

# NEWS



## GENERAL PATTERN

### NEWS

# ISO ACCREDITED!



General Pattern, the largest and most successful privately owned Rapid Prototype, Rapid Tooling and Low Volume Production Company is pleased to announce its accreditation to the ISO9001:2000 and ISO14001:1996 standards.

The Company recognized that the Low Volume Production supply of plastic products into the Automotive, Medical and Communications Industries required industry standard Quality Assurance to validate the companies procedures and environmental commitment.

In early 2002 the Quality Team made up of Ian Fairfield (QA Manager, General Pattern UK) and Mike Peterson (QA Manager, General Pattern USA) began to generate the ISO procedural Manual.



In November the ISO auditors, SGS, completed a successful pre audit and on the 12th December 2002 approved General Pattern for registration to ISO9001:2000 and ISO14001:1996. - **now that's rapid!**

Ian Fairfield, the UK Quality Manager said; "its been 9 months of hard work from everyone in the team. Without the commitment of the management and the enthusiasm of all the technical staff we couldn't have achieved such a significant accreditation in such a short period of time".

Ian and Mike are now concentrating on achieving accreditation for other parts of the General Pattern group whilst working towards a 2003 accreditation of TS16949 standards.

### Ham Lake USA

Further expansion at the Ham Lake injection mold facility.

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### 3D Keltool

General Pattern acquire Keltool licence.

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### New injection mould facility in UK

Further expansion to injection moulding in Europe.

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**Leading the World in Rapid Product Development!**

Check out our website: [www.generalpattern.com](http://www.generalpattern.com)

GENERAL PATTERN



# THE NEXT BIGGEST THING!

**Denny Reiland  
President of General  
Pattern on what's  
coming up in 2003**

Happy New Year... while most companies fought to simply survive the sluggish economy last year, 2002 was a record sales year for General Pattern, with slightly more than \$22 million in revenue.

General Pattern prides itself as a forward-thinking company. While we aggressively strive to reduce cost, we are not adverse to investments that position us for growth. For maximum value, these investments are closely tied to strategic plans that create new markets, capture market share or build undeniable differences between our competitors and us. Our recent purchase of Rapid Tooling Technologies (and acquisition of the 3D KelTool license) is one such investment that will position General Pattern as a leader in Rapid Tooling.

In addition to the acquisition of Rapid Tooling Technologies, General Pattern also purchased 22 new CNC Milling machines that were recently installed in the tool shop.

Our mission is to develop new products, applications and technologies that will deliver value to our customers; which will further differentiate General Pattern from all other companies in our industry. At a time when most of our competitors are slashing R&D budgets to survive the economic slump, General Pattern has committed 15% of sales to Research and Development spending.

With our recently expanded and diverse sales force, and a strong dedicated employee base, General Pattern is able to provide our customer base with innovative low cost solutions that will fuel our growth and position us as industry leader in 2003, and for years to come.



## Injection Moulding capacity further increased with new 'Ham Lake' facility



As the New Year begins the production molding facility at Ham Lake continues to prepare for its July ISO registration. Each team member is looking forward to its completion so that they can gain recognition of all their hard work, and add it to their current UL Registered facility designation.

A newly updated and expanded secondary assembly area is now complete after coming online during February. It is currently capable of Pad Printing, Hot Stamping, Sonic Welding, Heat Staking, Machining and actual part assembly. It has provided a significant cost savings

to those customers that are looking to reduce their overall project costs. The secondary assembly will be capable of working on much larger projects.

Our presses continue to mold 24 hours a day, 7 days a week. Customers find that our range of press size (20 ton - 1000 ton), combined with capacity at the European operation, and the prototype capabilities of our other facilities offers a true one stop shop for projects. The ability to effectively process most engineered grade resins, as well as the experience and confidence to work with developmental materials help new projects get underway.

General Pattern have special expertise in the use of a broad range of TPE (Thermoplastic Elastomers) to create gasket, seals, and soft touch overmolds.

## General Pattern increases Rapid Tooling offerings With acquisition of '3D Keltool' license



General Pattern has announced it's acquisition of the 3D Keltool license from Rapid Tooling Technologies, LLC of St. Paul, Minnesota.

