July 22, 1998

Visual Plus and *Visual Plus* II "*Special Edition*
T e c h n i c a l U p d a t e

Over the past two years ***Visual Plus*** units have been purchased by facilities throughout North America and many countries around the world. Advanced Inspection Technology have units in military installations, fire departments, hydrostatic test centers, colleges and universities, dive stores and cylinder manufacturing facilities. It is essential that all of these units are used correctly to maximize the units' effectiveness.

We at Advanced Inspection Technology (AIT) have learnt many things regarding the ***Visual Plus*** unit over these past two years and now it is time to pass on this information. This information will help you and your staff become more proficient in your cylinder inspections. It will help you distinguish between defective cylinders that should be removed from service and safe cylinders that can be returned to service with the utmost confidence.

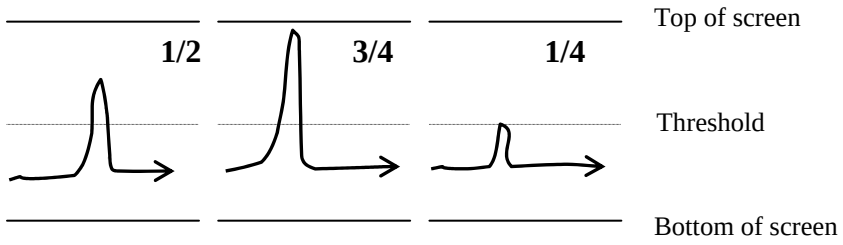
Throughout North America the yearly fee for annual maintenance inspections of aluminum cylinders has risen enabling more diligent inspections to be performed. These more diligent inspections will make the industry safer for all.

Setting up the probe.

It is essential that you know that your inspection equipment is working correctly. Insert the probe into the test standard frequently to test your equipment. Make sure that your probe is at the correct sensitivity. For most inspections you should have a ½ screen spike when using the test standard. If you do not have a ½ screen spike adjust the sensitivity accordingly.

Probe Sensitivity.

It is essential that you are operating the ***Visual Plus*** unit at the correct sensitivity. When you are checking the size spike against your test standard, it is very important to get a ½ screen size spike. Not a ¾ screen size spike (too sensitive); not a ¼ screen size spike (not enough sensitivity).



There are two ways to increase/decrease the sensitivity of your probe/unit.

1. The hidden screw beneath the storage compartment cover (left hand hole).

Use a 2mm flathead precision-type screwdriver. With the probe inserted into the test standard, insert the screwdriver into the hole next to the probe wire connection module (left hand hole). The screwdriver will slide into the hidden screw. Turn the screw to the right to increase the sensitivity (the trace line will move downwards) or turn to the left to decrease the sensitivity (the trace line will move upwards). This adjustment will decrease or increase the sensitivity, hence decreasing or increasing the size of the spike. (THIS PROCEEDURE WILL NOT CHANGE THE FREQUENCY NUMBER). Push reset and check the size of spike.

e.g. If on a regular basis your unit sets up at a certain number (for example 180) but you do not get a ½ screen size spike, you will need to adjust the hidden screw until the correct size spike is obtained. The frequency number will not change.

2. The left and right arrows on the units' control panel.

With the menu options not showing on the screen (menu off), push the left arrow to lower the frequency number (decreasing the sensitivity/spike size) or the right arrow to raise the frequency number (increasing the sensitivity/spike size). Push reset and check the size of spike. This method is for a 'quick fix' situation. You should only have to raise or lower the frequency by a maximum of two or three numbers. If you need to adjust the frequency by more than three (on a consistent basis during set up), adjustment should be made by turning the hidden screw.

e.g. If multiple probes are used, set your ½ size spike to the most commonly used probe by adjusting the hidden screw (for a ½ screen spike indication). Adjust other probes to a ½ screen spike by raising or lowering the frequency number. This is a 'quick fix' adjustment.

Note: Each probe should be producing a ½ screen spike. Take time to ensure that each probe is operating at the correct sensitivity.

How do I check the size of the spike in my test standard?

Insert the probe into the test standard until the bottom of the probe is flush with the back of the standard. Turn the probe counter clockwise approximately one revolution (the probe sensor is in the second thread from the bottom of the probe and this operation is to ensure that the sensor is approximately in the center of the test standard when checking for the size of spike). Make sure that the white line (which shows the position of the sensor) is not directly in line with the manufactured crack of the standard. Sweep the probe sensor back and forth across the manufactured crack several times. This will produce a spike. This spike should be a ½ screen size spike.

Setting up in air.

