Quincy
COMPRESSOR

Quincy Efficiency Quotient

EQ

Quincy EFFICIENCY QUOTIENT

A PERFORMANCE & FINANCIAL
COMPRESSED AIR SYSTEM ANALYSIS

2005 FROST & SULLIVAN
Customer Service Innovation Award

what's YOUR EQ?
Quincy EFFICIENCY QUOTIENT

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THE SCIENCE OF COMPRESSED AIR

Advances Globally Competitive Technology:

- Applies "Best Practice" Solutions
- Generates Bottom-line Energy Savings
- Ensures Scientifically Proven Results

YOUR "BEST PRACTICE" FOR ENERGY SAVINGS

In order to stay competitive in the global market, you need partners that offer proven "Best Practice" solutions. More than promises of energy efficiency, you need bottom-line accountability – and Quincy's "Best Practice" standards for compressed air deliver bottom-line results.

BEST PRACTICE STANDARDS

Industry Examples	Compressor kWh per Industry Metrics
Aluminum Can Manufacturing	258 kWh per 100,000 cans
Foam/Plastic Cup Manufacturing	290 kWh per thousand cups
Pulp and Paper Mill w/Woodyard	115 kWh per ton of paper
Corrugated Box Plant	640 kWh per million sq. ft.
Rubber Products Manufacturing	1088 kWh per 1000 tires

The generation of compressed air accounts for 10% of the total industrial energy used in the United States. More importantly, it's the cost of this energy that directly impacts your bottom-line. Our "Best Practice" standards allow you to compare your facility to the most efficient compressed air systems in similar industries.

COST SAVINGS OPPORTUNITY

EQ Rating	50 hp system	100 hp system	500 hp system
85%	$ 4,973	$ 9,944	$ 49,722
75%	$ 7,458	$ 14,917	$ 74,584
65%	$ 11,187	$ 22,375	$ 111,875

Note: Calculated @$0.07 /kWh.
See page 6 for more on the EQ Rating.

It's the application of the patent pending Quincy Efficiency Quotient (EQ™) that allows us to quickly and accurately define the potential energy savings in your plant. And it's the bottom-line results that will make Quincy your "Best Practice" partner for energy savings.

QUINCY'S COMMITMENT TO EFFICIENT & COMPETITIVE INDUSTRY IN AMERICA

Efficiency is critical to success in the global marketplace and Quincy's commitment to efficiency is leading to innovative solutions that give American industry a competitive edge.

Quincy's extensive distributor network understands the global challenges you face everyday. And because Quincy's distributors are independent businesses with ties to your community, they are committed to your success.

Since 1920, Quincy Compressor has been driven to making American industry more competitive. Quincy's EQ is setting industry standards for efficiency and is just one example of how we are reducing operating costs for our clients. Advanced R&D, state-of-the-art manufacturing and an uncompromised design philosophy make Quincy the value added partner American industry needs in today's global economy.

A PERFORMANCE & FINANCIAL COMPRESSED AIR SYSTEM ANALYSIS

WHAT'S YOUR EQ?

EQ stands for Efficiency Quotient:

- Industry standard for evaluating the overall efficiency of your compressed air system
- Innovative, patented method
- Based on proven "Best Practice" solutions

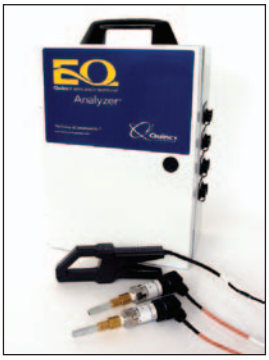
WHAT'S THE BENEFIT OF A HIGH EQ RATING?

Optimizes your compressed air system:

- Reduces energy consumption
- Stabilizes system pressure
- Improves system performance
- Enhances product consistency
- Improves plant productivity

THE EQ ANALYSIS IS A 3-STEP PROCESS

- Determine Existing EQ Rating with a free plant walkthrough
- Conduct EQ Analysis to quantify cost-reduction opportunities
- Evaluate EQ Analysis report and Action Plan to reduce operating costs



STEP 1 – DETERMINE YOUR EXISTING EQ RATING

Your Quincy representative will conduct a free walkthrough and complete the EQ Rating worksheet included in this brochure. This does more than just identify your existing EQ Rating, it estimates your current compressed air system operating costs and your cost reduction potential.

