



APPENDIX A

**TABLES OF WATER-DISTRIBUTION SYSTEM PIPELINE CHARACTERISTICS,
DOVER TOWNSHIP AREA, NEW JERSEY, 1962-96**



Table A-1. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1962¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	2,217	71.6	93.0	4,6,8,12	120
Cast iron (CI)	1950	53	1.6	2.1	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.1	2	130
Ductile iron (DI)	1950	77	2.4	3.1	6,8,12	130
Galvanized (GA)	1950	45	1.4	1.8	2	120

¹Assumed in-service date for all pipelines is January 1, 1962.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 2,402

Total length of pipe segments in model network: 77.1 miles

Total number of pipe junctions (nodes) in model network: 2,272

Table A-2. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1963¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	2,535	81.4	93.3	4,6,8,10,12	120
Cast iron (CI)	1950	59	1.8	2.1	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.1	2	130
Ductile iron (DI)	1950	79	2.4	2.8	6,8,12	130
Galvanized (GA)	1950	45	1.4	1.6	2	120
Plastic (PVC)	1963	1	0.04	0.05	12	140

¹Assumed in-service date for all pipelines is January 1, 1963.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 2,730

Total length of pipe segments in model network: 87.2 miles

Total number of pipe junctions (nodes) in model network: 2,571

Table A-3. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1964¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	2723	86.9	93.2	4,6,8,10,12	120
Cast iron (CI)	1950	60	1.8	1.9	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.1	2	130
Ductile iron (DI)	1950	86	2.9	3.1	6,8,12	130
Galvanized (GA)	1950	45	1.4	1.5	2	120
Plastic (PVC)	1963	1	0.04	0.04	12	140

¹Assumed in-service date for all pipelines is January 1, 1964.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 3,068

Total length of pipe segments in model network: 93.2 miles

Total number of pipe junctions (nodes) in model network: 2,884

Table A-4. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1965¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	3,402	108.9	94.4	4,6,8,10,12	120
Cast iron (CI)	1950	63	1.8	1.6	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.1	2	130
Ductile iron (DI)	1950	89	2.9	2.5	6,8,12	130
Galvanized (GA)	1950	45	1.4	1.2	2	120
Plastic (PVC)	1963	2	0.2	0.2	12	140

¹Assumed in-service date for all pipelines is January 1, 1965.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 3,613

Total length of pipe segments in model network: 115.3 miles

Total number of pipe junctions (nodes) in model network: 3,403

Table A-5. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1966¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	3,678	116.8	94.8	4,6,8,10,12	120
Cast iron (CI)	1950	63	1.8	1.5	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.1	2	130
Ductile iron (DI)	1950	89	2.9	2.4	6,8,12	130
Galvanized (GA)	1950	45	1.4	1.1	2	120
Plastic (PVC)	1963	2	0.2	0.2	12	140

¹Assumed in-service date for all pipelines is January 1, 1966.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 3,892

Total length of pipe segments in model network: 123.2 miles

Total number of pipe junctions (nodes) in model network: 3,666

Table A-6. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1967¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	4,050	128.9	95.3	4,6,8,10,12,16	120
Cast iron (CI)	1950	63	1.8	1.3	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.1	2	130
Ductile iron (DI)	1950	89	2.9	2.1	6,8,12	130
Galvanized (GA)	1950	45	1.4	1.0	2	120
Plastic (PVC)	1963	2	0.2	0.1	12	140

¹Assumed in-service date for all pipelines is January 1, 1967.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 4,267

Total length of pipe segments in model network: 135.3 miles

Total number of pipe junctions (nodes) in model network: 4,013

Table A-7. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1968¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	4,371	138.6	95.4	4,6,8,10,12,16	120
Cast iron (CI)	1950	68	1.9	1.3	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.1	2	130
Ductile iron (DI)	1950	97	3.1	2.1	6,8,12	130
Galvanized (GA)	1950	45	1.4	1.0	2	120
Plastic (PVC)	1963	2	0.2	0.1	12	140

¹Assumed in-service date for all pipelines is January 1, 1968.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 4,601

Total length of pipe segments in model network: 145.3 miles

Total number of pipe junctions (nodes) in model network: 4,327

Table A-8. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1969¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	4,868	150.9	95.3	4,6,8,10,12,16	120
Cast iron (CI)	1950	68	1.9	1.2	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.1	2	130
Ductile iron (DI)	1950	101	3.4	2.1	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.9	2	120
Plastic (PVC)	1963	20	0.6	0.4	6,8,12	140

