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PIONEER POLAR STRUCTURES
SPECIFICATIONS FOR JAMESHAY SHELTER ACCESSORIES
5 April 1963

U. S. NAVAL CIVIL ENGINEERING LABORATORY
PORT HUENEME, CALIFORNIA

NO OTS
PIONEER POLAR STRUCTURES
SPECIFICATIONS FOR JAMESWAY SHELTER ACCESSORIES

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Type S

Compiled by
G. E. Sherwood

ABSTRACT

Accessories were developed for improving the Jamesway in order to provide a suitable, lightweight, quick-erecting shelter for use as quarters, mess, galley, utilities, administration and other such applications in pioneer polar camps. These accessories include: A heavy duty floor and foundation system; a wall extension kit; special entry kits; an improved electrical distribution system; and special utility accessories. This technical note contains the specifications for the Jamesway shelter accessories presented in the Naval Civil Engineering Laboratory Technical Report TR-241, "Pioneer Polar Structures - Accessories for the Jamesway Shelter."
INTRODUCTION

Experience has shown that a warm, comfortable shelter for use as quarters, mess, galley, utilities, administration and medical care is required for efficient and effective performance of a work force in a polar environment. Shelters for use when pioneering these regions must be lightweight and quick-erecting. Based on fulfillment of the above requirements and several years of successful use in Arctic and Antarctic operations, the Army Quartermaster Corps Tent, frame-type, insulated, commonly known as the Jamesway, was selected as the basic building to be used for development of a suitable shelter for pioneer polar camps. Although the Jamesway basically fulfills the requirements of shelters for pioneer polar operations, continued usage of the structure has revealed certain limitations. This technical note contains the specifications for accessories developed for the Jamesway to overcome these limitations.

DESCRIPTION OF THE ACCESSORIES

The accessories developed for the Jamesway are detailed in the drawings contained in the Appendix. Accessories developed are:

1. A heavy duty floor which supports large concentrated loads without excessive deflection. Y&D Drawing No. 936916.

2. A special foundation system which provides structural steel support under the center of a building where cavitation is most critical. Y&D Drawing No. 936916.

3. A wall extension kit which raises the roof arches two feet above the standard position providing adequate headroom along the edges of the building. Y&D Drawing Nos. 936903 through 936905.

4. A side entry kit which is an entry vestibule for the side of a building. Y&D Drawing Nos. 936907 through 936912.

5. A standard vestibule end entry kit which permits direct entry through a standard vestibule. Y&D Drawing No. 936913.

6. An improved electrical distribution system which provides adequate lighting and convenience outlets for general use and flexibility for special applications. Y&D Drawing No. 936906.


8. A snow melter which can be supplied with snow and used inside a building. Y&D Drawing No. 936917.


10. A special roof vent which can be placed anywhere in a building. Y&D Drawing No. 936902.

SPECIFICATIONS FOR THE ACCESSORIES

The specifications in the following paragraphs apply as appropriate to the Jamesway shelter accessories.

1. Scope. The work shall include the furnishing of all material and equipment, and performing all labor for the complete fabrication of the items indicated on the drawings and described and specified herein. The contractor's proposal shall be based on the drawings and specifications herewith and no deviations shall be accepted except as approved in writing by the Contracting Officer.

2. Materials

A. Wood

(1) Lumber. (Referred to on drawings as "Wood"). All lumber shall thoroughly and uniformly be dried to a moisture content not more than 12 percent at time of fabrication determined in accordance with Specification MIL-W-6110, and shall be free from decay, case bordering, shakes, checks, or any other defect which may affect the strength, wear or serviceability of the member. Not more than two small round knots 1/4 to 1/2 inch in diameter or one 3/4 inch knot will be permitted per square foot. Members shall be finished on all sides to drawing dimensions. Any of the following species of wood may be used, unless otherwise specified:

Fir, Douglas, Coast Region
Hemlock, Western
Pine, Norway or Ponderosa
Pine, (White) Northern or Western
Spruce (Eastern, Sitka)
Pine, Southern (long leaf, slash, short leaf and loblolly)
(2) Plywood. Plywood shall conform to Specification NN-P-530a for all plywood, and shall be grade marked to indicate conformance with the following requirements.

(a) Douglas Fir, Exterior Type, Grade AC, sanded 2 sides, as per Commercial Standard CS-45 of latest date.

