

# GIPSA Backgrounder

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## STRESS CRACK ANALYSIS

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**INTRODUCTION:** Stress cracks are an undesirable physical attribute in corn. Stress cracks in corn are internal narrow cracks in the endosperm of the kernel. Typically, stress cracks are induced by excessive heat during drying. Kernels of corn having stress cracks are more susceptible to breakage and quality degradation during handling and also indicate potential processing problems to corn millers.

**BACKGROUND:** Knowing the levels of stress cracks in corn is important to corn wet millers because stress cracks directly affect the wet milling process. High-temperature drying, which results in an increased incidence of stress cracks, affects the millers' ability to separate the starch and protein fractions of the corn kernel. Therefore, stress cracks generally indicate a negative effect on starch yield and total oil recovery.

Dry millers are also concerned with processing corn with stress cracks because stressed corn affects the grit's ability to withstand mechanical force without breaking. Kernels of corn with stress cracks generally result in a reduced yield of large flaking grits - a primary product.

Stress cracks are also important to grain handlers and the feed industry because corn is more susceptible to breakage during handling when stress cracks are present. This breakage could result in additional grain losses and increased storage risk due to cracked corn's vulnerability to microorganisms and insect infestations. Cracked corn can also contribute to increased elevator dust, and, thus, negatively impact elevator safety and the environment.

**GIPSA'S ROLE IN STRESS CRACK ANALYSIS:** The USDA Grain Inspection, Packers and Stockyards Administration, Federal Grain Inspection Service (FGIS) adopted the stress crack analysis method as an official service on January 1, 1996.

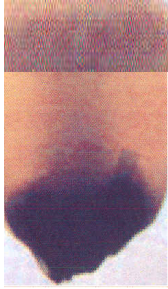
**TESTING METHODS:** The test involves a visual inspection of whole corn kernels on a backlit lightboard. The "candling" inspection process transmits light through the kernel, which makes the internal narrow cracks in the endosperm visible for detection.

Kernels are separated into two basic categories during the analysis:

- ❖ no stress cracks or
- ❖ stress cracked

**RESULTS:** The total percentage of stress-cracked kernels is reported based on the analysis. Upon request, the analysis will separate and report stress-cracked kernels in three different categories:

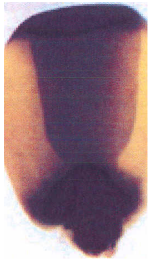
- ❖ single crack
- ❖ double cracks, and
- ❖ multiple cracks.



None



Single



Double



Multiple

*(Photographs provided by the Illinois Crop Improvement Association, Identity Preserved Grain Laboratory, Champaign, Illinois)*

**CONTACT:** For more information about the availability of stress crack analysis contact your local FGIS field office.

<b><u>Field Office</u></b>	<b><u>Telephone</u></b>	<b><u>Fax</u></b>
Cedar Rapids	319-841-9210	319-841-9213
Grand Forks	701-772-3371	701-772-0362
League City	281-338-2787	281-338-2788
Minneapolis	952-895-0037	952-895-6090
New Orleans	985-764-2324	985-764-0732
Portland	503-326-7887	503-326-7896
Stuttgart	870-673-2508	870-673-2500
Toledo	419-259-6276	419-259-7464
Washington	360-753-9072	360-586-5257
Wichita	316-722-6370	316-722-1780

For additional information about the official United States grain standards or official grain inspection services; contact:

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