

# INSULATION STANDARD SPECIFICATIONS

INSULATION STANDARD	LOCATION	PLANT SERVICE	DESIGN TEMPERATURE (°F)	INSULATION TYPE	INSULATION DESIGN STANDARD	THICKNESS (IN.)	THERMAL CONDUCTIVITY (BTU IN/HR-FT <sup>2</sup> °F @75°F)	MAXIMUM TEMPERATURE (°F)	VAPOR BARRIER JACKET	ASTM E84 FLAME SPREAD	ASTM E84 SMOKE DEVELOPMENT	MANUFACTURER	INSULATION CONSTRUCTION	JACKET TYPE	JACKET THICKNESS	JACKET DESIGN STANDARDS	JACKET JOINING METHOD	JACKET FITTINGS	MOSTURE BARRIER	BANDING	MANUFACTURERS	
UI-GSP-INS	MPP	GENERAL SERVICE	350	MINERAL WOOL PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.22	1200	N/A	<25	<50	INDUSTRIAL INSULATION GROUP - MINWOOL 1200 PIPE, OR EQUAL	N/A	ALUMINUM SHEET - STUCCO FINISH	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS	ITW INSULATION SYSTEMS OR EQUAL BY JM PABCO/CHILDERS	
UI-MPP-LPS-INS	MPP	LOW PRESSURE STEAM	530	MINERAL WOOL PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.22	1200	N/A	<25	<50	INDUSTRIAL INSULATION GROUP - MINWOOL 1200 PIPE, OR EQUAL	N/A	ALUMINUM SHEET - STUCCO FINISH	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS	ITW INSULATION SYSTEMS OR EQUAL BY JM PABCO/CHILDERS	
UI-MPP-MPS-INS	MPP	MEDIUM PRESSURE STEAM	775	CALCIUM SILICATE PIPE INSULATION	ASTM C533, TYPE 1	SEE INSULATION THICKNESS REFERENCE TABLE	0.33	1200	N/A	N/A	N/A	INDUSTRIAL INSULATION GROUP - THERMO 12 GOLD, OR EQUAL	N/A	ALUMINUM SHEET - STUCCO FINISH	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS	ITW INSULATION SYSTEMS OR EQUAL BY JM PABCO/CHILDERS	
UI-MPP-HPS-INS	MPP	HIGH PRESSURE STEAM	775	CALCIUM SILICATE PIPE INSULATION	ASTM C533, TYPE 1	SEE INSULATION THICKNESS REFERENCE TABLE	0.33	1200	N/A	N/A	N/A	INDUSTRIAL INSULATION GROUP - THERMO 12 GOLD, OR EQUAL	N/A	ALUMINUM SHEET - STUCCO FINISH	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS	ITW INSULATION SYSTEMS OR EQUAL BY JM PABCO/CHILDERS	
UI-MPP-LP-CON-INS	MPP	LOW PRESSURE CONDENSATE	530	MINERAL WOOL PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.22	1200	N/A	<25	<50	INDUSTRIAL INSULATION GROUP - MINWOOL 1200 PIPE, OR EQUAL	N/A	ALUMINUM SHEET - STUCCO FINISH	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS	ITW INSULATION SYSTEMS OR EQUAL BY JM PABCO/CHILDERS	
UI-MPP-MP-CON-INS	MPP	MEDIUM PRESSURE CONDENSATE	775	MINERAL WOOL PIPE INSULATION	ASTM C533, TYPE 1	SEE INSULATION THICKNESS REFERENCE TABLE	0.33	1200	N/A	N/A	N/A	INDUSTRIAL INSULATION GROUP - THERMO 12 GOLD, OR EQUAL	N/A	ALUMINUM SHEET - STUCCO FINISH	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS	ITW INSULATION SYSTEMS OR EQUAL BY JM PABCO/CHILDERS	
UI-MPP-HP-CON-INS	MPP	HIGH PRESSURE CONDENSATE	775	MINERAL WOOL PIPE INSULATION	ASTM C533, TYPE 1	SEE INSULATION THICKNESS REFERENCE TABLE	0.33	1200	N/A	N/A	N/A	INDUSTRIAL INSULATION GROUP - THERMO 12 GOLD, OR EQUAL	N/A	ALUMINUM SHEET - STUCCO FINISH	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS	ITW INSULATION SYSTEMS OR EQUAL BY JM PABCO/CHILDERS	