STEP 2 – CONDUCT QUINCY EQ ANALYSIS

- A trained Quincy representative will come on-site and connect the EQ Analyzer.
- The EQ Analyzer records the power and performance of the compressors and air pressure levels in your compressed air system during normal production.
- The recorded data combined with information gathered from plant personnel and observation will then be analyzed.

Financials Summary

Constituent	Existing	Proposed	Variance
Electricity	$170,853	$113,144	$57,710
Maintenance & Repairs	15,000	9,000	6,000
Cooling Water	5,125	3,394	1,731
Rental Compressors	4,500	0	4,500
Miscellaneous	0	0	0
TOTAL	**$195,478**	**$125,538**	**$69,941**
Estimated Retrofit Costs	$122,740		
Projected Annual Savings	**$69,941**		
Estimated Simple Payback	21 months		

STEP 3 – DELIVER QUINCY EQ ANALYSIS REPORT AND ACTION PLAN

- Financial projections include a payback calculation on the recommended Action Plan and capital investment.
- System performance graphs and tables provide details on existing and proposed system performance.
- The Action Plan details the specific recommendations and estimated costs to raise your system's EQ.

Prioritized Costed Action Plan

Description	Capital	Install
Install Quincy QDHP 3100 micro-burst heated dryer	$49,560	$3,500
Install Quincy QGV 150 variable speed drive compressor	56,600	5,000
Install 1000 gallon header storage receiver	3,330	1,000
Replace 200 scfm open blowing applications with low pressure blower system	3,000	750
Subtotal	**$112,490**	**$10,250**
Grand TOTAL	$122,740	

QUINCY EFFICIENCY QUOTIENT

CASE STUDY #1: MACHINING & ASSEMBLY FACILITY REDUCES OPERATING COSTS MORE THAN 38% AND TURNS OFF A COMPRESSOR

A U.S. based machining and assembly plant was looking for an opportunity to reduce air system operating costs and improve system reliability. The air system pressure was elevated to support widely varying production demand – it also increased operating costs, forced a second compressor to operate and caused the system pressure to fluctuate. The compressed air supply system was composed of two 60 hp rotary screw air compressors, a refrigerated dryer and a coalescing filter.

1) THE QUINCY EQ RATING: IDENTIFIED THE POTENTIAL FOR A 30-40% REDUCTION IN OPERATING COSTS

The 2 hour EQ Rating survey identified the most significant cost reduction opportunities as:

- Accurately controlling header pressure
- Eliminating artificial demand and other waste
- Turning off one part loaded compressor

QUINCY EQ RATING	
Supply Side EQ Rating	77%
Demand Side EQ Rating	73%
System EQ Rating	**75%**
Operating Cost Reduction >35%	

2) THE QUINCY EQ ANALYSIS: BASED ON THE EQ RATING, THE EQ ANALYZER WAS INSTALLED TO RECORD SYSTEM PERFORMANCE

EQ Analysis

A local EQ trained distributor installed the EQ Analyzer™ at the plant and collected critical system information.

- Data collected by the EQ Analyzer and the site information was then uploaded to the EQ Web Site.
- Patent pending technology calculated existing performance of the system and modeled multiple system configurations to determine the optimal system solution.
- Results of the EQ Analysis indicated the existing Power$ync® compressors were appropriate if header pressure was accurately controlled.

3) THE EQ ANALYSIS REPORT: CALCULATED THE ROI AT <14 MONTHS FOR IMPLEMENTING THE ACTION PLAN

- A *Quincy Pressure Flow Control* was installed to provide accurate control of header pressure.
- An additional *2500 gallon receiver* was also recommended and installed.
- The existing *Power$ync compressors were put in network mode* allowing one of them to turn off.
- The increased storage and pressure control supports peak air demands without turning on the second compressor.