¹Assumed in-service date for all pipelines is January 1, 1969.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 5,115

Total length of pipe segments in model network: 158.3 miles

Total number of pipe junctions (nodes) in model network: 4,808

Table A-9. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1970¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	5638	174.3	96.0	4,6,8,10,12,16	120
Cast iron (CI)	1950	68	1.9	1.0	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.1	2	130
Ductile iron (DI)	1950	98	3.2	1.8	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.8	2	120
Plastic (PVC)	1963	24	0.7	0.4	6,12,16	140

¹Assumed in-service date for all pipelines is January 1, 1970.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 5,891

Total length of pipe segments in model network: 181.6 miles

Total number of pipe junctions (nodes) in model network: 5,536

Table A-10. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1971¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	6,319	193.0	96.4	4,6,8,10,12,16	120
Cast iron (CI)	1950	68	1.9	0.9	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.05	2	130
Ductile iron (DI)	1950	98	3.2	1.6	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.7	2	120
Plastic (PVC)	1963	24	0.7	0.3	6,12,16	140

¹Assumed in-service date for all pipelines is January 1, 1971.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 6,584

Total length of pipe segments in model network: 200.3 miles

Total number of pipe junctions (nodes) in model network: 6,165

Table A-11. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1972¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	6,696	203.8	96.5	4,6,8,10,12,16	120
Cast iron (CI)	1950	75	2.0	0.9	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.05	2	130
Ductile iron (DI)	1950	98	3.2	1.6	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.7	2	120
Plastic (PVC)	1963	24	0.7	0.3	6,12,16	140

¹Assumed in-service date for all pipelines is January 1, 1972.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 6,970

Total length of pipe segments in model network: 211.2 miles

Total number of pipe junctions (nodes) in model network: 6,526

Table A-12. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1973¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	7,213	219.0	96.6	4,6,8,10,12,16	120
Cast iron (CI)	1950	75	2.0	0.9	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.04	2	130
Ductile iron (DI)	1950	108	3.5	1.5	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.6	2	120
Plastic (PVC)	1963	24	0.7	0.3	6,12,16	140
Plastic (PE)	1973	1	0.01	0.0	2	140

¹Assumed in-service date for all pipelines is January 1, 1973.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 7,488

Total length of pipe segments in model network: 226.7 miles

Total number of pipe junctions (nodes) in model network: 7,004

Table A-13. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1974¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	7,628	233.0	96.8	4,6,8,10,12,16	120
Cast iron (CI)	1950	76	2.0	0.8	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.04	2	130
Ductile iron (DI)	1950	108	3.5	1.5	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.6	2	120
Plastic (PVC)	1963	24	0.7	0.3	6,12,16	140
Plastic (PE)	1973	1	0.01	0.0	2	140

¹Assumed in-service date for all pipelines is January 1, 1974.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 7,904

Total length of pipe segments in model network: 240.7 miles

Total number of pipe junctions (nodes) in model network: 7,390

Table A-14. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1975¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	8,041	245.5	96.9	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.8	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.04	2	130
Ductile iron (DI)	1950	109	3.5	1.4	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.6	2	120
Plastic (PVC)	1963	24	0.7	0.3	6,12,16	140
Plastic (PE)	1973	1	0.01	0.0	2	140

¹Assumed in-service date for all pipelines is January 1, 1975.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 8,320

Total length of pipe segments in model network: 253.3 miles

Total number of pipe junctions (nodes) in model network: 7,765

Table A-15. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1976¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	8,281	251.9	96.3	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.8	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.04	2	130
Ductile iron (DI)	1950	142	5.1	1.9	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.4	2	120
Plastic (PVC)	1963	24	0.7	0.3	6,12,16	140
Plastic (PE)	1973	5	0.1	0.04	2	140

¹Assumed in-service date for all pipelines is January 1, 1976.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 8,565

