

Paper Manufacturers

Paper manufacturing ranges from making paper to manufacturing converted paper products, such as paper containers, cups, boxes, bags, coated paper, envelopes, and stationery products. Producing paper from pulpwood and other fiber sources is highly water- and energy-intensive. Recycling paper and cardboard products can cut this energy and water use in half.

Special Purposes

Water efficiency can be achieved by minimizing paper and other product wastes. Collect the waste that does occur to use as fiber sources in recycled products (non-post-consumer recycled content).

PROC

Before applying aqueous cleaning techniques, scrape equipment and vessels to remove as much waste as possible. **PROC**

Refer to the “**Commercial Printers**” summary for more information on the printing aspects of this industry.

Cooling and Heating Systems

Energy-efficient equipment reduces waste heat, which may in turn reduce the demand for larger water technologies such as cooling towers. **PROC**

Air cooling is more water efficient than recirculating cooling-water systems. If water is used for cooling, at a minimum use a recirculating system. **FOOD**

Additional water-efficiency measures include the following:

- consider all possible opportunities for water recovery and reuse or alternative water supplies, such as filtration and membrane processes and capturing condensate drain water from air-conditioning systems. **PROC, ALT**
- operate closed-loop steam systems at twenty cycles of concentration or greater (5 percent or less of make-up water) where water chemistry allows.

Producing paper from pulpwood and other “first-generation” sources is both water- and energy-intensive.



- ◆ equip steam distribution lines and equipment with steam traps meeting all codes.
- ◆ install make-up meters on feed-water lines to:
 - » steam boilers and water boilers of more than 100,000 Btus per hour.
 - » closed-loop hot-water systems for heating.
- ◆ situate boiler temperature and make-up meters to be clearly visible to operators.
- ◆ reduce plumbing leaks due to repeated opening of water-temperature and pressure-relief valves (TPRVs).
- ◆ make discharge pipes easy to inspect for flow and ensure there are visible indicators of any valve activation. **REST, THERM**

Water Treatment

Use water treatment only if and when necessary. **TREAT**

Measures to improve water efficiency in water treatment include:

- ◆ for all filtration processes, installing pressure gauges to determine when to backwash or change cartridges, followed by backwash based upon pressure differential.
- ◆ for all ion-exchange and softening processes, setting recharge cycles by volume of water treated or using conductivity controllers.
- ◆ avoiding the use of timers for softener-recharge systems.
- ◆ using water treatment only when necessary.
- ◆ use a reverse osmosis and nanofiltration systems with the lowest reject rate for its size.
- ◆ choose distillation equipment that recovers at least 85 percent of the feed water. **TREAT**

Plumbing

Use high-efficiency toilets requiring no more than 1.3 gallons per flush and urinals which flush with 1 gallon or less. Avoid automatically timed flushing systems. Use self-closing faucets with flows of 0.5 gpm for hand washing. If available, and if codes and health departments permit, flush with non-potable water. **REST**

Floor Cleaning

Employ these floor-cleaning efficiency practices:

- ◆ use low-flow, high-pressure nozzles on hoses or water brooms for floor and mat washing where a flow of water is needed. **REST, FOOD, PROC**

Choosing energy-efficient equipment saves on recurring energy costs, but, as well, can obviate the need for larger water-consuming technologies such as cooling towers.

- ◆ minimize the need to use a hose as a broom by installing drains close to areas where liquid discharges are expected. **PROC**

Submetering

Meter major water-using systems and building areas separately. **PROC, METER**

Other

Install automatic-shutoff and solenoid valves on all hoses and water-using equipment. **PROC**

Install faucets on set tubs and janitorial sinks with flows not to exceed 2.2 gpm. **REST** If water features or irrigated landscaping are used on a site, refer to the summary on “**Water Features, Pools, and Landscapes.**”

TIP: Conspicuously mark fire-protection plumbing so no connections will be made except for fire protection. Additionally, install flow-detection meters on fire services to indicate unauthorized water flows. **REST**

Reclaiming pre-consumer waste materials and recycling paper and cardboard products can cut energy and water use in half.