

Energy Initiative

Compressed Air - Air Compressors

2009 Project Information Form for Rhode Island

This Project Information Form provides a template to collect project systems and equipment information and specifications. In addition, this form serves as a guide to Compressed Air System terms and identifies energy efficiency improvement products and incentives. Prior to the start of any installation of equipment or systems, call your **Energy Solutions representative** to arrange a convenient time to perform an inspection of the existing equipment or systems. This inspection is required for all applications.

Customer Facility Information

Customer Facility Name: _____ Date of Application: _____
 _____ Sq. Ft. Covered by Application: _____
 Contact Person: _____ Federal ID Number: _____
 Street Address: _____ Company Type:
 City: _____ State: _____ Zip: _____ Incorporated Exempt Not Incorporated
 E-mail Address: _____ Phone Number: _____
 Facility Description: _____ Fax Number: _____

Customer of Record Information: Billing Account Number: _____ *Internal Use only*

Installation Contractor Information

Installation Performed By:* Customer Installation Contractor Project Expediter Other (Vendor)

Complete this section if installation is not by the customer

Installation Company: _____ Street Address: _____
 Contact Person: _____ City: _____
 E-mail Address: _____ State: _____ Zip: _____
 Phone Number: _____

* If contractor has not been selected, select **Customer**

Application Information

Application Funding Type: AAP Other *Internal Use only*

Expected Completion Date: _____

Proposed Incentive Recipient: Customer (*Account Credit or Check*) Installation Contractor** Project Expediter

** **Complete this section if Installation Contractor has been selected**

Federal ID Number: _____ Company Type: Incorporated Exempt Not Incorporated

This Form Was Completed By:

Name: _____
 Phone Number: _____ E-mail Address: _____

For More Information

Phone: 1-800-787-1706

Internet: www.nationalgridus.com

Project Information Form Index:

- Page 1: Customer information datasheet
- Page 2: Proposed Equipment Specification Table and reference guide to terms
- Page 3-4: Compressed Air Eligibility Requirements and Incentive Details
- Page 5: Compressed Air Survey document

Instructions:

- 1) Fill in the Customer information datasheet on page 1.
- 2) Fill in the Proposed Equipment Specification Table on page 2.
- 3) Fill in the Compressed Air Survey on page 5.
- 4) Contact your Energy Solutions representative to complete an application and to determine the incentive for this Compressed Air project.

Proposed Equipment Specification (Facility Detail)

Building and Room Identification (Installation Site): _____

Measure Type: Compressed Air

Control Type: L/NL - Load/ No Load VFD - Variable Frequency Drives VarD - Variable Displacement

Size: _____ Horsepower (Hp) (see page three, item #3 for conversion from kW to HP)

Storage: Yes (New Storage Proposed) No (No additional storage proposed)

(a) Existing Storage Remaining in Service: _____ Gallons (excludes storage from tank mounted compressors)

(b) New Proposed Storage Size: _____ Gallons

((c) Total New Storage* Size: _____ Gallons (a + b = c)

*New storage is the total storage being purchased through this proposal

Eligible Storage (from CAIR spreadsheet): _____ Gallons
Internal Use Only

Annual Hours of Compressor Operation: _____ (must run a minimum 2000 hours per year)*

Does this compressed air system have a Variable Frequency Drive (VFD)? Yes No (if yes – provide information below)

Harmonics Test Eligibility Information:

- Total VFD Load Supplied by Transformer (Hp)* _____
- KVA Rating of Building Transformer _____

* The value for the "Total VFD Load Supplied by Transformer" is the sum of the rated horse power for all motors, existing as well as all proposed at this time, in the facility that are under control of Variable Frequency Drives.

Guide to Terms

Compressed Air Unit of Measure: Hp (Horsepower)

Compressor Storage: Air receiver tanks (see page three and four, item #8 and #9 for details)

Annual Hours of Operation: *see page four, item #10 for details

KVA Rating of Building Transformer: For Utility Owned Transformers, contact your Energy Solutions representative

I. Compressed Air Eligibility Requirements and Incentive Details

Prescriptive versus Custom Approach:

Under the prescriptive program, incentives are available for air compressors in accordance with the rules that follow in this section.

