



IMPERIAL
INDUSTRIES
INCORPORATED

BULK STORAGE
SOLUTIONS



Wausau, WI • 800-558-2945 • www.imperialind.com



About Imperial Industries

Backed by over three decades of experience, with installations around the world, Imperial helps companies not only meet their bulk storage needs, but also optimize their material processing and manufacturing operations through tank design and accessory equipment.

The company's reputation reflects its commitment to providing its customers an unequalled combination of quality and value through proprietary tank design and construction capabilities, customization flexibility and service.

Design and Engineering

Specializing exclusively in tank design, Imperial engineers use proprietary tank design software to transform your application requirements into custom storage solutions supported by detailed drawings, materials lists, production schedules and cost estimates. The program incorporates data developed from hundreds of installations; plus factors such as wind load, soil and seismic conditions; as well as current local, national, and international building codes. Underlying our engineers' expertise are close working relationships and ongoing communication with our customers.



Fabrication

Pride of workmanship is evident in every Imperial tank. From thorough inspection of incoming materials, to computerized metal cutting and shaping technologies, to ongoing training and certification of our workforce, Imperial tanks are built better. Every Imperial welder is qualified to ASME Section IX standards and their work is overseen by AWS certified inspectors.

The **CUSTOMERS' CHOICE** for bulk storage tank solutions

Construction Capabilities

Imperial welded tanks, blenders and bins are available in a broad selection of materials, designs, sizes and features to meet the most demanding specifications:

Materials - Depending on specific application needs, Imperial constructs tanks from carbon steel, stainless steel, aluminum or any of several specialty alloys.

One-piece welded construction provides superior strength, integrity, and performance and as well as easy on-site installation.

Sizes up to 16' in diameter (holding 10,000 cubic feet or 75,000 gallons maximum) are factory complete and delivered as a single unit. Larger tanks available as components for field assembly.

Silo support options - choice of skirt, structural leg or lug supports. Modification for load cell mounting also available for all designs.

Linings and coatings - Our Polane® Urethane is factory applied in a controlled environment and meets all industry and federal standards (see following page for more information). Imperial also applies special applications to meet customer preferred paint specifications.

Operational designs to accommodate mass flowing, free-flowing and blended material operations.

Hopper designs for center draw, chisel bottom and transitional-multiple outlets.

Liquid storage available in both vertical and saddle supported horizontal tanks.

Customization capabilities - Imperial maintains a full complement of standard designs, all of which can be customized for specific applications.





The “Polane® Urethane” Protection Process

The “Polane® Urethane” Protection Process was developed as a result of customers demanding a finish and coating process that would be durable, corrosion resistant, display superior fade resistance and have a high gloss finish. With the assistance of the Sherwin Williams Technical Team, we were the pioneers in our Industry of the “Polane® Urethane” Protection Process. We have remained committed to the process through the years as others have only tried to duplicate.

Surface Preparation

With any paint or coating process it all starts with the surface preparation. At Imperial, we took that one step further and actually took a close look at our design of welded storage tanks to assure as clean a surface as possible to obtain the best results in preparation.

- Welded seams interior and exterior
- Smooth surface
- Avoid sharp angles of welded accessories

Preparation of welded storage tanks is a vital step in the protective coating process. Imperial provides a fully enclosed, climate/environmentally controlled blast building. Within this building, the first step of the “Polane® Urethane” Protection Process begins.

- Steel surfaces are grit blasted using 200 H.P. of compressed air at over 1000 PSI.
- During this process, mill scale and contaminants are removed and an anchor plate of 2.5 mils is established.
- The tank is thoroughly cleaned to remove residual contamination.
- An inspection hold point is created to examine every square foot of the tank for any imperfections.

The tank is then moved into an enclosed paint room capable of handling tanks as long as 95 feet in a no move process. The temperature and humidity in the paint

room are controlled to create the ideal coating environment. It is vital at this point in the process that the tank is properly coated within the critical window of time after blasting.

First level interior package

- 4–6 mils of Sherwin Williams FDA approved high solids epoxy primer B62W201/B60V20.
- Our standard interior coating is FDA approved, which is not always the case with our competition.

First level exterior paint package

- 2.2 mils of Sherwin Williams #61 V.O.C. catalyzed epoxy primer.
- A final coat of Sherwin Williams Polane® H.S. Plus Polyurethane Enamel F63 is applied.
- Our standard coverage exceeds the quality of standard coverages being offered by our competition.
- The “Polane® Urethane” Protection Process is offered by Imperial at three optional levels, with all offering the same high quality process to our customers.

Special applications also available

- If the “Polane® Urethane” Protection Process doesn't fit your needs, Imperial also applies special applications to meet customer preferred paint specifications.

