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Yield Precision

MASTERING SPRAY FOAM YIELD CALCULATIONS

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I've been in the industry since early 2011 and have gained broad experience working with companies from application to equipment manufacturing and chemical houses. My goal is to help build the industry workforces' knowledge of all components of spray foam insulation and to help produce better products.

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SPFA
SPRAY POLYURETHANE FOAM ALLIANCE

SPFA Antitrust Policy

"Our policy is to comply with all federal, state and local laws, including the antitrust laws. It is expected that all company member representatives involved in SPFA activities and SPFA staff will be sensitive to the unique legal issues involving trade associations and, accordingly, will take all measures necessary to comply with U.S. antitrust laws and similar foreign competition laws."

It is a per se violation of the federal antitrust laws for competitors to agree on prices, limitation of supplies, allocation of customers or territory, or boycotts. "Per se" means that no legal defense can be used to mitigate this automatic violation.

Even an agreement by competitors that is for the good of society and our industry may be a violation of the antitrust laws if it could affect competition.

If a topic of antitrust concern is raised at any time during a meeting, note your objection for the record. If the topic continues to be discussed, you should leave the room immediately and contact SPFA's general counsel and your company's attorney for further guidance.

Ensure that every SPFA meeting, where members are present, has an agenda, the agenda is followed, and minutes are kept by SPFA staff of the proceedings.

Understanding and acting on the requirements of U.S. and foreign antitrust and competition laws sometimes can be difficult. If you have a question about the propriety of activities or discussions in SPFA, you are encouraged immediately to contact your company's legal counsel and SPFA management.

What is Yield?

- Yield is the nominal measurement of a given materials, installed coverage in a given unit. Ex. 4500 bdft per set or 45 bdft per gallon
- Typical units of measure are board feet
- A board foot is 12” x 12” x 1”
- The higher the density the lower the bd/ft coverage
- Density is the measurement typically used to categorize the foam

Example (most):

- Open Cell is .5lb per cubic feet, or per 12 bd/ft
- Closed Cell is 2lb per cubic feet, or per 12 bd/ft

What Effects Yield

- Closed cell insulation is commonly 2 lb per cubic foot density.
- Open cell is .5lb
- This designation describes the nominal density when installed in an efficient process.
- Yield is a direct correlation to density
- The density can be greatly affected by the following influences
  - Processing temperature and pressure
  - Substrate temperature, heat sink
  - Humidity
  - Spray technique
  - Gun configuration
  - Distance of gun to substrate

How to Measure Yield

Yield calculations can be done in a number of ways

1. Density check to estimate yield
2. In place yield calculation is how I measure actual coverage of foam for a given situation
   - Area x Thickness x Cycle Factor / Cycles Installed
   - A cycle factor is unique to that series of machine.
     - Cycles per gallon or set for that unit

Example

- Graco E-30 uses 36.75 cycles to spray 1 gallon of foam
- 1 gallon of foam is .5 gal +.5 gal of each component (A+B)
  - Approx 3675 cycles per 100 gal set of foam for E-30

Example of Closed Cell Yield Calc

- An open wall that measures 8’ tall and 10’ long has an area of 80 sq ft
- An E-30 has a cycle factor of 36.75
  - 36.75 cycles per gallon of foam
- Before we start spraying, note cycle count on machine.
- Spray the wall to thickness
- Note finished cycles
- Take multiple depth checks per cavity and calculate an average thickness
  - I recommend at minimum 4 depth checks per cavity, 2 high 2 low
  - Do not use what the ticket says, find the actual average
  - Example 2.25” in a wall that calls for 2” use 2.25”
  - .25” of foam was over sparyed
- 80 sqft x 2.25” x 36.75 cycles per gal / 145 cycles installed = 45.63 bdft/gal foam
  - Let’s assume 100 gals in the set.
  - That’s 4,562 board feet per set
  - If 2” had been used the yield would appear to be 40.55 bdft/gal

What Is True Yield

- A hugely debated topic is the advertised yield statements made by different people within the industry.
- There are 2 types of yield and both are correct.
  - “In-place yield” and “end-of-job yield”
- Manufacturers use **in-place yield** and measure yield by precisely measuring an area, thickness, and cycles installed in an area that is easily measured and controlled
- **End-of-job yield** is what the contractor will see as an average of consumption at the end of a job over the course of time.
- Since every installer and every job has inconsistencies, the manufacturer has to use a more controlled environment.
- This is why there will always be 2 numbers, one of which can only be achieved by spraying multiple jobs to gather an average of coverage

How to Improve and Maintain Yield

To increase yield there are some things that can be addressed:

- Training
- Install correct thickness
- Correct formulation for environment
- Pre-heat environment
- Maintain processing temps and pressure
- Adjust temps for the current area that is being sprayed
- Spray technique
- Correct gun configuration for experience level
- Limit changeovers, which decreases waste material