Glass Spheres

GLASS INSTRUMENT HOUSINGS

Deep Sea Glass Spheres are a unique, reliable, cost-effective method for flotation and the housing of electronic instruments in the marine environment. Teledyne Benthos is the world's leading manufacturer of deep sea glass spheres and instrument housings. Ongoing improvements continue to insure their high reliability in extreme environments. Advanced assembly techniques and the patented VacuSealed® closure method consistently result in high quality, long-life spheres. Teledyne Benthos continues to pressure test every sphere prior to shipment, assuring their integrity in the field.

Deep sea glass spheres are superior to other types of flotation and instrument housing for several reasons: they are transparent, lightweight, inexpensive, corrosion resistant, easily handled, extremely strong, and non-polluting. As a result, they are preferred by oceanographers worldwide and are backed by over 40 years of experience in deep sea technology.

Specifications

Type	Low expansion borosilicate
Thermal Coefficient of Expansion	$38x10^{-7}$/°C
Specific Gravity	2.22
Young's Modulus	62 GPa ($9x10^{6}$ p.s.i.)
Poisson's Ratio	0.20
Refractive Index	1.48
Thermal Conductivity	0.0023 calorie cm/cm2 sec°C
Specific Heat	0.18 calorie/gm°C

Dimensions, Weight, and Depth Data	**Sphere Model 2040-10V**	**Sphere Model 2040-13V***	**Sphere Model 2040-17V**
Outside Diameter	25.4 cm (10 in)	33cm (13 in)	43.2 cm (17 in)
Inside Diameter	23.6 cm (9.3 in)	30.5 cm (12 in)	40.4 cm (15.9 in)
Weight in Air	4.1 kg (9 lbs)	9.07 kg (20 lbs)	17.7 kg (39 lbs)
Net Buoyancy	4.5 kg (10 lbs)	10.4 kg (23 lbs)	25.4 kg (56 lbs)
Depth Rating 9000 m	(29,500 ft) 9000 m	(29,500 ft) 6700 m	(22,000 ft)

*13" spheres available with improved optical transmission profiles, low potassium and low photonic radiation.

Teledyne Benthos patented VacuSealed® glass floats and instrument housings are manufactured from precision-molded spheres to exact specifications. The edge of each hemisphere is ground flat to extreme tolerances. When used for flotation the hemispheres are matched, mated, and then evacuated to an absolute internal air pressure of less than 0.3 atmospheres. After evacuation, a sealant and protective tape are applied around the equator. Spheres sealed in this method are nearly impossible to open due to the force exerted upon them by the atmospheric pressure. In the case of the 43.2 cm (17 in) diameter float, this force is in excess of 880 kg (2000 lbs).

VACUUM PORTS

A titanium vacuum port (Model 204-PFT) can be installed in a glass instrument housing to facilitate opening and closing the sphere. The vacuum port option is recommended for any housing that will be opened frequently.

INNOVATIVE UNDERSEA SYSTEMS TECHNOLOGY

TELEDYNE BENTHOS
A Teledyne Technologies Company

Protective Hard Hats for Glass Spheres

Bright yellow, neutrally buoyant, polyethylene hard hats are available for glass protection, storage, and ease of handling. Hard Hats consist of two flanged units bolted together with stainless steel hardware. Flanges can be bolted to a mounting framework, wire clamp, or chain section on a mooring line.

Standard 204H

Ribbed 204HR

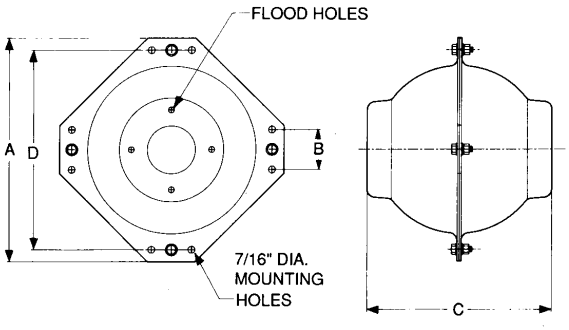
Super Ribbed 204-SRO/204-SRM

Dimensions and Weight in Air

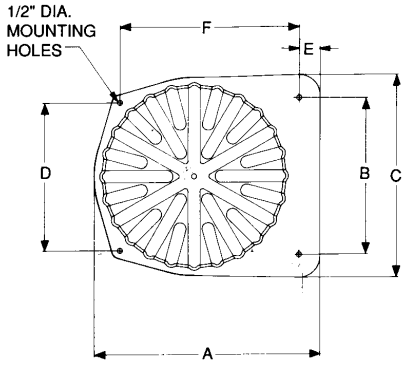
Dimensions in diagram below:	A		B		C		D		E		F		Air Weight	
Model	**cm**	**in**	**cm**	**in**	**cm**	**in**	**cm**	**in**	**cm**	**in**	**cm**	**in**	**kg**	**lbs**
204H-10	35.6	14.0	6.4	2.5	29.2	11.5	31.8	12.5					0.74	1.62
204H-17	55.9	22.0	12.7	5.0	48.3	19.0	49.5	19.5					2.95	6.50
204HR-17	54.6	21.5	38.1	15.0	49.5	19.5	35.8	14.1	5.1	2.0	43.2	17.0	3.29	7.25
204-SRO-13	48.3	19.0	12.7	5.0	40.6	16.0	43.2	17.0					2.50	5.50
204-SRO-17	61.0	24.0	12.7	5.0	53.3	21.0	55.9	22.0					3.63	8.00
204-SRM-17	55.9	22.0	38.1	15.0	51.8	20.4	35.0	13.7	3.8	1.5	43.7	17.2	3.74	8.25

(neutrally buoyant in water)

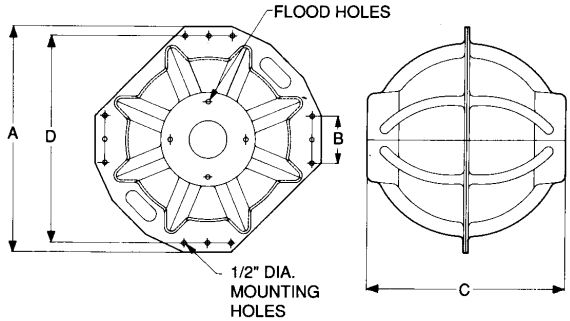
204H-10 and 17
Standard Hard Hat



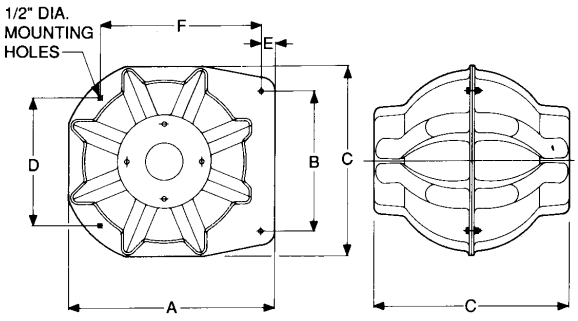
204HR-17
Ribbed Hard Hat



204-SRO-13 and 17
Super Ribbed Octagonal Hard Hat



204-SRM-17
Super Ribbed Mooring Hard Hat



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