Advanced Tank Manufacturing

Imperial was among the first to adapt modern manufacturing processes to the design and fabrication of bulk storage tanks. Today the company's state-of-the-art manufacturing facility, based on an assembly line model rather than the typical job-shop approach, is the most advanced plant of its kind in the industry. The latest technology and equipment provides superior design flexibility, product quality and manufacturing efficiency. As a result, Imperial not only offers competitive pricing but also the industry's fastest turnaround time on made-to-order units.

The **QUALITY** difference

Custom features to fit your applications

Imperial goes the extra mile to customize your tank to fit your application from engineering to turnkey processing systems.

Support Structures - Depending on your application, Imperial offers multiple support structures including extended legs to allow truck and rail car loading, skirted tanks to help protect your equipment from the weather and padded tanks to allow your tank to bolt in place on your structure.

Hopper and cone design - Imperial has the ability to fabricate almost any hopper or cone design to help achieve optimal results for your application.

Gravity blenders - Plastics companies and other processes needing to store and blend granulated free-flowing materials can realize up to a fifty-fold improvement in the blending operation with the proven blending systems available with Imperial silos.

As a licensed manufacturer of leading gravity blender technologies, Imperial fabricates the system as a part of a cone-bottom silo, providing both bulk materials storage and blending in one unit. No moving parts minimizes operating cost.

Turnkey Processing Systems - Complete assembled systems for OEMs. As a value-added service to OEM customers, Imperial can install their tank mounted equipment when the tank is built, handling the mounting, piping and wiring. A completed unit is shipped directly to the installation site, saving OEM customers the time and difficulty of field installation and reducing their labor and shipping costs.

Imperial factory installs customer supplied discharge, mixing, weighing and batching equipment, as well as many other components and accessories.

Ladder, guardrail, stairways and platforms - When it comes to Innovative design and manufacturing, Imperial is a leader in the industry. This statement does not fall short when it comes to OSHA approved ladders, cages and other related assemblies.



IMPERIAL TANKS for almost any industry

With over 30 years of experience and hundreds of custom installations per year, Imperial has a ready understanding of storage requirements and challenges of numerous industries and is the leading bulk storage expert for, but not limited to:

Chemical: Storage and blending of dry bulk solids, storage of liquids.

Food Processing and Milling

- **Milling:** Raw grains, flours and by-products.
- **Cereals:** Whole and processed grains, sugar, additives and by-products.
- **Bakery:** Flour, sugar, spices, salt, oils, additives and other ingredients.

Foundry and basic metals: Raw material storage for metals, ores, chips, by-products; all types of sand, clays, resins and binders.

Mining and Aggregates: Sand, gravel, cement, asphalt, rock, roofing granules and minerals.

Plastics: Storage and blending of pellets, powders, resin and flakes.

Power plants: Storage of dry bulk solids, PAC, lime and storage of liquids.

Pulp and paper: Storage of wood chips, chemicals and waste treatment.

Waste treatment: Storage tanks, complete assembly of systems and vessels for lime, soda ash, carbon and water treatment media vessels for processing sludge.

Experience the **ROYAL** treatment

ASME Coded Vessels

Bulk storage silos and tanks are manufactured in accordance with the requirements of The American Society of Mechanical Engineers.

Imperial has been issued a "U" stamp for fabrication of pressure vessels per ASME Section VIII, Division 1 and an "R" stamp for the repair and alteration of pressure vessels that are constructed per ASME Section VIII, Division 1. This allows Imperial to fabricate tanks and vessels that are capable of holding pressures exceeding 15 PSI up to 3000 PSI internal.

For more information and fabrication capabilities on ASME boiler and pressure vessels, contact a sales professional today at **800-558-2945**.



DOT 407/412 Units

ASME Certified Tanks, per DOT 407/412, to service the Hazardous Waste Industry, are now designed, engineered and manufactured by Imperial. The VAC3000 Series is available in stock sizes of 3200 and 3600 gallon capacities and also available in custom capacities.

Quality Assurance

Quality assurance at Imperial is comprehensive. Product testing procedures usually considered extraordinary among other tank builders are standard operating procedure here. Starting with raw materials and through every stage of construction, each Imperial tank is inspected and reinspected. Completed tanks routinely undergo pressure testing, spot radiography, and liquid penetrant testing.

Imperial's state of the art tank manufacturing facility is always open to our customers and their inspectors to witness firsthand the pride in our product and your storage tank!

Support Services

From engineering to field support, Imperial is committed to putting our capabilities and experience to work for our customers. Imperial engineers are ready to assist with tank design at any stage of development, whether it is working from a description of your storage needs and a sketch on a napkin or responding to detail specifications developed by your system or project engineer. You can count on Imperial's customer service to help with your tank order and installation every step of the way, including assistance with site assembly and supervision for field installations.





