

Refrigerant Line Sizing Chart for Air Conditioners – R-22

| Unit Capacity BTUH | Equivalent Length of Pipe in Feet | | | | | | | | | | | |
|--------------------------|-----------------------------------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|
| | 25 | | 35 | | 50 | | 75 | | 100 | | 125 | |
| | Liquid | Suction | Liquid | Suction | Liquid | Suction | Liquid | Suction | Liquid | Suction | Liquid | Suction |
| 18,000 | 1/4 | 5/8 | 1/4 | 5/8 | 1/4 | 5/8 | 5/16 | 3/4 | 5/16 | 3/4 | 5/16 | 3/4 |
| 24,000 | 5/16 | 5/8 | 5/16 | 5/8 | 5/16 | 5/8 | 5/16 | 3/4 | 5/16 | 3/4 | 5/16 | 3/4 |
| 30,000 | 5/16 | 3/4 | 5/16 | 3/4 | 5/16 | 3/4 | 5/16 | 3/4 | 5/16 | 3/4 | 3/8 | 7/8 |
| 36,000 | 5/16 | 3/4 | 5/16 | 3/4 | 5/16 | 3/4 | 5/16 | 7/8 | 3/8 | 7/8 | 3/8 | 7/8 |
| 42,000 | 3/8 | 7/8 | 3/8 | 7/8 | 3/8 | 7/8 | 3/8 | 7/8 | 3/8 | 7/8 | 3/8 | 1-1/8 |
| 48,000 | 3/8 | 7/8 | 3/8 | 7/8 | 3/8 | 7/8 | 3/8 | 7/8 | 3/8 | 1-1/8 | 3/8 | 1-1/8 |
| 60,000 | 3/8 | 7/8 | 3/8 | 7/8 | 3/8 | 7/8 | 3/8 | 1-1/8 | 1/2 | 1-1/8 | 1/2 | 1-1/8 |
| 72,000 | 1/2 | 1-1/8 | 1/2 | 1-1/8 | 1/2 | 1-1/8 | 1/2 | 1-1/8 | 1/2 | 1-1/8 | 1/2 | 1-1/8 |
| 90,000 | 1/2 | 1-1/8 | 1/2 | 1-1/8 | 1/2 | 1-1/8 | 1/2 | 1-1/8 | 1/2 | 1-3/8 | 1/2 | 1-3/8 |
| 120,000 | 1/2 | 1-1/8 | 1/2 | 1-3/8 | 5/8 | 1-3/8 | 5/8 | 1-3/8 | 5/8 | 1-3/8 | 5/8 | 1-3/8 |
| 150,000 | 5/8 | 1-3/8 | 5/8 | 1-3/8 | 5/8 | 1-3/8 | 5/8 | 1-5/8 | 5/8 | 1-5/8 | 5/8 | 1-5/8 |
| 180,000 | 5/8 | 1-5/8 | 5/8 | 1-5/8 | 5/8 | 1-5/8 | 5/8 | 1-5/8 | 3/4 | 1-5/8 | 3/4 | 1-5/8 |
| 240,000 | 3/4 | 1-5/8 | 3/4 | 1-5/8 | 3/4 | 2-1/8 | 3/4 | 2-1/8 | 3/4 | 2-1/8 | 3/4 | 2-1/8 |
| 300,000 | 7/8 | 1-5/8 | 7/8 | 2-1/8 | 7/8 | 2-1/8 | 7/8 | 2-1/8 | 7/8 | 2-1/8 | 7/8 | 2-1/8 |
| 360,000 | 7/8 | 2-1/8 | 7/8 | 2-1/8 | 7/8 | 2-1/8 | 7/8 | 2-1/8 | 7/8 | 2-1/8 | 7/8 | 2-1/8 |

Notes:

- 1) Above sizes based on height difference of 15 ft. or less between evaporator and condenser.
- 2) All horizontal suction lines should be pitched down 1 inch every 20 feet in direction of refrigerant flow to aid return of oil to compressor.
- 3) Crankcase heater should be installed whenever pipe length exceeds 50 feet.
- 4) Suction line accumulator should be installed near condensing unit when pipe length exceeds 75 feet.