- If a proposed compressor project falls short of the minimum hours established in this program but in all other ways complies with the requirements of the Prescriptive Approach, the proposed project is not eligible for an incentive under either the Prescriptive or the Custom Approach.
- Accessory devices that will be installed along with compressors will be handled as separate stand alone Custom Approach while the compressor, receiver for the same project continue on the standard prescriptive incentive track. Examples of such accessories include; low pressure drop filters and zero loss drains.
- Proposed compressor installations that satisfy all the requirements of the Prescriptive Approach, that also include significant energy conservation measures involving modifying the distribution system or reducing air consumption at the end uses, may apply for incentives under the Custom Approach.
- If harmonics remediation devices must be installed in order for a proposed Variable Frequency Drive compressor project to comply with National Grid’s harmonic standards, the project may be run as a Custom Approach project and the proposed project cost may include the harmonics remediation work.

Table 1: Prescriptive High Efficiency Air Compressor Incentives

| Horsepower | Incentive per Hp Load/No Load | Incentive per Hp Variable Speed | Incentive per Hp Variable Displacement |
|------------|-------------------------------|---------------------------------|--|
| ≥15 to <25 | \$205 | \$275 | N/A |
| ≥25 to <50 | \$180 | \$280 | N/A |
| ≥50 to <75 | \$180 | \$210 | \$215 |

Prescriptive High Efficiency Air Compressor Incentives

1. Only rotary screw compressors are eligible for prescriptive incentives. For scroll and reciprocating compressors follow the Custom Approach.
2. Projects replacing the following types of compressors are not eligible: Rotary screw compressors with; Load/No Load, variable displacement or variable speed drive controls and reciprocating compressors
3. Only compressors with nameplate horsepower equal to or greater than 15 Hp and less than or equal to 75 Hp are eligible for Prescriptive incentives. For compressors with capacity rated in kW, rating shall be converted to Hp for compliance check [= (kW) /(.746kW/HP)].
4. Prescriptive incentives are only applicable to oil flooded Rotary Screw Compressors. Oil free units must use the Custom Approach.
5. Proposed compressor must have; Load/No Load, Variable Speed Drive or Variable Displacement capacity control.
6. Prescriptive incentives are only applicable to single compressor systems. (Back-up compressors that operate only while primary machine is serviced will be allowed.) Multiple compressor systems of any size that serve a common distribution system must use the Custom Approach.
7. Prescriptive incentives are only applicable to compressors that operate at 145 psi or below. Compressors operating at higher pressures must use the Custom Approach.
8. Primary storage is required on all projects
 - a. For load/no load machines the minimum requirement is 4 gallons per acfm of compressor capacity.
 - b. For VSD or Variable Displacement machines, the minimum requirement is 2 gallons per acfm of compressor capacity
 - c. Where the limitations on the size range of available storage vessels (400 or 600 gallons etc) requires the purchase of more than the minimum required storage volume, an incentive will be provided for up to 1gallon/acfm compressor capacity beyond the required minimum. Example: if calculated minimum is 460 gallons, standard storage available is 600 gallons, 75 acfm compressor rating, the incentive paid is for 535 gallons. (460 + 75 = 535) Assumes there is not existing storage.
 - d. Incentives are paid only for new storage capacity installed coincident with a new eligible compressor.
 - e. Storage from any existing tank mounted compressors remaining on site may not be counted toward minimum requirements.
 - f. Contact your Energy Solutions representative for assistance with storage rules.