Tank Transportation

Imperial provides safe and timely delivery of tanks through the use of experienced drivers and optional self-unloading trailers that are designed specifically for transporting tanks. When using our contracted transportation services, you will also be provided with personal pre-delivery scheduling to the job site. Imperial will also ship via other carriers specified by its customers. In either case, tanks are carefully prepared for transportation.



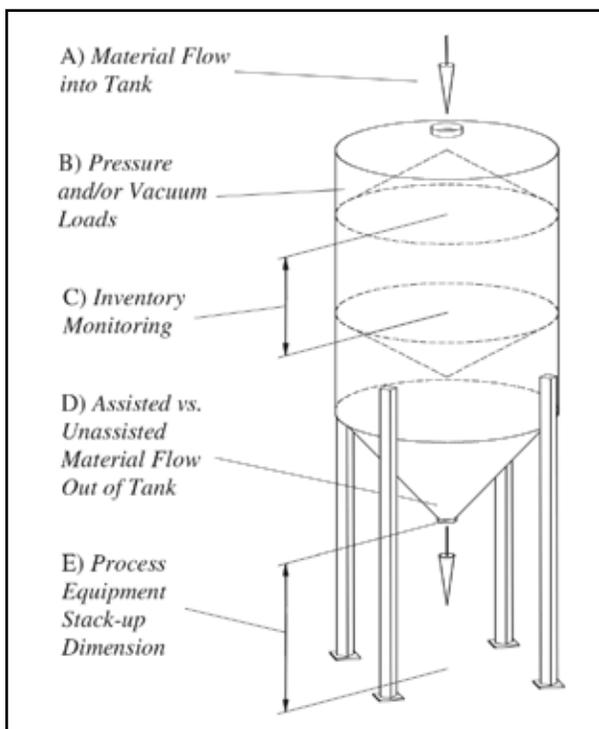
Building Codes

Proper tank design incorporates IBC building code for wind speed and seismic values to ensure that your storage tank will meet your expectations as well as being structurally sound. Imperial utilizes current building codes, such as IBC and ASCE, during their standard engineering and design processes.

Other building codes can be incorporated into a tank design as required. Consult your local building codes for any additional requirements which may affect the design.

How to obtain a QUOTE

Imperial has a team of sales professionals waiting to help you with your bulk storage solution needs. There are two ways to obtain a quote: one is through our website at www.imperialind.com and the other is to call a sales professional at **800-558-2945**. Below is some information that will help you throughout the quotation process:



How will the material be loaded into the tank? (Fig. 1, item A)

Pneumatic Feed:

Will you be filling the tank by means of a bulk truck, rail car, in-plant process, or some other means?

What type and size fill line will you need?

Mechanical Feed:

Will you be using a Bucket Elevator, Screw Feeder, or Conveyor to load material into the tank?

How big of an opening will you need for your mechanical load system?

Gravity Feed:

Will you be loading the tank with a front end loader or similar type of equipment?

Will you need an open top tank to accommodate loading material into the tank?

What pressure and vacuum loads will the tank be subject to? (Fig. 1, item B)

Closed Systems:

How will the tank vent during operation?

- Bin vent filter
- Ducting to air filtration system
- Open vent to atmosphere

What type of pressure/vacuum valves will be needed?

What type of pressure sealed manways will be needed?

Open Systems:

Will the tank "breathe" adequately?

Will blockages be likely to occur?

Will a pressure relief valve be needed in the event of a blockage?

What type of pressure sealed or bolted manways will be needed?

How will the inventory be monitored? (Fig. 1, item C)

- Plumb bob (mounted on the roof deck)
- Point level (mounted on the cylinder wall)

- Ultrasonic sensor (mounted on the roof deck)
- Load cell (mounted under a weight bearing surface)

Will you be using a leg or pad tank design, or will you be using a skirt tank that would require special attention for load cell support design?

How will the stored material flow from the tank? (Fig. 1, item D)

Assisted Flow:

Will you be using a bin activator mounted to the hopper cone bottom?

Will you be using bin aerators mounted through holes or to welded couplings in the hopper wall?

Will you be using a bin vibrator mounted to a welded bracket on the hopper wall?

Will you be using some other means of assisted flow?

Unassisted Flow:

Will gravity itself allow the material to flow from the silo?

What kind of process equipment will be used for material discharge? (Fig. 1, item E)

- Feeder
- Slide gate
- Rotary airlock
- Diverters

- Conveyors
- Other

What clearance requirements will be needed between the tank outlet and the tank foundation for accommodating your process equipment?

How will the silo be accessed and maintained?

