Effective Feed Pipe Design for Process and Troubleshooting Existing Pipes

Are you having processing problems with no idea where your gels are coming from? It's always a good idea to have your manufacturer check the feedpipes (through the use of simulation) to see if the pipes are causing your problems.

How long are the feed pipes on your machine? The shorter, the better. The reasons why are to keep the pressure drop lower, reduce residence time and provide enough shear rate for good flow properties. Length and bore need to be designed for volume, pressure and shear rates of the specific resins for the original machine. Sometimes a converter will change to different resins and not have any problems with the screw, valve or screen changer but will have problems with the pressure drop in the pipes. It's always a good idea to ask the machinery manufacturer if there are any concerns before trying something drastically different, including running much slower than usual.

When running shear sensitive resins, it is a good idea to avoid sharp turns in feed pipes elbows. The pictures in Figure 1 and Figure 2 show the flow path of a thermally sensitive resin. The first is a long radius elbow velocity profile. Note that the velocity through the entire sweep of the elbow is very even. There is zero velocity at the walls but most of the polymer is moving quite well. In Figure 1, the same polymer is turned very quickly in a very short amount of time. There is considerable velocity slow down along the outer side of the corner. This spot can be the cause of stagnation and resin degradation. Can thermally sensitive resins be run through a pipe with sharp turns? If the resin is kept moving there should be fewer issues but realize the risk for degradation is there.

Another important factor to be aware of with thermally sensitive resins is static mixers in the pipe can also cause problems. If the existing system already has one, it would be a good idea to remove it before trying certain resins such as EVOH or EVA. Contact: Black Clawson Converting Machinery division of Davis-Standard, LLC at 315-598-7121.

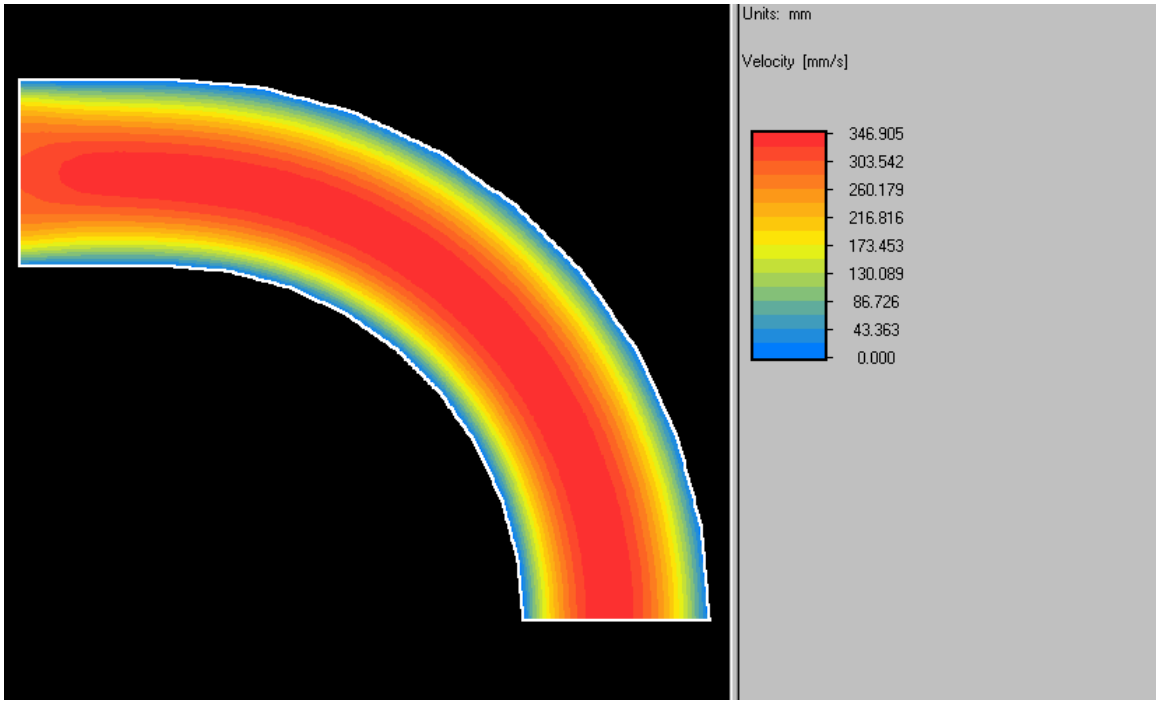

FIGURE 1

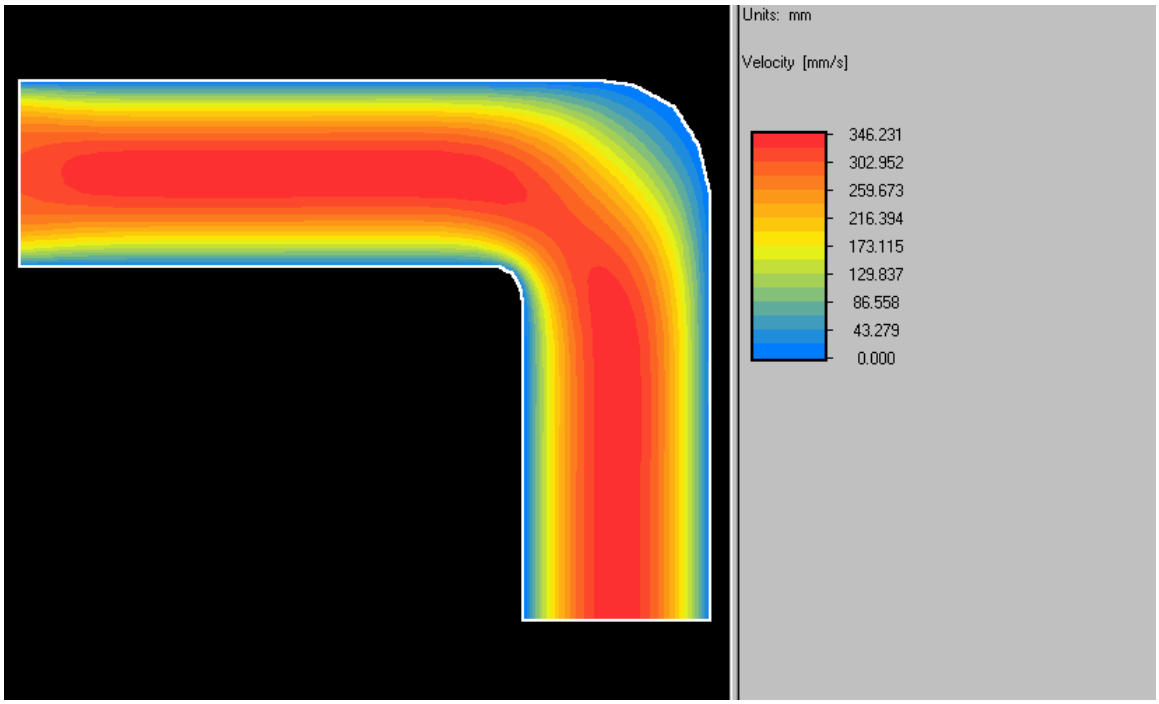

FIGURE 2