

Quality Assurance

Proving you have the answer right

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AIMS

- Learn something new about QA
 - Guidelines
 - Validation / commissioning
 - Biological Control
- Practice answering questions
- Have some fun!

Three Rules for Success

1. RTBQ

- Read the Bloody Question

(with apologies to any English people in the audience)

2. RTBQ

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2. Instrument Quality prompts
3. A well motivated, enthusiastic Scientist
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1. Quality Control
2. Staff training
3. Referral management
4. Error response procedure

- a) All the above
- b) 1,4
- c) 1, 2, 3
- d) 1, 3, 4

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The current ATS/ERS guidelines for spirometry indicate a spirometer plus circuit used for measuring FVC must have a resistance / backpressure of

1. $< 1.5 \text{ cmH}_2\text{O} \cdot \text{L}^{-1} \cdot \text{s}^{-1}$
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ATS/ERS guidelines specify that spirometers must meet accuracy standards over what flow range?

1. 2-10 L•sec⁻¹
2. 0-20 L•sec⁻¹
3. 0-14 L•sec⁻¹
4. 0-10 L•sec⁻¹

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an accuracy error has occurred if (for a
Volume of 3 L):

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2. Deviation is $> 100\text{ml}$
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A 3-Litre syringe (3.02 L) gave the following results for a new spirometer. What can be deduced about the spirometer?

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Average	CV
Obs vol (L)	3.05	3.00	3.05	2.95	3.05	3.02	1.5%

This spirometer is:

1. Accurate
2. Precise
3. Accurate and Precise
4. Accurate but imprecise

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	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Average	CV
Obs vol (L)	3.15	2.85	3.10	2.85	3.15	3.02	5.2 %

This spirometer is:

1. Accurate
2. Accurate and precise
3. Accurate but imprecise
4. Inaccurate and imprecise

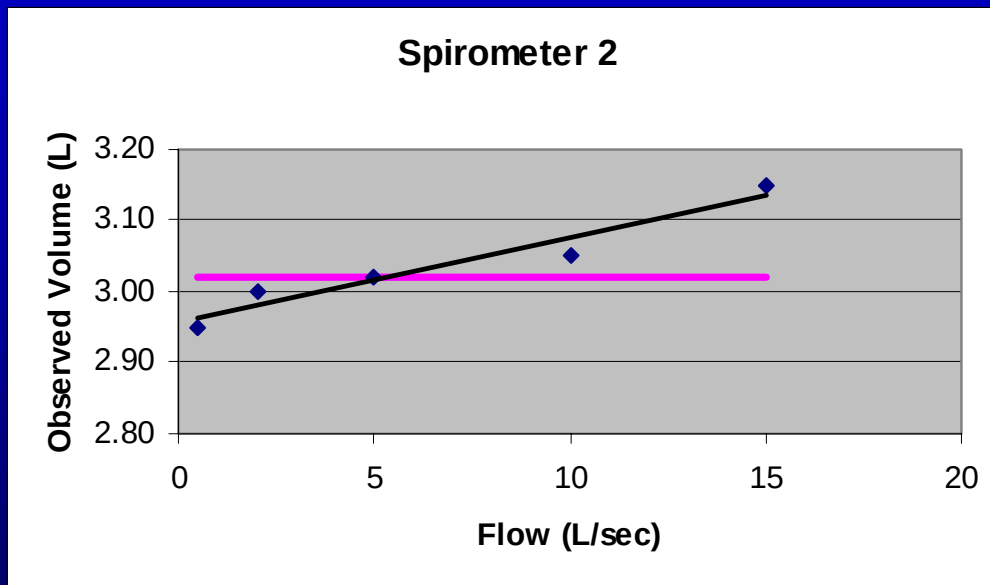
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Considering the validation data below, obtained with a reference syringe of volume 3.02 L, what can be said about this spirometer?