"General Pattern is the right home for 3D Keltool," says Brad Fox, who managed Rapid Tooling Technologies and the 3D Keltool process for the past three years. "It is a natural addition to GP's existing rapid tooling technology offerings." With this acquisition, we now offers four distinct rapid tooling technologies: 3D Keltool, Selective Laser Sintering, Deckel Maho laser based machining, and high speed CNC machining.

General Pattern's President, Denny Reiland comments; "we are pleased to bring the 3D Keltool license in-house. GP is poised to begin the mass

commercialization of 3D Keltool inserts and bridges the important gap of post finishing the inserts – never offered previously by RTT."

"Technology is just one part of the equation;" continues Fox, the new Vice-President of Business Development for GP, "this company has made a reputation of delivering quality injection molding tooling in dramatically short time frames at significantly lower costs. This will remain the key objective for us – and now we have one more RT technology to choose from to meet these demanding needs of our customers."

The 3D Keltool installation at General Pattern makes it the sole practitioner of the technology in North America.

For more information about General Pattern, 3D Keltool or any of it's RT technologies, please call 011 763 780 3518 or visit the website at: [www.generalpattern.com](http://www.generalpattern.com)

# That's Great! So



Over the last 18 months General pattern has expanded its UK operation based in Basildon to include a fully operational Low Volume Injection Moulding Plant.

This expansion was initiated due to the demands of our customers for a facility that can take any format of CAD data and employ the full

## New Injection Molding

development process from design verification prototype to full blown production of up to 100,000 parts per year.

The expansion includes 6 brand new Negri Bossi Injection Mould machines ranging from 55 tonnes to 370 tonnes, the latest in material processing equipment, a Branson high capacity vibration welding machine and a high tech tool room for any additional requirement such as tool modifications etc.

Design was also another factor General Pattern considered as part of their expansion program, this led to the development of the European

Design Facility which houses a variety of CAD seats such as ICEM SURF, IDEAS and DELCAM.

Many of our customers have utilized this facility and through this General Pattern has gained specialist experience in a number of low volume components such as Expansion tanks.



## Expansion Tank Overview



To the inexperienced, developing an expansion tank may seem a relatively simple task, but this involves using a broad range of technologies and science.

All factors from design, material specification to working pressures, temperature changes etc must be



considered in detail, as this component must withstand the rigors of everyday driving over many years.

Finite element analysis, mouldflow, pressure vessel testing and material bonding methods are all examples of technologies and science which General Pattern



utilizes when considering a component of this nature.

We are currently working as a Tier One Supplier for some of the automotive industries most prestigious companies and further expansion is now planned in 2003 due to our accreditation last December to ISO9001:2000 and ISO14001.

### BAE SYSTEMS

## New Aeronautical Contract

### Problem - Bridge Production

BAE Systems won the contract to produce the Advanced Targeting Forward Looking Infra Red Pods (ATFLIR) for the US Navy F/A-18

Aircraft. Due to the extremely low production rate (one 22 piece assembly per week), the high level of part complexity and the weight sensitivity conventional tooling and traditional fiberglass or aluminum fabrication was not a viable solution.

### Solutions - Direct Manufacturing

With one of the largest up-to-date fleets of 5 SLS machines in the World, General Pattern quickly went to work constructing a

dedicated, secure manufacturing cell capable of manufacturing, assembling and testing the 21 part sub assembly. Within 4 weeks, General Pattern were producing one set per week at our UK facility... just minutes from the BAE assembly line!

### Impact - Reduced Lead Time

The modified DuraformGF creates a super alloy variation of the standard glass filled nylon, allowing BAE to receive highly

complex organic shaped parts without tooling. These parts meet extremely rigid weight objectives while still operating in the demanding environment subjected to Fighter Aircrafts'. All this and at a set cost less than that of traditional alternatives.

# Whats New???

## New SLS Technologies

### The Technology



General Pattern currently have 5 of the latest 2500 plus SLS machines. Selective Laser Sintering converts 3 dimensional CAD data into Nylon or Steel parts. Using a computer controlled laser the powder is cured and bonded layer by layer. Each layer is built on top of the other on a platform that lowers into a container, powder is reapplied each time by a roller.