It is essential that the probe is in the test standard (the silver ring) when you are setting up the unit. If you set up the unit in air (outside of the test standard) your frequency number will most likely be approximately 20 kHz lower than the normal operating frequency. This low operating frequency will result in an imperfection producing a negative spike (a signal spiking downwards) or no spike at all.

Corrosion.

Corrosion in the threads of cylinders can make the trace line very erratic and can frustrate the technician performing the inspection. You can turn down the sensitivity of the probe, washing out the corrosion, but the unit will still be capable of seeing cracks and folds.

Corrosion Solution.

Ensure that the menu options are not visible on the screen.
Push the left arrow and you will notice that the frequency number decreases. (The right arrow increases the frequency number).
Decrease the number by five.
Conduct an inspection as normal by withdrawing the probe. You will notice that the erratic signal will decrease and if a crack is present the trace line will still spike (a smaller spike because you have a less sensitive probe). The trace line may drift above the threshold line more often. You can still perform the inspection with the trace line breaking the threshold. Remember you are looking for sharp spikes not rounded signals. If a sharp spike is noted, push reset (drop the trace line down below the threshold), then see if the spike is large enough to break the criteria.
Pinpoint the imperfection and then increase the sensitivity back to the normal operating frequency (half screen size spike with the test standard).
Now concentrate on the pinpointed area of the cylinder and see if the imperfection breaks the criteria.

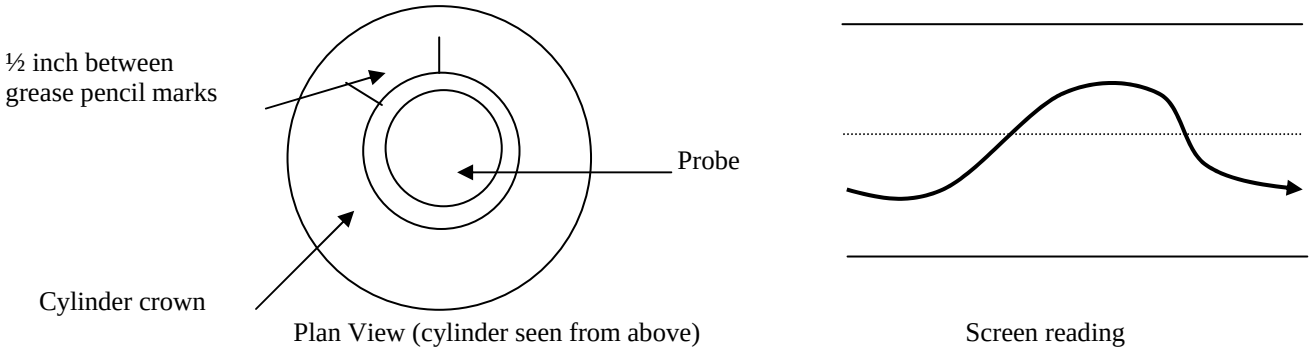
If you get a good spike (not a rounded signal) in the same position that breaks the criteria, in two or more consecutive threads, you should condemn the cylinder.

Note: If you push reset when the trace line (moving line) is above the threshold, the trace line will reset itself approximately midway between the threshold and the bottom of the screen. When you then start to move the probe the line may drop to the bottom of the screen. If this happens push reset.

What is a good spike?

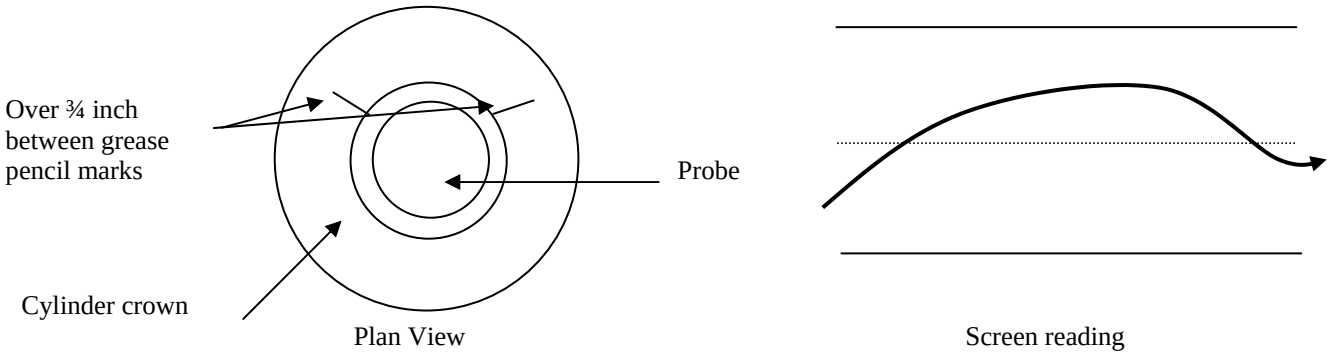
It is not the speed that you turn the probe that determines the indication but the distance the probe sensor moves. Anyone can make a spike out of a rounded signal by turning the probe quickly. If you only have to move the probe a short distance (1/8" or less) to produce a spike then an imperfection/crack/fold is found.
A good way to track imperfections is to mark the cylinder with a grease pencil (permanent pen marks are difficult to remove). Mark the cylinder when the trace line rises and then mark the cylinder when the trace line lowers.

