BAUER
PLASTICS TECHNOLOGY GROUP

GAS ASSIST
CASE STUDY 322-3

25" TELEVISION FRONT CABINET

Excerpted from "Gas Assist Injection Molding", by Paul Dier and Rick Goralski

25 Inch Television Front Cabinet

Television cabinets are naturally conducive to the gas assist process due to their complex ribbing, and high surface quality requirements. They also benefit from the added strength and rigidity that the gas channels provide. In most cases, cycle time will also be reduced. We have converted hundreds of television cabinets to gas assist. The conversion is relatively simple and inexpensive, and if done properly, the benefits can be enormous.

In this case study we will examine the process by which we converted an existing tool to gas assist to improve the quality, as well as, optimize cycle time. The mold was a 25 inch television cabinet front cover, with a 3 millimeter wall thickness. A center cold sprue and 8 runners supplied material to 8 sub-gates. A mechanical slide was used to form the vented pan at the bottom of the cabinet. This is typical of most conventional TV cabinet designs. **(See Fig. 322-3A)**

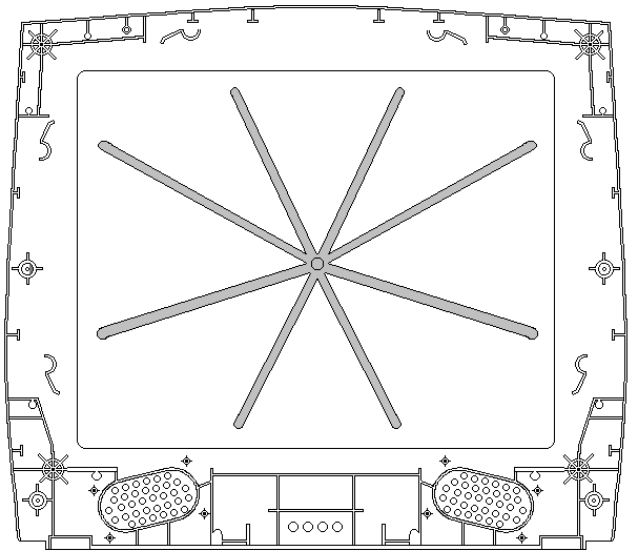

Fig. 322-3A

FIGURE 322-3A As is typical of many TV cabinet designs, this 25-inch cabinet front cover had a center cold sprue and eight runners supplying material to eight subgates.

The mold was being run in a 1700 ton molding machine. The problems with this part were as follows:

1. The cycle time was quite long at 76 seconds overall.
2. There were slight sink marks visible on the front corners of the cabinet.
3. Heavy knit lines between the gates were difficult to control.
4. Flash around the slide area was a continuing problem that required constant tool repair.
5. Ejector pin push marks would appear due to over packing.
6. Heavy paint coats were required to hide surface defects.

We convinced the molder we could solve all of these problems by converting this part to gas assist. The first step in the conversion was to weld up six of the eight runners and gates. We recommended that only two gates at the top of the cabinet would be necessary with gas assist. Gas channels were then cut in the core half of the tool, from the two gates, through the CRT mounting bosses, down the sides of the cabinet and into the vented pan. The size of these channels was 2 ½ times the nominal wall thickness, including the nominal wall. **(See Fig. 322-3B)**

