

## Personnel Protection Tables

*Thickness Requirements for  
Selected Surface Temperatures*

For additional information, visit the website at [www.jm.com/industrial](http://www.jm.com/industrial). For customer service, sales information, technical information, or order placement, please refer to the last page of these tables.

### PERSONNEL PROTECTION TABLES

The following tables indicate the minimum insulation thickness of Thermo-12 Gold required to maintain the outside surface at or below the temperature indicated in the table heading. These tables were generated using the NAIMA 3E-Plus computer program which follows the heat transfer calculation methodology in ASTM C 680.

Operating conditions are:

- Ambient Temperature = 75°F
- Surface Emittance of Weathered Aluminum Jacket = 0.15
- Surface Emittance of Painted or PVC Jacket = 0.9
- Wind Velocity = 0 mph
- Pipe Insulation Dimensions per ASTM C 585
- Minimum Thickness of Insulation Offered is 1 Inch

**Thermo-12<sup>®</sup> Gold - Weathered Aluminum Jacketing**  
**Thickness Required for Surface Temperature ≤ 150°F**

Pipe Size, NPS (in)	Operating Temperature (°F)							
	200	300	400	500	600	800	1000	1200
1/2	1	1	1	1	1.5	2	2	2
3/4	1	1	1	1.5	1.5	2	2.5	3
1	1	1	1	1	1.5	2	2.5	3
1 1/2	1	1	1	1.5	1.5	2.5	3	3.5
2	1	1	1	1.5	1.5	2	2.5	3.5
2 1/2	1	1	1	1.5	2	2.5	3	4
3	1	1	1	1.5	1.5	2.5	3	4
4	1	1	1	1.5	2	3	3.5	4.5
6	1	1	1.5	1.5	2	3	4	4.5
8	1	1	1.5	2	2.5	3.5	4	5.5
10	1	1	1.5	2	2.5	3.5	4.5	6
12	1	1	1.5	2	2.5	3.5	5	6
14	1	1	1.5	2	2.5	4	5	6.5
16	1	1	1.5	2	2.5	4	5	6.5
18	1	1	1.5	2	3	4	5.5	7
20	1	1	1.5	2	3	4	5.5	7
24	1	1	1.5	2	3	4	5.5	7
30	1	1	1.5	2.5	3	4.5	5.5	7.5
36	1	1	1.5	2.5	3	4.5	6	8
48	1	1	1.5	2.5	3	4.5	6.5	8
Vertical Flat	1	1	1.5	2.5	3	5	7	9

**Thermo-12<sup>®</sup> Gold - Weathered Aluminum Jacketing**  
**Thickness Required for Surface Temperature ≤ 140°F**

Pipe Size, NPS (in)	Operating Temperature (°F)							
	200	300	400	500	600	800	1000	1200
1/2	1	1	1	1.5	1.5	2	2	2
3/4	1	1	1	1.5	1.5	2.5	2.5	3.5
1	1	1	1	1.5	1.5	2.5	3	3.5
1 1/2	1	1	1.5	1.5	1.5	2.5	3.5	4
2	1	1	1	1.5	2	2.5	3	4
2 1/2	1	1	1.5	1.5	2	3	3.5	4.5
3	1	1	1.5	1.5	2	2.5	3.5	4.5
4	1	1	1.5	2	2.5	3	4	5
6	1	1	1.5	2	2.5	3.5	4.5	5.5
8	1	1	1.5	2	2.5	3.5	5	6.5
10	1	1	2	2.5	2.5	4	5.5	7
12	1	1	1.5	2.5	3	4	5.5	7
14	1	1	1.5	2.5	3	4.5	6	7.5
16	1	1	2	2.5	3	4.5	6	7.5
18	1	1	2	2.5	3.5	4.5	6	8
20	1	1	2	2.5	3.5	5	6.5	8
24	1	1	2	2.5	3.5	5	6.5	8
30	1	1.5	2	2.5	3.5	5	6.5	8.5
36	1	1.5	2	3	3.5	5.5	7	9
48	1	1.5	2	3	3.5	5.5	7.5	9.5
Vertical Flat	1	1.5	2	3	4	6	8	11

