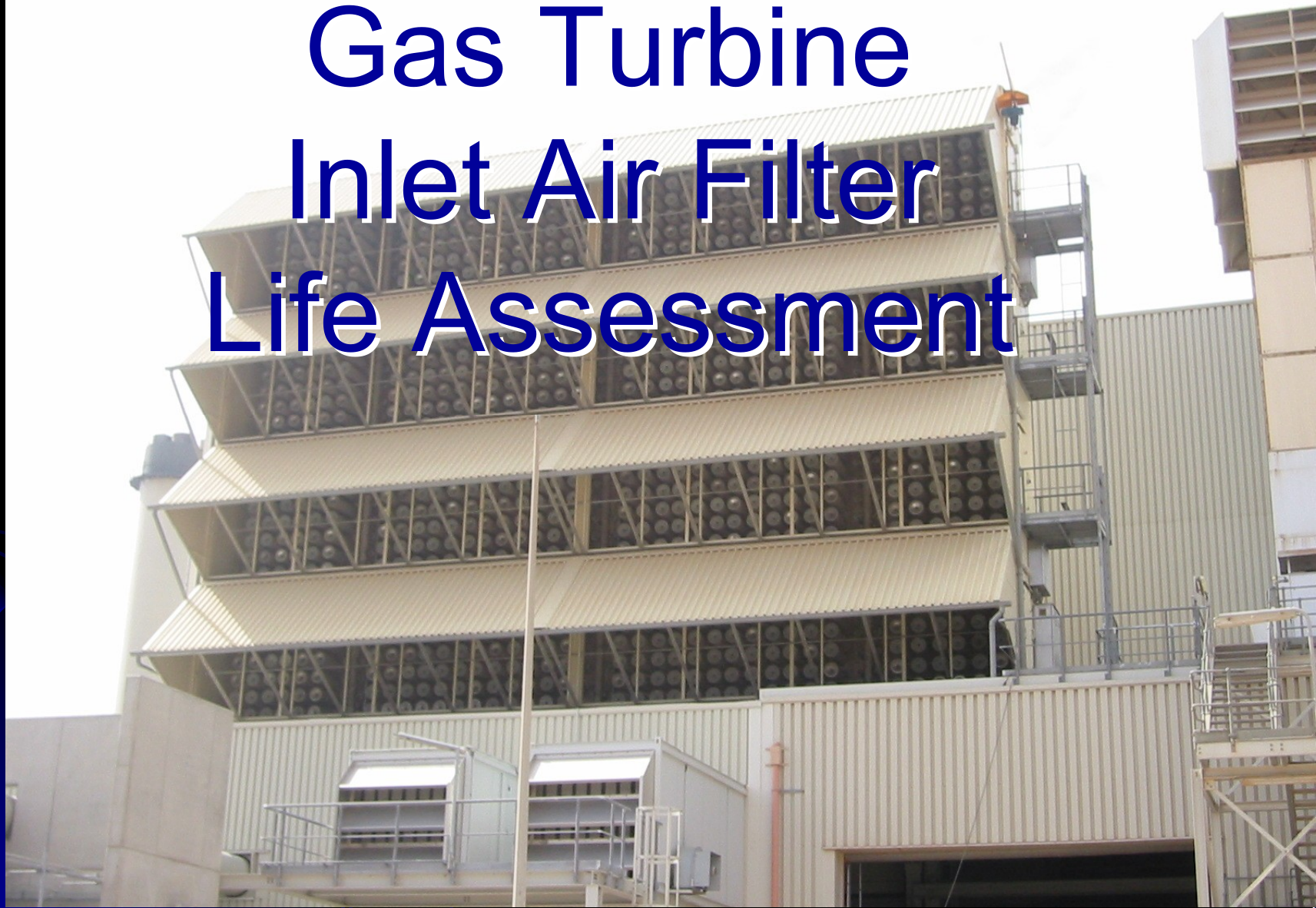
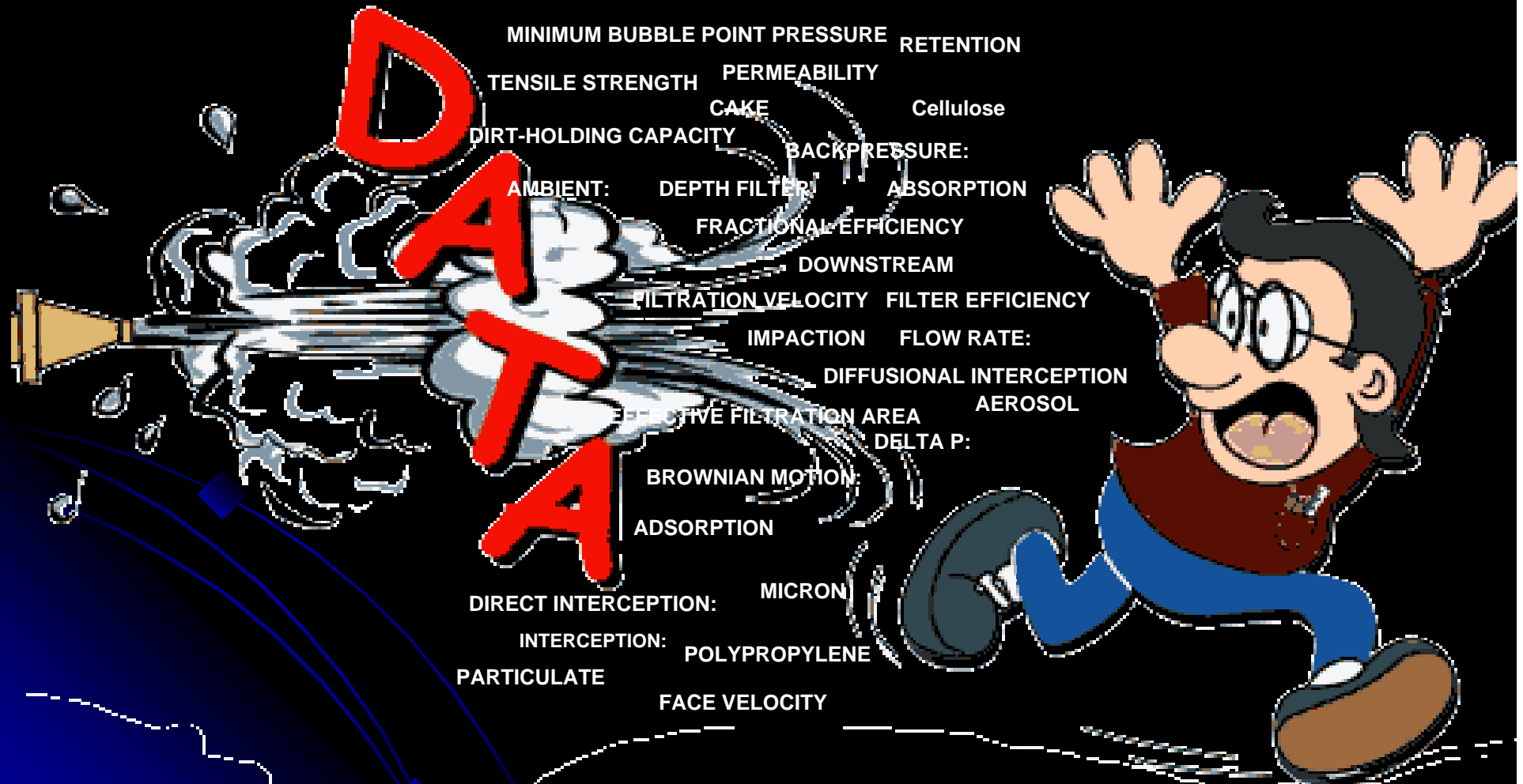


