

# POWDER

## NEWS



### NEW ORGANIZATION FOR customer cooperation

*Alrik Danielson, CEO of Höganäs, has called for greater cooperation to drive the P/M industry into innovative and profitable growth areas. A new organization led by Senior Vice President, Ulf Holmqvist, is in place to ensure successful partnerships.*

“At Höganäs, we understand that the only way for us to succeed is for our customers to be profitable and grow. Ultimately, success stems from providing a better and more competitive solution for the end user. And we can best accomplish this by working together more closely with our customers”, says the CEO of Höganäs, Alrik Danielson, who talked to Powder News about the untapped potential of the P/M industry and the company’s efforts to improve its partnership performance.

**The present scenario**

“Growth in some areas of the P/M industry is not as fast as it could be. There is not enough innovation or differentiation against other technologies. By not introducing new applications fast enough, we are leaving

opportunities on the table for competing technologies.”

**Closer cooperation in the value chain**

“The reason the industry is in its present position is because we do not work together closely enough. I want to emphasize that we can only win against competing technologies if we work together in the value chain. This company and its customers need to work more closely to create components and consumables with features that make it possible for powder to conquer new territory by delivering lower total costs for end users. It is only by providing more value and new solutions that we can grow faster using the fantastic potential of powder.”

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#### Joint expertise and resources

"Höganäs and its customers are interdependent. If we work independently, we don't have the resources to go after all the opportunities. Together, we have a unique palette of resources and competencies to take powder technology to the next level and conquer more territory."

#### Early involvement in design

"With most components the conversion to powder is done at a late stage in the transition. We need to get involved with our customers early on in the development process, so that we can work with the OEM. Then we can design using the full benefits of powder to lower the overall cost of making the product. One area in which this is already working is Soft Magnetic Composite (SMC) technology, where our early involvement in design is helping OEMs to improve the overall efficiency of electric motors. We know this approach works and we need to adopt it in more P/M partnerships."

#### Höganäs as a partner

"Our aim as a partner is to promote P/M technology, not to take over the role of the

customers. Höganäs will not make components, but will continue to produce powder-related products and services. We want to achieve closer cooperation with customers and greater involvement at the end user. It is our belief that this approach is crucial to develop the P/M industry for all concerned."

#### A new organization for cooperation

"Closer cooperation is a challenge for us and our customers. We are working very hard to prepare the company for this challenge. Therefore, we have put in place a dedicated group, a new organization within the marketing department, to ensure a customer-focused approach and create optimum conditions for future cooperation."

The new group is headed by Ulf Holmqvist, Senior Vice President responsible for Marketing and Product Innovation & Transition, who explains how the new organization will work and its benefits for customers and end users:

"We want to improve our performance as a partner. This new way of working has to be supported within the organization by a structure that makes us more receptive to customers' needs and wants. The new customer-oriented group will drive activities with the assistance of local sales forces

around the world. We will also bring in external people with the right expertise. The organization is worldwide and we will ramp up our resources as demand increases."

#### Improving understanding

"Better cooperation is based on gaining a better understanding of the needs and wants of the customer and end users. We will use industry scans, but we will also take time to listen. We don't want to impose our ideas. The best solution is one that we arrive at together with the customer."

"The more we understand, the more we can help. We want to be a driving force in helping customers to be competitive and create innovative solutions. We can combine our skills in powder technology with the customer's own expertise to add value to a component in a way that perhaps we or our customer could not do alone."

"Once we have identified a solution together we can use the resources of our Tech Center network in actual application development. The aim is that our customers will notice the new spirit of cooperation in a very tangible way, by finding that they are partnering us on an increasing number of development projects with OEMs."





# Open communication OPENS THE WAY TO SUCCESS

*What is the secret of a successful powder substitution programme? An Italian case study shows good communication is the catalyst for profitable cooperation.*

After a powder substitution programme in cooperation with Höganäs, the Italian company, Metalsinter s.r.l, began producing belt pulleys made from a tailored Starmix® composition in the autumn of 2005.

Metalsinter is now using one new composition customized for different geometries in the family of components.

"This is a success story that shows not only what Starmix® can do, but also how good cooperation can pay off for the customer and Höganäs," says Luigi Alzati who works at the Tech Center in Sweden and coordinated the programme. "What made this cooperation so smooth and simple is that it was based on good relations between our Sales Director in Italy, Riccardo Crosa, who initiated this project, and Metalsinter, whose attitude was strongly geared towards improvement. There was an open flow of information throughout the programme, between Metalsinter and us, and internally within the Group."

