

Technology Profile



**Value
to
Wood**

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Dust Collection Systems



Having an efficient dust collection system will add dollars to your bottom line. By improving the environment in which you and your employees work, productivity and manufacturing efficiency can be increased, while product quality is improved. Dust and noise issues in a manufacturing environment are nuisances that can be easily dealt with if good planning principles are used during the design of dust collection systems. However, before installing a dust collection system, or even considering whether or not one is needed, business owners must investigate a number of issues. These include:

Legal Requirements

Most jurisdictions in Canada have specific requirements that restrict the amount of pollutants that can be expelled into the atmosphere and

onto the soil. Federal limits are sometimes different than provincial and/or city limits. Consultation with your local authority early on in the process is suggested.

Employee Comfort & Health Hazards

Returning clean, heated air to the work area is important to ensure employee comfort.

Along with the necessity for compliance with applicable regulations, there are moral responsibilities that must play a part in controlling contaminants being generated during your production process.



Natural Resources
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Manufacturing Processes and Product Quality

The quality of manufacturing and finishing can be adversely affected if the by-product extraction system is not effective in removing the sawdust, shavings and sanding dust generated during the process. Marketing your product and presenting it to consumers in the best possible form is one of the key ingredients for success. High quality packaging that is clean and free of residual dust and shavings is a must.

Type of Waste

A properly-sized cyclone separator with exhaust air filtered through a baghouse equipped with air locks and closed canisters is the best way to handle fine sanding dust. Other methods to remove larger-sized waste products should be considered depending on the volume generated, the distance needed to move it to a central collection area, and the cost involved.

Capital Costs and Energy Efficiency

Two-stage systems that employ suction fans after the cyclone are more efficient and do not wear out as quickly. While these systems are generally more expensive, they can also be quite noisy and a noise suppression device may be needed to meet local noise bylaws.

Considering a number of systems rather than a central one may be more suited to your operation, particularly if the plant uses a number of machines that do not need to run concurrently. The total length of piping also needs to be considered, especially when evaluating installation of more than one system, otherwise boosters may be required.

If a lot of suction is required to remove waste products, for example when operating a planer or molder, the addition of outside make-up air is suggested. However, replacing heated or humidified air can be expensive, so using a closed system in all or part of the plant should be considered.

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Humidity Control

If adhesives are part of the manufacturing process, additional moisture in the plant may be required. Begin by ensuring that the glue being used is formulated for the plant environment. In drier regions, humidity may need to be introduced to maintain a good quality glue joint. Keeping the inside



temperature of the plant consistent is also important when gluing wood products. A closed system that returns the air that was used in the plant will help in keeping heating costs down and quality levels consistent.

Disposal of Waste

While some companies simply blow or dump the by-product in a pile outside of their plant, the costs associated with disposing of the waste at a later date can be high. In addition, a number of companies sell their shavings and sawdust to the general public for animal bedding and landscaping. It is important to be aware of any liabilities that may arise from having outside parties come onto the site to remove by-products. Designing a system that is safe to operate must be a consideration in these instances.

Size of a Dust Control System

The system design should take into account the amount of dust that may be blown from the cyclone's air exhaust into any neighboring properties and the amount of noise that the system will make. Planning ahead will limit the system's impact on nearby businesses and individuals.

Investigating and then installing a dust control system is not "rocket science" but a good pneumatics expert and experienced dust-control company can save a lot of headaches and future expense. The system's size should be left to someone who is experienced and knowledgeable in the field. In general, if the system is incorrectly sized, more energy will be spent on cleaning up waste before, and possibly after, the system.

System Requirements Checklist

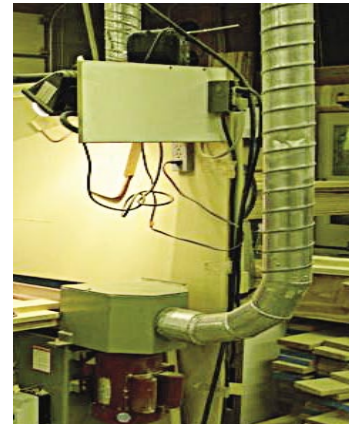
A simple checklist will help guide the design of a dust collection system. Some of the key questions business owners need to answer are:

Size requirement – Will one or multiple smaller systems be more suitable for the plant and will all the machinery be running at



the same time? A Volume and Velocity calculation must be made to determine the system's capacity. This analysis should also take into account the number and size of the collection points.

Type of particulate generated – The collection of green sawdust and shavings may require only a basic cyclone, while gathering fine dust will require a baghouse filter. The abrasive qualities of the particulate are often overlooked when installing a system.



Controlling the climate in the plant

– Will air be returned to the plant or will it be vented into the atmosphere, and is a climate-controlled environment in your plant necessary?

Safety considerations – The system must be fire safe and explosion-proof. Fine dry dust will require spark arrestors and explosion-proofing.

Bag house requirements and operation – This includes determining the number of bags and their size, as well as the mechanism to clean the bags (shaker or air pulse system).

Best Practices

- Consult an experienced source to design a system according to requirements and budget.
- Select a blower or suction fan with adequate capacity for future expansion or additional machines.
- Anticipate the replacement of cheaper spiral pipe and weigh the economics of starting with this lower quality pipe.
- Install blast gates on all machines that will not be operating at all times.
- Avoid sharp bends in the system.
- Be sure to include fire suppression and/or abort gates as well as explosion panels in the bag house as a safeguard against major losses.

- g) Inspect your system regularly and use professional maintenance methods (not duct tape).
- h) Ensure that electrical components are isolated, well sealed and cleaned regularly.
- i) Ensure the system is adequately grounded.
- j) Post and use safety lock-out procedures when servicing the system.

Forintek acknowledges the assistance of Lee Ryan of Allied Blower and Sheet Metal Ltd. (www.alliedblower.com) in the preparation of this *Technology Profile*.

To speak with your nearest Forintek Industry Advisor about this article or other ways to improve the performance of your business, call Forintek at the numbers below, or visit us at www.valuetowood.ca to find out about upcoming workshops or seminars in your area.

For more information on the 2006-2007 *Value to Wood* research program, visit www.valuetowood.ca (Research and Development). The partners involved are:



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As part of the *Value to Wood* program, funded by Natural Resources Canada, Forintek's Industry Advisors are providing technical services to value-added wood product manufacturers in all regions of Canada. If you need information on any technical issue related to wood product manufacturing, you can:

- Send a request via valuetowood.ca (Help Desk).
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