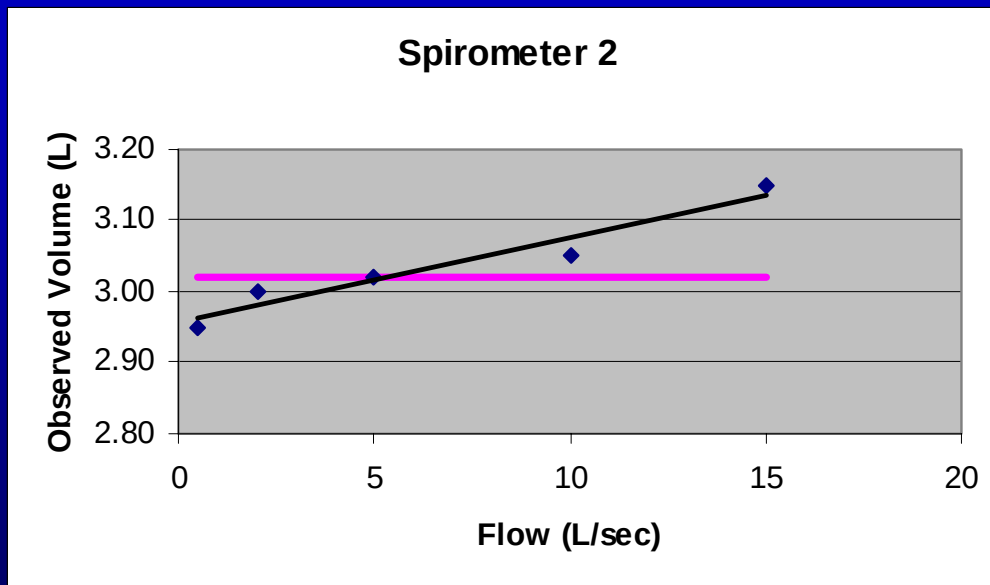


Avg Volume: 3.03

CV: 2.5 %

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2. Displays a slewing error
3. Displays a skewing error
4. Displays hysteresis

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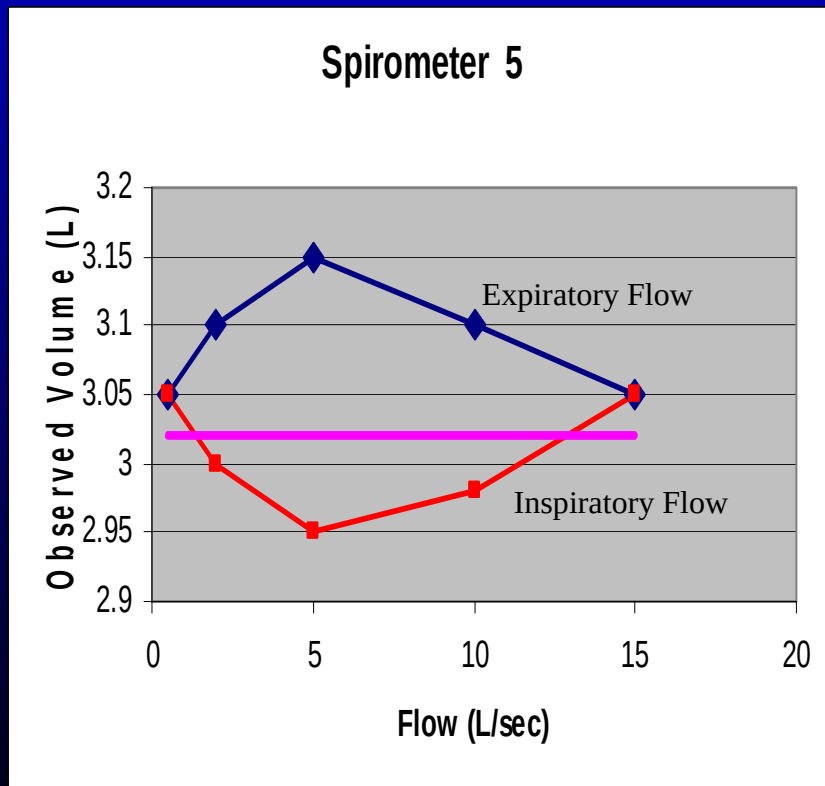


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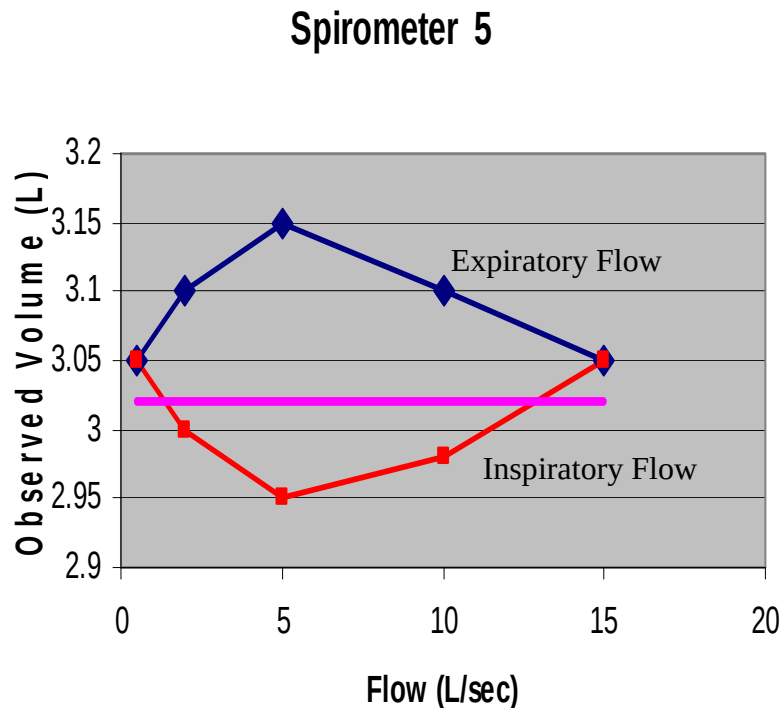
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A pneumotach spirometer is used to measure inspired and expired volumes across its desired flow range using a reference syringe (3.02 L). The following data are obtained. What can be deduced about the pneumotach?



