

The effects of humidity, dust, and temperature are often overlooked even though they can wreak havoc with the quality of film produced by a precision piece of equipment like an imagesetter or a film recorder. Stability of the operating environment becomes even more critical as quality requirements increase. This is particularly true with the trend towards larger format recording devices which must be accurate over greater lengths than their predecessors. Without a consistent level of stability in the working environment, quality goals become harder and harder to reach.

Relative humidity

Relative humidity (sometimes abbreviated as RH) refers to the ratio of the amount of water vapor in the air at a given temperature, as compared to the total amount of water vapor that the air could conceivably carry. In a production environment, relative humidity should generally be no higher than 85% and no lower than 45%. (See the chart below for equipment-specific data.) Even in rainy locales the heating system in a building may dry out the air inside. This can cause the relative humidity to drop substantially. In cold, dry areas the relative humidity can typically be as low as 20-25%. Low relative humidity can cause the following problems:

- *Registration problems* – Swings in relative humidity can affect the dimensional stability of film. The more the relative humidity of the ambient air differs from the value at which the film roll was produced and packed (typically 50-55%), the greater the dimensional variations. Any shrinkage or expansion of the film will ultimately lead to registration problems.
- *Pinholing* – Low humidity increases the possibility of static electricity. (See below.) Static attracts dust particles to film, which may cause pinholes (tiny clear marks on a solid black film) during contacting, duping, or plating.¹
- *Static* – Static discharges may expose the film in a couple of different ways. A single static discharge may cause a small fuzzy mark that is usually no larger than a 1/2" across. Very thin fuzzy parallel lines may appear on film where small static charges occur as film moves across the surface that is generating the discharges.

¹ Pinholes may also appear during film processing, but this is usually due to problems with the emulsion of the film rather than with the ambient relative humidity.

Selected Temperature & Humidity Specifications <i>(please see current spec sheets for up-to-date information)</i>		
Device	Temperature	Humidity
<i>Linotronic 260</i>	18-30°C, 64.4-86°F	45%-85%, non-condensing
<i>Linotronic 330</i>	18-27°C, 64.4-80.6°F	45%-85%, non-condensing
<i>Linotronic 560</i>	18-27°C, 64.4-80.6°F	45%-85%, non-condensing
<i>Linotronic 630</i>	18-28°C, 64.4-82.4°F	50%-80%, non-condensing
<i>Herkules</i>	18-28°C, 64.4-82.4°F	45%-80%, non-condensing
<i>R3030PS</i>	18-28°C, 64.4-82.4°F	50%-70%, non-condensing

Static may also cause the charged film to stick to interior surfaces, inhibiting film feeds and causing film jams (when the charged film sticks to everything and doesn't feed properly). While most films have anti-static coatings, many jams could be averted if the relative humidity were kept in the appropriate range.

Carpeting can also be a source of static. Operators who cross the carpet and touch a machine set off a static discharges that in extreme cases can cause the device to lockup and may even damage its inner circuitry.

Poor film contact – On external drum recorders, low relative humidity can even cause the film to fly off of the rapidly revolving drum. The vacuum on the drum can usually be increased to prevent this from happening.

Dust

Dust can cause a variety of problems by itself or in combination with static caused by low relative humidity:

- *Dust filters* – Dust can clog dust filters, preventing the flow of fresh air.
- *Circuit boards* – Dust can create an insulating layer on circuit boards preventing the circuitry from cooling properly. Overheating can cause premature failure or reduced life.
- *Optics* – Dust on the recording optics can gradually degrade the quality of the image on the film. (This type of degradation is sometimes called flair.)
- *Disk drives* – Dust on disk drive heads can cause file reading and writing errors. It may also leave scratches on the diskette rendering the data on the disk unreadable.
- *Film* – Dust is more likely to stick to static charged film. This may cause scratches or pinholes during processing. This may also lead to contact problems during proofing and platemaking that result in imperfections on the proofs or plates. (Dust particles make it more difficult for a vacuum frame to achieve a good, even draw-down.)

To minimize the effects of dust, try the following techniques: Clean carpets with a vacuum. Damp mop tile floors rather than sweeping with a broom. (This will keep dust from becoming airborne.) Clean during non-production hours. Clean any vacuum frames with an anti-static cleaner. Position air conditioning ducts away from areas that will be most affected by dust. And finally, clean heating or cooling system air filters frequently.

Temperature

Fluctuations in temperature can cause problems with film dimensional stability. Films may actually expand or contract after undergoing significant changes in temperature. This is most noticeable concerning films that have just been removed from a film processor. The dryer in the processor may raise the temperature of the film significantly. The film should be allowed to cool to room temperature before it is checked for registration. Wide ranges in temperature can also cause expansion and contraction of delicate machine operating parts, so it is best to operate at a consistent temperature in the range of the temperatures shown in the chart on the previous page.

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