Where crystal items have been produced since 1834 with artisan tradition, precision, and industrial power to create the perfect glassware.

WHAT: International Design Competition for Graduate & Undergraduate Design Students at Pratt Institute Spring Semester 2010
Faculty: Stefanie Kubanek and Katrin Mueller-Russo
WHEN: Introduction Tuesday, December 15th at 12:30 pm
WHERE: PS 43
Nachtmann Project Brief

Introduction and background information

As a recent acquisition by the Riedel Crystal Group, the Nachtmann brand carries a sophisticated association that is translated through its brilliant crystal products, contemporary classic design and superior quality control. Within the three brands of the Riedel group, Nachtmann differentiates itself by focusing on decorative crystal and giftware. The current US market product offerings are a mix of Nachtmann’s new stylish pieces as well as traditional designs.

Market overview/competition

![Competitors’ chart](image)

The outcomes offered by this table are the characteristics of Nachtmann’s functional (horizontal) categories and the characteristics of competitors’ products offerings. Nachtmann’s differentiating design strategy is the simple modern designs embellished on its basic shapes. In comparison, competitors’ aesthetic schemes are summarized below:

- Swarovski – fashion crystal with a focus on decorative pieces
- Waterford – aesthetic focused products encompassing all categories
- Dansk – casual, colorful beverage wares
- Orrefors – design and color forward products encompassing all categories
- Nambe – an exotic aesthetic translated in unusual shapes
- Mikasa – contemporary design crystalware of wide range product categories
- Godinger – elegant decorative crystalwares
Objectives

The objective of the course is to develop stylish and decorative items that complement the Nachtmann product range. The design solutions should consider Nachtmann’s branding elements and attempt to contribute to or enhance its current product mix.

Requirements/Constraints

The new designs should be able to be produced with Nachtmann’s given production technology, see attached PPT presentation.

Target audience review

The current audience of crystalware is the lifestyle-oriented 30-to-50-year-old female with a moderate-to-high income level. The customer’s buying habits are highly dependant on occasion, and are not completely independent of budget. A general description is outlined below:

<table>
<thead>
<tr>
<th>Buying Purpose</th>
<th>User Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wedding gift registry</td>
<td>30-to-40-year-old female or male with moderate to high income level and an active lifestyle.</td>
</tr>
<tr>
<td>Individual gifts purchases</td>
<td>30-to-50-year-old female with moderate to high purchasing power and a leisure oriented lifestyle.</td>
</tr>
<tr>
<td>Personal household purchases</td>
<td>40-to-50-year-old female with moderate to high purchasing power and a design concerned lifestyle.</td>
</tr>
<tr>
<td>Special events</td>
<td>40+ year-old female with moderate to high purchasing power and a leisure oriented lifestyle.</td>
</tr>
</tbody>
</table>

The typical distributors of the current target audience stated above are moderate- to high-end department stores and gift registry stores. Examples include Macy’s, Bloomingdales, Saks Fifth Avenue, Michael C. Fina, Fortunoff, and Sur la Table.

Nachtmann’s target audience varies somewhat from their actual audience. The company strives to appeal to the youthful, style-oriented female consumer with moderate to high purchasing power. As the company has not yet developed a prominent brand presence, they have yet to breach this market. In today’s market, the trend among stylish 30-40-year-olds is one of identity through brands. People identify closely and develop relationships with strong brands; they define themselves to a certain extent through the brands with which they associate. Through a stronger brand identity, Nachtmann would be more likely to attract such customers.

Key items of interest for new design

- Tumblers/Barware
- Vases and bowls (Center pieces)
- Candelabras
- Crystal X-Mas accessories
Company presentation
Where crystal items have been produced since 1834...
with artisan tradition,
precision,
... and industrial power,
... to create the perfect glasses.
• **1834** The glassmaker Michael Nachtmann founds the company F.X. Nachtmann.

• **1900** Zacharias Frank takes over the company and moves headquarters to Neustadt an der Waldnaab, where they are still located today.

Today's headquarters are in the city of Neustadt. Nachtmann has its production facilities in Weiden and Amberg.
Company history

- **1945** Nachtmann rebuilds the partially destroyed production facilities and begins again with the production of lead crystal in Neustadt and Riedlhütte.

- **1983** Laying of the foundation stone for the third, highly modern lead crystal plant in Weiden.

