



- Pneumatic Cylinders • Hydraulic Cylinders • Pneumatic Valves • Advance Piping Solutions for Air / Vacuum / Oil / Gas / Water Piping
- Energy Audit • Project Installations • Digital Flow Meters • Zero Air Loss Drain Valves

Performance Evaluation of Compressors at a leading Forging Industry

Acknowledgement

We are thankful to the management for giving us the opportunity to be involved in this very interesting and challenging project. We would be happy to provide any further clarifications, if required, to facilitate implementation of the recommendations.

We received full co-operation and support from the concerned personnel from all the departments. We would like to particularly thank: **Mr. ABCD** and all other supporting staff who have given full co-operation and support. They took keen interest and gave valuable inputs during the course of study.

Executive Summary:

This section presents a brief summary of the results of the compressed air system audit and carried out at LEADING FORGING INDUSTRY - XYZ on 7th Jan'2020.

A team of specialist consultants were involved in the compressed air system audit. The audit was mainly targeted at identifying Compressor Free Air Delivery and Compressor efficiency. The audit involved using a wide range of sophisticated, portable, diagnostic and measuring instruments to generate refined data and facilitate in complex analysis to give a more reliable basis for identification of compressor performance.

Instruments:

The audit study made use of various portable instruments, for carrying out various measurements and Analysis. The specialized instruments used during the audit are given below:

- VPIstruments DP Flow Scope
- Clamp on Current meter



- Pneumatic Cylinders • Hydraulic Cylinders • Pneumatic Valves • Advance Piping Solutions for Air / Vacuum / Oil / Gas / Water Piping
- Energy Audit • Project Installations • Digital Flow Meters • Zero Air Loss Drain Valves



Performance Evaluation of Compressors

3.1 Design Specification of Compressors

We conducted FAD Audit for 3 Compressors of XXXXX make.

Two screw compressors **AA - 011**, **BB - 022** & a Variable Speed Drive compressor **CC - 500**

VSD. Table 3.1 Design specifications of the compressor

Description	Unit	Compressor 1 AA - 011	Compressor 2 BB - 022	Compressor 3 CC - 500 VSD
Pressure	kg/cm ²	7.5	7.5	8.6
FAD	CFM	3600	1500	2800
Motor Power	kW	563	315	497
Specific Power Consumption	kW/CFM	0.16	0.21	0.18
Year of Installation	Year	2004	2007	2004





- Pneumatic Cylinders • Hydraulic Cylinders • Pneumatic Valves • Advance Piping Solutions for Air / Vacuum / Oil / Gas / Water Piping
- Energy Audit • Project Installations • Digital Flow Meters • Zero Air Loss Drain Valves

3.3 Specific Energy Consumption (SEC)

Specific energy consumption depends upon the compressor type, operating pressure, amount of free air delivery, etc. The evaluated SEC of the compressors is given in table 3.3.

Table 3.3 Specific power consumption of compressors.

Description	Unit	Compressor 1 AA - 011	Compressor 2 BB - 022	Compressor 3 CC - 500 VSD
Pressure	kg/cm2	7.5	7.5	8.6
FAD	CFM	3122	-	1962
Motor Power	kW	558	-	285
Specific Power Consumption	kW/CFM	0.18	-	0.15

3.2 Free air delivery (FAD) of compressor

The Compressor was set on Maximum Pressure. The compressed air outlet was kept open to air to achieve maximum compressor load. The VP FlowScope dP was installed at the outlet to monitor the Flow, Pressure and Temperature of the compressed air. Also, a clamp on meter was connected to monitor input Power (kW).

