# BALTIMORE GAS AND ELECTRIC COMPANY (BGE)

## Residential HVAC Diagnostic Tune-up (a BGE Smart Energy Savers Program℠)

## 2009 Performance Sheet

BGE We're on it.℠

This Performance Sheet must be uploaded as a supporting document to the Rebate Application.

### I. Contact/Site Information

| | | | |
|---|---|---|---|
| Company Name: | Technician Name: | | |
| Service Date: | BGE Account Number: | | |
| Customer Name: | Customer Telephone Number: | | |
| Residence Address: | City: | State: | Zip: |

### II. Installed Central A/C or Heat Pump Equipment

| | | |
|---|---|---|
| **Condenser/Outdoor Unit:** | Manufacturer: | Tonnage: |
| | Model Number: | SEER: |
| | Serial Number: | EER: |
| | Cooling Capacity (Btuh): | HSPF: |
| | Heating Capacity (Btuh) @ 47 °F: | |
| **Coil/Indoor Unit:** | Manufacturer: | |
| | Model Number (if available): | Serial Number (if available): |

### III. Installed Gas Furnace Equipment

| | | |
|---|---|---|
| **Gas Furnace:** | Manufacturer: | AFUE: |
| | Model Number: | Serial Number: |
| | Input Btuh: | Output Btuh: |
| | ECM or ICM: ☐ Yes ☐ No | Indicate Type: ECM ☐ or ICM ☐ |

### IV. Gas Meter Test Calculations

| | | |
|---|---|---|
| Return air: _____ °F DB | Supply air: _____ °F DB | |
| Orifice size: | Manifold pressure: _____ IWC | Gas meter dial size: |
| Gas meter seconds for one revolution of meter: | Low: | High: |

### V. Gas Combustion Test

| | | | |
|---|---|---|---|
| Indicate high fire gas rate (from meter lookup tables): | | | |
| Indicate actual high fire rate: | | | |
| Indicate temperature rise at high fire rate: | | | |
| O2: | CO: | Stack temperature: _____ °F | Draft pressure: _____ PSI |

### VI. Pre-Test Requirements

Fan Speed Setting: ☐ Low ☐ Medium-Low ☐ Medium ☐ Medium-High ☐ High

Method of Airflow Measurement: ☐ Pressure matching method ☐ Anemometer ☐ Flow grid ☐ Transverse pitot tubes
☐ TESP Method/Blower Table ☐ Temperature rise method (heating only)

## VII. Performance Test Data

Fan Airflow (CFM measured/verified): Before _____ CFM @ _____ IWC After _____ CFM @ _____ IWC

| Test Description | Before | After |
|---|---|---|
| System Watts (watts = measured volts x measured amps) | _____ Watts | _____ Watts |
| Coil Entering DB/WB (coil entering temperatures) | _____°F _____ °F | _____°F _____ °F |
| Coil Leaving DB/WB (coil leaving temperatures) | _____°F _____ °F | _____°F _____ °F |
| Coil Capacity (A) (Btu = CFM x 4.5 x Δ Enthalpy) | _____ Btuh | _____ Btuh |
| Equipment Nominal Btu (B) (manufacturer's rated nominal Cooling Btuh) | _____ Btuh | _____ Btuh |
| (A÷B) Equals System Effective Efficiency (should exceed 90% of nominal capacity) | _____ % | _____ % |

## VIII. Refrigerant Charge Verification/Test Results

| | | |
|---|---|---|
| Refrigerant Charge (indicate quantity added or recovered) | ☐ Added ☐ Recovered | _____ Lb. _____ Oz. |
| Refrigerant Type | ☐ R-22 ☐ R-410A | ☐ Other |

| | Before | After |
|---|---|---|
| Condenser Entering Air DB (outdoor air temperature at condenser) | _____°F | _____°F |
| Suction Pressure (required to check refrigerant charge) | _____ psi | _____ psi |
| Discharge Pressure (required to check refrigerant charge) | _____ psi | _____ psi |
| Suction Line Temperature (required to check refrigerant charge) | _____°F | _____°F |
| Discharge Line Temperature (required to check refrigerant charge) | _____°F | _____°F |
| Actual Results (indicate before and after results) | _____°F | _____°F |
| OEM Specification (indicate required temperatures and charging method) | _____°F | _____°F |

