

Quality Roofing Granules – Features and Benefits

In their simplest form, roofing granules start out as big rocks that get crushed into small rocks which are then color coated. Now – if it was only that simple! Understandably, roofing granules serve performance needs critical to the asphalt shingle industry. But, many of these same attributes also best serve DECRA’s desire to manufacture high quality stone coated **DECRA Metal Roofing** systems.

Roofing granules serve several important functions, including providing roofing panels with vibrant color blends and a desirable surface texture. Roofing granules are manufactured from natural stone. The rock is mined at the quarry then crushed and screened to various sizes from very small particles (0.0167 inches diameter) to the larger particles (0.067 inches). The overall granule blend mixture is a specific distribution of sizes.

This is referred to as the **“particle size distribution”** of the granules, or the **“grade distribution”**. The granules are manufactured in such a way that when applied to and embedded in our DECRA acrylic base coat, the particles fit together to provide the maximum coverage for our roof panel surface.

Colored Granules

Manufacturing colored roofing granules is a process where the stone particles are coated with a combination of pigments similar to paint. The pigment slurry mixture, once applied to the stone, is baked on at high temperatures causing the pigment mixture to coat the stone in a ceramic process. Pigment selection will determine the final appearance and color of the roofing granule.

Multiple color readings, using a spectrophotometer, are performed at different intervals during the manufacturing process. Color fixation tests are also conducted to make certain that the pigmentation has adhered properly to the stone granule – ensuring that the color will remain stable over time. Given the intense solar UV exposure on a roof system, roofing granules must prove to be durable. Other tests are also completed on the colored granules prior to shipment to ensure they meet the manufacturer’s quality standards.

Crush the Right Rock Type

Although particle size distribution and the coloration process are of crucial importance, the selection of the natural stone itself is, in fact, just as important. Several characteristics are critical when analyzing and selecting an appropriate and suitable stone. Several of the key characteristics desired are:

- Hardness
- Opacity to solar ultraviolet light
- Chemical and physical inertness to provide resistance to acid rain and leaching
- Durability to freeze/thaw and wet/dry cycling
- Minimal oxidation and rusting (iron content)
- Low porosity
- Suitability for coating
- Particle shape

Granule Shape

The “**particle shape index**” test was developed to determine the shape of the roofing granules. Roofing granules should be round and cubical – not flat and elongated. Round and cubical granules reduce shading effects on roof panels whereas flat and elongated granules are more prone to exhibiting shading effects on roof panels. Also, cubicle granules provide a higher granule loading on the roof panel coated surface than flat and elongated granules.

Granule Hardness

An ideal stone must be sufficiently hard, otherwise it has the potential to break apart or fracture either during the manufacturing process or by people walking on the roof panels during or after their installation. The majority of rock types are too soft to be considered suitable for colored roofing granules. Brittle stones such as limestone, dolomite or slate can break down, leading to the exposure of the uncolored interior portion of the granule and possibly to premature granule loss.

Granule Opacity to Ultraviolet Rays

Opacity is the ability of the roofing granule to prevent UV light from passing through it. Typically, a granite or quartz-rich stone allows UV light to pass through easier than an iron rich stone type. The granules’ ability to prevent UV light transmission is determined by the base rock. UV rays that pass through the granules lead to premature degradation of the underlying roof material. While this is a major issue for asphalt shingles in protecting their underlying asphalt base, it is also a quality factor for DECRA roofing materials. The rock selected for 3M roofing granules is chosen to be opaque to UV light, and serves to protect the underlying roofing material.

Granule Iron Content

An equally important characteristic found in stone is its iron content. In general, most stone sources have a small percentage of iron as part of the stone's chemical composition. In some cases, the iron content is contained in minerals that can oxidize allowing for traces of rust to leach from the stone. A suitable stone source for roofing granules should have very few minerals with the potential for oxidization to eliminate any chance of rust stains forming on the roof surface. DECRA roofing materials using 3M roofing granules are shown through outdoor exposure to have virtually no rust potential.

Roof Granules that Reflect Unwanted Solar Heat

Roofing granules are available that incorporate color coat technology that is designed to reflect more sunlight and absorb less heat than a standard roof. **'Cool Roof'** granules reflect more of the infrared wavelengths that comprise more than half of the sun's total energy. DECRA sources roofing granules from the **3M Company**, where they also manufacture **Cool Roofing Granules** with higher Total Solar Reflectance than standard roofing granules. The highly reflective colored ceramic coating still maintains the rich colors desired by DECRA while maintaining higher solar reflectance. DECRA offers several **Cool Color** roofing granule color blends to meet California Energy Commission Title 24 energy code requirements. Generally speaking, a 'cool' roof panel exhibits approximately a 20-degree F surface temperature reduction as compared to the same color blend using standard roofing granules.

Summary

A well-made **DECRA Metal Roofing** panel and stone-coated accessories incorporate a hard, durable, opaque, rust-resistant, roofing granule – adding both aesthetic appeal and weather resistance. Further, DECRA utilizes the most advanced computerized roofing granule blending and application machinery to ensure a quality stone coat manufacturing process – all backed by the DECRA Lifetime Limited Warranty coverage.