## PERSONNEL PROTECTION TABLES

**Thermo-12® Gold - Weathered Aluminum Jacketing**  
**Thickness Required for Surface Temperature ≤ 130°F**

Pipe Size, NPS (in)	Operating Temperature (°F)							
	200	300	400	500	600	800	1000	1200
1/2	1	1	1	1.5	1.5	2	2	2
3/4	1	1	1.5	1.5	2	2.5	3	4
1	1	1	1.5	1.5	2	2.5	3.5	4.5
1 1/2	1	1	1.5	1.5	2.5	3	4	5
2	1	1	1.5	2	2	3	3.5	4.5
2 1/2	1	1	1.5	2	2.5	3.5	4	5.5
3	1	1	1.5	2	2.5	3.5	4.5	5
4	1	1	1.5	2	2.5	3.5	5	6
6	1	1	2	2.5	3	4	5	6.5
8	1	1.5	2	2.5	3	4.5	6	7.5
10	1	1.5	2	2.5	3	4.5	6.5	8
12	1	1.5	2	3	3	5	6.5	8.5
14	1	1.5	2	3	3	5	7	9
16	1	1.5	2.5	3	4	5.5	7	9
18	1	1.5	2.5	3	4	5.5	7.5	9.5
20	1	1.5	2.5	3	4	5.5	7.5	9.5
24	1	1.5	2.5	3	4	6	7.5	10
30	1	1.5	2.5	3.5	4	6	8	10
36	1	1.5	2.5	3.5	4.5	6.5	8.5	11
48	1	1.5	2.5	3.5	4.5	6.5	9	11.5
Vertical Flat	1	1.5	2.5	3.5	4.5	7	10	13.5

**Thermo-12® Gold - Plain, Canvas, PVC, or Painted Metal Jacketing**  
**Thickness Required for Surface Temperature ≤ 150°F**

Pipe Size, NPS (in)	Operating Temperature (°F)							
	200	300	400	500	600	800	1000	1200
1/2	1	1	1	1	1	1.5	1.5	2
3/4	1	1	1	1	1	1.5	2	2
1	1	1	1	1	1	1.5	2	2
1 1/2	1	1	1	1	1.5	1.5	2	2.5
2	1	1	1	1	1	1.5	2	2
2 1/2	1	1	1	1	1	1.5	2	2.5
3	1	1	1	1	1	1.5	2	2.5
4	1	1	1	1	1.5	2	2.5	3
6	1	1	1	1	1.5	2	2.5	3
8	1	1	1	1	1.5	2	2.5	3.5
10	1	1	1	1	1.5	2	2.5	3.5
12	1	1	1	1	1.5	2	3	3.5
14	1	1	1	1.5	1.5	2	3	3.5
16	1	1	1	1.5	1.5	2.5	3	4
18	1	1	1	1.5	1.5	2.5	3	4
20	1	1	1	1.5	1.5	2.5	3	4
24	1	1	1	1.5	1.5	2.5	3	4
30	1	1	1	1.5	1.5	2.5	3.5	4
36	1	1	1	1.5	1.5	2.5	3.5	4.5
48	1	1	1	1.5	1.5	2.5	3.5	4.5
Vertical Flat	1	1	1	1.5	1.5	2.5	3.5	5

For current information such as Safety Data Sheets (SDS), product data sheets, and other pertinent information, please go to the website at [www.jm.com/industrial.com](http://www.jm.com/industrial.com)

**Thermo-12<sup>®</sup> Gold - Plain, Canvas, PVC, or Painted Metal Jacketing**  
**Thickness Required for Surface Temperature ≤ 140°F**