Total length of pipe segments in model network: 259.7 miles

Total number of pipe junctions (nodes) in model network: 7,991

Table A-16. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1977¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	8,516	260.7	96.3	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.7	2,4,6,6,10,12	130
Copper (CP)	1950	3	0.1	0.04	2	130
Ductile iron (DI)	1950	142	5.1	1.9	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.4	2	120
Plastic (PVC)	1963	24	0.7	0.3	6,12,16	140
Plastic (PE)	1973	36	0.6	0.2	2	140

¹Assumed in-service date for all pipelines is January 1, 1977.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 8,863

Total length of pipe segments in model network: 270.6 miles

Total number of pipe junctions (nodes) in model network: 8,262

Table A-17. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1978¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	8,983	273.3	96.3	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.7	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.04	2	130
Ductile iron (DI)	1950	159	5.4	1.9	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.5	2	120
Plastic (PVC)	1963	24	0.7	0.2	6,12,16	140
Plastic (PE)	1973	52	0.9	0.3	2	140

¹Assumed in-service date for all pipelines is January 1, 1978.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 9,363

Total length of pipe segments in model network: 283.8 miles

Total number of pipe junctions (nodes) in model network: 8,718

Table A-18. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1979¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,295	283.3	95.9	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.7	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.03	2	130
Ductile iron (DI)	1950	167	5.5	1.9	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.5	2	120
Plastic (PVC)	1963	26	0.9	0.2	6,12,16	140
Plastic (PE)	1973	101	2.0	2.0	2	140

¹Assumed in-service date for all pipelines is January 1, 1979.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 9,733

Total length of pipe segments in model network: 295.2 miles

Total number of pipe junctions (nodes) in model network: 9,056

Table A-19. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1980¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,431	287.7	95.7	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.7	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.03	2	130
Ductile iron (DI)	1950	167	5.5	1.8	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.5	2	120
Plastic (PVC)	1963	33	1.3	0.4	6,8,12,16	140
Plastic (PE)	1973	124	2.4	0.8	2	140

¹Assumed in-service date for all pipelines is January 1, 1980.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 9,904

Total length of pipe segments in model network: 300.5 miles

Total number of pipe junctions (nodes) in model network: 9,212

Table A-20. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1981¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,495	289.7	93.8	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.6	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.03	2	130
Ductile iron (DI)	1950	167	5.5	1.8	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.5	2	120
Plastic (PVC)	1963	235	7.2	2.3	6,8,12,16	140
Plastic (PE)	1973	146	2.7	0.9	2	140
Plastic (IPS)	1981	10	0.1	0.03	2	140

¹Assumed in-service date for all pipelines is January 1, 1981.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 10,199

Total length of pipe segments in model network: 308.8 miles

Total number of pipe junctions (nodes) in model network: 9,490

Table A-21. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1982¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	92.1	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.6	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.03	2	130
Ductile iron (DI)	1950	167	5.5	1.7	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.4	2	120
Plastic (PVC)	1963	378	12.4	3.9	6,8,12,16	140
Plastic (PE)	1973	172	3.2	1.0	2	140
Plastic (IPS)	1981	10	0.1	0.03	2	140

¹Assumed in-service date for all pipelines is January 1, 1982.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 10,370

Total length of pipe segments in model network: 314.6miles

Total number of pipe junctions (nodes) in model network: 9,646

Table A-22. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1983¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	89.5	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.6	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.03	2	130
Ductile iron (DI)	1950	168	5.5	1.7	6,8,12	130
Galvanized (GA)	1950	45	1.4	0.4	2	120
Plastic (PVC)	1963	672	21.0	6.5	2,6,8,12,16	140
Plastic (PE)	1973	202	3.9	1.2	2	140
Plastic (IPS)	1981	10	0.1	0.03	2	140

¹Assumed in-service date for all pipelines is January 1, 1983.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 10,697

Total length of pipe segments in model network: 323.9 miles

Total number of pipe junctions (nodes) in model network: 9,944

Table A-23. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1984¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	85.3	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.6	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.03	2	130
Ductile iron (DI)	1950	178	5.9	1.7	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.4	2	120
Plastic (PVC)	1963	1,193	35.3	10.4	2,6,8,12,16	140
Plastic (PE)	1973	250	5.1	1.5	2	140
Plastic (IPS)	1981	10	0.1	0.03	2	140

¹Assumed in-service date for all pipelines is January 1, 1984.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 11,276

