

ASHRAE JOURNAL

THE MAGAZINE OF HVAC&R TECHNOLOGY AND APPLICATIONS MARCH 2012

First CO₂ Refrigeration Ice Rink

Optimizing Chiller Plants | Total Energy Wheel Control
Improving DHW System | Ins and Outs of VAV Terminals

Inside | Best of the Best: the 2012 ASHRAE Technology Awards

CONTENTS

Vol. 54, No. 3 | March 2012



28



38



© Dino Hrustanovic/Fotolia

80

Features

46 Total Energy Wheel Control in a Dedicated OA System

By John Murphy

60 Optimizing Design & Control of Chilled Water Plants

Part 4: Chiller & Cooling Tower Selection

By Steven T. Taylor, P.E.

72 Improving DHW System Performance

By Hui Chen, P.E.; Homer Bruner Jr.; Robert Henry, P.E.;

Les Williams; and James Riley

2012 ASHRAE TECHNOLOGY AWARDS

28 ASHRAE's Best: 2012 Technology Awards

38 Ice Rink Uses CO₂ System

By Luc Simard

Standing Columns

80 Building Sciences

Parthenon, Eh!

By Joseph W. Lstiburek, Ph.D., P.Eng.

88 Emerging Technologies

Energy Efficiency in a Box: Variable Air Volume Terminal Units

By John Dieckmann; Alissa Cooperman; And James Brodrick, Ph.D.

94 Refrigeration

The Temperature Lift

By Andy Pearson, Ph.D., C.Eng.

98 IAQ Applications

Public Policy and IAQ

By Steven J. Emmerich

Departments

4	Commentary	96	Special Products	110	Classified Advertising
6	Show Coverage	100	People	112	Advertisers Index
26	Meetings and Shows	102	Products		

ASHRAE® Journal (ISSN 0001-2491) **MISSION STATEMENT** | ASHRAE Journal reviews current HVAC&R technology of broad interest through publication of application-oriented articles. ASHRAE Journal's editorial content ranges from back-to-basics features to reviews of emerging technologies, covering the entire spectrum of professional interest from design and construction practices to commissioning and the service life of HVAC&R environmental systems. **PUBLISHED MONTHLY** | Copyright 2012 by ASHRAE, 1791 Tullie Circle N.E., Atlanta, GA 30329. Periodicals postage paid at Atlanta, Georgia, and additional mailing offices. **LETTERS/MANUSCRIPTS** | Letters to the editor and manuscripts for publication should be sent to: Fred Turner, Editor, ASHRAE Journal, fturner@ashrae.org. **SUBSCRIPTIONS** | \$8 per single copy (includes postage and handling on mail orders). Subscriptions for members \$6 per year, included with annual dues, not deductible. Nonmember \$79 (includes postage in USA); \$79 (includes postage for Canadian); \$149 international (includes air mail). Expiration dates vary for both member and nonmember subscriptions. Payment (U.S. funds) required with all orders. **CHANGE OF ADDRESS** | Requests must be received at subscription office eight weeks before effective date. Send both old and new addresses for the change. ASHRAE members may submit address changes at www.ashrae.org/address. **POSTMASTER** | Send form 3579 to: ASHRAE Journal, 1791 Tullie Circle N.E., Atlanta, GA 30329. Canadian Agreement Number 40037127.

ONLINE at ASHRAE.org | Feature articles are available online. Members can access articles at no cost. Nonmembers may purchase articles at www.ashrae.org/bookstore. | **MICROFILM** | This publication is microfilmed by National Archive Publishing Company. For information on cost and issues available, contact NAPC at 800-420-NAPC or www.napubco.com. **PUBLICATION DISCLAIMER** | ASHRAE has compiled this publication with care, but ASHRAE has not investigated and ASHRAE expressly disclaims any duty to investigate any product, service, process, procedure, design or the like which may be described herein. The appearance of any technical data, editorial material or advertisement in this publication does not constitute endorsement, warranty or guarantee by ASHRAE of any product, service, process, procedure, design or the like. ASHRAE does not warrant that the information in this publication is free of errors and ASHRAE does not necessarily agree with any statement or opinion in this publication. The entire risk of the use of any information in this publication and its supplement is assumed by the user.