Subject: ISO22232-1 2020 vs EN12668-1 2010 high level differences

This memo summarizes the high-level differences between ISO22232-1 which replaces EN12668-2010 Non-destructive - Characterization and verification of ultrasonic test equipment.

The new standard covers digital ultrasonic instrument for pulse operation using Asan display for manual inspection using pulse echo or dual element probes within the frequency range of 0.5 to 15MHz. ISO 22232 specifically includes applicability to multi-channel instruments. It is important to note that for ultrasonic instruments marketed before the introduction of ISO22232 continued compliance shall be demonstrated by performing the Group 2 periodic tests every 12 months.

While much is same, ISO22232 has removed some tests from Group 2 (items 9.x) and moved them into the Group 1 manufactures technical Specification (items 8.x). Many of the acceptance criteria has been relaxed from EN12668 or have been changed to "meeting manufactures specification" making overall acceptance criteria less stringent to the previous EN12668 standard. Examples of this include center frequency & bandwidth range and noise specification. These changes are summarized below.

Group 2 Periodic and Repair Tests Comparison			
Item	**EN12668-1 2010**	**ISO 22232-1 2020**	**Note**
Physical state and external aspects	9.2	9.2	Same
Stability after warm-up time	9.3.2	N/A	8.3 Moved to Group 1
Display Jitter	9.3.3	N/A	Removed from specification
Stability against voltage variation	8.5	N/A	8.5 Moved to Group 1
Transmitter voltage, pulse rise time and duration	9.4.2 includes Reverberation	9.3	ISO standards • reverberation <4% requirement dropped • Do not measure pulse voltage to overshoot • Deduct scope probe rise time • Pulse width now at 50% (10% in EN12668-1)
Frequency Response	9.5.2	9.4.2	Acceptance/Test criteria changed to: • **Center frequency** and bandwidth +/-10 % (EN12668=1 was +/-5% center frequency)
Noise	9.5.3	9.4.3	• Acceptance criteria relaxed in new standard to value being less to those stated in manufacturers technical specification
Gain Linearity		9.4.4	• Added acceptance criteria of <+/-0.5dB over any 1dB span
Vertical display linearity	9.5.5	9.4.5	Same
Linearity of time base	9.6	N/A	Removed from specification. Time base deviation is an ISO 22232 Group 1 test 8.6.1 which equivalent to EN12668-10 test 8.8.2 Linearity of time base for digital ultrasonic instruments

In addition to group 2 test changes, some group 1 technical specifications have been changed as follows.

- Transmitter pulse frequency spectrum dropped
- Crosstalk from transmitter to receiver during transmission was modified to add to acceptance criteria that value is higher than manufacturers technical specification
- Dynamic range acceptance criteria has changed only requiring single frequency analysis
- Temporal resolution has been dropped from specification
- Gate Response threshold and switching hysteresis acceptance criteria relaxed from hard number to within manufacturers technical specification
- Delay and hold time of gate alarm acceptance criteria relaxed from hard number to within manufacturers technical specification
- Linearity of amplitude in gate changed from manufacturers specification to +/-2% FSH
- Linearity of TOF in gate NEW
- Frequency response of proportional gate output DROPPED
- Noise on proportional gate output DROPPED

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