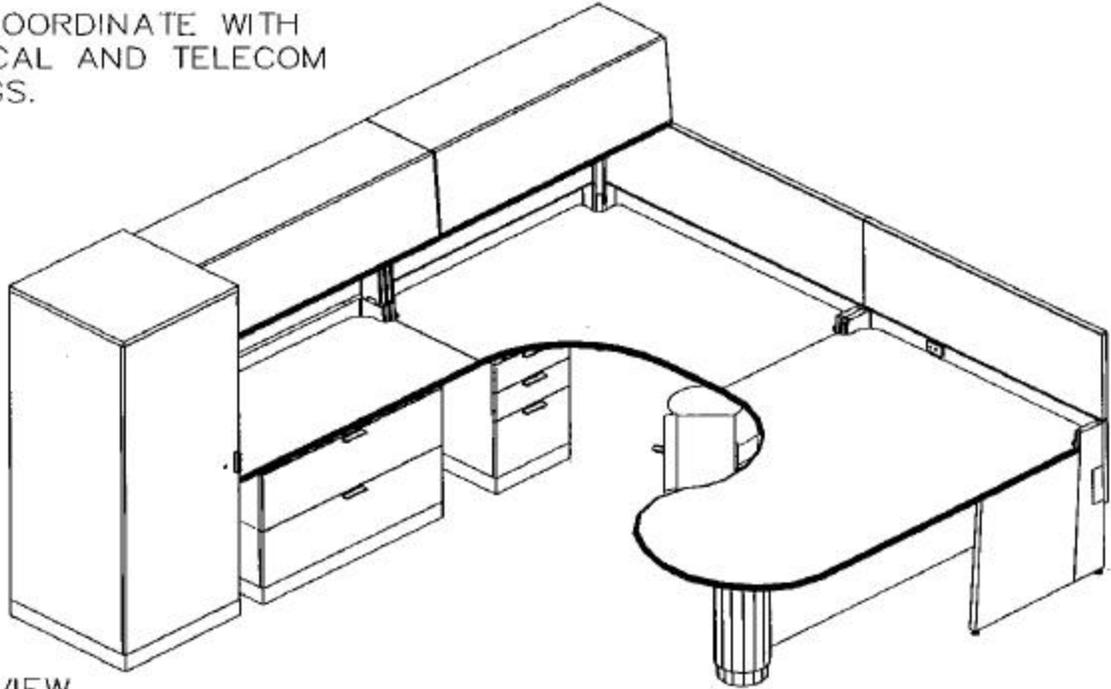
HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

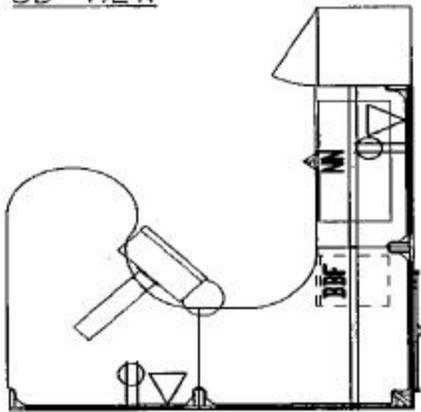
Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 2B	
M19V-1518G- BBF	@Ped,Mobile,Slpd Pull,B/B/F	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
PB1LC.DB33P	+Rec,24x30,Lam Top/Vin Ed,L C-Leg/R C-Leg,Pwr	1
PB1LC.DV33P	+Rec,30x78,Lam Top/Vin Ed,L C-Leg/R C-Leg,Pwr	1
PH200.1824S	+Screen,Stack,Straight End	1
PH200.1878S	+Screen,Stack,Straight End	1
PJ101.78V	@Flipper Door Unit,Wt-Red,Veneer Front	1
PJ101.24V	@Flipper Door Unit,Wt-Red,Veneer Front	1
PM130.60M	+Task Light,Basic,Can/NY,3500K	1
PM130.24M	+Task Light,Basic,Can/NY,3500K	1
PG210.06	+Pwr Entry,Dir Conn 6Ft L	1
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

PRINT DATE: 4/4/2003

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



3D VIEW



PLAN VIEW

SCALE

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SYSTEMS FURNITURE TYPICAL #3
HERMAN MILLER "PASSAGE"
FIBER LAMINATE WORKSURFACES
VENEER STORAGE DOORS
FABRIC TACK PANELS
PAINTED METAL COMPONENTS

CIRCUIT LOCATIONS:

- SP- TECH CONTROL OFFICE 105C,
- SP- WAR GAME SPCL. OFFICE 105D,
- NA- SITE MGR'S OFFICE 110D,
- C4- TEAM CHIEF OFFICE 117B,
- C4- TEAM CHIEF OFFICE 118B,
- C4- TEAM CHIEF OFFICE 119B

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
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OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 3, REV

REV. DATE
03-26-03.31.03

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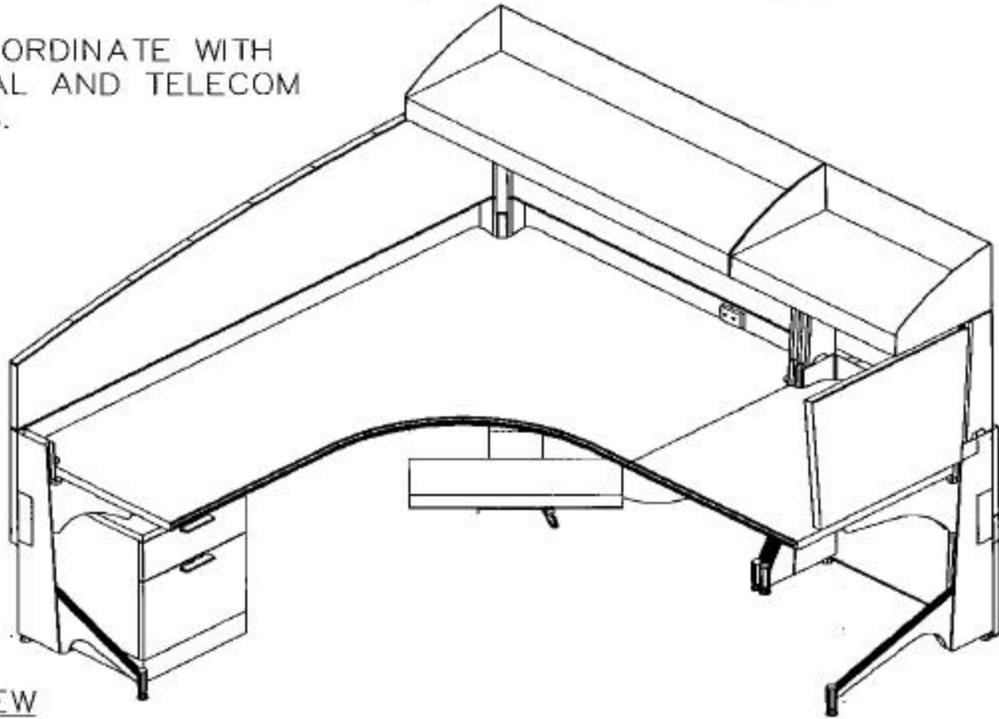
TYPICAL WORKSTATION COMPONENTS LIST
HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

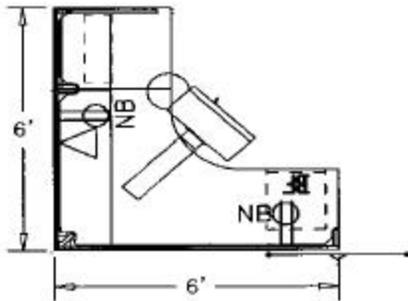
Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 3	
29V-3618G-2N	@File,FS Lat Slpd Pull,2 Dwr	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
M19V-1518G-BBF	@Ped,Mobile,Slpd Pull,B/B/F	1
PA2LC.CM22P	+Crn,Ext,30x54x48x24,Lam Top/Vin Ed,L Rec Leg/R Rec Leg,Pwr	1
PB1LC.DE23P	+Rec,24x48,Lam Top/Vin Ed,L Rec Leg/R C-Leg,Pwr	1
PC2LC.GE42P	+Ellp Pen,78x30,Lam Top/Vin Ed,L Full End/R Rec Leg,Pwr	1
PH200.1848S	+Screen,Stack,Straight End	2
PH200.1854L	+Screen,Stack,Bev R End for L Side of Corner	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PJ101.48V	@Flipper Door Unit,Wt-Red,Veneer Front	1
PJ111.47V	@Flipper Door Unit,Cnr,Wt-Red,,Veneer Front	1
PM130.24M	+Task Light,Basic,Cen/NY,3500K	1
PG210.06	+Pwr Entry,Dir Conn 6Ft L	1
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PM130.36M	+Task Light,Basic,Cen/NY,3500K	1
49V-2424R-BX	@Twr,Stg,Slpd Pull,Hng-Wdrb R/4 Adj Sh (discontinuing 12/6/02)	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

PRINT DATE: 4/4/2003

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



3D VIEW



PLAN VIEW

SCALE

NTS

SYSTEMS FURNITURE TYPICAL #4
HERMAN MILLER "PASSAGE"
SPECKLED LAMINATE WORKSURFACES
FABRIC FLIPPER DOORS
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS
LOCATIONS:
TRANISENT OFFICES 102A

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 4, REV

REV. DATE
03-26-03.24.03

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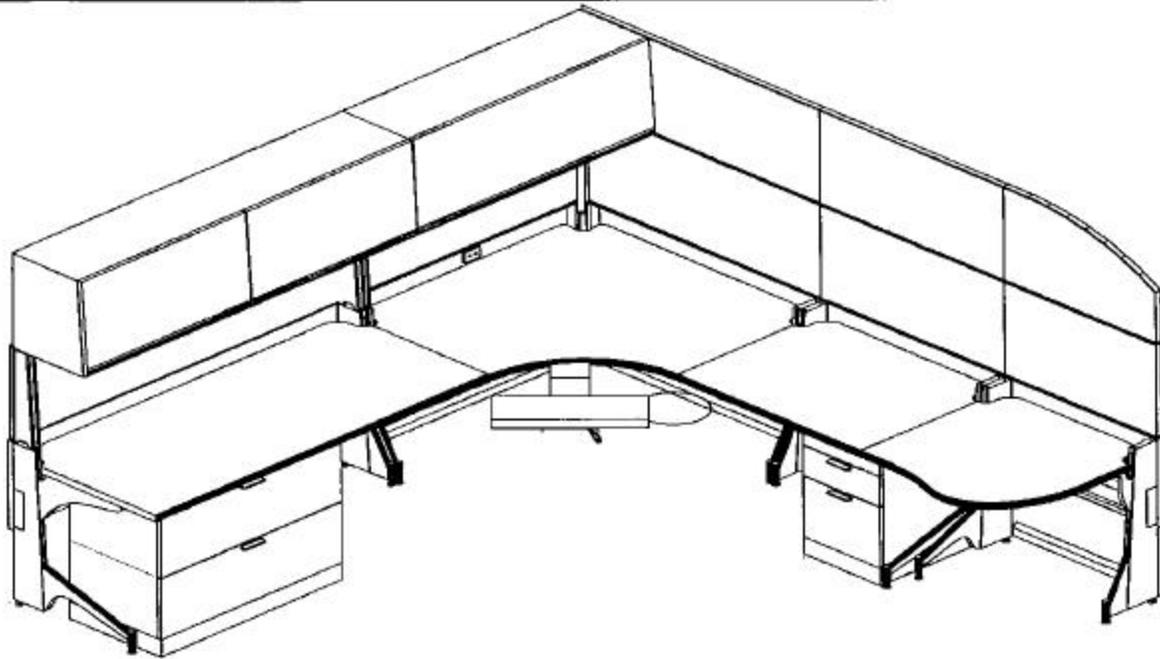
TYPICAL WORKSTATION COMPONENTS LIST

HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

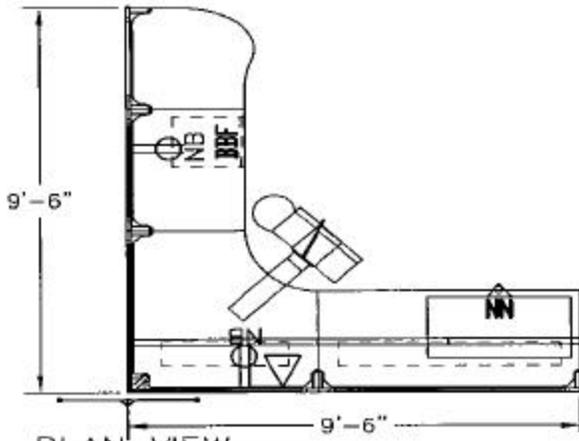
DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 4	
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PA2LC.AQ32P	+Crn,Ext,24x72x48x30,Lam Top/Vin Ed,L C-Leg/R Rec Leg,Pwr	1
PB1LC.DL23P	+Rec,30x24,Lam Top/Vin Ed,L Rec Leg/R C-Leg,Pwr	1
PG210.06	+Pwr Entry,Dir Conn 6Ft L	1
PH200.1824S	+Screen,Stack,Straight End	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PH210.72L	+Screen,Arc,10In H Lx18In H R,Bev R End for L Corner	1
PM130.24M	+Task Light,Basic,Can/NY,3500K	1
M19P-1518G-BF	+Ped,Mobile,Slpd Pull,B/F	1
PH500.30	+Side Screen,30In W	1
PJ510.47	+Shelf,Cnr,47In W	1
PJ500.24	+Shelf,24In W	1
G7740.T	+Mouse Tray,Keybd Tray Alt	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

PRINT DATE: 4/4/2003



3D VIEW



PLAN VIEW

SCALE

NTS

SYSTEMS FURNITURE TYPICAL #5
HERMAN MILLER "PASSAGE"
FIBER LAMINATE WORKSURFACES
FABRIC FLIPPER DOORS
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS
LOCATIONS:
ADMINISTRATION 105A

NOTE: COORDINATE WITH ELECTRICAL
AND TELECOM DRAWINGS.

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 5, REV.

REV. DATE
03-26-03 / 29/03

0209

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BATTLE SIMULATION CENTER

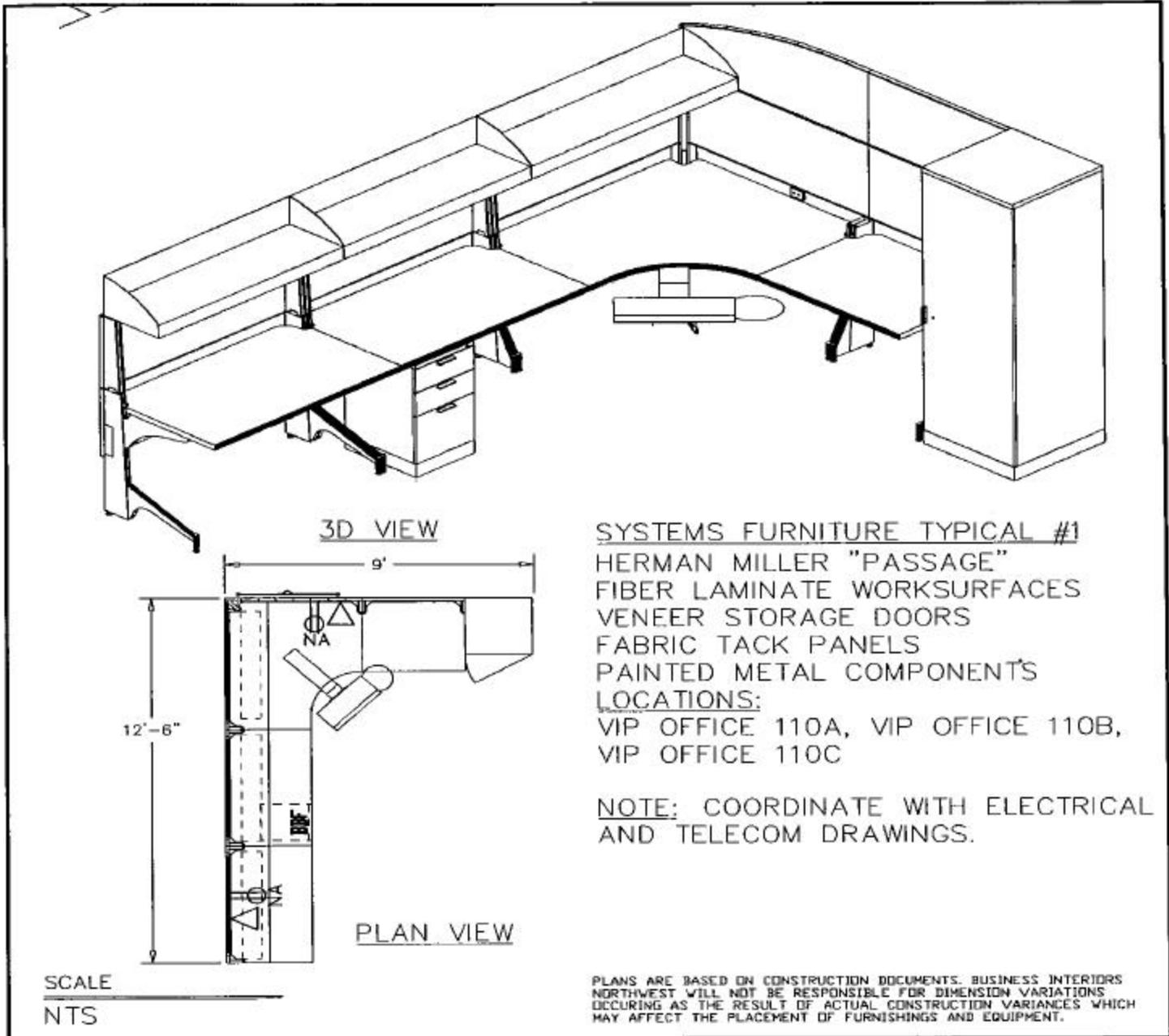
TYPICAL WORKSTATION COMPONENTS LIST

HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 5	
PG210.06	+Pwr Entry,Dir Conn 6Ft L	1
PM130.36M	+Task Light,Basic,Can/NY,3500K	1
PM130.60M	+Task Light,Basic,Can/NY,3500K	1
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PA1LA.AE22P	+Cnr,30x48x48x30,Lam Top/Vin Ed,L & R Rec Leg,Pwr	1
PB1LA.DN23P	+Rec,30x36,Lam Top/Vin Ed,L Rec Leg/R C- Leg,Pwr	1
PB1LC.DT32P	+Rec,30x66,Lam Top/Vin Ed,L C-Leg/R Rec Leg,Pwr	1
PB3LA.RB32N	+Ext,Lam Top/Vin Ed,30x30D R Ext w/L C- Leg/R Rec Leg,Nonpwr	1
PH200.1830S	+Screen,Stack,Straight End	1
PH200.1836S	+Screen,Stack,Straight End	2
PH200.1848L	+Screen,Stack,Bev R End for L Side of Corner	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	2
PH200.1866S	+Screen,Stack,Straight End	1
PH211.30S	+Screen,Arc,18In H Lx10In H R,Straight End	1
PJ101.66B	+Flipper Door Unit,Wt-Red,Fabric Front	1
PJ111.47B	+Flipper Door Unit,Cnr,Wt-Red.,Fabric Front	1
M19P-1518G- BBF	+Ped,Mobile,Slpd Pull,B/B/F	1
29P-3618G-2N	+File,FS Lat Slpd Pull,2 Dwr	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

