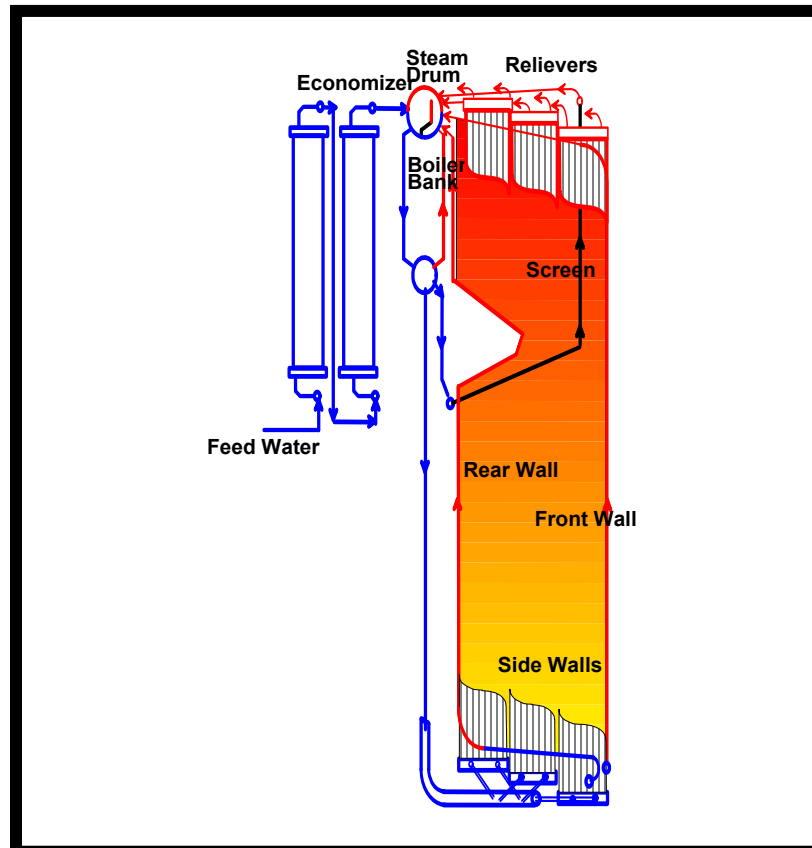


CAPABILITIES

BOILER CIRCULATION STUDIES



Boiler Circulation (Chemical Recovery, Biomass, and RDF/MSW Boilers)

Circulation of water through boiler tubes is necessary to prevent tube overheating and potential failure. The need to conduct a circulation study on a boiler is typically dictated because of any one, or combination of, the following reasons:

- To establish the maximum steaming rate at which circulation remains adequate.
- To determine pressure part modifications needed to support a significant increase in fuel burning rate.
- To evaluate the effect of changing boiler operating conditions (such as type of fuel or operating pressure) on circulation.
- To evaluate the effect of changing heating surfaces on circulation.
- To uncover factors causing repeat pressure part failures and/or tube overheating.
- To investigate the cause of excessive scale depositions inside tubing.

A valuable technique used by JANSEN during its analyses of circulation conditions is the application of Ultrasonic Flow Monitoring (UFM).

Selected References (see next page)