- Ladders
- Platforms
- Guardrails
- Manholes
- Doors
- Other

Will you be using Imperial Industries, Inc. designed OSHA approved ladders, platforms, and guardrails or other design?

Will a roof mounted manway provide sufficient interior access or will shell or hopper manways be required?

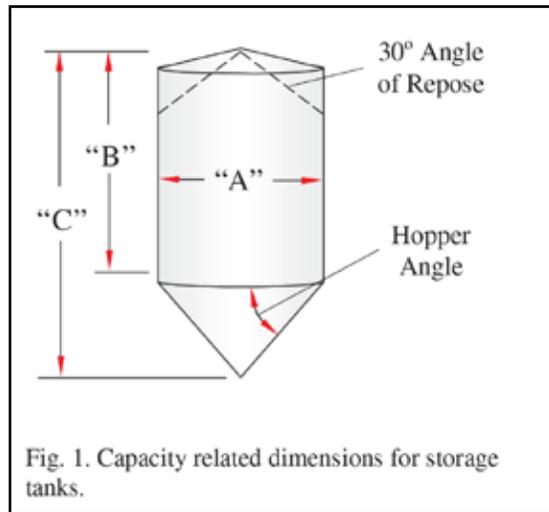
Will equipment such as a bin activator allow for single door access or require double door access in skirted tanks?

What special features will you require to be included in the tank design?



Thank you for your interest in Imperial

Capacity Chart



- Use the following Capacity Chart as a reference guide for common storage tank sizes and capacities. See Fig 1. for dimensions referenced in the chart.
- See the following Material Density Guide to determine densities per cubic foot.

Cylinder		45 Hopper		60 Hopper		70 Hopper	
"A"	"B"	"C"	Capacity	"C"	Capacity	"C"	Capacity
9	54	58.5	3531	61.7	3601	66.3	3698
10	12	17.0	1073	20.6	1169	25.7	1302
10	15	20.0	1309	23.6	1405	28.7	1538
10	18	23.0	1545	26.6	1640	31.7	1773
10	21	26.0	1780	29.6	1876	34.7	2009
10	24	29.0	2016	32.6	2112	37.7	2245
10	27	32.0	2251	35.6	2347	40.7	2480
10	30	35.0	2487	38.6	2583	43.7	2716
10	33	38.0	2723	41.6	2819	46.7	2951
10	36	41.0	2958	44.6	3054	49.7	3187
10	39	44.0	3194	47.6	3290	52.7	3423
10	42	47.0	3430	50.6	3525	55.7	3658
10	45	50.0	3665	53.6	3761	58.7	3894
10	48	53.0	3901	56.6	3997	61.7	4130
10	51	56.0	4136	59.6	4232	64.7	4365
10	54	59.0	4372	62.6	4468	67.7	4601
10	57	62.0	4608	65.6	4703	70.7	4836
10	60	65.0	4843	68.6	4939	73.7	5072
11	12	17.5	1315	21.5	1442	27.1	1619
11	15	20.5	1600	24.5	1727	30.1	1904
11	18	23.5	1885	27.5	2012	33.1	2189
11	21	26.5	2170	30.5	2297	36.1	2474
11	24	29.5	2455	33.5	2583	39.1	2759
11	27	32.5	2740	36.5	2868	42.1	3045
11	30	35.5	3025	39.5	3153	45.1	3330
11	33	38.5	3310	42.5	3438	48.1	3615
11	36	41.5	3595	45.5	3723	51.1	3900
11	39	44.5	3881	48.5	4008	54.1	4185
11	42	47.5	4166	51.5	4293	57.1	4470
11	45	50.5	4451	54.5	4578	60.1	4755
11	48	53.5	4736	57.5	4863	63.1	5040
11	51	56.5	5021	60.5	5148	66.1	5325
11	54	59.5	5306	63.5	5434	69.1	5610
11	57	62.5	5591	66.5	5719	72.1	5896
11	60	65.5	5876	69.5	6004	75.1	6181
12	12	18.0	1583	22.3	1749	28.4	1979
12	15	21.0	1923	25.3	2088	31.4	2318
12	18	24.0	2262	28.3	2428	34.4	2657
12	21	27.0	2601	31.3	2767	37.4	2997
12	24	30.0	2941	34.3	3106	40.4	3336
12	27	33.0	3280	37.3	3445	43.4	3675
12	30	36.0	3619	40.3	3785	46.4	4014
12	33	39.0	3958	43.3	4124	49.4	4354
12	36	42.0	4298	46.3	4463	52.4	4693
12	39	45.0	4637	49.3	4803	55.4	5032
12	42	48.0	4976	52.3	5142	58.4	5372
12	45	51.0	5316	55.3	5481	61.4	5711
12	48	54.0	5655	58.3	5820	64.4	6050
12	51	57.0	5994	61.3	6160	67.4	6389
12	54	60.0	6333	64.3	6499	70.4	6729
12	57	63.0	6673	67.3	6838	73.4	7068
12	60	66.0	7012	70.3	7178	76.4	7407
13	12	18.5	1880	23.2	2091	29.8	2383
13	15	21.5	2279	26.2	2489	32.8	2781
13	18	24.5	2677	29.2	2887	35.8	3179