PRINT DATE: 4/4/2003



FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 7, REV

03-26-03

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BATTLE SIMULATION CENTER

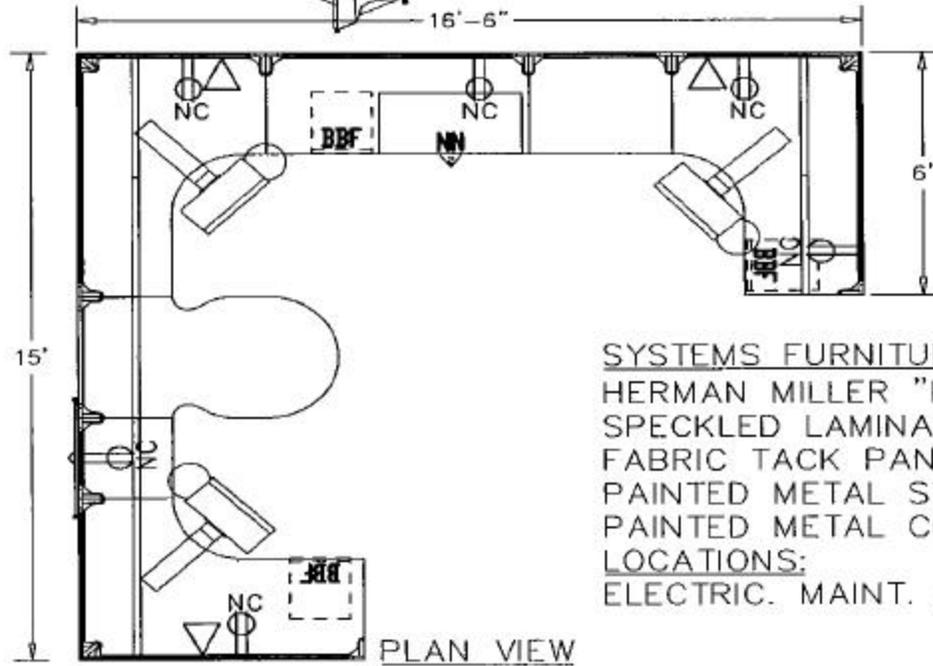
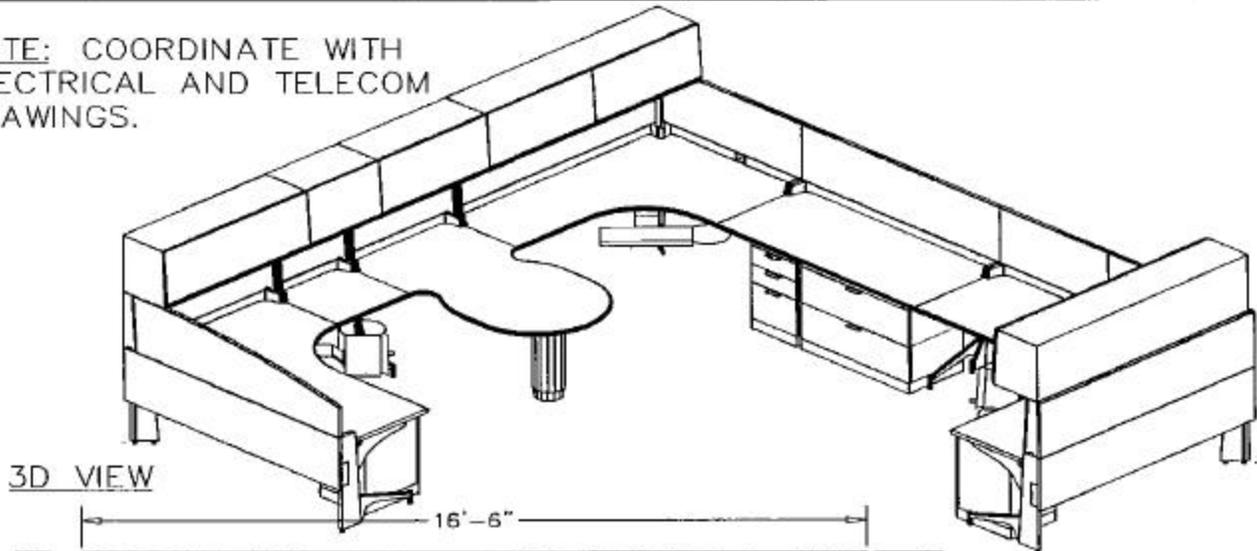
TYPICAL WORKSTATION COMPONENTS LIST
HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-8400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 7	
PG210.06	+Pwr Entry,Dir Conn 6Ft L	1
PM130.48M	+Task Light,Basic,Cnr/NY,3500K	3
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PJ500.48	+Shelf,48In W	2
PJ510.53	+Shelf,Cnr,53In W	1
PA2LC.CN22P	+Crm,Ext,30x54x48x30,Lam Top/Vin Ed,L Rec Leg/R Rec Leg,Pwr	1
PB1LC.DN23P	+Rec,30x36,Lam Top/Vin Ed,L Rec Leg/R C- Leg,Pwr	1
PB1LC.DQ32P	+Rec,30x48,Lam Top/Vin Ed,L C-Leg/R Rec Leg,Pwr	1
PB1LC.DQ33P	+Rec,30x48,Lam Top/Vin Ed,L C-Leg/R C- Leg,Pwr	1
PH200.1836S	+Screen,Stack,Straight End	2
PH200.1848L	+Screen,Stack,Bev R End for L Side of Corner	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PH200.1848S	+Screen,Stack,Straight End	2
PH210.48S	+Screen,Arc,10In H Lx18In H R,Straight End	1
M19V-1518G- BBF	@Ped,Mobile,Slpd Pull,B/B/F	1
49V-2424R-BX	@Twr,Stg,Slpd Pull,Hng-Wdrb R/4 Adj Sh (discontinuing 12/6/02)	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

PRINT DATE: 4/4/2003

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



SYSTEMS FURNITURE TYPICAL #9
HERMAN MILLER "PASSAGE"
SPECKLED LAMINATE WORKSURFACES
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS
LOCATIONS:
ELECTRIC. MAINT. ADMINISTRATION 116D

SCALE 6'
NTS

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 9, REV

REV. DATE
03-26-03

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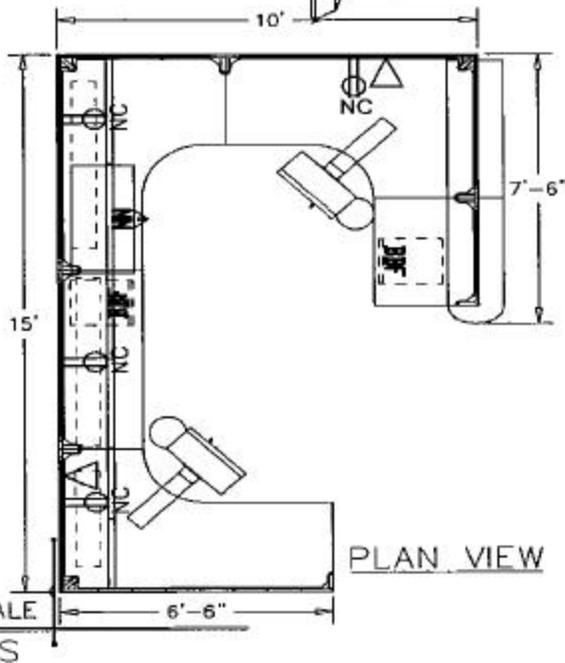
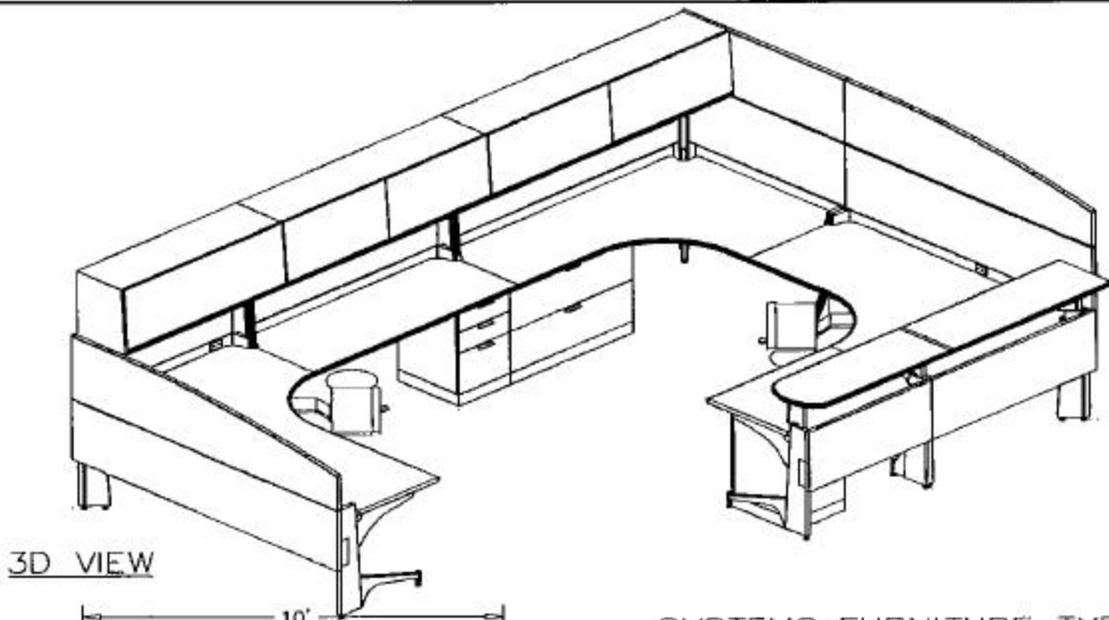
FORT LEWIS, WA
BATTLE SIMULATION CENTER

TYPICAL WORKSTATION COMPONENTS LIST
HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 9	
PG210.06	+Pwr Entry,Dir Conn 6FI L	1
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	3
PJ101.24P	+Flipper Door Unit,Wt-Red,Paint Front	1
PJ101.36P	+Flipper Door Unit,Wt-Red,Paint Front	1
PJ101.48P	+Flipper Door Unit,Wt-Red,Paint Front	1
PJ111.71P	+Flipper Door Unit,Cnr,Wt-Red,,Paint Front	2
PA2LC.AQ32P	+Crm,Ext,24x72x48x30,Lam Top/Vin Ed,L C-Leg/R Rec Leg,Pwr	1
PA2LC.AU23P	+Crm,Ext,30x72x48x24,Lam Top/Vin Ed,L Rec Leg/R C-Leg,Pwr	1
PB1LC.DA23P	+Rec,24x24,Lam Top/Vin Ed,L Rec Leg/R C-Leg,Pwr	1
PB1LC.DN23P	+Rec,30x36,Lam Top/Vin Ed,L Rec Leg/R C-Leg,Pwr	1
PB1LC.DT23P	+Rec,30x66,Lam Top/Vin Ed,L Rec Leg/R C-Leg,Pwr	1
PC4LE.KG22P	+Rnd-End Pen,Lam Top/Vin Ed,24x36x24x66, Pwr	1
PH200.1824S	+Screen,Stack,Straight End	1
PH200.1836S	+Screen,Stack,Straight End	1
PH200.1836S	+Screen,Stack,Straight End	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PH200.1866S	+Screen,Stack,Straight End	1
PH200.1872L	+Screen,Stack,Bev R End for L Side of Corner	1
PH210.72L	+Screen,Arc,10In H Lx18In H R,Bev R End for L Corner	1
M19P-1518G-BBF	+Ped.Mobile,Slpd Pull,B/B/F	3
29P-3618G-2N	+File,FS Lat Stpd Pull,2 Dwr	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	3
G7740.T	+Mouse Tray,Keybd Tray Att	3
G1314.	+Elec Dist,Work Surf-Attached	3
G1320	+Voice/Data Outlet,Work Surf-Attached	3

PRINT DATE: 4/4/2003



SYSTEMS FURNITURE TYPICAL #10
HERMAN MILLER "PASSAGE"
SPECKLED LAMINATE WORKSURFACES
FABRIC FLIPPER DOORS
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS
LOCATIONS:
SUPPLY ADMINISTRATION 116A

NOTE: COORDINATE WITH ELECTRICAL
AND TELECOM DRAWINGS.

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 10, REV

03-26-03 REV. DATE

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BATTLE SIMULATION CENTER

TYPICAL WORKSTATION COMPONENTS LIST

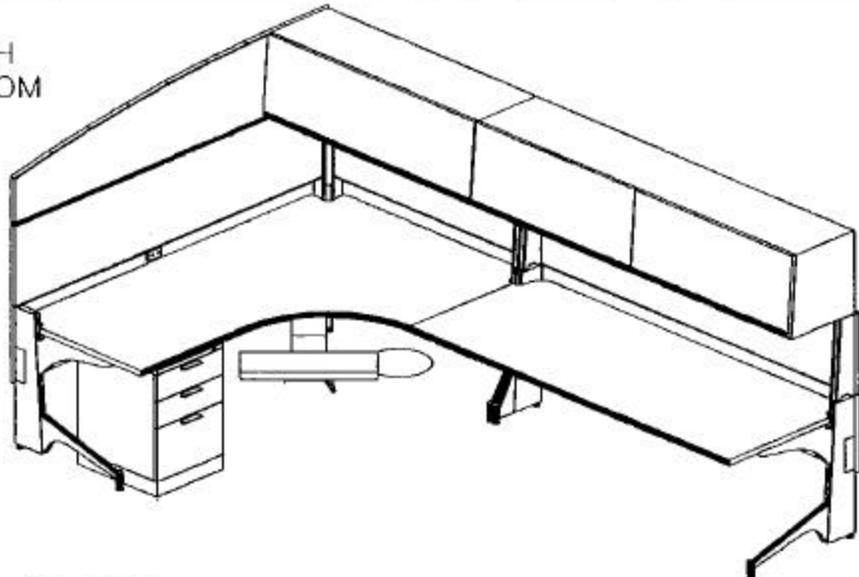
HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-8400

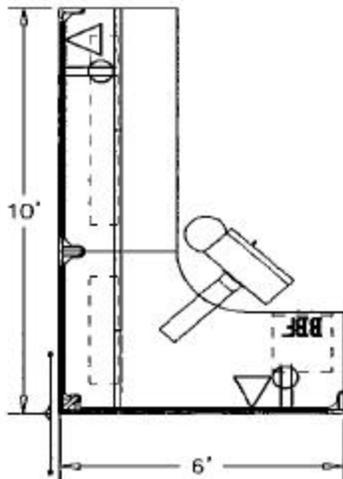
Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 10	
PG210.06	+Pwr Entry,Dir Conn 6Ft L	1
PM130.36M	+Task Light,Basic,Can/NY,3500K	2
PM130.60M	+Task Light,Basic,Can/NY,3500K	1
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	2
PF111.36L	+Trans Surf,Rec End,11In Abv Ht Sirt Ed,Lam Top/Vin Ed	1
PF201.47L	+Crn Trans Surf,Rec End,11" above Dsk Mod Ht,Crn Dsk w/scr, Lam Top/Vin Ed	1
PA2LC.AQ32P	+Crn,Ext,24x72x48x30,Lam Top/Vin Ed,L C-Leg/R Rec Leg,Pwr	1
PA2LC.AW32P	+Crn,Ext,30x78x48x24,Lam Top/Vin Ed,L C-Leg/R Rec Leg,Pwr	1
PA2LC.AZ22P	+Crn,Ext,30x72x48x30,Lam Top/Vin Ed,L Rec Leg/R Rec Leg,Pwr	1
PB1LC.DG23P	+Rec,24x60,Lam Top/Vin Ed,L Rec Leg/R C-Leg,Pwr	1
PB1LC.DN23P	+Rec,30x36,Lam Top/Vin Ed,L Rec Leg/R C-Leg,Pwr	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	3
PH200.1880S	+Screen,Stack,Straight End	1
PH200.1872S	+Screen,Stack,Straight End	1
PH211.72S	+Screen,Arc,18In H Lx10In H R,Straight End	1
PJ101.60B	+Flipper Door Unit,Wt-Red,Fabric Front	1
PJ111.47B	+Flipper Door Unit,Cnr,Wt-Red.,Fabric Front	1
PJ111.71B	+Flipper Door Unit,Cnr,Wt-Red.,Fabric Front	1
M19P-1518G-BBF	+Ped,Mobile,Slpd Pull,B/B/F	2
29P-3618G-2N	+File,FS Lat Slpd Pull,2 Dwr	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	2
G7740.T	+Mouse Tray,Keybd Tray Att	2
G1314.	+Elec Dist,Work Surf-Attached	2
G1320	+Voice/Data Outlet,Work Surf-Attached	2

PRINT DATE: 4/4/2003

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



3D VIEW



PLAN VIEW

SCALE
NTS

SYSTEMS FURNITURE TYPICAL #11A
HERMAN MILLER "PASSAGE"
SPECKLED LAMINATE WORKSURFACES
FABRIC FLIPPER DOORS
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS

CIRCUIT

- NB- OFFICE 1010
- NB- ADMIN. OFFICES 101T,
- NA- LIBRARY OFFICE 111B,
- NC- SUPPLY ADMINISTRATION 116A,
- C9- COMM. OFFICE 121A

LOCATIONS:

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 11A, REV

REV. DATE
03-26-03.31.03

0209

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BATTLE SIMULATION CENTER

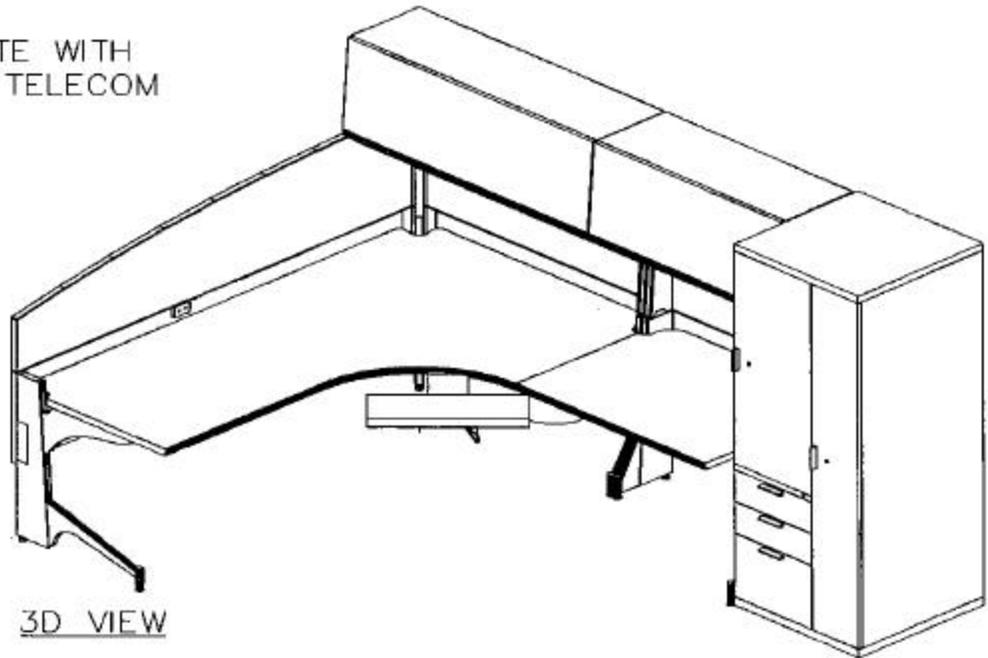
TYPICAL WORKSTATION COMPONENTS LIST

HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

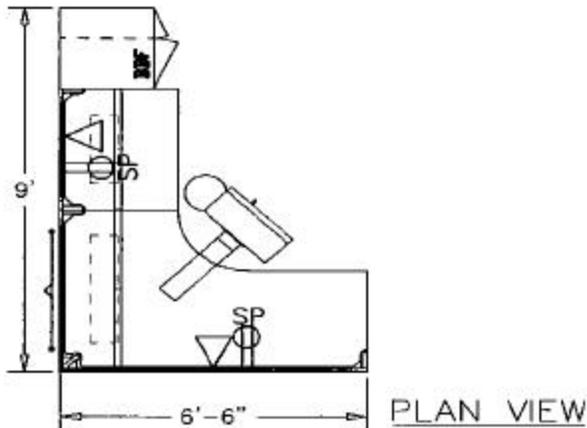
DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 11A	
PG210.06	+Pwr Entry,Dir Conn 6Ft L	1
PM130.36M	+Task Light,Basic,Crn/NY,3500K	1
PM130.60M	+Task Light,Basic,Crn/NY,3500K	1
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PJ101.72P	+Flipper Door Unit,Wt-Red,Paint Front	1
PJ111.47P	+Flipper Door Unit,Cnr,Wt-Red,Paint Front	1
PA2LC.AZ32P	+Crn,Ext,30x72x48x30,Lam Top/Vin Ed,L C-Leg/R Rec Leg,Pwr	1
PB1LC.DU23P	+Rec,30x72,Lam Top/Vin Ed,L Rec Leg/R C-Leg,Pwr	1
PH200.1848L	+Screen,Stack,Bev R End for L Side of Corner	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PH200.1872S	+Screen,Stack,Straight End	1
PH210.72L	+Screen,Arc,10In H Lx18In H R,Bev R End for L Corner	1
M19P-1518G-BBF	+Ped,Mobile,Slpd Pull,B/B/F	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



3D VIEW



PLAN VIEW

SYSTEMS FURNITURE TYPICAL #11B
HERMAN MILLER "PASSAGE"
SPECKLED LAMINATE WORKSURFACES
PAINTED METAL FLIPPER DOORS
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS
LOCATIONS:
ENTRY CONTROL 105B

SCALE

NTS

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 11B, REV

03-26-03

REV. DATE

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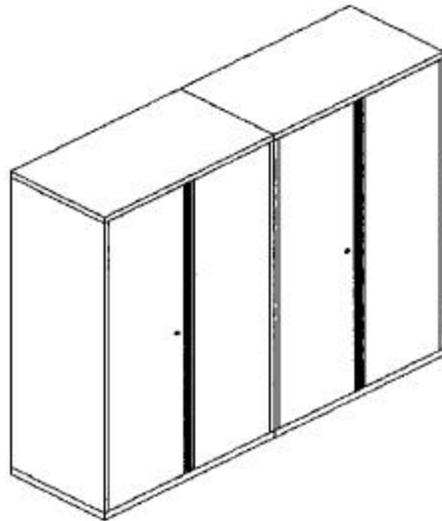
FORT LEWIS, WA
BATTLE SIMULATION CENTER

TYPICAL WORKSTATION COMPONENTS LIST
HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

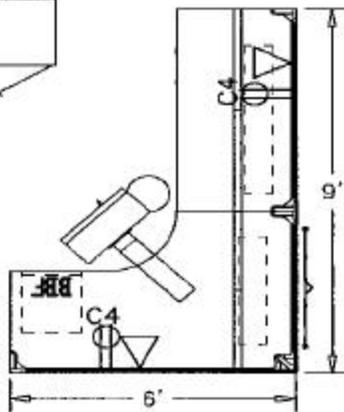
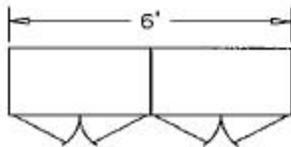
DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 11B	
MTV6P.24RFS	+Vrt Twr w/Wrdrb Rt & Stg Case,Slp Pull,64H 24W,F/F,Adj Shlfs,Sm Stl	1
PG210.06	+Pwr Entry,Dir Conn 6Ft L	1
PM130.24M	+Task Light,Basic,Cnr/NY,3500K	1
PM130.36M	+Task Light,Basic,Cnr/NY,3500K	1
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PJ101.36P	+Flipper Door Unit,Wt-Red,Paint Front	1
PJ111.47P	+Flipper Door Unit,Cnr,Wt-Red,,Paint Front	1
PA2LC.BA32P	+Cnr,Ext,30x78x48x30,Lam Top/Vin Ed,L C- Leg/R Rec Leg,Pwr	1
PB1LC.DN23P	+Rec,30x36,Lam Top/Vin Ed,L Rec Leg/R C- Leg,Pwr	1
PH200.1836S	+Screen,Stack,Straight End	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PH210.78L	+Screen,Arc,10In H Lx18In H R,Bev R End for L Corner	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



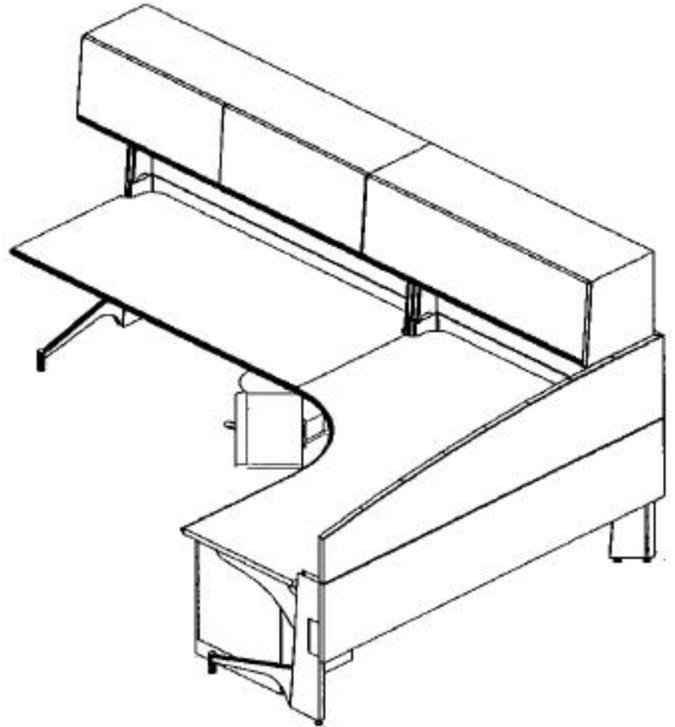
3D VIEW



PLAN VIEW

SCALE

NTS



SYSTEMS FURNITURE TYPICAL #11C
HERMAN MILLER "PASSAGE"
SPECKLED LAMINATE WORKSURFACES
PAINTED METAL FLIPPER DOORS
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS
LOCATIONS:
FACILITY MAINT. OFFICE 107B

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 11C, REV

03-26-03

REV. DATE

0209

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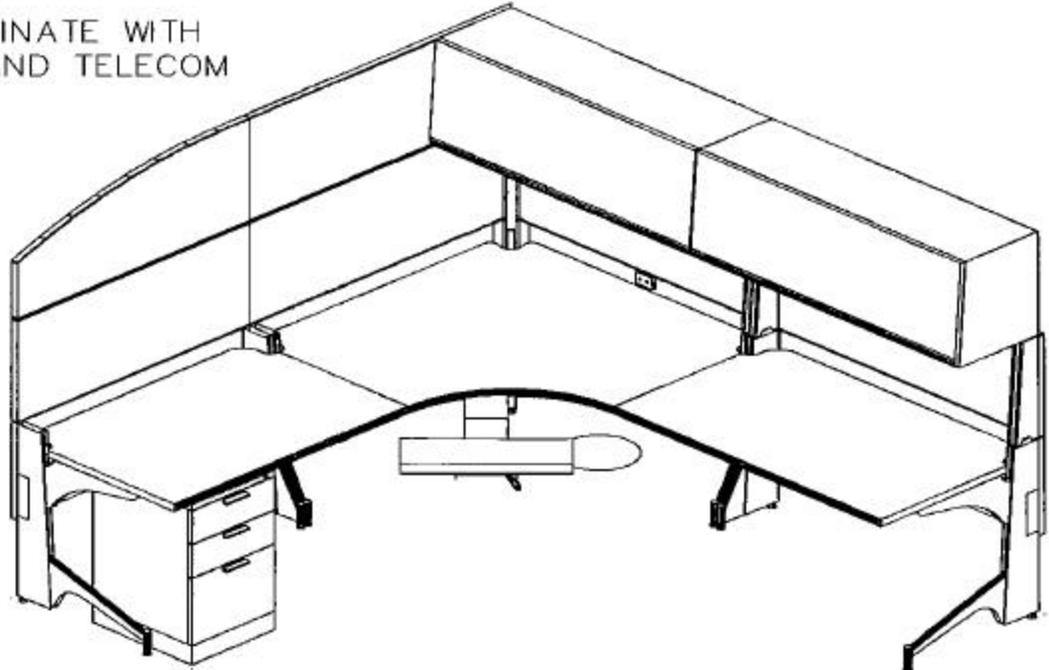
TYPICAL WORKSTATION COMPONENTS LIST

HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

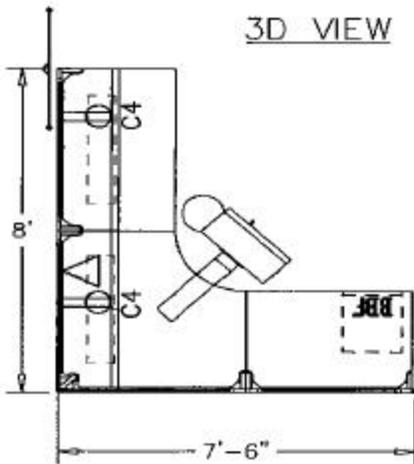
DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 11C	
46-3620-66	+Storage Case Std Pull 36W 20D 65-5/8H	2
PG210.06	+Pwr Entry,Dir Conn 6Fl L	1
PM130.36M	+Task Light,Basic,Can/NY,3500K	1
PM130.48M	+Task Light,Basic,Can/NY,3500K	1
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PH210.72L	+Screen,Arc,10In H Lx18In H R,Bev R End for L Corner	1
PJ101.60P	+Flipper Door Unit,Wt-Red,Paint Front	1
PJ111.47P	+Flipper Door Unit,Cnr,Wt-Red.,Paint Front	1
PA2LC.AZ32P	+Crn,Ext,30x72x48x30,Lam Top/Vin Ed,L C- Leg/R Rec Leg,Pwr	1
PB1LC.DS23P	+Rec,30x60,Lam Top/Vin Ed,L Rec Leg/R C- Leg,Pwr	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PH200.1860S	+Screen,Stack,Straight End	1
M19P-1518G- BBF	+Ped,Mobile,Spd Pull,B/B/F	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



3D VIEW



PLAN VIEW

SYSTEMS FURNITURE TYPICAL #11D
HERMAN MILLER "PASSAGE"
SPECKLED LAMINATE WORKSURFACES
PAINTED METAL FLIPPER DOORS
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS
LOCATIONS:
CENTRAL CONTROL 117A,
CENTRAL CONTROL 119C

SCALE

NTS

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 11D, REV

03-26-03

REV. DATE

0209

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FORT LEWIS, WA
BATTLE SIMULATION CENTER

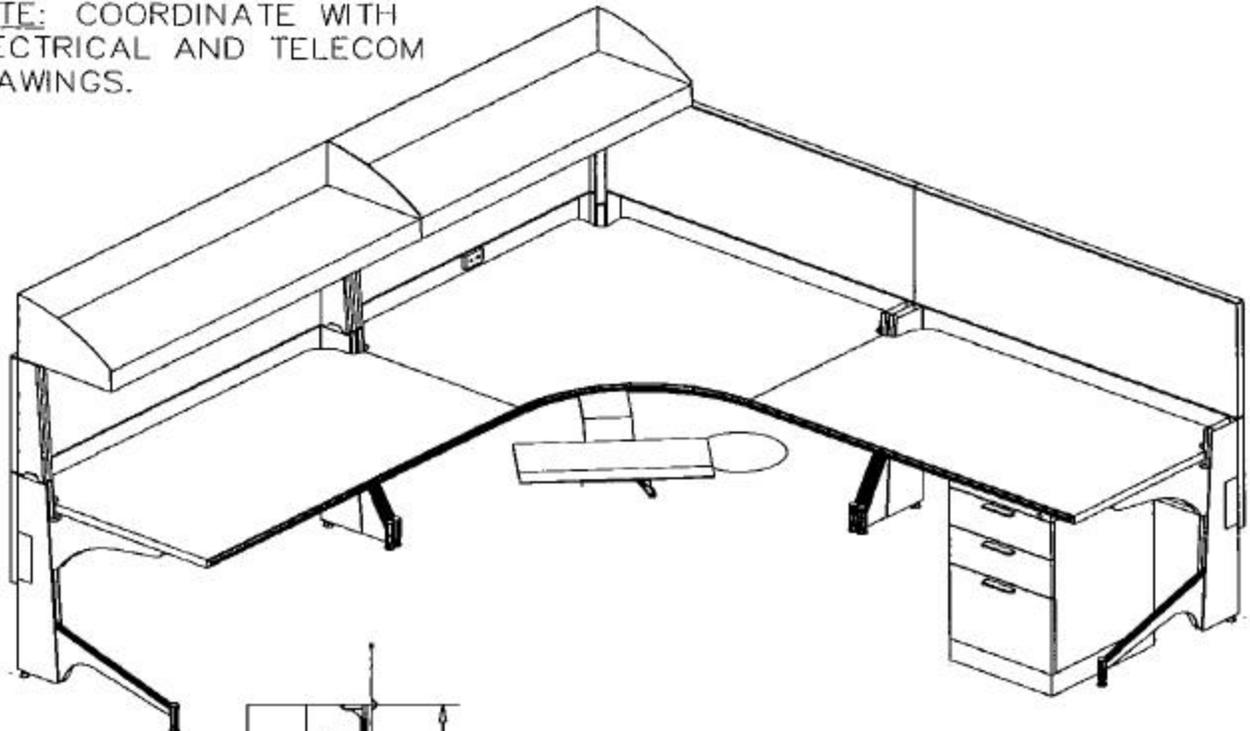
TYPICAL WORKSTATION COMPONENTS LIST

HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

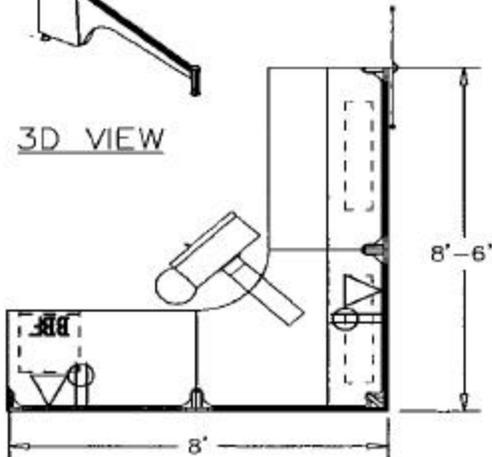
DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 11D	
PG210.06	+Pwr Entry,Dir Conn 6Fl L	1
PM130.36M	+Task Light,Basic,Can/NY,3500K	2
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PJ101.48P	+Flipper Door Unit,Wt-Red,Paint Front	1
PJ111.47P	+Flipper Door Unit,Cnr,Wt-Red,,Paint Front	1
PA1LC.AE22P	+Cnr,30x48x48x30,Lam Top/Vin Ed,L & R Rec Leg,Pwr	1
PB1LC.DP32P	+Rec,30x42,Lam Top/Vin Ed,L C-Leg/R Rec Leg,Pwr	1
PB1LC.DQ23P	+Rec,30x48,Lam Top/Vin Ed,L Rec Leg/R C- Leg,Pwr	1
PH200.1842S	+Screen,Stack,Straight End	1
PH200.1848L	+Screen,Stack,Bev R End for L Side of Corner	2
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PH200.1848S	+Screen,Stack,Straight End	1
PH210.42S	+Screen,Arc,10In H Lx18In H R,Straight End	1
M19P-1518G- BBF	+Ped,Mobile,Slpd Pull,B/B/F	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



3D VIEW



PLAN VIEW

SCALE
NTS

SYSTEMS FURNITURE TYPICAL #12A
HERMAN MILLER "PASSAGE"
SPECKLED LAMINATE WORKSURFACES
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS

