

Explanation of Sector Bond Log Calibrations

Assuming that the gates have been properly set in each of the waveform boxes, we will go through the steps of what is need to perform a sector bond tool calibration and the effects of these steps.

Before a tool is run for the first time a Shop / Free Pipe calibration must be done. This is done from Acquisition by selecting Action – Calibrate – SCBL Shop/Free Pipe Cal.

The first calibration window that comes up is the Zero Baseline Calibration. The target baseline amplitude is entered, (normally 0.0 MV) that the sensor readings will be calibrated to. The sample button is then clicked which brings up the Sample & Average Sensor window. When the Begin button is clicked, the sensor readings will be averaged for 10 seconds. When the sampling is done, the user can select the ACCEPT or CANCEL buttons on Sample & Average Sensor window. The Zero Baseline Calibration window will now display the results of the sampling. **Since this step of the calibration is meant to get zero baseline readings for the signals, all of the readings should be very close to zero.** For this step to be valid or have any meaning, the gates should be properly set on where the first arrival of the waveform would be in the size of casing being calibrated. Otherwise you are not calibrating to the section of the waveform that you will be logging in.

There is an exception to this. The CAL waveform has no zero baseline amplitude, the CAL waveform is always present even with the tool in air. To get a usable CAL baseline value the CAL gate should be moved off of the CAL signal to a section of the waveform that gives a sensor reading at or near 0.0 volts before the sampling is performed.

Once again, all of the sample readings should be at or near zero for the calibration to be valid and give good results. If these results are not possible, this step of the calibration should be skipped by clicking the CANCEL button. If the CANCEL button is selected, the calibration goes to the E1 AMPLITUDE CALIBRATION by using the previously stored baseline samples from the last shop calibration. If the ACCEPT button is clicked then the baseline readings just taken will be used.

The E1 AMPLITUDE CALIBRATION window has two value boxes that must be entered. The Target Pipe E1 Amplitude value defaults to the correct API value for the size of pipe that the Variable CASEOD currently holds, but may be changed by the user. The Target Sector Amplitude defaults to the last value that was calibrated. There is no API standard for Sector amplitudes and various service companies treat this differently. Most prefer to have the sector free pipe amplitudes to be 100 MV no matter what the size of casing. Others prefer to have the sectors match what the Pipe E1 amplitude would be for a given size of casing.

If the waveforms are properly gated (be sure to re-gate the CAL waveform if it was moved in the zero baseline reading step), then the SAMPLE button needs to be clicked to go to the Sample & Average Sensor window to begin and accept the data sampling. Once the sampling has been accepted, a SCBL Amplitude Cal Results window will be displayed. This shows the gain and offset of each of the waveform calibrations. **Each of the offsets should be very close to zero for the calibration to be considered acceptable. The gains may vary considerably. They should not be less than 20, but may be as high as several hundred.** The lower the number, the less problem you are likely to have with noise affecting the log.

The system is now calibrated to run the log. If the CAL pulse height is set to the same value as when the shop calibration was performed, the system should produce a calibrated log.

There are two options that can be used to change settings in the system and still produce a calibrated log. Each receiver, in addition to the AMP calibration has a WS_ calibration. This applies corrections to the calibrated signal.

The first correction is to do the SCBL Wellsite Air Zero Cal. With the gates properly set on all receivers, and the tool in air (or optionally 100% bonded pipe), the signals from all of the receivers are measured. This measured offset replaces the offset that was created from the shop calibration, in effect becoming part of the shop calibration.

The second correction is the SCBL Wellsite Internal Ref Cal. The purpose of this is to allow the operator to change the sonic signal gain to increase the sensor signals and still remain calibrated. It does this by measuring the amplitude of the CAL signal during the shop calibration and then measuring the amplitude of the CAL signal during the Internal Ref Cal. It then computes the change from the shop calibration and applies a gain and offset to correct the current internal reference back to the shop calibration. This gain and offset is also applied to every receiver signal to correct them proportionally.

With the gate set over the cal pulse, the reading of the ref max is sampled. The results cannot be accepted without doing the reading of ref baseline sample. The gate must be moved off of the Cal signal to a near zero sensor reading before the sample is taken. The result is a correction gain and a correction offset. The gain should be in .5 to 3 or 4 range and the offset should be very near zero or the calibration should not be accepted.

Be aware that if a new Shop Calibration is performed, that the wellsite air zero cal is over written by the new shop calibration and the WS_ corrections are reset to a gain of 1 and an offset of 0.