Components Should Be Easy

COMPONENT PRODUCTS BUYER'S GUIDE

MUELLER

Mueller® Has Your Solution

- Clear Communication
- Shipped to Your Door
- Creating Quality for Life
- Competitive Lead Times

Check out our easy online ordering platform to keep your project organized and your parts in stock.

shop.paulmueller.com

Components Guides and Tools. Scan here.

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Guide to Buying Tank Heads

DISHED AND CONICAL HEADS

Quote Checklist

Please provide the following information to expedite your tank head quotation. Thank you

- ☐ Quantity
- ☐ Head Style
- ☐ Material Type
- ☐ Minimum Thickness
- ☐ Material Thickness
- ☐ Radius
- ☐ X-Ray
- ☐ Preferred Bevel
- ☐ Diameter
- ☐ ASME Code

Guide to Buying
Tank Cylinders

CYLINDERS AND SHELLS

Quote Checklist

Please provide the following information to expedite your tank head quotation. Thank you.

- ☐ Quantity
- ☐ Height
- ☐ Material Type
- ☐ Minimum Thickness
- ☐ Material Thickness
- ☐ X-Ray
- ☐ Bevel
- ☐ Diameter
- ☐ Width
- ☐ ASME Code
- ☐ Material Finish

Guide to Buying Manways

MANWAYS

1. Visit shop.paulmueller.com for all your manway needs.
2. Determine pressure, temperature, ASME/ non-code, and size requirements.
3. Call your Mueller Sales Representative with your questions at 1-800-545-5224.
4. Enjoy lifetime support from our responsive team.

ROUND

- Suitable for horizontal or vertical applications
- Available in various sizes
- Pressure-rated (ASME Code or PED compliant) and atmospheric options
- Accessories available: Spring assists, lift assists, sanitary fittings

OVAL

- Ideal for horizontal applications
- In-swing/out-swing door design for easy access
- Pressure- and vacuum-rated (ASME Code or PED compliant) and atmospheric options

RECTANGULAR

- Ideal for bottom tank access
- Unique shape allows quicker, more economical cleaning
- Multiple gasket material options for specific needs

Guide to Buying
Heat Transfer Surface

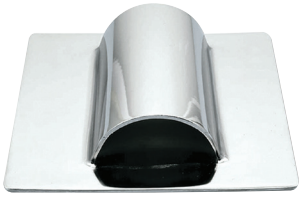
HEAT TRANSFER SURFACE

Ordering Information

1. Review the Mueller Component Products heat transfer options.
2. Work with your Mueller Sales Representative to determine the specifications.
3. Add to your Mueller Component Products order.
4. Call your Mueller Sales Representative with questions at 1-800-545-5224.

TEMP-PLATE®

- Economical heat transfer surface for tank walls and heads
- Available in single- and double-embossed designs
- Provides precise, consistent control with minimal pressure drop
- Spot-welded and inflated channels create fluid turbulence for high heat transfer efficiency



HALF-PIPE COIL

- Handles large volumes of flow and high-pressure applications
- Available for heads, shells, and cones
- Offered as fully welded, “fit-and-tacked” assembly, or loose coils

DIMPLED

- Ideal for applications with temperature and high-pressure extremes
- Custom sizes, shapes, and materials to fit any vessel design
- Compatible with various refrigerants or heating media

Component Products
Capabilities

TESTS AND CERTIFICATIONS

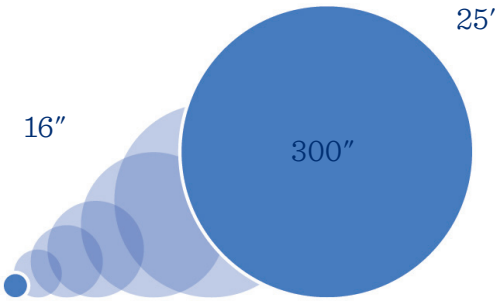
Paul Mueller Company supports your commitment to quality with rigorous in-house testing programs for on-time product delivery.

- ASME inspectors are on-site, and Mueller can comply with additional codes such as PED, 3-A, Chinese code, and API 650.
- On-site radiography team with a full lead-lined vault allows radiography without field mobilization.
- Welding engineering and grinding specialists can accommodate unusual materials for welding or grinding.
- Additional quality testing includes dye penetrant, Positive Material Identification (PMI), and ultrasonic material thickness testing.