CIRCUIT LOCATIONS:

SP- SCIF 105A,
C4- CENTRAL CONTROL 117A

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 12A

03-26-03

REV. DATE

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BATTLE SIMULATION CENTER

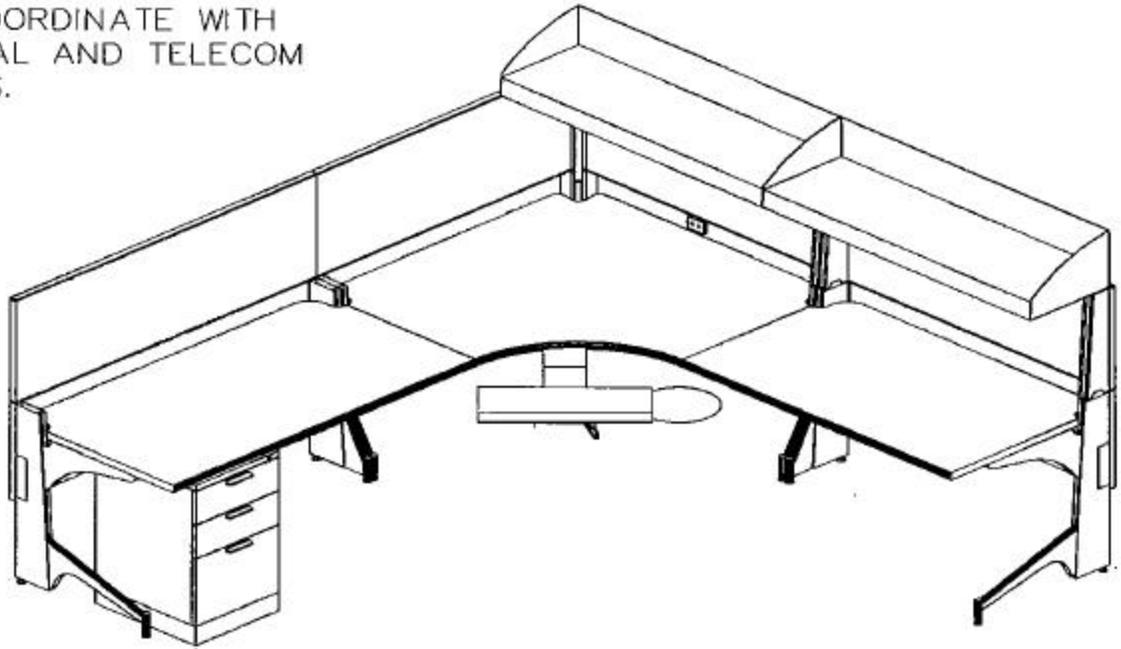
TYPICAL WORKSTATION COMPONENTS LIST

HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

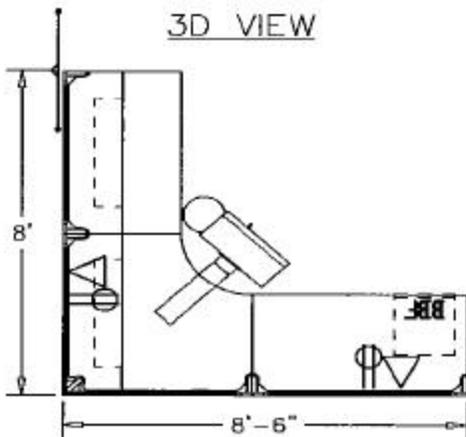
DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 12A	
PG210.06	+Pwr Entry,Dir Conn 6Ft L	1
PM130.36M	+Task Light,Basic,Can/NY,3500K	2
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PH200.1848L	+Screen,Stack,Bev R End for L Side of Corner	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PH200.1848S	+Screen,Stack,Straight End	2
PH200.1854S	+Screen,Stack,Straight End	1
PJ500.54	+Shelf,54In W	1
PJ510.47	+Shelf,Cnr,47In W	1
PA1LC.AE22P	+Cnr,30x48x48x30,Lam Top/Vin Ed,L & R Rec Leg,Pwr	1
PB1LC.DQ23P	+Rec,30x48,Lam Top/Vin Ed,L Rec Leg/R C- Leg,Pwr	1
PB1LC.DR32P	+Rec,30x54,Lam Top/Vin Ed,L C-Leg/R Rec Leg,Pwr	1
M19P-1518G- BBF	+Ped,Mobile,Slpd Pull,B/B/F	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



3D VIEW



PLAN VIEW

SCALE

NTS

SYSTEMS FURNITURE TYPICAL #12B
HERMAN MILLER "PASSAGE"
SPECKLED LAMINATE WORKSURFACES
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS

CIRCUIT LOCATIONS:

SP- SCIF 105A,

C4- CENTRAL CONTROL 119C

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 12B

REV. DATE
03-26-03

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BATTLE SIMULATION CENTER

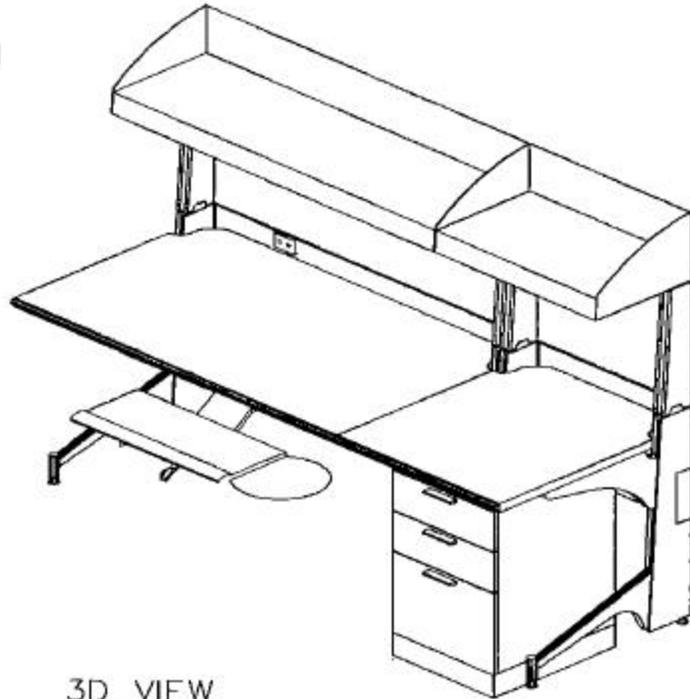
TYPICAL WORKSTATION COMPONENTS LIST

HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

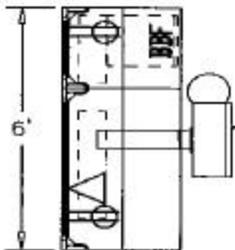
DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 12B	
PG210.06	+Pwr Entry,Dir Conn 6Ft L	1
PM130.36M	+Task Light,Basic,Can/NY,3500K	2
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PH200.1848L	+Screen,Stack,Bev R End for L Side of Corner	1
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PH200.1848S	+Screen,Stack,Straight End	2
PH200.1854S	+Screen,Stack,Straight End	1
PJ500.48	+Shelf,48In W	1
PJ510.47	+Shelf,Cnr,47In W	1
PA1LC.AE22P	+Cnr,30x48x48x30,Lam Top/Vin Ed,L & R Rec Leg,Pwr	1
PB1LC.DQ23P	+Rec,30x48,Lam Top/Vin Ed,L Rec Leg/R C- Leg,Pwr	1
PB1LC.DR23P	+Rec,30x54,Lam Top/Vin Ed,L Rec Leg/R C- Leg,Pwr	1
M19P-1518G- BBF	+Ped,Mobile,Slpd Pull,B/B/F	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



3D VIEW



PLAN VIEW

SCALE

NTS

SYSTEMS FURNITURE TYPICAL #12C
HERMAN MILLER "PASSAGE"
SPECKLED LAMINATE WORKSURFACES
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS

CIRCUIT LOCATIONS:

- C4-- CENTRAL CONTROL 117A,
- C9-- COMM. OFFICE 121A

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 12C

03-26-03 ^{REV. DATE}

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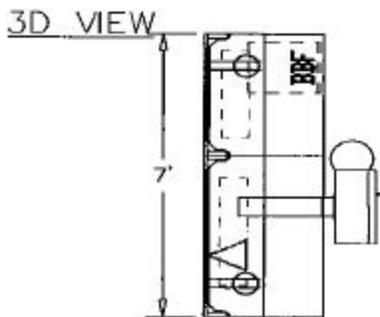
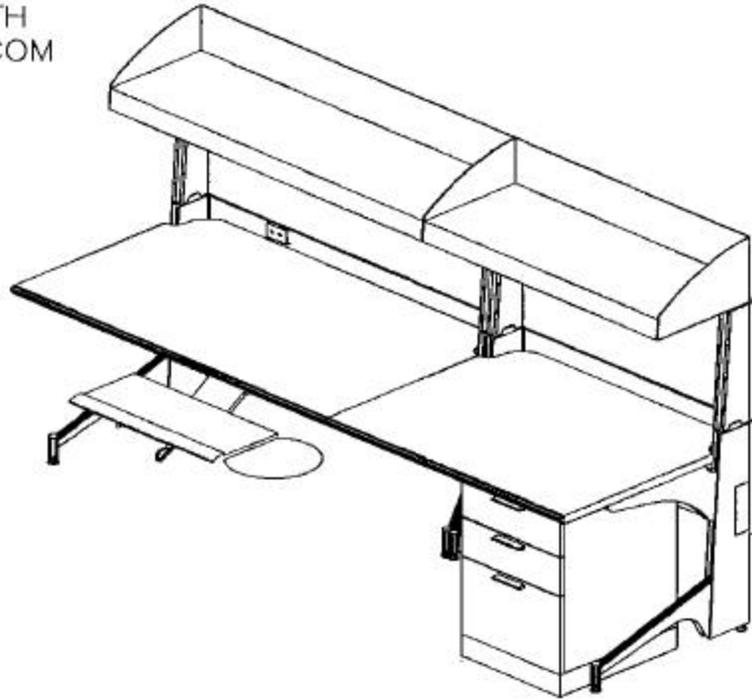
FORT LEWIS, WA
BATTLE SIMULATION CENTER

TYPICAL WORKSTATION COMPONENTS LIST
HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 12C	
PM130.24M	+Task Light,Basic,Can/NY,3500K	1
PM130.36M	+Task Light,Basic,Can/NY,3500K	2
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PH200.1824S	+Screen,Stack,Straight End	1
PH200.1848S	+Screen,Stack,Straight End	1
PJ500.24	+Shelf,24In W	1
PJ500.48	+Shelf,48In W	1
PB1LC.DL23P	+Rec,30x24,Lam Top/Vin Ed,L Rec Leg/R C Leg,Pwr	1
PB1LC.DQ32P	+Rec,30x48,Lam Top/Vin Ed,L C-Leg/R Rec Leg,Pwr	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



SYSTEMS FURNITURE TYPICAL #12D
HERMAN MILLER "PASSAGE"
SPECKLED LAMINATE WORKSURFACES
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS

CIRCUIT LOCATIONS:

SP- SCIF 105A,
C4- CENTRAL CONTROL 119C

SCALE
NTS

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
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TYPICAL 12D

03-26-03

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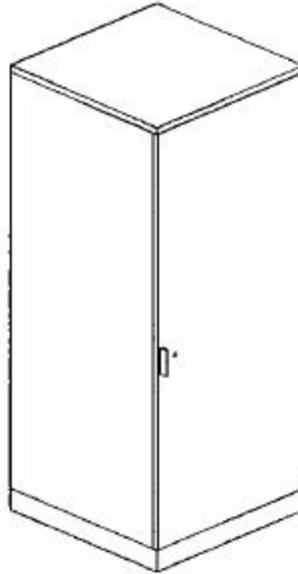
TYPICAL WORKSTATION COMPONENTS LIST

HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

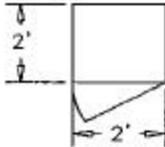
DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-5400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 12D	
PM130.30M	+Task Light,Basic,Can/NY,3500K	1
PM130.36M	+Task Light,Basic,Can/NY,3500K	2
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	1
PH200.1836S	+Screen,Stack,Straight End	1
PH200.1848S	+Screen,Stack,Straight End	1
PJ500.36	+Shelf,36In W	1
PJ500.48	+Shelf,48In W	1
PB1LC.DN23P	+Rec,30x36,Lam Top/Vin Ed,L Rec Leg/R C-Leg,Pwr	1
PB1LC.DQ32P	+Rec,30x48,Lam Top/Vin Ed,L C-Leg/R Rec Leg,Pwr	1
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	1
G7740.T	+Mouse Tray,Keybd Tray Att	1
G1314.	+Elec Dist,Work Surf-Attached	1
G1320	+Voice/Data Outlet,Work Surf-Attached	1

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



3D VIEW



PLAN VIEW

SCALE

NTS

SYSTEMS FURNITURE TYPICAL #12E
HERMAN MILLER "PASSAGE"
PAINTED METAL STORAGE
PAINTED METAL SHELVES
LOCATIONS:
SCIF 105A,
CENTRAL CONTROL 117A,
CENTRAL CONTROL 119C

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 12E

REV. DATE
03-26-03

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Fort Lewis, Washington

FY03 MCA PN 25057

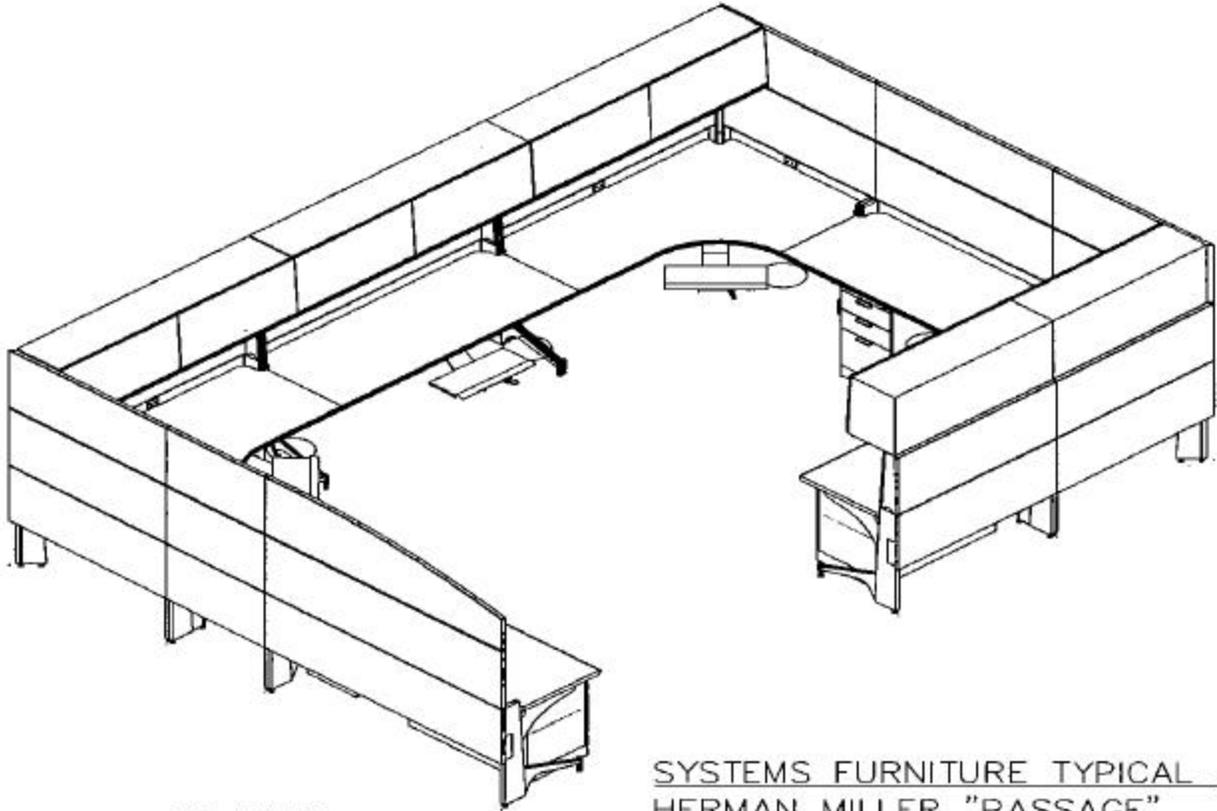
FORT LEWIS, WA
BATTLE SIMULATION CENTER

TYPICAL WORKSTATION COMPONENTS LIST
HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 12E	
49P-2424R-BX	@Twr,Stg,Slpd Pull,Hng-Wdrb R/4 Adj Sh	1

NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



3D VIEW

SYSTEMS FURNITURE TYPICAL #13
HERMAN MILLER "PASSAGE"
SPECKLED LAMINATE WORKSURFACES
FABRIC TACK PANELS
PAINTED METAL STORAGE
PAINTED METAL COMPONENTS

LOCATIONS:
AAR OFFICE 108A

SCALE

NTS

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS
NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS
OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH
MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

FT. LEWIS
BATTLE SIMULATION CENTER

TYPICAL 13 3D VIEW

REV. DATE
03-26-03

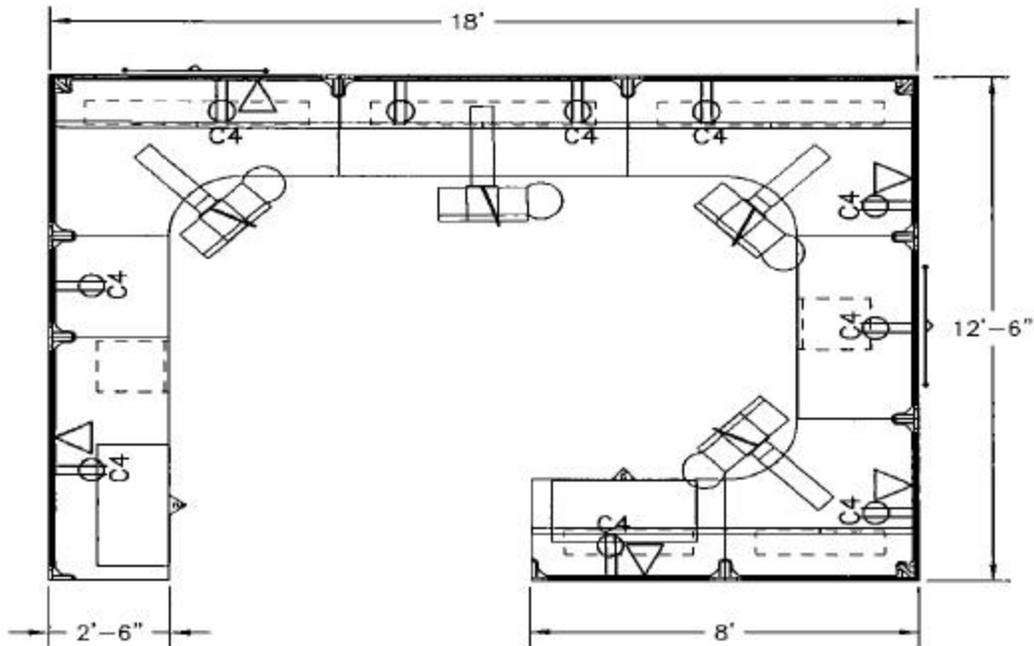
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NOTE: COORDINATE WITH
ELECTRICAL AND TELECOM
DRAWINGS.



