Details for follow-up activities: Rectangular Evase Recommendation
**Installation & Labour**

The installation of a rectangular evase is simple, but when fabricating a new rectangular evase, the experienced welder should take measurements for which disassembling of cyclone dust collector may be needed. A total of 2 days may be required to disassemble, weld the rectangular evase, and to perform tests. It is approximated that 2 welders and 2 helpers for 2 days that charge $75 per hour and $45 per hour respectively. Assuming 8 hour work days, and neglecting travel costs for the workers, the total estimated cost is $1,920.

**Implementation Schedule**

Aforementioned, if properly planned, the work can be completed in 2 days. It should be noted that the normal workflow and production rate may be affected during installation. Therefore, it is recommended, if possible, to schedule the installation during a non-working day.

**Energy saving cost**

Assuming the following:

- Volumetric Air Flow: 4.72 m³/s
- Average Pressure Reduction: 40 Pa

And substituting into the equation below,

Savings in Air Power = Volumetric Air Flow * Average Pressure Reduction

The savings in Air Power yield **188.8 W**.

Assuming the following:

- Cyclone operates 10 hrs per day
- Cyclone operated 251 days per year

And substituting values into the equation below:

Savings in Air Power per day = 188.8 * 10 = **1.888 kWh**

Annual savings in Air Power = 1.888 * 251 = **473 kWh**

With the following assumptions:

- Savings in Air Power: 188.8 W
- Fan Efficiency: 55%
- Motor Efficiency: 95%

the following equations can be used to calculate the electrical power savings (in kWh)

Electrical Power Savings = Savings in Air Power / (Fan Efficiency X Motor Efficiency)
Electrical Power Savings = \( \frac{188.8}{(0.55 \times 0.95)} = 361 \text{ W} \)

With the following assumptions:
- Cyclone operates 10 hrs per day
- Cyclone operates 251 days per year

The electrical power savings per day can be calculated with the following equation

\[
\text{Electrical Power Savings} = 361 \times 10 = 3.61 \text{ kWh}
\]

Annual savings in Electrical power = 3.61 \times 251 = 906 \text{ kWh}

And therefore, with the cost of electricity equalling $0.06 per kWh, the annual savings in electrical power savings are approximately $55.

**Success Stories [1]**

A study conducted by P.A Funk from U.S department of Agriculture observed that there has been a pressure drop in a cyclone that can be reduced by between 8.7 and 11.9% with the addition of a radial evase. This accounted for savings in energy.

- Evasés may reduce cyclone pressure drop without affecting collection efficiency.
- Investment in an evasé can be recovered through reduced operating energy costs

**Welders**

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<tr>
<th>Company</th>
<th>Location</th>
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</thead>
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<tr>
<td>Karnel Inc</td>
<td>Nescopeck, PA</td>
<td>570-586-1488</td>
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<td>Genesis Metalworks</td>
<td>Lexington, NC</td>
<td>336-238-5760</td>
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<td>Hardee &amp; Cox Welding, Inc</td>
<td>Greenville, NC</td>
<td>252-355-5007</td>
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<td>Wahlen’s Mobile Welding</td>
<td>Greenville, NC</td>
<td>252-902-4082</td>
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**References**