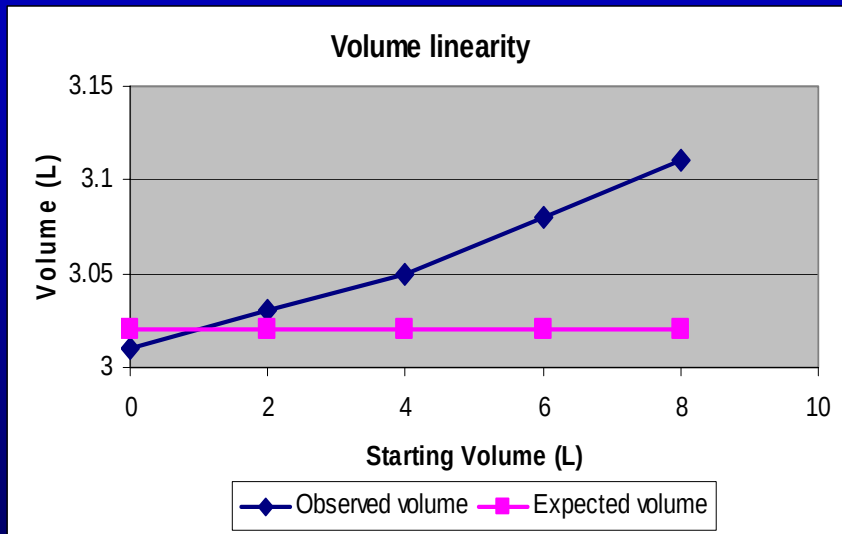
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2. Spirometer should be used only for expiratory measurement
3. Pneumotach needs to be heated.
4. Spirometer displays a hysteresis type error

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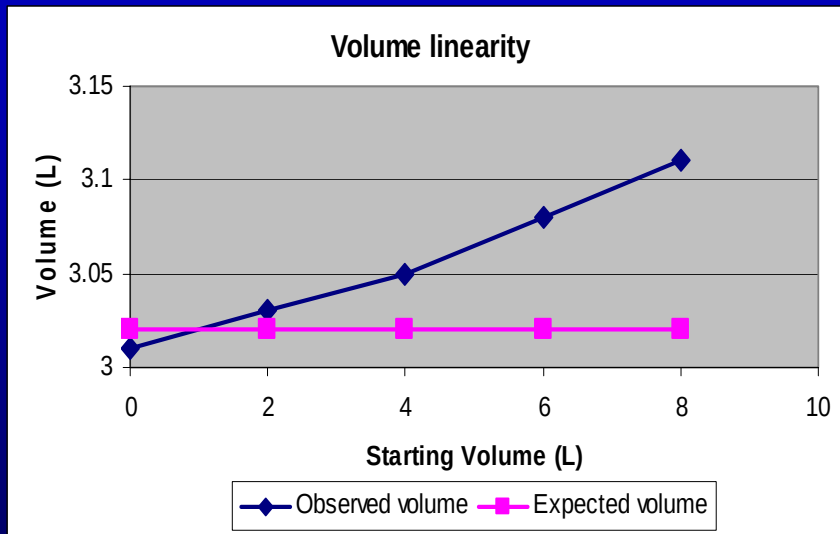
A volume based spirometer is validated across its volume range using a reference syringe (3.2L). The following data were obtained. What can be deduced about the spirometer?



Start Volume	Observed Volume	Reference Volume
0	3.01	3.02
2	3.03	3.02
4	3.05	3.02
6	3.08	3.02
8	3.11	3.02

1. Spirometer is fine.
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A rolling seal spirometer under-reads Slow Vital Capacity by 12%. Which of the following are possible causes?