B. Steel

(1) Sheet or Strip. Conform to Specification QQ-S-640 FS-1020 unless noted otherwise.


C. Aluminum

(1) For structural purposes. Alloy 6061 or 6062, T-6 Temper, conform to Specification QQ-A-270a. Alloy and use as indicated on the drawings.


(3) Welding Wire. 5154 or 5356 for Alloys 6061 and 6062; 5356 for Alloy 5052.


D. Fastenings

(1) Nails. The nails shall be steel, cement coated, either standard (coolers) or countersunk head (sinkers) and size as indicated on the drawings, and shall conform to Specification FF-N-105.

(2) Screws

(a) Wood. Wood screws shall be steel, of the size indicated on the drawings and of style 2c (Flat (countersink) head with cross recess drive) and shall conform to Specification FF-S-111b. Wood screws shall be used only where length requirements are in excess of two (2) inches.
(b) **Screws, threaded full length.** All screws screwing wood to wood or other materials to wood and where the length requirement is not in excess of two (2) inches shall be a type of screw that is threaded full length. These screws shall be cadmium plated with cross recess drive and head type as indicated on the drawings. Type A, Parker Kalon, cadmium plated screws with Phillips slot conforms to these requirements.

(3) **Fasteners, Corrugated.** Corrugated fasteners shall be standard commercial of size indicated on the drawings.

(4) **Bolts, nuts, washers**

(a) **Bolts, carriage, square neck, and nuts.** Conform to Type C-2 Table X, of Specification FF-B-571a, and nuts Type Al and Table XII.

(b) **Bolts, and nuts, hexagonal.** Conform to Specification FF-B-571a, Type Bl and Table V and nuts Type Al and Table XII.

(c) **Nuts, wing.** The wing nuts shall be standard commercial, of the type and size as indicated on the drawings.

(d) **Washers.** The washers shall be standard commercial cut steel of the type and size indicated on the drawings.

(e) **Finishes.** All bolts, nuts, and washers shall be finished with a zinc coating conforming to type II or III, class 2 of Specification QQ-Z-325a or cadmium plating type II or III, class 2 of Specification QQ-P-416a.

(5) **Rivets.** Rivets for attaching metal to wood shall be standard commercial, of type and size as indicated on the drawings and finished the same as specified for bolts in Section (D) (4) (e).

(6) **Adhesive A - wood to wood.** The adhesive used for adhering wood to wood (other than the manufacture of plywood) shall conform to Type I, Grade A Class I of Specification MIL-A-397B.

E. **Insulation**

(1) **Blanket.** The insulation material shall be composed of glass fibers firmly bonded with a thermo-setting plastic resin into a mat structure of thickness as indicated on the drawings, (plus 1/2 inch, minus 0), with a density of 1# per cubic foot plus or minus 10 percent. The blanket shall be faced on each face with bright aluminum foil, 2 mils thick, and applied with a fire retardant adhesive. The thermal
conductivity shall not exceed 0.25 B.T.U. per hour, per square foot, per degree Fahrenheit taken at a mean temperature of 70 F; when tested in accordance with the ASTM Specification D 1518-57T.

(2) Felt. Gaskets indicated as felt shall be composed of a wool felt, specially impregnated with an anti-corrosion and anti-electrolysis compound. It shall have a tacky, pressure sensitive adhesive on one side as an application aid. Size shall be as indicated on the drawings.

F. Straps

(1) Webbing, cotton. The webbing for straps shall conform to Specification MIL-W-530B and shall be Type III, Class 4 of width indicated on the drawings. Webbing shall be dyed to olive drab shade No. 7.

(2) Clips, end. The end clips on webbing straps shall be brass, black chemical finish conforming to type I, (ball type) of Specification JAN-C-496.

(3) Buckles, slide, with hook. The buckles shall be made of steel, hot rolled sheet or strip, condition optional as indicated on the drawings. The buckle shall be heat treated to a hardness of RC-16-22 and shall be free from cracks, scale, and other injurious defects. Case hardening will not be permitted. The buckles shall be given a finish consisting of a phosphate treated zinc-plate, conforming to Class 3, Type III of Specification QQ-Z-325, followed by bake enameling. The enamel shall conform to Type II, Specification JAN-E-480, in a black color. The coatings shall level out to a uniform dry film thickness of 0.25 mils minimum, without objectionable orange peel, wrinkles, drops, streaks, or areas of thin or no film.

