S-5! Tensile Pull Test (Load parallel to panel seam)

Machine: Universal or tensile testing machine, having a test bed of at least 14 in. sq., and travel of not less than 30″; capacity of 6,000 pounds or greater; speed of .25 inch per minute.

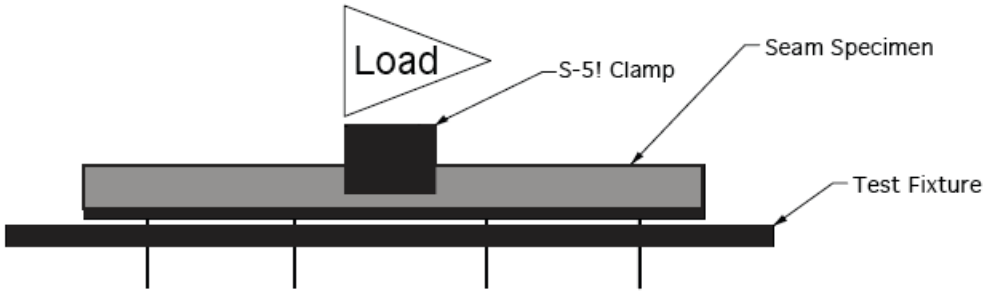
Apparatus: The apparatus consists of 1/8″ steel plate measuring approximately 14″ x 30″. The plate is reinforced as necessary with angle, tube or channel to prevent its buckling, warping or twisting when under tension loads parallel but offset from its surface. The apparatus is securely anchored to the test table along the 14″ dimension, and sufficiently braced to the table to prevent excessive deflection during the test.

Specimen: The test specimen shall consist of a section of a typical panel seam of the desired panel material as reported on the “Specimen Information Section,” which is 30″ (nominal) in length to conduct tensile pulls with different clamp locations along the panel seam. The total width of the specimen is at least 10″ and not more than 16″. The seam is to be mated as prescribed by its manufacturer or user in a normal installation, exclusive of any attachment clips. If the joint is normally machine seamed on site, the provider furnishes same in a seamed condition, using the same type seaming machinery, methods, tools, equipment, etc. as would be used in actual field assemblies.

Setup: Attach the specimen to the apparatus using #12 or #14 self-drilling screws along and adjacent to the panel seam in sufficient quantity and spacing so as to prevent failure of the panels’ attachment to the apparatus during the test.

In the case of a specimen having a finished seam oriented in the vertical position, the clamp is fitted to the seam so that the setscrews push the seam material into a position such that the protrusion at the bottom of the clamp “throat” engages the base portion of the rolled side of the seam. For seams not having a “rolled” seam, the orientation of the clamp is not critical. In the case of a specimen having a finished seam in the horizontal position, the S-5! clamp(s) are attached to the seam so that the setscrews are above the seam and accessible for tightening.

Three S-5! clamps may be tested on the same panel specimen. Place clamps on the panel seam, evenly spaced from each other, and so that the end of the lower clamp on the specimen (most leeward from load) is a minimum of 6″ from the lower end of the specimen. The setscrews of the clamps are tensioned to the stated tension using a torque-indicating wrench. Unless other specific instruction is given, tighten and verify all clamp setscrews to indicated tension. Sequentially retighten setscrews if necessary as panel seam material compresses during clamp installation. Mark the location of the clamp(s) on the panel seam so that any differential movement between seam and clamp can be monitored.



Procedure
Securely fasten the load cell arms to the hole(s) through the S-5! clamp using appropriate bolt size. Beginning at the lowest clamp (closest to test bed), load each clamp with upward pull at .25 inch per minute (parallel to seam) until failure*. Photograph the specimen after testing.
Reporting
Record the tensile value in pounds and Newtons at the failure* point along with the failure* mode for each S-5! clamp tested. Calculate and record average ultimate load. Note any unusual observations of the specimen during testing, as well as a verbal description of the specific failure* observed if it is other than type “A” or “B.” Record the date of test, date of report, name of lab, name of technician and execute the completed data sheet.
***Failure**
For the purpose of this test, any of the following occurrences shall be considered “failure”:
A. Disengagement of clamp from panel seam
B. Clamp displacement of a distance of more than 8 millimeters (.315″)
C. Breakage or fracturing of clamp or fasteners
D. Strippage of the clamp setscrews
E. Fracturing of any area of panel seam
F. Buckling or any other structural or severe cosmetic damage to panel seam

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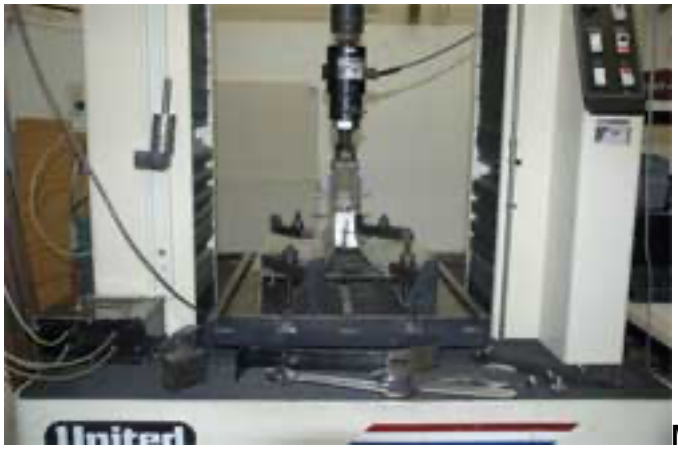
S-5! Tensile Pull Test (Load normal to panel seam)