Possible fold readings



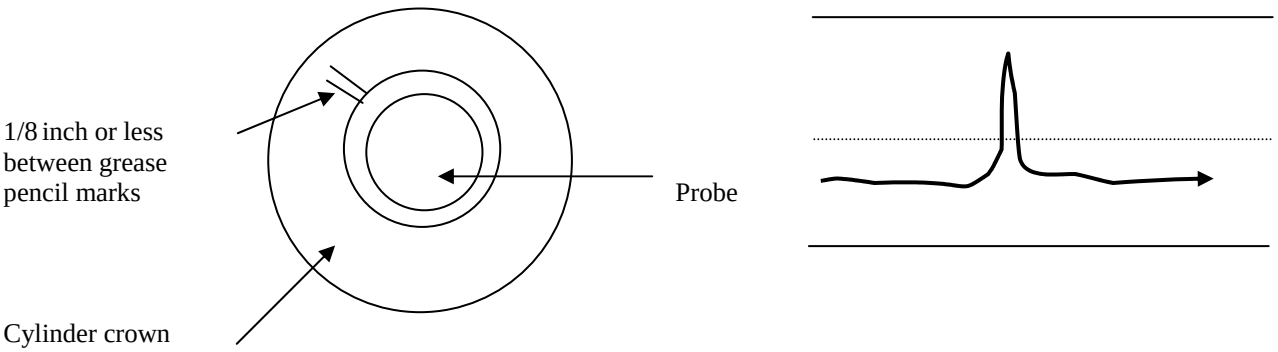
If this indication is on the bottom thread of the cylinder it could mean that a fold is present. On the next revolution (next thread up) you would be looking for a sharp spike in between the two grease pencil marks. If this situation occurs then a fold propagating into two threads or more would have been found. Condemn the cylinder.

Possible valley readings



Valleys are found on the bottom threads. This same indication (rounded signal) could occur further up the threads. Flattened threads could cause this indication as the probe sensor would be further from the material. The further the sensor is from the material the higher the trace line will climb.
Dirty threads (too much Dow at the root of the threads) can cause the trace line to climb.
Elongated threads will also give a similar reading (rounded signal).

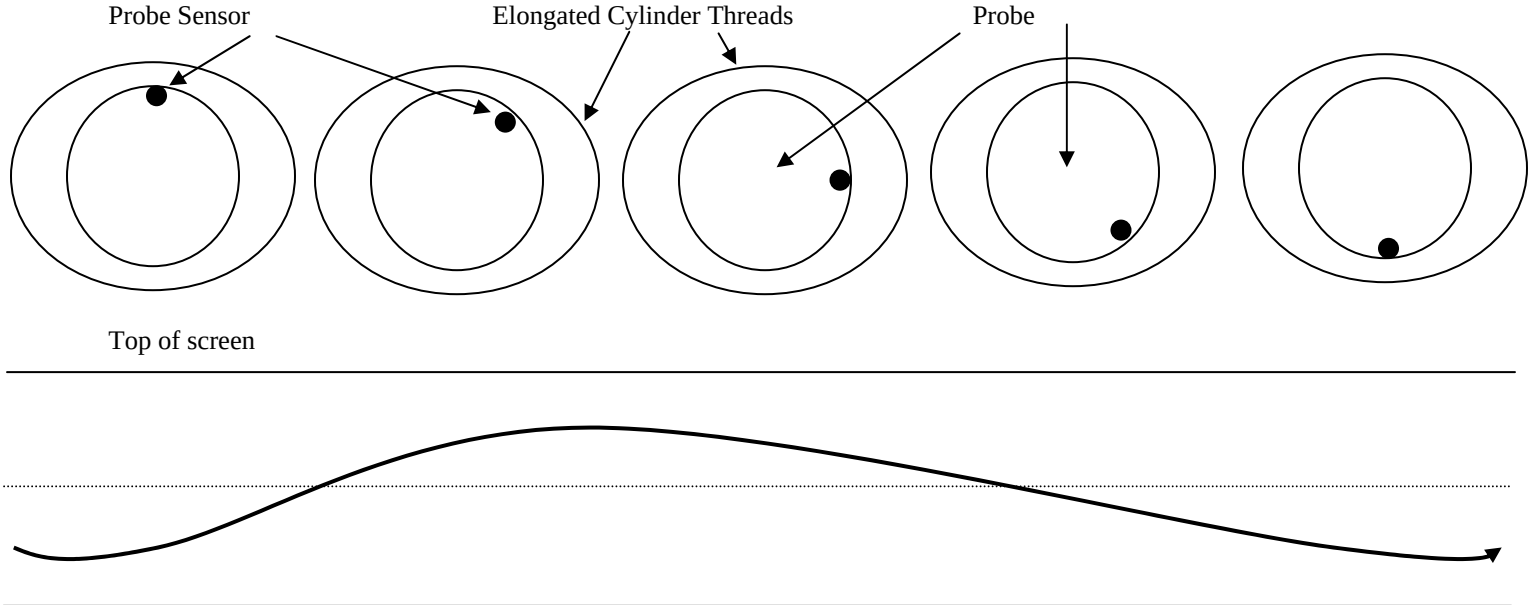
Crack indication.