THE RESULTS: OPERATING COSTS REDUCED BY MORE THAN 38% ($11,936/YR), STABLE HEADER PRESSURE, ONE COMPRESSOR TURNED OFF FOR BACKUP USE

- The plant header pressure is now stable to within 1 psi vs. 28 psi before the system upgrades.
- With the second compressor turned off, the plant now has a redundant system.
- The original system EQ Rating took less than 2 hours and accurately predicted >35%

EQ Analysis — FINANCIALS SUMMARY

Constituent	Existing	Proposed	Variance
Electricity	$25,946	$16,560	$9,386
Maintenance & Repairs	$5,100	$2,550	$2,550
Cooling Water	0	0	0
Rental Compressors	0	0	0
Miscellaneous	0	0	0
Totals	$31,046	$19,110	$11,936
Estimated Retrofit Costs	$13,450		
Projected Savings/Year	$11,936		
Estimated Simple Payback	<14 (months)		

CASE STUDY #2: BOTTLING / PACKAGING FACILITY REDUCES OPERATING COSTS MORE THAN 29% AND TURNS OFF A COMPRESSOR

A California bottling and packaging manufacturer believed its air system operating costs could be reduced. While the air system pressure was elevated to prevent production shutdowns, it was also increasing operating costs, forcing multiple compressors to modulate and causing the system pressure to fluctuate. The compressed air supply system was composed of two 75 hp and one 40 hp rotary screw air compressors, a refrigerated dryer and a coalescing filter.

1) THE QUINCY EQ RATING: IDENTIFIED THE POTENTIAL FOR A 25-30% REDUCTION IN OPERATING COSTS

The 2 hour EQ Rating survey identified that the most significant cost reduction opportunities result from actively supporting the wide variations in air demand:

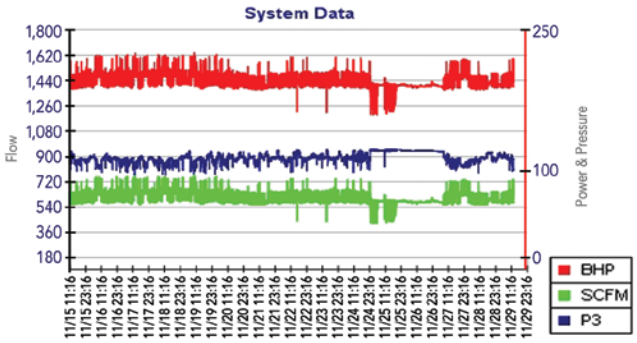
- Eliminate multiple modulated compressors
- Stabilize header pressure
- Reduce artificial demand and waste

QUINCY EQ RATING	
Supply Side EQ Rating	72%
Demand Side EQ Rating	81%
System EQ Rating	**77%**
Operating Cost Reduction >25%	

2) THE QUINCY EQ ANALYSIS: BASED ON THE EQ RATING, THE EQ ANALYZER WAS INSTALLED TO RECORD SYSTEM PERFORMANCE

A local EQ trained distributor installed the EQ Analyzer™ at the plant and collected critical system information.

- Data collected by the EQ Analyzer and the site information was then uploaded to the EQ Web Site.
- Patent pending technology calculated existing performance of the system and modeled multiple system configurations to determine the optimal system solution.
- The results of the EQ Analysis indicated a QGV-150 variable speed compressor could support the wide variations in air demand and reduce operating costs.



3) THE EQ ANALYSIS REPORT: CALCULATED THE ROI AT <16 MONTHS FOR IMPLEMENTING THE ACTION PLAN

- A *Quincy QGV-150 Variable Speed Compressor* was installed to provide accurate control of system pressure.
- True PID Functions in the PLC controller adjusts the speed of the Quincy QGV to match the rate of change in air demand.
- Remote Pressure Signal Connection overcomes the pressure drop created by air treatment equipment and stabilizes header pressure.
- With turndown capability as much as 85%, the Quincy QGV performs as the trim compressor in all production conditions.

THE RESULTS: OPERATING COSTS REDUCED BY MORE THAN 29% ($44,000/YR) AND PRODUCTION SHUTDOWNS WERE ELIMINATED

- The plant header pressure is now stable to within 2 psi vs. 20 psi before the system upgrades.
- The broad turndown range of the Quincy QGV compressor eliminates the need to operate any part-loaded, inefficient compressors.
- The original system EQ Rating took less than 2 hours and accurately predicted a >25% operating costs savings and an attractive ROI.

