EQUISTAR
A Lyondell Company

Wire and Cable Technical Tip

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Poor Physical Properties

Poor physical properties are indicated by lower than expected tensile strength and/or elongation results. If these results are low based on raw material testing, then examination of the testing procedures may be necessary.

If the low readings occur after insulating (after the standard cool down period), but the raw material results were normal, suspect the processing conditions. Most of the physical properties in a foam/skin construction come from the skin.

When low physical properties occur after insulating, the following questions need to be asked:

1. Was the testing procedure correct? Dimensional readings correct? Crosshead speed correct?
2. During the test, did the specimen pull down uniformly, or did it appear to have neck-down areas?
3. Was there difficulty removing the insulation from the conductor? Was the surface smooth?
4. Has there been a change in processing conditions?

Possible cause of poor physical properties and recommended solutions:

A. Testing problem.
Crosshead speed is normally the first parameter to check. Verify that the correct procedure is being followed before checking processing conditions.

B. Too much color concentrate in the skin.

1. Normally, the problem of too much color concentrate manifests itself in the surface quality. Look for radial cracks, a rough surface and possibly, an increase in spark failures.

C. The skin is too thin or the foam is overblown, resulting in thin skin sections.

1. This problem can be detected only by visual examination. Extreme overblowing is evidenced by a rough surface on the skin.

D. Interfacial instability.

1. If the viscosity difference between the foam and the skin materials is too great, the result is thin sections of skin, resulting in poor physical properties.

E. Antioxidant levels too high.

1. This problem is uncommon, but would result in poor physical properties especially in the skin materials.

F. Wet material.
Even slightly moist resin yields a rough surface on the end product and subsequent poor physical properties.

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Poor Physical Properties *(continued)*

G. Contamination.

1. Examine material taken from the extruder hopper for contamination. Press plaques for a visual examination if necessary.

H. Excessive adhesion to the conductor.

1. Excessive adhesion results in damage to the insulation during the removal process. Determine the cause and correct it.

I. Insulation cooled too quickly, resulting in built-in stresses. This problem is evidenced by shrink voids along the conductor, resulting in shrinkback problems.

1. Try gradient cooling or increase the air gap.
2. Increase the conductor preheat (watch blow rate and adhesion).
3. Increase the melt temperature of the skin.

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