

When Felicia Coates, a second-year MBA student at the University of Virginia's Darden Graduate Business School, first visited Giberson Art Glass in May 1994, she found the business files in disarray and the proprietor wondering how much longer he could stay in business. Records of production and data on product costs were nonexistent, and the only financial records were a checkbook, unreconciled bank statements, and several tax returns. Edward Engelhardt Giberson, the proprietor, was a skilled glassblower who had recently moved his studio from Charlotte, North Carolina, to Charlottesville, Virginia. Giberson's wife had always taken care of the books and other records, but the bookkeeping had been neglected since their divorce the previous year. Even though his glass work sold well during his first year in Charlottesville, Giberson was quickly draining his limited resources. He did not expect a big salary, but estimated that he would need a minimum of \$25,000 a year in wages and benefits. Notwithstanding his lack of organized financial information, he realized that something needed to change if he was to avoid bankruptcy. In desperation, he contacted the student consulting group at the Darden School, and Felicia Coates volunteered to assist Mr. Giberson.

## PRODUCTION PROCESS

Giberson produced fine, handblown glassware in the form of tumblers, paperweights, patterned glasses, and vases. In a refurbished shed behind the McGuffey Art Center in historic downtown Charlottesville, Giberson fashioned handblown items from molten glass gathered on a long metal blowpipe. Using his own breath to shape the object, Giberson formed each vessel by a process analogous to blowing honey on the end of a straw. Once the bottom was formed, a metal punty was attached, and the vessel was broken from the pipe. After reheating, the lip was trimmed, fire-polished, and formed. When the object was broken off from the punty, the characteristic "punty mark" was left. The glass was first annealed (a slow process of cooling) for several hours in an oven to relieve stress and was later ground, sanded, and polished before shipping.

### Charging

Production began each week by melting a 200-pound batch of glass in the furnace. Each batch contained about 80 percent new raw materials and chemicals and no more than 20 percent cullet, which was clear scrap glass from previous melts. Giberson carefully monitored the proportion of the ingredients in each batch, including the amount of cullet used, because he believed any deviation from the desired mix and batch size resulted in an inferior quality of glass. As a result, he usually had to dispose of a considerable amount of good unused glass at the end of each week, but he was reluctant to reduce the quantity of the batch below 200 pounds. Figure 2-1 shows the typical recipe for a batch.

**FIGURE 2-1**  
Materials for a Batch

<i>Batch Mix</i>	<i>Cost/Unit</i>	<i>Cost/Batch</i>
100 lbs. sand	\$35/ton	\$1.75
38 lbs. soda	\$110/700 lbs.	5.97
9 lbs. potassium	\$105/200 lbs.	4.72
3 lbs. borax	\$.50/lb.	1.50
14 lbs. lime	\$5.50/50 lbs.	1.54
2 lbs. fluor spar	\$.47/lb.	.94
<u>3 lbs. zinc oxide</u>	<u>\$1.40/lb.</u>	<u>4.20</u>
169 lbs.		\$20.62
<i>Additional Ingredients</i>		
20 grams antimony	\$5.20/lb.	\$ .23
40 grams arsenic	\$6.50/lb.	<u>.57</u>
		<u>\$ .80</u>
	Total	<u>\$21.42</u>
Cullet: 35 lbs.		

Melting required an entire day, because the materials had to be put in the furnace gradually; the next day was lost to fining, a process that allowed the gas bubbles to escape from the molten batch. Typically, Giberson charged the furnace on Sunday, fined on Monday, and blew glass Tuesday through Saturday. Since the furnace ran continuously and daily oven use was known during the weeks glass was being blown, total gas used (one of his biggest cost items) was a predictable \$1,000 per month.

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## Blowing

Daily production began with lighting the glory hole<sup>1</sup> to bring it from room temperature to 2,300° F, which took about two hours. Meanwhile, Giberson turned up the furnace to raise the temperature of the molten glass to 1,800° F. About 40 minutes before glassblowing began, he turned on the annealing ovens so that they would reach 850° F by the time everything else was ready. While the furnace and ovens were heating, Giberson did miscellaneous chores, including grinding and polishing the previous day's production, office work, and general maintenance.

Giberson usually blew paperweights first, because they were solid and needed more time to relieve stress. Approximately two hours were spent on these pieces and on vases. After lunch, he began to make glasses. He worked approximately four hours in the afternoon, making a total of six hours spent glassblowing on a typical day. Finished items varied as to their content of glass, as shown in Figure 2-2. At week's end, unused glass became cullet or was scrapped. On average, approximately 50 pounds of unused glass, called "dirty scrap," was left that could not be recycled as cullet. Disposal costs were insignificant, although public concerns over the community landfill and other environmental issues were expected to make glass disposal more difficult and more expensive in the future.

**FIGURE 2-2**  
Glass Content

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<i>Item</i>	<i>Weight/Piece</i>
Patterned glasses	.5 lb.
Paperweights	.9 lb.
Wrapped tumblers	.5 lb.
Vases	.6 lb.

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During the forty production weeks a year, Giberson worked in his studio almost every day. He did, however, spend considerable time speaking to visitors and friends who dropped by to watch him work. Giberson typically spent some time on Sundays and Mondays doing miscellaneous chores and catching up on grinding, sanding, and polishing that had not been completed during the previous week.