UI-DSH-INS	MPP	DESUPERHEATER WATER	400	MINERAL WOOL PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.22	1200	N/A	<25	<50	INDUSTRIAL INSULATION GROUP - MINWOOL 1200 PIPE, OR EQUAL	N/A	ALUMINUM SHEET - STUCCO FINISH	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS	ITW INSULATION SYSTEMS OR EQUAL BY JM PABCO/CHILDERS	
UI-RWS-INS	MPP	RIVER WATER	100	CLOSED CELL FOAM INSULATION	ASTM C534	SEE INSULATION THICKNESS REFERENCE TABLE	0.25	220	VAPOR BARRIER REQUIRED	N/A	N/A	ARMACELL - ARMAFLEX OR EQUAL BY AEROFLEX OR K-FLEX	N/A	POLYVINYL CHLORIDE (PVC) - GREEN	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE	
UI-BOS/BDS-INS	MPP	BOILER BLOWDOWN AND BOILER BLOWOFF	500	MINERAL WOOL PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.22	1200	N/A	<25	<50	INDUSTRIAL INSULATION GROUP - MINWOOL 1200 PIPE, OR EQUAL	N/A	ALUMINUM SHEET - STUCCO FINISH	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS	ITW INSULATION SYSTEMS OR EQUAL BY JM PABCO/CHILDERS	
UI-NRBR-INS (1)	MPP	NON-ROUND BREECHING	300	MINERAL WOOL INSULATION WRAP	ASTM A553, TYPE 1	SEE INSULATION THICKNESS REFERENCE TABLE	0.22	1200	N/A	<25	<50	INDUSTRIAL INSULATION GROUP - MINWOOL 1200 PIPE AND TANK WRAP, OR EQUAL	STAINLESS STEEL HEX WIRE METAL MESH, BOTH SIDES; TO BE INSTALLED WITH PE-9 OUTER LAYER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
UI-NRBR-INS (2)	MPP	NON-ROUND BREECHING	300	MINERAL WOOL INSULATION BOARD	ASTM C612	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	1200	N/A	<25	<50	INDUSTRIAL INSULATION GROUP - MINWOOL 1200 PIPE AND TANK WRAP, OR EQUAL	N/A	ALUMINUM LAGGING - STUCCO EMBOSSED	0.04" THICK; 1 1/2" DEEP RIBBED SIDING	ASTM B209-96	N/A	N/A	N/A	N/A	INSTALL HAT CHANNEL BENEATH LAGGING	ALCOA ALCLAD 3004
UI-MPP-LPS-VLV-INS	MPP	REMOVABLE COVERS FOR LOW PRESSURE STEAM MANUAL AND MOTOR OPERATED VALVES	530	PYROGEL XT-E AEROGEL INSULATION	N/A	SEE INSULATION THICKNESS REFERENCE TABLE	0.24 @ 572°F	1200	N/A	N/A	N/A	ASPEN AEROGEL	HOT SIDE: TEFLON/FIBERGLASS COMPOSITE JACKETING; 16.5 OZ/YD <sup>2</sup> ; MINIMUM SERVICE TEMPERATURE 600°F	COLD SIDE: 1700-S SILICONE COATED FIBERGLASS CLOTH JACKET; CLOTH SHALL BE GRAY, COATED BOTH SIDES WITH SILICONE	17 OZ/YD <sup>2</sup>	N/A	0.114" DIAMETER ARAMID FIBER THREAD WITH BREAKING STRENGTH OF 35 LBS. USE DOUBLE SEWN LOCK STITCHES AT A MINIMUM OF 4-6 STITCHES PER INCH	2" WIDE FLAP WITH VELCRO® LOOP WHICH MATES TO A 1 1/2" WIDE STRIP OF VELCRO® HOOK SEWN ON THE OUTER COVER OF THE JACKET. 2" FLAP SHALL BE SECURED WITH HT NYLON STRAPS AND STAINLESS STEEL DOUBLE "D" RINGS EVERY 9" TO 12". ANODIZED ALUMINUM IDENTIFICATION TAGS WITH THE FOLLOWING VALVE/ITEM INFORMATION: NUMBER, DESCRIPTION, LOCATION, SIZE, INSULATION TYPE, INSULATION THICKNESS	N/A	N/A	TANI DIVISION	
