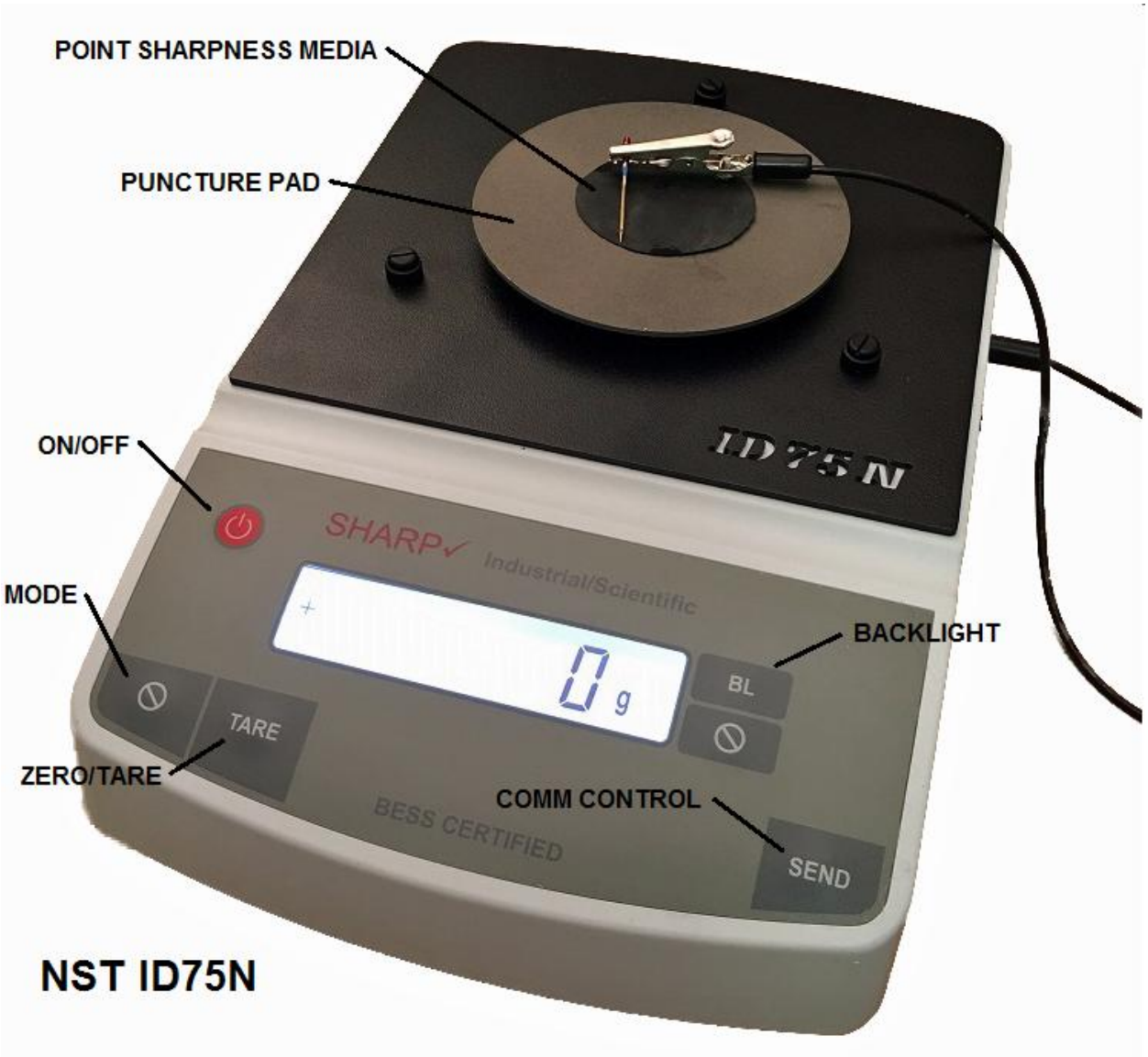
Operating Manual For The
NST ID75N

Manufactured by edge-on-up



Thank you for purchasing an NST ID75N. Your ID75N is a multipurpose instrument built on the same hardware and software frame as our popular ID75A Industrial edge sharpness tester. The ID75N is amazingly simple and fast to operate as well as versatile.

