

Compressed Air Conservation Ideas

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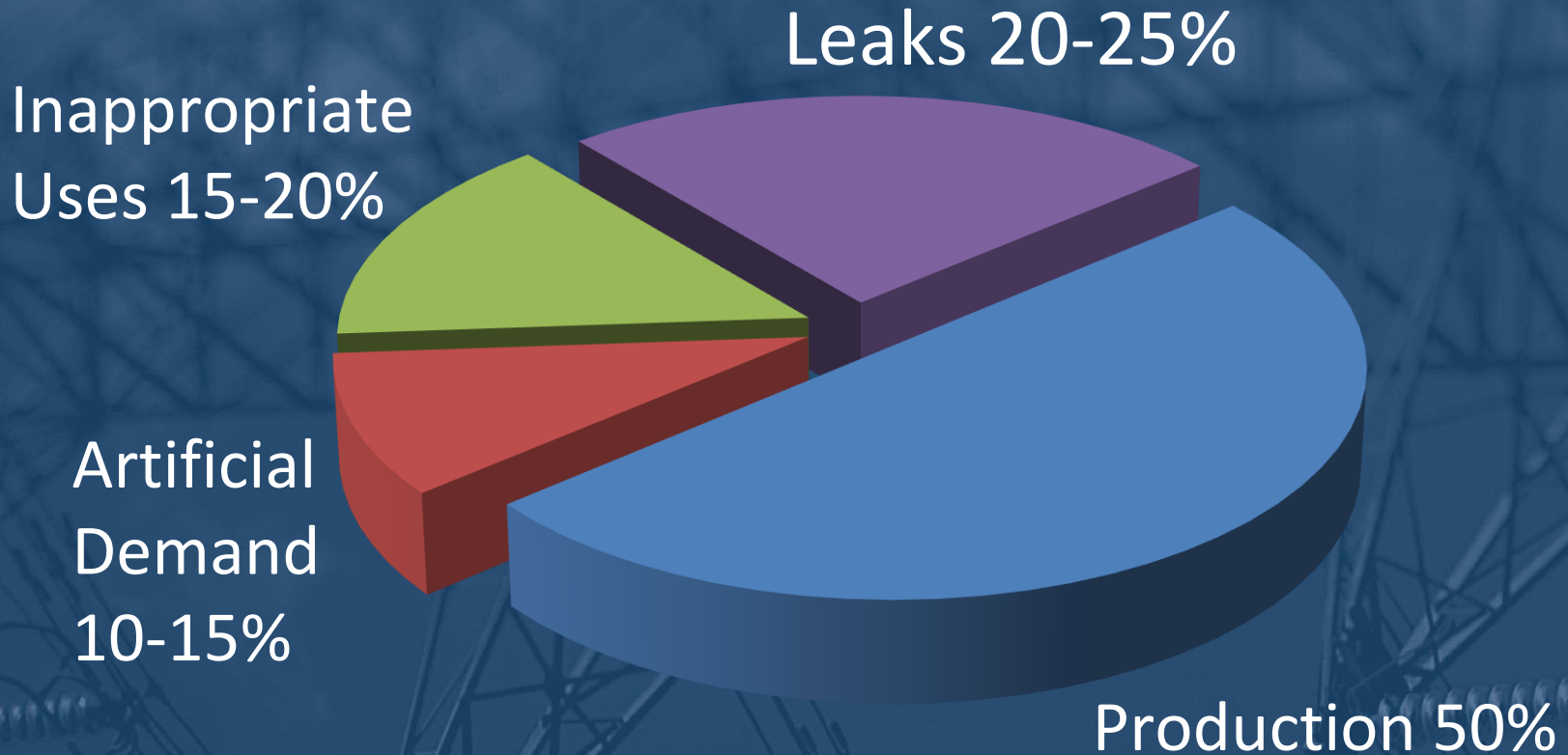
POWER SUPPLY INDUSTRIES

- Founded in 1983 and currently employs 45 people at 3 locations in Missouri and Illinois including 10 Graduate Engineers and (3) DOE Air Master+ Certified Auditors
- Air Audit department saved customers over \$30m in the past 11 years
- Focus exclusively on Compressed Air Systems
- Educate and Train customers on Energy Savings

COMPRESSED AIR UTILITY

- US Industry compressed air operating costs in excess of 90,000,000,000 kWh per year.
- The Compressed Air Challenge estimates 25% of that energy is wasted.
- Inappropriate Uses of “Compressed Air” represent the best opportunity for process improvement and utility savings.
- A very small portion of US industry tracks compressed air costs per production units as an efficiency tracking tool.

TYPICAL COMPONENTS OF DEMAND



ELIMINATE INAPPROPRIATE USES

Potentially Inappropriate Uses	Suggested Alternatives/Actions
Clean-up, Drying, Process cooling	Low-pressure blowers, electric fans, brooms, nozzles
Sparging	Low-pressure blowers and mixers
Aspirating, Atomizing	Low-pressure blowers
Padding	Low to medium-pressure blowers
Vacuum generator	Dedicated vacuum pump or central vacuum system
Personnel cooling	Electric fans
Open-tube, compressed air-operated vortex coolers without thermostats	Air-to-air heat exchanger or air conditioner, add thermostats to vortex cooler
Air motor-driven mixer	Electric motor-driven mixer
Air-operated diaphragm pumps	Proper regulator and speed control; electric pump
Idle equipment*	Put an air-stop valve at the compressed air inlet
Abandoned equipment**	Disconnect air supply to equipment

*Equipment that is temporarily not in use during the production cycle.