UI-MPP-HPS/MPS-VLV-INS	MPP	REMOVABLE COVERS FOR HIGH PRESSURE AND MEDIUM PRESSURE STEAM MOTOR OPERATED VALVES	775	PYROGEL XT-E AEROGEL INSULATION	N/A	SEE INSULATION THICKNESS REFERENCE TABLE	0.24 @ 572°F	1200	N/A	N/A	N/A	ASPEN AEROGEL	HOT SIDE: ONE LAYER OF 321 STAINLESS STEEL MESH 0.011" DIAMETER IN DIRECT CONTACT WITH PIPE. ONE LAYER OF VERMICULITE COATED FIBERGLASS CLOTH; MAXIMUM TEMPERATURE 1500°F	COLD SIDE: 1700-S SILICONE COATED FIBERGLASS CLOTH JACKET; CLOTH SHALL BE GRAY, COATED BOTH SIDES WITH SILICONE	17 OZ/YD <sup>2</sup>	N/A	0.114" DIAMETER ARAMID FIBER THREAD WITH BREAKING STRENGTH OF 35 LBS. USE DOUBLE SEWN LOCK STITCHES AT A MINIMUM OF 4-6 STITCHES PER INCH; STITCHES SHALL BE SEWN THROUGH BOTH LAYERS OF CLOTH AND INSULATION CORE	MINIMUM 2" PARTING SEAM FLAPS SECURED WITH VERMICULITE COATED FIBERGLASS CLOTH STRAPS AND STAINLESS STEEL DOUBLE "D" RINGS EVERY 9" TO 12"; MINIMUM 3" WIDE SEALING FLAP WITH 3/16" DIAMETER ARAMID PULL CORD WITH BREAKING STRENGTH OF 500LBS WHERE THE INSULATION JACKET AND ADJOINING PIPE INSULATION MEET; ANODIZED ALUMINUM IDENTIFICATION TAGS WITH THE FOLLOWING VALVE/ITEM INFORMATION: NUMBER, DESCRIPTION, LOCATION, SIZE, INSULATION TYPE, INSULATION THICKNESS	N/A	N/A	TANI DIVISION	
UI-MUS/PWS-INS (INT)	MPP, OPP	MAKEUP WATER AND POTABLE WATER - INTERIOR	40	CELLULAR GLASS FOAM INSULATION	ASTM C522, TYPE II AND III	SEE INSULATION THICKNESS REFERENCE TABLE	0.29	250	VAPOR BARRIER REQUIRED	<25	<50	OWENS CORNING FOAMGLAS	N/A	POLYVINYL CHLORIDE (PVC) - LIGHT GREEN	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE	
UI-MUS/PWS-INS (EXT)	MPP, OPP	MAKEUP WATER AND POTABLE WATER - EXTERIOR	40	CELLULAR GLASS FOAM INSULATION	ASTM C522, TYPE II AND III	SEE INSULATION THICKNESS REFERENCE TABLE	0.29	250	VAPOR BARRIER REQUIRED	<25	<50	OWENS CORNING FOAMGLAS	N/A	POLYVINYL CHLORIDE (PVC) - LIGHT GREEN	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE	
UI-FW-INS	MPP, OPP	BOILER FEEDWATER	400	MINERAL WOOL PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.22	1200	N/A	<25	<50	INDUSTRIAL INSULATION GROUP - MINWOOL 1200 PIPE, OR EQUAL	N/A	ALUMINUM SHEET - STUCCO FINISH	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS	ITW INSULATION SYSTEMS OR EQUAL BY JM PABCO/CHILDERS	
UI-GFS-INS	MPP, OPP	NATURAL GAS	100	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	FACTORY-APPLIED FOIL KRAFT PER ASTM C1136 WITH SELF-SEALING ADHESIVE JOINTS	N/A	N/A	INDUSTRIAL INSULATION GROUP - MICRO-LOK HP	N/A	POLYVINYL CHLORIDE (PVC) - YELLOW	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE	
UI-SEW-INS (INT)	ALL PLANTS	STORM AND SANITARY SEWER - INTERIOR	35	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	VAPOR BARRIER REQUIRED	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	POLYVINYL CHLORIDE (PVC) - WHITE	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE	
UI-SEW-INS (EXT)	ALL PLANTS	STORM AND SANITARY SEWER - EXTERIOR	35	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	N/A	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	WB FINISH WITH POLYVINYL CHLORIDE (PVC) - WHITE	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE	