Metalsinter, based in Seregno near Milan, was established in 1969 and specializes in shaped parts such as gears, pinions, flanges and pistons for a wide range of applications.

## Rapid progress

Good communication meant the substitution programme could proceed rapidly from its beginnings in the early summer of 2005.

The starting point was discussions between

Metalsinter's production manager Giovanni Pozzi and Höganäs Italia's Riccardo Crosa, which led to Starmix® being proposed as a replacement for the existing premix iron-copper-carbon material being used to produce belt pulleys.

Starmix®, an optimizable bonded mix, is increasingly replacing premixes by offering opportunities to improve efficiency and productivity as well as obtain tighter tolerances. Good results are achieved by bonding ingredients to reduce segregation and enhance filling performance. This is especially valid for parts where the combination of complexity such as levels, filling and surface area makes the compaction operation the critical step of the whole production process.

"Through open communication it was easier for us to understand the needs of our customer and add extra value to our products by tailoring a mix that is specific for their application," says Daniel Edman, a bonded mix specialist at Höganäs. "We usually say that Starmix® is not our product, but our customer's, as it is tailored on the basis of the customer's application in terms of powder handling, geometry of the component and other factors."

## Productivity increases

After positive tests of the samples produced in the laboratory, production was scaled up at Stony Creek in the USA, and in the autumn

the first production lot was delivered to Metalsinter. "The customer, again, was astonished by the properties, but the most important point for them was what this meant in terms of increased productivity and production stability," points out Luigi Alzati. The successful outcome of the belt pulley project has created a good foundation for future cooperation on other components.

## Joint presentation

One spin-off from the substitution programme is a joint paper: *Reduced Weight Scatter Achieved with Bonded Powder Mixes* by Daniel Edman, Luigi Alzati (Höganäs) Giovanni Pozzi, Carlo Frediani (Metalsinter) and Riccardo Crosa (Höganäs Italia), which will be presented at the 2006 Powder Metallurgy World Congress in Korea in September.

"What makes the paper interesting is that it is based on a real production case, not a trial we designed. We have compared the results of Starmix® against the standard premix on the components in the substitution programme – four belt pulleys," says Daniel Edman.

The paper gives an insight on how total manufacturing costs can be reduced due to a combination of better material utilization and Starmix® characteristics such as superior filling that increase productivity.



# BRINGING GOOD COOPERATION WITHIN REACH

*The introduction of a new EU regulation on registration of chemicals is approaching fast. With the right level of cooperation and information, Höganäs can handle customer's registrations.*

The forthcoming EU chemical regulation – REACH (Registration, Evaluation and Authorisation of Chemicals) – is expected to be adopted by the end of 2006 and come into force in 2007. Katarina Edlund, an environmental engineer at Höganäs, says: “It means that all the substances we manufacture or import in quantities of over 1 tonne will need to be registered. There are over 30 key raw materials in our portfolio that fall within the scope of REACH.”

REACH is being introduced principally to provide better information about the effects of chemicals, and thereby improve protection of human health and the environment from chemical-related risks.

Höganäs is running a project until the end of 2007 to ensure full compliance with the new regulation. The project involves the development of a strategy and action plan, the securing of business agreements for each substance, and the creation of a portfolio of registered products. A REACH database will be created to hold the relevant product information.

“The project group will ensure our raw materials meet the REACH regulatory requirements, so that we can continue to

produce metal powders in Europe,” explains Katarina. “They will also ensure we have future supplies of registered raw materials for our European operations, including imports from outside Europe.”

As the REACH regulation imposes new duties on all those in the supply chain – producers, importers and users of chemicals – a major part of the project involves contacting, and cooperating with, suppliers and customers concerning substances and applications.

“Our raw materials must be registered either by us or our suppliers, and we will be talking to them about how we can best achieve this in particular cases,” states Katarina. “For our customers, it’s a case of the more we cooperate, the more we can help. The customer mixes that we make must be registered, and we need to talk to customers about how these materials are used in applications. We can offer a lot of support and, if we get sufficient information to establish exposure scenarios, we can actually handle our customers’ registrations for them.”

“I think preparing for REACH can be a positive process for our company and its suppliers and customers,” concludes Katarina.

“We will get to know more about our products and their applications. The collection of data will lead to a better understanding of the human health and environmental effects of our substances and that means the improved management of risks. The process also promises to improve supply chain communication and give us a better understanding of our customers’ needs.”