Additional Refrigerant Charge Required for Piping in Excess of 15 Ft. Total Length – R-22

| Lgth. Ft. | Charge Oz. – R-22 | | | | | | | |
|--------------|-------------------|------|------|------|-----|-----|-------|-----|
| | Factor | .44 | .46 | .48 | .66 | .68 | .70 | .76 |
| | Liq. | 5/16 | 5/16 | 5/16 | 3/8 | 3/8 | 3/8 | 3/8 |
| Suct. | 3/4 | 3/4 | 7/8 | 5/8 | 3/4 | 7/8 | 1-1/8 | |
| 16 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | |
| 17 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | |
| 18 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | |
| 19 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | |
| 20 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | |
| 21 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | |
| 22 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | |
| 23 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | |
| 24 | 4 | 4 | 4 | 6 | 6 | 6 | 7 | |
| 25 | 4 | 5 | 5 | 7 | 7 | 7 | 8 | |
| 26 | 5 | 5 | 5 | 7 | 7 | 8 | 8 | |
| 27 | 5 | 6 | 6 | 8 | 8 | 8 | 9 | |
| 28 | 6 | 6 | 6 | 9 | 9 | 9 | 10 | |
| 29 | 6 | 6 | 7 | 9 | 10 | 10 | 11 | |
| 30 | 7 | 7 | 7 | 10 | 10 | 11 | 11 | |
| 31 | 7 | 7 | 8 | 11 | 11 | 11 | 12 | |
| 32 | 7 | 8 | 8 | 11 | 12 | 12 | 13 | |
| 33 | 8 | 8 | 9 | 12 | 12 | 13 | 14 | |
| 34 | 8 | 9 | 9 | 13 | 13 | 13 | 14 | |
| 35 | 9 | 9 | 10 | 13 | 14 | 14 | 15 | |
| 36 | 9 | 10 | 10 | 14 | 14 | 15 | 16 | |
| 37 | 10 | 10 | 11 | 15 | 15 | 15 | 17 | |

| Factor | .44 | .46 | .48 | .66 | .68 | .70 | .76 |
|--------|------|------|------|-----|-----|-----|-------|
| Liq. | 5/16 | 5/16 | 5/16 | 3/8 | 3/8 | 3/8 | 3/8 |
| Suct. | 3/4 | 3/4 | 7/8 | 5/8 | 3/4 | 7/8 | 1-1/8 |

| Lgth. Ft. | Charge Oz. – R-22 | | | | | | | |
|--------------|-------------------|----|----|----|----|----|----|--|
| 38 | 10 | 11 | 11 | 15 | 16 | 16 | 17 | |
| 39 | 11 | 11 | 12 | 16 | 16 | 17 | 18 | |
| 40 | 11 | 12 | 12 | 17 | 17 | 18 | 19 | |
| 41 | 11 | 12 | 12 | 17 | 18 | 18 | 20 | |
| 42 | 12 | 12 | 13 | 18 | 18 | 19 | 21 | |
| 43 | 12 | 13 | 13 | 18 | 19 | 20 | 21 | |
| 44 | 13 | 13 | 14 | 19 | 20 | 20 | 22 | |
| 45 | 13 | 14 | 14 | 20 | 20 | 21 | 23 | |
| 46 | 14 | 14 | 15 | 20 | 21 | 22 | 24 | |
| 47 | 14 | 15 | 15 | 21 | 22 | 22 | 24 | |
| 48 | 15 | 15 | 16 | 22 | 22 | 23 | 25 | |
| 49 | 15 | 16 | 16 | 22 | 23 | 24 | 26 | |
| 50 | 15 | 16 | 17 | 23 | 24 | 25 | 27 | |
| 51 | 16 | 17 | 17 | 24 | 24 | 25 | 27 | |
| 52 | 16 | 17 | 18 | 24 | 25 | 26 | 28 | |
| 53 | 17 | 17 | 18 | 25 | 26 | 27 | 29 | |
| 54 | 17 | 18 | 19 | 26 | 27 | 27 | 30 | |
| 55 | 18 | 18 | 19 | 26 | 27 | 28 | 30 | |
| 56 | 18 | 19 | 20 | 27 | 28 | 29 | 31 | |
| 57 | 18 | 19 | 20 | 28 | 29 | 29 | 32 | |
| 58 | 19 | 20 | 21 | 28 | 29 | 30 | 33 | |
| 59 | 19 | 20 | 21 | 29 | 30 | 31 | 33 | |
| 60 | 20 | 21 | 22 | 30 | 31 | 32 | 34 | |
| 61 | 20 | 21 | 22 | 30 | 31 | 32 | 35 | |
| 62 | 21 | 22 | 23 | 31 | 32 | 33 | 36 | |