- **1990** The Nachtmann group acquires the traditional crystal factory Spiegelau.
Company history

- **1995** F.X. Nachtmann Crystal AG takes over Rosenthal AG’s shares in the Amberg crystal glass factory and has held a capital share of nearly 90% since July 1997.

- **2001** Certification as a company with an extensive environmental protection program (in accordance with DIN ISO 14001).

- **2004** On September 17th, Riedel Glas takes over 100% of the shares of the Nachtmann Crystal AG.
OUR RESPONSIBILITY

The Nachtmann plant in Weiden, Europe’s most modern glass factory, uses primarily electrical energy. It is regarded as the most environmentally friendly method of our day.

We are especially pleased that Nachtmann was certified in accordance with DIN ISO 14001 in 2001, the only company in the lead crystal and crystal glass industry to obtain this certification to date, and thus recognized for its commitment to the establishment and introduction of an environmental management system.
The structure of the Riedel - Nachtmann Group
Riedel Glass Works with its daughters Nachtmann and Spiegelau offers a rich portfolio of glass products:

- **Riedel**: High-end drinking glasses for prestige oriented customers, perfect in design and function.
- **Nachtmann**: Decorative lifestyle, stemware, tableware and accessories in crystal.
- **Spiegelau**: The expert on sophisticated functional glassware for professional use.

**Brands and communication**

Nachtman

A Division of Riedel Glassworks
## Brand Focus

<table>
<thead>
<tr>
<th>Riedel</th>
<th>Private sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nachtmann</td>
<td>Wine retail</td>
</tr>
<tr>
<td>Spiegelau</td>
<td>Professional sector</td>
</tr>
</tbody>
</table>

*Image of a triangle with brands Riedel, Nachtmann, and Spiegelau at the vertices, showing their focus areas.*
The Nachtmann brand communication

Savoir vivre:
Nachtmann home and table top accessories
Gourmet 2000
Vivendi
Bossa Nova
Bossa Nova
Nachtmann – Category Tableware

Ocean
Nachtmann – Category Tableware

Manhattan
Dancing Stars
Dancing Stars
Dancing Stars
Nachtmann – Category Vases
Nachtmann – Colored Crystal

Chess, Circle, Straight
Nachtmann – Colored Crystal

Red Leopard
Nachtmann – Colored Crystal

Sahara
Nachtmann – Colored Crystal

Traube
Crystal Christmas
Nachtmann – Category Candleholders
What is glass?

Glass is an inorganic product of fusion that has cooled to a rigid condition without crystallizing.

<table>
<thead>
<tr>
<th>crystalline structure</th>
<th>amorphous structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rock crystal</td>
<td>„Crystal“ Glass</td>
</tr>
</tbody>
</table>
What makes a glass?

**Network former:** Silicon Oxide SiO$_2$

**Modifiers:**
- Sodium Oxide Na$_2$O
- Potassium Oxide K$_2$O

**Stabilizers:**
- Lead Oxide PbO
- Barium Oxide BaO
- Calcium Oxide CaO
- Zinc Oxide ZnO
- Boron Oxide B$_2$O$_3$
- Aluminum Oxide Al$_2$O$_3$
The magic of lead crystal

- **High refractive index**, that is how much glass bends light. --> high reflective surface
- **High dispersion**, that is the difference between how much glass bends different colors of light. --> rainbow effect
- **No solarisation**, that is a color change in glass under prolonged exposure to sunlight
- **Corrosion-resistance**
  Lead oxide makes glass more resistant to detergents
Colors for cased glass

<table>
<thead>
<tr>
<th>Color</th>
<th>Oxide/Compound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruby red</td>
<td>Metallic gold</td>
</tr>
<tr>
<td>Cobalt blue</td>
<td>Cobalt oxide</td>
</tr>
<tr>
<td>Amethyste</td>
<td>Manganese oxide</td>
</tr>
<tr>
<td>Emerald</td>
<td>Chromium and copper oxide</td>
</tr>
<tr>
<td>Light green</td>
<td>Chromium oxide</td>
</tr>
<tr>
<td>Amber</td>
<td>Metallic gold and silver</td>
</tr>
<tr>
<td>Aquamarine</td>
<td>Copper oxide</td>
</tr>
<tr>
<td>Copper ruby</td>
<td>Metallic copper</td>
</tr>
</tbody>
</table>
Glass consistency

