

## Mismatched Coil Testing to Simulate Condenser Replacement



### Tested with 10 SEER ID Coil and 13 SEER HP

Cooling 95 F Outside / 80 F Inside

Factory Refrigerant Charge: 8 lb 7 oz Fixed Orifice

|   | Rated  | Tested |
|---|--------|--------|
| Capacity too low<br>Capacity (BTU/hr)         | 36794  | 22208  |
| SEER too low<br>SEER                          | 13.62  | 8.46   |
| Superheat (service valve) (F)                 | 17.93  | 54.54  |
| Subcool (service valve) (F)                   | 6.08   | 0.98   |
| Charge appears too low<br>Liquid press (psig) | 222.76 | 209.94 |
| Return gas press (psig)                       | 81.38  | 58.42  |

## Tested with 10 SEER ID Coil and 13 SEER HP

Heating 47 F Outside / 70 F Inside  
 Factory Refrigerant Charge: 8 lb 7 oz Fixed Orifice

|                               | Rated  | Tested |
|-------------------------------|--------|--------|
| Capacity (BTU/hr)             | 36484  | 29997  |
| EER                           | 15.71  | 10.60  |
| Superheat (service valve) (F) | 12.05  | 11.24  |
| Subcool (service valve) (F)   | 21.07  | 26.73  |
| Liquid press (psig)           | 203.88 | 233.03 |
| Return gas press (psig)       | 58.09  | 60.86  |

Capacity too low

EER too low

Charge appears OK

## Tested with 10 SEER ID Coil and 13 SEER HP

Cooling 95 F Outside / 80 F Inside  
 Refrigerant Charge: 14 lb 14 oz Fixed Orifice

|                               | Rated  | Tested |
|-------------------------------|--------|--------|
| Capacity (BTU/hr)             | 36794  | 29823  |
| SEER                          | 13.62  | 8.92   |
| Superheat (service valve) (F) | 17.93  | 14.68  |
| Subcool (service valve) (F)   | 6.66   | 17.58  |
| Liquid press (psig)           | 222.76 | 262.49 |
| Return gas press (psig)       | 81.38  | 79.96  |

Capacity too low

SEER too low

Charge appears OK

## Tested with 10 SEER ID Coil and 13 SEER HP

Heating 47 F Outside / 70 F Inside

Refrigerant Charge: 14 lb 14 oz Fixed Orifice

|                               | Rated  | Tested |
|-------------------------------|--------|--------|
| Capacity (BTU/hr)             | 36484  | 18706  |
| EER                           | 15.71  | 5.74   |
| Superheat (service valve) (F) | 12.05  | 6.6    |
| Subcool (service valve) (F)   | 21.07  | 87.00  |
| Liquid press (psig)           | 203.88 | 410.1  |
| Return gas press (psig)       | 58.09  | 64.60  |

## Tested with 10 SEER ID Coil and 13 SEER HP

Cooling 95 F Outside / 80 F Inside

Refrigerant Charge: 10 lb 0.5 oz Fixed Orifice

|                               | Rated  | Tested |
|-------------------------------|--------|--------|
| Capacity (BTU/hr)             | 36794  | 26188  |
| SEER                          | 13.62  | 9.08   |
| Superheat (service valve) (F) | 17.93  | 50.31  |
| Subcool (service valve) (F)   | 6.08   | 4.12   |
| Liquid press (psig)           | 222.76 | 214.25 |
| Return gas press (psig)       | 81.38  | 62.48  |

## Tested with 10 SEER ID Coil and 13 SEER HP

Heating 47 F Outside / 70 F Inside  
 Refrigerant Charge: 10 lb 6 oz Fixed Orifice

|                               | Rated  | Tested |
|-------------------------------|--------|--------|
| Capacity (BTU/hr)             | 36484  | 30178  |
| EER                           | 15.71  | 9.47   |
| Superheat (service valve) (F) | 12.05  | 11.22  |
| Subcool (service valve) (F)   | 21.07  | 62.23  |
| Liquid press (psig)           | 203.88 | 310.50 |
| Return gas press (psig)       | 58.09  | 61.83  |

## Tested with 10 SEER ID Coil and 13 SEER HP

Cooling 95 F Outside / 80 F Inside  
 Refrigerant Charge: 10 lb 6 oz with TXV

|                               | Rated  | Tested |
|-------------------------------|--------|--------|
| Capacity (BTU/hr)             | 36794  | 31266  |
| SEER                          | 13.62  | 11.85  |
| Superheat (service valve) (F) | 17.93  | 26.22  |
| Subcool (service valve) (F)   | 6.08   | 2.20   |
| Liquid press (psig)           | 222.76 | 220.06 |
| Return gas press (psig)       | 81.38  | 77.06  |

## Tested with 10 SEER ID Coil and 13 SEER HP

Heating 47 F Outside / 70 F Inside  
Refrigerant Charge: 10 lb 6 oz with TXV

|  | Rated  | Tested |
|--|--------|--------|
| Capacity (BTU/hr)  | 36484  |        |
| <b>High Pressure Switch opened because head pressure exceeded 410 psi. Charge needs to be reduced for heating but cooling is requiring more charge</b> |        |        |
| Liquid press (psig)  | 203.88 |        |
| Return gas press (psig)  | 58.09  |        |

## Result of Only Replacing Condensing Unit

- Up to 40% reduced capacity in cooling meaning system may not be able to keep up with thermostat setting.
- Up to 48% reduced capacity in heating resulting in strip heat coming on earlier.
- Up to 40% reduced efficiency in cooling resulting in higher power bills. Not only is it going to run longer but dollars per cooling will be more as well.
- Up to 60% reduced efficiency in heating resulting in higher power bills.
- System charging becomes critical since the charge might seem correct for one condition but flood on another.
- TXV will not solve the charge problem for all cases since the SH and SC can change dramatically with condition.
- All of these situations will result in numerous service calls and most likely the only way to resolve it is to replace the indoor coil with a larger coil anyway.

## 2-Ton Condensing Unit Analysis VS. Compressor Replacement

| <u>Cost</u>         | <u>10 SEER</u> | <u>13 SEER CU<br/>w/ matched Indoor</u> | <u>13 SEER CU<br/>w/ TXV Install</u> |
|---------------------|----------------|---|--------------------------------------|
| Condensing Unit     | \$700          | \$1,000                                 | \$1,000                              |
| Installation C/U    | \$400          | \$400                                   | \$400                                |
| A-Coil              | -              | \$500                                   | \$60                                 |
| Installation A-Coil | -              | \$600                                   | \$200                                |
| <b>Total</b>        | <b>\$1,100</b> | <b>\$2,500</b>                          | <b>\$1,660</b>                       |

### Compressor Change

|                            |              |
|----------------------------|--------------|
| Compressor                 | \$385        |
| Installation of Compressor | \$375        |
| Filter, Refrigerant, etc   | \$100        |
| <b>Total</b>               | <b>\$860</b> |

|  |         |
|--|---------|
| Premium for 10 SEER CU change out:       | \$240   |
| Premium for 13 SEER unit replacement:    | \$1,640 |
| Premium for 13 SEER CU & TXV change out: | \$800   |