

## **IAGI Seam Study Results**

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Several years ago the International Association of Geosynthetic Installers (IAGI) launched a program of reduced-cost destructive seam testing for its membership. Member testing laboratories contracted to do peel and shear tests for IAGI members at significantly reduced pricing. Part of the contract terms included the collection of information to determine the causes of peel failure.

We would like to report the results of testing to date which collected and noted the causes of failure in peel, using magnified specimen observation if needed. The sample set is not as large as hoped for because in many cases sufficient information was not noted. Nevertheless, the data is significant, advancing the understanding about the causes of peel failure from heat seaming.

The data effectively corroborates what our industry has for long unofficially declared to be true based on the intuition and informal surveys of field installation and laboratory personnel. The highest number of peel failures is due to dirt in the seam area. Insufficient heat penetration from too fast welding or too cold welding temperatures are another very large contributor to peel failure.

For the data collected in the Table, seams were passed or failed based on the particular project specifications called for, since the primary purpose of the testing was project related. Some seams would have failed certain specifications but since they passed the particular project specification for which they were submitted they were counted as passing and not as failing. Overall failure percentage was good and very much in line with general expectations of < 5% failure rates.

The results beg the question, which has been asked for a long time now. Why are we still cutting so many holes in seams? With improvements in welding technology and more consistency with modern hot wedge welders (as opposed to the predominant extrusion welding of the mid-1980's) and understanding where the failures are coming from, couldn't we do better by emphasizing preventive care in place of cutting destructs in the seaming? Couldn't we make more use of non-destructive test methods (eg, air pressure, and electrical leak testing) instead of spending so much money on destructive testing? Air pressure can even provide a measure of seam strength and degree of fusion. Couldn't destructive testing be relegated to test samples only at the ends of panels? Isn't it past time to start thinking outside the box?

The IAGI data is summarized as follows:

**Reasons for Failure in Destructive Heat Seam Testing of Field Seams  
per ASTM D 4437**

(peel failures assessed according to project specification criteria, usually non-FTB and minimum strength, or minimum %peel separation and minimum strength)

<b>Parameter</b>	<b>Number</b>
Total Number of Seam Samples Assessed	1952
HDPE	823
LLDPE	584
PVC, R-PVC	467
PPE, R-PPE	78
Total No. of IAGI Members Represented	16
Total No. of Different Welding Equipment Represented	6, (with many more combinations of parts)
Total No. of Failures	61
Moisture Related Failures	5
Dirt Related Failures	28
Heat Penetration Related Failures	27
Undetermined Combination of Causes	1
Overall Failure Percentage	3.12 %
Moisture Failure Percentage	0.26%
Dirt Failure Percentage	1.43%
Heat Penetration Failure Percentage	1.38%
Undetermined Combination Failure Percentage	0.05%