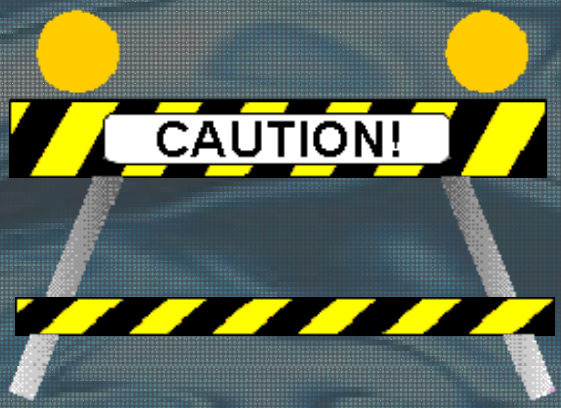
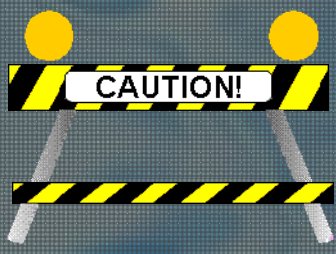


The Dead-End Danger Zone

How Uncirculating Water in Distribution System Dead-Ends Can Pose a Health Threat to Consumers

THE KUPFERLE FOUNDRY COMPANY
Since 1857
2511 North 9th Street, St. Louis, MO 63102
www.hydrants.com / info@hydrants.com
800-231-3990



STEP ONE: Recognizing the Threats

Dead-End Danger Zone Concern #1

Falling Disinfectant Residuals

- Disinfectant residuals can begin to drop within 200 hours (8.3 days) in uncirculating water*
- Depending on initial disinfectant residual levels, uncirculating water can become unsafe in 28 days or less*
- Once disinfectant residuals fall below minimum levels, they become ineffective in controlling the growth and spread of microbial pathogens**

Dead-End Danger Zone Concern #2

Rising Disinfectant Byproducts

- Disinfectant Byproducts (DBPs) form when naturally occurring organic material in water comes in contact with disinfectants and transform into TTHMs and HAAs†
- DBPs, when consumed, have been shown to cause health related issues, such as, atherosclerosis (heart disease) and kidney and/or liver cancers
- DBPs can begin to form in water in as little as 4-7 days††

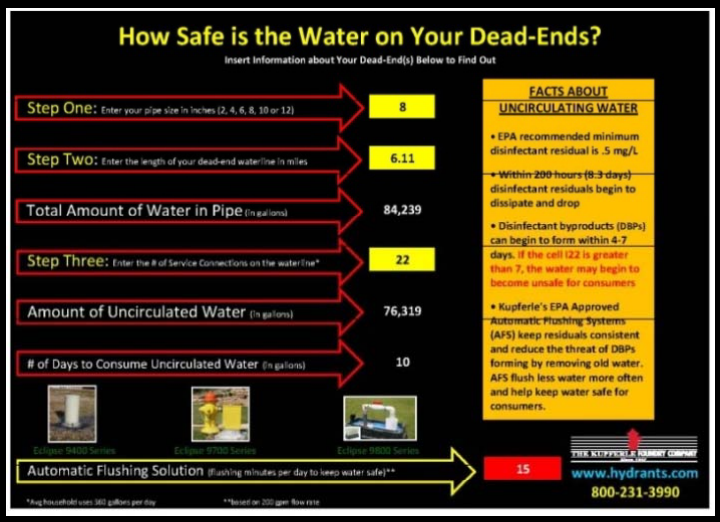
* "*Optimizing Distribution System Water Quality*", an AWWA Webcast – January 2010
** EPA Guidelines for residual level s are 4.0 mg/L (ppm) maximum, .5 mg/L (ppm) minimum
† EPA Guidelines for DBPs is .080 mg/L (ppm) for Trihalomethanes (TTHMs) and .060 mg/L (ppm) for Haloacetic Acids (HAAs)
†† *How Old Is Too Old for Distribution System Water?,* Opflow, March 2011

STEP TWO: Identifying Hazardous Dead-Ends

Water Quality Spreadsheet Calculator

- Easy to use, just input data
  - Pipe Size
  - Dead-End Length
  - # of service connections
- Automatically calculates results
  - Total amount of water in dead-end
  - Total amount of uncirculated water
  - # of days for excess water to be drawn off
  - Flushing minutes per day, based on needs analysis
- Assist in identifying problem dead-ends

FREE download at
www.hydrants.com



Complete Distribution Dead-End Analysis

- Complete distribution dead-end analysis
- Report sorts dead-ends based on water age
  - Identifies high risk dead-ends for DBPs
  - Identifies potential for low residuals
- Includes recommendations to address issues
- Assists in management of allocating resources

