A network of TURBUFLOW conveying systems can also include the transportation of by-product additives for blending into the ground clinker and to move cement product to silo’s in preparation for despatch to road, rail and bagging plant. The cumulative pipework can extend to 100’s of metres. Existing systems using Dilute Phase will rely on hefty air compressors and coolers with their attendant power demand, all of which can be replaced by smaller units when using the Turbuflow system, or subject to review, down rated.

The TURBUFLOW system has been used successfully throughout the world for over 20 years. Under failure of compressed air, the system can be restarted without any problem, even with material filled lines. There are no plugged pipes in the TURBUFLOW dense phase conveying system and very little wear, if any, is experienced.

Further information overleaf, or to arrange for a discussion please contact:
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Cement companies in the UK have used Fairport Engineering for over 30 years and the Möller name can be traced back to 1934. Equipment such as Möller Pumps and Fuller Kenyon Pumps are highly respected in the market. Together both organisations offer a unique mix of local experience and product innovation.

The TURBUFLOW dense phase pneumatic conveying system is particularly suitable for fine grained bulk materials such as cement, lime and fly ash, including highly abrasive cements with Mohs values over 8 and Blaine values over 10,000. The slower conveyance of material reduces wear and therefore increases operational reliability. So how does it work?

**Dilute Phase** – a low product to air ratio, with high product speed

**TURBUFLOW Dense Phase** – a high product to air ratio with low product speed

Dense phase conveying can lead to blockages with costly downtime and is often associated with shorter runs. The TURBUFLOW system overcomes this by using an air carrier pipe within the conveying pipe using a port and diaphragm arrangement. This fluidises the material along the pipe enabling high material loads whilst prohibiting blockages. This is why a material filled line can be restarted and material conveyed over distances in excess of 1000M.

**Wear Factor**

Dilute phase speeds can be 25-34m/s at the end of a pipe, TURBULFOW speeds are typically 10-16m/s

The very low air to bulk material velocity at the beginning and end of the conveying pipe results in very low pipe and bend maintenance. In fact in most installed systems no maintenance on these parts is necessary. No conveying pipes have been renewed in any TURBUFLOW system since 1984.

**Efficiency and Energy Consumption**

The use of an internal air carrier pipe enables long pipe runs, in excess of 1000M with little reduction in material load.

**Summary Comparison between Dilute Phase and Turbuflow Dense Phase**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Dilute Phase</th>
<th>TURBUFLOW Dense Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Velocity at beginning of pipe</td>
<td>10-12 m/s</td>
<td>4-6 m/s</td>
</tr>
<tr>
<td>Velocity at end of pipe</td>
<td>25-34 m/s</td>
<td>10-16 m/s</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>8-9 kWh/t·km</td>
<td>3-6 kWh/t·km</td>
</tr>
<tr>
<td>Grain Size distribution</td>
<td>100% &lt; 200 μm</td>
<td>50% &lt; 20-30 μm</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>0,6-1,4 t/m³</td>
<td></td>
</tr>
</tbody>
</table>

The marginal difference in power consumption is notionally considered to be in the region of 4KWhrs per Tonne.Km. So if it is assumed a typical plant will pneumatically convey 1,000,000 tonnes of material per year, across a cumulative 1 Km length of pipework, where electricity is assumed to cost £0.1 per KWhr then plant power consumption savings in the region of £300,000 to £400,000 per year per Km are entirely possible.