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| Factor | .44 | .46 | .48 | .66 | .68 | .70 | .76 |
|--------|-------------------|------|------|-----|-----|-----|-------|
| Liq. | 5/16 | 5/16 | 5/16 | 3/8 | 3/8 | 3/8 | 3/8 |
| Suct. | 3/4 | 3/4 | 7/8 | 5/8 | 3/4 | 7/8 | 1-1/8 |
| Lgth. | Charge Oz. – R-22 | | | | | | |
| Ft. | | | | | | | |
| 63 | 21 | 22 | 23 | 32 | 33 | 34 | 36 |
| 64 | 22 | 23 | 24 | 32 | 33 | 34 | 37 |
| 65 | 22 | 23 | 24 | 33 | 34 | 35 | 38 |
| 66 | 22 | 23 | 24 | 34 | 35 | 36 | 39 |
| 67 | 23 | 24 | 25 | 34 | 35 | 36 | 40 |
| 68 | 23 | 24 | 25 | 35 | 36 | 37 | 40 |
| 69 | 24 | 25 | 26 | 36 | 37 | 38 | 41 |
| 70 | 24 | 25 | 26 | 36 | 37 | 39 | 42 |
| 71 | 25 | 26 | 27 | 37 | 38 | 39 | 43 |
| 72 | 25 | 26 | 27 | 38 | 39 | 40 | 43 |
| 73 | 26 | 27 | 28 | 38 | 39 | 41 | 44 |
| 74 | 26 | 27 | 28 | 39 | 40 | 41 | 45 |
| 75 | 26 | 28 | 29 | 40 | 41 | 42 | 46 |
| 76 | 27 | 28 | 29 | 40 | 41 | 43 | 46 |
| 77 | 27 | 29 | 30 | 41 | 42 | 43 | 47 |
| 78 | 28 | 29 | 30 | 42 | 43 | 44 | 48 |
| 79 | 28 | 29 | 31 | 42 | 44 | 45 | 49 |
| 80 | 29 | 30 | 31 | 43 | 44 | 46 | 49 |
| 81 | 29 | 30 | 32 | 44 | 45 | 46 | 50 |
| 82 | 29 | 31 | 32 | 44 | 46 | 47 | 51 |
| 83 | 30 | 31 | 33 | 45 | 46 | 48 | 52 |
| 84 | 30 | 32 | 33 | 46 | 47 | 48 | 52 |
| 85 | 31 | 32 | 34 | 46 | 48 | 49 | 53 |
| 86 | 31 | 33 | 34 | 47 | 48 | 50 | 54 |
| 87 | 32 | 33 | 35 | 48 | 49 | 50 | 55 |
| 88 | 32 | 34 | 35 | 48 | 50 | 51 | 55 |
| 89 | 33 | 34 | 36 | 49 | 50 | 52 | 56 |
| 90 | 33 | 35 | 36 | 50 | 51 | 53 | 57 |
| 91 | 33 | 35 | 36 | 50 | 52 | 53 | 58 |
| 92 | 34 | 35 | 37 | 51 | 52 | 54 | 59 |
| 93 | 34 | 36 | 37 | 51 | 53 | 55 | 59 |
| 94 | 35 | 36 | 38 | 52 | 54 | 55 | 60 |
| 95 | 35 | 37 | 38 | 53 | 54 | 56 | 61 |
| 96 | 36 | 37 | 39 | 53 | 55 | 57 | 62 |
| 97 | 36 | 38 | 39 | 54 | 56 | 57 | 62 |
| 98 | 37 | 38 | 40 | 55 | 56 | 58 | 63 |
| 99 | 37 | 39 | 40 | 55 | 57 | 59 | 64 |
| 100 | 37 | 39 | 41 | 56 | 58 | 60 | 65 |
| 101 | 38 | 40 | 41 | 57 | 58 | 60 | 65 |
| 102 | 38 | 40 | 42 | 57 | 59 | 61 | 66 |
| 103 | 39 | 40 | 42 | 58 | 60 | 62 | 67 |
| 104 | 39 | 41 | 43 | 59 | 61 | 62 | 68 |
| 105 | 40 | 41 | 43 | 59 | 61 | 63 | 68 |
| 106 | 40 | 42 | 44 | 60 | 62 | 64 | 69 |
| 107 | 40 | 42 | 44 | 61 | 63 | 64 | 70 |
| 108 | 41 | 43 | 45 | 61 | 63 | 65 | 71 |
| 109 | 41 | 43 | 45 | 62 | 64 | 66 | 71 |
| 110 | 42 | 44 | 46 | 63 | 65 | 67 | 72 |
| 111 | 42 | 44 | 46 | 63 | 65 | 67 | 73 |

