TECHNICAL ADVISORY BULLETIN

To: GAF Commercial Sales, GAF Contractors, GAF Field Services

From: Technical Services Department

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Subject: Test Welding Thermoplastic Membranes

When Should Test Welds Be Performed?

Test welds should be performed at the **beginning of every work period, including...**

- Just before welding in the **morning**
- Upon returning from lunch in the **afternoon**
- Whenever there has been a **significant change in weather** (e.g., air temperature, wind speed, cloud cover, etc.)

Setting up the hot air robotic welder correctly is key to having a properly installed roof. Performing test welds is one of the most important steps to insure that you are obtaining a properly welded roof. Making appropriate adjustments before you begin the final welding process ensures that the correct combinations are achieved.

What Is the Test Weld Procedure?

GAF recommends the following **test weld procedure…**

- Take 2 pieces of "bag fresh" EverGuard® membrane approximately 18" (457 mm) long.
- Set your automatic welder's speed and heat.
  - For full size welders, such as the BAK LarOn, GAF suggests starting at the following settings:
    - Temperature between 800˚F (427˚C) and 1,148˚F (620˚C)
    - Speed 10-16 feet (3.05-4.88 m) per minute.
    - NOTE: New equipment may run faster and hotter.
  - For an initial setting, use the speed formula below as a general guideline:
    - **Speed Formula:** (ambient temperature/10) + 2 = FPM (Feet Per Minute)
    - **Example Scenario:** Ambient temperate is 80˚F (27˚C). So, (80/10) +2 = 10 FMP. Start out by setting the speed at 10 FPM and the temperature at 600°F (315˚C) degrees and do a test weld. Bump temperature up 100°F (38˚C) to 700°F (371˚C) keeping same 10 FPM. Perform another test weld. Continue doing this in 100°F (38˚C) degree increments keeping speed the same until machine is maxed out [typically 1,148˚F (620˚C)] and find the weld window. Set up the machine in the middle of the weld window.
  - ***Note:*** *Remember, settings required for a good weld will change based on equipment type, weather conditions, membrane thickness and type. PVC membrane settings tend to run hotter and faster.*
- Weld the 18" (457 mm) pieces together and then allow the membrane to cool for at least 10 minutes.
- Cut 1" (25 mm) wide strips across the welded material.
- The welds are tested by application of pressure causing the seam to peel apart.

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How Can I Determine What An Acceptable Weld Is?

For an acceptable weld, **a "film tearing bond" is required…**

- An **acceptable weld** (Fig. 1) will:
  - Fail by exposing the scrim reinforcement called a "film tearing bond" or "FTB".
  - Be between 1" (25 mm) and 1.5" (38 mm) wide.
- A **partial weld** (Fig. 2) will:
  - Fail by partially separating between the two layers of the membrane.
- An **unacceptable weld** (Fig. 3) will:
  - Fail by separating between the two layers of the membrane.
  - This is also known as a "cold weld" or "false weld".

Fig. 1: Acceptable Weld

Fig. 2: Partial Weld

Fig. 3: Unacceptable Weld

How Do I Make Adjustments To The Hot Air Robotic Welder Settings?

Adjustments to robotic welding equipment is easy. Remember to make only one change at a time **and never change heat and speed together…**

- If you are welding at 1,148˚F (620˚C) and do not get a good weld, do not automatically adjust the speed because the temperature may be too high. Lowering the temperature or increasing speed may be a necessary adjustment.
- If the weld is greater than 1.5" (38 mm), you may have the temperature too high and this could lead to a failed weld over time.
- Having too much weight on the automatic hot-air welder combined with too high of a speed setting can potentially cause wrinkles in the weld area.

Where Can I Get More Information?

GAF Technical Services Can Assist You… with these and other questions you may have regarding your new roof installation. GAF Technical Services can be contacted **at 800-ROOF-411** (800-766-3411). Also, the GAF website is a great resource for just about any question you may have or for additional information you may require. Please visit www.gaf.com to find the latest information on our products and their installation.

Important: This document supersedes any prior GAF Technical Advisory Bulletins on this topic. Please always check www.gaf.com to make sure you have the most up to date information.

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