**Equipment that is no longer in use either due to a process change or malfunction.

DEMAND SIDE LOW COST CHECK LIST

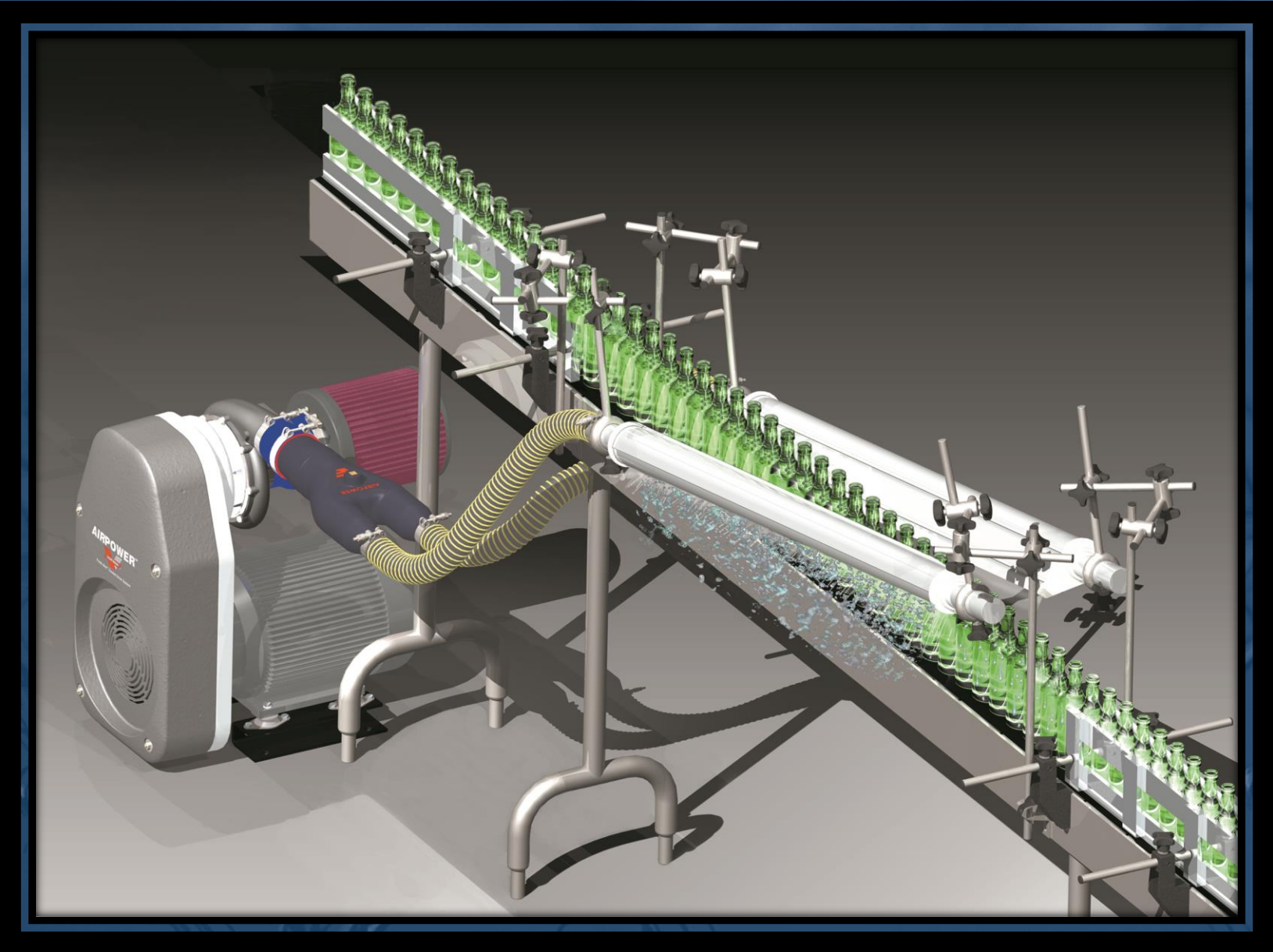
- Check piping Delta P static vs dynamic
- Locate all Air blow off applications
- Product Drying with compressed air
- Creating Vacuum with compressed air
- Fix leaks you can hear
- Product/Process Cooling
- Check your dust collection for savings

BLOW-OFF SYSTEMS APPROACH

- Power Supply Industries has created a niche in the industrial equipment market place. We target process improvement & energy savings. We compile utility energy rebate documents.
- We provide a technical review of the production process and work from the air nozzle or air knife back to a blower selection and fixture design. Every application is a custom design. The process is labor intensive frequently requiring site visits to collect dimensions and details. **We assume responsibility for the customer's satisfaction in the finished operating system.**

BLOW-OFF SYSTEMS APPROACH

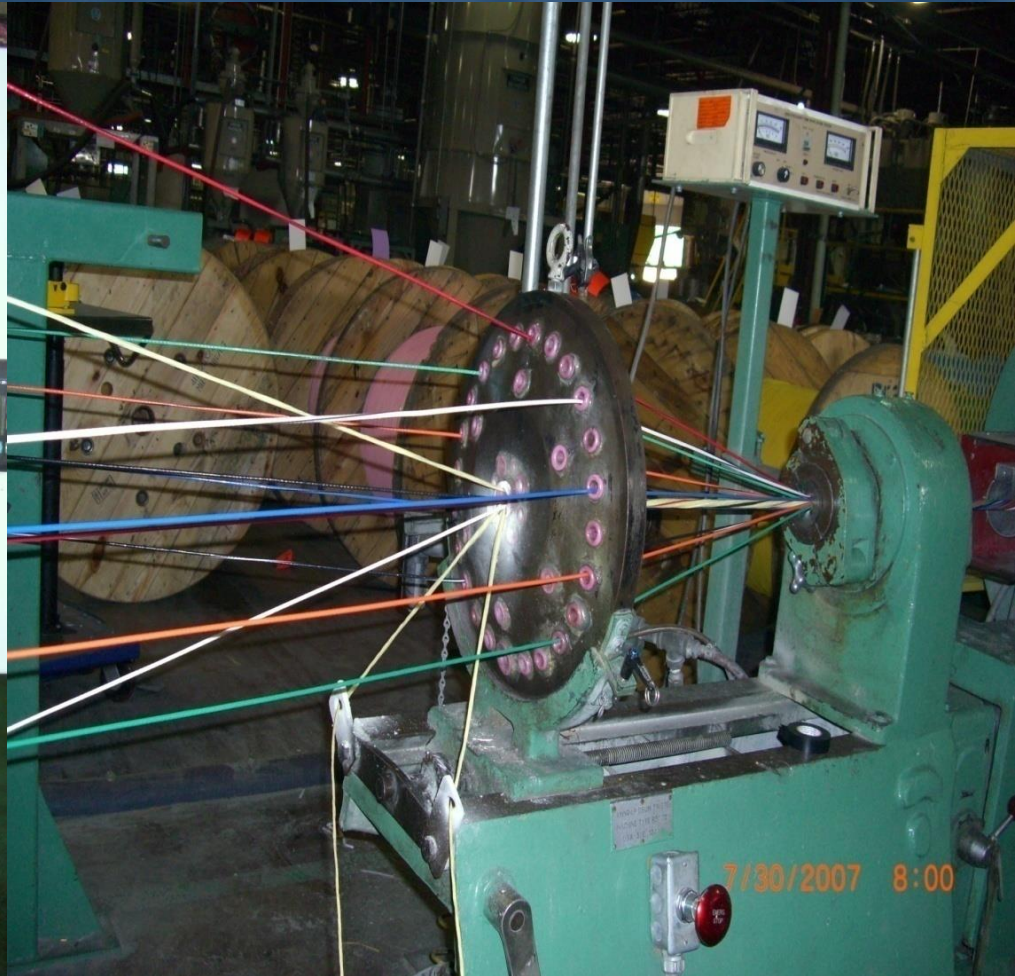
- It is a mission of Power Supply Industries to identify and develop industrial applications for “Point of Use” compression equipment and air delivery fixtures.
- We offer means to resolve inappropriate uses of Plant Air Energy as identified in the “Compressed Air Challenge”. We supply complete **Industrial Blow-Off Systems** for **fluid removal, debris removal and air cooling** processes. In most cases we can improve blow-off effectiveness which can increase production speeds while **creating reductions in electric and gas utility costs.**