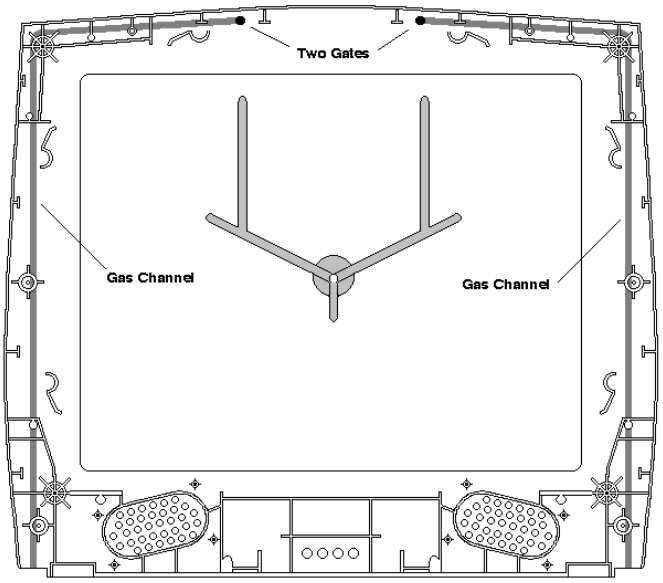

Fig. 322-3B

FIGURE 322-3B To convert to gas assist, six of the eight runners were welded, leaving two gates at the top of the cabinet. Gas channels were then cut in the core half of the tool.

This work was performed in two days at their tool shop. The mold was then set in their molding machine for the tryout.

The gas would be injected at the tip of the injection nozzle, forward of a resin shutoff valve to prevent gas from entering the machine barrel. The gas was to be vented by using sprue-break. The start of gas signal was set at ½" before bottom. We reduced the current material dosage by 20%. In order to have accurate shot control, the screw was set to bottom out with no cushion. It was also necessary to disable the cushion correction feature on the molding machine, to maintain shot repeatability. The pack timers were set on the molding machine at zero. The hold timer was set at 0.5 seconds to prevent the screw from bouncing back after each shot.

They normally used a chiller set at 55 degrees F. to cool the mold and try to reduce the overall cycle time. With gas assist, this would not be necessary. We put the mold on a thermolator set at 80 degrees. This would help the gas penetrate the gas channels, and aid in the resin flow. The initial gas settings were as follows:

Gas Delay Timer	1.0 seconds
Injection First Stage	4.5 seconds at 3500 psi.
Injection Second Stage	3.5 seconds at 1500 psi.

Note that the first stage gas pressure setting for a television cabinet is generally higher than that of most other parts. The extra pressure is needed to pack out the sinks. As a rule, never exceed 5000 psi. If pressures greater than 5000 psi are necessary, then tool corrections are necessary. Pressures in this range can cause problems such as gas permeation and trapped gas bubbles, in the thin wall sections.

It was now time to take the first shot. This first shot was short in the pan area, so we began adding resin until the part held gas. When the “pop” was heard as the gas escaped during sprue-brake, we knew we had a full part.

These first parts were visually inspected and exhibited no significant knit lines. The flash at the slide area was no longer evident. There were, however, some slight sink marks at the lower corners over the CRT mounting bosses. To correct this, the first stage gas pressure was increased by 200 psi every two shots until the sinks were eliminated.

We now had visibly acceptable parts, so we decided to work on decreasing the overall cycle time. We started lowering the cooling gradually as the mold was running. We were quite pleased with the results. We were now able to mold this cabinet at a 55 second overall cycle. That was a savings of 58% over the conventional molding process!

We then did a weight comparison between the new gas parts and the parts that were molded conventionally. The gas parts realized a 7% material savings. The next step was to test the cabinet for strength and dimensional stability. Their lab personnel performed these tests. The new gas assist cabinet surpassed the conventional version in every test.

The part was now stronger, free of sinks and flow lines, and produced much faster. The last test was painting. The gas assist cabinets were sent to the paint room. After a single light coat of paint, the parts were ready for assembly. We now had a capable gas assist process that was much more efficient than the conventional process.

The final results were:

1. Cycle time reduced from 95 to 55 seconds.
2. Material usage reduced by 7%.
3. Sink marks were eliminated.
4. Ejector pin push marks were eliminated.
5. Flash was eliminated on the slide shut-off area, requiring less tool maintenance.
6. Knit lines were easily covered with a single coat of paint.
7. The cabinet was 12% stronger than before.

WHY NOT SPEAK WITH A BAUER REPRESENTATIVE TODAY?

Phone: (586) 286-0360

Web: www.bauerptg.com