

**Objective** Determine if EXAIR can supply a more efficient blow off method for Jones Machinery than their existing system for their gear hobbing line.

## **Current Process**

Steel gears are machined in a hobbing operation using a heavy oil lubricant. To make the gears easier to handle and package, a low grade plastic flat nozzle is used to blow off chips and excessive oil after hobbing.

## **Proposed Process**

Replace the existing non-engineered nozzle with a model 110003 Super Air Knife, or possibly a model 1122 Super Air Nozzle.

## **Procedure**

First, we determine if the 110003 Super Air Knife can adequately clean the chips and excess oil off the gears. Samples of the gears are coated with a heavy oil of the same viscosity used at Jones. Stainless steel chips were added to the oil to mimic production conditions. The air knife is then passed over the samples (see photos in Appendix A) at the same rate (60 in./min) the gears normally travel down a conveyor. While this cleans most of the excess oil off, it still leaves too much to allow for neat and clean packaging.

The test is then repeated with a model 1122-.010. It cleans the excess oil and chips off satisfactorily, so that only a minimal amount of oil is transferred to a gloved hand during the packaging operation.

Next, the 1122-.010 is compared for flow, force and noise. Results are tabulated below.

## **Results**

Unit	SCFM	dBA	Force (lbs)
Existing nozzle @ 80 psi	23.0	81	1.35
EXAIR 110003 @ 80 psi	8.7	69	0.51
EXAIR 1122-.010 @ 80 psi	16.1	75	0.90

## Conclusion

While the EXAIR model 1122-.010 did not provide the same amount of force as the existing nozzle, it still performed the same function using much less air and is much quieter.

Assuming a cost of \$0.25/1000 SCF of air, the following equation:

Difference in air consumption x time operated x compressed air cost = cost savings.

$(23.0 \text{ SCFM} - 16.1 \text{ SCFM}) \times 8 \text{ hrs/day} \times 60 \text{ min/hr} \times 250 \text{ working days} \times \$0.25/1000 \text{ SCF} = \$207/\text{yr}$

Each EXAIR model 1122-.010 Super Air Nozzle will pay for itself in less than 13 weeks. In addition, the reduced noise level will make the packaging area safer and more pleasant to work in.

## Equipment

Force Scale – calibration due 10/17/2010

Flow Meter – calibration due 2/12/2010

Digital Pressure Gage – calibration due 6/10/2010

Heavy machining oil – centipoise of 990 (similar to oil used by Jones)

## Appendix A