1. Miscalibration
 2. Overcorrection for BTPS
 3. Torn seal
 4. Subject being tested has a restrictive condition
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- a) All above
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A pneumotach used for measuring flow volume loops generates a forced expiratory loop that has a flat region at peak flow but is otherwise normal. What is the most likely explanation?

1. Tongue blocked the mouthpiece
2. Mouth leak
3. Airway collapse
4. A/D board saturated

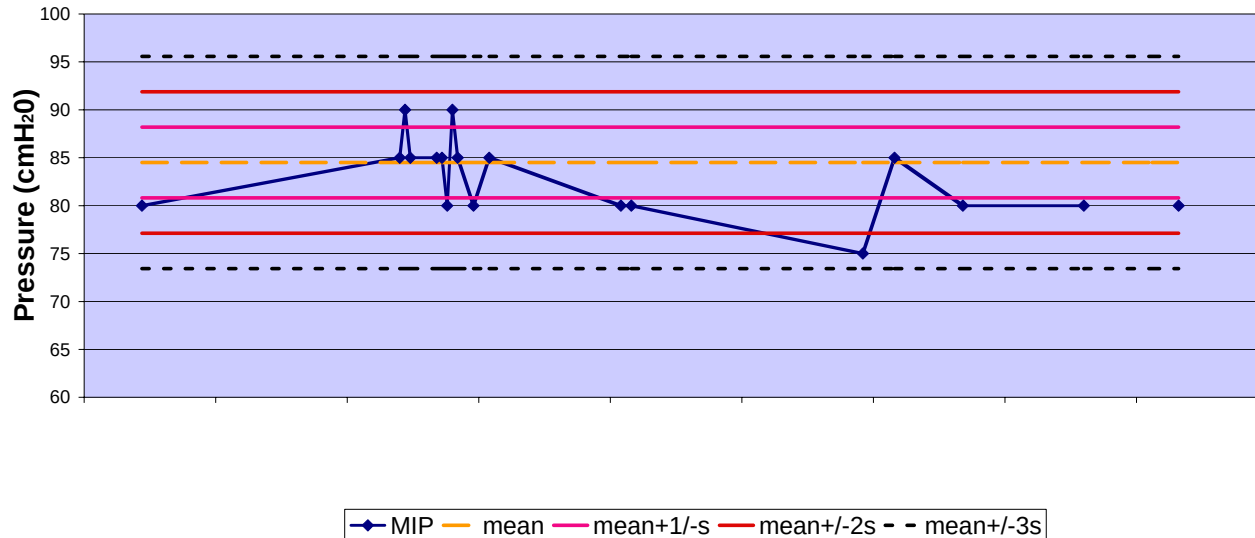
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Westgard rules

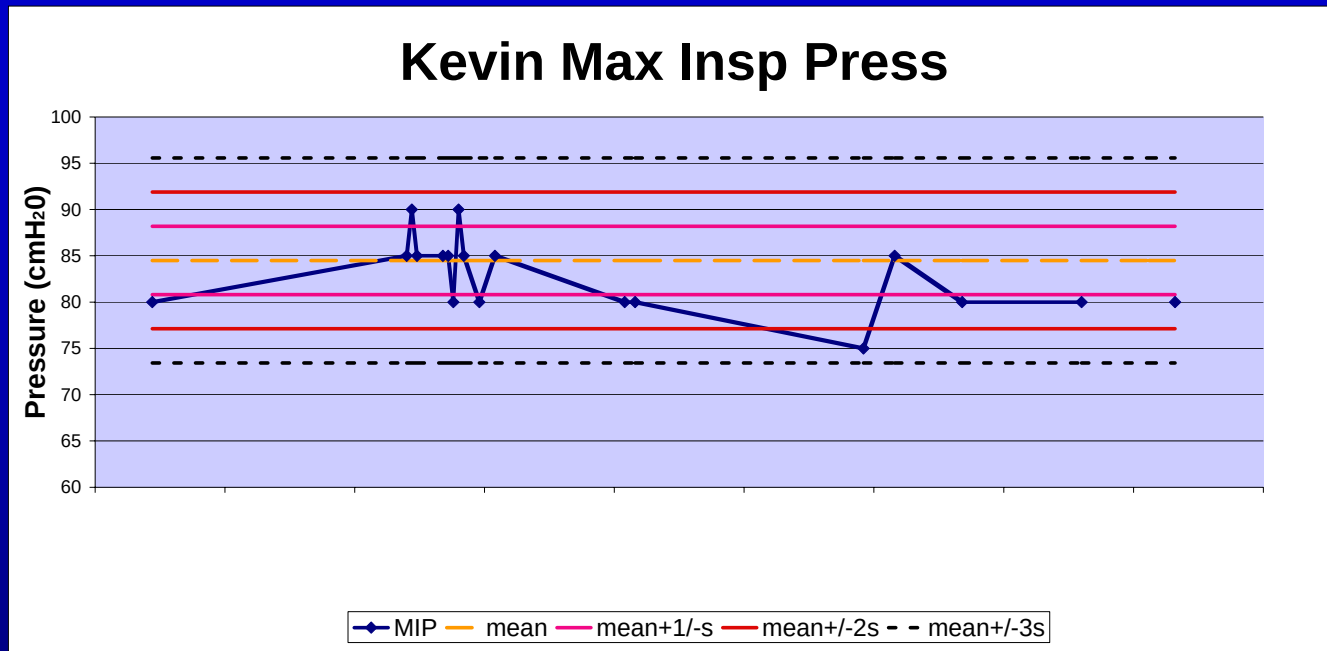
- 1_{2s} 1 control observation exceeding mean $\pm 2SD$ gives “warning”
- 1_{3s} 1 control observation exceeding mean $\pm 3SD$ gives rejection - random
- 2_{2s} 2 consecutive control observations exceeding mean+2SD or mean-2SD gives rejection - systematic
- R_{4s} 1 observation exceeding mean+2SD and another exceeding mean-2SD gives rejection - random
- 4_{1s} 4 consecutive observations exceeding mean +1SD or mean-1SD gives rejection- systematic
- 10_x 10 consecutive observations falling above or below the mean gives rejection - systematic.