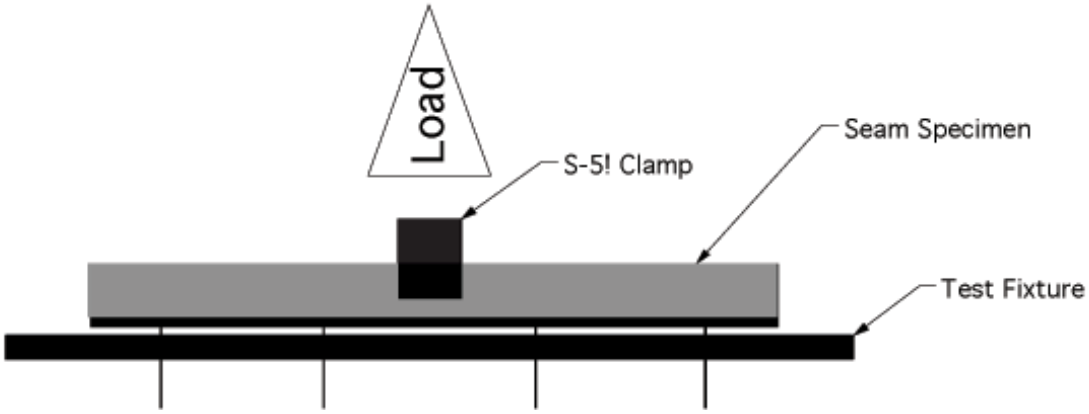


Machine: Universal or tensile testing machine having a test bed of at least 14 in. sq. and travel of not less than 12”; capacity of 6,000 pounds or greater; speed of .25 inch per minute.
Apparatus: The apparatus consists of 1/8” steel plate measuring approximately 12’ x 12”. The plate is reinforced as necessary with angle, tube or channel to prevent its buckling, warping or twisting

when under tension loads perpendicular to its surface. The apparatus is securely anchored to the test table to prevent deflection or movement during the test.

Specimen: The test specimen shall consist of a section of the typical panel seam of the desired panel material as reported on the “Specimen Information Section”, which is 8” minimum width and a maximum of 12” in length (measured parallel to seam) to conduct tensile pull with one clamp mounted in the approximate center of the seam specimen. The seam is to be mated as prescribed by its manufacturer or user in a normal installation, exclusive of any attachment clips. If the joint is normally machined seamed on site, the provider furnishes same in a seamed condition, using the same type seaming machinery, methods, tools, equipment, etc. as would be used in actual field assemblies.

Setup: Attach the specimen to the apparatus using #12 or #14 self-drilling screws and large washers along and adjacent to the panel seam in sufficient quantity and spacing so as to prevent failure of the panels’ attachment to the apparatus during the test.



For machine rolled seams, the clamp is fitted to the seam so that the setscrews push the seam material into a position such that the protrusion at the bottom of the clamp “throat” engages the base portion of the rolled side of the seam. For seams not having a “rolled” seam, the orientation of the clamp is not critical. In the case of a specimen having a finished seam in the horizontal position with a horizontal projection measuring 11/16” or more, the S-5-U clamp(s) are attached to the seam so that the setscrews are above the seam and accessible for tightening.

The clamp is placed on the seam at the approximate center of the panel. The setscrew(s) of the clamp is tensioned to the stated tension using a torque-indicating wrench. Unless other specific instruction is given, tighten and verify all clamp setscrews to indicated tension on test report form. Sequentially re-tighten setscrew if necessary as panel seam material compresses during clamp installation.

Procedure

Photograph the specimen and apparatus prior to testing. Securely fasten the load cell arm(s) to the

mounting hole(s) in the S-5 clamp with appropriate bolt size. Load clamp with upward pull at .25 inch per minute until failure*. Photograph the specimen after testing.
Reporting: Record the tensile value in pounds and Newtons at failure* along with the failure* mode for S-5 clamp tested. Note any unusual observations of the specimen during testing, as well as a verbal description of the specific failure*. Record the clamp model, date of test, date of report, name of lab, name of technician, and execute the completed data sheet. Repeat test protocol 3 times and report average ultimate load.
***Failure:** For purposes of this test, any of the following are considered “failure”:
A. Separation of the clamp from the seam
B. Breakage of any part of the clamp
C. Tearing or otherwise yielding of the seam
D. Any other yielding of clamp-to-seam connection

S-5!® Tensile Pull Test (Load parallel to mounting surface of S-5! bracket)