UI-HWS/HWR-INS	OPP	HOT WATER SUPPLY AND RETURN	250	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	VAPOR BARRIER REQUIRED	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	POLYVINYL CHLORIDE (PVC) - PURPLE	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE	
UI-PCW-INS (CS)	CWP, OPP	PROCESS WATER - INTERIOR	40	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	VAPOR BARRIER REQUIRED	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	POLYVINYL CHLORIDE (PVC) - GREEN	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE	
UI-PCW-INS (SS)	CWP, OPP	PROCESS WATER - EXTERIOR	40	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	N/A	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	ALUMINUM SHEET - STUCCO FINISH	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS	ITW INSULATION SYSTEMS OR EQUAL BY JM PABCO/CHILDERS	
UI-CHW-INS	CWP, OPP	CHILLED WATER SUPPLY AND RETURN	40	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	VAPOR BARRIER REQUIRED	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	POLYVINYL CHLORIDE (PVC) - BLUE	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE	

## INSULATION STANDARD SPECIFICATIONS

INSULATION STANDARD	LOCATION	PLANT SERVICE	DESIGN TEMPERATURE (°F)	INSULATION TYPE	INSULATION DESIGN STANDARD	THICKNESS (IN.)	THERMAL CONDUCTIVITY (BTU IN/HR-FT <sup>2</sup> °F @75°F)	MAXIMUM TEMPERATURE (°F)	VAPOR BARRIER JACKET	ASTM E84 FLAME SPREAD	ASTM E84 SMOKE DEVELOPMENT	MANUFACTURER	INSULATION CONSTRUCTION	JACKET TYPE	JACKET THICKNESS	JACKET DESIGN STANDARDS	JACKET JOINING METHOD	JACKET FITTINGS	MOSTURE BARRIER	BANDING	MANUFACTURERS
UI-CS-INS (INT)	CWP, OPP	CONDENSER WATER - INTERIOR	40	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	VAPOR BARRIER REQUIRED	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	POLYVINYL CHLORIDE (PVC) - GRAY	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHN MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE
UI-CS-INS (EXT)	CWP, OPP	CONDENSER WATER - EXTERIOR	40	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	N/A	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	ALUMINUM SHEET - STUCCO FINISH	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PREFORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYURETHANE, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS	ITW INSULATION SYSTEMS OR EQUAL BY JM PABCOCHILDERS
UI-LPS-INS	CWP, OPP	LOW PRESSURE STEAM	300	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	N/A	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	POLYVINYL CHLORIDE (PVC) - ORANGE	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHN MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE
UI-HPS-INS	CWP, OPP	HIGH PRESSURE STEAM FOR CHILLED WATER PLANT	400	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	N/A	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	POLYVINYL CHLORIDE (PVC) - RED	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHN MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE
UI-LP-CON-INS	CWP, OPP	LOW PRESSURE CONDENSATE	300	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	N/A	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	POLYVINYL CHLORIDE (PVC) - GRAY	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHN MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE
UI-HP-CON-INS	CWP, OPP	MEDIUM PRESSURE CONDENSATE	400	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	N/A	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	POLYVINYL CHLORIDE (PVC) - GRAY	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHN MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE
UI-LPS-VLV-INS	CWP, OPP	REMOVABLE COVERS FOR LOW PRESSURE STEAM MANUAL AND MOTOR OPERATED VALVES	300	PYROGEL XT-E AEROGEL INSULATION	N/A	SEE INSULATION THICKNESS REFERENCE TABLE	0.24 @ 572°F	1200	N/A	N/A	N/A	ASPEN AEROGEL	HOT SIDE: TEFLOM/FIBERGLASS COMPOSITE, JACKETING: 16.5 OZ/YD <sup>2</sup> , MINIMUM SERVICE TEMPERATURE 600°F	COLD SIDE: 1700-S SILICONE COATED FIBERGLASS CLOTH JACKET. CLOTH SHALL BE GRAY, COATED BOTH SIDES WITH SILICONE	17 OZ/YD <sup>2</sup>	N/A	0.114" DIAMETER ARAMID FIBER THREAD WITH BREAKING STRENGTH OF 35 LBS. USE DOUBLE SEWN LOCK STITCHES AT A MINIMUM OF 4-6 STITCHES PER INCH	2" WIDE FLAP WITH VELCRO® LOOP WHICH MATES TO A 1 1/2" WIDE STRIP OF VELCRO® HOOK SEWN ON THE OUTER COVER OF THE JACKET. 2" FLAP SHALL BE SECURED WITH HT NYLON STRAPS AND STAINLESS STEEL DOUBLE "D" RINGS EVERY 9" TO 12". ANODIZED ALUMINUM IDENTIFICATION TAGS WITH THE FOLLOWING VALVE/ITEM INFORMATION: NUMBER, DESCRIPTION, LOCATION, SIZE, INSULATION TYPE, INSULATION THICKNESS	N/A	N/A	TANI DIVISION
UI-HPS-VLV-INS	CWP, OPP	REMOVABLE COVERS FOR HIGH PRESSURE AND MEDIUM PRESSURE STEAM MOTOR OPERATED VALVES	400	PYROGEL XT-E AEROGEL INSULATION	N/A	SEE INSULATION THICKNESS REFERENCE TABLE	0.24 @ 572°F	1200	N/A	N/A	N/A	ASPEN AEROGEL	HOT SIDE: ONE LAYER OF 321 STAINLESS STEEL MESH 0.011" DIAMETER IN DIRECT CONTACT WITH PIPE, ONE LAYER OF VERMICULITE COATED FIBERGLASS CLOTH; MAXIMUM TEMPERATURE 1500°F	COLD SIDE: 1700-S SILICONE COATED FIBERGLASS CLOTH JACKET. CLOTH SHALL BE GRAY, COATED BOTH SIDES WITH SILICONE	17 OZ/YD <sup>2</sup>	N/A	0.114" DIAMETER ARAMID FIBER THREAD WITH BREAKING STRENGTH OF 35 LBS. USE DOUBLE SEWN LOCK STITCHES AT A MINIMUM OF 4-6 STITCHES PER INCH; STITCHES SHALL BE SEWN THROUGH BOTH LAYERS OF CLOTH AND INSULATION CORE	MINIMUM 2" PARTING SEAM FLAPS SECURED WITH VERMICULITE COATED FIBERGLASS CLOTH STRAPS AND STAINLESS STEEL DOUBLE "D" RINGS EVERY 9" TO 12". MINIMUM 3" WIDE SEALING FLAP WITH 3/16" DIAMETER ARAMID PULL CORD WITH BREAKING STRENGTH OF 500LBS WHERE THE INSULATION JACKET AND ADJOINING PIPE INSULATION MEET; ANODIZED ALUMINUM IDENTIFICATION TAGS WITH THE FOLLOWING VALVE/ITEM INFORMATION: NUMBER, DESCRIPTION, LOCATION, SIZE, INSULATION TYPE, INSULATION THICKNESS	N/A	N/A	TANI DIVISION