G. Coating

(1) Galvanizing. Conform to Specification QQ-Z-325a, Type II, Class I zinc coating.

(2) Cadmium Plating. Conform to Specification QQ-P-416a, Class I, Type II.

H. Paint

(1) Primer. The primer shall conform to Specification TT-P-636b.
(2) Enamel. The enamel shall conform to Specification TT-E-529a, Class A. The color shall be No. 24087, Table VI of Standard FED-STD-595.

J. Hardware

(1) Hinges. All hinges shall conform to Specification FF-H-116c of the following types and sizes as indicated on the drawings.
   - Doors - type 2171H
   - Tie down assembly bar - Strap hinge, type 2203
   - Dry Head Lid - Tee hinges, type 2209
   - Dry Head Access Door - Type 2203, 4" strap
   - Snow Melter Chute - Type 2203, 4" strap

(2) Latch and Keeper. Latch and keeper for doors shall be a type easily operated from either inside or outside of the door. Latch and keeper shall be substantially the type indicated on the drawings, easily operated by a person wearing polar type mittens, but any acceptable latch that meets the necessary requirements, may be used upon the approval of the contracting officer. The Vonnegut No. 25 latch, as manufactured by Vonnegut Hardware Company, Indianapolis, Indiana, meets the requirements of this specification.

(3) Barrel bolt. Conform to Specification FF-H-111a, Type F1012C, 4 inches long.


(5) Suitcase fasteners. Standard commercial as detailed, cadmium or zinc plated.

(6) Link lock. Medium duty, spring locking device. Load carrying capacity 1,000 pounds tension, operated by cam action with large wing-nut handle. (No. 2 Spring-Loaded Link-Lock as manufactured by Simmons Fastener Corporation, Albany, New York, conforms to this specification.)


K. Toilet Seat

(1) Standard commercial, regular, solid wood core with plastic white finish, without cover.
L. Cloth

(1) For Vent Roof Flashing. A closely woven glass fabric coated on one side with chloroprene containing fire retardant. Material shall be resistant to acids, alkalies, gasoline and grease and will withstand a constant temperature of 250 F. (Ventglas, LA, manufactured by Ventfabrics, Inc., 640 North Kedzie Avenue, Chicago 12, Illinois, conforms to this specification.)

M. Plumbing Materials

(1) Pipe fittings - for steel pipe. Conform to Specification WW-P-521d.

N. Electrical Materials

(1) Materials listed below shall conform to Specifications as noted.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Specification</th>
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<tbody>
<tr>
<td>(a) Conduit outlets</td>
<td>W-C-586a</td>
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<td>(b) Type VI, Design 27, Form 2</td>
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<td>(c) Wire connectors</td>
<td>W-S-610</td>
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<td>Types I, Class B</td>
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<td>Style 3 or 4</td>
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<td>Type II, Class A</td>
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<td>(d) Fittings, cable and conduit</td>
<td>W-F-406a</td>
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<tr>
<td>Type I, Class 3, Style A</td>
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<tr>
<td>Type V, Class 1, Style A</td>
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<tr>
<td>(e) Outlet Boxes</td>
<td>W-J-800a</td>
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<td>Type I, Size A, Style 1</td>
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<tr>
<td>Type I, Size C, Style 8</td>
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**Materials**

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<tr>
<td>Type II, Size E, Style 13; Type II, Size G, Style 18; Type IV Size K Style 29; Type VIII, Size S, Style 43; Type VIII, Size S Style 44; Type VIII, Size U, Style 52, 54, 56, 57, 58; Type VIII, Size S, Style 49</td>
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</table>

(f) Panel Boards

Class A-1, A-2, and A-4 as indicated on drawings and conform to Table III.

(g) Receptacles and Plugs

Style, Series D except with pressure type terminals.

(h) Switches, (surface mounted)

Type NDD, Design 4, Box 1

(i) Switches, toggle

Table III, Style 62

(j) Conduit, Steel, flexible

Sizes as indicated

(k) Conduit, steel, rigid

Sizes as indicated

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<tr>
<td>WW-P-131a(2)</td>
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<td>W-C-596</td>
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<td>W-S-865c</td>
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<tr>
<td>W-S-896a</td>
</tr>
<tr>
<td>WW-C-566a</td>
</tr>
<tr>
<td>WW-C-581c</td>
</tr>
</tbody>
</table>
Materials

(1) Nipples
Type 1, sizes as indicated

WW-C-351a

(m) Tubing, metallic
Sizes as indicated

WW-T-806b

(2) Conductors

(a) Conductors in buildings shall be copper, of size indicated, color coded; insulation to be of a type to withstand bending at -50 F without damage.