## Finishing and shipping

Solid glass pieces had to be ground, sanded, and polished prior to shipping. For one solid piece of glass, 40 percent of the time required for finishing was spent on initial

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<sup>1</sup>Area from which molten glass is gathered.

grinding, 15 percent on a second grinding, 20 percent on first sanding, 10 percent on a second sanding, 5 percent on third sanding, and 10 percent on final polishing. Total finishing time averaged 15 minutes per piece. Hollowware pieces required only polishing, which requires an average of three minutes per piece for glasses and five minutes for vases. The finishing procedure was referred to as "cold time," as contrasted with blowing, which was known as "hot time."

Orders were packed and shipped once or twice a week. Packaging involved wrapping, boxing, and labeling. It took about 15 minutes to pack a case of twelve glasses, and Giberson used part-time labor for packing, shipping, and general shop cleaning.

## QUALITY CONTROL

During production runs, firsts, seconds, clean scrap, and dirty scrap were produced. Firsts were those objects meeting the artist's criteria for a quality piece of art glass. Seconds had some flaw, such as a lesser glass quality (too many small bubbles) or a bad break from the punty rod. Some clean scrap became cullet, and the excess was discarded; dirty scrap was always discarded. Seconds required the same hot and cold time as firsts. Only firsts were packed for shipment. Seconds were sold only at the studio, and their number varied with the item being produced. Rarely were items of such inferior quality they could not at least be sold as seconds.

## PRODUCTION TIME

By closely watching the business over a period of several weeks, Felicia estimated Giberson spent the times shown in Figure 2-3 for each type of object blown. (Figure 2-3 also lists the typical production rate for a week.) As can be seen, wrapped tumblers were his biggest volume item, on average, taking 15 minutes to blow and another 3 minutes to "finish." Giberson did all of the blowing and finishing himself, although he mentioned to Felicia that he was considering hiring additional part-time labor to do some or all of the finishing.

**FIGURE 2-3**  
Production Times and Weekly Output

<i>Item</i>	<i>Production Time</i>		<i>Average Weekly Production</i>	
	<i>Hot Time</i>	<i>Cold Time</i>	<i>Firsts</i>	<i>Seconds</i>
Patterned glasses	15 min.	3 min.	18	1
Paperweights	15 min.	15 min.	10	0
Wrapped tumblers	15 min.	3 min.	30	2
Vases	25 min.	5 min.	7	1

Giberson worked a normal schedule from September through mid-June. During the summer, he spent about ten weeks traveling to trade shows where he exhibited his work, and he spent the remaining two weeks of the year vacationing in the mountains.

## SALES

Giberson sold firsts directly from his studio in response to mail orders and orders taken at trade shows. Individual prices are shown in Figure 2-4. Sales were only slightly seasonal, and Giberson almost always had at least a one-month backlog. Seconds, which were available to customers who visited his small studio, sold for the same price as firsts.

**FIGURE 2-4**  
Per Unit Price List<sup>2</sup>

<u>Item</u>	<u>Price</u>
Patterned glasses	\$9.00
Paperweights	\$15.00
Wrapped tumblers	\$8.00
Vases	\$25.00

## OPERATING COSTS

In addition to the costs for raw materials and gas, Giberson's business incurred various operating costs (see Exhibit 2-1). With the exception of expenditures for office supplies, hand tools, manufacturing supplies, and part-time labor, operating costs were incurred every month regardless of whether production occurred. Some of the ongoing costs were not incurred evenly throughout the year, and the amounts shown therefore represent monthly averages.

## FIXED ASSETS

Felicia produced a rough balance sheet for the business as of its inception on September 1, 1993 (see Exhibit 2-2). The most crucial facilities (i.e., the furnace and ovens) had a life span of only two years. The equipment and gas tanks were expected to last eight years and the truck five years. Giberson's truck payments were \$205 a month for 36 months beginning in September 1993. He had only a few thousand dollars in personal savings left and wondered how long it would last. He also wondered what each of his products cost, which items were most profitable, and whether his prices were too low. Perhaps it was time to develop a sound production and pricing strategy.

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<sup>2</sup>These amounts do not include shipping charges. Orders were prepaid and included an estimated shipping charge.

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**EXHIBIT 2-1**

**GIBERSON ART GLASS**

**Average Monthly Operating Costs**

Office supplies	\$ 25.00
Hand tools and manufacturing supplies	150.00
Part-time labor (at \$5.00/hour)	100.00
Professional services	50.00
Advertising and promotion	20.00
Contributions	15.00
Dues and subscriptions	35.00
Travel and entertainment	75.00
Insurance	90.00
Taxes and licenses	45.00
Repairs and maintenance	25.00
Rent	175.00
Utilities and telephone	60.00
Miscellaneous	<u>50.00</u>
	<u>\$915.00</u>

EXHIBIT 2-2

GIBERSON ART GLASS

Balance Sheet

September 1, 1993

<u>Assets</u>		<u>Liabilities and Equity</u>	
Cash	\$ 100	Accounts payable	\$ 125
Inventory:		Truck loan	<u>6,000</u>
Supplies	75	Total liabilities	6,125
Raw materials	50		
Prepaid insurance	200	Owner's equity	11,375
Prepaid rent	175		
Furnace and ovens	5,000		
Equipment	3,000		
Gas tanks	400		
Truck	<u>8,500</u>		
Total	<u>\$17,500</u>	Total	<u>\$17,500</u>

