

AIR FILTRATION WORKSHOP - RESULTS

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Luke Thompson
AAF

- **Air Filtration Survey Explained**

- Survey format
- Responses
- Data summary

- **Roundtable Discussion**

- Offshore group
- Onshore groups

- **Conclusions and Next Steps**



Air Filtration Survey Explained

Structured questionnaire with 38 questions issued in advance of workshop with rating system

Designed to capture the most important issues relative to Turbine filtration and engine operation

Extract questions

		Delta	Offshore (OG)	Onshore (PG)
Filter characteristics	11) Performance under variable relative humidity?	11	9.57	8.08
	12) Shaker test importance?	12	3.00	3.00
	13) Dry burst test? (continuous pressure drop)	13	6.20	5.22
	14) Wet burst test? (continuous pressure drop)	14	7.80	5.56
	15) Salt retention?	15	9.57	8.50
	16) Water repellency?	16	9.29	8.62
	17) Oil repellency?	17	8.71	6.25

0 Not Important
5 Moderately Important
10 Critical Importance

For user satisfaction as follows:-

0 Totally Unsatisfied
5 Barely Acceptable
10 Totally Satisfied



ETN

Air Filtration Survey Explained

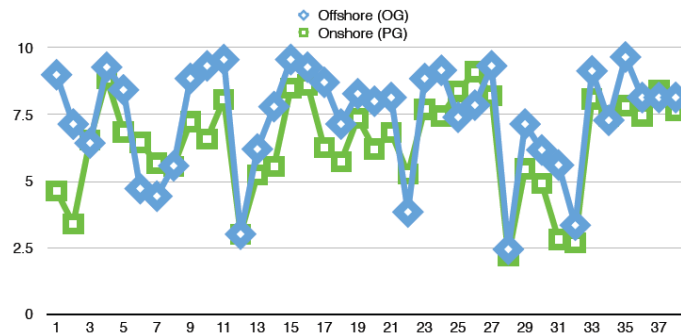
22 responses were recieved and compiled into a statistical model.

Contrast areas of importance and the gap in market satisfaction

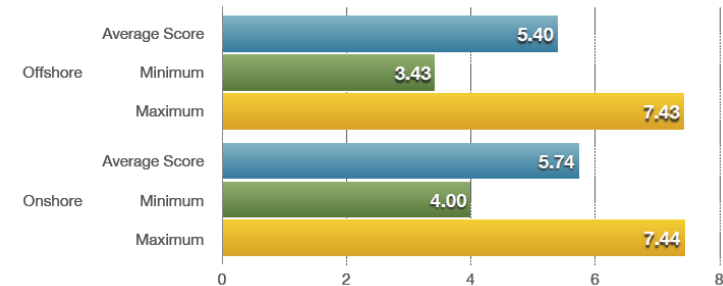
Divide the sectors O&G (Offshore) and Power Generation (Onshore)

Correlation of results between sectors

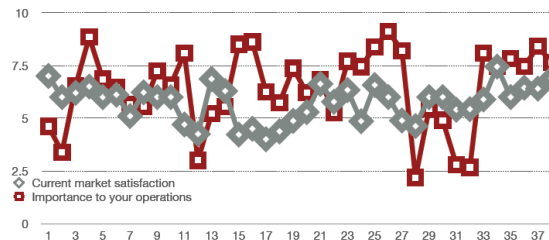
Graph 1: Operation Importance



Graph 4: Trend Comparison Satisfaction



CURRENT MARKET SATISFACTION ALONGSIDE IMPORTANCE TO YOUR OPERATION (ON-SHORE)





DATA SUMMARY IMPORTANCE RATING

38 Questions Rated Important Over 8

OFFSHORE

Questions Rated above 8 = 20

ONSHORE

Questions Rated above 8 = 9

TOP 3 BY HIGHEST RATING

1# Clean Compressor

2# Salt Retention

3# Performance under variable
humidity

1# Final Filter service life

2# Filter System Performance

3# Water Repellence

GAPS BETWEEN IMPORTANCE & SATISFACTION

1# Salt retention

2# Water repellence

3# Filter test dust

1# Salt retention

2# Water repellence

3# Performance under variable
humidity

ONLY 7 CATEGORIES

Roundtable discussions

After dividing into three groups (x1 Off, x2 On):

- Do we agree with our own results of the survey summary?
- Importance Rating
- Satisfaction – Importance Gap
- Try to explain how you interpreted the topics we will focus on now?





Clean compressor performance:

“Availability is the critical issue”

Salt retention:

Combination of salts with H₂S. Look into the test dust more in detail considering also other factors.

→ Qualify filters for certain conditions

Performance under variable humidity:

What is truly happening; what is the relation to salts and condensates on clean air side.



Roundtable Highlights ~ Onshore 1 & 2

Filter service life:

Of interest if it is looked at in multiple of outage intervals (ie 24000hrs). Mainly important for final filter and preferably also for prefilters.

Filter system performance:

Filter house size should NOT be too small in any case (Operator specifications are not giving enough details)

How to predict real life operation more accurately?

- Possibly different tests for particular contaminants (salts, pollen, hydrocarbons) but on a system not a single filter stage.

Managing seasonal contamination is difficult



Roundtable Highlights ~ Onshore 1 & 2

Water repellence:

1. Guarantee no free droplets on clean air side
2. Coalescing pads should be discarded as a solution for new installations.

Salt retention:

Mainly potassium and sodium chlorides need to be taken care of primarily whereas Calcium is less of an issue.

Look to improve media structural resistance to handle variations in size of salt particles in order to assure media doesn't break over time.

Capex versus Opex remains a main discussion point:

Pre-study of min. 1 year would be recommended to get real life data before defining the final specification.

Conclusions and Follow-up Actions

- Filtration Survey and Report identified key areas for greater focus
- Strong correlation across both Oil & Gas and Power Generation sectors
- Still a lot of room for improvement to reduce gaps between importance and satisfaction
- More ETN members to complete survey to increase reference database
- Identify if key areas still have same levels of importance
- Work with other professional bodies (e.g. ISO) to produce more relevant test standards
- ETN & filtration companies to suggest steps for interactive cooperation between operators, OEMs and filtration companies

End of Presentation



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Chaussée de Charleroi 146-148/20, 1060 Brussels, Belgium

Tel: +32 (0)2 646 15 77 info@etn-gasturbine.eu

www.etn-gasturbine.eu