(3) Lighting Fixtures. Conform to Specification 9Yg.

3. Jamesway Wall Extension Kits (Y&D Drawings 936903, 936904 and 936905)

(a) The Wall Extension Kits consist of prefabricated, insulated plywood panels two feet (2') high of length indicated used for increasing the head room of the Jamesway Structure by two feet (2'). Included in the kit is the necessary material for modification of the end walls. The side and end wall panels connect to the floor units by means of bolts and link-lock fasteners. The end walls must be modified in the field in accordance with the drawings. Separate kits are listed for 32' long and 48' Jamesway Structures.

(b) Fabrication. All panels and items for end wall modification shall be fabricated in accordance with the drawings. Materials to conform to paragraph 2. All joints, wood to wood, and plywood to wood, shall be nail-glued with Adhesive A. All exposed surfaces of wood and plywood and all surfaces of steel shall receive one coat of Primer and two (2) coats of Enamel.

4. Jamesway General Electrical (Y&D Drawing 936906)

(a) The General Electrical plan provides a general lighting system with convenience outlets on each fixture. Separate designs are indicated for the 32' long and 48' long Jamesway Structure. This electric system is included as part of the Basic Building indicated on Y&D Drawing 936902.

(b) Fabrication. Materials to conform to paragraph 2-N. Assemblies shall be shop assembled with all parts as indicated and with wire ends cleaned ready for connecting.
5. Jamesway Side Entry Kit - For use with wall extensions (Y&D Drawing 936907, 936908, 936909)

(a) The Side Entry Kit provides a method of entering the Jamesway Structure along either side. It fits between arches and makes a vestibule with outer and inner doors. A four foot (4') long wall extension panel is furnished to replace one of the standard wall extension panels.

(b) Fabrication. Materials to conform to Paragraph 2. All joints, wood to wood, and plywood to wood, shall be nail-glued with Adhesive A. All exposed surfaces of wood and plywood, steel and hardware, shall receive one (1) coat of Primer and two (2) coats of Enamel.

6. Jamesway Side Entry Kit - For use with standard unit (Y&D Drawing 936910, 936911, 936912)

(a) The Side Entry Kit provides a method of entering the Standard (without wall extension) Jamesway Structure on either side. It fits between arches and makes a vestibule with outer and inner doors.

(b) Fabrication. Materials to conform to Paragraph 2. All joints, wood to wood, and plywood to wood, shall be nail-glued with Adhesive A. All exposed surfaces of wood and plywood, steel and hardware, shall receive one (1) coat of Primer and two (2) coats of Enamel.

7. Jamesway Vestibule End Entry Kit (Y&D Drawing 936913)

(a) The Vestibule End Entry Kit provides a door in the end of the standard vestibule. The kit consists of a frame and door, all assembled, ready for installation.

(b) Fabrication. Materials to conform to Paragraph 2. All joints, wood to wood and plywood to wood, shall be nail-glued with Adhesive A. All exposed surfaces of wood, plywood, steel and hardware shall receive one (1) coat of Primer and two (2) coats of Enamel.

8. Jamesway Dry Head Kit (Y&D Drawing 936914)

(a) The Dry Head Kit is used in conjunction with a Jamesway Side Entry Kit to provide a toilet stall. It is furnished in a "knock-down" condition and must be assembled in the field. It is so arranged that the waste can be removed from the exterior of the building.
(b) Fabrication. Materials to conform to Paragraph 2. All shop fabricated joints, wood to wood and wood to plywood, shall be nail-glued with Adhesive A. All surfaces of wood, plywood, steel and hardware shall receive one (1) coat of Primer and two (2) coats of Enamel.

9. Jamesway Tanks and Supports (Y&D Drawing 936915)

(a) The Tanks and Supports provide a 190 gallon Water Storage Tank, with cover, and Tank Support.

(b) Water Storage Tanks shall be formed of aluminum in accordance with details. Joints shall be full butt welds, ground smooth. Edges of sheared sheets shall be ground smooth. Holes in tank for piping shall be reinforced as detailed. Materials to conform to Paragraph 2.