The ID75N operates in two primary modes , Needle Sharpness Test(NST) and Insertion Force Test (IFT). These two basic testing formats differ in that with NST we are asking only how sharp the point of the needle is without regard for needle geometry and with IFT we are asking how sharp the needle is *with* regard for needle geometry. There are two sub-sets to these tests in that either; (1) A BESSU-NST Certified test pad is used to collect the data (NST or IFT) or (2), a test material of the users choosing is used for test purposes (NST or IFT). In a nutshell, users will be generally interested in answering one and/or two questions; (1) How sharp is a needle or, (2) how resistant to puncture is a particular material? Your ID75N is capable of answering both of these questions within the maximum limits of its specifications.

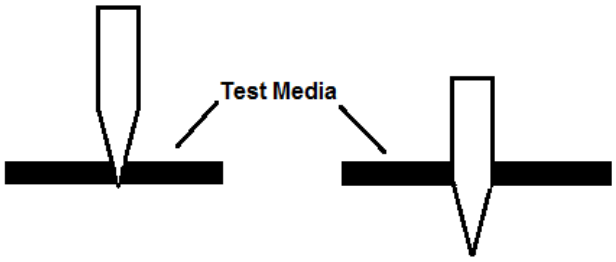


Figure 1 - NST

Figure 2 - IFT

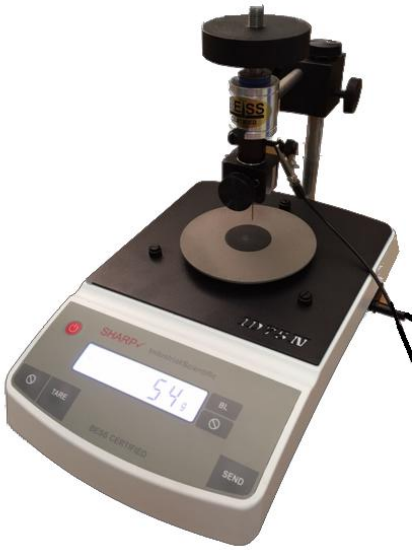
Only the NST test method applied in conjunction with BESSU-NST Certified test pads are supported by the BESSU-NST Universal Needle Sharpness Scale (UNSS).Use of all other test methods and test materials are valid only for relative or comparative purposes. Purchase of your Edge On Up ID75N gives you automatic license to log or disseminate UNSS numbers for intra-company reference or freely communicated to others outside your organization for discussion or non-commercial informational purposes. Reprinting of UNSS scores for marketing or sales purposes must be conducted under license from BESS Universal (BESS Partner Program).

Design Principle - The ID75N is designed to accommodate both research and maintenance. Our hand-held and portable operation allows very fast and accurate measurements to be taken on the factory floor. With the addition of mechanical fixtures extremely accurate research may be conducted on both needles and materials.

Principle of Operation - In the BESSU- NST mode your ID75N senses that an electrical connection has been made between the metallic needle and the sensor plate of your ID75N. The needle must be conductive (or made conductive via conductive coating) and the spring clip connection must have a good conductive path (directly or indirectly) to the needle. When this electrical connection is sensed an audible alarm is triggered. Only the slightest protrusion (microns) through the test media by the needle is required to trigger the alarm. Under most test conditions you must immediately stop exerting downward force in order to receive the most accurate reading. The number of grams of force required to penetrate the test media will be locked on the display. Under other test conditions (i.e. some multi-layer tests or penetration tests) you may not want to stop exerting force until your test force requirements have been met. In any case, if force continues to be exerted and electrical contact is maintained, your ID75N will continue to log any increases in force and the alarm will continue to sound.

Under normal test circumstances and with typical steel needles this method is totally non-destructive to the needle point with no loss in sharpness.

Your ID75N in conjunction with BESSU-NST test pads is capable of amazing accuracy and repeatability. The most repeatable data will be taken when the instrument is used in conjunction with a test fixture such as the one pictured below. Edge On Up does not manufacture for sale mechanical test fixtures.



