

## Thermal Dryer How does it work?

### 1. Coater Mixer and top Screw Conveyor

Wet biosolids are pumped to the Coater Mixer (1A). The Coater Mixer uses rotating paddles (1B) to coat recirculated, dried pellets with a thin layer of the wet incoming biosolids, building the pellet up layer by layer (1C).

The pellets drop into the top of the dryer where they are spread across the topmost plate by the spiral spreader (1D).

### 2. Dryers

Each dryer can process 5 tonnes of wet incoming biosolids per hour. The incoming biosolids are composed of around 85% water.

The dryer is made up of 14 trays, stacked one upon another (2A). The trays are heated to around 280°C and the pellets are raked across the plates, dropping from one plate to the next. As they move down the dryer, the wet outer layer becomes progressively dryer until the pellet has less than 10% water within it.

As the pellets are heated and become dryer, steam is generated. The steam displaces the air inside the dryer and creates a safe, low oxygen environment as the pellets are dried. The oxygen sensor helps to ensure the dryer is operating correctly by monitoring how much oxygen is present within the dryer (2B).

The steam is vented through the top of the dryer and passed through a condenser. The condensate is returned to the Black Rock Water Reclamation Plant.

On start up, additional water is pumped into the hot dryer to produce extra steam (2C).

You can't go into the raking arms when it is operating, but these portholes allow you to see the raking arms roll the pellets across the drying trays. The door permits access to the trays and raking arms of the dryer for maintenance (2D).

The dryer and the associated equipment are insulated to keep the heat in and use energy as efficiently as possible.

The dryers are sunken into the ground to minimise the total height of the Biosolids Treatment Facility.

### 3. Drive Motor

The raking arms are driven by a large electric motor installed at the bottom of the dryer (3A). This drives a central shaft to which all of the raking arms are connected. The shaft slowly rotates and the raking arms roll the pellets across the stationary dryer plates.

### 4. Bucket Elevator

Once the pellets reach the bottom of the dryer, they are carried by a screw conveyor to the bucket elevator (4A). The bucket elevator carries the pellets from the bottom of the dryer up around 17 metres to the Separation Hopper.

### 5. Separation Hopper

The Separation Hopper roughly sorts the pellets by size (5A). Small pellets are returned to the Coater Mixer where they are coated with another layer of the wet, incoming biosolids.

The larger pellets are released from the bottom of the separation hopper and fall into the pellet cooler.

### 6. Pellet Cooler

The pellet cooler blows cool air over the pellets to bring them down to a temperature where they can be safely stored (6A).