Kevin Max Insp Press



This test is:

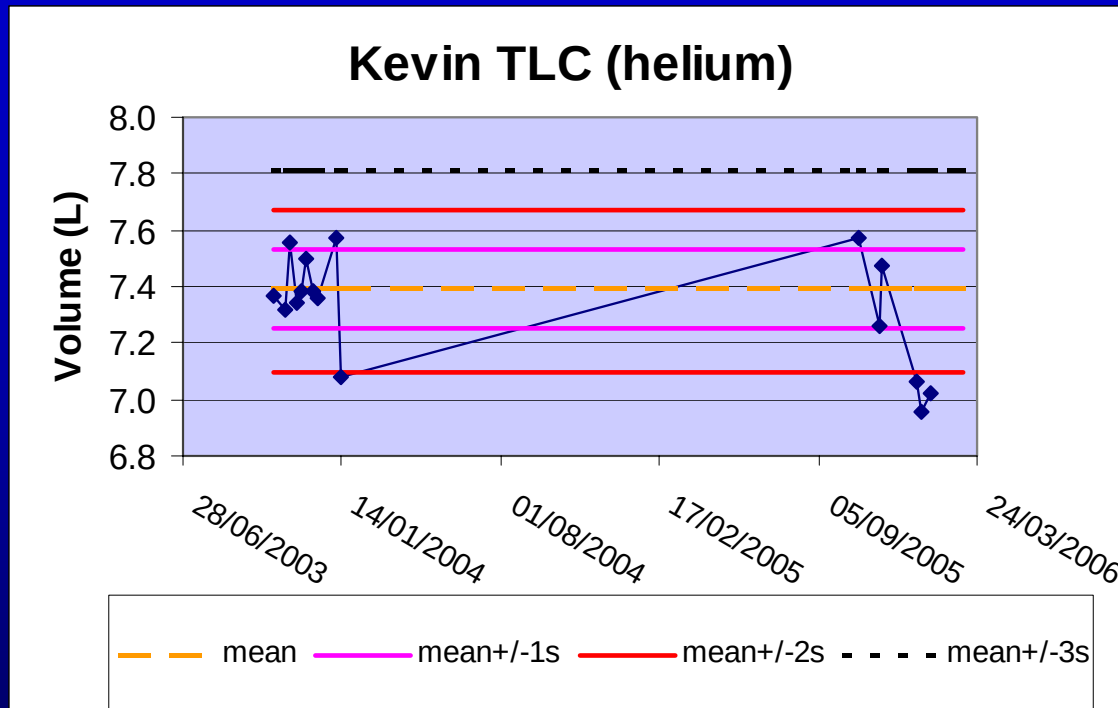
1. Out of control with a random error evident
2. In control
3. Out of control with a systematic error evident
4. The data are unhelpful



This test is:

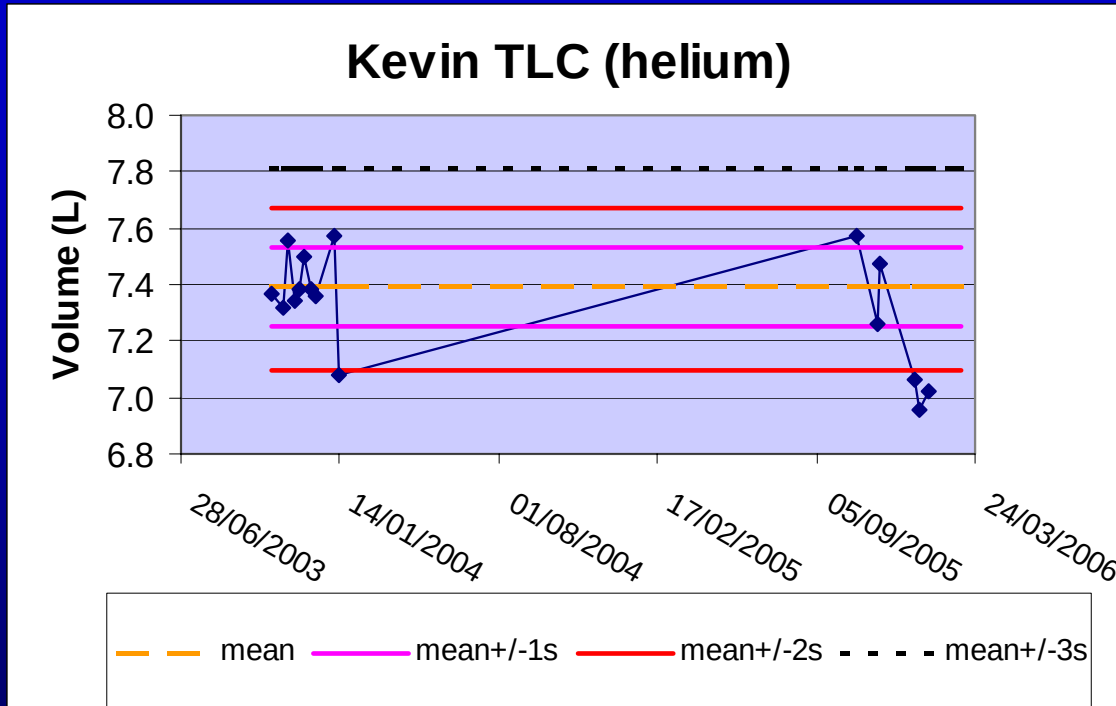
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Considering the biological control data below, what can be said about the test?



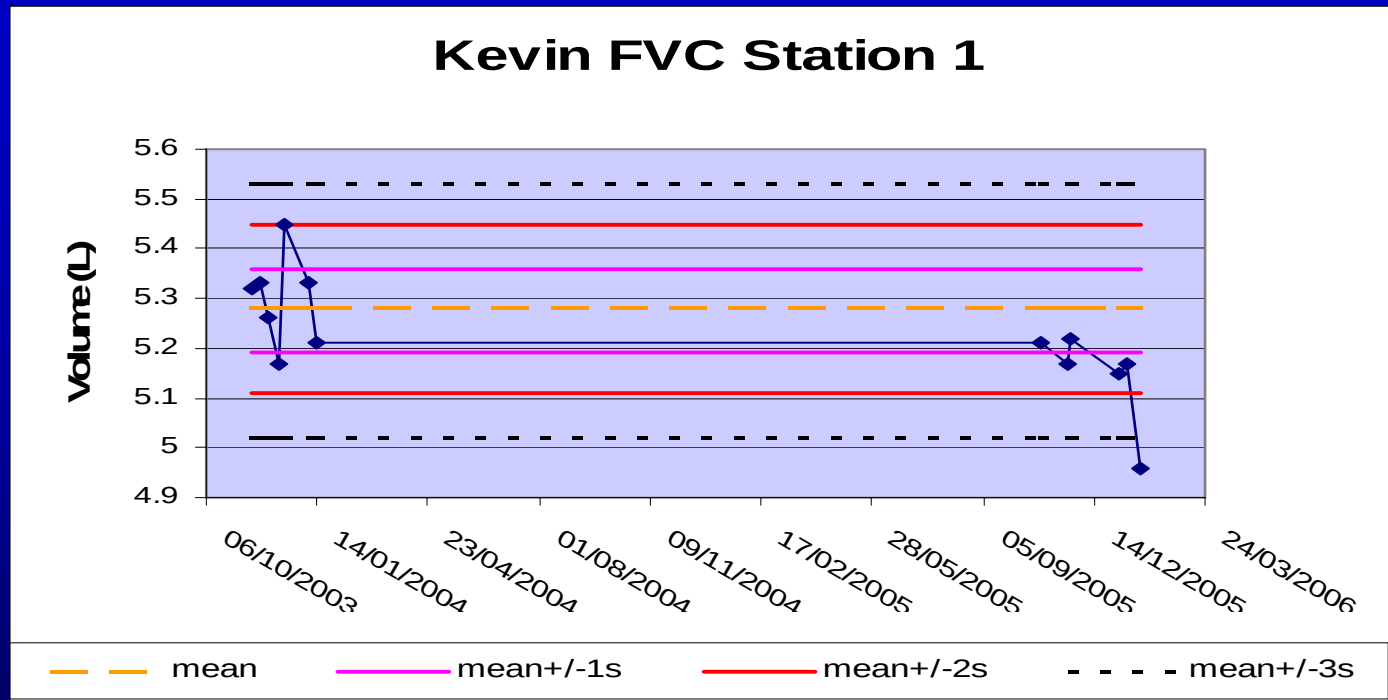
1. In control
2. Out of control due to a random error
3. Out of control due to a systematic error
4. Subject is in abject decay