A crack indication will be a sharp spike where the distance the probe sensor moves is about 1/8th inch or less. You may not be able to see the imperfection with the naked eye.

Probe Signal.

An understanding on how the probe sensor detects will help technicians determine whether a cylinder should be condemned because of cracks and folds or passed and returned to service. Elongation of threads will give a signal such as the example below.



As the probe sensor moves around the threaded area it sends out a signal that rebounds off the solid material of the cylinder. If the distance between the sensor and the material is constant (an equal distance), the trace line will move across the screen without moving up or down. When the sensor is further from the material the line will climb upwards. If the sensor is closer to the material the line will get closer to the baseline (bottom of the screen).

Reset button.

It is not necessary to reset the trace line constantly. The only times you need to push reset while performing an inspection is if the trace line wanders to the bottom of the screen (Illustration A) or if a small imperfection is found and you need to verify if the size of the indication breaks the criteria (Illustration B).

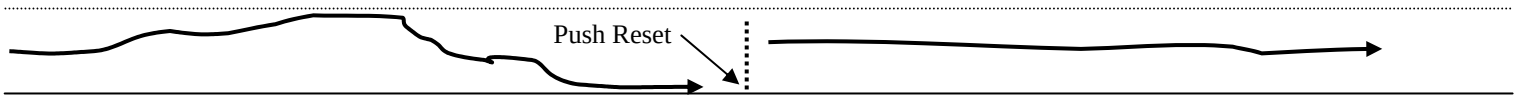


Illustration A

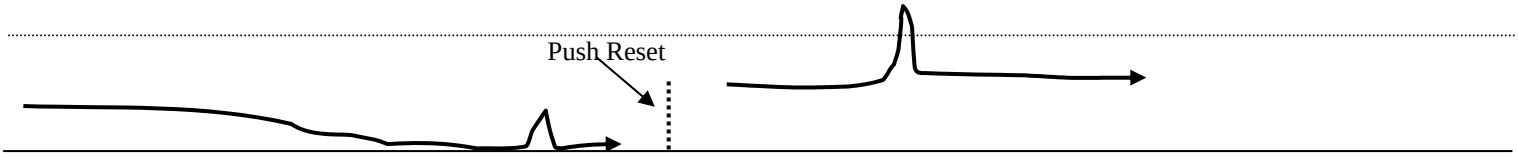


Illustration B

The inspection can be performed even if the trace line wanders above the threshold line (Illustration C).

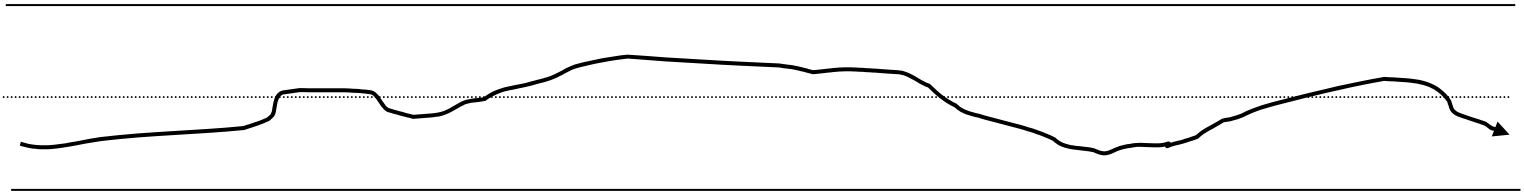


Illustration C

Only if an imperfection is found would you then push reset to verify whether the size of the imperfection breaks the criteria (Illustration D).

