



## OFFE TECHNOLOGY 2011 LTD.

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### **EFB-Premium (Ecological Floating Balls) for Industrial Applications**

Not just a ball but a solution to a problem.

**EFB-Premium** floating ball blankets provide highly effective solutions to difficult liquid storage problems in industries including processing, petrochemical and metal treatment. By placing a sufficient quantity of hollow plastic balls onto the surface of a liquid, the balls automatically arrange themselves into a close packed formation over 91% of the surface area. This high surface coverage provides an extremely effective barrier and significantly reduces the mass and heat transfer mechanisms operating between the liquid and surrounding environment.

The hollow plastic balls that form a floating cover for ponds, tanks, lagoons, and other basins.



The **EFB-Premium** balls are of course hollow and full of air. And the plastic balls offer very low heat conductivity. Together, these properties result in a very effective thermal insulation barrier. The air pockets between the balls -- although not sealed -- also contribute to this cellular insulation system, dramatically reducing heat loss.

The barrier works both ways: the low liquid surface area exposed to atmosphere dramatically reduces liquid loss through evaporation and odor release to the atmosphere. It also prevents surface absorption of oxygen.

Yet this barrier to the elements does not present an obstacle to product dipping or equipment moving through the liquid surface. The **EFB-Premium** balls are pushed aside, but quickly reform their cover as the equipment moves forward or products are lifted away from the tank. The balls will rise and fall with liquid level within storage tanks, and also provide a constant cover over liquids held in reservoirs with sloping sides. If the liquid level falls -- causing the surface area to shrink -- the balls simply stack in a double layer; they automatically spread themselves into a single layer again as the level rises.





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### *Innovative Applications for EFB-Premium Hollow Plastic Balls Include...*

- Heat retention. As the balls cover more than 90% of the surface area, they provide an insulation blanket on the tank.
- Evaporation reduction. Covering the water surface minimizes evaporation and water loss.
- Algae control. The balls block the UV from penetrating the water.
- Oxygen absorption.
- Vapor containment. The balls reduce chemical vapor emissions.
- Odor containment. Less exposed surface area results in less odor emission.
- Radiant protection
- Acid mist reduction from electrowinning process
- Camouflage pond basins from waterfowl / bird deterrent

### *Advantages of EFB-Premium Balls*

**EFB-Premium** Balls provide several advantages over other cover systems:

- Heating costs reduced by up to 75%
- Reduction of liquid loss through evaporation by up to 90%
- Reduced chemical consumption
- Improved working environments
- A reduction in corrosive vapors, ensuring increased life expectancy of building structures
- Reduced demand on air extract systems, saving factory heating and reducing gas scrubber demands
- Dramatic reduction of foul odors reaching the atmosphere
- Allows movement of equipment through the liquid
- Reduces penetration of UV rays, precluding growth of algae and clogging weeds
- Reduction of ice formation in freezing conditions, lowering the ice formation point by up to 50°F (10°C)
- The balls spread automatically as the liquid levels rise and fall  
The balls are available in a variety of materials; high density polyethylene (HDPE) is the most popular ball material for outdoor applications.
- Reduced heat loss helps to maintain biological reactions during cold weather
- Rain water is not a problem. Unlike solid covers, the balls allow rain water to pass directly into the basin. There is no opportunity for ponding to occur.
- Quick and simple to install; installation is as simple as pouring the balls into the tank.
- The balls naturally assume equal distribution
- Immediate solution to odor problems
- Virtually maintenance free



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## EFB-Premium Technical Data

Chemical Resistance of Plastics

**PVDF** -- This material offers significant increases in operating temperatures up to 320°F (160°C), providing resistance to many aggressive chemicals where other plastics would fail.

**Polypropylene (PP)** -- Able to withstand continuous working temperatures of up to 230°F 110°C. Suitable for contact with most chemicals used in the metal treatment industry.

**High Density Polyethylene (HDPE)** -- Suitable for working conditions up to 176°F (80°C). HDPE is recommended for all external applications due to its enhanced resistance to freezing conditions. Black, UV stabilizing additives prevent the degrading effects of sunlight. HDPE is also recommended for demineralized water and Chromic acid applications.



PVDF	320°F (160°C)
Polypropylene	230°F (110°C)
HDPE	176°F (80°C)

## EFB-Premium Ball Diameter and Surface Coverage

Diameter (mm)	Average weight (g)	Number per ft <sup>2</sup>	Number per m <sup>2</sup>
10	0.2	1,076	11,600
20	1.0	270	2,900
25	1.5	172	1,850
38	4.5	74	800
45	7.0	53	570
50	8.0	43	465
70	16.0	22	235
100	40.0	10	116
150	100.0	4.8	51.5

The percentage of area covered by the balls is independent of the ball diameter, being the ratio of a circle to the hexagon which surrounds it. This equates to 91% of the liquid surface area. The frictional contact points ensure that each ball remains stable when subjected to increased liquid or air turbulence.



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### EFB-Premium Heat and Liquid Loss Savings

	Open Surface	1 layer 38mm balls	2 layers 38mm balls
Average Surface Temperature °C	90, 70, 50	90, 70, 50	90, 70, 50
Energy consumption Kwh/h	10.73, 4.61, 1.61	2.70, 1.31, 0.60	2.04 0.76 0.51
Percentage energy saving	---	75%, 71%, 65%	81%, 76%, 70%
Evaporation liters/m <sup>2</sup> h	13.05, 4.97, 1.45	1.67, 0.41, 0.14	1.28, 0.38, 0.13
Percentage evaporation saving	---	87%, 91%, 90%	90%, 92%, 91%

Test Tank Dimensions = 600mm(W) x 1850mm(L) x 1000mm(H).

