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Suzhou Hechang Polymeric Materials., Ltd

ProTec Polymer Processing

User report with Suzhou Hechang Polymeric Materials, Ltd.

Cooperation spanning the world: Chinese plastics processor uses German LFT technology

Chinese supplier HCJH produces high quality long fiber reinforced plastics in pellet form for numerous international automotive manufacturers. Key factors in their success are innovative compounds and custom materials development and this explains the company‘s high research spending. HCJH is using an LFT pultrusion line from ProTec, Germany, to mass produce the pellets.

Suzhou, where over ten million people live and work, is a booming industrial city close to Shanghai. International corporations such as Samsung, LG, Mazda and Nissan have a presence in the region. One of their suppliers is Suzhou Hechang Polymer Materials Ltd. (HCJH), a manufacturer of polymer compounds.

Long fiber reinforced thermoplastics (LFT), which the company often develops on a custom basis to solve complex problems, are a key element of their business. HCJH holds 35 patents and around 60 of its 220 staff are employed in technical roles, including in their in-house R&D technology center. “We compound polymers to create novel, high quality materials which are innovative and environmentally friendly”, explains Vice General Manager Shi Yaoqi. “At present, we are focusing on lightweight and heat-resistant materials and long fiber reinforced plastics.”

HCJH is relying on dependable German technology to produce the high-quality LFT compounds: ProTec, the one-stop system supplier from Bensheim, supplied the most recent pultrusion line which was commissioned in March 2017. This line approximately doubled HCJH‘s LFT production capacity. Up to 1,000 kg/h of pellets can be produced using any conventional thermoplastics as well as biopolymers such as PLA as the matrix and glass, steel, carbon, and aramid fibers as the reinforcement.

The LFT pultrusion line is approx. 30 m long and was adapted to the space available at Chinese plastics processor HCJH.

Photo: ProTec Polymer Processing GmbH

“We were looking for a line capable of combining high speed production with good pellet quality.Top quality is crucial on the Chinese LFT market, in particular for our customers in the automotive and household appliance industries.”

Shi Yaoqi, Vice General Manager, Suzhou Hechang Polymeric Materials, Ltd.

left:
Production starts from a creel holding 64 bobbins.

right:
The line handles 64 strands and produces up to one metric ton of LFT pellets per hour which are supplied to customers from the automotive industry and other sectors.

Photos: ProTec Polymer Processing GmbH

Lightweight components for the automotive industry

HCJH is currently primarily using the line to produce poly-propylene and glass fiber composites which are mainly delivered to automotive sector customers for producing moldings such as front-end modules, instrument panel carriers and sliding roof frames. Using LFT pellets means the moldings can combine light weight with high load capacity.

The length of the fibers corresponds to the pellet length which is usually 10 to 12 mm at HCJH. The pellets are easy to store and be injection molded into components with very good surface quality and excellent mechanical properties.

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High quality is crucial

“We were looking for a line capable of combining high speed production with good pellet quality”, says Yaoqi. “Top quality is crucial on the Chinese LFT market, in particular for our customers in the automotive and household appliance industries.”

HCJH came across the German company at the 2015 Chinaplas plastics and rubber trade fair and just under a year later the deal was clinched: HCJH would purchase a 64 strand LFT pultrusion line and a SOMOS® Gramix gravimetric dosing and mixing system, likewise from ProTec. An existing extruder was to be integrated into the line.

“What sets us apart is that, being a one-stop shop, we can supply complete solutions that include planning, construction and commissioning”, says Peng Fei, General Manager at ProTec Polymer Processing in Shanghai. “And we can make use of our own components for dosing, drying and conveying or integrate the customer‘s existing units.”

Test line in Bensheim

If you want to see a complete ProTec solution in operation, there‘s no need to travel all the way to Asia. ProTec‘s technology center in Bensheim has a fully automated LFT line with peripherals on which potential customers can carry out extensive testing. The resultant pellets and sample components can immediately be analyzed in the adjacent laboratory. Drawing on many years of experience with pultrusion, ProTec can also provide in-depth advice about formulations and potential applications of long fiber reinforced thermoplastics.

In the case of HCJH, the new line was in particular required for producing pellets with glass fiber contents of 30, 40 and 50 weight per cent. Even fiber contents as high as 65 weight per cent are possible on ProTec‘s LFT line.

Standard and custom LFT lines

As standard, a ProTec LFT line consists of a creel which holds and simultaneously unwinds a number of fiber bobbins, a chucking device with combs for guiding and tensioning the fiber strands and an extruder for melt preparation. In addition, there is a die for impregnating the fibers with the polymer melt and a water bath for cooling the coated strands, while a puller as drive unit conveys the fiber strands. The strands are then chopped to length in a pelletizer. A central control module with touch panel controls the individual components of the line, for example automatically coordinating them in the event of a variation in line speed or pellet chopping length.

The LFT line was adapted to local circumstances for HCJH, for example to the extruder provided by the customer and the dimensions of the production shop in Suzhou where the approx. 30 m long line was to be set up. The dosing unit was also mounted on the extruder using a special flange to save space.

top and middle:
In the tensioning device, fiber strands are finely separated and uniformly aligned to ensure that each filament is individually coated. This process ensures the exceptional quality of the composite.

bottom:
The puller ensures that the strands are evenly and precisely pulled along the entire line.

Photos: ProTec Polymer Processing GmbH

“The line is very simple to operate and is extremely reliable”

Shi Yaoqi, Vice General Manager,
Suzhou Hechang Polymeric Materials, Ltd.

ProTec Polymer Processing

left:
Products manufactured using the LFT pellets that HCJH produces on the line include front-end modules.

right:
Vice General Manager Shi Yaoqi in front of the LFT line.

Photos: Suzhou Hechang Polymeric Materials Ltd.

Integrating the extruder into fully automated operation

The extruder was additionally integrated into the line controller so enabling retrieval and direct adjustment of rotational speed and temperature via the touch panel. “The controller also stores the extruder parameters for each formulation. This simplifies operation since all relevant line parameters can be retrieved by touch”, explains Omar Metwaly, project manager at ProTec Polymer Processing in Bensheim. “Each unit can be individually controlled. So an operator can initially run the line in manual mode to adjust the individual components and then change over to automatic mode.”

The new line was delivered to Suzhou in late 2016 and installation by ProTec staff from Shanghai and Bensheim began the following February. By the end of the month, HCJH staff were able to start initial test runs and expressed their great satisfaction. “The line is very simple to operate and is extremely reliable”, says Yaoqi. He is keen to emphasize the particularly uniform fiber impregnation, flexibility in formulation and possibility of fully automated operation.

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