PLAN VIEW

SCALE _____

NTS

PLANS ARE BASED ON CONSTRUCTION DOCUMENTS. BUSINESS INTERIORS NORTHWEST WILL NOT BE RESPONSIBLE FOR DIMENSION VARIATIONS OCCURRING AS THE RESULT OF ACTUAL CONSTRUCTION VARIANCES WHICH MAY AFFECT THE PLACEMENT OF FURNISHINGS AND EQUIPMENT.

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BATTLE SIMULATION CENTER

TYPICAL 13 PLAN VIEW

03-26-03 ^{REV. DATE}

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TYPICAL WORKSTATION COMPONENTS LIST
HERMAN MILLER
PASSAGE DESKING SYSTEM
GSA CONTRACT #GS-28F-8049H

DEALER: B.I.N.W.
10848 East Marginal Way S.
Seattle, WA 98168
(206) 441-6400

Part Number	Part Description	Qty
FT. LEWIS	BATTLE SIMULATION TYP 13	
PG210.06	+Pwr Entry,Dir Conn 6Ft L	2
PM130.36M	+Task Light,Basic,Can/NY,3500K	2
PM130.60M	+Task Light,Basic,Can/NY,3500K	3
K1311.A	+Receptacle,4 Cir,15 Amp,Duplex,Cir A	5
PJ101.48P	+Flipper Door Unit,Wt-Red,Paint Front	1
PJ101.72P	+Flipper Door Unit,Wt-Red,Paint Front	1
PJ111.47P	+Flipper Door Unit,Cnr,Wt-Red,,Paint Front	1
PJ111.71P	+Flipper Door Unit,Cnr,Wt-Red,,Paint Front	2
PA1LC.AE22P	+Cnr,30x48x48x30,Lam Top/Vin Ed,L & R Rec Leg,Pwr	1
PA2LC.AZ32P	+Cm,Ext,30x72x48x30,Lam Top/Vin Ed,L C- Leg/R Rec Leg,Pwr	1
PA2LC.BR22P	+Cm,Ext,30x48x72x30,Lam Top/Vin Ed,L Rec Leg/R Rec Leg,Pwr	1
PB1LC.DM32P	+Rec,30x30,Lam Top/Vin Ed,L C-Leg/R Rec Leg,Pwr	1
PB1LC.DQ23P	+Rec,30x48,Lam Top/Vin Ed,L Rec Leg/R C- Leg,Pwr	1
PB1LC.DR22P	+Rec,30x54,Lam Top/Vin Ed,L Rec Leg/R Rec Leg,Pwr	1
PB1LC.DU33P	+Rec,30x72,Lam Top/Vin Ed,L C-Leg/R C- Leg,Pwr	2
PH200.1830S	+Screen,Stack,Straight End	2
PH200.1848L	+Screen,Stack,Bev R End for L Side of Corner	4
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	2
PH200.1848R	+Screen,Stack,Bev L End for R Side of Corner	1
PH200.1848S	+Screen,Stack,Straight End	1
PH200.1854S	+Screen,Stack,Straight End	2
PH200.1872L	+Screen,Stack,Bev R End for L Side of Corner	1
PH200.1872R	+Screen,Stack,Bev L End for R Side of Corner	1
PH200.1872S	+Screen,Stack,Straight End	2
PH210.72S	+Screen,Arc,10In H Lx18In H R,Straight End	1
M19P-1518G- BBF	+Ped,Mobile,Slpd Pull,B/B/F	2
29P-3618G-2N	+File,FS Lat Slpd Pull,2 Dwr	2
G7715.08P	+Keybd Tray,Fully Adj,Paddle Adj 21In Trk	4
G7740.T	+Mouse Tray,Keybd Tray Att	4
G1314.	+Elec Dist,Work Surf-Attached	5
G1320	+Voice/Data Outlet,Work Surf-Attached	4

-- End of Attachment --

Reissued to include attachment missing in R0002

SECTION 15895

AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AIR CONDITIONING AND REFRIGERATION INSTITUTE (ARI)

ARI 410 (1991) Forced-Circulation Air-Cooling and Air-Heating Coils

ARI 430 (1999) Central-Station Air-Handling Units

ASTM INTERNATIONAL (ASTM)

ASTM A 53/A 53M (2001) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM C 916 (1985; R 1996e1) Adhesives for Duct Thermal Insulation

ASTM C 1071 (2000) Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)

ASTM E 84 (2001) Surface Burning Characteristics of Building Materials

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 52.1 (1992) Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter

ASHRAE 70 (1991) Method of Testing for Rating the Performance of Air Outlets and Inlets

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 90A (1999) Installation of Air Conditioning and Ventilating Systems

SHEET METAL & AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

- SMACNA HVAC Duct Const Stds (1995; Addenda Nov 1997; 6th Printing 2001)
HVAC Duct Construction Standards - Metal and Flexible
- SMACNA Install Fire Damp HVAC (1992; 2th Printing 1996) Fire, Smoke and
Radiation Damper Installation Guide for HVAC
Systems
- SMACNA Leakage Test Mnl (1985; 6th Printing 1997) HVAC Air Duct
Leakage Test Manual

UNDERWRITERS LABORATORIES (UL)

- UL 181 (1996; Rev thru Dec 1998) Factory-Made Air
Ducts and Air Connectors
- UL 214 (1997; Rev thru Aug 2001) Tests for Flame-
Propagation of Fabrics and Films
- UL 555 (1999; Rev thru Jan 2002) Fire Dampers
- UL 723 (1996; Rev thru Sep 2001) Test for Surface
Burning Characteristics of Building Materials
- UL Bld Mat Dir (1999) Building Materials Directory
- UL Elec Const Dir (2001) Electrical Construction Equipment
Directory
- UL Fire Resist Dir (2001) Fire Resistance Directory (2 Vol.)

1.2 COORDINATION OF TRADES

Ductwork, piping offsets, fittings, and accessories shall be furnished as required to provide a complete installation and to eliminate interference with other construction.

1.3 DELIVERY AND STORAGE

Equipment delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variations, dirt and dust, or other contaminants. Additionally, all pipes shall either be capped or plugged until installed.

1.4 FIELD MEASUREMENTS

After becoming familiar with all details of the work, the Contractor shall verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the work.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Drawings; G
Installation; G

Drawings showing equipment layout, including assembly and installation details and electrical connection diagrams; ductwork layout showing the location of all supports and hangers, typical hanger details, gauge reinforcement, reinforcement spacing rigidity classification, and static pressure and seal classifications; and piping layout showing the location of all guides and anchors, the load imposed on each support or anchor, and typical support details. Drawings shall include any information required to demonstrate that the system has been coordinated and will properly function as a unit and shall show equipment relationship to other parts of the work, including clearances required for operation and maintenance.

SD-03 Product Data

Components and Equipment; G

Manufacturer's catalog data included with the detail drawings for the following items. The data shall be highlighted to show model, size, options, etc., that are intended for consideration. Data shall be adequate to demonstrate compliance with contract requirements for the following:

- a. Piping Components
- b. Ductwork Components
- c. Air Systems Equipment
- d. Air Handling Units
- e. Terminal Units

Ductwork Leak Test Procedures; G

Pamper Acceptance Test

Proposed test procedures for ductwork leak test, and performance tests of systems, at least 2 weeks prior to the start of related testing.

Diagrams; G

Proposed diagrams, at least 2 weeks prior to start of related testing. System diagrams that show the layout of equipment, piping, and ductwork, and typed condensed operation manuals explaining preventative maintenance procedures, methods of checking the system for normal, safe operation, and procedures for safely starting and stopping the system shall be framed under glass or laminated plastic. After approval, these items shall be posted where directed.

Manufacturer's Experience; G

Statement demonstrating successful completion of similar services on at least 5 projects of similar size and scope, at least 2 weeks prior to submittal of other items required by this section.

Performance Tests; G

Proposed test schedules for hydrostatic test of piping, ductwork leak test, and performance tests, at least 2 weeks prior to the start of related testing.

Field Training; G

Proposed schedule for field training, at least 2 weeks prior to the start of related training.

SD-06 Test Reports

Performance Tests; G
Testing, Adjusting, and Balancing; G

Test reports for the piping hydrostatic test, ductwork leak test, and performance tests in booklet form, upon completion of testing. Reports shall document phases of tests performed including initial test summary, repairs/adjustments made, and final test results.

SD-10 Operation and Maintenance Data

Operating and Maintenance Instructions; G

Six manuals listing step-by-step procedures required for system startup, operation, shutdown, and routine maintenance, at least 2 weeks prior to field training. The manuals shall include the manufacturer's name, model number, parts list, list of parts and tools that should be kept in stock by the owner for routine maintenance including the name of a local supplier, simplified wiring and controls diagrams, troubleshooting guide, and recommended service organization (including address and telephone number) for each item of equipment. Each service organization submitted shall be capable of providing 4 hour onsite response to a service call on an emergency basis.

PART 2 PRODUCTS

2.1 STANDARD PRODUCTS

Components and equipment shall be standard products of a manufacturer regularly engaged in the manufacturing of products that are of a similar material, design and workmanship. The standard products shall have been in satisfactory commercial or industrial use for 2 years before bid opening. The 2-year manufacturer's experience shall include applications of components and equipment under similar circumstances and of similar size. The 2 years must be satisfactorily completed by a product which has been sold or is offered for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures. Products having less than a 2-year

field service record will be acceptable if a certified record of satisfactory field operation, for not less than 6000 hours exclusive of the manufacturer's factory tests, can be shown. The equipment items shall be supported by a service organization.

2.2 ASBESTOS PROHIBITION

Asbestos and asbestos-containing products shall not be used.

2.3 NAMEPLATES

Equipment shall have a nameplate installed by the manufacturer that identifies the manufacturer's name, address, type or style, model or serial number, and catalog number.

2.4 EQUIPMENT GUARDS AND ACCESS

Belts, pulleys, chains, gears, couplings, projecting setscrews, keys, and other rotating parts exposed to personnel contact shall be fully enclosed or guarded according to OSHA requirements. High temperature equipment and piping exposed to contact by personnel or where it creates a potential fire hazard shall be properly guarded or covered with insulation of a type specified.

2.5 DUCTWORK COMPONENTS

2.5.1 Metal Ductwork

All aspects of metal ductwork construction, including all fittings and components, shall comply with SMACNA HVAC Duct Const Stds unless otherwise specified. Under no conditions shall DUCTWORK thinner than 26 ga be allowed on this project. Elbows shall be radius type with a centerline radius of 1.5 times the width or diameter of the duct where space permits. Otherwise, elbows having a minimum radius equal to the width or diameter of the duct or square elbows with factory fabricated turning vanes may be used. All return, exhaust, and supply ductwork downstream of the VAV boxes shall be constructed to a pressure class of 2-inch w.g. (Class 500 pa) and shall meet the requirements of seal class C. All supply ductwork from the air handlers to the VAV terminal boxes shall be constructed to 6-inch w.g. (Class 1500) and shall meet the requirements of seal class A. Sealants shall conform to fire hazard classification specified in THERMAL INSULATION FOR MECHANICAL SYSTEMS and shall be suitable for the range of air distribution and ambient temperatures that it will be exposed to. Pressure sensitive tape shall not be used as a sealant. Spiral lock seam duct, and flat oval shall be made with duct sealant and locked with not less than 3 equally spaced drive screws or other approved methods indicated in SMACNA HVAC Duct Const Stds. The sealant shall be applied to the exposed male part of the fitting collar so that the sealer will be on the inside of the joint and fully protected by the metal of the duct fitting. One brush coat of the sealant shall be applied over the outside of the joint to at least 2 inch (50 mm) band width covering all screw heads and joint gap. Dents in the male portion of the slip fitting collar will not be acceptable. Outdoor air intake ducts and plenums shall be fabricated with watertight soldered or brazed joints and seams.

2.5.1.1 Transitions

Diverging air flow transitions shall be made with each side pitched out a maximum of 15 degrees, for an included angle of 30 degrees. Transitions for converging air flow shall be made with each side pitched in a maximum of 30 degrees, for an included angle of 60 degrees, or shall be as indicated. Factory-fabricated reducing fittings for systems using round duct sections when formed to the shape of the ASME short flow nozzle, need not comply with the maximum angles specified.

2.5.1.2 Insulated Nonmetallic Flexible Duct Runouts

Flexible duct runouts shall be used only where indicated. Runout length shall be as shown on the drawings, but shall in no case exceed 3 feet (1 m). Runouts shall be preinsulated, factory fabricated, and shall comply with NFPA 90A and UL 181. Either field or factory applied vapor barrier shall be provided. Where coil induction or high velocity units are supplied with vertical air inlets, a streamlined and vaned and mitered elbow transition piece shall be provided for connection to the flexible duct or hose. The last elbow to these units, other than the vertical air inlet type, shall be a die-stamped elbow and not a flexible connector. Insulated flexible connectors may be used as runouts. The insulated material and vapor barrier shall conform to the requirements of Section 15080 THERMAL INSULATION FOR MECHANICAL SYSTEMS. The insulation material surface shall not be exposed to the air stream.

2.5.1.3 General Service Duct Connectors

A flexible duct connector approximately 6 inches (150 mm) in width shall be provided where sheet metal connections are made to fans or where ducts of dissimilar metals are connected. For round/oval ducts, the flexible material shall be secured by stainless steel or zinc-coated, iron clinch-type draw bands. For rectangular ducts, the flexible material locked to metal collars shall be installed using normal duct construction methods. The composite connector system shall comply with UL 214 and be classified as "flame-retarded fabrics" in UL Bld Mat Dir.

2.5.1.4 High Temperature Service Duct Connections

Material shall be approximately 3/32 inch (2.38 mm) thick, 35 to 40-ounce per square yard (1.2 to 1.36 kg per square meter) weight, plain weave fibrous glass cloth with, nickel/chrome wire reinforcement for service in excess of 1200 degrees F (650 degrees C).

2.5.2 Ductwork Accessories

2.5.2.1 Duct Access Doors

Access doors shall be provided in ductwork and plenums where indicated and at all air flow measuring primaries, automatic dampers, fire dampers, coils, thermostats, and other apparatus requiring service and inspection in the duct system, and unless otherwise shown, shall conform to SMACNA HVAC Duct Const Stds. Access doors shall be provided upstream and downstream of air flow measuring primaries and heating and cooling coils. Doors shall be minimum 15 x 18 inches (375 x 450 mm), unless otherwise shown. Where duct size will not accommodate this size door, the doors shall be made as large as practicable. Doors 24 x 24 inches (600 x 600 mm) or larger shall be

provided with fasteners operable from both sides. Doors in insulated ducts shall be the insulated type.

2.5.2.2 Smoke/Fire Dampers

a. Ratings:

1. Fire Resistance: 1-1/2 hours in accordance with UL555.
2. Smoke Rating: Leakage Class I Smoke Damper in accordance with UL555S. A Class I smoke damper leaks no more than 8 cubic feet per minute (.23 m³/min) at 4 in. wg. (1 kPa) differential pressure. Damper shall be rated for vertical or horizontal applications.
3. Air Flow Rating: 2000 fpm/610 (M/min).

b. Construction:

1. Frame: 5 inches x minimum 16 gage (127 x minimum 1.6 mm) roll formed, galvanized steel hat-shaped channel, reinforced at corners. Structurally equivalent to 13 gage (2.3 mm) U-channel type frame.
2. Blades:
 - a) Style: True airfoil-shaped, single piece, double skin.
 - b) Action: Opposed.
 - c) Orientation: Horizontal.
 - d) Material: Minimum 14 gage (2.0 mm) equivalent thickness, galvanized steel.
 - e) Width: Maximum 6 inches (152 mm).
3. Bearings: Self-lubricating stainless steel sleeve, turning in extruded hole in frame.
4. Seals:
 - a) Blade: Inflatable silicone fiberglass material to maintain smoke leakage rating to a minimum of 450 degrees F (232 degrees C) and galvanized steel for flame seal to 1,900 degrees F (1,038 degrees C). Mechanically attached to blade edge (glue-on or grip type seals are not acceptable).
 - b) Jamb: Stainless steel, flexible metal compression type.
5. Linkage: Concealed in frame.
6. Axles: Minimum 1/2 inch (13) diameter plated steel, hex-shaped, mechanically attached to blade.
7. Temperature Release Device: Heat-Actuated, Quick Detect.
 - a) Close (in a controlled manner) and lock damper during test, smoke detection, power failure, or fire conditions through actuator

closure spring. At no time shall actuator disengage from damper blades.

b) Allow damper to be automatically and remotely reset after test or power failure conditions. After exposure to high temperature or fire, inspect damper before reset to ensure proper operation.

c) Controlled closing and locking of damper in 7 to 15 seconds to allow duct pressure to equalize. Instantaneous closure is not acceptable.

8. Release Temperature:

a) 165 degrees F (74 degrees C).

9. Actuator: Electric 120 V, 60 Hz, two-position, fail close. With external mounting.

10. Duct Transition Connection: Provide duct transition as required.

c. Accessories:

1. Duct Smoke Detector: Provide a factory mounted duct smoke detector completely wired into the damper assembly. The duct smoke detector shall be capable of detecting smoke in the ductwork from 0-2000 FPM. The detector shall utilize the Ionization method for smoke detection.

2. Mounting Angles: Provide factory fabricated mounting angles. The exact configuration is the contractor choice.

3. Factory Sleeve:

a) Minimum 16 gage (1.0 mm) thickness, minimum 17 inches (432 mm) long.

b) Silicone caulk factory applied to sleeve at damper frame to comply with leakage rating requirements.

d. Source Quality Controls:

a. Factory Tests: Factory cycle damper and actuator assembly to assure proper operation.