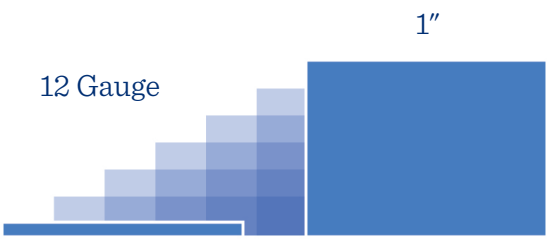
Materials

- Type 304/304L
- Type 316/316L
- Type 317L
- Custom nickel alloys
- Monel®
- Inconel®
- Hastelloy®
- 254 SMO®
- Carbon steel
- Alloy 20
- Copper
- Aluminum
- AL-6XN®
- 904L
- Duplex
- And others

Head Sizes



Material Thickness



Material Finishes

The following finishes are available. Some applications may require a specific finish. For help determining final finish, contact your Mueller Sales Representative.

HOT ROLLED (HR)

Rough and dull appearance on surface. Most of the scale is removed by pickling. This applies to all steel plate thicknesses .1875″ and above.

2B MILL FINISH

A smooth, bright, moderately reflective finish suitable for "as-is" specifications or a preliminary finish for further polishing.

#3 FINISH

Polished surface achieved by finishing with the equivalent of an 80-grit abrasive. This finish has a pronounced grit line. 75 Ra average.

#4 FINISH

Bright finish with visible grain for use where sanitary surfaces are required. 35 Ra target. Request 32 Ra maximum finish to comply with 3-A standards.

#6 FINISH

Polished surface achieved by finishing with the equivalent of a 240-grit abrasive. Higher reflectivity and finer grit lines. Improved product release and cleanability. 25 Ra target.

#7 FINISH

Highly reflective surface achieved by finishing with the equivalent of a 320-grit abrasive. Minimal grit lines. Used when product contact surfaces are critical. 15 Ra target.

GARNET-BEAD BLAST

Follows sandblasting to create a satin, gray appearance that resembles a 2B finish.

RADIAL SPIN POLISH

Spin polishing finishes of preformed, inside, outside, knuckle, and straight flange surfaces in a circular pattern. Results in an appealing sanitary finish.

CIRCUMFERENTIAL SPIN POLISH

Similar to radial spin polish, further reduces visibility of circular pattern. Results in superior aesthetic finish for high visibility tank heads.

Weld Finishes

The following weld finishes are available. Certain forming processes require specific finishes. Choose weld finishes with your Mueller Sales Representative during the custom quote step.

AS-IS

Quality welds are to remain as deposited with no grinding.

BUFF

Minimal removal of weld material. Welds are not ground flush and may contain crevices, ripples, and irregularities in the remaining weld material.

#2 WELD FINISH

The weld finish will not be ground flush. Defined by coarse grit lines which may run in any direction. Weld edge may not be completely removed.

#3 WELD FINISH

Welds are ground flush and weld discoloration is removed. Scattered nicks and scratches are acceptable. Ideal where a uniform surface is required.

#4 WELD FINISH

Normally used with #4 material finish when sanitary product contact surfaces are required. 35 Ra target. Request 32 Ra maximum to comply with 3-A standards.

#6 WELD FINISH

Characterized by finer grit lines and higher reflectivity than #4 finish. Improved product release, as well as cleanability. 25 Ra target.

#7 WELD FINISH

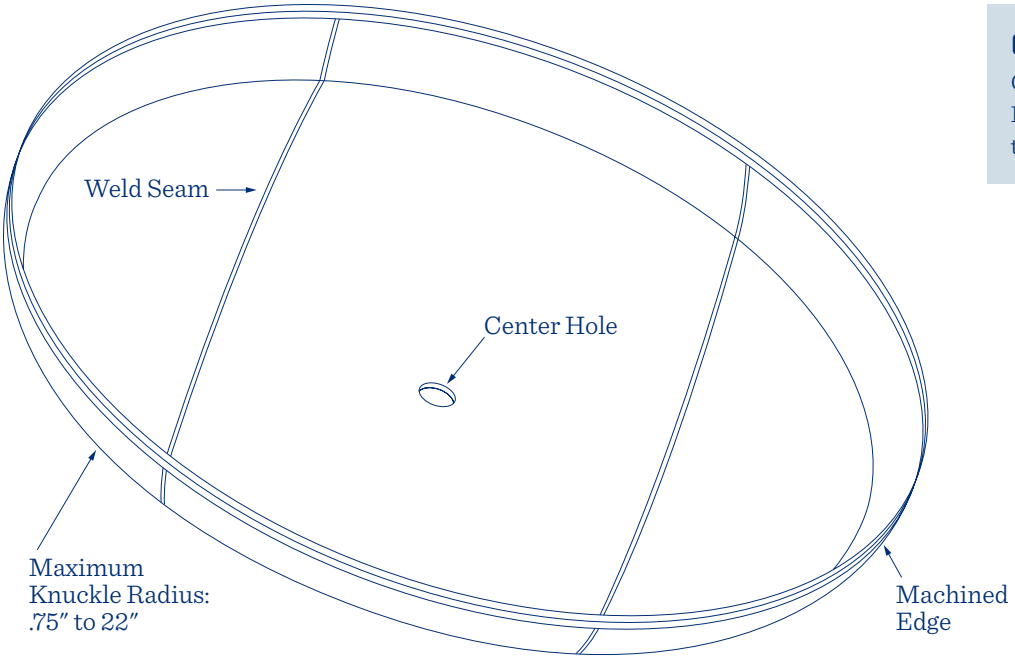
A highly reflective and sanitary surface with minimal grit lines. Provides excellent product release, as well as cleanability. 15 Ra target.