| Factor | .44 | .46 | .48 | .66 | .68 | .70 | .76 |
|--------|------|------|------|-----|-----|-----|-------|
| Liq. | 5/16 | 5/16 | 5/16 | 3/8 | 3/8 | 3/8 | 3/8 |
| Suct. | 3/4 | 3/4 | 7/8 | 5/8 | 3/4 | 7/8 | 1-1/8 |

| | | | | | | | |
|-------|-------------------|----|----|----|----|----|----|
| Lgth. | Charge Oz. – R-22 | | | | | | |
| Ft. | | | | | | | |
| 112 | 43 | 45 | 47 | 64 | 66 | 68 | 74 |
| 113 | 43 | 45 | 47 | 65 | 67 | 69 | 74 |
| 114 | 44 | 46 | 48 | 65 | 67 | 69 | 75 |
| 115 | 44 | 46 | 48 | 66 | 68 | 70 | 76 |
| 116 | 44 | 46 | 48 | 67 | 69 | 71 | 77 |
| 117 | 45 | 47 | 49 | 67 | 69 | 71 | 78 |
| 118 | 45 | 47 | 49 | 68 | 70 | 72 | 78 |
| 119 | 46 | 48 | 50 | 69 | 71 | 73 | 79 |
| 120 | 46 | 48 | 50 | 69 | 71 | 74 | 80 |
| 121 | 47 | 49 | 51 | 70 | 72 | 74 | 81 |
| 122 | 47 | 49 | 51 | 71 | 73 | 75 | 81 |
| 123 | 48 | 50 | 52 | 71 | 73 | 76 | 82 |
| 124 | 48 | 50 | 52 | 72 | 74 | 76 | 83 |
| 125 | 48 | 51 | 53 | 73 | 75 | 77 | 84 |

Notes:

- 1) In addition to above charge addition, be sure to add any extra charge required by coil selection.
- 2) See refrigerant line sizing chart for correct line size.
- 3) For heat pumps, *do not exceed 75 feet and do not increase liquid line size.*

General Piping Recommendations

1) Never add oil to the system

2) Maximum total line length for the following units:

| | |
|-------------------------------|----------|
| Heat Pumps 1 to 5 tons | 75 Feet |
| Cooling Units 1 to 1-1/2 tons | 125 Feet |
| Cooling Units 2 to 5 tons | 175 Feet |

3) Always use a suction line accumulator when:

- a) underground pipe exceeds 10 ft. on cooling-only units.
- b) piping length exceeds 75 ft. on cooling-only units.

4) For split system heat pumps, size refrigerant lines to match factory supplied fittings. Vapor lines may be increased one size to minimize pressure drop. Liquid lines must NEVER be increased or decreased; the additional charge required for larger liquid lines will overflow the accumulator in the heating cycle.

5) Substantial differences in elevation between indoor and outdoor units will have considerable effect on line size and orifice size.

6) If not provided as standard, the following items are required when equivalent pipe length exceeds 50 ft.:

- a) Low voltage start kit
- b) Off cycle timer
- c) Crankcase heater