

CURVED INSULATION APPLICATIONS

PRECISION AND PERFORMANCE

Pamrod **HATS**[®] provide a fit and thermal performance difficult to obtain with the conventional method of field cutting flat block at the project site. Each segment is custom designed for an exact fit. On heads with center nozzles 16" IPS and larger, the first course is cut to fit around the nozzle. On bottom skirted heads, the last course is designed to fit "inside the skirt," simplifying installation and reducing field labor.

SUPERIOR MATERIALS FOR THERMAL PERFORMANCE

Pamrod **HATS** are custom designed to meet high-performance thermal requirements. Segments are available in single layer thickness from 1½" to 4" and multiple layers from 3" and up. Multiple layered heads are designed with staggered joints. We can fabricate segments in the thickness required for your vessel head, and **HATS** are available in the following materials:



Expanded perlite



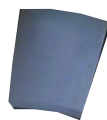
Polyisocyanurate



Polystyrene



Cellular glass



Phenolic foam

OUTSTANDING COST EFFECTIVENESS

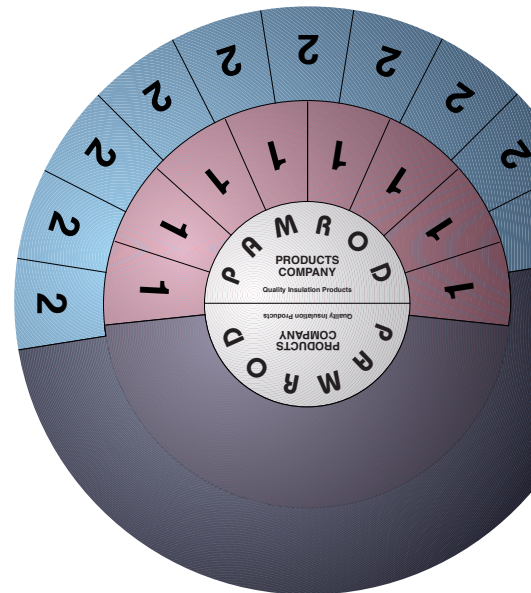
Because Pamrod **HATS** are prefabricated and shipped ready to install, the need for field cutting is virtually eliminated. You not only benefit from a quicker installation but also a precision fit that ensures outstanding cost effectiveness and thermal performance. This superior fit and finish is achieved without additional cost to your project. Pamrod's numbering system simplifies installation without extensive personnel training. The uniform thickness and precise fit of Pamrod **HATS** provide a smooth outer surface of insulation that allows for a quick and neat metal, PVC or mastic finish.

SUPERIOR QUALITY — GUARANTEED!

Mis-cut flat block insulation can cost you — in time, dollars and thermal performance. Each Pamrod **HATS** segment is custom engineered, numbered and individually wrapped and packaged to prevent damage in shipping. Most importantly, **HATS** segments are guaranteed to fit your application.

ON-TIME, WORLDWIDE DELIVERY

Wherever you are, you can count on Pamrod. We ship our **HATS** daily, by land, sea and air to locations throughout the world.



Pamrod HATS were installed while this cryogenic tank was in operation.



Specialty Products
and Insulation



ORDERING IS EASY

ORDERING INFORMATION

PAMROD HATS' MATERIAL AVAILABILITY

- | | | |
|--------------------|----------------|--|
| ▪ Cellular Glass | ASTM C-522 | Pittsburgh Corning
Foamglas® |
| ▪ Polyisocyanurate | ASTM C-591 | Dow Trymer® |
| ▪ Expanded Perlite | ASTM C-610 | Calsilite Sproule® and
Howred Goodtemp™ |
| ▪ Polystyrene | ASTM C-578 | Dow Styrofoam® |
| ▪ Phenolic Foam | ASTM C-1126-94 | Kingspan Koolphen® K |

PAMROD HATS VESSEL HEADS FIT

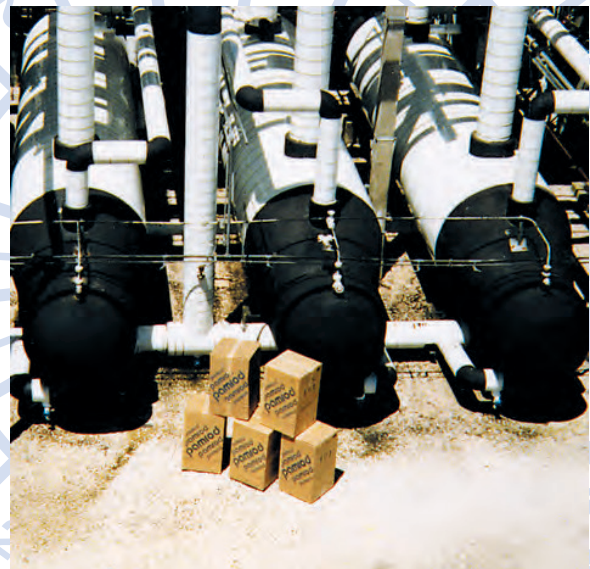
- | | |
|---------------------------|--------------------------|
| ▪ 2:1 Elliptical | ▪ 80'-10" Heads |
| ▪ ASME Flanged and Dished | ▪ Conical or Toriconical |
| ▪ Hemispherical | ▪ Single Radius |

ORDERING REQUIREMENTS

When you request a quote or order **HATS**, please supply the following information:

- Vessel O.D. (or I.D. and the wall thickness).
- Type of vessel head.
- Insulation thickness and number of layers needed.
- Identification of any center nozzles which are 16" IPS or larger.
- Identification of any bottom skirted heads.