GARNET-BEAD BLAST

Follows sandblasting to create a satin, gray appearance that resembles a 2B finish.

Anatomy of a Tank Head

DISHED AND FLANGED TANK HEADS

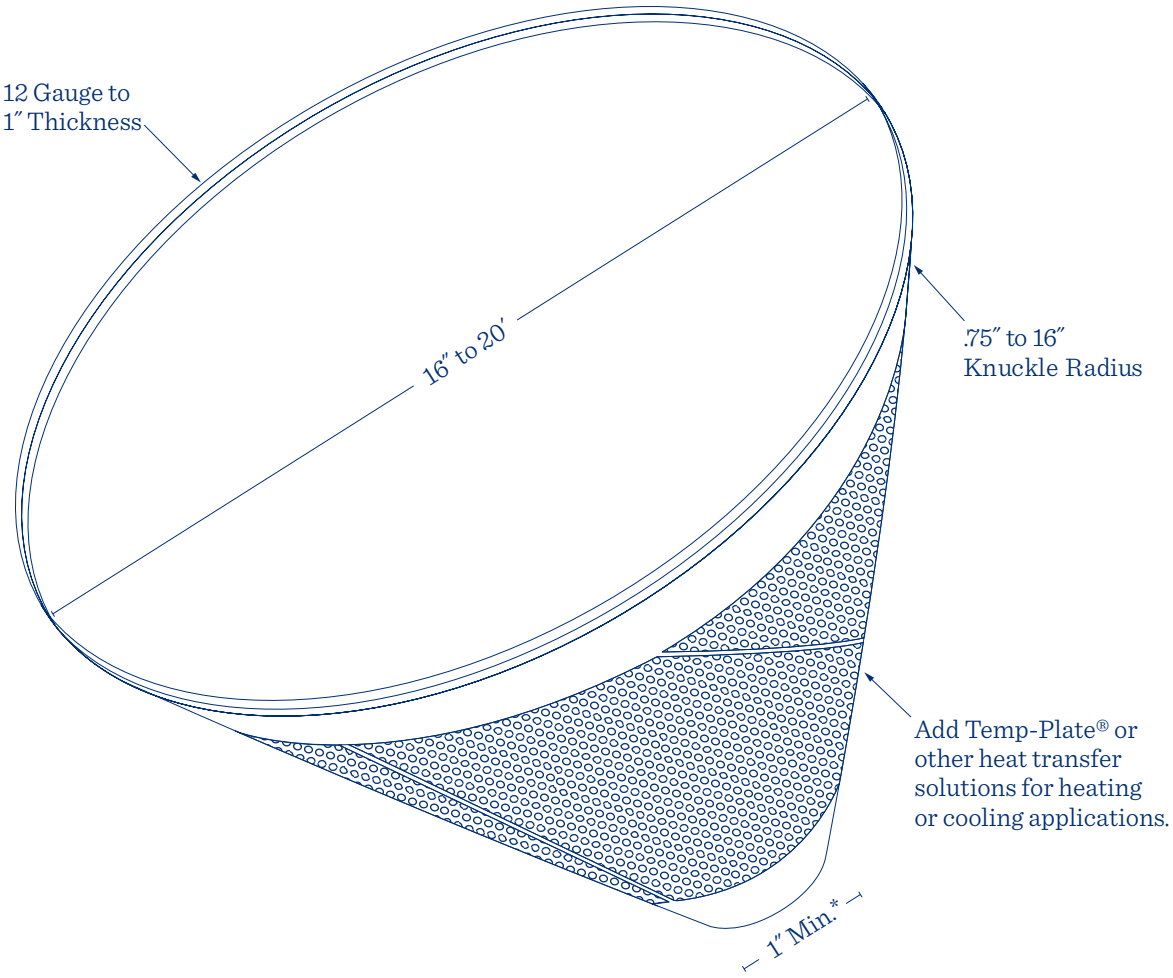


CENTER HOLE:
Center holes are standard; however, Paul Mueller Company also provides tank heads without center holes.