Pipe Size, NPS (in)	Operating Temperature (°F)							
	200	300	400	500	600	800	1000	1200
1/2	1	1	1	1	1	1.5	2	2
3/4	1	1	1	1	1.5	1.5	2	2.5
1	1	1	1	1	1	1.5	2	2.5
1 1/2	1	1	1	1	1.5	1.5	2.5	3
2	1	1	1	1	1.5	2	2	2.5
2 1/2	1	1	1	1	1.5	2	2.5	3
3	1	1	1	1	1.5	1.5	2	3
4	1	1	1	1	1.5	2	2.5	3.5
6	1	1	1	1.5	1.5	2	3	3.5
8	1	1	1	1.5	1.5	2.5	3	4
10	1	1	1	1.5	2	2.5	3	4
12	1	1	1	1.5	1.5	2.5	3.5	4
14	1	1	1	1.5	2	2.5	3.5	4.5
16	1	1	1	1.5	2	2.5	3.5	4.5
18	1	1	1	1.5	2	2.5	3.5	4.5
20	1	1	1	1.5	2	3	3.5	4.5
24	1	1	1	1.5	2	3	4	5
30	1	1	1	1.5	2	3	4	5
36	1	1	1	1.5	2	3	4	5
48	1	1	1	1.5	2	3	4	5.5
Vertical Flat	1	1	1	1.5	2	3	4.5	5.5

**Thermo-12<sup>®</sup> Gold - Plain, Canvas, PVC, or Painted Metal Jacketing**  
**Thickness Required for Surface Temperature ≤ 130°F**

Pipe Size, NPS (in)	Operating Temperature (°F)							
	200	300	400	500	600	800	1000	1200
1/2	1	1	1	1	1.5	1.5	2	2
3/4	1	1	1	1	1.5	2	2.5	2.5
1	1	1	1	1	1.5	2	2.5	3
1 1/2	1	1	1	1.5	1.5	2	2.5	3.5
2	1	1	1	1.5	1.5	2	2.5	3
2 1/2	1	1	1	1.5	1.5	2	3	3.5
3	1	1	1	1.5	1.5	2	2.5	3.5
4	1	1	1	1.5	1.5	2.5	3	4
6	1	1	1	1.5	2	2.5	3.5	4
8	1	1	1.5	1.5	2	3	3.5	4.5
10	1	1	1.5	1.5	2	3	3.5	4.5
12	1	1	1.5	1.5	2	3	4	5
14	1	1	1.5	1.5	2	3	4	5
16	1	1	1.5	2	2	3	4	5.5
18	1	1	1.5	2	2.5	3.5	4.5	5.5
20	1	1	1.5	2	2.5	3.5	4.5	5.5
24	1	1	1.5	2	2.5	3.5	4.5	5.5
30	1	1	1.5	2	2.5	3.5	4.5	6
36	1	1	1.5	2	2.5	3.5	5	6
48	1	1	1.5	2	2.5	3.5	5	6.5
Vertical Flat	1	1	1.5	2	2.5	3.5	5	7

Industrial Insulation Group, LLC manufactures MinWool-1200<sup>®</sup> mineral fiber pipe, block and a variety of other insulations; Thermo-12<sup>®</sup> Gold Calcium Silicate pipe and block insulation; Microporous Blanket Insulation; Super Firetemp<sup>®</sup> fireproofing board; SprouleWR-1200<sup>®</sup> Perlite pipe and block insulation; high-temperature adhesives, and insulating finishing cement. The physical and chemical properties presented herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Numerical flame spread and smoke developed ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions. Check with the Customer Service Office to assure current information. All Industrial Insulation Group products are sold subject to the Johns Manville Limited Warranty and Limitation of Remedy. For a copy of the Johns Manville Limited Warranty and Limitation of Remedy, email [info.industrial@jm.com](mailto:info.industrial@jm.com).

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