

EXECUTIVE SUMMARY

A total of 27 pressure gauges were inspected for integrity, compatibility with oxygen systems, end connections, pressure reading, pressure reading scale and units at the oxygen backup system and liquid storage areas.

2 pressure gauges were missing, 2 were with the wrong tags (according to the P&ID), 4 were broken and all exhibited opportunities for improvement (some were not oxygen cleaned).

Swagelok recommends the use of block and bleeds for instruments for safety purposes, especially in Oxygen systems, only one installation presented this.

A recommended suggestion is to implement pressure gauges with tube adaptors for the oxygen instruments, so it cannot be mixed with other pressure gauges that are being used on the rest of the plant. The list of materials has the part numbers for all pressure gauges with this feature. This will also eliminate potential thread tape contamination into the system.

The recommended part numbers also takes in consideration the minimum amount of different scales and models for easier stock and repair.

SURVEY GOALS

Based on the discussions with [customer's name] prior to the survey, Swagelok was invited to survey a certain quantity of pressure gauges to:

- Identify pressure gauges that are not oxygen cleaned.
- Check for end connections and propose an optimisation on part numbers and models for the oxygen pressure gauge lines.

We have identified critical correction that should be made as Category 2.

Other changes that would align to best practises and improve safety are considered Category 1.

APPENDIX A: BILL OF MATERIAL

Swagelok provides this report for general information only. Swagelok does not provide any warranty or guarantee regarding the accuracy or completeness of the information and conclusions in the report. Swagelok does not have the same level of knowledge and information as the recipient about the recipient's applications, products, designs, and conditions of use, and the recipient bears responsibility for determining the suitability of Swagelok's products and recommendations for the recipient's own situation and application.

Plant Area : Cooling Water Pump

Cust Tag ID	Manufacturer	Part Type	Part Number	Description	Qty
NO TAG	WIKA	Measurement Devices	PGI-100S-SG600-BAP-1	PRESSURE GAUGE 100 MM LOWER BACK MOUNT 1/2" NPT 0-600 KPA	1

Plant Area : Liquid Oxygen Storage

Cust Tag ID	Manufacturer	Part Type	Part Number	Description	Qty
PI S10	BUDENBERG	Measurement Devices	PGI-100S-SG400-BAR-A	PRESSURE GAUGE 100 MM LOWER BACK MOUNT 1/4" G OXYGEN CLEANED NPT 0-400 KPA	1
PI S21	BUDENBERG	Measurement Devices	PGI-100S-SG400-BAR-A	PRESSURE GAUGE 100 MM LOWER BACK MOUNT 1/4" G OXYGEN CLEANED NPT 0-400 KPA	1
PI S22	Swagelok	Measurement Devices	PGI-100S-SG6000-LAR-A	PRESSURE GAUGE 100 MM LOWER MOUNT 1/2" NPT OXYGEN CLEANED 0-6000 KPA	1

Plant Area : Oxygen Backup System Upgrade

Cust Tag ID	Manufacturer	Part Type	Part Number	Description	Qty
DP N33	WIKA	Measurement Devices	TBA	DP GAUGE 0-250 KPA	1
NO PART NUMBER	NO BRAND	Measurement Devices	PGI-100S-SG400-LAP	PRESSURE GAUGE 100 MM LOWER MOUNT 1/2" NPT 0-400 KPA	1
PI 1A	WIKA	Measurement Devices	PGI-100S-SG6000-BAR-A	PRESSURE GAUGE 100 MM LOWER BACK MOUNT 1/2" NPT OXYGEN CLEANED 0-6000 KPA	1
PI 1B	WIKA	Measurement Devices	PGI-100S-SG6000-BAR-A	PRESSURE GAUGE 100 MM LOWER BACK MOUNT 1/2" NPT OXYGEN CLEANED 0-6000 KPA	1
PI N 851	WIKA	Measurement Devices	PGI-100S-SG1000-LAR-A	PRESSURE GAUGE 100 MM LOWER MOUNT 1/2" NPT OXYGEN CLEANED 0-800 KPA	1
PI N214	WIKA	Measurement Devices	PGI-100S-SG400-BAR-A	PRESSURE GAUGE 100 MM LOWER BACK MOUNT 1/2" NPT OXYGEN CLEANED 0-600 KPA	1
PI N216	Ambiti	Measurement Devices	PGI-100S-SG60-LAR-A	PRESSURE GAUGE 100 MM LOWER MOUNT 1/2" NPT OXYGEN CLEANED 0-60 KPA	1