For a FREE complete analysis of your distribution system dead-ends contact us at:
analysis@hydrants.com

ABC Water Company

CRITICAL

Pipe Size	Dead-End Length in Miles	Total Water Volume	# of Service Connections	Total Uncirculated Water	# Days for Water Replacement	Recommended Daily Flush Times
10	5.8	124,886	34	112,646	9	54
12	3.9	121,079	38	107,399	8	47
6	5.7	44,181	14	39,141	8	17
8	5.4	74,407	18	67,927	10	35
8	8.3	114,366	21	106,806	14	60

HIGH

Pipe Size	Dead-End Length in Miles	Total Water Volume	# of Service Connections	Total Uncirculated Water	# Days for Water Recycling	Recommended Flush Times
6	5.4	41,855	16	36,095	6	13
4	10.3	35,484	12	31,164	7	13
4	2.6	8,957	5	7,157	4	1
6	6.7	51,932	23	43,652	5	13
8	8.1	111,610	41	96,850	7	38

MODERATE

Pipe Size	Dead-End Length in Miles	Total Water Volume	# of Service Connections	Total Uncirculated Water	# Days for Water Recycling	Recommended Flush Times
4	2.4	8,268	9	5,028	2	-3
6	3.8	29,454	19	22,614	3	1
4	5.1	17,570	12	13,250	3	0
4	4.7	16,192	11	12,232	3	0
6	6.2	48,056	41	33,296	2	-8

SAFE

Pipe Size	Dead-End Length in Miles	Total Water Volume	# of Service Connections	Total Uncirculated Water	# Days for Water Recycling	Recommended Flush Times
4	4.3	14,814	33	2,934	0	-23
10	2.1	45,217	53	26,137	1	-22
6	5.7	44,181	88	12,501	0	-59
8	9.1	125,389	143	73,909	1	-58

Portable Automatic Chlorine-Analyzer Flushing Device

- Attaches to existing fire hydrants or any 2½" NST blow-off
- Built-in Programmable Logic Control (PLC) and Chlorine Analyzer
- Analyzes residuals and compares to selected minimum level
- Automatically flushes when residuals are below minimum level
- Flushes exact amount of water needed to reach desired residual level
- Records data on residual levels and flushing times on micro SD card
- Data can be imported into a pre-formatted Excel file including tables, charts and graphs
- Can be used to calibrate Kupferle's Eclipse Automatics w/ hand-held controllers (9-volt battery powered)

Eclipse i-Series 9700i

STEP THREE: Solutions To Address Problems

Permanent Automatic Flushers w/ Chlorine Analyzer

- Designed for critical dead-ends that require constant residual /DBP maintenance
- Installs directly onto dead-end water main (requires line or solar power)
- Built-in Programmable Logic Control (PLC) and Chlorine Analyzer
- Analyzes residuals and compares to selected minimum level
- Automatically flushes when residuals are below minimum level
- Flushes exact amount of water needed to reach desired residual level
- Records data on residual levels and flushing times on micro SD card
- Import data into a pre-formatted spreadsheet that includes tables, charts and graphs
- Keeps water safe utilizing technology for the ultimate water flushing efficiency!

Eclipse i-Series 9800WCi

Permanent Automatic Flushing Devices

- Designed for critical or high risk dead-ends requiring year-round residual/DBP maintenance
- Provides programmable flushing times to keep residuals consistent and remove DBPs
- Includes programmable hand-held controller (9-volt battery operated)
- Adjustable solenoid-valve flushes up to 200 gpm (1" and 2" models)
- Direct (sanitary/storm sewer) or diffused surface discharge models available
- Warm and freezing climates models, with lockable UV resistant enclosures
- Keeps water safe for consumers, while saving time, water and money!

Eclipse 9800WC

Eclipse 9400

Portable Automatic Flushing Devices

- Designed for high or moderate risk dead-ends requiring periodic residual/DBP maintenance
- Attaches to existing fire hydrants or any 2½" NST blow-off
- Provides programmable flushing times to keep residuals consistent and remove DBPs
- Includes programmable hand-held controller (9-volt battery operated)
- Adjustable solenoid-valve flushes up to 200 gpm (1" and 2" models)
- Lockable powder-coated aluminum enclosure
- Keeps water safe for consumers, while saving time, water and money!

Eclipse 9700

Manual Blow-Offs

- Designed for moderate or safe dead-ends requiring annual or infrequent residual/DBP maintenance
- Easy to operate and repairable/maintainable from above ground – no digging!
- 2" and 4" sizes, above and below ground, warm and cold (self-draining) models available for a variety of applications

Eclipse #2

TF #500

TF #200

MainGuard #7500

MainGuard #77