QUINCY EQ WORKSHEET

Supply Side EQ Rating	score	enter value for each condition that applies	
Rotary / Recip Control Mode		0	VSD or Variable Displacement
		3	Load/Unload
		8	Modulation
Centrifugal Compressor Blowoff		0	No blowoff valves ever open
		3	One blowoff valve open occasionally
		5	One blowoff valve open often
		7	Two blowoff valves open at times
		10	More than two blowoff valves open
Supply Side Storage		0	10 gallons / cfm of largest compressor
		1	5 gallons / cfm of largest compressor
		2	3 gallons / cfm of largest compressor
		4	2 gallons / cfm of largest compressor
		6	1 or less gallons / cfm of largest compressor
Multiple Compressor Sequencing		0	PLC based rate of change automation
		2	Compressor manufacturer network sequencer
		4	Pressure switch sequencer
		6	None - manual rotation
Compressor & Equipment Maintenance		0	Professional Service Contract
		1	In-house preventive maintenance
		3	Repair only maintenance
		6	Repair only maint.; experiencing reliability issues
Compressor Room Conditions *(Use all that apply)*		0	Clean and well ventilated
		2	Elevated temperatures
		2	Dusty or dirty air
		2	Poor cooling water treatment
Air Treatment - Dryers		0	Cycling refrigerated dryers
		1	Non-cycling refrigerated dryers
		2	Heat of compression dryers
		4	Heated blower desiccant dryers
		6	Heated desiccant dryers
		10	Heatless desiccant dryers
Air Treatment - total pressure drop		0	< 2 psid
		1	< 5 psid
		4	< 10 psid
		7	> 10 psid

Contact Information —

Company: _____

_____

Contact: _____

Title: _____

Address: _____

_____

_____

Phone: _____

Fax: _____

Email: _____

EQ Rating conducted by —

Name: _____

Company: _____

_____

Phone: _____

Fax: _____

Email: _____

Total Supply System Score		Add up all scores above
Supply System EQ Rating	%	Subtract total from 100 (relative to 100% of potential efficiency)

Energy Calculations

compressors	*hp		kW
#1		x .746/.92	
#2		x .746/.92	
#3		x .746/.92	
#4		x .746/.92	
#5		x .746/.92	
#6		x .746/.92	
		compressor kW subtotal	

refrig dryers	cfm capacity	**divide by	kW
#1		200	
#2		200	
#3		200	
#4		200	
#5		200	
#6		200	
		dryer kW subtotal	

***cooling kW subtotal	
compressor + dryer + cooling = total kW	
x operational hours per year	
x $ per kW local rate	
= Operating Costs Estimate	$

* enter nominal motor hp if on, leave blank if off

***divide by 60 for heated desiccant dryers*

*** calculated as 3% of compressor kW

Demand Side EQ Rating	score	enter value for each condition that applies	
Artificial Demand		1	<80 psig plant header pressure
		3	80-90 psig plant header pressure
		5	90-100 psig plant header pressure
		8	>100 psig plant header pressure
Open Blowing Applications		0	No compressed air blowing or use low pressure blowers only
		2	Minimal blowing applications using engineered nozzles
		5	Some compressed air blowing using tubing or pipe manifolds
		8	Significant use of comp air blowing on product or equipment
Inappropriate or Inefficient Uses		0	No inappropriate or inefficient uses identified
		2	Vacuum generators and venturis driven by compressed air
		2	Sparging, mixing of liquids with compressed air
		2	Vibrators or agitators powered by compressed air
		2	Other: diaphragm pumps, filter presses
		4	Large or multiple pulse type baghouses or dust collector
		5	Conveying of material with compressed air (not blowers)
		7	Significant use of air <45 psig but compressed to >90 psig
Leak Management		1	Aggressive leak repair program including ultrasonic scanning
		3	Semi or annual leak repair effort
		5	No leak management but do repair large or obvious leaks
		7	Minimal effort on leak repairs
Idle Production Equipment		0	Automatic shutoff of air to idle production equipment
		2	Manual shutoff of air to idle production equipment
		4	No shutoff of air to idle production equipment
Condensate Drain Losses		0	All demand style drains well maintained
		2	Mix of demand and solenoid drains
		4	Timed solenoid drains
		6	Partially open valves or drain bypasses
Total Demand Side Score		Add up all scores above	
Demand Side EQ Rating	%	Subtract total from 100 (relative to 100% of potential efficiency)	