This process is a great way to produce functional parts both rapidly and accurately.

### The Applications

- Creation of metal parts and functional plastic parts for one-off assemblies and trials.
- Plastic Injection Moulds.
- Nylon material can be finished and painted to look and feel like production parts.
- Engineering Models.
- Direct Manufacturing.

### The Advantages

- General Patterns capacity of 5 2500 plus machines ensures quick delivery.
- Nylon material can be finished and painted to look and feel like production parts.
- Excellent for living hinges and clips.
- Not geometry sensitive. The more complex the greater the savings.
- Excellent durability and wear characteristics.

## New SLA Technologies

The most significant recent improvement in SLA technology has been in materials - both in selection and performance. No longer is it necessary to settle for brittle parts made from a single resin. Today we offer high-performance resins to meet the requirements of a wide variety of applications. The key word is durability. Where resins of the past exhibited less than 4% elongation at break, our resins today range from 13.7% to 25%. SLA parts are no longer just visual models or patterns used to make more durable parts. Our resins now possess properties similar to engineering polymers such as Polyethylene, Polypropylene, ABS, Polycarbonate and Nylon.

### WaterClear™: Somos® 10120

#### Applications:

- Strong, rigid, durable parts
- Optically clear parts
- Low viscosity material
- Fast build times

### WaterShed™: Somos® 11120

#### Applications:

- Tough, durable material that mimics properties of PBT and ABS
- Resistant to high humidity and aqueous environments
- Low viscosity material that aids in post cure clean up

### Polyethylene-like: Somos® 8120

#### Applications:

- Excellent for snap-fit application
- White parts with properties similar to polyethylene
- Fastest photospeed currently available in any epoxy
- Humidity resistant and water tolerant

### Polypropylene-like: Somos® 9120

#### Applications:

- Robust, durable resin ideal for RTV tooling applications
- White parts with properties similar to polypropylene
- Resistant to a wide range of environments

## IN CHALLENGING TIMES, SERVICE MATTERS MOST!

As the World adjusts in difficult economic times, other business's cut costs by cutting corners on customer service.

At General Pattern we pride ourselves on customer service, that's why we continue to invest in it.

### GP News

The introduction of General Pattern News will keep you upto date with the latest, greatest and next biggest things happening in the company.

### Better communication

We are raising industry expectations on Project Management and Customer Communication. In the last 6 months alone we have taken on 6 new Project and 9 new Business Development Engineers.

### Rapid Payment

We recognize how difficult it can be to ensure rapid product development while still ensuring correct paperwork, that's why we have introduced a rapid payment method by credit card. We can accept payment anytime through your credit card facilities, just speak to your Project Engineer.

### Quote Guarantee

We guarantee quote turn round in 24 hours on all Rapid Prototype, Rapid Tooling and Low Volume Production projects.

### Part Delivery Guarantee

Parts delivered on time or you do not pay! Speak to your Project Engineer for more information.

### Price Guarantee

Find a cheaper quote with the same quality and delivery schedule and we will not only match it, but give you an additional 5% discount!

### We are here to help

With quality and delivery guarantees we are always keen to 'add value' to your project. If there is a service we do not currently offer we want to know!



Thanks for your continuing support!

General Patterns new 'When Service Matters Most' Hotline.

USA: 011 44 1268 564616  
Europe: 0044 (0) 1268 564616

# Case Studies



## Visteon Air Ducts

### Problem/Challenge - Bridge Production

Faced with the daunting task of supplying production quantities of air induction ducts for Jaguars XKR8 in less than 6 weeks, Visteon, a premier supplier of Climate Control Systems, was struggling to find a solution. In light of the fact that the design had just been completed and tooling had not yet been released, a 6 week solution seemed hopeless.

### Solutions/Results - Rapid Tooling

General Pattern has supplied well over 1000 injection molds using our proprietary hybrid Rapid Tooling solution. In order to support Visteon's air induction duct requirements, 4 injection molds (each with multiple lifters) were built; with the intention of providing 4000 sets of parts as a means of "bridging" Visteon until production tools came on-line.