Total length of pipe segments in model network: 339.8 miles

Total number of pipe junctions (nodes) in model network: 10,488

Table A-24. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1985¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	81.8	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.6	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.03	2	130
Ductile iron (DI)	1950	181	6.0	1.7	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.4	2	120
Plastic (PVC)	1963	1,675	48.8	13.8	2,6,8,12,16	140
Plastic (PE)	1973	276	5.9	1.7	2	140
Plastic (IPS)	1981	10	0.1	0.03	2	140

¹Assumed in-service date for all pipelines is January 1, 1985.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 11,782

Total length of pipe segments in model network: 354.1 miles

Total number of pipe junctions (nodes) in model network: 10,962

Table A-25. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1986¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	73.3	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.5	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.03	2	130
Ductile iron (DI)	1950	187	6.2	1.6	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.4	2	120
Plastic (PVC)	1963	3,065	90.0	22.8	2,4,6,8,12,16	140
Plastic (PE)	1973	277	5.9	1.5	2	140
Plastic (IPS)	1981	10	0.1	0.03	2	140

¹Assumed in-service date for all pipelines is January 1, 1986.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 13,180

Total length of pipe segments in model network: 395.5 miles

Total number of pipe junctions (nodes) in model network: 12,292

Table A-26. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1987¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	71.3	4,6,8,10,12,16	120
Cast iron (CI)	1950	77	2.0	0.5	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.02	2	130
Ductile iron (DI)	1950	188	6.2	1.5	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.3	2	120
Plastic (PVC)	1963	3,331	100.7	24.8	2,4,6,8,12,16	140
Plastic (PE)	1973	278	5.9	1.5	2	140
Plastic (IPS)	1981	10	0.1	0.02	2	140

¹Assumed in-service date for all pipelines is January 1, 1987.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 13,447

Total length of pipe segments in model network: 406.2 miles

Total number of pipe junctions (nodes) in model network: 12,545

Table A-27. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1988¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	67.9	4,6,8,10,12,16	120
Cast iron (CI)	1950	78	2.0	0.5	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.02	2	130
Ductile iron (DI)	1950	192	6.2	1.5	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.3	2	120
Plastic (PVC)	1963	3,932	121.0	28.4	2,4,6,8,12,16	140
Plastic (PE)	1973	279	6.0	1.4	2	140
Plastic (IPS)	1981	10	0.1	0.02	2	140

¹Assumed in-service date for all pipelines is January 1, 1988.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 14,050
 Total length of pipe segments in model network: 426.6 miles
 Total number of pipe junctions (nodes) in model network: 13,114

Table A-28. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1989¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	66.0	4,6,8,10,12,16	120
Cast iron (CI)	1950	78	2.0	0.5	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.02	2	130
Ductile iron (DI)	1950	193	6.3	1.4	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.3	2	120
Plastic (PVC)	1963	4,408	133.5	30.4	2,4,6,8,12,16	140
Plastic (PE)	1973	280	6.0	1.4	2	140
Plastic (IPS)	1981	10	0.1	0.02	2	140

¹Assumed in-service date for all pipelines is January 1, 1989.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 14,528
 Total length of pipe segments in model network: 439.2 miles
 Total number of pipe junctions (nodes) in model network: 13,543

Table A-29. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1990¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	65.4	4,6,8,10,12,16	120
Cast iron (CI)	1950	78	2.0	0.5	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.02	2	130
Ductile iron (DI)	1950	193	6.3	1.4	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.3	2	120
Plastic (PVC)	1963	4,510	137.4	31.0	2,4,6,8,12,16	140
Plastic (PE)	1973	280	6.0	1.4	2	140
Plastic (IPS)	1981	10	0.1	0.02	2	140

¹Assumed in-service date for all pipelines is January 1, 1990.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information
 Total number of pipe segments (links) in model network: 14,629
 Total length of pipe segments in model network: 443.1 miles
 Total number of pipe junctions (nodes) in model network: 13,632

Table A-30. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1991¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	64.7	4,6,8,10,12,16	120
Cast iron (CI)	1950	78	2.0	0.4	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.02	2	130
Ductile iron (DI)	1950	193	6.3	1.4	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.3	2	120
Plastic (PVC)	1963	4,646	142.2	31.7	2,4,6,8,12,16	140
Plastic (PE)	1973	280	6.0	1.3	2	140
Plastic (IPS)	1981	10	0.1	0.02	2	140