2.5.2.3 Fire Dampers

Fire dampers shall be 1-1/2 hour fire rated unless otherwise indicated. Fire dampers shall conform to the requirements of NFPA 90A and UL 555. Fire dampers shall be automatic operating type and shall have a dynamic rating suitable for the maximum air velocity and pressure differential to which it will be subjected. Fire dampers shall be approved for the specific application, and shall be installed according to their listing. Fire dampers shall be equipped with a steel sleeve or adequately sized frame installed in such a manner that disruption of the attached ductwork, if any, will not impair the operation of the damper. Sleeves or frames shall be equipped with perimeter mounting angles attached on both sides of the wall

or floor opening. Ductwork in fire-rated floor-ceiling or roof-ceiling assembly systems with air ducts that pierce the ceiling of the assemblies shall be constructed in conformance with UL Fire Resist Dir. Fire dampers shall be curtain type with damper blades out of the air stream. Dampers shall not reduce the duct or the air transfer opening cross-sectional area. Dampers shall be installed so that the centerline of the damper depth or thickness is located in the centerline of the wall, partition or floor slab depth or thickness. Unless otherwise indicated, the installation details given in SMACNA Install Fire Damp HVAC and in manufacturer's instructions for fire dampers shall be followed.

2.5.2.4 Splitters and Manual Balancing Dampers

Splitters and manual balancing dampers shall be furnished with accessible operating mechanisms. Where operators occur in finished portions of the building, operators shall be chromium plated with all exposed edges rounded. Splitters shall be operated by quadrant operators or 3/16 inch (5 mm) rod brought through the side of the duct with locking setscrew and bushing. Two rods are required on splitters over 8 inches (200 mm). Manual volume control dampers shall be operated by locking-type quadrant operators. Dampers and splitters shall be 2 gauges heavier than the duct in which installed. Unless otherwise indicated, multileaf dampers shall be opposed blade type with maximum blade width of 12 inches (300 mm). Access doors or panels shall be provided for all concealed damper operators and locking setscrews. Unless otherwise indicated, the locking-type quadrant operators for dampers, when installed on ducts to be thermally insulated, shall be provided with stand-off mounting brackets, bases, or adapters to provide clearance between the duct surface and the operator not less than the thickness of the insulation. Stand-off mounting items shall be integral with the operator or standard accessory of the damper manufacturer. Volume dampers shall be provided where indicated.

2.5.2.5 Air Deflectors and Branch Connections

Air deflectors shall be provided at duct mounted supply outlets, at takeoff or extension collars to supply outlets, at duct branch takeoff connections, and at 90 degree elbows, as well as at locations as indicated on the drawings or otherwise specified. Conical branch connections or 45 degree entry connections may be used in lieu of deflectors or extractors for branch connections. All air deflectors, except those installed in 90 degree elbows, shall be provided with an approved means of adjustment. Adjustment shall be made from easily accessible means inside the duct or from an adjustment with sturdy lock on the face of the duct. When installed on ducts to be thermally insulated, external adjustments shall be provided with stand-off mounting brackets, integral with the adjustment device, to provide clearance between the duct surface and the adjustment device not less than the thickness of the thermal insulation. Air deflectors shall be factory-fabricated units consisting of curved turning vanes or louver blades designed to provide uniform air distribution and change of direction with minimum turbulence or pressure loss. Air deflectors shall be factory or field assembled. Blade air deflectors, also called blade air extractors, shall be approved factory fabricated units consisting of equalizing grid and adjustable blade and lock. Adjustment shall be easily made from the face of the diffuser or by position adjustment and lock external to the duct. Stand-off brackets shall be provided on insulated ducts and are described herein. Fixed air deflectors, also called turning vanes, shall be provided in 90 degree elbows.

2.5.3 Duct Sleeves, Framed Prepared Openings, Closure Collars

2.5.3.1 Duct Sleeves

Duct sleeves shall be provided for round ducts 15 inches (375 mm) in diameter or less passing through floors, walls, ceilings, or roof, and installed during construction of the floor, wall, ceiling, or roof. Round ducts larger than 15 inches (375 mm) in diameter and square, rectangular, and oval ducts passing through floors, walls, ceilings, or roof shall be installed through framed prepared openings. The Contractor shall be responsible for the proper size and location of sleeves and prepared openings. Sleeves and framed openings are also required where grilles, registers, and diffusers are installed at the openings. Framed prepared openings shall be fabricated from 20 gauge (1.0 mm) galvanized steel, unless otherwise indicated. Where sleeves are installed in bearing walls or partitions, black steel pipe, ASTM A 53/A 53M, Schedule 20 shall be used. Sleeve shall provide 1 inch (25 mm) clearance between the duct and the sleeve or 1 inch (25 mm) clearance between the insulation and the sleeve for insulated ducts.

2.5.3.2 Framed Prepared Openings

Openings shall have 1 inch (25 mm) clearance between the duct and the opening or 1 inch (25 mm) clearance between the insulation and the opening for insulated ducts.

2.5.3.3 Closure Collars

Collars shall be fabricated of galvanized sheet metal not less than 4 inches (100 mm) wide, unless otherwise indicated, and shall be installed on exposed ducts on each side of walls or floors where sleeves or prepared openings are provided. Collars shall be installed tight against surfaces. Collars shall fit snugly around the duct or insulation. Sharp edges of the collar around insulated duct shall be ground smooth to preclude tearing or puncturing the insulation covering or vapor barrier. Collars for round ducts 15 inches (375 mm) in diameter or less shall be fabricated from 20 gauge (1.0 mm) galvanized steel. Collars for round ducts larger than 15 inches (375 mm) and square, and rectangular ducts shall be fabricated from 18 gauge (1.3 mm) galvanized steel. Collars shall be installed with fasteners on maximum 6 inch (150 mm) centers, except that not less than 4 fasteners shall be used.

2.5.4 Sound Attenuation Equipment

a. Acoustical Duct Liner:

Acoustical duct lining shall be fibrous glass designed exclusively for lining ductwork and shall conform to the requirements of ASTM C 1071, Type I and II. Liner composition may be uniform density, graduated density, or dual density, as standard with the manufacturer. Lining shall be coated, not less than 1 inch (25 mm) thick. Where acoustical duct liner is used, liner or combination of liner and insulation applied to the exterior of the ductwork shall be the thermal equivalent of the insulation specified in THERMAL INSULATION FOR MECHANICAL SYSTEMS. Duct sizes shown shall be increased to compensate for the thickness of the lining used. In lieu of sheet metal duct with field-applied acoustical lining, acoustically equivalent lengths of fibrous glass duct or factory fabricated double-walled

internally insulated duct with perforated liner may be provided. Net insertion loss value, static pressure drop, and air flow velocity capacity data shall be certified by a nationally recognized independent acoustical laboratory.

2.5.5 Diffusers, Registers, and Grilles

Units shall be factory-fabricated of steel, corrosion-resistant steel, or aluminum and shall distribute the specified quantity of air evenly over space intended without causing noticeable drafts, air movement faster than 50 fpm (0.25 m/s) in occupied zone, or dead spots anywhere in the conditioned area. Outlets for diffusion, spread, throw, and noise level shall be as required for specified performance. Performance shall be certified according to ASHRAE 70. Inlets and outlets shall be sound rated and certified according to ASHRAE 70. Sound power level shall be as indicated. Diffusers and registers shall be provided with volume damper with accessible operator, unless otherwise indicated; or if standard with the manufacturer, an automatically controlled device will be acceptable. Volume dampers shall be opposed blade type for all diffusers and registers, except linear slot diffusers. Linear slot diffusers shall be provided with round or elliptical balancing dampers. Where the inlet and outlet openings are located less than 7 feet (2 m) above the floor, they shall be protected by a grille or screen according to NFPA 90A.

2.5.5.1 Diffusers

Diffuser types shall be as indicated. Ceiling mounted units shall be furnished with anti-smudge devices, unless the diffuser unit minimizes ceiling smudging through design features. Diffusers shall be provided with air deflectors of the type indicated. Air handling troffers or combination light and ceiling diffusers shall conform to the requirements of UL Elec Const Dir for the interchangeable use as cooled or heated air supply diffusers or return air units. Ceiling mounted units shall be installed with rims tight against ceiling. Sponge rubber gaskets shall be provided between ceiling and surface mounted diffusers for air leakage control. Suitable trim shall be provided for flush mounted diffusers. Duct collar connecting the duct to diffuser shall be airtight and shall not interfere with volume controller. Return or exhaust units shall be similar to supply diffusers.

2.5.5.2 Registers and Grilles

Units shall be four-way directional-control type, except that return and exhaust registers may be fixed horizontal or vertical louver type similar in appearance to the supply register face. Registers shall be provided with sponge-rubber gasket between flanges and wall or ceiling. Wall supply registers shall be installed at least 6 inches (150 mm) below the ceiling unless otherwise indicated. Return and exhaust registers shall be located 6 inches (150 mm) above the floor unless otherwise indicated. Four-way directional control may be achieved by a grille face which can be rotated in 4 positions or by adjustment of horizontal and vertical vanes. Grilles shall be as specified for registers, without volume control damper.

2.5.6 Air Vents, Penthouses, and Goosenecks

Air vents, penthouses, and goosenecks shall be fabricated from galvanized steel sheets with galvanized structural shapes. Sheet metal thickness,

reinforcement, and fabrication shall conform to SMACNA HVAC Duct Const Stds. Louver blades shall be accurately fitted and secured to frames. Edges of louver blades shall be folded or beaded for rigidity and baffled to exclude driving rain. Air vents, penthouses, and goosenecks shall be provided with bird screen.

2.6 AIR SYSTEMS EQUIPMENT

2.6.1 Fans

2.6.1.1 Centrifugal Type Power Wall Ventilators

Fans shall be V-belt driven centrifugal type with backward inclined, non-overloading wheel. Motor housing shall be removable and weatherproof. Unit housing shall be designed for sealing to building surface and for discharge and condensate drippage away from building surface. Housing shall be constructed of heavy gauge aluminum. Unit shall be as scheduled with an airtight and liquid-tight metallic wall sleeve. Motor enclosure shall be dripproof type. Lubricated bearings shall be provided.

2.6.1.2 Centrifugal Type Power Roof Ventilators

Fans shall be spun aluminum V-belt driven with backward inclined, non-overloading wheel. Motor compartment housing shall be hinged or removable and weatherproof, constructed of heavy gauge aluminum. Fans shall be provided as scheduled. Motors enclosure shall be dripproof type. Lubricated bearings shall be provided.

2.6.2 Air Filters

2.6.2.1 Cartridge Type Filters

Filters shall be 2 inch (50mm) depth, sectional, replaceable dry media type of the size as required and shall have an average efficiency of 30 percent when tested according ASHRAE 52.1. Initial resistance shall not exceed .28 inches (7mm) at 500 FPM (2.54 /s) Filters shall be UL class 1. Media shall be pleated micro-glass paper media with corrugated aluminum separators, sealed inside the filter cell to form a totally rigid filter assembly. Fluctuations in filter face velocity or turbulent air flow will have no effect on filter integrity of performance.

Filters shall be 12 inch (305 mm) depth, sectional, replaceable dry media type of the size indicated and shall have an average efficiency of 80 to 85 percent when tested according to ASHRAE 52.1. Initial resistance at 500 feet per minute (2.54 m/s) shall not exceed 0.56 inches (14 mm), water gauge. Filters shall be UL class 1. Media shall be pleated microglass paper media with corrugated aluminum separators, sealed inside the filter cell to form a totally rigid filter assembly. Fluctuations in filter face velocity or turbulent airflow will have no effect on filter integrity or performance. Each filter shall be installed with an extended surface pleated media panel filter as a prefilter in a factory preassembled side access housing, or a factory-made sectional frame bank, as indicated.

2.6.2.2 Holding Frames

Frames shall be fabricated from not lighter than 16 gauge (1.6 mm) sheet steel with rust-inhibitor coating. Each holding frame shall be equipped

with suitable filter holding devices. Holding frame seats shall be gasketed. All joints shall be airtight. Frames to be constructed so air pressure assists in sealing filters to frames.

2.6.2.3 Filter Gauges

Filter gauges shall be dial type, diaphragm actuated draft and shall be provided for all filter stations, including those filters which are furnished as integral parts of factory fabricated air handling units. Gauges shall be at least 3-7/8 inches (98 mm) in diameter, shall have white dials with black figures, and shall be graduated in 0.01 inch (0.0025 kPa mm), and shall have a minimum range of 1 inch (0.25 kPa) beyond the specified final resistance for the filter bank on which each gauge is applied. Each gauge shall incorporate a screw operated zero adjustment and shall be furnished complete with two static pressure taps with integral compression fittings, two molded plastic vent valves, two 5 foot (1.5 m) minimum lengths of 1/4 inch (6.35 mm) diameter vinyl tubing, and all hardware and accessories for gauge mounting.

2.7 AIR HANDLING UNITS

2.7.1 Factory-Fabricated Air Handling Units

Units shall be variable air volume or constant volume as indicated in schedule, roof mounted, draw through, scheduled as indicated. Units shall include fans, coils, airtight insulated casing, prefilters, final filter sections, adjustable V-belt drives, mixing box vibration-isolators, and appurtenances required for specified operation. Vibration isolators shall be as indicated. Each air handling unit shall have physical dimensions suitable to fit space allotted to the unit and shall have the capacity indicated. Air handling unit shall have published ratings based on tests performed according to ARI 430. Unit shall come complete with all wiring suitable for single point electrical connection, including approved disconnects and breakers for ancillary loads.

2.7.1.1 Casings

Casing of each air handler shall have a complete stand alone welded steel tube frame with a welded steel channel base. Panels shall be 4-inch (100 mm) thick, insulated, double wall, steel panels, bolted and gasketed to the frame. Units shall be fabricated to allow removal of panels for access to internal parts and components, if necessary. Joints between sections shall be sealed air-tight, during assembly. Casing shall be rated for 8 inches (200 mm) water column differential pressure. Units shall be constructed with additional bracing and supports as required for the pressure rating, without sound or vibration problems. Casing sections shall be as indicated, galvanized steel, or 16 gauge (1.6 mm) steel outer casing protected with a factory baked enamel finish according to paragraph FACTORY PAINTING. Inner casing of double-wall units shall be minimum 18 gauge (1.0 mm) solid galvanized steel and perforated steel as scheduled. Casing shall be designed and constructed with an integral insulated structural steel frame such that exterior panels are non-load bearing. Casings shall be provided with inspection doors, access sections, and access doors as indicated. Inspection and access doors shall be insulated, fully gasketed, double-wall type, of a minimum 16 gauge (1.3 mm) outer and 18 gauge (1.0 mm) inner panels. Doors shall be rigid and provided with heavy duty hinges and latches. Access doors shall be minimum 24 inches (600 mm) wide and shall be

the full height of the unit casing or a minimum of 6 foot (1800 mm), whichever is less. A minimum 8 by 8 inches (200 by 200 mm) sealed glass. Access Sections shall be according to paragraph AIR HANDLING UNITS. Drain pan shall be double-wall insulated type constructed of 16 gauge (1.4 mm) stainless steel, double pitched to the drain connection. Drain pans shall be welded water tight, treated to prevent corrosion, and designed for positive condensate drainage. When 2 or more cooling coils are used, with one stacked above the other, condensate from the upper coils shall not flow across the face of lower coils. Intermediate drain pans or condensate collection channels and downspouts shall be provided, as required to carry condensate to the unit drain pan out of the air stream and without moisture carryover. Drain pan shall be constructed so that the pan may be visually inspected easily including underneath the coil without removal of the coil and so that the pan may be physically cleaned completely and easily underneath the coil without removal of the coil. Casing insulation shall conform to NFPA 90A Single-wall casing sections handling conditioned air shall be insulated with not less than 1 inch (25 mm) thick, 1-1/2 pound density (24 kg per cubic meter) coated fibrous glass material having a thermal conductivity not greater than 0.23 Btu/hr-sf-F (100 mm). Double-wall casing sections handling conditioned air shall be insulated with not less than 0.23 Btu/hr-sf-F (100 mm) of insulation. Foil-faced insulation shall not be an acceptable substitute for use with double wall casing. Double wall insulation must be completely sealed by inner and outer panels. Factory applied fibrous glass insulation shall conform to ASTM C 1071, except that the minimum thickness and density requirements do not apply, and shall meet the requirements of NFPA 90A. Air handling unit casing insulation shall be uniform over the entire casing. Duct liner material, coating, and adhesive shall conform to fire-hazard requirements specified in Section 15080 THERMAL INSULATION FOR MECHANICAL SYSTEMS. Exposed insulation edges and joints where insulation panels are butted together shall be protected with a metal nosing strip or shall be coated to conform to meet erosion resistance requirements of ASTM C 1071. A latched and hinged inspection door, shall be provided in the fan and coil sections. Additional inspection doors, access doors and access sections shall be provided where indicated.

Floor shall be insulated double wall galvanized steel, sloped to drain. Provide 10 ga aluminum tread plate floor material with ample cross members (maximum 18-inch (457 mm) spacing) to support foot traffic. Floor to be welded water tight. Provide for four 3/4 inch (18 mm) anchor bolts for seismic anchoring. Locate one bolt in each corner of the air handler.

Provide two spare 1 inch (25 mm) conduit running the full length interior of each side of the Air Handling unit with a 4-inch by 4-inch (100 mm by 100 mm) junction box in each section suitable for control wiring. Conduit and junction boxes shall be located so as not to interfere with the normal function of the Air Handling unit including the removal of heating and cooling coils. Provide a junction box at one end at the exterior of the Air Handling Unit that will allow wiring to pass to the spare conduit on the interior of the Air Handling Unit.

Provide weather proof lights located in each section of the Air Handling Unit. Lights shall be completely wired to a single light switch located on the exterior of the Air Handling Unit and terminated in a junction box. Provide at least one 120v service receipt.

2.7.1.2 Cooling Coils

Coils shall be constructed of not less than 5/8 inch (16 mm) outside diameter seamless copper tubing, with copper or aluminum fins mechanically bonded or soldered to the tubes. Coils shall be provided with not less than 5/8 inch (16 mm) outside diameter flare or sweat connectors, accessory piping package with thermal connections suitable for connection to the type of control valve supplied, and manual air vent. Coils shall be tested hydrostatically at 300 psi (2000 kPa) or under water at 250 psi (1700 kPa) air pressure and suitable for 200 psi (1400 kPa) working pressure. Provisions shall be made for coil removal.