TYPICAL HEAD TYPES	DISH RADIUS	KNUCKLE RADIUS	DIAMETER	THICKNESS
Shallow Flanged and Dished	Equal to 150% of the outside diameter	2″	16″ – 300″	12 gauge – 1″
Standard Flanged and Dished	Equal to 100% of the outside diameter	2″	16″ – 300″	12 gauge – 1″
ASME Flanged and Dished	Equal to 100% of the outside diameter	Minimum of 6% outside diameter.	16″ – 300″	12 gauge – 1″
80/10 Flanged and Dished	80% of the outside diameter	10% of the outside diameter	20″ – 220″	.375″ – 1″
2:1 Elliptical Flanged and Dished	Approximately 90% of the outside diameter.	Approximately 17% of the outside diameter	20″ – 144″	.375″ – 1″
Custom Flanged and Dished	Tank heads are fully customizable to meet your specific applications. Contact your Paul Mueller Company Sales Representative for additional configurations.			

Anatomy of a
Tank Head

CONICAL TANK HEADS

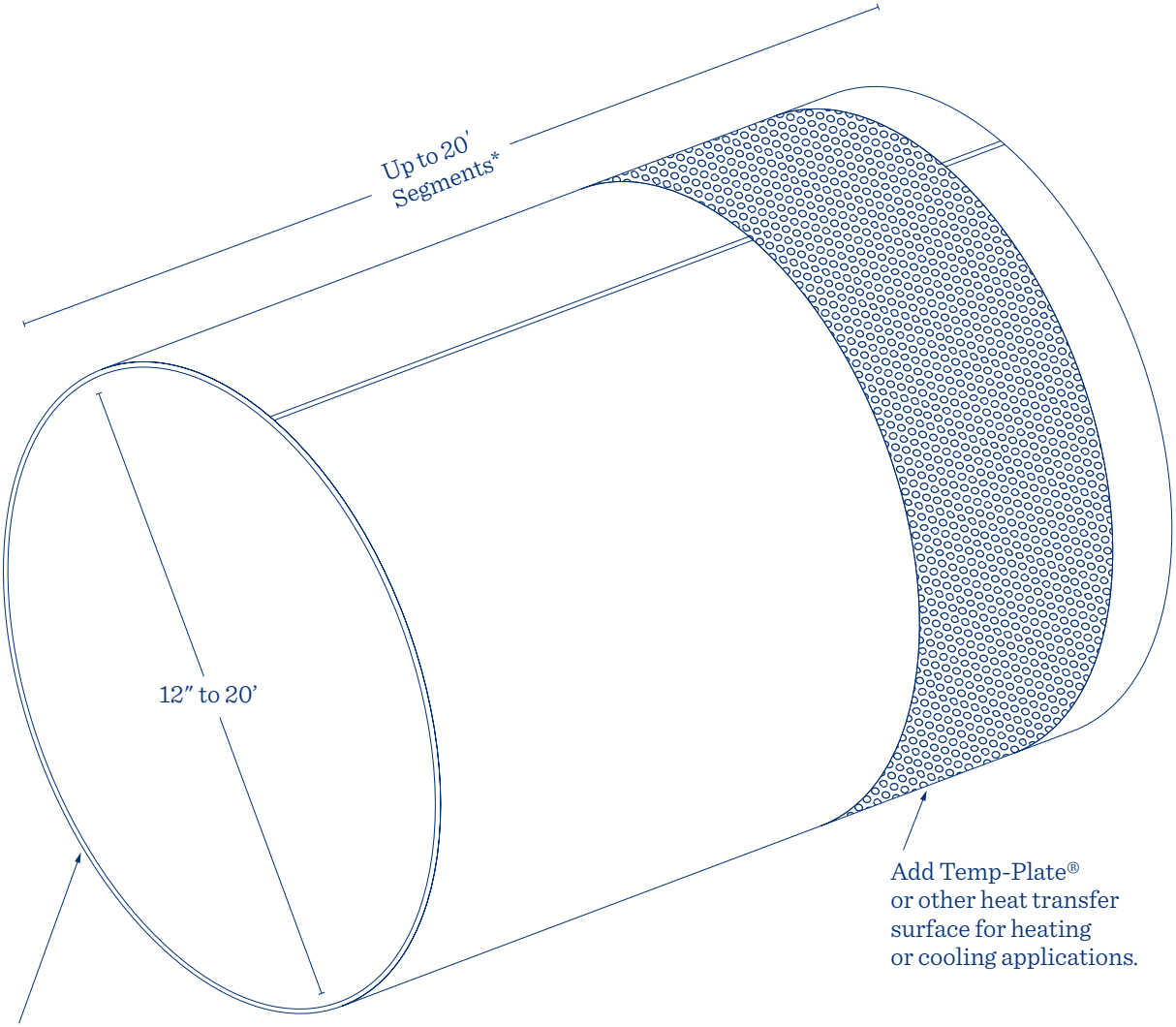


**Depending on thickness and geometry. Call a Mueller Sales Representative for specific details.*

Anatomy of a Cylinder

TANK CYLINDERS

Paul Mueller Company's extensive manufacturing capabilities allow us to build cylinders to almost any specification. Whether you need a cylinder that is too big or too thick for your rolls or are simply having trouble meeting demand and need a little relief, we are here to provide a