ning presses which consume fount at a fast rate. Dosing equipment is necessary which may be required to dose three materials – water, fount and alcohol. The standard equipment available should dose these materials accurately but this is not always the case and they can overdose or underdose.

A back-up test system should be available for analysing the mix fed to the reservoirs and the reservoir tanks themselves, not just because of inaccuracies of metering but also because alcohol can be lost through evaporation, thus changing the mix, and many systems return excess fount solution via return pipes to the reservoir tanks and small quantities of materials can be washed out of the ink or paper back into the reservoir and change its composition.

By means of a range of fairly straightforward tests the system can be analysed and any problems diagnosed and hopefully corrected as follows: pH (measure of acidity), conductivity (measures of concentration), temperature (influences conductivity, viscosity), and alcohol losses, specific gravity (measure of alcohol content), surface tension (measure of wetting capacity), water hardness (influences pH control), bacteria (influences pH control), and foam formation (can affect fount feed).

It is important to note that pH is not a measure of fount concentration. The buffer present should ensure that the pH difference between a weak solution and the concentrate itself is small.

Conductivity, an electrical measurement, is proportional to concentration and, for this reason, is very important. Measurement of conductivity offers an accurate measure of fount additive concentration and indicates whether the dosing equipment is accurate and/or whether the composition of the fount system is changing during a press run.

Conductivity changes with temperature, increasing proportionately. Therefore the temperature of the fount is important and temperature changes will result in changes in the chemistry and hence performance of the fount. Refrigeration of fount systems offers some advantages as follows: constant regulated feed giving a stable press system, no hot weather scumming, constant ionisation (conductivity) giving no changes in the chemistry of the system, discourages bacteria growth, no change in viscosity of fount giving a constant volume feed, and reduced alcohol losses.

Alcohol content of the fount can be accurately determined from specific gravity measurements. As mentioned previously, alcohol reduces surface tension. However, large additions (above 20-25%) cease to have any real additional effect on wetting and are just wasteful.

Water hardness can be measured using test papers or a portable test kit and results interpreted in terms of a universal scale. Very hard waters can interfere with the buffering salts and cause the pH to drift upwards. Water treatment plants can be installed to remove salt from harder waters but this will change the nature and performance of the fount solution.

The presence of bacteria in a fount system can sometimes be obvious from the odour but more accurate checks can be carried out using Agar slides. Special cleaning treatment may be necessary where excesses of bacteria are present.

The relationship between ink and fount on a press, particularly a fast running press, is very complex. Ink makers are attempting to study the relationship in the laboratory by building 'models' which reflect conditions on the press. The main problem is that the press condition is a dynamic one with ink and fount constantly being fed and consumed whereas our laboratory models are essentially static.

Three factors are believed to be important in establishing good ink/water balance: good fount pick-up, formation of a stable emulsion, and good fount release properties.

The aim is to formulate ink and fount so that ink will take up fount rapidly and readily to achieve a stable emulsion where the water droplets are small and evenly dispersed. The ink should then release the fount quickly and efficiently on the plate and blanket.

By way of illustration listed below are the 'main-line' Mander-Kidd founts and their specific applications: *Acimak* (conventional covered dampening systems, bareback systems and alcohol), *Alkosol* – alcohol substitute (bareback systems – no alcohol; Dahlgren systems – reduced alcohol), *Newsmak* (newspaper systems – conventional plates), and *Alkamak* (newspaper systems – wipe-on plates).

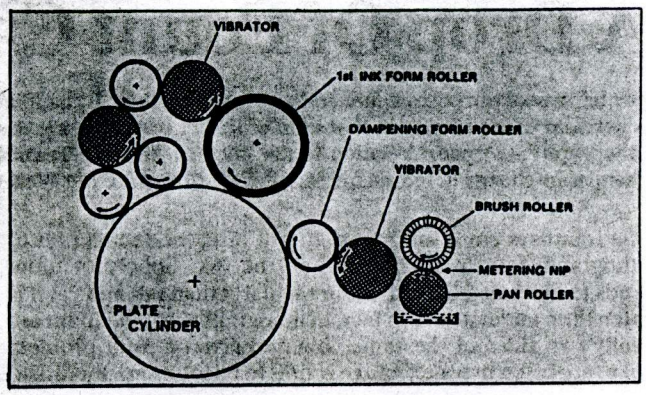


*Fig 2*

To understand more fully these applications it is helpful to look at the various dampening systems that they need to conform to (see *fig 1,* general classification of dampening systems and *figs 2-8,* examples of different types of press dampening).

The advantage of non-contacting systems, eg brush or spray damp *(figs 2 and 3)* is that there is no contamination of the fount reservoirs due to feed back of ink, etc, as a result of the defined 'gap' in the system. Also some of the more modern systems can give zonal damping, ie control in local areas of the plate. Disadvantages tend to be difficulties in achieving the correct amount of fount, controlling direction of spray jets to avoid contamination of press and atmosphere, and the absence of any means of washing out waste materials.

The requirement is for a gum free fount to avoid clogging of jets and bristles and a good wetting fount.

Contacting systems can be of the ductor type or continuous. The ductor type can be sub-divided into conventional, cloth covered systems *(fig 4)* which have good storage capacity but feed thick films and demonstrate slow response to higher speeds, and bareback systems *(fig 5)* which give faster responses, being more 'forgiving' to adjustments in feed. Conventional systems require standard fount with no alcohol, bareback systems require alcohol or an aslcohol substitute.

Continuous systems can feed directly to the plate *(figs 6 and 7)* using either fount plus alcohol or alcohol substitute, or alternatively feed through the inking system, eg, Dahlgren *(fig 8).*

Alcohol or a substitute for it is clearly a requirement in a large number of damping systems and is worthy of some discussion. Firstly, what is the purpose of the alcohol and what problems does it bring? The advantages of alcohol are: reduces surface tension (improves wetting), permits thinner films, fast evaporation (less damp to paper), can help emulsion stability, cooling effect, efficient wetter of rubber, and can reduce foaming.

The disadvantages of alcohol are: additional cost, complicates fount dosing, high wastage through evaporation, gives off odour (pollutes atmosphere), flammable, solvency power (can give problems with ink/fount additives) and high levels can lead to excessive emulsification.

The development of alcohol substitutes emerged during the 1973/74 oil crisis when printers, particularly in the United States, began to panic about their supplies of alcohol. Development of substitutes were encouraged and financed, and press time offered for trials. The crisis ended and printers went back to alcohol but the development scene had been set.

While alcohol substitutes can be very effective it should be understood that they are not the same as alcohol and direct replacement of alcohol will result in changes in the metered film thickness – particularly in continuous dampening systems. The chrome pan roller and the metering roller are geared to each other and driven at the same speed, so whatever happens between them will control the metered film thickness as follows: roller speed (faster speed result in more fount), roller hardness (softer rollers result in thicker films – more fount), roller pressures (looser pressure result in thicker films – more fount), viscosity (higher viscosity result in thicker films – more