Industrial Whitepaper

ISO11171-2010 Standard Requirement Changes

ISO11171-2010…What's new?

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Introduction

When the ISO 11171 Standard was officially released in December of 1999 it provided the Hydraulic Particle Counting Industry with definitive methodology by which a suitable hydraulic Particle Counter could be fully characterized and calibrated using a NIST traceable calibration suspensions and equipment. Table 1 of the standard detailed the elements that would be needed to be either characterized or calibrated. The term *Calibrated* for the purpose of this whitepaper will be defined as meeting a specification or Pass/Fail criteria. The term *Characterized* for the purpose of this whitepaper will be defined as determining the instrument performance. Those elements are defined as follows:

- Clause 6: Sizing calibration procedure (Calibration)
- Annex A: Preliminary Instrument check (Characterization)
- Annex B: Coincidence Error Limits (Characterization)
- Annex C: Flow Rate Limits (Calibration and Characterization)
- Annex D: Resolution (Calibration)
- Annex E: Accuracy (Calibration)

At the end of the day, the ISO 11171 Standard is a common platform that specifies a formal process that ensures your counter is calibrated accurately. Manufacturers performing this process must use the same yardstick for comparison…. requiring *"specs-manship"* to take a back seat to measured performance. The resultant data package and certification detail the functional attributes to the customer to ensure they are not using the instrument outside of its performance capabilities and can expect a consistent and useful test result.

ISO11171-2010 Modifications…what gives?

- The specific sequence of steps to be followed during calibration are no longer mandated
- A guidance is provided to detect a change in the calibration of an APC
- New standard explicitly requires that a minimum of 5000 particles are required to be measured in order to have statistically valid measurement for any particular channel setting;
- ISO11171-2010 no longer requires that a 0% concentration sample be analyzed
- The updated standard distinguishes between fixed flow rate and adjustable flow rate instruments. Fixed flow rate instruments are required to consistently deliver a constant flow rate within ± 3%. For adjustable flow rate instruments, it is required that their working flow rate and flow rate limits be determined, in addition to their ability to consistently deliver a constant flow rate within ± 3%.
- D.12 increases the acceptable 10µm Resolution specification from 10% to 15%. Using an NIST traceable 10µm particle standard (with a COV < 5%) the acceptance criteria was increased from < 10% @ 10µm to < 15% @ 10µm. Additionally, the difference between RR and RL must now not exceed 5%.
- Section E.3 requires that NIST RM 8632 dust be used for verification of counting accuracy.
- Annex H of the standard includes an example of how to construct a calibration curve.

Summary Table to show differences between 11171-1999 and 2010

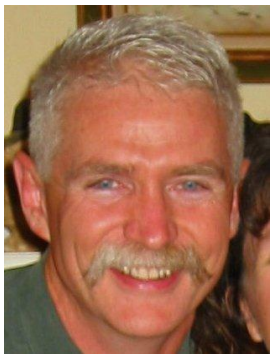
Standard	ISO 11171:1999	ISO 11171:2010
Primary Calibration Suspension	ISO MTD or ISO 12103-A3	NIST SRM 2806
Sequence of Calibration steps	mandated	not mandated
Minimum Count requirement	No minimum requirement	5000 Count minimum per channel setting
Size larger than 50µm(c)	Refer to ASTM F658-87	Refer to ISO 21501-3
Coincidence	0% concentration required (OK to use UFTD)	0% concentration sample is not required (must use RM 8632)
Flow Rate	N/A	± 3%
Flow Rate Limit	OK to use UFTD	Must use RM 8632
Resolution (PSL@10µm)	< 10% @ 10µm	< 15% @ 10µm and RL-RR < 5%
Counting Accuracy Suspension	OK to use UFTD	Must use RM 8632

Summary:

The purpose of this whitepaper is to detail the changes to the 11171-2010 standard. The changes were mostly minor, but deemed necessary for facilitating a meaningful and useful process to characterize and calibrate your hydraulic fluid Particle Counter. If you have any questions or comments, please contact Bill Bars at bbars@beckman.com .

Author Biography

Bill F. Bars is an Applications Scientist for Beckman Coulter, Inc. in Grants Pass, Oregon, USA. He has created and developed many of the Industrial Systems production processes and procedural tools for the Beckman Coulter Particle Counting products. These products include but are not limited to the: HIAC PODS, 8011, 8012, HRLD Sensors, PM4000 and the ROC. He was a primary technical resource for the (Hach Company) Particle Counting ISO 17025 accreditation project which culminated in receiving their formal ISO Accreditation Certificate from A2LA. He received his Electronics Engineering degree from DeVry Institute of Technology in 1982. He has worked for Beckman Coulter for 17+ years in a multitude of engineering capacities ranging from Metrology to Service Training and Industrial Application Support.



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