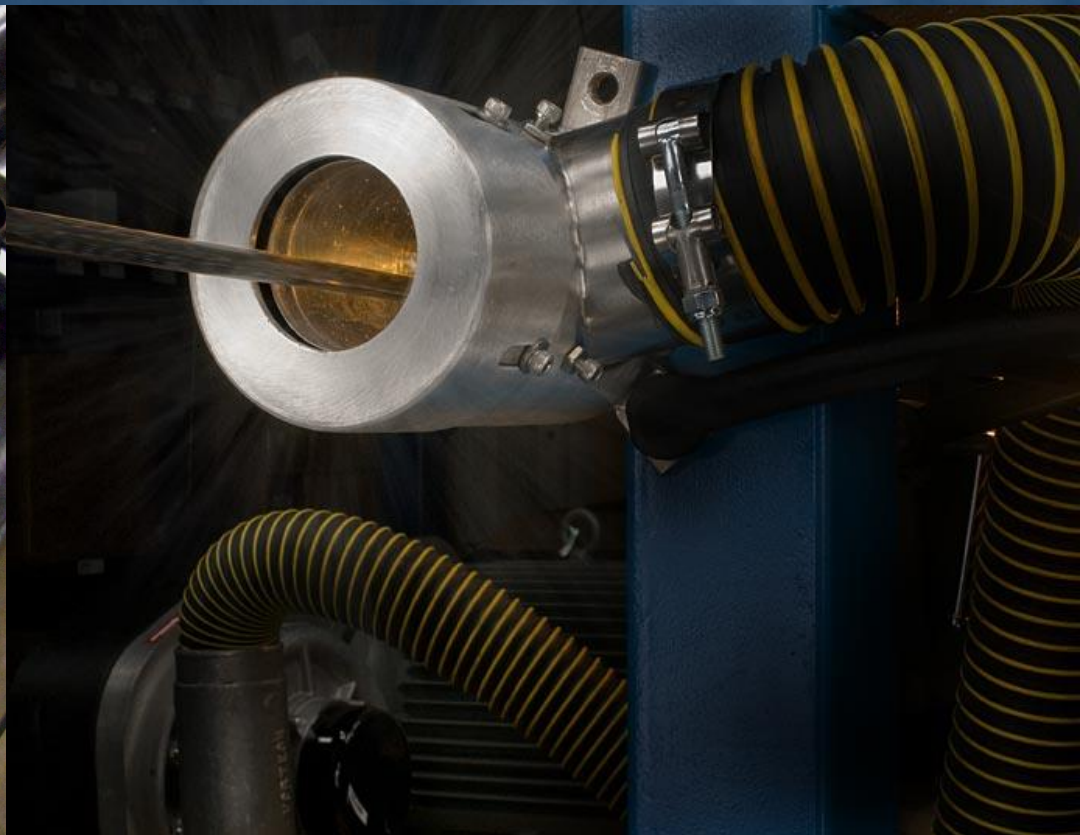
WATER BLOW-OFF AT A STEEL PLANT



FIBERGLASS GENERATOR & CABLE ASSEMBLY



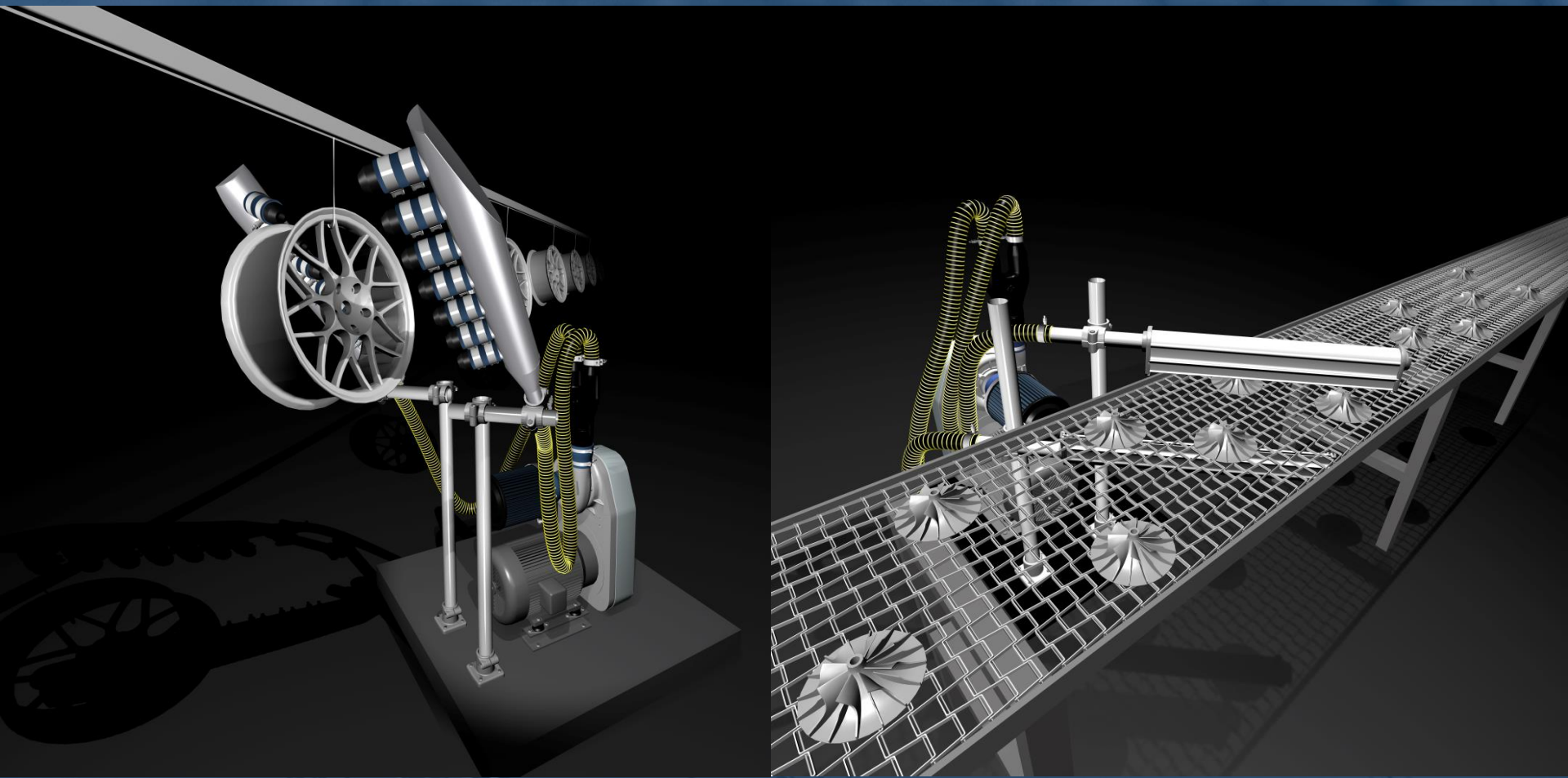
We have a patent pending status on our converging point round air knife fixture. We can apply a 360° air pattern on cable and production parts at different angles for cooling or water removal.