Efficiency Quotient Summary

Supply Side EQ Rating	%		
Demand Side EQ Rating	%		
(Demand EQ + Supply EQ) / 2	%	**System EQ Rating**	
System EQ Rating of	>95%	**5%**	Opportunities exist, but Return On Investment may be limited
	>90%	**10%**	Operating cost reductions of 5-10% exist, providing an attractive ROI
	>85%	**20%**	Operating cost reductions of 15-20% exist, providing an attractive ROI
	>80%	**25%**	Operating cost reductions of 20-25% exist, providing an attractive ROI
	>75%	**30%**	Operating cost reductions of 25-30% exist, providing an attractive ROI
	>70%	**35%**	Operating cost reductions of 30-40% exist, providing an attractive ROI
	>65%	**45%**	Operating cost reductions of >40% exist, providing an attractive ROI
OPERATING COSTS ESTIMATE *(From Energy Calculations Worksheet)*	$		
Cost reduction opportunity based on EQ Rating	%	*(copy in reduction opportunity based on system EQ rating)*	
Cost Reduction Opportunity	$		

QUINCY EFFICIENCY QUOTIENT

QUINCY EFFICIENCY QUOTIENT TECHNICAL ADVANTAGES

ACCURATELY ANALYZES EXISTING COMPRESSOR PERFORMANCE

- Simultaneous recording of all compressors analyzes system and compressor performance during normal, low and peak production demand periods for the existing and proposed arrangements.
- Designed for all brands and types of compressors and compressor controls including rotary, reciprocating and centrifugal.
- Determines the percent capacity and load on each compressor, correcting performance in power and flow for the effects of control type, discharge pressure, altitude and inlet temperature.
- Corrects for the impact of system storage on compressor efficiency in load-unload control modes.
- Provides correction for off-design motor conditions such as voltage, power factor and motor efficiency.
- Remotely located compressors can be logged and included in the analysis.

ACCURATELY ANALYZES EXISTING AIR TREATMENT EQUIPMENT

- Calculates pressure drop across air treatment equipment and the energy impact of reducing that pressure drop.
- Calculates the actual load on each dryer and the energy impact of dryer technology and controls, i.e. cycling refrigerated dryers and desiccant dryer purge controls.
- Corrects desiccant dryer purge losses based on dewpoint controls and load.

CALCULATES WASTE IN THE SYSTEM

- Calculates artificial demand based on existing system pressure vs. lowest acceptable pressure, adjusting for the level of unregulated demand in the system.
- Adjusts desiccant purge losses for modified controls and dryer loads.
- Provides for all types of waste reduction including leak repairs, open blowing, inappropriate uses, drain losses, etc.

MODELS MULTIPLE PROPOSED SYSTEM UPGRADES

- Allows multiple what-if scenarios to determine the optimum proposed compressed air system arrangement.
- Calculates the efficiency of recommended system modifications supporting the modified air demand after waste is eliminated based on:
  - new compressors, including control types and part loaded operating conditions
  - new air treatment equipment including dryer technology, purge losses, filter pressure drop, etc.
  - lower, more stable system pressure from automation, pressure flow controls, or compressor control mode
  - additional storage impact on compressor performance
  - repairs to malfunctioning compressor controls

PERFORMS A FINANCIAL ANALYSIS BASED ON RECOMMENDED UPGRADES

- Determines the existing and proposed energy consumption in kWh, kW demand and dollars.
- System energy calculations include compressors, compressor cooling fan motors and pumps, dryer motors and heaters.
- Allows for other system costs including rental compressors, compressor maintenance and cooling water costs.
- Performs a financial payback calculation based on the Costed Action Plan that allows installation estimates to be included.
- Confirms the Existing EQ Rating and projects the Proposed EQ Rating after the Action Plan is implemented.
- Provides a report that contains:
  - Existing System Graphs of pressure, power and flow
  - System Performance Summary Table including optional peak and low production loads
  - Existing and Proposed Compressor Performance and Efficiency Tables
  - Constituents of Air Demand Table including waste reduction opportunities
  - Existing and Proposed Energy Costs Table and Graph
  - Costed Action Plan Table detailing all recommended upgrades
  - Financial Summary Table with payback calculations
  - Efficiency Quotient Rating Summary Tables

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