Gas Turbine Inlet Air Filter Life Assessment



Too much information



Service Life Analysis

- Turbine make and model
- Inlet housing OEM
- Filter manufacturer
- Manufacturing date code (of the filter)
- Date of installation
- Total operating hours
- Sketch that confirms location of filters removed

Request for Testing

Protect Your Investment - Test Your Filter Life

TDC offers service life testing for filters. The test will show how much life is left in the filter and highlight other potential problems.

Company Name _____ Location _____
Contact Name _____ Date _____
Phone _____ Email _____

Please check the tests you would like performed.
_____ Service Life Expectancy
_____ Application/Systems
_____ Failed Filter Analysis

Filter Information
Manufacturer _____ Part # _____

Briefly explain the application and any problems.

Special Instructions
_____ Test and discard filter
_____ Test and retain filter
_____ Filter to be measured for quote
_____ Filter to be returned
_____ Other Evaluation. Explanation _____

we will contact your with an RGA Number and shipping instructions.

Get a quote or order online:
www.gtairfilter.com

TDC Filter
a midwesco® company

2 Territorial Court, Bolingbrook, IL 60440 1-800-424-1910
International Phone 1-630-410-6200 Fax 630-410-6201

We Take the DUST out of InDUSTry®
Call 1-888-649-5883
gtairfilters.com

Rev 5/08

Service Life Report

- General Evaluation
- Filter Specifications
- Restriction
- Permeability
- Mullen Test
- Conclusion



Service Life Report

Filter Specifications

- **Filter Part Number**
- **Design**
- **Media Type**
- **Permeability**
- **Dry Burst**
- **Wet Burst**
- **Temperature**
- **Construction**
- **Overall Length**
- **Number of Pleats**
- **Media Area**