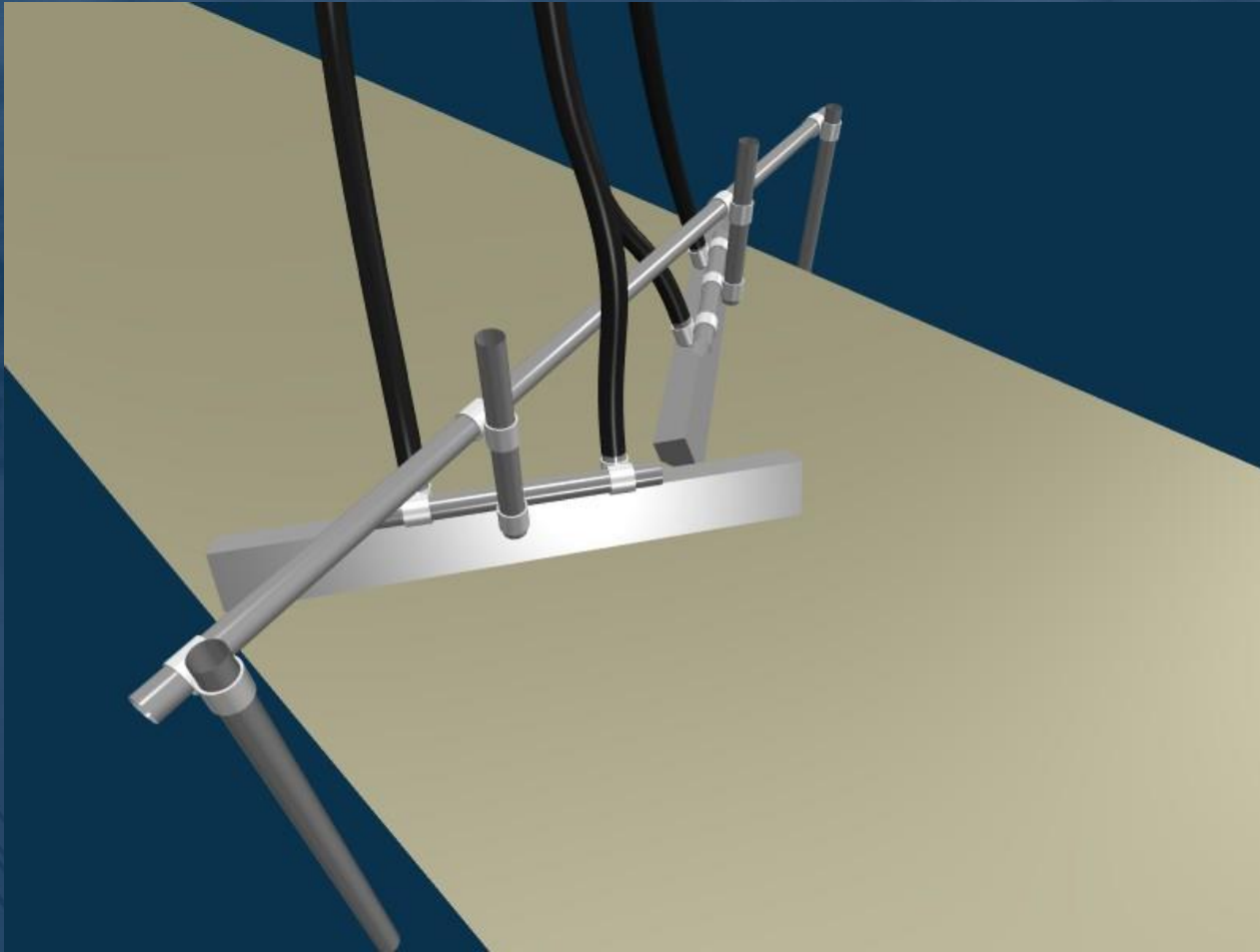
Printing Press Turn Bar & Galvanized Coatings



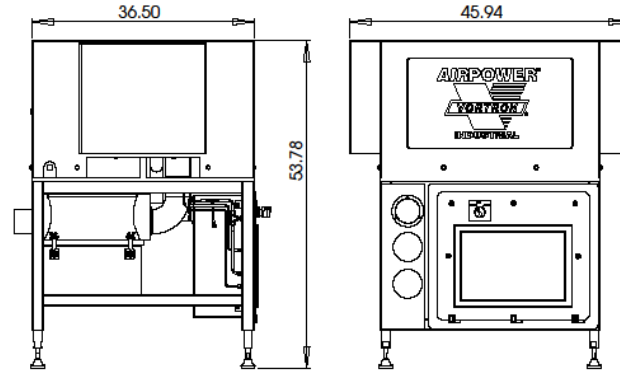
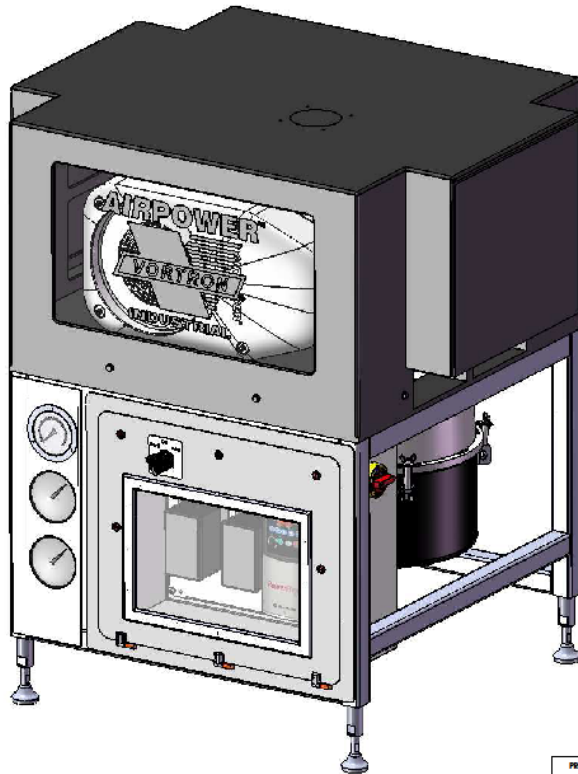
Nozzles arrays provide better low pressure blow-off performance when more than 4" from product.



Wide gap air knives are mounted in an arrangement that pushes water or debris to the side edge of the product.