solution. Our in-house transportation team makes shipping cost-effective. Through expert utilization of jelly-rolling, cradling, and bracing techniques, we can optimize shipping expenses to get your products delivered on time and on budget.



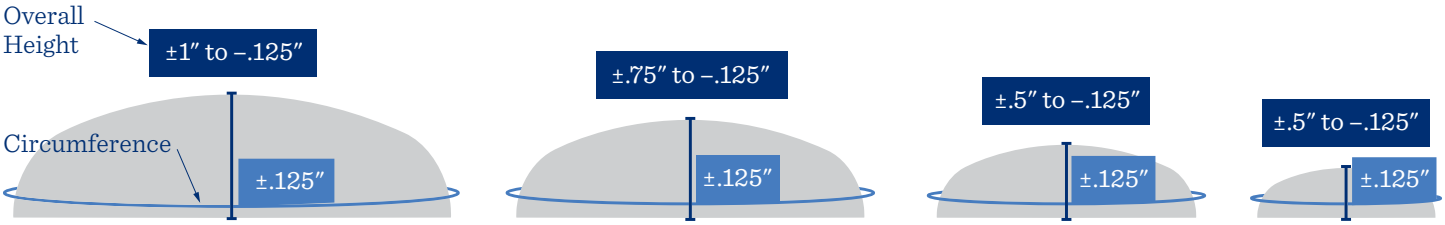
**Multiple segments can be circumferentially welded together to meet your custom shell requirements.*

Tolerances and Allowances

Circumference and Overall Height

The following tolerances apply to all typical flanged and dished heads. See page 13 for typical head types.

OVERALL HEIGHT (OAH):
The height of the head at its center, including the knuckle radius, thickness of material, and the straight flange.



145" AND ABOVE
Head Diameter

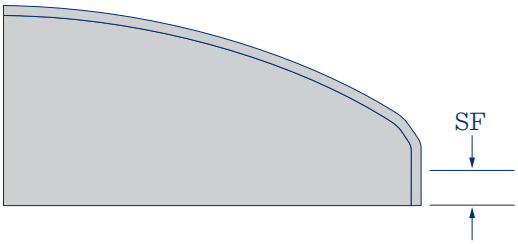
144" THRU 97"
Head Diameter

96" THRU 36"
Head Diameter

35" AND LESS
Head Diameter

Straight Flange

Both straight flange and overall height cannot be held simultaneously. Heads will be trimmed to comply with overall depth tolerances, as long as minimum straight flange is held as follows:



Standard Straight Flange: One inch for heads less than 48″ in diameter and 1.5″ for heads greater than or equal to 48″ in diameter.

STRAIGHT FLANGE (SF):
Flanges up to 3″ can be supplied on some heads, providing material thickness is suitable.

