Nylon Label Test in Liquid Nitrogen (-196°C)

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XF-300 is a nylon film with a permanent pressure sensitive acrylic adhesive (2mil) and a high opacity, matte white colored topcoat specifically designed for thermal transfer, dot matrix or write-on printing.

XF-301 is a nylon film with a permanent pressure sensitive acrylic adhesive (1mil) and a high opacity, matte white colored topcoat specifically designed for thermal transfer, dot matrix or write-on printing. The XF-301 is also UL & CUL approved.

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Test Objective:

Attach nylon label samples to glass slides and polyethylene cryogenic tube vials and immerse in liquid nitrogen for a period of one hour to determine if they adhere to the substrate during and after immersion.

Sample Information:

- A total of four samples had two label samples affixed to the substrate as shown below in figure 1. The materials used for evaluation were the XF-300 & XF-301 both 5 mil nylon cloth materials.

- The XF-300 has a 2 mil pressure sensitive acrylic adhesive, while the XF-301 has a 1 mil PSA and has UL & CUL approval.

- The XF-300 & XF-301 are nylon films with a high opacity, matte white colored topcoat specifically designed for thermal transfer, dot matrix or write-on printing.

The samples were labeled as A, B, C and D

- Substrates for samples A and B were nunc™ polyethylene cryoTube™ vials
- Substrates for samples C and D were glass slides

Testing:

- The samples were immersed in liquid nitrogen (temperature is -196°C or -320°F).
- The samples were monitored during immersion at 15 minute intervals until testing was completed.
- The immersion period was for one hour.
- Immediately after removal from the liquid nitrogen, each label was lightly probed with a fingernail to determine if it was loose or easy to peel.
- The samples were allowed to return to room temperature.

Test Results: (See figure 2)

Samples A and B (plastic vials)

- During testing: all labels held firm
- Immediately after testing (still cold): all labels held firm
- At room temperature after testing: all labels held firm

Samples C and D (slides)

- During testing: all labels held firm
- Immediately after testing (still cold): all labels held firm
- At room temperature after testing: all labels held firm

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