Or, send us your equipment drawings, and we can identify the elements for you.



Curves? No hassle. Each ethylene tank had Pamrod HATS custom cut to fit.

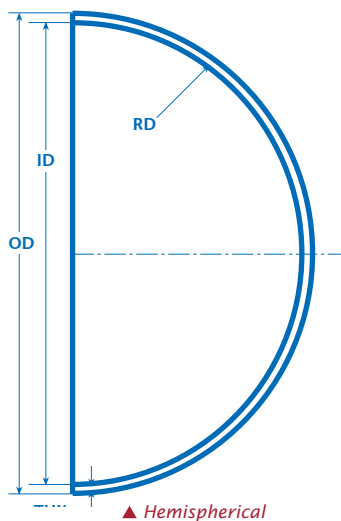


**Specialty Products
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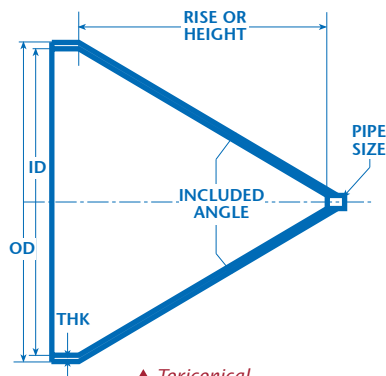


These buried hot and chilled water tanks were insulated with Pamrod HATS for trouble-free performance.

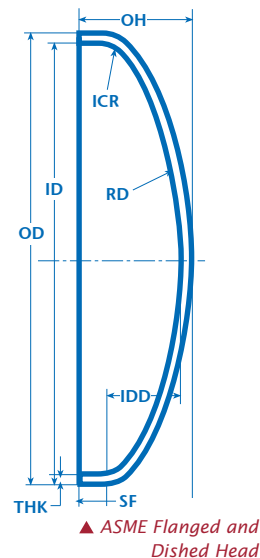


▲ Hemispherical

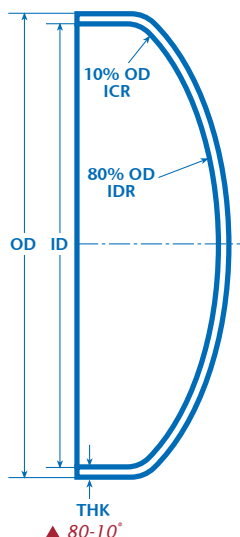
STANDARD VESSEL HEADS



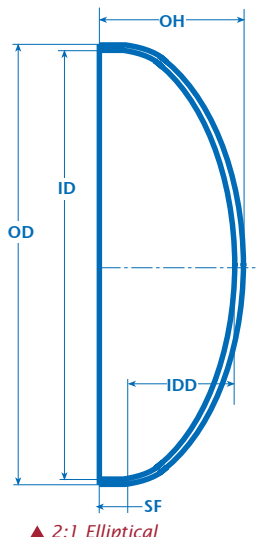
▲ Toriconical



▲ ASME Flanged and Dished Head



▲ 80-10°



▲ 2:1 Elliptical

GLOSSARY

- DR Dish radius, also referred to as the crown radius
- ID Inside diameter of head, or insulation
- IDR Inside dome radius
- IDD Inside depth of head dish
- ICR Inside corner radius, also known as the Knuckle Radius (KR) of a vessel head. For ASME code heads, the ICR is a minimum of 6% of the head diameter.
- OH Overall height of head
- OD Outside diameter of head or insulation
- RD Radius
- SF Straight flange, the extension beyond the head tangent to weld the head to the shell.
- THK Thickness

Typical HATS® Installation Steps



1. Install the two center half sections (with the Pamrod logo) in the center of the head using specified adhesives or mechanical supports. Your HATS may have been designed to fit around the center nozzle if it is 16" IPS or larger. Each course is numbered for ease of installation starting at 1, 2, 3 to the last course.

Note: Multi-layered systems are identified accordingly



2. Install one of each different numbered segment in sequence starting at the bottom of the center section and continuing in a straight line towards the "six o'clock" position. This "row" will confirm the proper location of the center and verify the fit of the HATS on the head. The row should end at the tangent of the head and the straight flange, short of the weld line.



3. Proceed in this fashion by adding additional "rows" of each numbered block on each side of the first row in a clockwise and counterclockwise fashion. Continue insulating the head to finish at the "twelve o'clock" position.

The HAT® installation is complete in a fraction of the time required to field cut and fit block insulation. The precision machined segments optimize system thermal performance and finishes great with our prefabricated metal jacket.