Table 3.2 Free air delivery of the air compressors

Particulars	Compressor 1 AA - 011	Compressor 2 BB - 022	Compressor 3 CC - 500 VSD
Rated FAD, CFM	3600	1500	2800
Operating FAD, CFM	3122	-	1962
Volumetric Efficiency (% FAD)	86.72 %	-	70.07 %

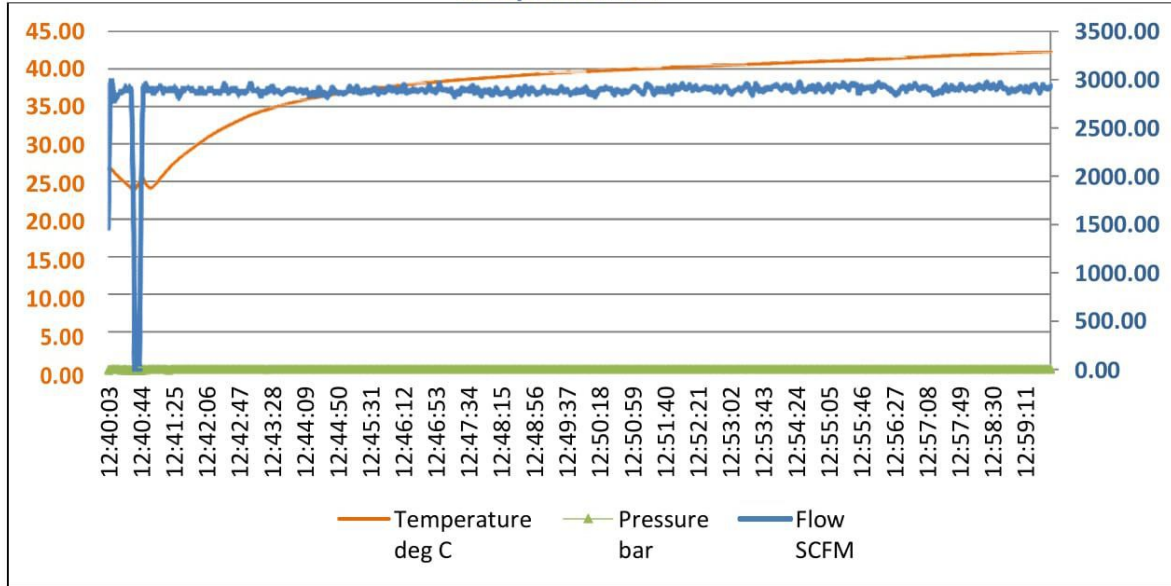
The below graphs indicate the flow, pressure and temperature trends for each compressor.