## REACH in brief

- Producers and importers have to register substances manufactured or imported in quantities of one tonne per year or more.
- Registering mainly involves presenting a hazard data set and risk assessment of uses for the substance.
- Registration is staggered: high-volume chemicals over 1,000 tonnes within three years, 100-1,000 tonnes within six years, and 1-100 tonnes within 11 years.
- Regulations apply to chemical substances on their own or in a preparation such as an alloy.
- The new European Chemicals Agency, based in Finland, will manage the technical, scientific and administrative aspects of the REACH system.





# Ensuring tight tolerances WITH ROBUST PREMIXES

*Höganäs is launching a concept that allows guaranteed specifications – Robust Premixes – to help customers meet today's demands for tight tolerances.*

“We have responded to customers’ requests for tighter tolerances in P/M component production by introducing a new concept that guarantees tight specifications on both Apparent Density (AD) and Dimensional Change (DC)” says Toste Jonsäter, Segment Manager Components at Höganäs.

The new concept, Robust Premixes, will be introduced from June onwards. “We have focused on two vital characteristics for components, AD and DC, and aimed to achieve tight tolerances in these two areas for Fe-Cu-C mixes by using sponge iron. However, what is really new is that we can guarantee the stability of these mixes by having tight specifications on AD and DC,” states Toste.

Stable Apparent Density (AD) is essential in production as it means exactly the right quantity of powder can be used to fill the tool. This ensures constant density, without having to make constant adjustments. Stable Dimensional Change (DC) guarantees minimal difference in the component after sintering.

Four different levels of AD and DC specifications will be available for Robust Premixes, depending on base materials (see table). Level four in the Robust Premix concept is for the tightest tolerances and offers a guaranteed specification range of 0.08 g/cc AD and 0.06 % DC.

	Mixes based on:	AD spec range	DC spec range
Level 4	PM 0205 and PM 0208	0.08	0.06
Level 3	SC100.26 + Distaloy Cu	0.10	0.07
Level 2	SC100.26 + Cu-100 NC100.24 + Distaloy Cu	0.10	0.08
Level 1	NC100.24 + Cu-100	0.10	0.09
Normal premixes		0.14	N.A.

“Customers will benefit from using the Robust Premix concept in critical component applications by being able to achieve better tolerances than they can with atomized powder,” emphasizes Toste. “We guarantee a very stable AD, which makes life easier for the customer in their own production routines, as there is far less time involved in setting up the presses and in making adjustments between lots.”

Robust Premixes are particularly suitable for end products that have demanding final tolerances, such as:

- VVT (Variable Valve Timing) parts
- Rotors in oil pumps
- Shock absorbers for vehicles and motorcycles

**Sponge powders for close tolerances**  
Höganäs has manufactured sponge iron for almost 100 years and remains the world’s largest producer. Initially supplied to Swedish

steel makers, the company’s sponge iron powders were used in the compacting and sintering developments of the 1930s to establish the basis for today’s P/M industry. Other iron powder production methods such as water atomization were developed in the 1950s, but sponge iron powders remain highly relevant to modern needs.

## Greater consistency

Höganäs sponge iron powders for the P/M industry are produced from virgin material which ensures greater consistency.

As the trend towards closer tolerances has gathered pace, having a base material with low dimensional scatter has become more important. Because it is possible to achieve lower dimensional scatter with sponge iron than with most atomized powders, there has been growing interest in sponge iron powder as an alternative for medium-strength applications in which close tolerances are a necessity.

The new Robust Premixes concept takes the development of sponge iron powder one step further by focusing on AD and DC guarantees. It marks the latest stage in the enduring and distinctive appeal of sponge iron powder, which is proving to be highly suitable for today’s pursuit of tighter tolerances.



# SEIZE THE SMC automotive advantage

*The number of small electric motors used in automobiles is rising fast. Lars Hultman, Market Development Manager SMC Technology at Höganäs, looks at the trend and highlights new opportunities for innovative SMC-based electric motor designs.*

**Today's automobiles already contain 50-100 electric motors. Why will there be more?**

There are increasing consumer demands for improved vehicle performance, comfort, safety, functionality, emission control and fuel economy. These demands are to an increasing degree leading towards electric systems. This trend will accelerate, especially with the introduction of more powerful electric generation systems and batteries, which will enable electrification of more vehicle subsystems.