Cylinder	45 Hopper	60 Hopper	70 Hopper
"A" "B"	"C" Capacity	"C" Capacity	"C" Capacity
8 6	10.0 369	12.9 418	16.9 486
8 9	13.0 519	15.9 568	19.9 637
8 12	16.0 670	18.9 719	22.9 787
8 15	19.0 821	21.9 870	25.9 938
8 18	22.0 972	24.9 1021	28.9 1089
8 21	25.0 1123	27.9 1172	31.9 1240
8 24	28.0 1273	30.9 1322	34.9 1391
8 27	31.0 1424	33.9 1473	37.9 1541
8 30	34.0 1575	36.9 1624	40.9 1692
8 33	37.0 1726	39.9 1775	43.9 1843
8 36	40.0 1877	42.9 1926	46.9 1994
8 39	43.0 2027	45.9 2076	49.9 2144
8 42	46.0 2178	48.9 2227	52.9 2295
8 45	49.0 2329	51.9 2378	55.9 2446
8 48	52.0 2480	54.9 2529	58.99 2597
9 6	10.5 477	13.7 547	18.3 644
9 9	13.5 668	16.7 738	21.3 835
9 12	16.5 859	19.7 929	24.3 1026
9 15	19.5 1050	22.7 1120	27.3 1216
9 18	22.5 1241	25.7 1310	30.3 1407
9 21	25.5 1431	28.7 1501	33.3 1598
9 24	28.5 1622	31.7 1692	36.3 1789
9 27	31.5 1813	34.7 1883	39.3 1980
9 30	34.5 2004	37.7 2074	42.3 2171
9 33	37.5 2195	40.7 2265	45.3 2362
9 36	40.5 2386	43.7 2456	48.3 2552
9 39	43.5 2576	46.7 2646	51.3 2743
9 42	46.5 2767	49.7 2837	54.3 2934
9 45	49.5 2958	52.7 3028	57.3 3125
9 48	52.5 3149	55.7 3219	60.3 3316
9 51	55.5 3340	58.7 3410	63.3 3507

• Note: All dimensions are in feet. All capacities are in cubic feet

Capacity Chart

Cylinder "A" "B"		45 Hopper "C" Capacity		60 Hopper "C" Capacity		70 Hopper "C" Capacity		Cylinder "A" "B"		45 Hopper "C" Capacity		60 Hopper "C" Capacity		70 Hopper "C" Capacity	
13	21	27.5	3075	32.2	3285	38.8	3578	14	21	28.0	3592	33.1	3855	40.2	4220
13	24	30.5	3473	35.2	3684	41.8	3976	14	24	31.0	4054	36.1	4317	43.2	4681
13	27	33.5	3871	38.2	4082	44.8	4374	14	27	34.0	4516	39.1	4778	46.2	5143
13	30	36.5	4270	41.2	4480	47.8	4772	14	30	37.0	4977	42.1	5240	49.2	5605
13	33	39.5	4668	44.2	4878	50.8	5170	14	33	40.0	5439	45.1	5702	52.2	6067
13	36	42.5	5066	47.2	5276	53.8	5569	14	36	43.0	5901	48.1	6164	55.2	6529
13	39	45.5	5464	50.2	5675	56.8	5967	14	39	46.0	6363	51.1	6626	58.2	6990
13	42	48.5	5862	53.2	6073	59.8	6365	14	42	49.0	6825	54.1	7088	61.2	7452
13	45	51.5	6261	56.2	6471	62.8	6763	14	45	52.0	7286	57.1	7549	64.2	7914
13	48	54.5	6659	59.2	6869	65.8	7161	14	48	55.0	7748	60.1	8011	67.2	8376
13	51	57.5	7057	62.2	7267	68.8	7559	14	51	58.0	8210	63.1	8473	70.2	8838
13	54	60.5	7455	65.2	7666	71.8	7958	14	54	61.0	8672	66.1	8935	73.2	9300
13	57	63.5	7853	68.2	8064	74.8	8356	14	57	64.0	9134	69.1	9397	76.2	9761
13	60	66.5	8252	71.2	8462	77.8	8754	14	60	67.0	9595	72.1	9858	79.2	10223
14	12	19.0	2206	24.1	2469	31.2	2834								
14	15	22.0	2668	27.1	2931	34.2	3296								
14	18	25.0	3130	30.1	3393	37.2	3758								