Outdoor Rated ENCLOSURE



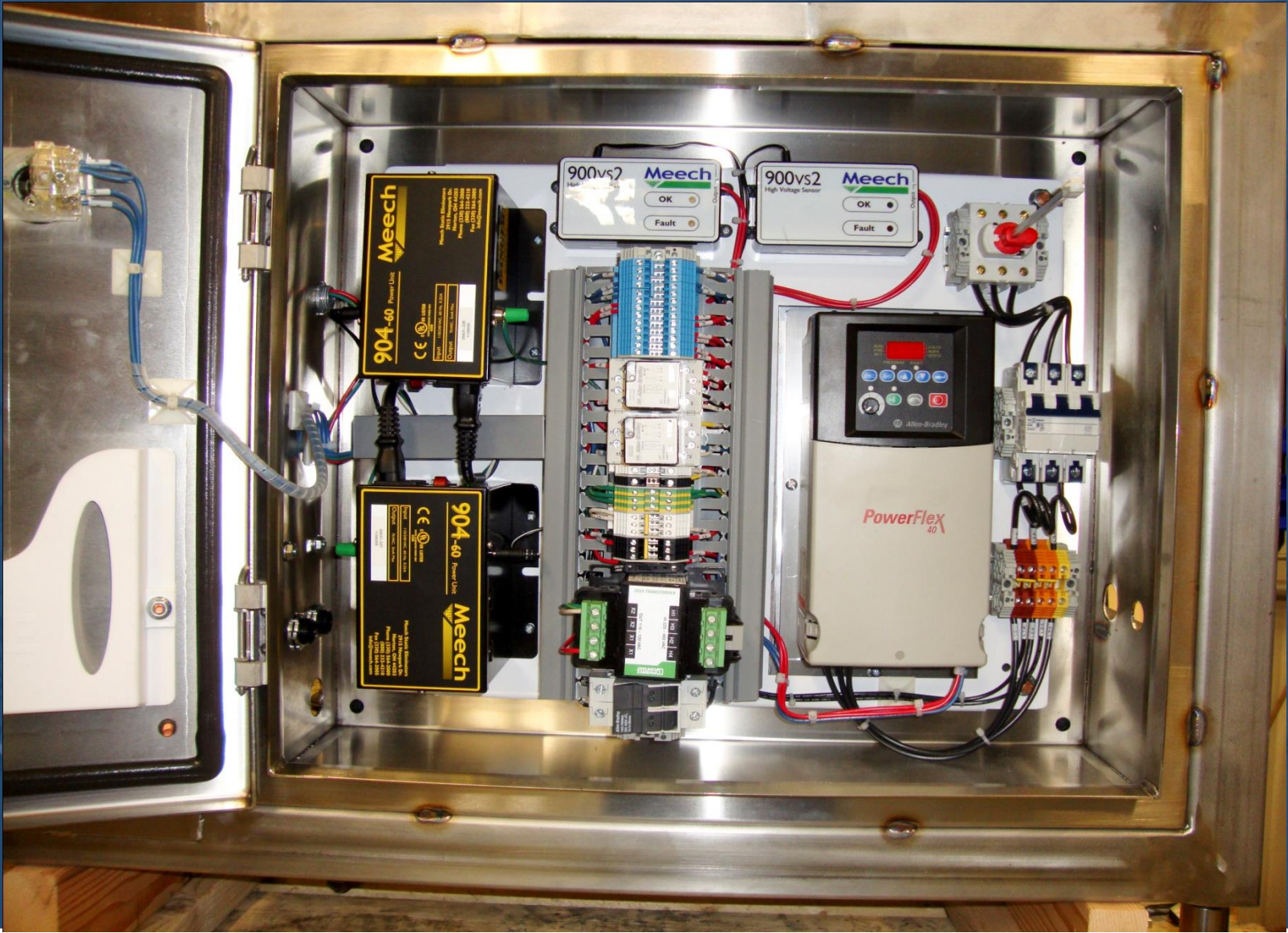
Blower, Complete, with Accessories, N4, Washdown

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS
DRAWING IS THE SOLE PROPERTY OF
PROCESS AIR SOLUTIONS (PAS). ANY
REPRODUCTION IN PART OR AS A WHOLE
WITHOUT THE WRITTEN PERMISSION OF
PROCESS AIR SOLUTIONS (PAS) IS
PROHIBITED.



COMMENTS:

SIZE B	Gatorade 24oz Package	REV
SCALE: 1:8	WEIGHT:	SHEET 1 OF 3





AIRPOWER BLOWERS

X40

Perfect for intermediate flow applications where flows from 100 to 700 SCFM and pressures of 1.45 to 3.6 are desired.

Z40e

Where flows of 600 to 1600 SCFM are required. Over 80% efficient. In some cases a single Z40E can do the work of multiple units.

J70

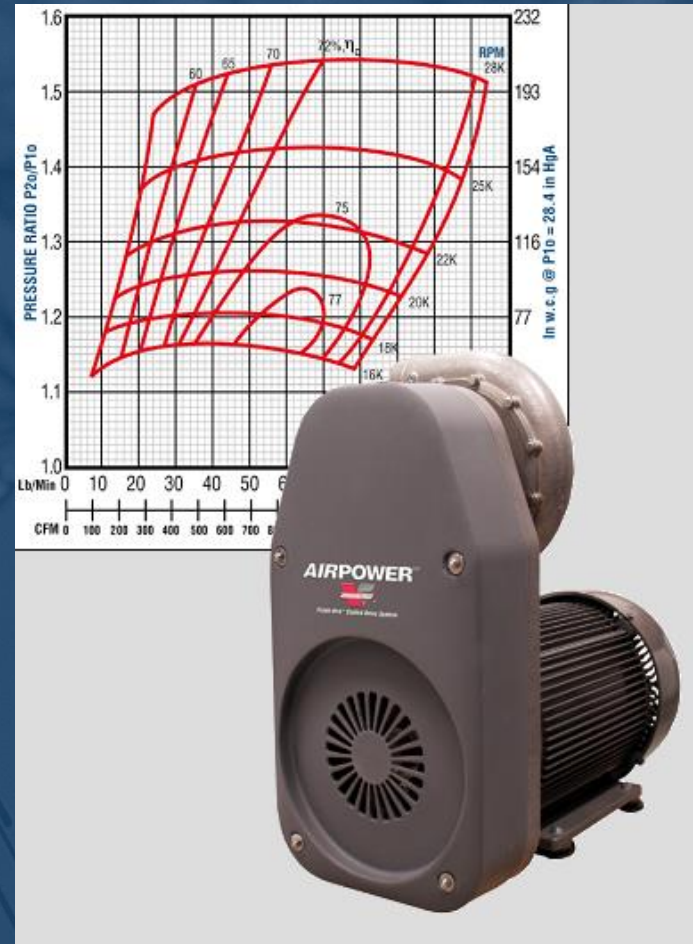
The most compact of the *AirPower* lineup, the J70 specializes in lower flow but high pressure. Maintains 76% efficiency; ideal for medium sized fluidized beds or where large pressure drops/long piping exist.

Z80

The new high capacity lower speed frame designed for 2000 SCFM and single package performance up to 40 horsepower.

AIR SUPERIORITY

- **Best-In-Class...**
 - Efficiency
 - Durability
 - Performance Curves
 - Product Execution
- **1,000 CFM @ 100in-Wc – under 20HP**
 - *A Vortron exclusive!*



ADVANCED BLOWER HEAD...

Better by Design

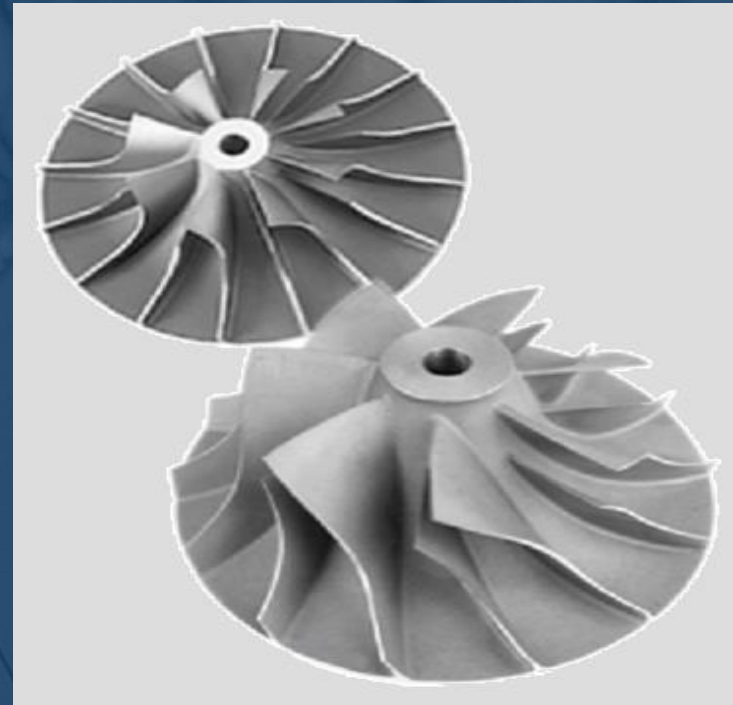
- Full-fledged single-stage centrifugal compressor
- “Outboard” bearing design
- Impeller – diffuser – volute components
- Patterned after Vortech’s hi-performance centrifugal compressor technology
- Optimized for industrial blower applications



ADVANCED BLOWER HEAD...