Edge Machining Types*

SQUARE EDGE

SINGLE BEVEL ID/OD

SINGLE BEVEL WITH LAND ZONE ID/OD

DOUBLE BEVEL

DOUBLE BEVEL WITH LAND ZONE

SINGLE BEVEL WITH LAND ZONE AND 3:1 TAPER ID/OD

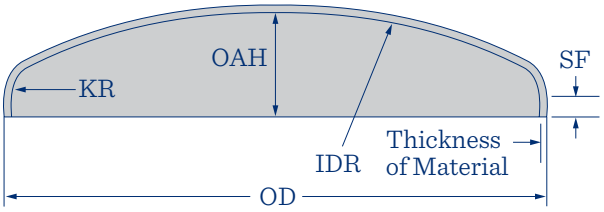
DOUBLE BEVEL WITH LAND ZONE AND 3:1 TAPER

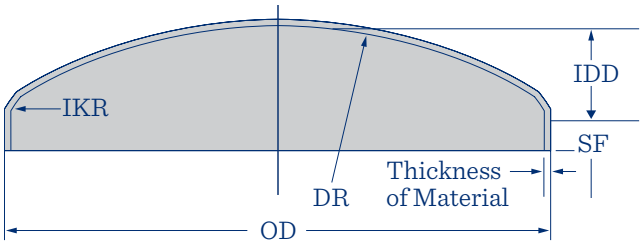
**Call for custom edge machining types.*

Tolerances and Allowances

Forming Allowances

Minimum thickness of material after forming, not including polishing, for typical flanged and dished heads:





ASME FLANGED AND DISHED FORMING ALLOWANCES
Diameter: 16″ to 300″
.5″ Thick or Less: .03125″
Greater Than .5″ Thick: 15% of the minimum thickness

80:10 FLANGED AND DISHED FORMING ALLOWANCES
Diameter: 20″ to 220″
.5″ Thick or Less: .0625″
Greater Than .5″ Thick: 15% of the minimum thickness

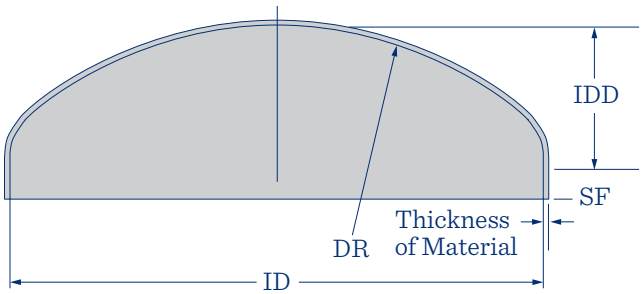
KNUCKLE RADIUS (KR):

The radius formed during the flanging process. ASME flanged and dished heads must have a KR greater than or equal to 6% of the head's OD.

INSIDE DISH RADIUS (IDR):

The radius formed during the dishing process. ASME flanged and dished heads must have a IDR less than or equal to 100% of the head's OD.

For custom flanged and dished, toriconical, or other designs with special order geometry, contact your Mueller Sales Representative for minimum thickness after forming.



2:1 ELLIPTICAL FLANGED AND DISHED FORMING ALLOWANCES
Diameter: 20″ to 144″
.5″ Thick or Less: .0625″
Greater Than .5″ Thick: 15% of the minimum thickness

Grinding Allowances

Due to the custom nature of fabricating components, we recommend contacting your Mueller Sales Representative to review your specifications and assess an agreed upon final nominal thickness with your quote.

Tolerances and Allowances

Reverse Dish Tolerances

Typical dished and flanged heads shall have a tolerance for maximum reversed condition as follows:

.25″
145" AND ABOVE
Head Diameter

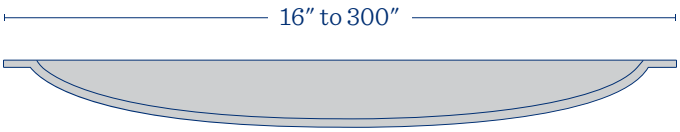
.1875″
144" THRU 101"
Head Diameter

.125″
100" THRU 0"
Head Diameter

REVERSE DISH;
The amount of deviation towards the center of the head where the dish radius meets the knuckle radius.

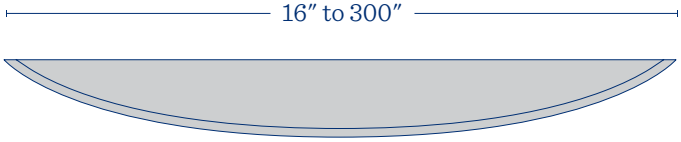
FLARED AND DISHED HEADS
Outside Diameter: –0″ to +.5″
Inside Diameter: ±.25″*
Out-of-Round: Not to exceed 1% of OD

**Inside diameter tolerance is for reference only.*



DISHED-ONLY HEADS
Outside Diameter: –0″ to +.5″
Inside Diameter: ±.25″*
Out-of-Round: Not to exceed 1% of OD

**Inside diameter tolerance is for reference only.*



Flanged-Only Head Flatness Tolerance*

Flanged-only heads shall have a ±.125″ circumference tolerance. Some warping of the flat portion may be expected depending on diameter, material thickness, and knuckle radius.

