

# X-RAY IMAGE QUALITY VERIFICATION SYSTEM



## MEET THE NEXT GENERATION OF ACCEPTANCE TESTING FOR EXPLOSIVES DETECTION SYSTEMS

Now you can quickly assess the image quality of Explosives Detection Systems (EDS) for acceptance testing, research, suitability for duty status checking and performance-over-time analysis. Battelle Verif-IQ provides a reliable, efficient and cost-effective alternative to traditional EDS testing methodologies.

Verif-IQ is based on ANSI N42.45 (IEC 62945 international) standards. These standards define test articles and analytical formulas to test and verify EDS image quality. In addition to providing an on-the-spot pass/fail assessment of the image quality of the tested EDS, Verif-IQ test data also provide the basis for trending and analyzing EDS system performance over time to anticipate imminent failures before they occur and to optimize maintenance schedules, resulting in potential lowered operational costs.

Verif-IQ offers a better testing solution based on the ANSI/IEC standards. Verif-IQ analysis software not only delivers a pass/fail status check of the tested system but also provides a detailed test report, including data on key system parameters to facilitate analysis, troubleshooting and other maintenance activities where operating detail is critical.

### TWO OPTIONS FOR RELIABLE, EFFICIENT TESTING

#### Verif-IQ 1

Compact, lightweight test articles and associated software that comply with many but not all of the ANSI standard performance metrics. The Verif-IQ 1 system is perfect for:

- Site Acceptance Testing
- Performance-Over-Time Measurements
- Maintenance Optimization
- Failure Tracking
- Daily System Qualification
- Quality Assurance/Control.



#### Verif-IQ 2

Fully compliant with ANSI N42.45-2011 IEC62945 standards. The Verif-IQ 2 system can be used for:

- Factory Acceptance Testing
- Engineered Change Assessments for Certification Authority Approvals
- Qualification/Certification Baseline Testing
- Manufacturer Research.



Battelle will soon offer a Verif-IQ solution for testing AT2 X-ray systems.

### BUILDING A BETTER ACCEPTANCE TEST DEVICE

To address the need for image quality verification, TSA tasked Battelle to develop the next generation of acceptance test devices—called test phantoms—and associated analysis software based on the ANSI N42.45-2011 standard. This standard contains requirements for test articles and formulas for analyzing test metrics from the image data that are collected. We conducted our system development in conjunction with the DHS Transportation Security Laboratory (TSL), the National Institute of Standards and Technology (NIST) and EDS manufacturers to identify the most important X-ray CT metrics for meaningful system evaluation. The completed testing hardware/software suite, the Verif-IQ X-ray Image Quality Verification System, is the first system built on the ANSI standard. The Verif-IQ system offers multiple benefits for all CT screening system stakeholders.

### THE VERIF-IQ (VIQ) SYSTEM OFFERS BENEFITS TO ALL STAKEHOLDERS

User/VIQ System (1/2)	Use	Benefits
<b>Certification Lab - VIQ 2</b>	Baseline IQ metrics of certified systems	Provides basis for assessing engineering changes to certified systems (detectors, X-ray tubes, etc.) that could affect detection performance. A favorable analysis of the new component against the certification baseline could obviate the need for recertification.
<b>Regulator VIQ 1,2</b>	Oversight inspection	Offers standardized test/tool for compliance monitoring by EU/member country regulators. "Inspection" could be an audit of airport collected IQ data and test results.
<b>Airport Use (A) VIQ 2</b>	Factory Acceptance Test (FAT)	Creates a standardized basis for formal FAT testing, which can be documented, included in tenders and verified empirically. OEMs can use their own VIQ 2 to conduct tests; testing can be conducted or witnessed by a third party on behalf of the airport.
<b>Airport Use (B) VIQ 1</b>	Site Acceptance Test (SAT); periodic testing; trend analysis	Provides airports with multiple benefits: 1) verify CT performance following new installation/ or return to duty; 2) conduct periodic CT suitability testing; and 3) analyze collected test data to identify performance over time trend analysis to anticipate failures and optimize maintenance.
<b>OEMs VIQ 1, 2</b>	Research; Q/C; FAT; engineering change management	The Verif-IQ system offers a range of benefits to OEMs: 1) research tool; 2) manufacturing Quality Control; 3) pre-FAT validation, FAT testing; 4) baseline systems at certification as means to assess proposed engineering changes with certification lab in the future to possibly avoid recertification; and 5) minimize maintenance contract costs.

### VERIF-IQ SYSTEM ANALYSIS SOFTWARE

The software analysis portion of the system is provided on a laptop that includes the ANSI analysis software, software for comparing the analysis results with a baseline reference for relevant performance parameters and the actual baseline parameter reference used for the comparison.

- ANSI N42.45-2011 Analysis Software
- Performance Parameter Comparison Software
- Parameter Reference Database

Verif-IQ 1	Dimensions	Weight
Phantom A	Length: 26 inches (66.4 cm)	25 lbs. (11 kg)
Phantom B	Width: 18.05 inches (46.99 cm) Height: 9.5 inches (24.13 cm)	18 lbs. (8.2 kg)
Verif-IQ 2	Dimensions	Weight
Phantom A	Length: 36.8 inches (93.5 cm)	32.1 lbs. (14.6 kg)
Phantom B	Width: 17.9 inches (45.5 cm) Height: 10.0 inches (25.4 cm)	40.7 lbs. (18.5 kg)

#### Optional System Additions

- Built-in Dosimeter
- Transport/Storage Case (Single Phantom)
- Transport/Storage Case (Two Phantoms)

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