**Why does this trend create an opportunity for SMC technology?**

The increasing number of high electrical energy-consuming applications makes electric motor efficiency a far more important design consideration than before. We can therefore expect a shift from the commonly used PM BDC motors towards higher efficiency motors such as Permanent Magnet Brushless DC (PM BLDC) as well as demand for innovative

high-efficiency motors in new automotive applications. The SMC concept is very suitable for creating various types of highly efficient motor, including PM BLDC, that are smaller and lighter due to the unique 3D features of the material.

**How would you describe the SMC concept?**

Somaloy® is our single brand in the SMC segment, and a component in this isotropic material has the ability to carry magnetic flux in 3 directions giving unique 3D properties. Add the 3D-shaping capability of the P/M-process and you have a way to improve or create new topologies in the design of innovative, compact and powerful electromagnetic machines for various uses, including automotive applications.

**What is the current status of SMC in the automotive sector?**

SMC is already an established solution in automotive applications. These include pulse transformers for ignition systems (Delphi Corp), linear actuators for diesel fuel injectors (Robert Bosch & Denso), ABS Oil pump motor (Aisin Seiki) and power torque steering sensor (Fine Sinter).

**What advantages does an SMC solution provide in practice?**

One of the best examples is the rotor for the Aisin Seiki PM BLDC ABS oil pump motor. Somaloy® technology, with its intrinsic freedom to apply 3D design, has been used to gain benefits such as commutator integration

inside the rotor, tighter copper winding and magnetic flux improvements. The result was a more compact solution with comparable performance, 36% shorter and 17% lighter than the laminated predecessor.

**Which new applications is SMC suited for?**

There are excellent opportunities for high-efficiency SMC components such as stator parts especially in the most energy-consuming applications that run constantly or for long periods such as: air-conditioning, water pumps, oil pumps, electric power assisted steering and many more. SMC can also be beneficial in the design of applications that operate intermittently such as starter motors and seat motors.

**How can Höganäs help customers adopt SMC solutions?**

We have led the development of SMC materials and amassed unique knowledge on applications. Our assistance extends all the way to motor design/analysis capabilities using 3D-FEA tools. We are currently involved in many application projects with component manufacturers and end users in the automotive industry. There is increasing interest in SMC within the automotive sector and the time is right to create new close partnerships and seize the SMC advantage in more automotive applications. We look forward to your challenging Somaloy® application development projects!



# Combating Iron Deficiency Anaemia

*Höganäs is helping to reduce IDA by advocating flour fortification and providing a new iron powder – NutraFine™ – for the world food industry.*

The World Health Organization (WHO) ranks iron deficiency among the world's top 10 most serious health problems, affecting 4-5 billion people. Over one billion people suffer from the severe form, Iron Deficiency Anaemia (IDA).

Iron deficiency undermines physical health, impairs mental development and increases the risks for pregnant women during childbirth. There are also serious socio-economic consequences. In the worst affected countries, iron deficiency is responsible for losses of up to 2% of GDP.

## Focus on food fortification

Food fortification, adding vitamins and minerals to the foods that people eat every day, has proved to be an efficient, cost-effective way to deliver micronutrients, such as iron, to mass populations.

Höganäs participates in GAIN (Global Alliance for Improved Nutrition) and was one of the charter members of the GAIN Business Alliance for Food Fortification (BAFF) in 2005. Supporters of GAIN include UNICEF, the World Bank, WHO, World Food Programme, US Aid and the Micronutrient Initiative. Other companies involved in BAFF include Unilever, Heinz, Danone, DSM, BASF, Tetra Pak and Coca-Cola.

In March, Höganäs was represented at a BAFF meeting in London, where it was announced that GAIN was to receive US \$20 million from the Bill & Melinda Gates Foundation for nutrition programmes in ten developing countries.

GAIN, a non-profit-making foundation, is developing a 10-year strategy to achieve a number of set targets that involve reducing the prevalence of vitamin and mineral deficiencies by reaching people with fortified food. The aim is to achieve results at a cost of less than 25 US cents per person, per year.

"GAIN has very specific goals and we felt it was one of the more suitable organizations for the company to support in efforts to combat IDA," says Patricia Jansson of Höganäs. "We focus particularly on flour fortification initiatives within BAFF. Interaction in this group gives us the input we need to develop the right products for food applications."

## A new iron fortification product

Höganäs has been producing high purity iron powders since 1910. High purity has opened up application areas such as Soft Magnetic Composite (SMC) technology and provided the basis for a product aimed at the food industry.

