

## Macawber Installation Case Study: Ground Biomass Ash - Brewery, Mexico

### IN BRIEF

**Problem:** Large brewery wishes to recycle waste grain and malt from the brew process for the production of electric power. Handling the biomass ash cleanly and economically was required.

**Solution:** Macawber pneumatic conveying systems were used to convey boiler bottom ash and fly ash away to storage. The biomass is dried and transferred to a boiler where it is burned with #6 oil. The biomass fly ash is gathered from four electrostatic precipitator (ESP) hoppers and pneumatically conveyed to an ash silo. The bottom ash is crushed and transferred a short distance via customer's mechanical conveyor to a pneumatic conveyor where it is transferred to an ash silo for truck loading.

### MATERIAL CHARACTERISTICS

|                  |   |
|------------------|---|
| Material         | Brewer Grain Fly Ash<br>Brewer Grain Bottom Ash<br>(brewer grain fired with #6 oil) |
| Bulk Density     | Aerated 570-730 kg/m <sup>3</sup> (36-76 lb./ft <sup>3</sup> )                      |
| Size             | Fly Ash: 100%<100 mesh<br>Bottom Ash: 300x150x65 mm (max)                           |
| Temperature      | 161°C – 300°C   |
| Moisture Content | ~0%   |
| Condition        | Free flowing when aerated   |

### SYSTEM OBJECTIVES

1. Minimize wear and air usage.
2. Reliable and consistent conveying.
3. Operate with -15.1" wc vacuum in baghouse.
4. Operate with elevated bottom ash temperature of 300°C

### SYSTEM PERFORMANCE

|                    |  |
|--------------------|--|
| Transfer Capacity  | BA: 635 kg/hr (1400 lb/hr)<br>FA: 657 kg/hr (1450 lb/hr) |
| Conveying Distance | BA: 120m (394ft)<br>FA: 56m (184ft)                      |
| Reception Points   | One  |

### IMPROVEMENTS ACHIEVED

1. System operation is stable, reliable and efficient
2. System capacity exceeded specified rates
3. Air consumption was below MEI quoted average