Service Life Report

Permeability



**Permeability
(CFM/sq ft @
0.5 in)**

Initial

As Received

FE110917

N/A

7.40 CFM

FE110918

N/A

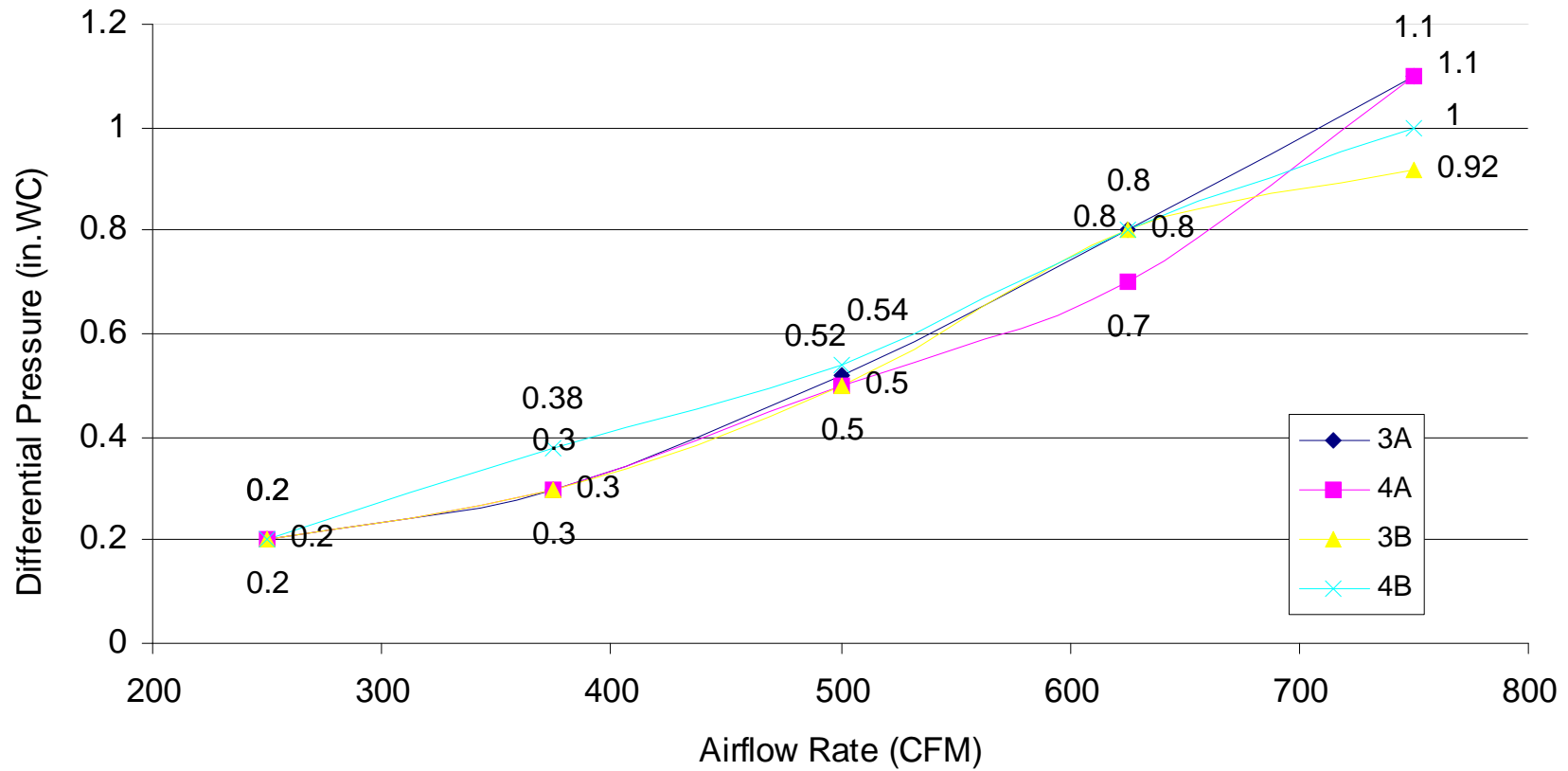
7.32 CFM

NA - Should compare against original values

Service Life Report

Restriction Test

volumetric flow rate vs. differential pressure
TDC filters



Service Life Report

Mullen Testing

Mullen Test (PSI)	Dry Spec	Dry As Recv'd	Wet Spec	Wet As Recv'd
FE110917	N/A	11 psi	N/A	6 psi
FE110918	N/A	10 psi	N/A	6 psi