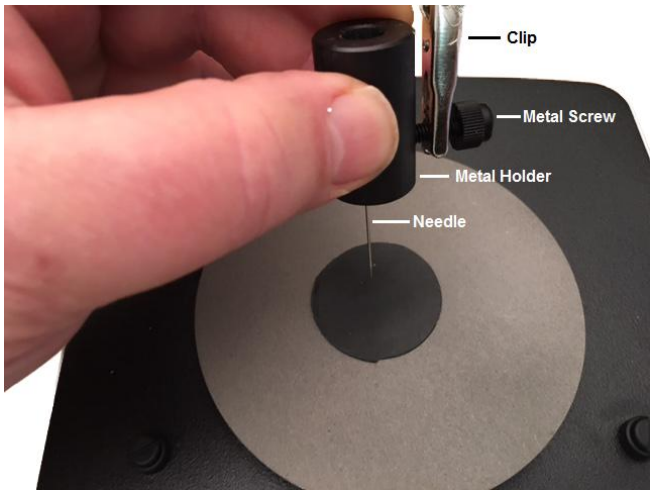
Mechanical fixtures can eliminate much of the "human factor" from the test process but the advantages are usually marginal in terms of final readings for common needles . Carefully taken hand held tests will generally yield final results that are 3 - 8 grams higher than mechanically assisted readings. For most applications this is a negligible difference.

Mechanical test fixtures *are* recommended for tests where more than 500 grams of force will be applied. This condition will apply usually during puncture resistance testing because most common needles fall well below this resistance level.

Consideration for good safety practices should always rule when conducting needle sharpness or puncture resistance testing. Even 200 grams of force applied to a sharp needle could produce a serious injury.

Performing a NST Needle Sharpness Test - The UNSS encompasses needle sharpness values from 1 - 3000 grams (6.6 lbs.) of force. Most common needles (sewing, medical, laboratory, utility) will be found in a range from 15 - 500 grams. Of course, the lower the score, the sharper the point. As an example, a standard push pin of the type used to pin papers to a bulletin board or wall will measure from 400-500 on the UNSS and an acupuncture needle 25. A "sharps" sewing needle may measure 70 with one manufacturer and 220 (a vast difference) with another. Needles used for industrial purposes may measure 500 - 1000 or even higher depending on the application.

As mentioned earlier, needles that measure under 500 are usually held in the provided alligator clamp fairly easily while those that measure more may require either a mechanical fixture or, at the least, a mechanical holder for the needle like the one shown below.



Conductivity is maintained because the clip is attached to the metal screw which is in secure contact with both the needle and the body of the metal holder. The body of the metal holder provides a safe and secure means of controlling the needle. If you do not require a mechanical fixture or holder then simply attach the clip directly to the needle and use the clip as a handle. You may need to "pinch" the jaws of the clip together to avoid slippage of the needle.

Place your ID75N on a solid and level surface and power the instrument up by pressing ON/Off. Allow the instrument to boot-up and auto calibrate. Turn on the back light if desired. Once you see "0" grams displayed you are ready to measure.

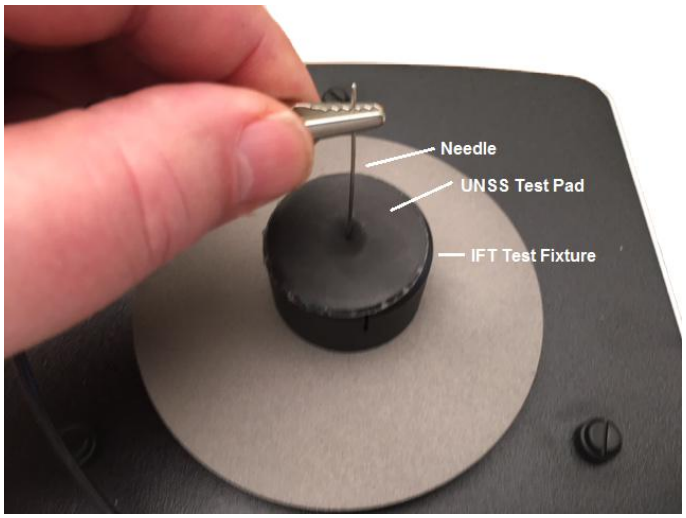
After Placing the 1.5" Diameter Test Pad at or near the center of the puncture pad press "Tare" to "zero" the unit if necessary. Hold the needle vertical on X and Y axis and slowly press down until you hear the alarm sound. Immediately stop applying downward force. The number shown on your instrument display will be your UNSS score.

Test Pad Replacement - In theory, hundreds of tests could be conducted with a single Test Pad. In practice, perhaps fifty. It is all a matter of how you choose to manage the surface of the Test Pad. The only error that can be made in this regard is if you attempt to take two tests in the same, exact location. You'll recognize the error immediately because the test result will be an inordinately low reading.