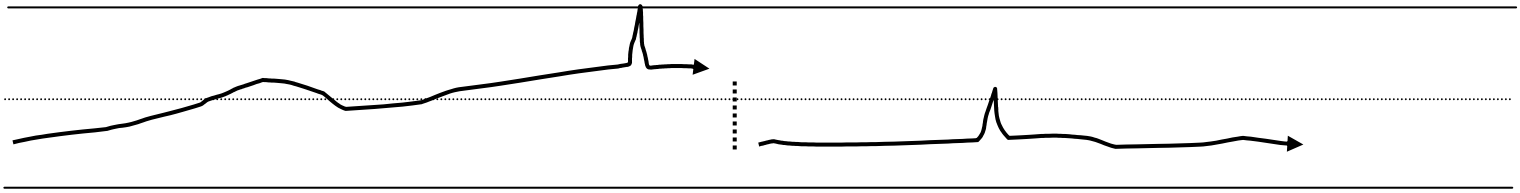


Illustration D

If the unit is too sensitive the imperfection may cause the trace line to go all the way to the top of the screen. A partial thread (valley) may show this type of signal. A crack is determined by the distance the probe sensor travels (1/8 inch or less) not the size of the spike (Illustration E).

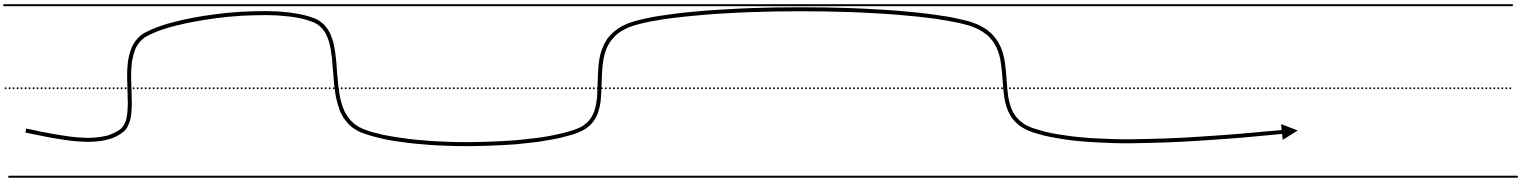
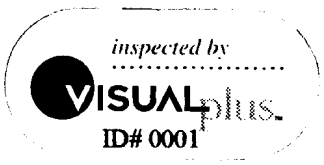


Illustration E

Visual Plus stickers.

500 Visual Plus stickers are sent with each unit. These stickers are to help each dive store identify that a Visual Plus electronic inspection was included when the annual visual inspection was performed. AIT will supply dive stores with additional stickers if needed at a nominal cost to the dive store. It is recommended, that once a dive store has depleted their supply of annual visual inspection stickers and they are ready to reorder, they can have their sticker manufacturer call AIT for a special ID number. This number, together with the Visual Plus sticker, should then be incorporated into the dive stores annual visual inspection sticker.
Please do not alter the Visual Plus sticker in any way as other dive stores are looking for this symbol. It will be okay to add an extra line indicating whether a Visual Plus inspection was performed or not.

e.g.



Lindycal Decals, a sticker company in Florida, have been granted permission to reproduce the Visual Plus sticker and add the ID number. If you use any other decal company for your stickers we will grant them permission and forward the ID number upon their request. If you wish to continue to use the separate Visual Plus sticker please contact AIT to reorder.

Why does my Visual Plus sticker not stick?

The Visual Plus sticker sticks very well to the store annual sticker if the surface is clear from grease and paper dust. Prepare the surface first.

What do I do if I have a cylinder that should be condemned?

If you find a cylinder with a crack in the neck/shoulder or a fold that propogates through two or more threads you need to condemn the cylinder. Explain to the customer that your inspection found a cylinder that should be returned to the manufacturer. You can either have the customer return the cylinder or offer to return the cylinder for them remembering to get shipping costs from them.

If on the return of the cylinder to the manufacturer the cylinder is indeed condemned.

Luxfer Cylinders:	Contact Luxfer customer service department @ 909-684-5110 for the RG (return goods) number.
Walter Kiddie Scuba Cylinders:	Contact Luxfer customer service department @ 909-684-5110 for the RG (return goods) number.
Catalina Cylinders:	714-890-0999