Better by Design

- **Impeller design:**
 - **Inducer blading**
 - **Splitter row**
 - **Backswept or radial exducer**
 - **Excellent diffusion performance**



ADVANCED BLOWER HEAD...

Better by Design

- **Diffuser and Volute**
 - **Vaneless diffuser**
 - Range
 - Surge margin
 - **Volute Exit Stage**
 - Added pressure recovery



ADVANCED BLOWER HEAD...

Better by Design

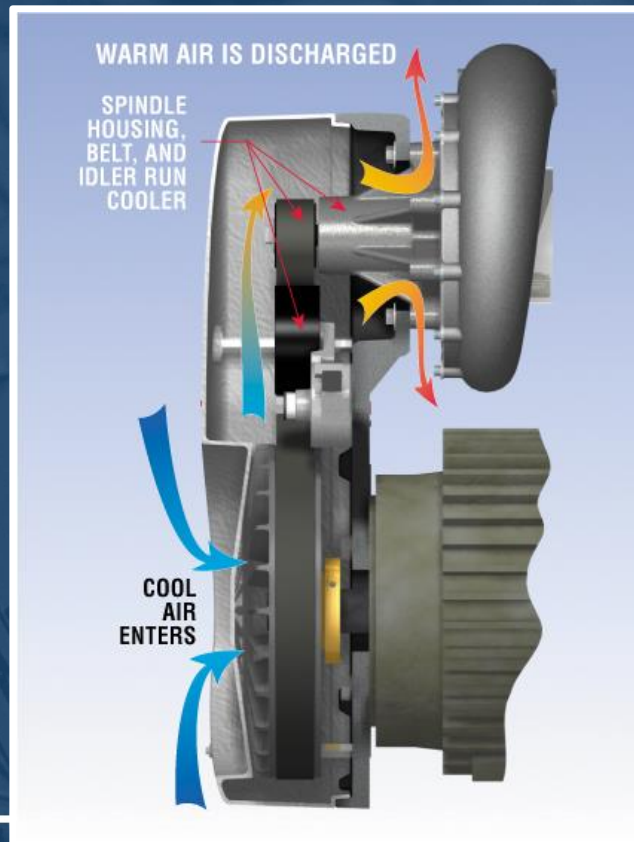
SPINDLE

- Multi-bearing, rigidly pre-loaded arrangement
 - Load-sharing
 - 20,000 - 80,000 hour design life
- More like high-speed machine tool design
- Hybrid ceramic bearings
 - ABEC 9 precision class
 - Speedability
 - Cooler running



PATENTED FRESH-AIRE™ SYSTEM

- ***A Vortron Exclusive!***
- **Cools all drive system components and spindle**
 - Bearing temps typically run 25°F – 30°F above ambient
- **Dramatically extends:**
 - Spindle life
 - Belt life
 - Tensioner/idler life
 - System reliability



DRIVE SYSTEM

- **K-series micro-vee belt**
- **Automatic backside tensioner**
 - 5-minute belt changeout!
- **Noise-attenuating High-impact cover**
- **10 Rib to 20 Horsepower**
- **14 Rib 25 to 40 Horsepower**



MOTOR OPTIONS

- **Standard 3 – 50 HP:**
 - Toshiba & Brook Crompton Motors
 - TEFC, c-face
 - 208-230/460V, 60hz, 1.25sf
 - 190/380V, 50 Hz, 1.0 SF
- **Optional:**
 - Class 1 / Div 2 (Haz. Loc.)
 - 575 volt Motors



TWO-YEAR WARRANTY

1. Warranty Policy – Vortron *AIRPOWER*™ blowers are warranted for two full years from the date placed in service (limited to 25 months from the date of shipment) for workmanship and material defect, to the original purchaser only. Should the blower fail, Vortron will examine the failure. If failure is determined by Vortron to be related to workmanship or material defect, Vortron will at its option repair or replace the blower.

2. Parts and Accessories Policy – Vortron *AIRPOWER* spare parts and accessories are guaranteed for four (4) months from date of shipment for workmanship and material defect, to the original purchaser only. If failure is determined by Vortron to be related to workmanship or material defect, Vortron will at its option repair or replace the part

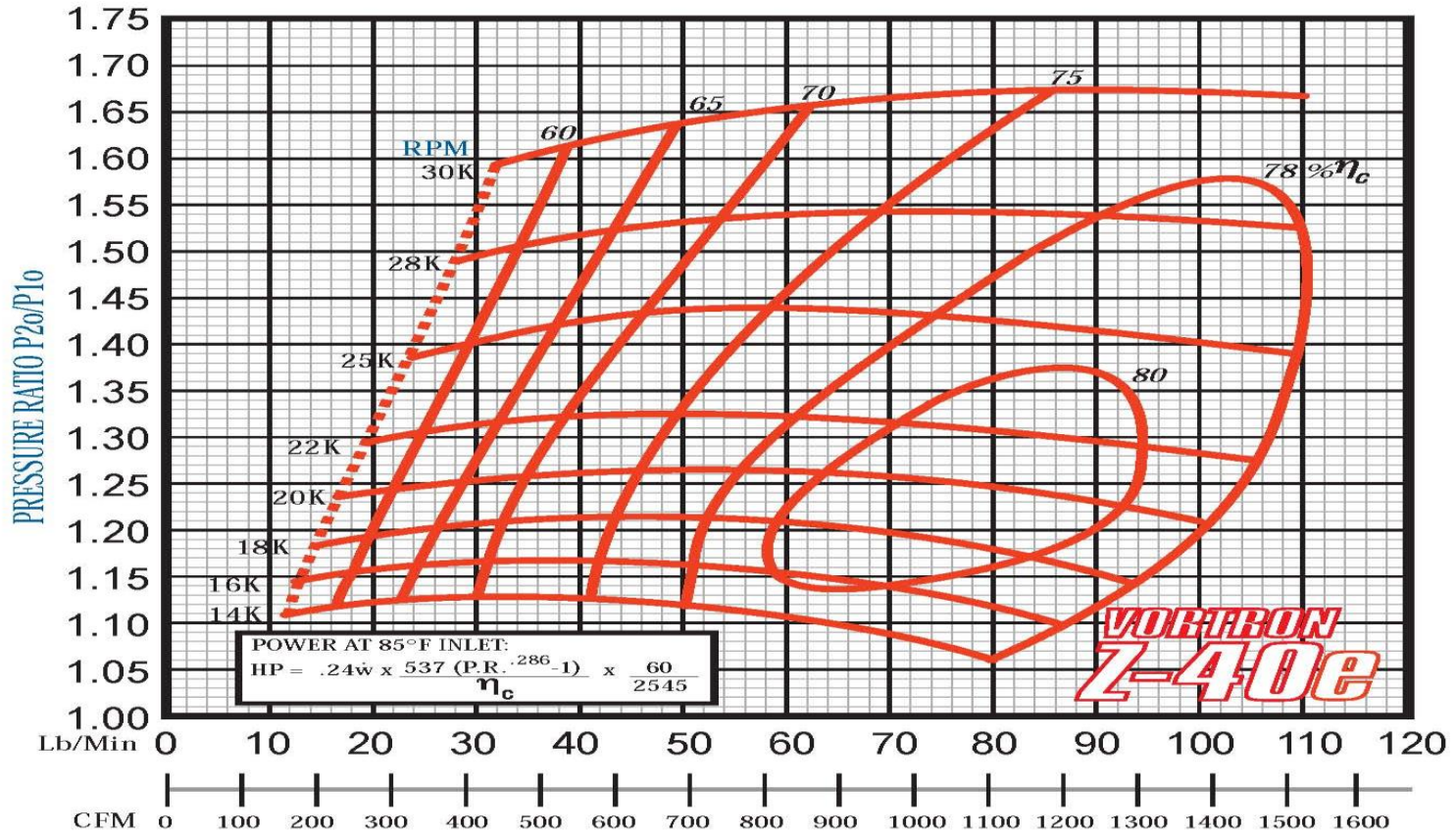
3. Corrective Action – Vortron will provide a written report indicating reason(s) causing the failure, with corrective action recommendations. Failures determined to be due to abuse, misuse, misapplication or repeat offense will not be covered. Vortron will then advise options that may be available to you. Any failed unit that has been tampered with by attempting repair or diagnosis will void the warranty, unless prior written authorization has been provided by Vortron.