"There are a lot of production methods approved for the elemental irons used in the food sector," states Patricia. "Höganäs is in the unique position of having all of these production methods. This meant we could develop a unique iron fortification product that can provide good bioavailability which

is a cost effective option that meets the GAIN target. Our objective was to create a product that can benefit people all over the world."

## NutraFine™ RS is launched

The result was the NutraFine™ brand, a powder range specifically for iron fortification applications in the food industry. Research important in the development of the first product, NutraFine™ RS, is outlined in a paper by Bo Hu "A Study on Elemental Irons and Iron Compounds for Food Fortification", which was presented at the conference "Nutrition Safari 2005", part of the 18th International Congress of Nutrition in South Africa. NutraFine™ RS was successfully introduced in North America, the company's largest single market for iron fortification, in 2005, and launched globally in 2006.

"With the NutraFine™ range and our manufacturing capacity, we are able to meet the demands for mass iron fortification of wheat and cereal products, and thus contribute to the global effort to reduce IDA," concludes Patricia.

The problem of IDA and the benefits of iron fortification are highlighted on the dedicated website: [www.ironfortification.com](http://www.ironfortification.com)

# ONWARDS AND UPWARDS IN JAPAN



The Swedish Ambassador Mikael Lindström, Carl-Gustav Eklund of Höganäs Japan KK and the former Chairman of JPMA Nobuo Furukawa.

*This year, Höganäs celebrates 50 years in Japan, one of the world's biggest and most exciting P/M markets.*

It is 50 years since Höganäs first entered the Japanese market as a supplier of sponge iron powder. Five decades on, the company has developed into a leading player in the market and a driving force for the Japanese P/M industry. To celebrate the 50-year-milestone, Höganäs Japan KK (HJKK) hosted an anniversary celebration at the Swedish Embassy in Tokyo in April for over 100 customers, suppliers and company staff.

The pioneering work of Sven Hulthen in the Japanese market from 1956 onwards, in cooperation with Gadelius, cannot be overestimated. He played an important role not just in establishing the reputation of Höganäs, but also in developing the P/M industry as a whole in Japan.

#### Long-term commitment

Höganäs founded the subsidiary, Höganäs Japan K.K., in 1985. "The establishment of our own company showed our total long-term commitment to serve the Japanese market," says Carl Eklund, President of HJKK.

The next big step was the opening of the Saitama mixing plant, 90 km northwest of Tokyo, two years later. "The company was then able to introduce the latest bonded mix technology, Starmix®, in Japan. The reaction was very positive and our market share grew steadily."

Today, Höganäs Japan K.K. has one-third of the Japanese market. "We are the leader in supplying value-added powders to the P/M industry, and have strong positions in

surface coating, oxygen absorbers and carrier cores. We also lead in the expanding area of SMC applications," states Carl.

This year, the Saitama plant has been able to increase capacity for press-ready mixes by 50% to support growth.

Sustaining long-term business partnerships has been vital to the company's success in Japan, says Carl: "The key factor has been the building up of a very competent Japanese organization since the start of HJKK. We are able to fully support our Japanese customers in the local language. We have also focused on just-in-time deliveries and meeting the demands for high quality from Toyota and our other P/M and powder customers."

#### An exciting future

Japan, along with Asia, US and Europe, is one of the four major P/M markets. End users in the Japanese market are growing strongly. Expansion of Japanese automotive producers in Japan and around the world, led by Toyota, is creating good growth prospects for the P/M industry.

Looking ahead, Carl says: "Our aim is to build the future of our own business as well as a better future for the whole P/M and powder industry. We will work towards expanding the total market by new innovations and utilizing our large R&D department, which leads the field in Japan."

"The potential for growth is enormous," he continues. "There is a rapid increase in SMC applications and HEV hybrid vehicles represent the real Holy Grail. High-density materials offer good possibilities and new high-strength materials will help to open the way towards P/M gears. Japanese Customers are good development partners for Höganäs, and we look forward to an exciting future."



Alrik Danielsson, CEO of Höganäs, Mikael Lindström, Swedish Ambassador, Carl-Gustav Eklund, HJKK welcome mr Shigehide Takemoto from Toyota.



Hitachi management with new president mr Fujinami and Jan Tengzelius, Höganäs.



Guests gathered around the delicious buffet.



Alrik Danielsson, CEO of Höganäs and Yoshiki Asano of SKF Japan, another Swedish company with a long history in Japan.

## Höganäs

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