- Sand (Alcaline earth oxide)
- Lime
- Sodium/Potassium carbonate (Alkali oxide)
- Spiegelau own waste glass

Melting (approx. 1500 °C)

- Forming
- Cooling

After treatment
Depending on the ingredients there are different types of glass:

- **Sodium glass**
  - 20% Sodium carbonate
  - 10% Lime
  - 70% Sand

- **Crystal glass**
  - 15% Potassium carbonate
  - 10% Metal oxide
  - 5% Lime
  - 70% Sand

- **Lead crystal**
  - 15% Potassium carbonate
  - 25% Lead oxide
  - 5% Lime
  - 60% Sand

- **Borosilicate glass**
  - 5% Sodium carbonate
  - 10% Borax
  - 5% Feldspath
  - 80% Sand

**Usage**
- **Sodium glass**: Technical glass, e.g. window glass, Container glass, e.g. mustard glass
- **Crystal glass**: Table ware, decoration, Gifts
- **Lead crystal**: Luxury glasses, table ware, decoration, gift items
- **Borosilicate glass**: Tempered glass, Lab equipment
The production process - Overview

• hot production: melting and forming of glass
  (different for colored and clear glass)

• cold finishing: finishing and decorating of glass
  (same for colored and clear glass)
Kinds of furnaces

Glass melts at temperatures around 1500°C (2730°F). Depending on the quantity and kind of glass that needs to be produced, the glass ingredients are melted in either pot furnaces or tanks.

<table>
<thead>
<tr>
<th>Pot furnace</th>
<th>Tank</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Is used to produce hand made glass</td>
<td>• Is used to produce machine made glass as well as hand made glass</td>
</tr>
<tr>
<td>• Needs to be refilled when empty. It is not possible to refill continuously with the ingredients.</td>
<td>• The ingredients are refilled continuously.</td>
</tr>
<tr>
<td>• Ideal for smaller quantities</td>
<td>• More stable glass quality.</td>
</tr>
<tr>
<td></td>
<td>• Ideal for larger quantities</td>
</tr>
</tbody>
</table>
Melting colored glass

- Pot furnace
- Discontinuous melting
- Electric or gas heating
- Melting temperature 1450 °C
- Working temperature 1200 °C
Forming cased glass

1. Preparing a clear glass blank

2. Fusing the blank with the colored glass cap

3. Blowing the fused glass into a mould
Melting clear glass

- Tank furnace
- Continuous melting
- Electric energy
- Cold top

Recycling of up to 70% of cullet
Most advanced environment-friendly technology
The production of stemware

The fluid glass comes from the tank directly to a machine, that carries the moulds

A hot drop of glass falls into a mould
Forming clear stemware

- Blowing the top and pressing the stem

- Pressing the foot, blowing the top and then pulling the stem

- Pressing the whole glass
Stemware with affiliated stem
Stemware with pulled stem
Cold finishing

- Cracking off the moil
- Finishing the rim
- Finishing the foot
- Diamond cutting
- Acid polishing
Finishing the rim

- cracking off the moil
- recycling of cullet
- grinding / mechanical polishing
- fire polishing
Finishing the foot

- removing of pressing lines and overpressed glass
- grinding both sides of the foot
The production of stemware

The glasses come out of the mould with a mould rim that needs to be cut off later.
The production of stemware

Laser cutting

Polishing the rims
The production of stemware

Fire polishing hardens the upper rims

Transportation to the quality check point
The production of stemware

Measuring the volume for applying the calibration mark at the right height

Applying the calibration mark on the glass
The production of stemware
Forming glass: a variety of forming possibilities

Monoblock molds
- Mold in one piece
- No undercuts possible

Divided molds (parted molds)
- 2-, 3-, 4-part molds
- Straight and curved seam lines
- More flexibility in design

Stationary blown (IS-blowing)
- Hollow items with design in mold
- Different shapes feasible

Blowing molds
- Plain surface
- Only round shapes possible
Production techniques

Overview:

- Pressed (molds with and without ring)
- Press injected (lead crystal only)
- Stationary blown (IS-blowing)
- Spinning
- Machine blown
Production techniques: Pressing molds

Characteristics:
- Glass will be distributed in the mold by plunger
- Only shapes possible where item/plunger can be removed from mold
- Molds with covering ring will produce exactly finished rims on the products
- Molds without ring enable 'organic' rims on the products