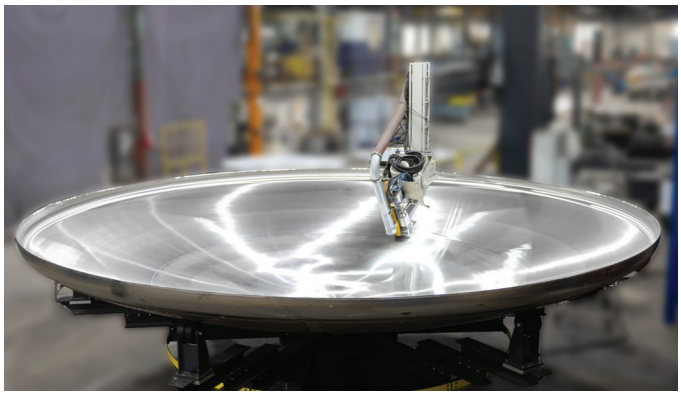
±.5″
120" THRU 96"
Head Diameter

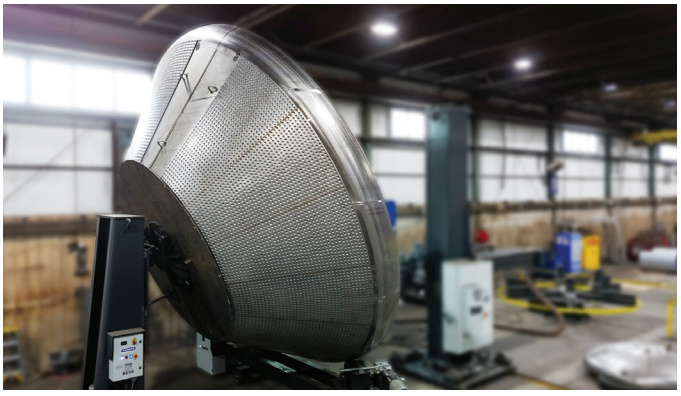
±.25″
95" THRU 61"
Head Diameter

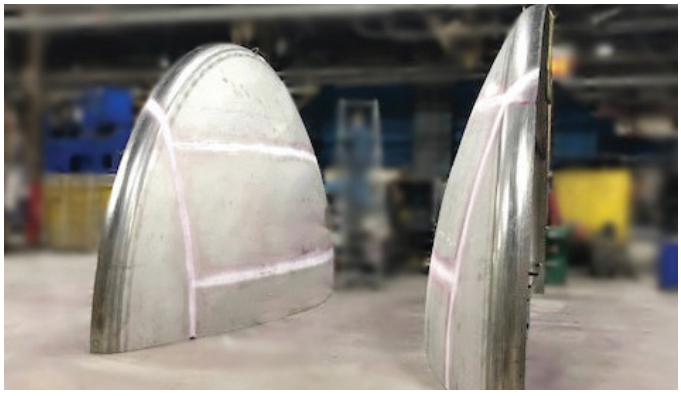
±.1875″
60" THRU 0"
Head Diameter

**Flanged-only head flatness tolerances do not apply to heads with weld seams.*

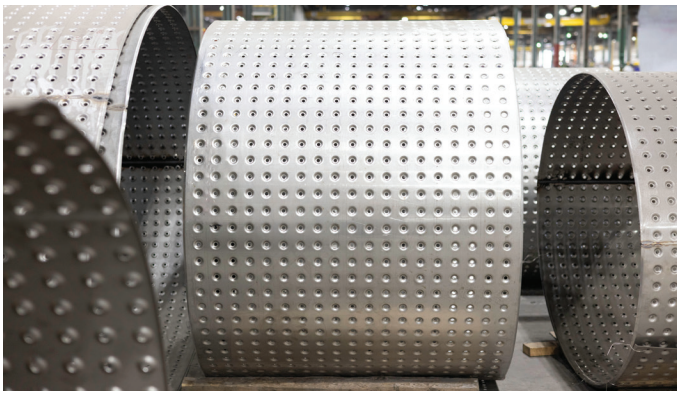
Component Products

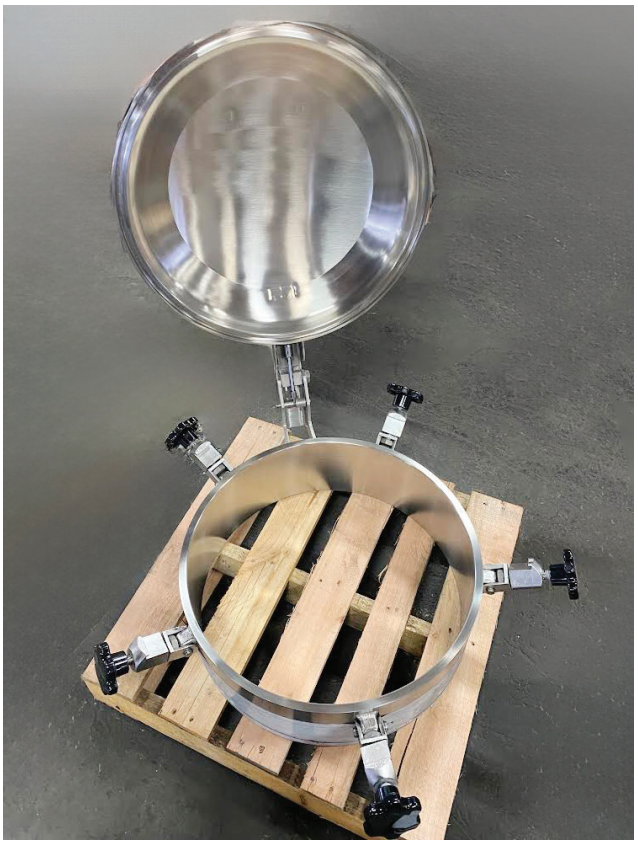






Component Products (cont.)





Notes

PAUL MUELLER COMPANY

Who We Are

At Paul Mueller Company, we are united by a belief that the only quality that matters is quality that works for life. With every piece of processing equipment we build, our goal is to have lasting impact. This collective vision has led us from a small sheet metal shop to a global supplier of heating, cooling, processing, and storage solutions. Our equipment allows farmers, brewers, and engineers to keep their products fresh and their inventory strong. Whether our equipment preserves milk in rural areas or helps manufacture medicine with broad health benefits, we are making an impact across the globe.

Creating Quality for *Life*

Our Products and Services

Skids and Integrated Systems
- Small Scale to Custom Automated Systems
- Modular Process Systems
- Water-for-Injection Distribution Skids

Custom Tanks and Vessels
- Mixing, Storage, and Process
- Design and Fabrication
- Routine to Extreme Specialty Process

Refrigeration Solutions
- Falling Film Chillers
- Batch Chillers
- Packaged Chillers
- Air-Cooled Condensing Units
- Heat Recovery
- Controls

Clean Utilities
- Pure Steam Generators
- Multiple-Effect Stills
- Water-for-Injection Distribution Systems

Heat Transfer Solutions
- Heat Transfer Surfaces