2.7.1.3 Air Filters

Air filters shall be as specified in paragraph AIR SYSTEMS EQUIPMENT for types and thickness indicated.

2.7.1.4 Fans

- a. Testing Requirements: The following factory tests are required:
 1. General: Sound power level ratings shall comply with AMCA Standard 301 "Method for Calculating Fan Sound Ratings From Laboratory Test Data" and shall be the result of tests made in accordance with AMCA Standard 300 "Test Code for Sound Rating." Fans shall be licensed to bear the AMCA Certified Sound Ratings Seal.
 2. Unit's fans performance ratings for flow rate, pressure, power, air density, speed of rotation, and efficiency shall be factory tested and ratings established in accordance with AMCA Standard 210/ASHRAE Standard 51 - Laboratory Methods of Testing Fans for Rating.
- b. Fan Section Construction: Fan section shall be equipped with a welded steel channel base for integral mounting of fan, motor, and casing panels. The fan scroll, wheel, shaft, bearings, and motor shall be mounted on a structural steel frame with frame mounted on base with vibration isolators. Vibration springs shall have 2-inch (12-mm) deflection and seismic restraints.
- c. Supply air fans shall be belt drive plenum fans with airfoil wheel. Drive shall be rated for 150 percent of scheduled motor horsepower or two full motor sizes whichever is greater. Centrifugal fans shall be supplied as shown in the plans and in the fan schedule. Fan shall be rigidly braced and reinforced with integral spring isolation on fan base to help prevent vibrations or pulsation. Wheel diameter and outlet areas shall be in accordance with the Airfoil standard sizes adopted by AMCA for non-overloading fans. Airfoil blades shall be continuously welded to both rim and backplate and shall be capable of Class III duty. The wheel inlet and fan inlet cone shall be fabricated of aluminum and carefully matched for optimal sound and air performance. Turned, ground and polished steel shafts shall be sized so the final critical speed is at least 25 percent over the maximum speed for each pressure class.
- d. Shaft Bearings: Grease-lubricated ball bearings selected for 200,000 hours average life, with grease fittings extended to an accessible location outside the fan section. Provide permanent drive shaft

grounding to prevent electrical currents eroding the bearings and drive shaft of fans.

- e. Provide airflow traverse probes mounted in the fan inlets capable of continuously measuring the air handling capacity (air volume) of the fan. The fan inlet airflow traverse probes shall contain multiple total and static pressure sensors placed at concentric area centers along the exterior surface of the cylindrical probes and internally connected to their respective averaging manifolds. Sensors shall not protrude beyond the surface of the probe, nor be adversely affected by particle contamination normally present in building system airflows. The fan inlet airflow traverse probes shall be symmetrical averaging signal takeoffs, and shall be of aluminum construction with hard anodized finish with galvanized steel mounting hardware. The probes shall be capable of producing steady, non-pulsating signals of standard total and static pressure, without need for flow corrections or factors, with an accuracy of 3 percent of actual flow over a fan operating range of 6 to 1 capacity turndown. Provide a multi-line digital display transmitter suitable for use with the air flow monitoring system. Transmitter shall be capable of displaying the actual CFM, static and velocity pressure for the system. Transmitter shall be capable of providing a calibrated output signal of 0-10 VDC or 4-20maDC. Transmitter shall be factory mounted on the outside of the AHU. Coordinate the installation with the Owner.
- f. Fan Discharge Safety Enclosure: The safety enclosure to be expanded metal screen with a heavy steel frame which completely encloses the fan wheel. The top portion of the enclosure is removable to allow access to and removal of the wheel. Cataloged performance is based on fan without safety screen enclosure.

2.7.1.5 Access Sections and Filter/Mixing Boxes

Access sections shall be provided where indicated and shall be furnished with access doors as shown. Access sections and filter/mixing boxes shall be constructed in a manner identical to the remainder of the unit casing and shall be equipped with access doors.

2.7.1.6 Dampers

General: Leakage rate when tested in accordance with AMCA Standard 500 - Test Method for Louvers, Dampers and Shutters, shall not exceed 2 percent of air quantity calculated at 2,000 fpm face velocity through damper and 4 inches (100 mm) w.g. pressure differential.

- a. Damper operators shall be electrically operated.

2.7.1.7 Dampers

Dampers shall be as specified in paragraph CONTROLS.

2.7.1.8 Variable Frequency Drives

Variable frequency drives shall be as specified in Section 15910, DIRECT DIGITAL CONTROL SYSTEMS.

2.7.1.9 Extra Materials and Work

a. Provide Two (2) complete spare sets of belts for each air handler in addition to the belts on furnished with each fan.

b. Provide Three (3) complete sets of filters for each air handler. Do not run the air handlers during the construction phase of the project without pre-filter and final filters in place. If the air handlers are operated during the construction phase of the project the contractor shall furnish the filters. The three (3) filters sets are intended to be used as follows:

1. During the final phase of construction for system check out and balancing and prior to occupancy.

2. The filters shall be changed prior to an owner directed two (2) week flush of the system immediately prior to occupancy. The contractor shall perform a flush of the building using 100% outside air for a period of not less than 14 days. During that time all of the VAV boxes shall be at a minimum of 50% open. This shall be coordinated with the owner to minimize energy usage during that time as well as avoid the possibility of freezing or overheating any systems that may be online in the building at that time.

3. The final set of filters shall be spares turned over to the owner at the beginning of occupancy.

2.8 TERMINAL UNITS

2.8.1 Variable Air Volume (VAV) and Dual Duct Terminal Units

2.8.1.1 Variable Volume, Single Duct

Variable volume, single duct, terminal units shall be provided with a calibrated air volume sensing device, air valve or damper, actuator, and accessory relays. Units shall control air volume to within plus or minus 5 percent of each air set point volume as determined by the thermostat with variations in inlet pressures from 3/4 to 6 inch water gauge (200 to 1500 Pa). Internal resistance of units shall not exceed 0.4 inch water gauge (100 Pa) at maximum flow range. External differential pressure taps separate from the control pressure taps shall be provided for air flow measurement with a 0 to 1 inch water gauge (0 to 250 Pa) range. Unit volume controller shall be normally open upon loss of electrical power.

2.8.1.2 Variable Volume, Single Duct, Fan-Powered

Variable volume, single duct, fan-powered terminal units shall be provided with a calibrated air volume sensing device, air valve or damper, actuator, fan and motor, and accessory relays. Units shall control primary air volume to within plus or minus 5 percent of each air set point as determined by the thermostat with variations in inlet pressure from 3/4 to 6 inch water gauge (200 to 1500 Pa). Unit fan shall be centrifugal, direct-driven, double-inlet type with forward curved blades. Fan motor shall be either single speed with speed controller or three-speed, permanently lubricated, permanent split-capacitor type. Fan/motor assembly shall be isolated from the casing to minimize vibration transmission. Fan control shall be factory furnished and wired into the unit control system. A factory-mounted

pressure switch shall be furnished to operate the unit fan whenever pressure exists at the unit primary air inlet or when the control system fan operates. Fan wheels shall be furnished with an anti-rotation device to prevent backwards rotation of fan due to primary air flow.

2.8.1.3 Reheat Units

- a. Hot Water Coils: Hot-water coils shall be fin-and-tube type constructed of seamless copper tubes and copper or aluminum fins mechanically bonded or soldered to the tubes. Where required, coils shall be minimum of 2 rows. Headers shall be constructed of cast iron, welded steel or copper. Casing and tube support sheets shall be 16 gauge (1.6 mm), galvanized steel, formed to provide structural strength. Tubes shall be correctly circuited for proper water velocity without excessive pressure drop and they shall be drainable where required or indicated. At the factory, each coil shall be tested at not less than 250 psi (1700 kPa) air pressure and shall be suitable for 200 psi (1400 kPa) working pressure. Drainable coils shall be installed in the air handling units with a pitch of not less than 1/8 inch per foot (10 mm per m) of tube length toward the drain end. Coils shall conform to the provisions of ARI 410.

PART 3 EXECUTION

3.1 INSTALLATION

Work shall be installed as shown and according to the manufacturer's diagrams and recommendations.

3.1.1 Equipment and Installation

Frames and supports shall be provided for pumps, air handling units, fans, coils, dampers, and other similar items requiring supports. Air handling units shall be floor mounted or ceiling hung, as indicated. The method of anchoring and fastening shall be as detailed. Floor-mounted equipment, unless otherwise indicated, shall be set on not less than 6 inch (150 mm) concrete pads or curbs doweled in place. Concrete foundations for circulating pumps shall be heavy enough to minimize the intensity of the vibrations transmitted to the piping and the surrounding structure, as recommended in writing by the pump manufacturer. In lieu of a concrete pad foundation, a concrete pedestal block with isolators placed between the pedestal block and the floor may be provided. The concrete foundation or concrete pedestal block shall be of a mass not less than three times the weight of the components to be supported. Lines connected to the pump mounted on pedestal blocks shall be provided with flexible connectors. Foundation drawings, bolt-setting information, and foundation bolts shall be furnished prior to concrete foundation construction for all equipment indicated or required to have concrete foundations.

3.1.2 Access Panels

Access panels shall be provided for concealed valves, vents, controls, dampers, and items requiring inspection or maintenance. Access panels shall be of sufficient size and located so that the concealed items may be serviced and maintained or completely removed and replaced. Access panels shall be as specified in Section 05500 MISCELLANEOUS METALS.

3.1.3 Flexible Connectors

Pre-insulated flexible connectors and flexible duct shall be attached to other components in accordance with the latest printed instructions of the manufacturer to ensure a vapor tight joint. Hangers, when required to suspend the connectors, shall be of the type recommended by the connector or duct manufacturer and shall be provided at the intervals recommended.

3.1.4 Sleeved and Framed Openings

Space between the sleeved or framed opening and the duct or the duct insulation shall be packed as specified in Section 07840 FIRESTOPPING for fire rated penetrations. For non-fire rated penetrations, the space shall be packed as specified in Section 07900 JOINT SEALING.

3.1.5 Metal Ductwork

Installation shall be according to SMACNA HVAC Duct Const Stds unless otherwise indicated. Duct supports for sheet metal ductwork shall be according to SMACNA HVAC Duct Const Stds, unless otherwise specified. Friction beam clamps indicated in SMACNA HVAC Duct Const Stds shall not be used. Risers on high velocity ducts shall be anchored in the center of the vertical run to allow ends of riser to move due to thermal expansion. Supports on the risers shall allow free vertical movement of the duct. Supports shall be attached only to structural framing members and concrete slabs. Supports shall not be anchored to metal decking unless a means is provided and approved for preventing the anchor from puncturing the metal decking. Where supports are required between structural framing members, suitable intermediate metal framing shall be provided. Where C-clamps are used, retainer clips shall be provided.

3.1.6 Exposed Ductwork

Exposed ductwork shall be fabricated from minimum 18 gauge (1.3 mm), Type 304L or 316L, stainless steel with continuously welded joints and seams. Ducts shall be pitched to drain at hoods and low points indicated. Surface finish shall match hoods.

3.1.7 Acoustical Duct Lining

Lining shall be applied in cut-to-size pieces attached to the interior of the duct with nonflammable fire resistant adhesive conforming to ASTM C 916, Type I, NFPA 90A, UL 723, and ASTM E 84. Top and bottom pieces shall lap the side pieces and shall be secured with welded pins, adhered clips of metal, nylon, or high impact plastic, and speed washers or welding cup-head pins installed according to SMACNA HVAC Duct Const Stds. Welded pins, cup-head pins, or adhered clips shall not distort the duct, burn through, nor mar the finish or the surface of the duct. Pins and washers shall be flush with the surfaces of the duct liner and all breaks and punctures of the duct liner coating shall be sealed with the nonflammable, fire resistant adhesive. Exposed edges of the liner at the duct ends and at other joints where the lining will be subject to erosion shall be coated with a heavy brush coat of the nonflammable, fire resistant adhesive, to prevent delamination of glass fibers. Duct liner may be applied to flat sheet metal prior to forming duct through the sheet metal brake. Lining at the top and bottom surfaces of the duct shall be additionally secured by welded pins or

adhered clips as specified for cut-to-size pieces. Other methods indicated in SMACNA HVAC Duct Const Stds to obtain proper installation of duct liners in sheet metal ducts, including adhesives and fasteners, will be acceptable.

3.1.8 Dust Control

To prevent the accumulation of dust, debris and foreign material during construction, temporary dust control protection shall be provided. The distribution system (supply and return) shall be protected with temporary seal-offs at all inlets and outlets at the end of each day's work. Temporary protection shall remain in place until system is ready for startup.

3.1.9 Insulation

Thickness and application of insulation materials for ductwork, piping, and equipment shall be according to THERMAL INSULATION FOR MECHANICAL SYSTEMS.

3.1.10 Duct Test Holes

Holes with closures or threaded holes with plugs shall be provided in ducts and plenums as indicated or where necessary for the use of pitot tube in balancing the air system. Extensions, complete with cap or plug, shall be provided where the ducts are insulated.

3.1.11 Power Roof Ventilator Mounting

Foamed 1/2 inch (13 mm) thick, closed-cell, flexible elastomer insulation shall cover width of roof curb mounting flange. Where wood nailers are used, holes shall be pre-drilled for fasteners.

3.1.12 Power Transmission Components Adjustment

V-belts and sheaves shall be tested for proper alignment and tension prior to operation and after 72 hours of operation at final speed. Belts on drive side shall be uniformly loaded, not bouncing. Alignment of direct driven couplings shall be to within 50 percent of manufacturer's maximum allowable range of misalignment.

3.1.13 Smoke-Fire and Fire Damper Installation

- a. Install dampers at locations indicated on the Drawings and in accordance with manufacturer's UL approved installation instructions.
- b. Install dampers square and free from racking with blades running horizontally.
- c. Do not compress or stretch damper frame into duct or opening.
- d. Handle damper using sleeve or frame. Do not lift damper using blades, actuator, or jackshaft.
- e. Install bracing for multiple section assemblies to support assembly weight and to hold against system pressure. Install bracing as needed.

3.2 DUCTWORK LEAK TEST

Ductwork leak test shall be performed for the entire air distribution and exhaust system, including fans, coils. Test procedure, apparatus, and report shall conform to SMACNA Leakage Test Mnl. The maximum allowable leakage rate is 2 percent. Ductwork leak test shall be completed with satisfactory results prior to applying insulation to ductwork exterior.

3.3 DAMPER ACCEPTANCE TEST

All fire dampers and smoke dampers shall be operated under normal operating conditions, prior to the occupancy of a building to determine that they function properly. Fire dampers equipped with fusible links shall be tested by having the fusible link cut in place. Dynamic fire dampers shall be tested with the air handling and distribution system running. All fire dampers shall be reset with the fusible links replaced after acceptance testing. To ensure optimum operation and performance, the damper must be installed so it is square and free from racking.

3.4 TESTING, ADJUSTING, AND BALANCING

Testing, adjusting, and balancing shall be as specified in Section 15990 TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS. Testing, adjusting, and balancing shall begin only when the air supply and distribution, including controls, has been completed, with the exception of performance tests.

3.5 PERFORMANCE TESTS

After testing, adjusting, and balancing has been completed as specified, each system shall be tested as a whole to see that all items perform as integral parts of the system and temperatures and conditions are evenly controlled throughout the building. Corrections and adjustments shall be made as necessary to produce the conditions indicated or specified. Capacity tests and general operating tests shall be conducted by an experienced engineer. Tests shall cover a period of not less than 3 days for each system and shall demonstrate that the entire system is functioning according to the specifications. Coincidental chart recordings shall be made at points indicated on the drawings for the duration of the time period and shall record the temperature at space thermostats or space sensors, the humidity at space humidistats or space sensors and the ambient temperature and humidity in a shaded and weather protected area.

3.6 CLEANING AND ADJUSTING

Pipes shall be cleaned free of scale and thoroughly flushed of foreign matter. A temporary bypass shall be provided for water coils to prevent flushing water from passing through coils. Strainers and valves shall be thoroughly cleaned. Prior to testing and balancing, air shall be removed from water systems by operating the air vents. Temporary measures, such as piping the overflow from vents to a collecting vessel shall be taken to avoid water damage during the venting process. Air vents shall be plugged or capped after the system has been vented. Inside of air terminal units, ducts, plenums, and casing shall be thoroughly cleaned of debris and blown free of small particles of rubbish and dust and then shall be vacuum cleaned before installing outlet faces. Equipment shall be wiped clean, with traces of oil, dust, dirt, or paint spots removed. Temporary filters shall be provided prior to startup of all fans that are operated during construction,

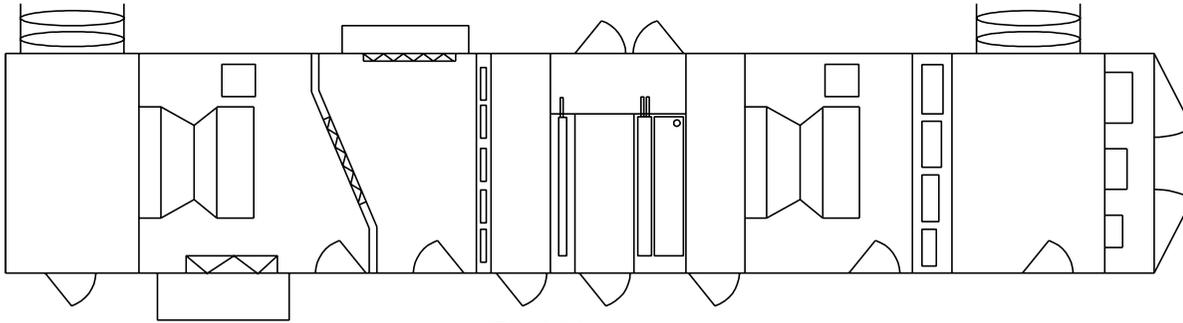
and new filters shall be installed after all construction dirt has been removed from the building, and the ducts, plenums, casings, and other items specified have been vacuum cleaned. System shall be maintained in this clean condition until final acceptance. Bearings shall be properly lubricated with oil or grease as recommended by the manufacturer. Belts shall be tightened to proper tension. Control valves and other miscellaneous equipment requiring adjustment shall be adjusted to setting indicated or directed. Fans shall be adjusted to the speed indicated by the manufacturer to meet specified conditions.