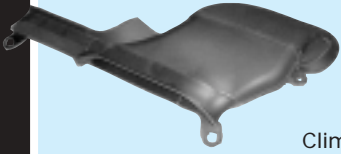
The challenge however was just beginning, Visteon air induction ducts also required assembly. General Pattern quickly went to work designing and building a multi-station Hot Plate Welding assembly line, capable welding of 500 sets per day.

### Benefit/Impact - Injection Moulding

Visteon began supplying Jaguar fully assembled and tested units, including PPAP documentation, in less than 4 weeks. In addition, due to uncertain design and product volumes, our Rapid Tools have gone on to produce production quantities in excess of 30,000 sets.

### Commercial

Performance 4 weeks



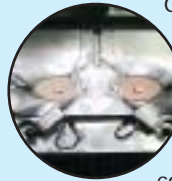
## Oakley Titanium Glasses

### Problem/Challenge - Bridge Production



When the need for a specialty series run of 2000 designer sunglasses presented itself to Oakley, the world's leader in sunglass technology, the company first thought it would have to let the opportunity pass them by. Traditional investment cast tooling for the titanium rims cost of \$100,000.00 and took 16 weeks, resulting in a missed opportunity.

### Solutions/Results - Rapid Tooling



General Pattern's radically different approach to tooling is not limited to just injection molds, but is well suited to all tooling requirements, including investment casting. That coupled with Laser Sintering's (LS) ability to produce parts, meant that prototype and production tooling could be produced in parallel.

### Benefit/Impact - Injection Moulding

At a cost of \$30,000.00 and 2 weeks, low volume markets once rejected as not profitable, are now a part of Oakley's sales strategy. Thus creating a new perspective for the mass customization of speciality eyewear.

### Commercial

Performance 14 days



## Oshkosh Truck

### Problem/Challenge - Low Volume Production

Oshkosh Truck the premiere manufacturer of class 7&8 trucks for the US Military was faced with a catastrophic situation. The Patriot Missile vehicles were built with an auxiliary battery that was catching fire (literally) as the trucks were being driven onto the transport ship bound for the Middle East. Oshkosh's engineering staff designed a new grounded cover that would eliminate the fire hazard. Timing was critical, Oshkosh needed 4000 covers in two weeks.

### Solutions/Results - Rapid Tooling

Oshkosh came to General Pattern with this important time sensitive situation. General Pattern's tool design staff worked with Oshkosh engineering staff to design a part that met or exceeded the specifications that was moldable in the timeframe needed. General Pattern's 24/7 approach to tool making and the application of our newly developed KBM (knowledge based machining), executed the large injection mold (12 x 18 x 12) with multiple side actions in less than 10 days and first parts in 13 days.

### Benefit/Impact - Low Volume Production

In 2 weeks Oshkosh Truck made field retrofits that eventually would tally 4000 units. The trucks are now in operation protecting our safety... "and the caissons keep rolling along!"

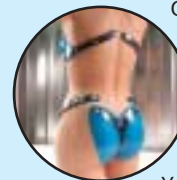
### Commercial

Performance -  
Tools completed in 2 weeks



## Atlantis Swimwear

### Problem/Challenge - Rapid Prototyping



General Pattern transforms great ideas into great products. Never was this more apparent than when Atlantis needed all of General Patterns "Suite of Rapid products" to produce a prototype of their newest swimsuit. Armed with little more than an idea, Atlantis, a New York fashion company, was seeking a new material alternative for swimwear. And as always, they had little time to "catch the wave" of the next fad.

### Solutions/Results - Rapid Prototyping

Utilizing General Patterns 24/7 services, we began by scanning a size 6 model. From there we built, refined, rescanned and rebuilt SLA & SLS models of the swimsuit. RTV molds were then built and polyurethane prototypes made by comolding two different durameter materials - all within 3 weeks.

### Benefit/Impact - Injection Moulding

New ideas often need new sources of funding to finance their development. Armed with proto-functional parts (that looked like production) Atlantis was able to secure the funding it needed to turn a good idea into a commercial success. Watch for the "SUIT" to arrive at a beach near you.

### Commercial

Performance 2 weeks



# GP PEOPLE

This edition - Worldwide Sales



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