Issue

Noise and dirt accumulated in the bottom of automobile doors. One part (called a sill plate) needed to be developed to seal noise and dirt along the entire door, in the process replacing 20 other parts that required difficult assembly. A new semi-rigid compound needed to be developed and manufactured.

Breakthrough Strategy

Measure	A process map revealed the key output and input variables for the sill plate that could cause shrinkage. The Gage R&R study showed the measurement system was adequate.
Analyze	A Taguchi DOE with 5 factors and 2 interactions was designed to evaluate which factors had an impact on part shrinkage. The results showed a strong effect of vacuum, cooling #1, and infrared heaters and no significant interaction. Production parameters were modified with dramatic results. A full factorial DOE with 3 factors was performed to optimize process parameters.
Improve	Results of a study on infrared heater settings were analyzed with One-way Anova and found to have significant differences. Alternate compounds were evaluated for processing effects, attribute of appearance and surface, and shrinkage of the final part and punchouts.
Control	Extrusion operators continued to follow the Control Plan. Productivity measured with output per shift increased. A punchout sample is collected periodically. These samples are measured several days later to record the amount of shrinkage that occurs.
Results	Specific results include providing continuous, on-time supply to the customer, establishing optimum process conditions, and increased output per shift of over 20%.
Savings	Scrap recovered saved $23,000. Improved compounds will save $8070 per month. Improved operations meant avoidance of an appropriation for a $45,000 piece of equipment.