☐ Approach ☐ Subcooling ☐ Superheat

## IX. Pre-Test Calculation Worksheet

| System Watts (Power) | Volts | x Amps | = Watts |
|---|---|---|---|
| Blower motor | | | _____ Watts |
| Compressor/Condenser Fan | | | _____ Watts |
| Total System Watts (Add blower motor and compressor/condenser fan watts to get total) | | | _____ Watts |

Converting Wet Bulb (WB) to Enthalpy ***(measure all temperatures to the 1st decimal place and record Enthalpy to 2 decimal places)***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Entering Coil WB | _____°F | = | | | Btu/Lb Enthalpy (A) | | |
| Leaving Coil WB | _____°F | = | | | Btu/Lb Enthalpy (B) | | |
| Coil Capacity CFM | **Coil Capacity CFM** | **x** | **4.5** | **x** | **(Enthalpy A minus B)** | **=** | **Btuh** |
| | | x | 4.5 | x | | = | _____ Btuh |
| System Efficiency | **Coil Capacity (Btuh)** | **÷** | **Equipment Nominal Capacity (Btuh)** | | | **=** | **System Effective Efficiency (%)** |
| | | ÷ | | | | = | |

## X. Tune-Up Procedures

| Required Procedures | Comments |
|---|---|
| ☐ Changed or cleaned air filter | |
| ☐ Cleaned condenser coil | |
| ☐ Cleaned evaporator coil | |
| ☐ Adjusted air flow | |
| ☐ Adjusted refrigerant charge | |

## XI. Post-Test Calculation Worksheet

| **System Watts (Power)** | **Volts** | **x Amps** | **= Watts** |
|---|---|---|---|
| Blower motor | | | _____ Watts |
| Compressor/Condenser Fan | | | _____ Watts |
| Total System Watts (Add blower motor and compressor/condenser fan watts to get total) | | | _____ Watts |

| Converting Wet Bulb (WB) to Enthalpy ***(measure all temperatures to the 1st decimal place and record Enthalpy to 2 decimal places)*** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Entering Coil WB | _____°F | = | | | Btu/Lb Enthalpy (A) | | |
| Leaving Coil WB | _____°F | = | | | Btu/Lb Enthalpy (B) | | |
| Coil Capacity CFM | **Coil Capacity CFM** | **x** | **4.5** | **x** | **(Enthalpy A minus B)** | **=** | **Btuh** |
| | | x | 4.5 | x | | = | _____ Btuh |
| System Efficiency | **Coil Capacity (Btuh)** | **÷** | **Equipment Nominal Capacity (Btuh)** | | | **=** | **System Effective Efficiency (%)** |
| | | ÷ | | | | = | |

## Notes

If the ductwork is installed in unconditioned space, a difference between the room return air and coil entering air temperatures could indicate delivered capacity loss from duct leakage and/or thermal transmission gains. Duct sealing or insulating may be recommended to improve delivered capacity, comfort and efficiency. **Please indicate the duct location's temperature: _____°F.**

A difference between the coil leaving temperature and the temperature delivered to a supply register usually indicates thermal transmission gains through inadequate insulation. If the supply air ducts leak, air is lost to the unconditioned space. If return air ducts leak, then unconditioned air at significantly elevated temperatures (i.e., 140 °F vs. 78 °F) is drawn into the system, which results in decreased operational efficiency.

If inadequate airflow cannot be achieved by replacing the filter, cleaning the evaporator coil or changing the blower speed, the problem is likely caused by an inadequate distribution system and repair / renovation may be required.

For additional assistance regarding this form, please contact ResidentialHVAC@BGESmartEnergy.com or call 410.290.1214.

**For more information about the program, go to BGESmartEnergy.com**

**This program supports the EmPOWER Maryland Energy Efficiency Act.**



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