The Vortron industrial blower product offers four different head assemblies to choose from to attain up to 80% mechanical efficiency. The Z40e can move 1000 SCFM to 100" WCG with less than 20 horsepower.



7/29/2008 13:35





NOZZLE CALCULATOR - PREDICTED AIR NOZZLE PERFORMANCE

(Model: Isentropic converging nozzle assumption)

Yellow Hi-Lited items require data entry

Customer: Dynegy

Quote:

Project: Seal Air Blower

Date:

5/1/2014

BLOWER: Z80

Inputs:

1	System Inlet Temperature (Ti):	105 F
2	Total Nozzle Number:	4
3	Manifold Pressure (Po):	5 psig
4	Manifold Pressure (Po):	138.47 in-H2O
5	Manifold Pressure (P):	0.48 in-H2O
6	Blower Operating PR (PR-tt):	1.34
7	Blower Effy (Eta-tt):	0.72
8	Manifold Temperature (To):	174.35 F
9	Nozzle Entry Width (d1):	1 inches
10	Local Atmospheric Pressure (Pb):	14.5 psia
11	Nozzle ID (d2):	1.278 inches

Isentropic Nozzle Calculations:

1	Standard Air Density:	0.069 lbm/ft ³
2	Pressure Ratio:	0.744 OK
3	Density, Manifold (Rho o):	0.083 lbm/ft ³
4	Exit Pressure (Pe):	14.500
5	Mach at Exit (Me):	0.66
6	Temperature at Exit (Te):	582.51 R
7	Acoustic Velocity at Exit (ce):	1,183 ft/s
8	Velocity at Exit (Ve):	47,190 FPM
9	Density at Exit (Rho-e):	0.0672 lbm/ft ³
10	Flowrate (m dot-e):	113.02 lbm/min
11	Total Blower Volume:	1,630 SCFM
12	Total Nozzle Area (An):	0.0356 ft ²
13	Nozzle Flow:	407.50 CFM/Nozz.
14	Required Blower PR:	1.34
15	Estimated blower power:	47.98 HP
16	USE:	FALSE HP MOTOR

Vortron

Process Air Solutions

636-343-2021, Fax 636-343-1285

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ENERGY CALCULATIONS:

17	Mass Flow per Nozzle:	0.47092 lbm/sec
18	Mass Flow per Nozzle:	0.21380 kg/sec
19	Velocity @ Nozzle Exit:	239.71 m/sec
20	Power @ Nozzle Exit:	6142.7 Watts
21	TOTAL Power, All Nozzles:	24571 Watts

USE THIS MODULE TO SIZE AND CALCULATE SIMPLE BLOWER APPLICATIONS

YELLOW Hi-Lited items require data entry

Customer: Dynegy Water Cannon Cooling Air Blower

Quote:

Project:

Date:

5/19/2014

BLOWER:

Inputs:

1	System Inlet Temperature (Ti):	105 F	
2	Local Atmospheric Pressure (Pb):	14.5 psia	
3	Desired System Pressure (Po):	2 psig	
4	Calculated System Pressure:	4.072 in-Hg	
5	Calculated System Pressure:	55.4 in-Wc	
6	Desired Flowrate:	1080 SCFM	
7	"Standard" Pressure:	29.23 in-Hg	(J1723)
8	"Standard" Temperature:	537 R	(J1723)
9	Air Density at Std/Corr. Conditions:	0.0722 lbm/ft ³	
10	Inlet Air Density, Blower Nozzle:	0.0693 lbm/ft ³	
11	Air Mass Flowrate, Corr:	77.96 lbm/min	
12	Air Mass Flowrate, Actual:	76.79 lbm/min	
13	Discharge Temperature:	131.6 F	
14	Air Volumetric Flowrate, Actual:	1107 ACFM	
15	Blower Operating PR (PR-tt):	1.138	
16	Blower Effy (Eta-tt):	0.8	
17	Estimated blower power:	11.55 HP	
18	Suggested Minimum Motor Size	15 HP	