Selected References Boiler Circulation Studies

Alabama River Cellulose - Perdue Hill, AL
 Alberta-Pacific Forest Industries, Inc. - Boyle, AB
 APRIL Group - Rizhao, China (2 units)
 AssiDomän Sepap - Stetf, Czech Republic
 Australian Paper - Morwell, Australia
 AV Nackawic - Nackawic, NB
 Bahia Specialty Cellulose S.A. - Camaçari, BA, Brazil
 Blue Ridge Paper Company - Canton, NC
 Boise Cascade Corp. - DeRidder, LA
 Boise Cascade Corp. - International Falls, MN (2 units)
 Boise Cascade Corp. - Jackson, AL
 Boise Cascade Corp. - Rumford, ME
 Boise Cascade Corp. - Wallula, WA (2 units)
 Bowater Incorporated - Catawba, SC
 BP Husky Refining LLC - Toledo, OH
 Bukoza - Hencovce, Slovakia
 Canadian Kraft Paper Industries - The Pas, MB
 Cargill - Uberlândia, Brazil
 Cariboo Pulp & Paper Co. - Quesnel, BC (2 units)
 Carter Holt Harvey Pulp & Paper Ltd. - Tokoroa, NZ
 Cascade Pacific Pulp - Halsey, OR
 Catalyst Paper - Biron, WI
 Champion International Corp. - Quinnesec, MI
 Champion International Corp. - Roanoke Rapids, NC
 Champion Papel e Celulose Ltda. - Mogi Guaçu, Brazil
 Covanta Energy - Hartford, CT
 Domtar Papers - Cornwall, ON
 Domtar Corporation - Ashdown, AR
 Domtar Corporation - Bennettsville, SC
 Domtar Corporation - Kingsport, TN
 Domtar Corporation - Lebel-sur-Quevillon, QC
 Domtar Corporation - Nekoosa, WI
 Donohue Forest Products Inc. - St. Félicien, QC
 E.B. Eddy Forest Products Ltd. - Espanola, ON
 Federal Paper Board Company, Inc. - Riegelwood, NC
 Finch Paper LLC - Glens Falls, NY
 Fletcher Challenge Canada - Mackenzie, BC
 Fort James Corporation - Clatskanie, OR
 Fraser Papers Inc. - Edmundston, NB
 Fraser Papers Inc. - Park Falls, WI
 Georgia-Pacific Corporation - Big Island, VA
 Georgia-Pacific Corporation - Camas, WA
 Georgia-Pacific Corporation - Cedar Springs, GA
 Georgia-Pacific Corporation - New Augusta, MS
 Georgia-Pacific Corporation - Palatka, FL
 Georgia-Pacific Corporation - Wauna, OR
 Georgia-Pacific Wood Products - Madison, GA
 Glatfelter - Chillicothe, OH
 Graphic Packaging Inc. - Macon, GA
 Graphic Packaging Inc. - West Monroe, LA
 Grupo Cassa - Ilzalco, El Salvador
 Harmac Pacific Inc. - Nanaimo, BC
 Hercules Pinova - Brunswick, GA
 Howe Sound Pulp & Paper - Port Mellon, BC
 Inland Paperboard & Packaging, Inc. - Orange, TX
 International Paper Company - Luiz Antônio, Brazil
 International Paper Company - Mansfield, LA (2 units)
 International Paper Company - Pine Bluff, AR
 International Paper Company - Pine Hill, AL (3 units)
 International Paper Company - Pineville, LA
 International Paper Company - Riegelwood, NC
 International Paper Company - Svetogorsk, Russia (2 units)
 Interstate Paper Company - Riceboro, GA
 Irving Pulp & Paper, Limited - Saint John, NB
 KapStone Paper - Roanoke Rapids, NC
 Kimberly-Clark Corporation - Coosa Pines, AL
 Kimberly-Clark Forest Products Inc. - Terrace Bay, ON
 Kimberly-Clark Nova Scotia Inc. - New Glasgow, NS
 MacMillan Bloedel Limited - Port Alberni, BC
 Mead Corporation - Chillicothe, OH
 Mead Corporation - Escanaba, MI (2 units)
 Mead Corporation - Kingsport, TN
 MeadWestvaco - Phenix City, AL (2 units)
 Minn-Dak Farmers Cooperative - Wahpeton, ND
 Minnesota Power - Duluth, MN
 Minnesota Power - Grand Rapids, MN
 Mondi Group - Richards Bay, South Africa
 Mondi Group - Ružomberok, Slovakia (2 units)
 Mondi Group - Syktyvkar, Russia
 Montenay Onyx - Burnaby, BC
 NewPage Corporation - Rumford, ME
 NewPage Corporation - Wisconsin Rapids, WI
 New Ulm Public Utilities - New Ulm, MN
 Nine Dragons Paper - Rumford, ME
 Northwood Pulp & Timber, Inc. - Prince George, BC
 Packaging Corporation of America - Counce, TN
 Packaging Corporation of America - Tomahawk, WI
 Packaging Corporation of America - Valdosta, GA
 Plainwell Paper Company - Anderson, CA
 Pope & Talbot, Inc. - Halsey, OR
 Rayonier, Inc. - Jesup, GA
 ReEnergy Holdings - Lyonsdale, NY
 Repap British Columbia Inc. - Prince Rupert, BC
 Repap Manitoba - The Pas, Manitoba
 Riverwood International Corporation - West Monroe, LA
 Sappi - Ngodwana, South Africa
 Sappi North America - Muskegon, MI
 Sappi North America - Skowhegan, ME
 SCP - Ruzomberok, Slovakia
 Simpson Paper Co. - Eureka, CA
 Simpson Tacoma Kraft - Tacoma, WA
 Smurfit Cartón de Colombia - Cali, Colombia (2 units)
 Smurfit Mocarpe - San Felipe, Venezuela
 SP Newsprint - Newberg, OR
 Stone-Consolidated Corp. - Fort Frances, ON
 Stone-Consolidated Corp. - Portage du Fort, QC
 Stora Enso North America - Wisconsin Rapids, WI
 Tasman Pulp and Paper Company Ltd. - Kawerau, NZ
 Twin Rivers Paper - Edmundston, NB
 Western Pulp Limited Partnership - Squamish, BC
 Westvaco Corporation - Covington, VA
 Westvaco Corporation - Wickliffe, KY
 WestRock - Phenix City, AL (2 units)
 Weyerhaeuser Canada Ltd. - Kamloops, BC
 Weyerhaeuser Paper Company - Longview, WA
 Weyerhaeuser Paper Company - New Bern, NC
 Weyerhaeuser Paper Company - Oglethorpe, GA
 Weyerhaeuser Paper Company - Port Wentworth, GA
 Weyerhaeuser Paper Company - Springfield, OR (3 units)