

# New Bumper Grade Extrusion Technology

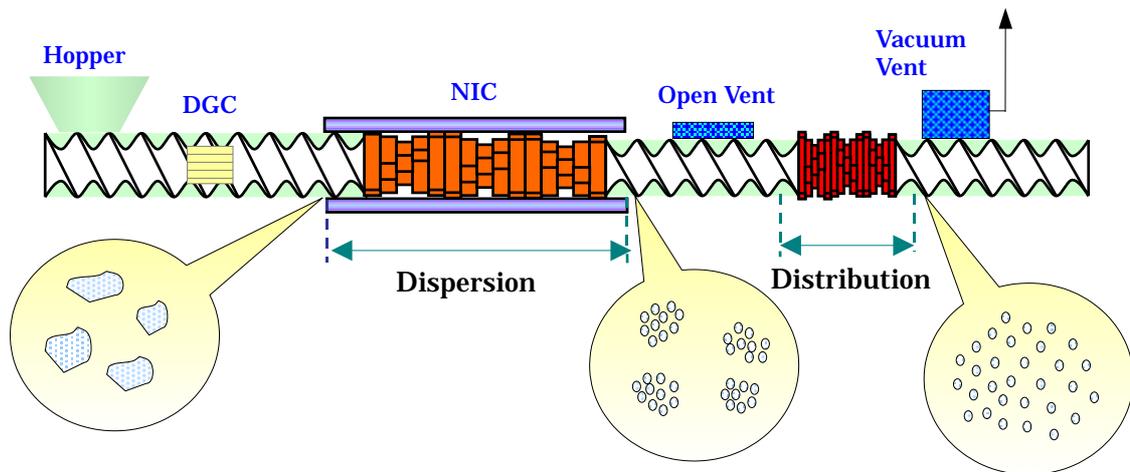
## 1. Background

Automobile bumpers made of plastics have been used more and more. At the beginning, most of them had been made of urethane. However, they are being replaced by PP-base plastics in many types of cars in order to improve productivity and to make efforts for recycling.

There are some different PP grades for bumper use, for example, to secure the high fluidity of PP or to improve mechanical properties. Besides that, various kinds of rubber with different viscosity are added and fine talc powders of 2~3 $\mu$ m are mixed into PP base resins at the rate 10~25 %. Compounding of these new bumper grades are getting more difficult because of complicated material blend to sufficiently improve bending elastic modulus and impact strength of the products.

We introduce here the latest compounding technology developed by JSW for these new bumper grades using our twin screw extruder, TEX.

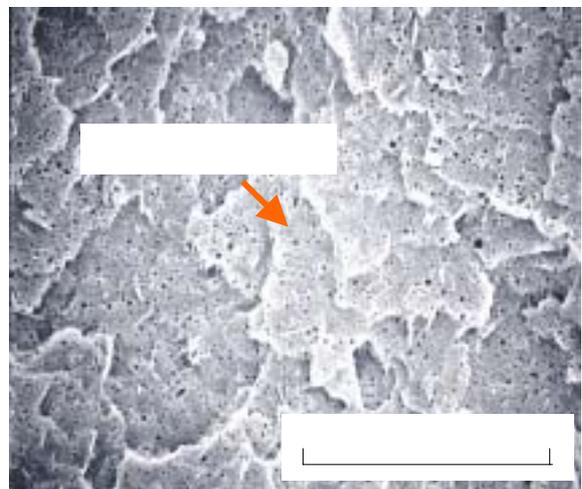
## 2. System flow



## 3. Dispersion analysis by test operation

Test equipment : TEX65 $\alpha$  II -52.5PW-2V  
Material : PP + Rubber + Talc (20%)

Result : Good dispersion can be achieved in wide extrusion range 650 ~ 1150 kg/h.

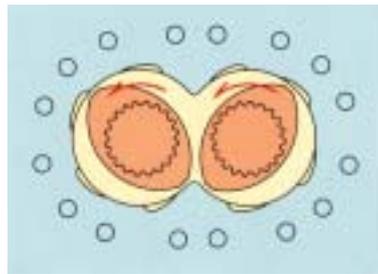


Dispersion of rubber (SEM)

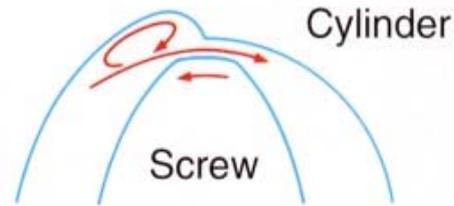
## 4. Features

### 1) Excellent kneading performance

1. Dispersion condition can be significantly improved because rubber is effectively broken up in PP at lower temperature using kneading discs with appropriate width and optimum stagger angle.
2. Kneading at lower temperature can be achieved because localized heat-up is prevented due to lower shear speed reduced by tip clearance control between screws and cylinders.
3. Using NIC (Special Kneading Cylinder), higher kneading efficiency can be achieved due to repeated shear stress variations.



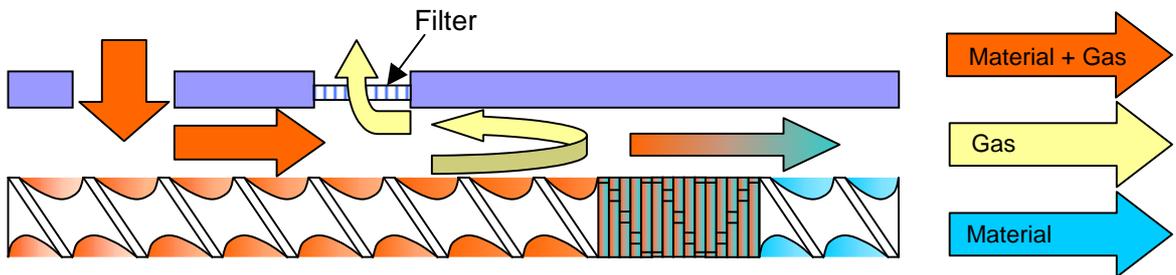
Section of NIC



Kneading effect in tip clearance

### 2) Higher capacity

1. Higher capacity can be acquired because gas is exhausted better from the open vent by optimized tip clearance and stagger angle of kneading disks.
2. Material feeding into the extruder is significantly improved by means of DGC (De-Gassing Cylinder).



DGC System flow

## 5. Afterwords

Plastic parts are in wide demand in recent automobile industry and they require quite high performance both in exterior and interior applications. We have delivered over 50 sets of TEX to produce automobile bumpers so far and we are going to promote further development of technology to achieve improved quality and higher capacity in smaller machines in corporation with our customers.

Four kinds of twin screw extruders, TEX30, TEX44, TEX65 and TEX90 are ready for your trial in our Plastics Machinery Developing Center in Hiroshima, Japan. You can test the system actually using your plastics material.

### For more information ; THE JAPAN STEEL WORKS, LTD.

Sales Dept./Tokyo      Hibiya Mitsui Bldg., 1-2, Yurakucho 1-chome, Chiyoda-ku, Tokyo, Japan 100-8456  
Phone : +81-3-3501-6134      Fax : +81-3-3595-4621

Hiroshima Plant      6-1, Funakoshi-minami 1-chome, Aki-ku, Hiroshima-city, Japan 736-8602  
Plastics Machinery Dept.  
Phone : +81-82-822-5515      Fax : +81-82-824-1512

Home page address : <http://www.jsw.co.jp/>