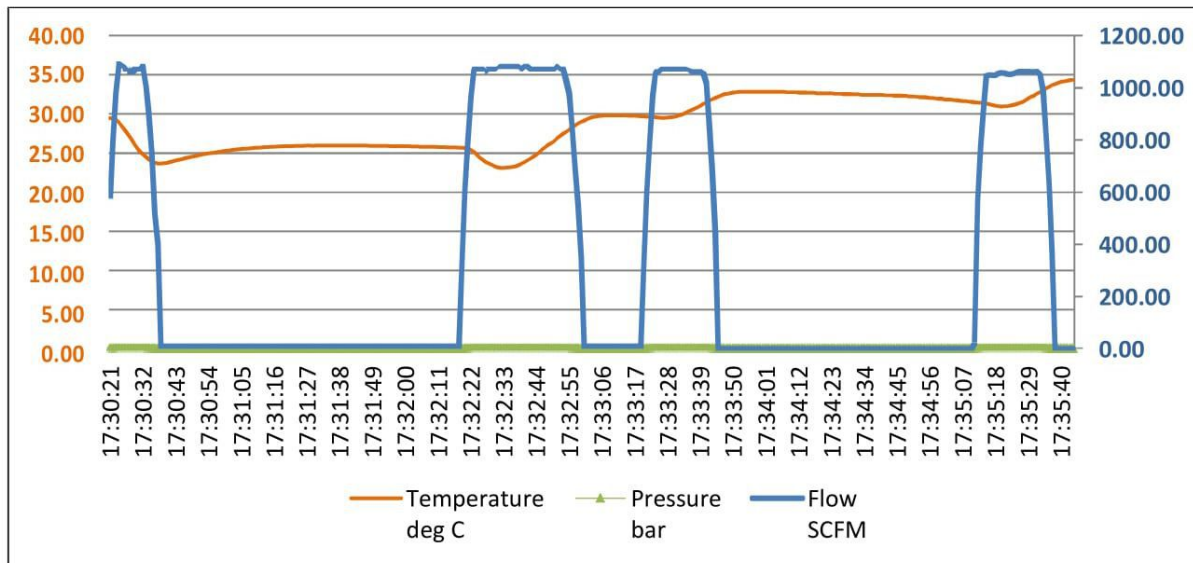


- Pneumatic Cylinders • Hydraulic Cylinders • Pneumatic Valves • Advance Piping Solutions for Air / Vacuum / Oil / Gas / Water Piping
- Energy Audit • Project Installations • Digital Flow Meters • Zero Air Loss Drain Valves

Compressor AA –



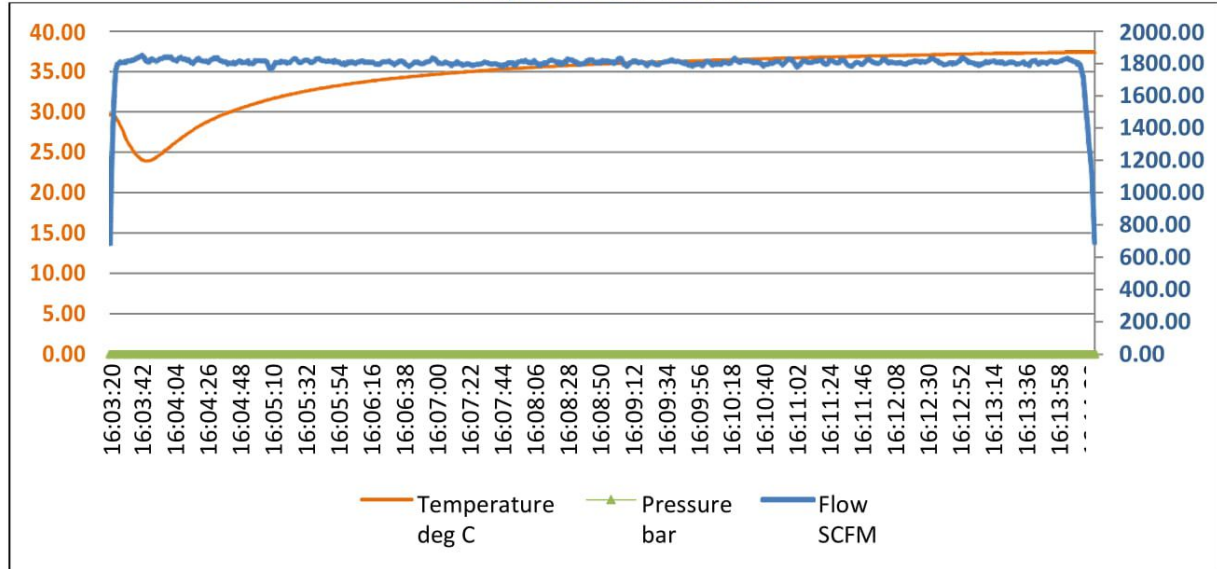
Compressor BB - 022 250





- Pneumatic Cylinders • Hydraulic Cylinders • Pneumatic Valves • Advance Piping Solutions for Air / Vacuum / Oil / Gas / Water Piping
- Energy Audit • Project Installations • Digital Flow Meters • Zero Air Loss Drain Valves

Compressor CC - 500 VSD



Result:

- The specific energy consumption of compressor **AA-011** is observed to be higher than the designed which is mainly due to ageing of the compressor.
- **BB - 022** was not able to achieve the desired maximum Free Air Delivery due to malfunctioning of the compressor components.
- The performance of compressor **CC - 500 VSD** is observed to be satisfactory and the operating specific energy consumption is found to be less than the design SEC. The operating frequency of the compressor motor was set at 1833 rpm.

Company: **Luthra Pneumsys**

Phone: **022 4022 8260**

