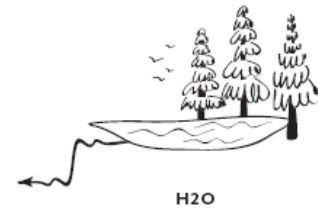


ENVIRONMENTAL FOOTPRINT COMPARISON TOOL

A tool for understanding environmental decisions related to the pulp and paper industry



EFFECTS OF RECYCLED FIBER USE ON WATER USE

Containerboard Sector

Mills with virgin pulp production vs. 100% recycled containerboard mills

This section explains that, in general, mills producing containerboard from only recovered fiber have effluent flows that are lower than mills that have virgin pulp mills on site. This finding, supported in the published literature, is confirmed by statistical analysis of NCASI data, which includes site-specific information from mills across North America.

Effluent flows from mills with virgin pulping, especially kraft pulping, are usually larger than those from mills using only recovered fiber. Some of the published values for representative effluent flows from virgin and recycled containerboard production are shown in the following table. NCASI site-specific data suggest that production-normalized flows from virgin mills using large amounts of recovered fiber will be between those of all virgin and all recycling mills.

Table R1.

Mill Description	Effluent Flow (m ³ /tonne)	Reference
Typical unbleached kraft mills	20 to 60	Springer 2000
Recycled liner, fluting	0 to 10	Gottsching and Pakarinen 2000
Unbleached kraft pulp mills using Best Available Techniques	15 to 25	EC BREF 2001
Recycled board mills using Best Available Techniques	< 7	
Typical virgin containerboard mills (weighted average of linerboard and medium mills)	45	Paper Task Force 2002
Typical recycled containerboard mill	8	
Average unbleached kraft mill (1990)	49	USEPA 1993 draft technical development document
Average semi-chemical pulping mill (1990)	22	

The differences between virgin and recycled effluent volumes depend on the type of containerboard grade

This section explains that virgin linerboard mills generally use more water than virgin semi-chemical medium mills so the effects of increasing recycled content on water use and effluent flow will be different for linerboard and medium.

Unbleached kraft mills producing linerboard tend to use and discharge more water than semi-chemical pulping mills producing corrugating medium. This is in part because semi-chemical pulping mills often include higher fractions of recovered fiber in the furnish. In addition, however, virgin semi-chemical operations tend to discharge less water than virgin kraft pulping operations. In the early 1990s, USEPA reported the average effluent volume from unbleached kraft mills at 48.6 m³/tonne while the average from

Effects of Recycled Fiber Use on Water Use Containerboard Sector

semi-chemical pulping mills was 21.5 m³/tonne (USEPA 1993). As a result, increasing the recycled content of corrugating medium will likely have less of an impact than increasing the recycled content of linerboard.

There are also different grades of linerboard, differing most notably in the basis weight (i.e., the weight per unit area) of the linerboard sheet. While the specifications associated with the different grades may affect the ability of individual mills to reduce water use, there is no published information indicating that the water use and effluent flow benefits associated with increasing recycled content of linerboard are a function of the grade of the linerboard.

References

- European Commission BAT Reference (BREF). 2001. *Integrated Pollution Prevention and Control (IPPC) reference document on best available techniques in the pulp and paper industry*. Seville, Spain: European Commission Joint Research Centre. <http://eippcb.jrc.es/reference/pp.html>
- Gottsching, L. and H. Pakarinen (eds.). 2000. *Recycled fiber and deinking*. Book 7 in Papermaking Science and Technology Series, ed. J. Gullichsen and H. Paulapuro. Atlanta, GA: TAPPI Press and Finnish Paper Engineers' Association.
- Paper Task Force. 2002. *Paper Task Force recommendations for purchasing and using environmentally preferable paper*. <http://epa.gov/epawaste/consERVE/tools/warm/pdfs/EnvironmentalDefenseFund.pdf>
- Springer, A. (ed.) 2000. *Industrial environmental control - Pulp and paper industry*, 3rd ed. Atlanta, GA: TAPPI Press.
- United States Environmental Protection Agency (USEPA). 1993. *Proposed technical development document for the pulp, paper, and paperboard category effluent guidelines, pretreatment standards, and new source performance standards*. EPA 821/R-93-019. Washington, DC: U.S. Environmental Protection Agency, Office of Science and Technology.