*** Note: All dimensions are in feet. All capacities are in cubic feet.**

Material Density Guide

Material	av. wt. lb./cu. ft.	Material	av. wt. lb./cu. ft.	Material	av. wt. lb./cu. ft.
A - B					
Adipic acid	40	Beans, white	43-48	Coal-bituminous sized	50
Alfalfa meal	14-22	Bentonite	50-60	Coal-dust	35
Alfalfa pellets	41-43	Bicarbonate of soda	40-45	Coal-granules	52
Alfalfa seed	48	Bisphenol	37	Coal-pulverized	38
Almonds-broken or whole	28-30	Bonemeal	50-60	Cocoa beans	30-40
Alum-lumpy	50-60	Bones-crushed 1/2"	35-40	Cocoa-powdered	30-35
Alum-pulverized	45-50	Borax-powdered	50-55	Coconut-shredded	20-22
Alumina	60-120	Boric acid-powdered	55	Coffee-green bean	32-45
Alumina, calcined	63	Bran	10-20	Coffee-ground	25
Aluminum hydrate	13-28	Brass powder	100	Coffee-roasted bean	22-26
Aluminum trihydrate	45	Brewers grain-spent, dry	14-30	Coke petroleum	35-45
Ammonium chloride	52	Brewers grain-spent, wet	50-60	Coke-loose	23-32
Ammonium nitrate	49	Buckwheat bran	15	Coke-breeze 1/4"	25-35
Ammonium nitrate-prilled	45-60	Buckwheat flour	41	Copper sulphate (bluestone)	60-70
Ammonium phosphate	55	Buckwheat hulls	13	Copra	22-33
Ammonium sulphate	45-48	Buckwheat middlings	22	Copra-ground or meal	40-45
Asbestos shred	20-40	Buckwheat-whole	40-42	Cork- 1/2"	5-15
Ashes-dry	35-40	Buttermilk-dried	31	Corn germs	21
Ashes-wet	45-50	C		Corn grits	40-45
Asphalt-crushed	45	Calcium carbide	70-80	Corn meal	32-40
Bagasse	7-10	Calcium carbonate	44	Corn sugar	30-35
Bakelite	30-40	Calcium chloride	60	Corn-cracked	45-50
Baking powder	41	Carbon, activated	20	Corn-shelled	45
Barium carbonate	55	Carbon black pellets	20-25	Cottonseed cake	40-45
Barium oxide	63	Carbon black powder	4-6	Cottonseed hulls	12
Bark wood refuse	10-18	Casein, dried milk	36	Cottonseed meal	35-40
Barley meal	28	Cast iron chips	130-200	Cottonseed meats	40
Barley-fine ground	46	Cement-clinker	75-80	Cottonseed-dry, delinted	22-40
Barley-malted	30	Cement, portland	60-85	Cottonseed-dry, undelinted	18-25
Barley-whole	37-48	Chalk-pulverized	70-75	Cracklings- 3"	40-50
Bauxite-crushed, 3"	75-85	Charcoal	18-25	Cullet, glass	80-120
Beans, castor	36	Cinders-coal	40	D - F	
Beans, navy	48	Clover seed	48	Dairy feed-heavy	20-28
Beans, soya	46	Coal-anthracite sized	60	Dairy feed-light	18-22
		Coal-bituminous 1/2"	50	Diatomaceous earth	16

Note: This table is for reference only. All values are average material densities. Consult your supplier for the exact material density ranges of the specific material you will be storing. ***Consult your supplier**

