

# TECHNICAL INFORMATION COMMUNICATION



**United  
Technologies**

Building & Industrial Systems

Quality and Continuous Improvement

**Number:** TIC2015-0002

**Date:** 1/29/2015

**Title:** Use of R-407C Refrigerant with Dry R-22 Units

**Product Category:** Air Conditioners/Heat Pumps

## Products Affected:

Payne PA13(N,P)R and PH13(N,P)R; Carrier 38CKC and 38CKD (Export) (Dry R-22)

## Situation:

As the above listed products were designed to use and will have the best unit performance and reliability for the customer with R-22, it is the recommended refrigerant. However, if R-22 is not available, R-407C may be used as an alternate refrigerant for service & replacement applications as long as the conditions set forth in the Technical Information section are satisfied.

## Technical Information:

- R-407C may ONLY be used with a new dry R-22 condensing unit that uses a POE oil compressor. These units can be identified as follows:
  - Serial number: Dry R-22 condensing unit serial numbers with digit 5 = "E" and from date range 4014 or 5114 (CVL manufactured units).
  - Serial number: Dry R-22 condensing unit serial numbers with digit 5 = "X" and from date range 0115 or later (CMXA manufactured units).
- The customer must be informed of the typical 3-8% reduction in system capacity and performance with the use of R-407C as an alternative to the recommended R-22 (actual reduction depends on the exact system combination and application in question).
- DO NOT mix refrigerants as it will have an adverse effect on unit performance and reliability.
- Filter drier: R-407C and units with POE oil compressors must use a 100% molecular sieve filter drier, with XH-11 as the desiccant. XH-6, which is the desiccant used with R-22, will absorb the R-32 in R-407C reducing the effectiveness of the drier. A 100% molecular sieve filter drier with XH-11 as the desiccant is the same drier used for R-410A units.
- Charging methods: Due to the refrigerant property differences, the unit charging procedure must follow charging charts for R-407C. Charging methods must follow the same requirements for charging with 'liquid refrigerant only' as contained in the unit installation instructions. Use charging charts shown below and or in the installation instructions.

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Unit with indoor **piston** (Superheat charging method):

| Table X --- Required Vapor-Line Temperature |          |                                   |    |    |    |    |    |    |    |    |    |    |    |    |    |
|---|----------|-----------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|
|   |          | Vapor Line Temperature (°F)       |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Vap Pres (psig)                             | P-T (°F) | R-407C Superheat Temperature (°F) |    |    |    |    |    |    |    |    |    |    |    |    |    |
|   |          | 2                                 | 4  | 6  | 8  | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 |
| 44  | 25       | 27                                | 29 | 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | 49 | 51 | 53 |
| 46  | 27       | 29                                | 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 |
| 48  | 29       | 31                                | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 |
| 50  | 30       | 32                                | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 56 | 58 |
| 52  | 32       | 34                                | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 |
| 54  | 33       | 35                                | 37 | 39 | 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 | 59 | 61 |
| 56  | 35       | 37                                | 39 | 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 | 59 | 61 | 63 |
| 58  | 36       | 38                                | 40 | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 |
| 60  | 38       | 40                                | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 |
| 62  | 39       | 41                                | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 | 59 | 61 | 63 | 65 | 67 |
| 64  | 41       | 43                                | 45 | 47 | 49 | 51 | 53 | 55 | 57 | 59 | 61 | 63 | 65 | 67 | 69 |
| 66  | 42       | 44                                | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 |
| 68  | 43       | 45                                | 47 | 49 | 51 | 53 | 55 | 57 | 59 | 61 | 63 | 65 | 67 | 69 | 71 |
| 70  | 45       | 47                                | 49 | 51 | 53 | 55 | 57 | 59 | 61 | 63 | 65 | 67 | 69 | 71 | 73 |
| 72  | 46       | 48                                | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 |
| 74  | 47       | 49                                | 51 | 53 | 55 | 57 | 59 | 61 | 63 | 65 | 67 | 69 | 71 | 73 | 75 |
| 76  | 48       | 50                                | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 |
| 78  | 50       | 52                                | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 |
| 80  | 51       | 53                                | 55 | 57 | 59 | 61 | 63 | 65 | 67 | 69 | 71 | 73 | 75 | 77 | 79 |
| 82  | 52       | 54                                | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 |
| 84  | 53       | 55                                | 57 | 59 | 61 | 63 | 65 | 67 | 69 | 71 | 73 | 75 | 77 | 79 | 81 |
| 86  | 54       | 56                                | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 | 82 |
| 88  | 55       | 57                                | 59 | 61 | 63 | 65 | 67 | 69 | 71 | 73 | 75 | 77 | 79 | 81 | 83 |