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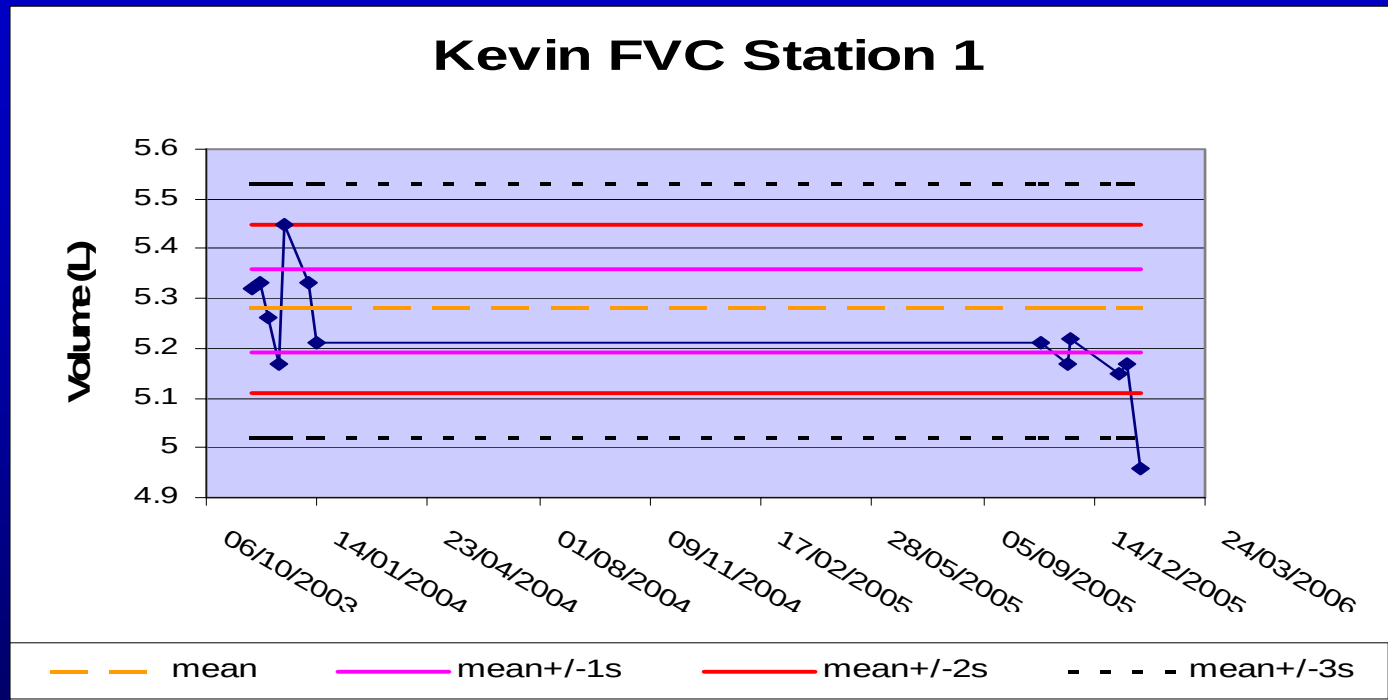
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	ATPH	BTPS _{corr}	BTPS
Trial 1	3.07	3.54	3.05
Trial 2	3.04	3.50	3.08
Trial 3	3.08	3.56	3.02