Material Density Guide

Material	av. wt. lb./cu. ft.	Material	av. wt. lb./cu. ft.	Material	av. wt. lb./cu. ft.
Dicalcium phosphate	40-45	Melamine	45	Saltpeter (potassium nitrate)	80
Distillers grain-spent, dry	20-30	Mica-flake	17-22	Sand	99
Distillers grain-spent, wet	40-60	Mica-ground	13-15	Sand silica-dry	90-100
Dolomite-granular	80-100	Mica-pulverized	13-30	Sand-foundry	90
Ebonite	65-70	Milk-dried flake	5-6	Sawdust-dry	10-30
Egg powder	16	Milk-malted	27-35	Sewage sludge-dry	40-50
Epsom salts	40-50	Milk-powdered	20	Shale-crushed	85-90
Feed-bulk mash	35-40	Milo-grain	56	Silicon carbide	45
Feed-molasses (5 to 8%)	20-25	Muriate of potash	77	Silicon dioxide	3
Feed-pellets & crumbles	36-40	Nylon pellets (1/8")	35	Slag-furnace, granulated	60-65
Feldspar	62	Nylon powder	39	Slate-crushed, 1/2"	80-90
Feldspar-minus 1/8"	65-75	Oat hulls	8	Slate-ground, 1/8"	80-85
Fertilizer (bulk)	70	Oat hulls, ground	11	Soap (detergent type)	*
Fishmeal	30-40	Oat meal	45	Soap chips	15-25
Flax seed	45	Oat middlings	38	Soap flakes	5-20
Flax seed cake (expelled)	48-50	Oats	26	Soap granules	15-35
Flax seed meal	25	Oats-crushed	22	Soap powder	20-25
Flour, wheat	33-40	Oats-flour	35	Soda ash-heavy	55-65
Flourspar	82-110	Oats-ground, fine	30	Soda ash-light	20-35
Flue dust-boiler, dry	35-125	Oats-rolled	19-26	Sodium bicarbonate	70-80
Fly ash	35-45	Oxalic acid crystals	60	Sodium chloride	80
Fullers earth-raw	35-40	Oyster shells-ground	50-60	Sodium hydroxide	60
Fullers earth-spent	60-65	P - R		Sodium nitrate	70-80
G - L		Paper pulp	62	Sodium silicate	32
Gelatin-granulated	32	Peanuts-shelled	35-45	Soybean cake	40-43
Gluten feed	33	Peanuts-unshelled	15-20	Soybean flakes (raw or spent)	18-26
Gluten meal	40	Peas-dried	45-50	Soybean meal-cold	40
Grape pomace	15-20	Perlite	15	Soybean-cracked	30-40
Graphite-flake	40	Petroleum coke	55	Soybean-whole	45-50
Graphite-flour	28	Petroleum coke dust	25	Starch	25-50
Grass seed	10-32	Phosphate rock	75-85	Steel chips or turnings	100-150
Grit	86	Phosphate sand	90-100	Sugar beet-pulp dry	12-15
Gypsum-calcinid 1/2"	55-60	Plastic resin	40	Sugar beet-pulp wet	25-45
Gypsum-crushed 1"	90-100	Polyethylene pellets, 3/16"	30-40	Sugar cane or beet-raw	55-65
Hempseed	35	Polyethylene powder	35	Sugar cane or beet-refined	50-55
Hydrocarbon compound	36	Polypropylene pellets, 1/8"	32	Sulphur-1/2"	50-60
Iron ore	162	Polypropylene powder	33	Sulphur-3"	80-85
Iron oxide dust	*	Polystyrene pellets	30-40	Sulphur-powered	50-60
Kaolin clay	160-170	Polyvinyl chloride (pvc)	35-40	Sunflower seed	38
Lead oxide	30-150	Popcorn-ear	56	T - Z	
Lignite-air dried, 3"	45-55	Popcorn-shelled	45	Tanbark-ground	55
Ligno sulfinat	30	Potash	77	Tankage	41
Lime-ground, 1/8"	60	Pumice-ground, 1/8"	42-45	Timothy seed	36
Lime-hydrated, 1/8"	35-40	Quartz-pulverized/ground	110	Tobacco-craps and stems	15-25
Lime-pebble	56	Rape seed	48	Tri Poly phosphate	60
Lime-pulverized	32-40	Rice grits	42-45	Tri-sodium phosphate	50-60
Limestone dust	55-95	Rice-hulled & polished	45-48	Urea	10-30
Limestone-crushed	85-90	Rice-rough or paddy	36	Vermiculite-expanded	16
Limestone, agricultural, 1/8"	68	Rubber-ground, 1/8"	20-50	Vermiculite-ore	80
M - O		Rye bran	15-20	Wheat	45-48
Magnesium chloride	12	Rye meal	40	Wheat bran	11-15
Magnesium hydroxide	39	Rye middlings	42	Wheat flour, loose	31
Magnesium oxide	65	Rye-whole	44	Wheat germ	18-28
Malt-dry, ground, 1/8"	22-40	S		Wheat middlings, standard	20
Malt-dry, whole	27-30	Safflower	45	Wheat screenings	17-25
Malt-wet or green	60-65	Safflower cake	50	Wheat-cracked	40-45
Manganese sulphate	70	Safflower meal	50	Wheat-ground, fine	38
Marl	80	Salt cake-dry, pulverized	65-85	Wood chips	10-30
Meat scraps-ground	41	Salt cake, dry and coarse	85	Wood flour	16-36
Meat-ground	50-55	Salt-dry, coarse, 1/4"	45-50	Wood shavings	15
Meat-meal	37-40	Salt-dry, fine	70-80	Zinc carbonate	35

Note: This table is for reference only. All values are average material densities. Consult your supplier for the exact material density ranges of the specific material you will be storing. ***Consult your supplier**