UI-DW-INS	CWP, OPP	DOMESTIC COLD WATER	50	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	VAPOR BARRIER REQUIRED	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	POLYVINYL CHLORIDE (PVC) - GREEN	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHN MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE
UI-DHW-INS	CWP, OPP	DOMESTIC HOT WATER	150	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	VAPOR BARRIER REQUIRED	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	POLYVINYL CHLORIDE (PVC) - RED	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHN MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE
UI-REF-INS	CWP, OPP	REFRIGERANT	100	CLOSED CELL FOAM INSULATION	ASTM C534	SEE INSULATION THICKNESS REFERENCE TABLE	0.25	220	VAPOR BARRIER REQUIRED	N/A	N/A	ARMACELL - ARMAFLEX OR EQUAL BY AEROFLEX OR K-FLEX	N/A	POLYVINYL CHLORIDE (PVC)	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHN MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE
UI-RV-INS	CWP, OPP	REFRIGERANT VENT PIPING	100	FIBERGLASS PIPE INSULATION	ASTM C547	SEE INSULATION THICKNESS REFERENCE TABLE	0.23	850	VAPOR BARRIER REQUIRED	<25	<50	JOHN MANVILLE MICRO-LOK OR EQUAL BY OWENS CORNING OR KNAUF	N/A	POLYVINYL CHLORIDE (PVC)	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHN MANVILLE ZESTON 2000 OR EQUAL BY KNAUF OR SPEEDLINE

## INSULATION THICKNESS REFERENCE TABLE

INSULATION STANDARD	INSULATION TYPE	JACKET	DESIGN TEMP. (°F)	INSULATION THICKNESS (IN.)																	
				PIPE SIZE (IN.)																	
				2	3	4	6	8	10	12	14	16	18	20	24	30	36	40	42	48	
UI-GSP-INS	MINERAL WOOL	BRIGHT ALUMINUM	350	1.0	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.5	2.5	--	--	--	--	--	
UI-MPP-LPS-INS	MINERAL WOOL	BRIGHT ALUMINUM	530	2.0	2.5	2.5	3.0	3.0	3.5	4.0	4.0	4.0	4.5	4.5	4.5	--	--	--	--	--	
UI-MPP-MPS-INS	CALCIUM SILICATE	BRIGHT ALUMINUM	775	3.5	4.5	4.5	5.5	6.0	6.5	7.0	7.0	7.5	7.5	8.0	8.5	--	--	--	--	--	
UI-MPP-HPS-INS	CALCIUM SILICATE	BRIGHT ALUMINUM	775	3.5	4.5	4.5	5.5	6.0	6.5	7.0	7.0	7.5	7.5	8.0	--	--	--	--	--	--	
UI-MPP-LP-CON-INS	MINERAL WOOL	BRIGHT ALUMINUM	530	2.0	2.5	2.5	3.0	3.0	3.5	4.0	4.0	4.0	4.5	4.5	4.5	--	--	--	--	--	
UI-MPP-MP-CON-INS	MINERAL WOOL	BRIGHT ALUMINUM	775	3.5	4.0	4.5	5.0	5.5	6.0	6.0	6.5	7.0	7.0	7.0	7.5	--	--	--	--	--	
UI-MPP-HP-CON-INS	MINERAL WOOL	BRIGHT ALUMINUM	775	3.5	4.0	4.5	5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	
UI-DSH-INS	MINERAL WOOL	BRIGHT ALUMINUM	400	1.0	1.5	1.5	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--	
UI-RWS-INS	ELASTOMERIC CLOSED CELL	GREEN PVC	100	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	--	--	--	--
UI-BOS/BDS-INS	MINERAL WOOL	BRIGHT ALUMINUM	500	1.5	2.0	2.0	2.5	2.5	2.5	--	--	--	--	--	--	--	--	--	--	--	
UI-NRBR-INS (1)	MINERAL WOOL WRAP	--	300	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	--	--	--	--	--	
UI-NRBR-INS (2)	MINERAL WOOL BOARD	ALUMINUM	300	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	--	--	--	--	--	