(continued on page 4)

Table 2: Storage Incentive

| | |
|-------------------------------------|--------|
| Storage Incentive per Gallon | \$2.75 |
|-------------------------------------|--------|

9. Where there is existing storage that will be reused with the new compressor, the existing capacity is deducted from the quantity of storage eligible for an incentive on the project. (Total Primary Storage Required - Existing Storage = Storage Eligible for an Incentive.) If existing storage to be reused satisfies the minimum requirements for Primary storage, no incentive is available for storage.
10. Compressors must run a minimum of 2,000 hours a year. Note when determining compliance; count only the hours that the end uses supplied by the compressor are operational, not the operating hours of the facility.
11. Harmonic test for eligibility is required on equipment using Variable Frequency Drive air compressors. Obtain a Standards of Harmonics form from your Energy Solutions representative.
12. Compressors with VFD's must have as a minimum a 3% impedance series reactor in its AC power input connection.
13. The Compressed Air System Assessment questionnaire (page five) must be completed in its entirety and submitted at time of application.
14. Supply cut-sheet on compressor that states capacity (CFM) at the operating pressure specific to this project.

Important Information on Variable Frequency Drives

VFDs can be sensitive to overvoltages that occur when power factor correcting capacitor banks on the utility power system are switched on. To qualify for an incentive payment, each VFD must include a series reactor (*inductor, choke*) in its AC input connections. Your VFD supplier should assist in the sizing of the reactor. Minimum requirement is a 3% impedance reactor, based on the horsepower of the VFD to be installed.

As a general rule, a 3% reactor is sufficient to avoid misoperation of VFDs during utility capacitor switching and will also help reduce the magnitude of harmonic currents generated by the drive. In some instances your supplier may find it necessary to install 5% reactors and, rarely, additional filtering devices to meet acceptable current and voltage harmonic distortion requirements.

If your power factor is less than 0.8 (80%), we recommend that you consider power factor correction concurrent with the installation of drives, because the presence of power factor correction equipment can influence proper reactor sizing, and because the presence of VFDs can influence the design of power factor correction equipment. In situations where the load due to VFDs is a substantial part of the facility load, we recommend that filters, rather than capacitors, be used for power factor correction.

The use of VFDs which incorporate pulse width modulation (PWM) may produce overvoltages which may cause premature failure of AC induction motors not rated for use with an inverter. We recommend that when installing PWM drives, you consider utilizing inverter rated motors or suitable overvoltages mitigation devices that may include additional line reactors between the drive and the motor. Consider shaft grounding, insulated bearings, load filters or conductive lubricants to prevent possible bearing frosting or fluting. This is particularly important for installations where the motor will operate in a narrow speed band for long periods of time.

Compressed Air Survey Document:

The following information is to be completed by the equipment vendor in coordination with the customer. Please describe the major components of your existing facility compressor and compressed air system.

| Existing Compressor Description (Manufacturer & Model) | Rated Hp & CFM | Operating PSI | Control Type | Existing Primary Storage | Hours/Wk and Loading | Compressor Loading (% Rated CFM) |
|---|----------------------|------------------|-----------------|--------------------------------|----------------------------|---|
| Ex: Gardner Denver Modulating 50 Hp Model: #ABCDEF | 50 Hp 220 cfm | 110 psi | Mod | 100 gal | 90 hrs/wk | 10hr@90% 30hr@30% 50hr@60% |
| 1. | | | | | | |
| 2. | | | | | | |
| 3. | | | | | | |

Operational Issues

How many shifts _____ and how does production vary? _____

What is the current system pressure at the furthest point from the compressor? _____psi

What is the minimum pressure required for proper equipment operation? _____psi

Any significant operational problems

- Inadequate pressure Yes No
- Moisture or air quality Yes No
- Production problems due to pressure fluctuations Yes No
- Other _____

Compressor Age _____

Compressor Cooling Medium (air, chilled water) _____

Number of Condensate Drains _____ Type _____ Timer Style Drain Settings _____

How many gallons of storage listed above are from tank mounted compressors? _____

Leak Identification and Remediation

Date of Last Leak Survey if Any _____

Survey Provider and Survey Type (eg ultrasonic) _____

Estimate Leak Level from Survey _____

Follow-up Leak Remediation Efforts _____

Has the customer attended the Compressed Air Challenge Fundamentals Training? Yes No

Would you like additional compressed air efficiency services?

- Compressed Air Challenge technical training Yes No
- Technical assistance with a more complex compressed air project Yes No
- Leak assessment assistance Yes No

For Compressed Air Challenge technical and training information please visit: www.compressedairchallenge.org