Product examples:
- Bowls, vases, votives, plates

Crystal Christmas votive STAR and candleholder GALAXIA (Nachtmann)
Molds without ring are used for production of the BOSSA NOVA plate (Nachtmann)

'Organic' rim
Production techniques: Press injected

Characteristics:  
• for lead crystal mainly  
• solid items

Product examples:  
• Figurines, paperweights

BULL and BEAR (Nachtmann)
Production techniques: Stationary blown (IS-blown)

Characteristics:
- Hollow items
- Glass distribution by air pressure

Product examples:
- Decanter

BOSSA NOVA and SAMBA decanters (Nachtmann)
Production techniques: Spinning

Characteristics:  • Glass distribution by spinning of the mold

Product examples:  • Vases, bowls, votives
Production techniques: Machine blowing

Characteristics:  
• Only round shapes  
• Glass will be distributed by blowing

Product examples:  
• Vases, tumblers

DANCING STARS Martini pitcher (Nachtmann)  
BOSSA NOVA, SAMBA and RUMBA decanters (Nachtmann)
Finishing and decorating: Overview

Application of color

Panthography

Sand blasting

Silk screen printing / decale

Cutting (clear/grey) / acid polishing

Glueing
Finishing and decorating: Application of color

Types:
- Hand painted glass
- (Hand-)painted rims
- Gold banding
- Glass fully covered with color (spraying)
- Acid etching

Product examples:

**Spraying**

- GIARDINO (Nachtmann)

**Hand painted rims**

- HEART2HEART (Nachtmann)
Finishing and decorating: Sand blasting

Characteristics:
• Sand blasting of partial details on e.g. figurines
• Decale mask for complicated logos

Product examples:
HORSE (Nachtmann)

Sandblasted details
Finishing and decorating: Cutting

Characteristics:  
- Hand cutting vs. machine cutting  
- Clear cutting vs. grey cutting  
- Use of diamond wheels

Product examples:

- BOSSA NOVA glasses (Nachtmann)  
- SAMBA glasses (Nachtmann)  
- RUMBA glasses (Nachtmann)
Quality explained one by one: Dishwasher safety (II)

Test Report 0954-09-1

1. Test specimen:
   Six series labelled as "Sahara".
   Plate round, 22 cm x 8 2/3, EDV-No. 85210, 4 pieces
   Plate square, 26 cm x 11 4/5, EDV-No. 85223, 4 pieces
   Plate square, 20 cm x 7 7/8, EDV-No. 85222, 4 pieces
   Plate octagonal, 49 cm x 13 3/4, EDV-No. 85221, 4 pieces
   Bowl, 16 cm x 6 2/7, EDV-No. 85224, 4 pieces
   Order No. 2107484

2. Date of arrival:
   08/17/2009

3. Date of testing:
   09/09 - 19/02/2009

4. Test Method:
   Determination of mechanical dishwashing resistance according to DIN 10512. Food hygiene - Commercial dishwashing with one tank dishwashers - Hygiene requirements. Type testing.
   1000 dishwashing cycles were performed. The temperature of the water for dishwashing was 65 °C. The temperature of the water for rinsing was 80 °C. As dishwashing agent the product "F 9109" of the F. Winterhalter was used. For rinsing, the product "Elektro Star KH Klimaklar neutral" of the Fa. Chem. Fabrik Dr. Weigert GmbH & Co KG was applied.

5. Sampling / Sample preparation:
   Sampling and delivery lay under responsibility of the customer.
   The samples were tested as received (3 of 4 test objects; one reference).

6. Result:
   The test objects were inspected by optical and manual scanning.
   For all samples no changes were found after 1000 washing cycles.
   The specimens were returned to the customer for direct evaluation.

7. Testing Uncertainties:
   Optical and manual testing, no further specifications possible.

8. Conclusion:
   All investigations were done in view of the latest scientific-technical trends and to the best of one's knowledge and belief. The testing results exclusively refer to the test specimen. In order to avoid misinterpretations the present report may only be copied and transmitted in its completeness. For a copy of extracts of the report written permission by the FGK is required.

Dr. Markus Pohlmann-Lott
(laboratory manager)
Hoh-Grenzhausen, 10/20/2009

For further inquiries please contact Dr. Pohlmann-Lott
Phone: +49-(0)6242-796-27 markus.pohlmann-lott@fgk-keramik.de

SAHARA