- Preformed Heat Transfer Panels
- Plate Heat Exchangers
- Replacement Parts
- Service and Repair

Component Products
- Tank Heads
- Tank Shells
- Manways
- Agitators

Cleaning Systems
- Clean-in-Place (CIP) Systems
- Chemical Dosing Systems

Specialty Hauling with Mueller Transportation, Inc.
- Door-to-Door Specialty Handling
- Oversized Hauling Capabilities

Industries We Serve

- Animal Health
- Battery Production and Recycling
- Beverage
- Brewing
- Chemical
- Dairy Farm
- Dairy Processing
- Food
- Heat Transfer
- HVAC
- Mining
- Oil and Gas
- Personal Care
- Pharmaceutical
- Refrigeration
- Tank Fabrication
- Wine
- And More

Facilities and Resources

- Domestic Facilities With Nearly One Million Square Feet Under Roof
- Comprehensive Test Facilities for Factory Acceptance Testing
- Expert Fabricators and Manufacturing Staff
- Onsite, Experienced Engineering Department

Project Support Services

- Comprehensive, Customizable Documentation Packages
- IQ/OQ Protocols and Execution
- Seamless Shipping with Mueller Transportation, Inc.
- Expanded Scope Facility Construction and Expansion
- Installation Supervision and Site Acceptance Testing

Quality and Process Certification

- ASME (American Society of Mechanical Engineers)
- ASME BPE (American Society of Mechanical Engineers Bioprocessing Equipment Standard)
- API (American Petroleum Institute)
- UL (Underwriters Laboratories)
- CSA (Canadian Standards Association)
- PED CE (Pressure Equipment Directive Certification)
- UKCA (United Kingdom Conformity Assessed)
- CRN (Canadian Registration Number)
- TSSA (Technical Standards and Safety)

Component Products: components@paulmueller.com | 1-800-545-5224

PAULMUELLER.COM | 1-800-MUELLER