(c) The Tank Support shall be fabricated as detailed ready for field assembly, including all erection bolts. Materials to conform to Paragraph 2.

(d) Welding shall be by inert gas process.

10. Jamesway Special Foundations (Y&D Drawing 936916)

(a) The Special Foundation provides steel supports, for the floor units, spanning 16 feet (16') to continuous timber sills. Included with each Special Foundation is insulation material to be placed over the snow below the foundation members and vent pipes to prevent or delay cavitation by heat from the building. The Special Foundation is to be used under floor areas where excessive heat may be generated. Special Foundations are provided for 16', 32' and 48' long structures. They may be used under the entire building or only a portion of the length.

(b) The Strengthening Members (SM) are pre-cut 2 x 6's for strengthening standard floor units where excessive loads may occur. They are to be field installed.

(c) Fabrication - Steel Beams and Angles. Shall be fabricated in accordance with American Institute of Steel Construction Specification for the Design, Fabrication and Erection of Structural Steel for Bridges and Buildings.

Steel Joists shall be fabricated of the members indicated in accordance with the specifications of the Steel Joist
Institute. Wood sills require no fabrication. Vent Pipes shall be fabricated of galvanized steel of gage indicated. Seams shall be of the single grooved seam type. Parts shall be separate ready for field assembly. Strengthening Members shall be cut to dimensions indicated.

(d) Painting. All surfaces of steel and wood shall receive one (1) coat of Primer and two (2) coats of Enamel. Steel members shall be dipped.

11. Snow Melter Tank and Chute (Y&D Drawing 936917)

(a) The Snow Melter consists of a melting tank and chute. The tank is constructed of plywood, insulation and aluminum liner. Immersion type electric water heaters are used for melting snow. The chute is constructed of lumber and plywood and requires modification of the end wall of the Jamesway Structure for installation. The door frame in the end wall and the entire vestibule must be discarded. The chute, when raised, provides a closure for the new opening.

(b) The Tank, shall be fabricated of the materials and to the dimensions as indicated on the drawings. The aluminum liner shall fit snugly into the plywood box and be secured only at the top. Joints in liner shall be full butt welded and ground smooth. Sheared edges shall be ground smooth. Fittings for pipe outlet shall be installed as detailed. Materials to conform to Paragraph 2. Joints, wood to wood and wood to plywood, shall be screw-glued with Adhesive A. Exposed surfaces of wood or plywood shall receive one (1) coat of Primer and two (2) coats of Enamel.

(c) The Chute and End Wall Modification shall be fabricated of materials and to dimensions indicated on the drawings ready for field installation. Joints, wood to wood and plywood to wood, shall be screw-glued with Adhesive A. Exposed surfaces of all material, except felt, shall receive one (1) coat of Primer and two (2) coats of Enamel.

(d) Welding shall be by inert gas process.
REFERENCES


## AppenDix

### Drawings For The Jamesway Shelter Accessories

The original of the drawings listed below and shown at reduced scale are available at the Naval Civil Engineering Laboratory, Port Hueneme, California. All drawings are 28 by 40 inches.

<table>
<thead>
<tr>
<th>Y&amp;D Drawing No.</th>
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<tbody>
<tr>
<td>936902</td>
<td>Jamesway Structure Basic Building</td>
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</table>
| 936903          | Jamesway Wall Extension Kit  
|                 | Fabrication - Walls |
| 936904          | Jamesway Wall Extension Kit  
|                 | Fabrication - Door Frame |
| 936905          | Jamesway Wall Extension Kit  
|                 | Erection Details |
| 936906          | Jamesway General Electrical  
|                 | 32' and 48' Buildings |
| 936907          | Jamesway Side Entry Kit  
|                 | (For use with wall extensions)  
|                 | Fabrication Details |
| 936908          | Jamesway Side Entry Kit  
|                 | (For use with wall extensions)  
|                 | Fabrication Details |
| 936909          | Jamesway Side Entry Kit  
|                 | (For use with wall extensions)  
|                 | Erection Details |
| 936910          | Jamesway Side Entry Kit  
|                 | (For use with standard unit)  
|                 | Fabrication Details |
| 936911          | Jamesway Side Entry Kit  
|                 | (For use with standard unit)  
<p>|                 | Fabrication Details |</p>
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<td>Fabrication and Erection Details</td>
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<td>Jamesway Special Foundations</td>
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<td>Snow Melter Tank and Chute</td>
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