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PI N218	WIKA	Measurement Devices	PGI-100S-SG1000-LAR-A	PRESSURE GAUGE 100 MM LOWER MOUNT 1/2" NPT 0-1000 KPA	1
PI S111	VIBRAGAUGE	Measurement Devices	PGI-100S-SG6000-BAR-A	PRESSURE GAUGE 100 MM LOWER BACK MOUNT 1/2" NPT OXYGEN CLEANED 0-6000 KPA	1
PI S222A	WIKA	Measurement Devices	PGI-100S-SG6000-LAR-A	PRESSURE GAUGE 100 MM LOWER MOUNT 1/2" NPT OXYGEN CLEANED 0-6000 KPA	1
PI S222B	WIKA	Measurement Devices	PGI-100S-SG6000-LAR-A	PRESSURE GAUGE 100 MM LOWER MOUNT 1/2" NPT OXYGEN CLEANED 0-6000 KPA	1
PI S222C	WIKA	Measurement Devices	PGI-100S-SG6000-LAR-A	PRESSURE GAUGE 100 MM LOWER MOUNT 1/2" NPT OXYGEN CLEANED 0-6000 KPA	1

Plant Area : Oxygen Compressor

Cust Tag ID	Manufacturer	Part Type	Part Number	Description	Qty
PI N4324 3A	Ambit	Measurement Devices	PGI-100S-SG6000-LAR-A	PRESSURE GAUGE 100 MM LOWER MOUNT 1/2" NPT OXYGEN CLEANED 0-6000 KPA	1
PI N4324 3B	Ambit	Measurement Devices	PGI-100S-SG6000-LAR-A	PRESSURE GAUGE 100 MM LOWER MOUNT 1/2" NPT OXYGEN CLEANED 0-6000 KPA	1

Plant Area : Oxygen to Huntsman

Cust Tag ID	Manufacturer	Part Type	Part Number	Description	Qty
ARN 4324	WIKA	Measurement Devices	PGI-63S-SG250-LAQ-A	PRESSURE GAUGE 63 MM LOWER MOUNT 1/4" NPT OXYGEN CLEANED 0-250 KPA	1

APPENDIX B: FINDINGS AND RECCOMENDATIONS

ID : Y00010

Category : 1

Plant Area:	Oxygen Compressor	Part Material:	Stainless Steel
Customer Tag ID:	PI N4324 3A	Connection Type:	Tapered Threads
Location:	Outside Shelter A	Connection Size:	1/2 in
GPS Location:			
Part Description:	PRESSURE GAUGE 100 MM LOWER MOUNT 1/2" NPT OXYGEN CLEANED 0-6000 KPA		
Process Fluid:	Oxygen	Type of Part:	Measurement Devices
Pressure:	25 bar	Manufacturer:	Ambit
Temperature:	30 C	Part Number:	PI N4324 3A
Issue:	Installation	Equiv Swagelok Part:	PGI-100S-SG6000-LAR-A
Description:	No purge option to depressurize the system		
Other Findings:	Installation		
Possible Solution:	Use valve with purge option (SS-1RPS8-SC11)		
Ultrasound dB:		Display Range:	0 - 6000 kPa
Ultrasound ID:		Dial Size:	100



IMPORTANT: Always depressurize the system before working on, disassembling or assembling a fluid system. Safe Product Selection: When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

NOTE: Where the Part Number is followed by " * ", it should be confirmed before placing an order.

ID : Y00011

Category : 1

Plant Area:	Oxygen Compressor	Part Material:	Stainless Steel
Customer Tag ID:	PI N4324 3B	Connection Type:	Tapered Threads
Location:	Outside Shelter	Connection Size	1/2in
GPS Location:			
Part Description:	PRESSURE GAUGE 100 MM LOWER MOUNT 1/2" NPT OXYGEN CLEANED 0-6000 KPA		
Process Fluid:	Oxygen	Type of Part:	Measurement Devices
Pressure:	25bar	Manufacturer:	Ambit
Temperature:	30C	Part Number:	PI N4324 3B
Issue:	Installation	Equiv Swagelok Part:	PGI-100S-SG6000-LAR-A
Description:	No purge option to depressurize the system		
Other Findings:	Installation		
Possible Solution:	Use valve with purge option (SS-1RPS8-SC11)		
Ultrasound dB:		Display Range	0 - 6000 kPa
Ultrasound ID:		Dial Size	100 mm



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ID : Y00012

Category : 2

Plant Area:	Oxygen	Part Material:	Stainless Steel
Customer Tag ID:	ARN 4324	Connection Type:	Tapered Threads
Location:	Outside Shelter	Connection Size:	1/4 in
GPS Location:			
Part Description:	PRESSURE GAUGE 63 MM LOWER MOUNT 1/4" NPT OXYGEN CLEANED 0-250 KPA		
Process Fluid:	Oxygen	Type of Part:	Measurement Devices
Pressure:	2.5 bar	Manufacturer:	WIKA
Temperature:	30 C	Part Number:	ARN 4324
Issue:	Incorrect Part	Equiv Swagelok Part:	PGI-63S-SG250-LAQ-A
Description:	NOT OXYGEN CLEANED		
Other Findings:	Incorrect Part		
Possible Solution:	Substitute gauge for an oxygen cleaned gauge		
Ultrasound dB:		Display Range:	0 - 250 kPa
Ultrasound ID:		Dial Size:	63 mm



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NOTE: Where the Part Number is followed by " * ", it should be confirmed before placing an order.