Any number of additional experiments may be conducted because the instrument "stays live" even after the alarm has sounded. Many of these experiments may be facilitated by wrapping subsequent media layers in aluminum foil or other thin conductive materials.

Performing an IFT Test Using a BESSU-NST Test Pad - The same Test Pad used for NST testing is used for this test but the results are not valid UNSS scores. These results may only be used for internal standards or the comparison of the puncture force required by one needle versus another.

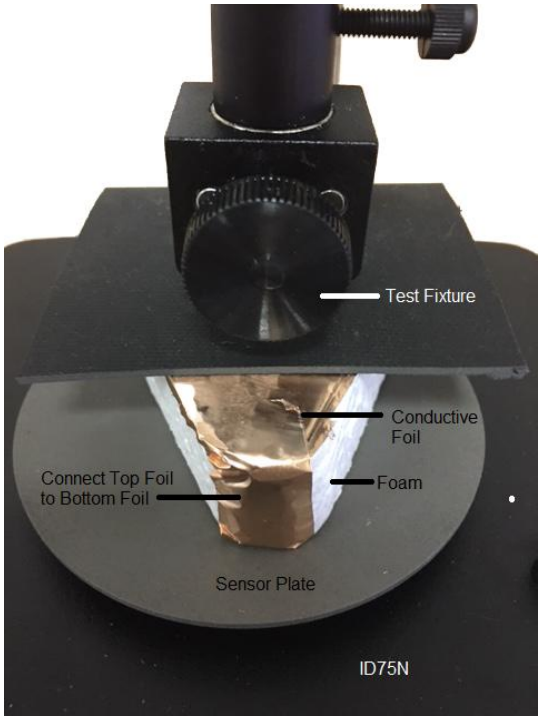
The IFT Test Fixture is 1.5" in diameter and has a .375" diameter hole in the center. The top of the fixture is covered with a durable two-faced adhesive film. Peel the top layer of paper off and affix a UNSS Test Pad to the fixture.



Follow the same procedure in readying the instrument to take a measurement as for a NST measurement. Place the needle point in the center of the IFT fixture and apply downward pressure until the entire shaft of the needle has penetrated the Test Pad. The reading shown on the display will be your IFT score. Usually more than one test may be conducted with a single Test Pad but the number will be dependent on both needle size and sharpness. When ready to replace the old Test Pad simply peel the old pad off and affix the new. A spare adhesive circle is included with every new ID75N.

IFT readings when using BESSU-NST (UNSS) Test Pads are particularly valid when testing very sharp needles. These tests will indicate just what you think they should. The IFT readings are higher than the NST readings. As needle sharpness declines however these two readings amy merge and then cross because the Test Pads are subject to stress at higher force levels with the IFT test fixture set-up. When comparing one needle to another the readings for duller needles are still valid, just not as intuitive. Feel free to experiment with other reproducible test materials when conducting this test.

IFT Modified TEST or "Stepped Test" - There is yet one additional test that may be conducted with the ID75N and that is an abbreviated IFT test. While NST tests will yield minimum puncture results and IFT tests will yield maximum puncture results many customers need more detailed data. These tests are usually conducted on containment vessels or bladders designed to prevent or slow leak rates due to puncture. In many of these tests it is useful to know the rate of liquid or gas loss as a function of puncture size. Of course the dimensions of a hole made in a resilient material due to puncture is difficult or impossible to measure. Puncture hole size may be accurately estimated though by the application of additional force once the NST minimum has been exceeded during a test procedure. The performance of these tests will always require a conductive layer of appropriate thickness that offers little resistance to puncture. During the test the tester is notified by the ID75N alarm once the test material has been minimally punctured. Additional force is then applied to a predetermined level. Once the test material has been prepared in this manner , suitable and additional leak rate testing is conducted.



In the picture at left we have an example of a "Stepped Test" being conducted. The insertion layer is composed of 1lb. Styrofoam with a very thin layer of copper foil plating both top and bottom. When the small piece of conductive foil is adhered to both top and bottom plates a clear path of conductivity is established from the ID75N sensor plate to the puncture tool.

Once the puncture tool penetrates the test material and contacts the top layer of foil the alarm will sound indicating the beginning of the procedure. Force will be continued to be supplied until the desired force level has been met. Puncture tools must be used or designed in accordance with the thickness of the material to be tested and with respect for the range of hole sizes to be produced. Insertion layers must be thick enough only to accommodate the desired insertion depth.