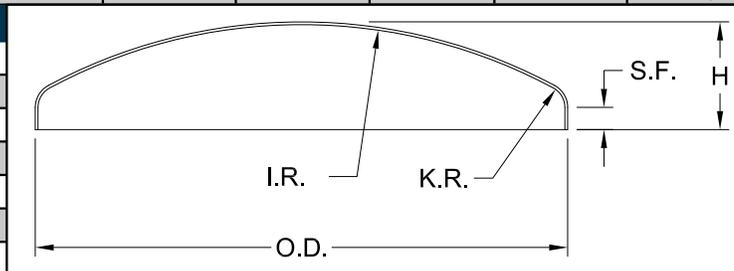
Flanged and Dished Heads (Non-Code)

Imperial now manufactures flanged and dished heads for direct purchase.

OUTSIDE DIAMETER	MATERIAL	THICKNESS	PART#	INSIDE RADIUS	KNUCKLE RADIUS	STRAIGHT FLANGE	CAPACITY	HEIGHT	WEIGHT
48" (1219 mm)	A36 Steel	0.250" (6.4 mm)	108714	48" (1219 mm)	2" (50 mm)	2" (50 mm)	50 Gal (189 L)	9.72" (246 mm)	163 Lbs (74 kg)
50" (1270 mm)	A36 Steel	0.188" (4.8 mm)	109075	50" (1270 mm)	2" (50 mm)	2" (50 mm)	56 Gal (212 L)	9.75" (246 mm)	133 Lbs (60 kg)
50" (1270 mm)	A36 Steel	0.250" (6.4 mm)	118826	50" (1270 mm)	2" (50 mm)	2" (50 mm)	56 Gal (212 L)	9.75" (246 mm)	175 Lbs (80 kg)
54" (1371 mm)	A36 Steel	0.188" (4.8 mm)	108767	54" (1371 mm)	2" (50 mm)	2" (50 mm)	68 Gal (257 L)	10.25" (260 mm)	152 Lbs (69 kg)
54" (1371 mm)	A36 Steel	0.250" (6.4 mm)	108718	54" (1371 mm)	2" (50 mm)	2" (50 mm)	68 Gal (257 L)	10.25" (260 mm)	201 Lbs (91 kg)
60" (1524 mm)	A36 Steel	0.250" (6.4 mm)	108739	60" (1524 mm)	2" (50 mm)	2" (50 mm)	89 Gal (336.8 L)	11.31" (287 mm)	243 Lbs (110 kg)
66" (1676 mm)	A36 Steel	0.250" (6.4 mm)	108715	66" (1676 mm)	2" (50 mm)	1.25" (31 mm)	114 Gal (431 L)	11.25" (285 mm)	289 Lbs (131 kg)
66" (1676 mm)	A36 Steel	0.312" (7.9 mm)	108875	66" (1676 mm)	2" (50 mm)	1.25" (31 mm)	114 Gal (431 L)	11.25" (285 mm)	361 Lbs (164 kg)
72" (1828 mm)	A36 Steel	0.250" (6.4 mm)	108719	72" (1828 mm)	2" (50 mm)	1.25" (31 mm)	143 Gal (541 L)	12.25" (311 mm)	339 Lbs (154 kg)
72" (1828 mm)	A36 Steel	0.312" (7.9 mm)	108864	72" (1828 mm)	2" (50 mm)	2" (50 mm)	165 Gal (624 L)	14.34" (364 mm)	420 Lbs (191 kg)
78" (1981 mm)	A36 Steel	0.250" (6.4 mm)	108732	78" (1981 mm)	2" (50 mm)	2" (50 mm)	176 Gal (665 L)	13.73" (348 mm)	393 Lbs (179 kg)
78" (1981 mm)	A36 Steel	0.312" (7.9 mm)	108734	78" (1981 mm)	2" (50 mm)	2" (50 mm)	176 Gal (665 L)	13.75" (349 mm)	491 Lbs (223 kg)
84" (2133 mm)	A36 Steel	0.250" (6.4 mm)	108716	84" (2133 mm)	2" (50 mm)	2" (50 mm)	214 Gal (810 L)	14.38" (365 mm)	451 Lbs (205 kg)
84" (2133 mm)	A36 Steel	0.312" (7.9 mm)	118827	84" (2133 mm)	2" (50 mm)	2" (50 mm)	214 Gal (810 L)	14.38" (365 mm)	563 Lbs (256 kg)

TOLERANCES

OUTSIDE DIAMETER	+/- (.006 x D)
THICKNESS	+/- .06"
INSIDE RADIUS	+/- .375"
KNUCKLE RADIUS	+ .25 / -0
STRAIGHT FLANGE	.50"
HEIGHT	.50"
CIRCUMFERENCE	+/- .375



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