UI-MPP-LPS-VLV-INS	PYROGEL	GRAY FIBERGLASS FABRIC	530	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	--	--	--	--	--	
UI-MPP-HPS/MPS-VLV-INS	PYROGEL	GRAY FIBERGLASS FABRIC	775	1.0	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	--	--	--	--	--	
UI-MUS/PWS-INS (INT)	CELLULAR GLASS FOAM	LIGHT GREEN PVC	40	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	--	--	--	--	--	
UI-MUS/PWS-INS (EXT)	CELLULAR GLASS FOAM	LIGHT GREEN PVC	40	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	--	--	--	--	--	
UI-FW-INS	MINERAL WOOL	BRIGHT ALUMINUM	400	1.0	1.5	1.5	1.5	1.5	2.0	--	--	--	--	--	--	--	--	--	--	--	
UI-GFS-INS	FIBERGLASS	YELLOW PVC	100	1.0	1.0	1.0	1.0	1.0	1.0	--	--	--	--	--	--	--	--	--	--	--	
UI-SEW-INS (INT)	FIBERGLASS	WHITE PVC	35	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	--	--	--	--	--	
UI-SEW-INS (EXT)	FIBERGLASS	WHITE PVC	35	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	--	--	--	--	--	
UI-HWS/HWR-INS	FIBERGLASS	PURPLE PVC	250	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	--	--	--	--	--	
UI-PCW-INS (CS)	FIBERGLASS	GREEN PVC	40	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	--	--	--	--	--	

## INSULATION THICKNESS REFERENCE TABLE

INSULATION STANDARD	INSULATION TYPE	JACKET	DESIGN TEMP. (°F)	INSULATION THICKNESS (IN.)																	
				PIPE SIZE (IN.)																	
				2	3	4	6	8	10	12	14	16	18	20	24	30	36	40	42	48	
UI-PCW-INS (SS)	FIBERGLASS	BRIGHT ALUMINUM	40	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	--	--	--	--	--
UI-CHW-INS	FIBERGLASS	BLUE PVC	40	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
UI-CS-INS (INT)	FIBERGLASS	GRAY PVC	40	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
UI-CS-INS (EXT)	FIBERGLASS	BRIGHT ALUMINUM	40	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
UI-LPS-INS	FIBERGLASS	ORANGE PVC	300	0.5	0.5	0.5	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	--	--	--	--	--
UI-HPS-INS	FIBERGLASS	RED PVC	400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.5	--	--	--	--	--
UI-LP-CON-INS	FIBERGLASS	GRAY PVC	300	0.5	0.5	0.5	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	--	--	--	--	--
UI-HP-CON-INS	FIBERGLASS	GRAY PVC	400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.5	--	--	--	--	--
UI-LPS-VLV-INS	PYROGEL	GRAY FIBERGLASS FABRIC	300	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	--	--	--	--	--
UI-HPS-VLV-INS	PYROGEL	GRAY FIBERGLASS FABRIC	400	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0	1.0	--	--	--	--	--
UI-DCW-INS	FIBERGLASS	GREEN PVC	50	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	--	--	--	--	--
UI-DHW-INS	FIBERGLASS	RED PVC	150	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	--	--	--	--	--
UI-REF-INS	ELASTOMERIC CLOSED CELL	WHITE PVC	100	1.0	1.0	1.0	1.0	1.5	1.5	--	--	--	--	--	--	--	--	--	--	--	--
UI-RV-INS	FIBERGLASS	WHITE PVC	100	0.5	0.5	0.5	0.5	0.5	0.5	0.5	--	--	--	--	--	--	--	--	--	--	--

**NOTE:** \_\_\_\_\_