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TECHNICAL INFORMATION

Char Depth Gauge

Catalog No. CG1000

INTRODUCTION

The physical burning of wood is a chemical process. When wood is exposed to high temperatures, the process of pyrolysis (chemical change due to heat) begins. Certain components of wood are converted into flammable gases or vapors, and when combined with oxygen, the resultant oxidation of these gases produces a visible flame.

The by-products of the burning wood are water (in the form of steam) and the resulting char or charcoal is basically the element carbon. This carbon burns with an even greater heat than the basic components of the wood.

Obviously, if carbon or charcoal continues to burn for a long period of time or if an accelerant such as gasoline was introduced, the depth of charring will be more significant.

The purpose of the Char Depth Gauge is to determine just how deep the charring actually is. This measurement will aid in determining several important factors relating

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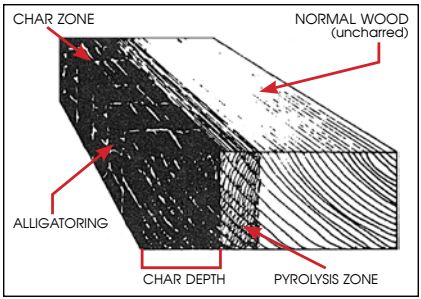


to the origin of the fire. For example, if a large portion of an exposed hardwood floor is charred, taking char depth readings at various points will indicated which area burned the longest or fastest. Drastically different readings within a small area may indicate that an accelerant was spread across the surface.

The wood products used in building construction produce alligatoring of the charred surface because a slow-burning fire produces a uniform, somewhat flat alligatoring while a fast-burning fire produces irregular, heavy, shiny alligatoring (Figure 1). The depth of these cracks or fissures is not a general indicator of the total char depth but should be measured and recorded nonetheless. For a more accurate determination, cut out samples from different locations and submit them to the laboratory.

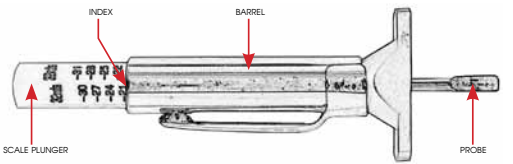
FIGURE 1—Alligatoring from slow burning fire (left) and fast burning fire (right).

PROCEDURE

1. To measure char depth, press the gauge against the alligatored surface with the probe fully retracted.
2. Holding the gauge firmly in place with one hand, slowly depress the scale plunger with the other hand.

   The probe will stop penetrating when solid wood or obstruction is reached. Avoid extreme pressure and do not force the probe farther when resistance is reached as this may damage the probe.

3. The char depth reading is the number which lines up with the index (top of barrel). The printed black line directly under the number should be fully visible for the most accurate reading.
4. The numbers on the scale plunger are calibrated in 1/32" increments. A reading of 15 indicates the depth of charring at 15/32". If the measurement results in an even number (2, 4, 6, 8, etc.), reduce the fraction by dividing it by 2 until the fraction cannot be reduced further. The resulting fraction will end up with an odd number on top as illustrated below:
   a. 6/32" divided by 2 = 3/16"
   b. 12/32" divided by 2 = 6/16" divided by 2 = 3/8"
5. Care must be taken to protect the Char Depth Gauge probe. DO NOT attempt to re-sharpen the tip—this will shorten the probe and result in inaccurate readings. When not in use, keep the probe retracted.



Heavy alligatoring is indicative of intese burning. *—Photo courtesy of Franklin County (NC) Crime Scene Unit.*

NOTE: Take several readings within a small area since the probe may strike a nail or wood knot on the first attempt. All readings within a few measurements of one another should be reasonably close.

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