Pre-audit work

for

CALMS Feasibility study

Company Name:

Company Address:

Postal code: City: Country:

Contact person name: Email: Phone:

CALMS customer user name: Email: Phone:

Default currency:

System name:

Utility type: *Compressed air*

Please attached or send via email:

Company logo: Y / N (for in jpg format for reports)

Compressed air PI&D: Y / N (use CALMS PID tool or attach pdf schematic)

Compressor station photo: Y / N (attach photos of compressors, room, installation, equipment plates)

Estimation

Annual energy consumption for compressed air		kWh
Annual compressed air consumption		m³

System details

Operating hours		h
Electricity cost		currency/kWh
Compressed air cost		currency/m³
Specific power estimation		kWh/m³
CO2 emission (country specific) * https://www2.compareyourcountry.org/climate-policies		kg/kWh
Max operating pressure		barg
Pressure setpoint		barg
Min operating pressure		barg
CA System type		Oil flooded / Oil-free
Compressed air quality class** *ISO8573*		*Particles : Water: Oil: .*

*CO2 from electricity generation emissions is a country based value that is changing over time. Please check which value is relevant for your country.
Useful link

Compressor data

Model / TAG	Manufacturer	Control type	Year	Nominal power kW/HP	Nominal capacity cmm/cfm	Nominal pressure bar/psi	Total running h	Total loaded h	Utilization rate %	Data sheet Y / N	Electric drawing Y / N

Air treatment (Dryer, Filter, drain, separator..) data

Model / TAG	Manufacturer	Type	Year	Nominal power	Total running	Capacity	Pressure max	Description	Special

Receiver-storage data

Name-model	Manufacturer	Size-volume	Year	Last checked year	wet/dry	Pressure max	Condensate drain type

Master control system data

Name-model	Manufacturer	Type	Remarks-description

Instrumentation data and location on PI&D

TAG	Name – model	Manufacturer	Measurment variable	Range	Output of signal

System Overall Efficiency *(please mark-highlight correct answer)*

Supply side	Very low	Low	Moderate	High	Very high
Heat recovery	None	HRC on 25% of compressors	HRC on 50% of compressors	HRC on 75% of compressors	HRC for complete system
System capacitance - storage (m3 or cf) as a percentage of normal operating flow per (m3/min or cfm)	Less than 20%	20-40%	40-60%	60-80%	More than 80%
Compressor control method	Bypassing or Online / Offline - high cycling 5x min	Modulation or Online / Offline - high cycling 2x min	Online / Offline - high cycling 1x min	Online / Offline - low cycling less than 1x min	Variable speed drive
System control method	Local only		Simple sequencer		Master controller
Flow controller	No flow controller		Flow controller		Flow controller with remote monitoring
Dryer type	No dryer	Heatless desiccant	Heated desiccant	Refrigerated	Heat of compression
Pressure drop across air treatment	More than 0.7 bar (10 psi)	0.5 bar (8 psi)	0.4 bar (6 psi)	0.3 bar (4 psi)	Less than 0.2 bar (3 psi)
Condensate management	Hand valves / cracked or opened		Timed drains	No-loss drains - not checked	No-loss drains regularly checked
Distribution side	**Very low**	**Low**	**Moderate**	**High**	**Very high**
Excessive pressure in distribution or working pressure above minimum required (based on typical 6-10 bar / 85-145 psi)	+ 2 bar (20 psi)	+ 1.5 to 2 bar (15 to 20 psi)	+ 1 to 1.5 bar (10 to 15 psi)	+ 0.5 - 1 bar (7 to 10 psi)	+ 0.5 bar (7 psi)
Main pipeline size / flow speed	More than 20 m/s (65 f/s)	18 m/s (60 f/s)	15 m/s (50 f/s)	12 m/s (40 f/s)	Less than 10 m/s (32 f/s)
Pipeline ring	No				Yes
Piping material	Corroded steel	Carbon steel	Non metallic	Aluminium	Stainless steel
Pressure drop in distribution piping	More than 0.7 bar (10psi)	0.5 bar (8 psi)	0.4 bar (6 psi)	0.3 bar (4 psi)	Less than 0.2 bar (3 psi)
Demand side	**Very low**	**Low**	**Moderate**	**High**	**Very high**
Leak management program	Not maintained	Occasional	Spot maintenance	Routine maintenance	Sustainable program
Leak rate %: (Leak flow / Avg. flow)	More than 40%	35%	30%	20%	Less than 10%
Inappropriate use awareness / management	None evident		Occasional		Sustainable program
Artificial demand awareness / management	None evident		Occasional		Sustainable program
Compressed air usage training for end-users	Never		Occasional		Regular

System overall Reliability *(please mark-highlight correct answer)*

Compressor room	Very low	Low	Moderate	High	Very high
P&I diagram & project documentation	None		Outdated		Up to date
Compressor room temperature	Not monitored & not regulated (high)		Monitored		Monitored and regulated (low)
Environment / cooling air quality	High dust / dirty	Dust / dirty	Some dust / moderate	Some dust / clean	No dust / clean
Space for maintenance / access fork, crane	Less than 1m (3ft), no		1m (3 ft), yes		More than 1m(3ft), yes
Compressor station maintenance checklist	None		Sporadic checklist updates		Daily checklist entrances
Spare connection for rental equipment-expansion	No				Yes
Assessment - Audit	Not recalled		Before new investment		Yearly, independent expert
Compressors	**Very low**	**Low**	**Moderate**	**High**	**Very high**
Age in years (oldest running)	More than 15	13 - 15	8 - 12	5 - 7	Less than 5
Number of overhauls or hours in operation after last overhaul	More than 2 or 60,000h	2 or 50,000 - 60,000h	1 or 34,000 - 50,000h	0 or 20,000 - 34,000h	0 or less than 20,000h
Maintenance	Break / fix	Ad hoc	Service intervals	Preventive maintenance	Service contract & preventive maintenance
Back up - redundancy % capacity of largest compressor	Less than 50%		100%		More than 150%
Remote monitoring, diagnostic	None		Alert notification only		Remote monitoring & preventive notification
Compressor start/stops or load/unloads	High cycling more than 10 stops/h or 5 unloads/min		Moderate cycling 5 stops/h or 3 unloads/min		Low cycling less than 1 stop/h or 1 unload/min
Air treatment	**Very low**	**Low**	**Moderate**	**High**	**Very high**
Age in years (Oldest running)	More than 15	13 - 15	8 - 12	5 - 7	Less than 5
Maintenance	Break / fix	Ad hoc	Service intervals	Preventive maintenance	Service contract & preventive maintenance
Back up - redundancy %capacity of largest unit	Less than 50%		100%		More than 150%
Bypass installation	None		Dryers and filters collectively		Dryers and filters separately
Inline filter elements	No action recalled, no dP indicator		Replaced as per service interval / no dP indicator		Replaced as per service interval or dP indicator
Drains service	No action recalled		Checked weekly		Checked daily
Oil water separator service	No action recalled	When broken or advised	Service interval		Per service interval or annually
Desiccant change (if applicable)	No action recalled	6y ago	5y ago	4y ago	Sample or 3y ago
Standards	**Very low**	**Low**	**Moderate**	**High**	**Very high**
ISO 9001:2015 Quality management systems or equivalent	No				Yes
ISO 14001 Environmental management systems or equivalent	No				Yes
ISO 50001 Energy management systems or equivalent	No				Yes

Interview

Low pressure
Poor air quality
Frequent downtime
Poor efficiency/high electricity cost
Other