Vortron

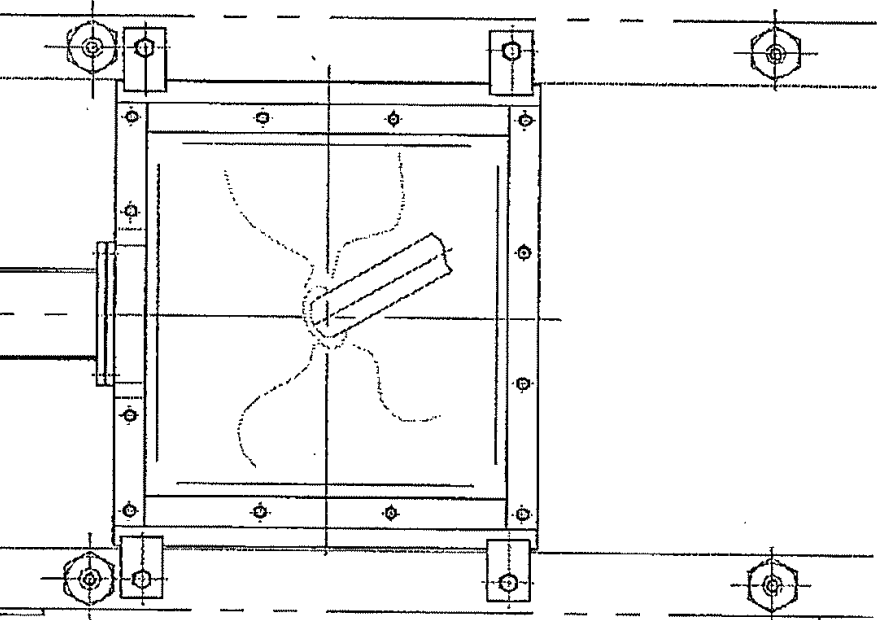
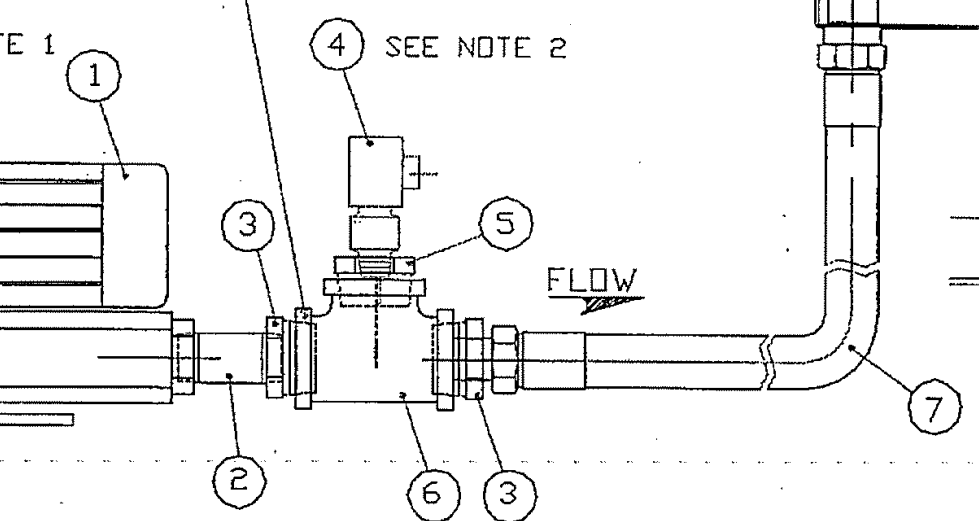
1650 Pacific Avenue, Channel Islands, CA 93033

805-247-0226 FAX: 805-487-5468

279	SEAL AIR FAN MODEL SAP 220	1
529-37	2" SCH 40 NIPPLE x 5" LONG	1
517	3" HEX BUSHING W/2" ID.	2
516	FLOW SWITCH MODEL V4	1
518	3" HEX BUSHING W/1-1/2" ID.	1
519	3" x 3" x 3" TEE SCREWED	1
374	2" I.D. x 6' LONG FLEXIBLE HOSE ASSEMBLY	1

Seal Air Monitoring System & Cooling Fan

er provides air to this point if no rovided




TECHNICAL DATA:

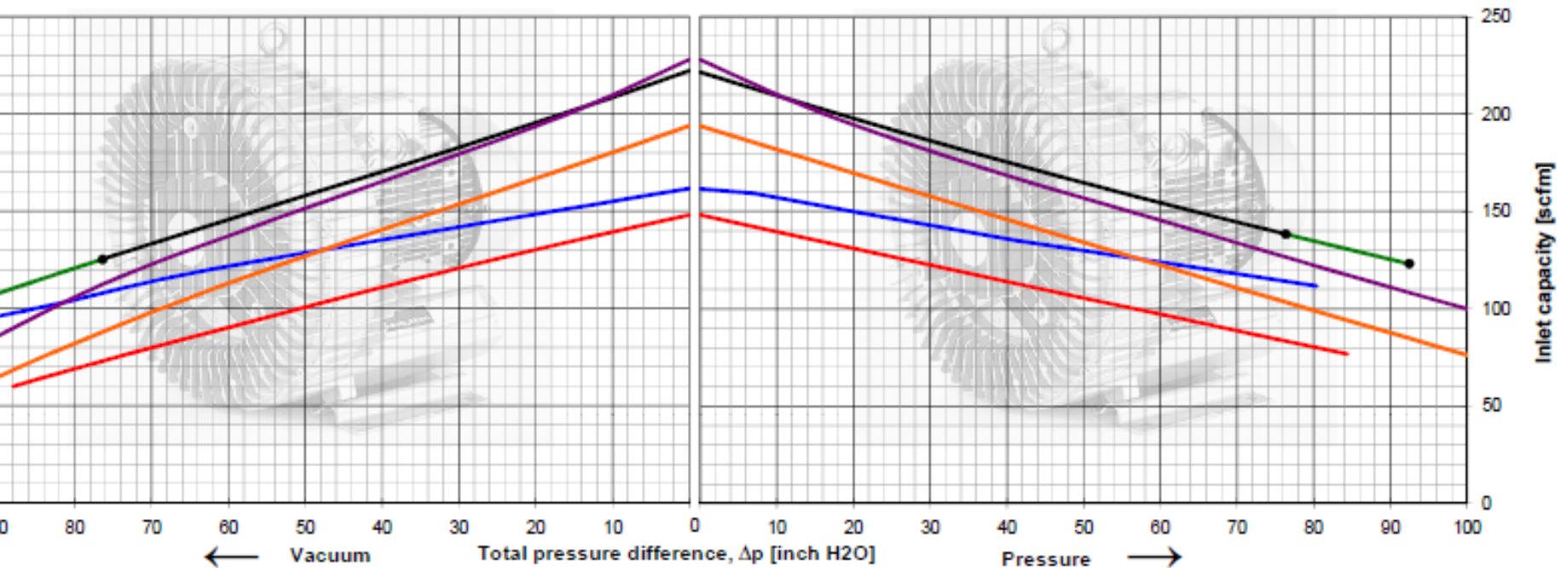
AIR FAN DATA (ITEM 1):
 SCFM - 180 SCFM
 / 60 Hz / 480 V
 11.3/6.5

MEDIUM : AIR (2 PSIG / 120 SCFM MIN REQUIRED)
 AMBIENT TEMP: 200F-250F

/ SWITCH DATA (ITEM 4):
 SCFM DEACTUATE- 120 SCFM ACTUATE
 CH MUST BE INSTALLED WITHIN 5° OF VERTICAL
 ? 30VDC

	Systems & Solution Division		
	WATER CANNON - SEAL AIR SYSTEM W/FAN		
DWN. JHM 6/19/01	SIZE B	DRAWING LOCATION	DWIC NO. CBA000527
SCALE 1=1	SHEET 1 OF 1		REV 0

Elmo Rietschle 2BH15307AH36 - 2.55 kW
 Elmo Rietschle 2BH15007AH26 - 2.05 kW



SAP 220	2BH16007AH16 Typically Stocked	2BH16007AH26 Typically Stocked	2BH16907AH26 Typically Stocked	2BH15307AH36	2BH15007AH26 Typically Stocked
2.6	2.55	3.45	3.45	2.55	2.05
60	60	60	60	60	60
200-277/346-480	220-275/380-480 **	220-275/380-480 **	220-275/380-480 **	220-275/380-480 **	220-275/380-480 **
72.5	72	72	72	71	70
80	64	75	93	57	46
2	2	2	2	2	2
Discontinued	\$1,994	\$2,020	\$1,968	\$1,795	\$1,574

* Note: Dual frequency motor. Consult data sheet for 50Hz values.

** Note: For 208V operation, please be sure to use the alternate 200-240/345-415V model with voltage code "1". Example: 2BH16007AH31



PD Blower Packages