¹Assumed in-service date for all pipelines is January 1, 1991.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information
 Total number of pipe segments (links) in model network: 14,773
 Total length of pipe segments in model network: 447.9 miles
 Total number of pipe junctions (nodes) in model network: 13,770

Table A-31. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1992¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	64.2	4,6,8,10,12,16	120
Cast iron (CI)	1950	78	2.0	0.4	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.02	2	130
Ductile iron (DI)	1950	193	6.3	1.4	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.3	2	120
Plastic (PVC)	1963	4,746	145.4	32.2	2,4,6,8,12,16	140
Plastic (PE)	1973	280	6.0	1.3	2	140
Plastic (IPS)	1981	10	0.1	0.02	2	140

¹Assumed in-service date for all pipelines is January 1, 1992.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 14,874

Total length of pipe segments in model network: 451.2 miles

Total number of pipe junctions (nodes) in model network: 13,863

Table A-32. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1993¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	63.2	4,6,8,10,12,16	120
Cast iron (CI)	1950	78	2.0	0.4	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.02	2	130
Ductile iron (DI)	1950	193	6.3	1.4	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.3	2	120
Plastic (PVC)	1963	4,986	152.5	33.3	2,4,6,8,12,16	140
Plastic (PE)	1973	280	6.0	1.3	2	140
Plastic (IPS)	1981	10	0.1	0.02	2	140

¹Assumed in-service date for all pipelines is January 1, 1993.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 15,112

Total length of pipe segments in model network: 458.2 miles

Total number of pipe junctions (nodes) in model network: 14,083

Table A-33. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1994¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	62.1	4,6,8,10,12,16	120
Cast iron (CI)	1950	78	2.0	0.4	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.02	2	130
Ductile iron (DI)	1950	194	6.3	1.3	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.3	2	120
Plastic (PVC)	1963	5,316	161.1	34.5	2,4,6,8,12,16	140
Plastic (PE)	1973	280	6.0	1.3	2	140
Plastic (IPS)	1981	10	0.1	0.02	2	140

¹Assumed in-service date for all pipelines is January 1, 1994.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 15,444

Total length of pipe segments in model network: 466.9 miles

Total number of pipe junctions (nodes) in model network: 14,402

Table A-34. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1995¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	61.3	4,6,8,10,12,16	120
Cast iron (CI)	1950	78	2.0	0.4	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.02	2	130
Ductile iron (DI)	1950	194	6.3	1.3	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.3	2	120
Plastic (PVC)	1963	5,560	166.9	35.3	2,4,6,8,12,16	140
Plastic (PE)	1973	280	6.0	1.3	2	140
Plastic (IPS)	1981	10	0.1	0.02	2	140

¹Assumed in-service date for all pipelines is January 1, 1995.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 15,688

Total length of pipe segments in model network: 472.7 miles

Total number of pipe junctions (nodes) in model network: 14,629

Table A-35. Water-distribution system pipeline characteristics, Dover Township area, New Jersey, 1996¹

Pipe material (model identification) ²	Year pipeline first installed	Numer of pipe segments in model network	Length of pipe segments in model network (miles)	Percentage of total model network by length (percent)	Range of pipe diameters in model network (inches)	Value of Hazen-Williams “C-Factor” used in model ³ (dimensionless)
Asbestos cement (AC)	1950	9,505	289.8	60.1	4,6,8,10,12,16	120
Cast iron (CI)	1950	78	2.0	0.4	2,4,6,8,10,12	130
Copper (CP)	1950	3	0.1	0.02	2	130
Ductile iron (DI)	1950	194	6.3	1.3	6,8,12,16	130
Galvanized (GA)	1950	45	1.4	0.3	2	120
Plastic (PVC)	1963	5,920	176.4	36.6	2,4,6,8,12,16	140
Plastic (PE)	1973	280	6.0	1.2	2	140
Plastic (IPS)	1981	10	0.1	0.02	2	140

¹Assumed in-service date for all pipelines is January 1, 1996.

²Data for pipe material, year first installed, year last installed, and range of pipe diameters from Flegal (1997).

³From Rossman (2000, Table 3.2).

Additional information

Total number of pipe segments (links) in model network: 16,048

Total length of pipe segments in model network: 482.1 miles

Total number of pipe junctions (nodes) in model network: 14,965