3.7 FIELD TRAINING

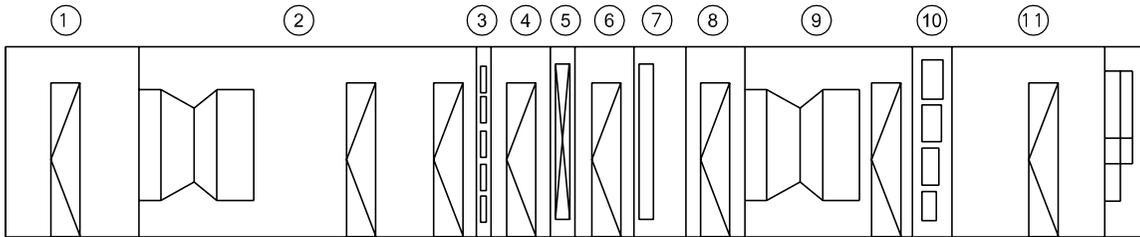
The Contractor shall conduct a training course for operating and maintenance personnel as designated by the Contracting Officer. Training shall be provided for a period of 24 hours of normal working time and shall start after the system is functionally complete but prior to the performance tests. The field instruction shall cover all of the items contained in the approved Operating and Maintenance Instructions.

~~End of Section~~

Attachment follows.



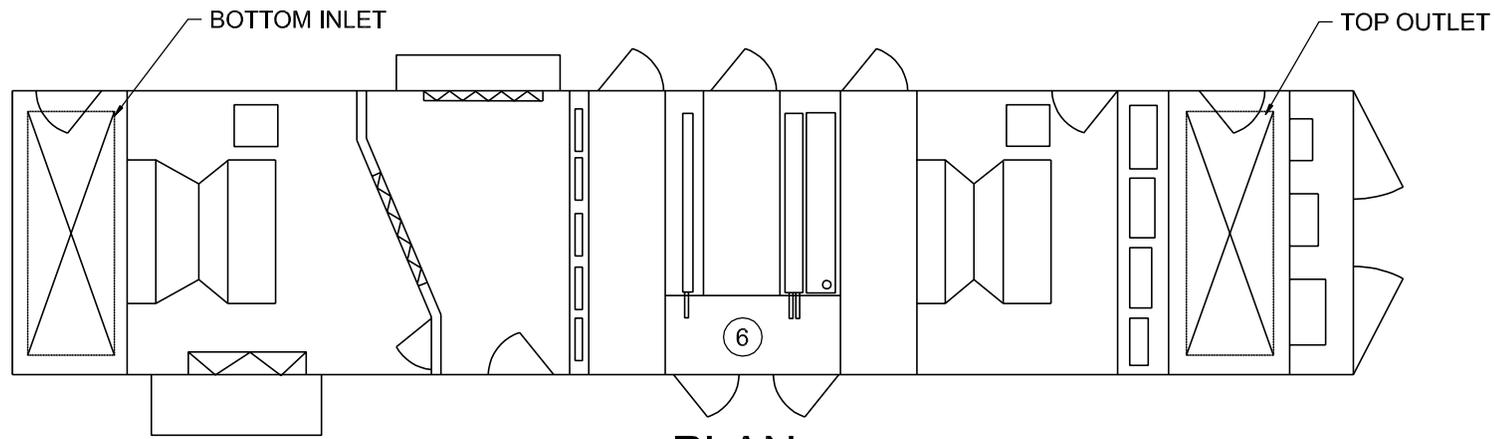
PLAN



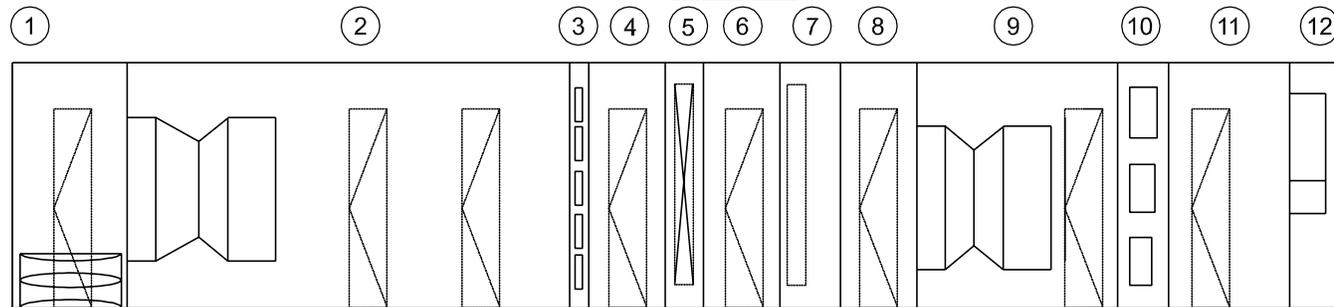
ELEVATION

- ① 48 x 48 INTAKE PLENUM SECTION WITH 3 ft SILENCER IN THE SIDE OPENING.
- ② RETURN FAN/ECONOMIZER SECTION
- ③ PRE- FILTER SECTION
- ④ ACCESS SECTION
- ⑤ HEATING COIL SECTION
- ⑥ ACCESS SECTION
- ⑦ COOLING COIL SECTION
- ⑧ ACCESS SECTION
- ⑨ SUPPLY FAN SECTION
- ⑩ FINAL FILTER SECTION
- ⑪ 48 x 48 DISCHARGE PLENUM SECTION WITH 3ft. SILENCER IN THE SIDE OPENING

BATTLE SIMULATION CENTER
AHU-1



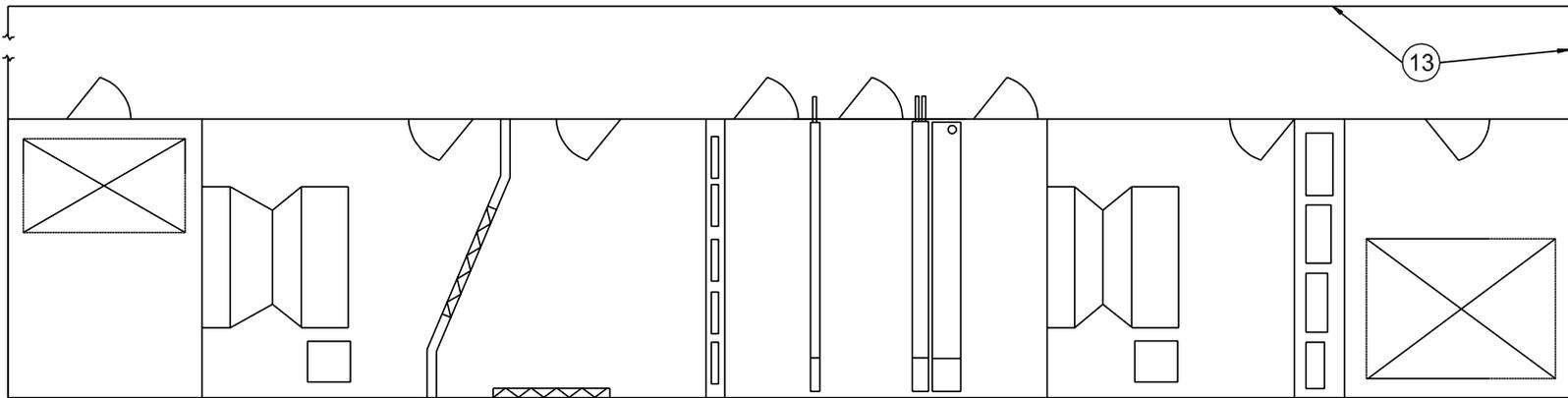
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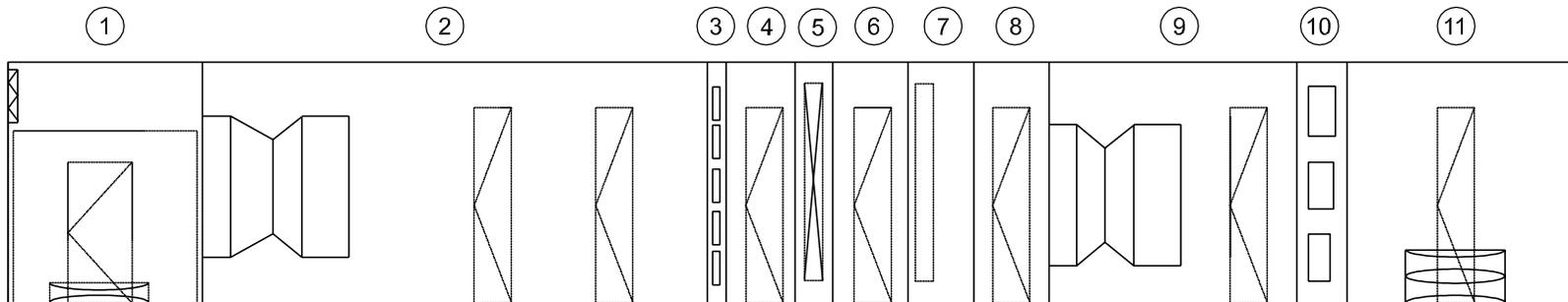
ELEVATION

- ① 62 x 26 INTAKE PLENUM SECTION WITH 3 ft SILENCER IN THE BOTTOM OPENING.
- ② RETURN FAN/ECONOMIZER SECTION
- ③ PRE- FILTER SECTION
- ④ ACCESS SECTION
- ⑤ HEATING COIL SECTION
- ⑥ ACCESS SECTION
- ⑦ COOLING COIL SECTION
- ⑧ ACCESS SECTION
- ⑨ SUPPLY FAN SECTION
- ⑩ FINAL FILTER SECTION
- ⑪ 62 x 26 DISCHARGE PLENUM SECTION WITH EXTERNAL 5' SILENCER
- ⑫ VFD'S/CONTROL PANEL SECTION

**BATTLE SIMULATION CENTER
AHU-2**



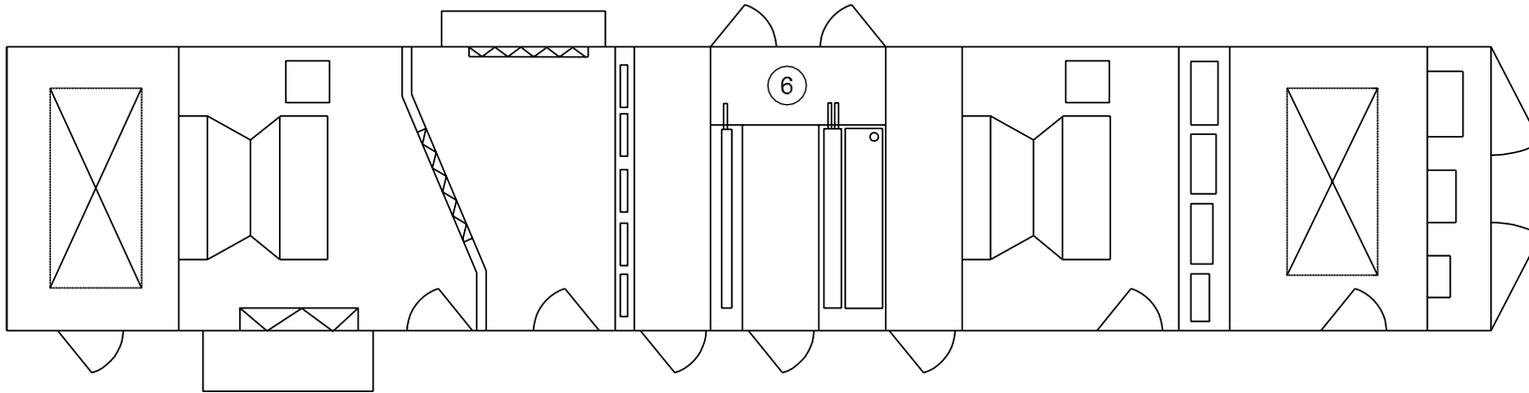
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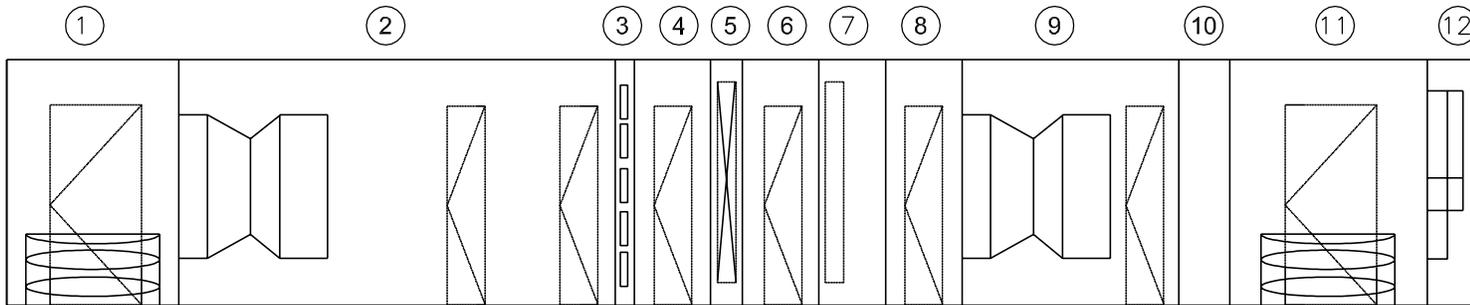
ELEVATION

- ① 60 x 60 INTAKE PLENUM SECTION WITH 3 ft SILENCER IN THE BOTTOM OPENING.
- ② RETURN FAN/ECONOMIZER SECTION
- ③ PRE- FILTER SECTION
- ④ ACCESS SECTION
- ⑤ HEATING COIL SECTION
- ⑥ ACCESS SECTION
- ⑦ COOLING COIL SECTION
- ⑧ ACCESS SECTION
- ⑨ SUPPLY FAN SECTION
- ⑩ FINAL FILTER SECTION
- ⑪ 60 x 60 DISCHARGE PLENUM SECTION WITH 3ft. SILENCER IN THE BOTTOM OPENING
- ⑫ VESTIBULE
- ⑬ VESTIBULE REFER TO PLAN DRAWING FOR DOOR LOCATIONS

**BATTLE SIMULATION CENTER
AHU-3**



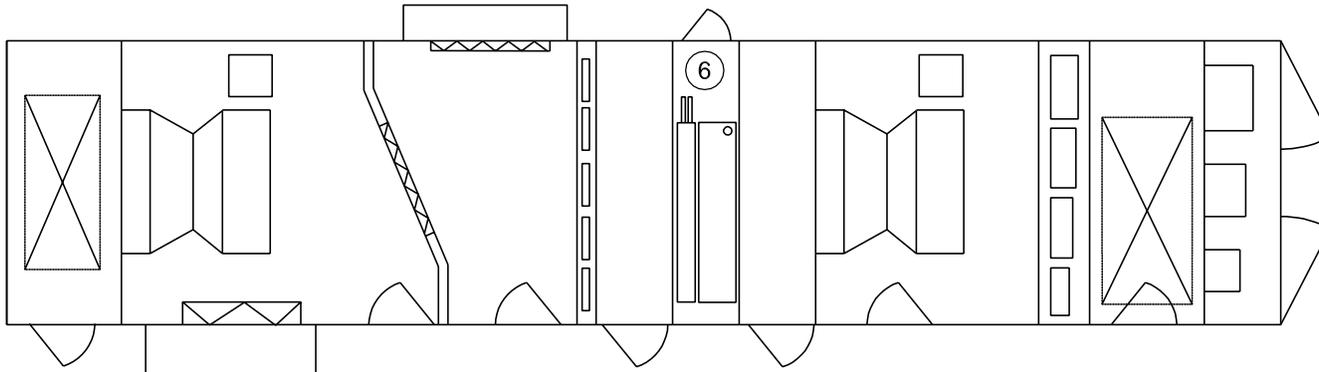
PLAN



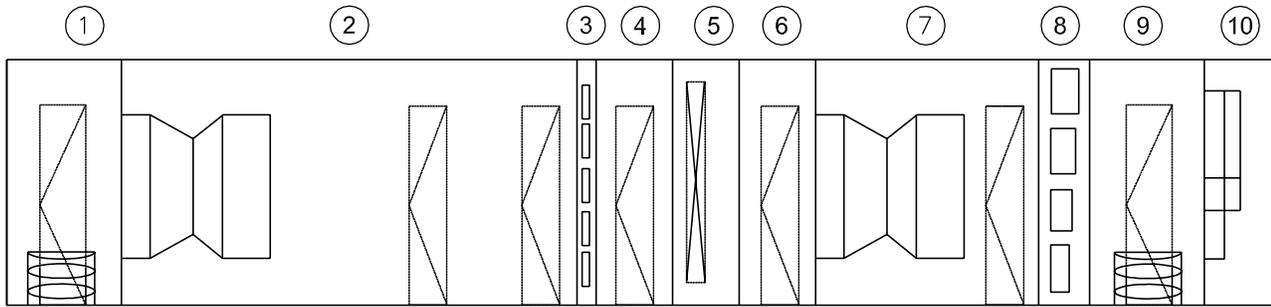
ELEVATION

- ① 60 x 24 INTAKE PLENUM SECTION WITH 3 ft SILENCER IN BOTTOM OPENING.
- ② RETURN FAN/ECONOMIZER SECTION
- ③ PRE- FILTER SECTION
- ④ ACCESS SECTION
- ⑤ HEATING COIL SECTION
- ⑥ ACCESS SECTION
- ⑦ COOLING COIL SECTION
- ⑧ ACCESS SECTION
- ⑨ SUPPLY FAN SECTION
- ⑩ FINAL FILTER SECTION
- ⑪ 60 x 24 DISCHARGE PLENUM SECTION WITH 3ft. SILENCER IN THE BOTTOM OPENING
- ⑫ VFD'S/CONTROL PANEL SECTION

**BATTLE SIMULATION CENTER
AHU-4**



PLAN



ELEVATION

- ① 60 x 60 INTAKE PLENUM SECTION WITH 3 ft SILENCER IN BOTTOM OPENING.
- ② RETURN FAN/ECONOMIZER SECTION
- ③ PRE- FILTER SECTION
- ④ ACCESS SECTION
- ⑤ COOLING COIL SECTION
- ⑥ ACCESS SECTION
- ⑦ SUPPLY FAN SECTION
- ⑧ FINAL FILTER SECTION
- ⑨ 60 x 60 DISCHARGE PLENUM WITH 3ft SILENCER IN BOTTOM OPENING
- ⑩ VFD'S/CONTROL PANEL SECTION

**BATTLE SIMULATION CENTER
AHU-5**

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