Machine: Universal or tensile testing machine, having a test bed of at least 24 in. sq., and travel of not less than 36″; capacity of 6,000 pounds or greater; speed between .2 and .25 inch per minute.
Apparatus: The apparatus consists of 1/8″ steel plate measuring approximately 16″ x 30″. The plate is reinforced as necessary with angle, tube or channel to prevent its buckling, warping or twisting when under tension loads parallel but offset from its surface. The apparatus is securely anchored to the test table along the 16″ dimension, and sufficiently braced to the table to prevent excessive deflection during the test.
Specimen: Test specimens may consist of panel sheeting only, or of panel sheeting together with substrate.
Panel Sheeting Only: The test specimen shall be a simple, composite assembly consisting of a section of the desired metal panel material, 30″ (+-) in length. The total width of the specimen is at least 6″ and not more than 16″.
Panel Sheeting and Substrate: The test specimen shall be a simple, composite assembly consisting of a section of the desired metal panel material, 30″ (+-) in length, together with desired substrate material of the same length. The total width of the specimen is at least 6″ and not more than 16″.
Brackets to be tested are spaced at approximately equal intervals on the 30” specimen length to enable a total of three tensile pulls.
Setup: Attach the specimen to the apparatus using bolts and nuts along top and bottom of the specimen sufficient in quantity and spacing so as to prevent failure of the specimen’s attachment to the apparatus during the test. A total of three S-5 brackets are placed on the substrate and evenly spaced from each other and the ends of the specimen. Fasten bracket to substrate using fastener as specified for use in given substrate material. Note the fastener type and description on the test report form.
Procedure: Photograph the specimen and apparatus prior to testing. Securely fasten the load cell arms to the S-5 bracket using bolts as appropriate. Beginning at the lowest bracket (closest to test bed), load each bracket with upward force (parallel to substrate) at a rate of travel between .20 and .25 inch per minute until failure*. Photograph the specimen after testing.
Reporting: Record the tensile load in pounds at the failure* point along with the failure mode for each S-5 bracket tested. Calculate and record “average” values. Note any unusual observations of the specimen during testing, as well as a verbal description of the specific failure if other than a listed failure mode (below). Record the date of test, date of report, name of lab, name of technician, and execute the completed data sheet.

***Failure:** For the purpose of this test, any of the following occurrences shall be considered “failure”:
A. Bracket rotated more than 20 degrees
B. Yielding of bracket-to-substrate connection
C. Visible, permanent deformation of the bracket, including bending or tearing
D. Buckling or any other structural or severe cosmetic damage to panel seam
For a copy of a lab test report, please have the engineer of record contact Technical Support.

S-5!® Tensile Pull Test (Load normal to mounting surface of S-5 bracket)

Machine: Universal or tensile testing machine, having a test bed of at least 24 in. sq., and travel of not less than 36″; capacity of 6,000 pounds or greater; speed between .2 and .25 inch per minute.
Apparatus: The apparatus consists of 1/8″ steel plate measuring approximately 12″ x 12″. The plate is reinforced as necessary with angle, tube or channel to prevent its buckling, warping or twisting when under tension loads perpendicular to its surface. The apparatus is securely anchored to the test table to prevent excessive deflection during the test.
Specimen: Test specimens may consist of panel sheeting only, or of panel sheeting together with substrate.
Panel Sheeting Only: The test specimen shall be a simple assembly consisting of a section of the desired metal panel material, 12″ (+-) in length. The total width of the specimen is at least 6″ and not more than 16″.
Panel Sheeting and Substrate: The test specimen shall be a simple assembly consisting of a section of the desired metal panel material, 12″ (+-) in length, together with desired substrate material of the same length. The total width of the specimen is at least 6″ and not more than 16″. Brackets to be tested are mounted center to the specimen.
Setup: Attach the specimen to the apparatus using bolts and nuts, or screws along top and bottom of the specimen sufficient in quantity and spacing so as to prevent failure of the specimen’s attachment to the apparatus during the test.
The S-5 bracket is placed center to the substrate. Fasten bracket to the substrate using fastener as specified for use in given substrate material. Note the fastener type and description on the test report form. Repeat process on three separate specimens.
Procedure: Photograph the specimen and apparatus prior to testing. Securely fasten the load cell arms to the S-5 bracket using bolts as appropriate. Beginning at the lowest bracket (closest to test bed), load each bracket with upward force (parallel to substrate) at a rate of travel between .20 and .25 inch per minute until failure*. Photograph the specimen after testing.
Reporting: Record the tensile load in pounds at the failure* point along with the failure mode for each S-5 bracket tested. Calculate and record “average” values. Note any unusual observations of the specimen during testing, as well as a verbal description of the specific failure if other than a listed failure mode (below). Record the date of test, date of report, name o flab, name of technician, and execute the completed data sheet.
***Failure:** For the purpose of this test, any of the following occurrences shall be considered “failure”:
A. Mounting bolt strips from bracket
B. Yielding of bracket-to-substrate connection
C. Visible, permanent deformation of the bracket, including bending or tearing
D. Fastener holding bracket in place pulls out 1 or more threads
E. Bracket migrates a distance of 8 or more millimeters
For a copy of a lab test report, please have the engineer of record contact Technical Support.