NA - Should compare against original values

Test Detail

MULLEN TEST								
Sample ID:	3A		4A		3B		4B	
	DRY	WET	DRY	WET	DRY	WET	DRY	WET
1	57	38	56	35	49	40	49	42
2	51	29	54	39	44	33	60	37
3	47	37	51	37	46	39	55	39
4	46	32	59	37	51	28	60	37
5	56	34	60	41	57	32	56	38
6	50	28	51	39	49	34	62	35
Min	46	28	51	35	44	28	49	35
Max	57	38	60	41	57	40	62	42
STDEV	5	4	4	2	5	5	5	2
AVG	51	33	55	38	49	34	57	38

FRAZIER PERMEABILITY TEST (CFM/SQ. FT. @ .5 INCHES)				
Sample ID:	3A	4A	3B	4B
1	9.90	11.86	10.50	12.90
2	12.20	10.67	11.69	12.34
3	12.03	11.01	10.84	15.26
4	9.90	11.52	10.10	12.34
5	11.69	11.18	12.03	12.03
Min	9.90	10.67	10.10	12.03
Max	12.20	11.86	12.03	15.26
STDEV	1.15	0.46	0.81	1.32
AVG	11.14	11.25	11.03	12.97



Media Physical Properties Tests:

“Destructive tests”, reported in Sections IV & V, were conducted on samples of media taken from the filters after the intact analysis & testing was conducted.

Test results reported in this section are color-coded to assist in interpreting the data (see chart at right). The color-coding thresholds are determined according to the relative (%) change from the nominal specification value, which varies by parameter and media type.

V. MULLEN TEST:

The Initial/specification dry Mullen value of QX is 60psi and wet Mullen value is 47psi.

MULLEN TEST (PSI)	DRY SPECIFICATION	DRY As RECEIVED	WET SPECIFICATION	WET As RECEIVED
3A	60	51 psi*	47	33 psi*
	Change from Spec.	15% loss		30% loss
4A	60	55 psi*	47	38 psi*
	Change from Spec.	8% loss		19% loss
3B	60	49 psi*	47	34 psi*
	Change from Spec.	18% loss		28% loss
4B	60	57 psi*	47	38 psi*
	Change from Spec.	5% loss		19% loss

Measurements indicate that the media is maintaining its wet & dry burst strength.

APPENDIX A: PHOTOS



Photo 1 – 4 TDC filter cartridges

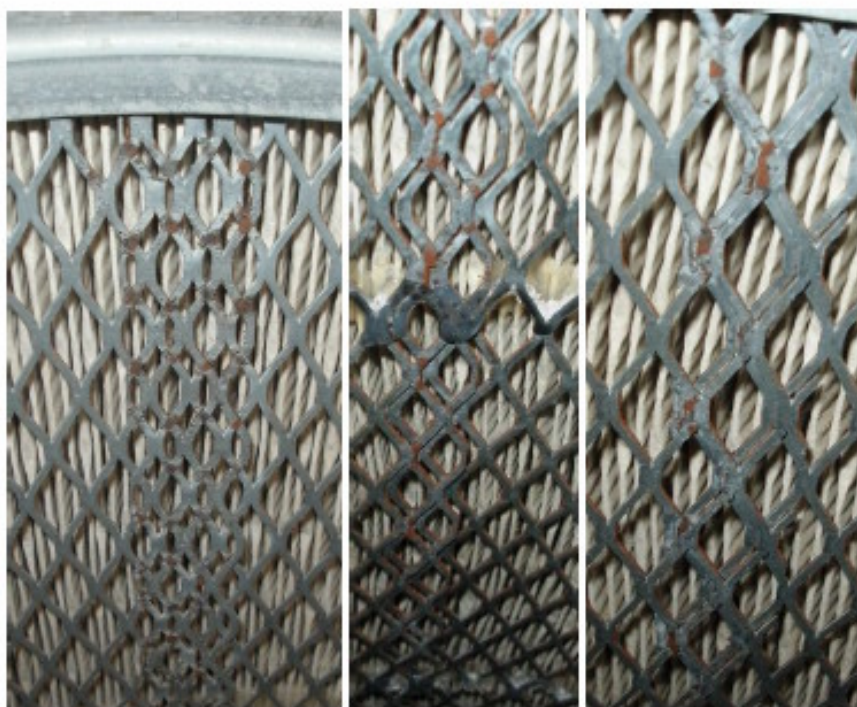


Photo 2 – variety of corrosion on the spot welded

Independent Lab Testing

1. Initial Efficiency
 2. Initial Resistance
 3. Dust Holding
 4. Dust Rejection
 5. Humidity Test
 6. Loss of Efficiency
 7. Burst Test
 8. Shaker Test
- Hydrophobic Test *

Summary

- Filter Life assessment can be a very useful tool in planning service requirements on the inlets of gas turbines
- The test data can also help the user to identify atmospheric or environmental conditions which are negatively impacting filter performance.
- Provide sufficient time for an operator to address design/performance issues and adequately search the market for the best solution.

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