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3. BTPS correction is in error
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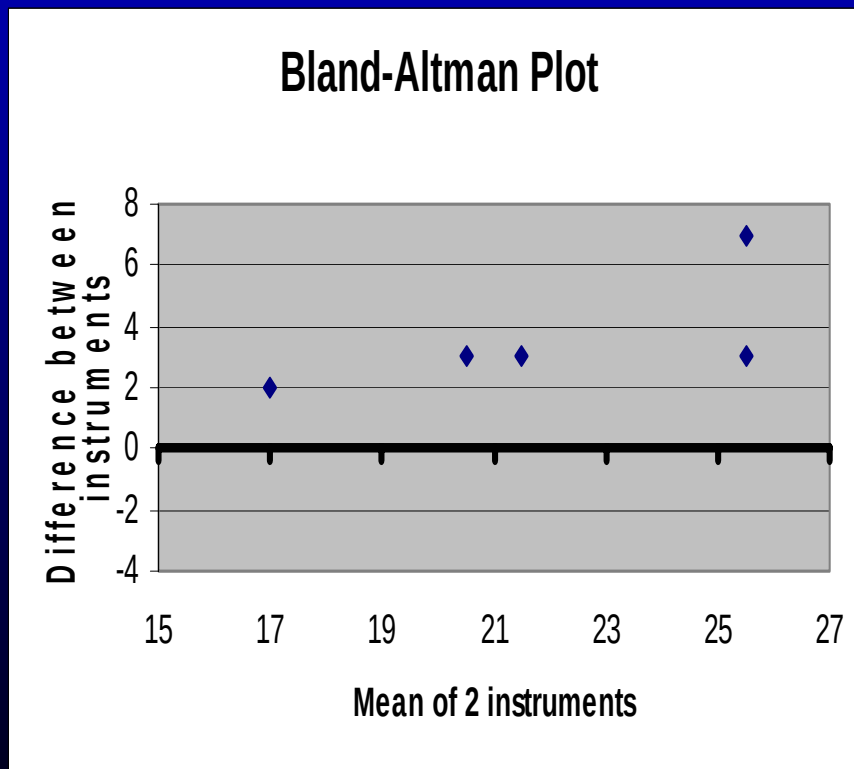
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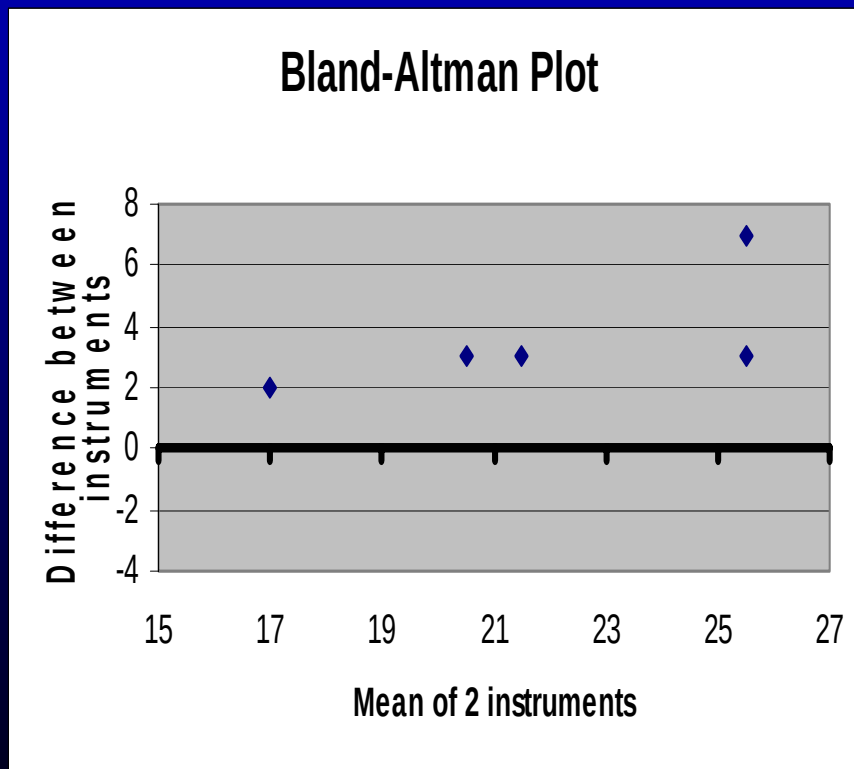
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2. Repaired instrument shows a positive offset error
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4. Nothing

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