



THERMAL ENERGY STORAGE FOR HEAT AND COLD

Thermal Energy Storage (TES) is temporary storage for heat or cold for use at a later time. It bridges the gap between supply and demand of energy. Thermal energy storage systems with Phase Change Materials are suitable for short (24h) and medium-term energy storage of up to one week. For most applications, Phase Change Materials must be packaged in well-sealed containers. Global-E-Systems has developed several standard types of PCM balls suitable for various applications.

The GAIA PCM Energy Storage Ball is an encapsulation of Phase change Materials with a diameter of 63mm, 80mm, 100mm or 125mm Ø and made from high-grade plastics or stainless steel. The PCM balls can easily be applied in a buffer tank for a heating or cooling circuit. This results in a required increase (in capacity) or decrease (in volume) of the storage system. The pcm balls are selected for each project so that the material and phase change temperature are suitable for the application.



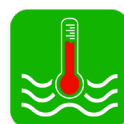
LOWER OPERATIONAL COSTS AND LESS CO2 EMISSIONS



POWER REDUCTION OF THE CHILLER/HEAT PUMP



THERMAL ENERGY STORAGE FOR STANDBY CAPACITY IN CASE OF CALAMITIES



PCM TEMPERATURES AVAILABLE FROM -30°C TO +89°C



MORE FULL LOAD HOURS THUS IMPROVING THE COP/ EER

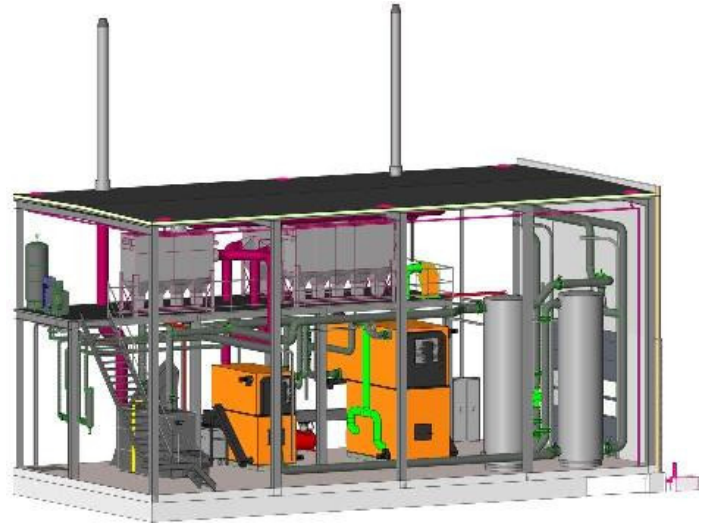


LOWER CONNECTION COSTS AND REDUCED START/STOPS AND LESS MAINTENANCE



BIOMAS ENERGY PLANTS

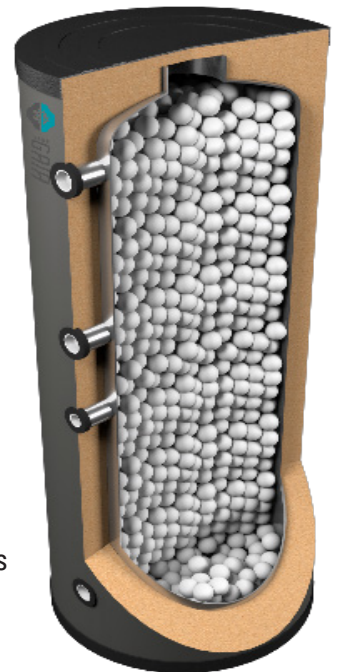
For biomass power plants, a well-dimensioned buffer tank is vital. The disadvantage of these buffer tanks, however, is their size and the amount of space they occupy. In addition, the aesthetic aspect plays a major role. Buffer tanks placed outside do not look attractive and could even be an obstacle when trying to obtain a building permit. In these cases, PCM balls can offer a solution. If phase Change material is applied, the volume can be reduced by a factor of 4. In the right image, the planned 60,000 litre buffer tank has been replaced by 2 PCM buffer tanks with a capacity of 10,000 litres. Both tanks are filled with a total of 50,000 PCM78 balls.



ADDITIONAL EXAMPLES FOR APPLICATION



- » Buffer storage systems for thermal solar energy.
- » By implementing Phase Change Materials the storage volume can be decreased by a factor of 3-4 at equal storage capacity.
- » Buffer storage for heat pumps and chillers.
- » Cold / heat storage for peak shaving in the (process) industry.
- » PCM balls can be stacked in an air duct. (rectangular or round) or simply added randomly.
- » Preheating of air-water heat pumps. Charging during the day cycle, better COP during operation at night.
- » For area cooling. Can be pre-charged with cold night air.
- » Housing. For example in a series connection with a High efficiency ventilation unit.
- » Using PCM balls as an active storage medium in building materials (concrete, for instance). PCM balls with a diameter of 63mm Ø are best suited for this application.



TECHNICAL SPECIFICATIONS:

Storage material	Salt hydrates (heat) or an eutectic mixture (cold), for instance water / glycol Fire classification DIN EN 13501-1 (non-flammable)
Heat storage capacity	For example PCM58: Capacity per ball: 65,5kJ / 18,2Wh (80mm Ø) Capacity per m3: 35 kWh (See datasheet for all PCM's)
Process temperatures	-30°C - + 89°C
Specifications (80mm)	Weight: 200 - 400 gram (depending on specific mass of the PCM) Filling volume: 200 mL Total weight per m3: 540 - 765 kg (depending on specific mass of the PCM) Quantity per m3: 1920 pcs. Also available diameters: 63mm, 100mm and 125mm
Ball material	Made of High Density Polyethylene (HDPE) polypropylene or Stainless Steel with high heat stability and a optimised exchange surface for excellent energy transfer.
Max. installation pressure	HDPE / polypropylene: 3 bar - Stainless steel: 6 bar