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Unit with cooling mode **TXV** (charging by subcooling method)

**Table Y --- Required Liquid-Line Temperature**

| Liq Pres<br>(psig) | P - T ( °F) | Liquid Line Temperature °F       |     |     |     |     |     |     |     |     |     |     |     |     |
|--------------------|-------------|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                    |             | R-407C Subcooling Temperature °F |     |     |     |     |     |     |     |     |     |     |     |     |
|                    |             | 2                                | 4   | 6   | 8   | 10  | 12  | 14  | 16  | 18  | 20  | 22  | 24  | 26  |
| 140                | 70          | 68                               | 66  | 64  | 62  | 60  | 58  | 56  | 54  | 52  | 50  | 48  | 46  | 44  |
| 150                | 74          | 72                               | 70  | 68  | 66  | 64  | 62  | 60  | 58  | 56  | 54  | 52  | 50  | 48  |
| 160                | 78          | 76                               | 74  | 72  | 70  | 68  | 66  | 64  | 62  | 60  | 58  | 56  | 54  | 52  |
| 170                | 82          | 80                               | 78  | 76  | 74  | 72  | 70  | 68  | 66  | 64  | 62  | 60  | 58  | 56  |
| 180                | 85          | 83                               | 81  | 79  | 77  | 75  | 73  | 71  | 69  | 67  | 65  | 63  | 61  | 59  |
| 190                | 89          | 87                               | 85  | 83  | 81  | 79  | 77  | 75  | 73  | 71  | 69  | 67  | 65  | 63  |
| 200                | 92          | 90                               | 88  | 86  | 84  | 82  | 80  | 78  | 76  | 74  | 72  | 70  | 68  | 66  |
| 210                | 95          | 93                               | 91  | 89  | 87  | 85  | 83  | 81  | 79  | 77  | 75  | 73  | 71  | 69  |
| 220                | 98          | 96                               | 94  | 92  | 90  | 88  | 86  | 84  | 82  | 80  | 78  | 76  | 74  | 72  |
| 230                | 101         | 99                               | 97  | 95  | 93  | 91  | 89  | 87  | 85  | 83  | 81  | 79  | 77  | 75  |
| 240                | 104         | 102                              | 100 | 98  | 96  | 94  | 92  | 90  | 88  | 86  | 84  | 82  | 80  | 78  |
| 250                | 107         | 105                              | 103 | 101 | 99  | 97  | 95  | 93  | 91  | 89  | 87  | 85  | 83  | 81  |
| 260                | 110         | 108                              | 106 | 104 | 102 | 100 | 98  | 96  | 94  | 92  | 90  | 88  | 86  | 84  |
| 270                | 113         | 111                              | 109 | 107 | 105 | 103 | 101 | 99  | 97  | 95  | 93  | 91  | 89  | 87  |
| 280                | 115         | 113                              | 111 | 109 | 107 | 105 | 103 | 101 | 99  | 97  | 95  | 93  | 91  | 89  |
| 290                | 118         | 116                              | 114 | 112 | 110 | 108 | 106 | 104 | 102 | 100 | 98  | 96  | 94  | 92  |
| 300                | 120         | 118                              | 116 | 114 | 112 | 110 | 108 | 106 | 104 | 102 | 100 | 98  | 96  | 94  |
| 310                | 123         | 121                              | 119 | 117 | 115 | 113 | 111 | 109 | 107 | 105 | 103 | 101 | 99  | 97  |
| 320                | 125         | 123                              | 121 | 119 | 117 | 115 | 113 | 111 | 109 | 107 | 105 | 103 | 101 | 99  |
| 330                | 128         | 126                              | 124 | 122 | 120 | 118 | 116 | 114 | 112 | 110 | 108 | 106 | 104 | 102 |
| 340                | 130         | 128                              | 126 | 124 | 122 | 120 | 118 | 116 | 114 | 112 | 110 | 108 | 106 | 104 |
| 350                | 132         | 130                              | 128 | 126 | 124 | 122 | 120 | 118 | 116 | 114 | 112 | 110 | 108 | 106 |
| 360                | 134         | 132                              | 130 | 128 | 126 | 124 | 122 | 120 | 118 | 116 | 114 | 112 | 110 | 108 |
| 370                | 136         | 134                              | 132 | 130 | 128 | 126 | 124 | 122 | 120 | 118 | 116 | 114 | 112 | 110 |
| 380                | 139         | 137                              | 135 | 133 | 131 | 129 | 127 | 125 | 123 | 121 | 119 | 117 | 115 | 113 |

**References** TIC2014-0006

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