

Title            Effect of Tempering Shelled Yellow Corn on Single Kernel Moisture Content and Stress Cracks  
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### **Abstract**

The need to improve grain quality has become even more important as competition around the world increases and energy costs rise. The objectives of this paper were to determine whether (1) a correlation could be found between single kernel moisture content and quantity and severity of stress cracks, (2) tempering reduced the viscoelastic stresses enough to decrease the occurrence of stress cracks during drying, and (3) a correlation could be found between single kernel moisture variability and the tempering time. A square insulated tempering bin was used for eight tempering tests during the harvest seasons of 2003 and 2004 using shelled yellow corn. The grain entered the tempering bin at temperatures ranging from 43.2 to 55.2°C and a tempering time range from two to twelve hours. 25-200 kernels were removed from the tempering bin and tested immediately after the tempering bin was filled, each hour during the tempering time for up to six hours and before emptying the tempering bin. The results indicated that tempering reduced stress cracks up to 100% and moisture variability by 14.8 to 73%. The results also indicated that grain exiting the dryer at a moisture content of 14.3% had up to 36% cracked kernels whereas grain at 15.9% produced only 4% cracked kernels. The stress cracks and moisture variability were reduced continually during tempering until the bin was emptied, but the greatest benefit was observed during the first four hours. Thus, tempering corn at 9.3-28.3% MC and 43.2-55.2°C for as little as four hours can substantially increase the overall grain quality during the drying process. The results indicate that tempering reduced both moisture variability and stress cracks throughout the grain bed.