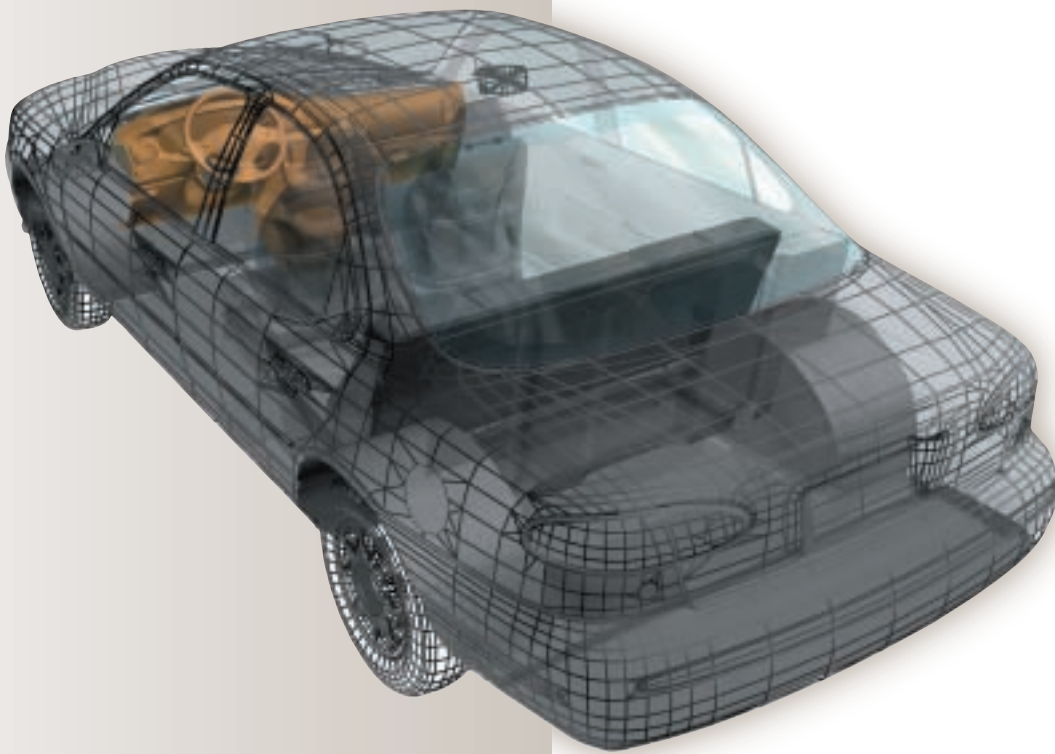


Maximizing *Instrument Panel* P E R F O R M A N C E



Innovating *Solutions* to help you meet every IP Performance Challenge

The components that comprise the instrument panels of the vehicles you're designing today must meet performance criteria that were unheard of 10 years ago. Aesthetic expectations, cost issues, weight considerations, safety regulations, even the role the IP plays in the structural integrity of the vehicle—each new demand makes IP design and manufacturing a little more daunting.

For each new challenge, Dow Automotive, a business unit of The Dow Chemical Company and its subsidiaries, is ready with the materials you need to succeed. Working with OEMs and their molders, we've explored and created ways to improve occupant safety, consolidate parts, reduce weight, enhance design flexibility, ease processing and decrease costs.

Key to this pursuit is our commitment to developing innovative IP materials. The global leaders in PC/ABS resin technology and application, Dow Automotive developed the automotive industry's most trusted IP engineering resins, PULSE* 830 for North America and PULSE A35-105 for Europe. A balanced combination of superior heat resistance, cold-temperature impact, processability, paintability and aesthetics made these the IP materials of choice for many OEMs and their molders. PULSE 830 and PULSE A35-105 became the workhorse resins for IP retainers, panels, structural ducts and knee bolsters and enabled us to easily meet many design and molding challenges.

You've counted on us for innovations that have included the first structural IP, an advanced design that addressed energy management, weight, cost and structural challenges by capitalizing on the amazing ductility of our engineering resins. You've counted on us for solutions applicable to the cars you're building around the globe. And you can count on us to develop the materials that will help shape the IPs of the future.



Outstanding flexibility for designers, superior performance for molders and unrivaled physical and thermal properties in the vehicle have made PULSE PC/ABS resins the preferred material for almost every key component of the IP.

Current Dow Automotive IP Materials

PULSE* engineering resins
MAGNUM* ABS resins
CALIBRE* polycarbonate resins
DOW PolyPropylene RESiNS*
VORANOL* polyether polyols
PAPI* polymeric MDI
INTEGRAL* adhesive films
RETAIN* post-consumer recycled content resins
SPECFLEX* polyurethane foam systems
TYRIL* styrene-acrylonitrile resins

IP Application Areas

- IP retainer, panels, knee bolsters and trim
- IP foam, ankle bolsters
- Soft coverstock to substrate
- Covered or painted IP components
- Air bag doors
- IP lenses

Supporting *IP Concept* to IP Complete

Application development and design

A broad range of products makes us “material neutral,” free to help you create the optimal design, not one that capitalizes on a specific material. Best-in-class materials, computer-aided design and engineering (CAD/CAE), finite element analysis (FEA), concept development and material selection capabilities—Dow Automotive brings them all to bear on your IP challenges. But it’s our years of listening and learning, working side-by-side with you, our OEM and Tier One customers, that enables us to deliver custom solutions to meet your IP requirements.

Validation and testing

To test these solutions we use comprehensive prototyping, testing, and validation processes. We perform static and dynamic material property characterization and state-of-the-art component-level impact testing to determine energy management potential, and validate longer-term performance in an environmental chamber that replicates hot, cold or ambient in-vehicle conditions.

Processing and equipment selection

Our Technical Service & Development specialists understand and have experience with numerous processing technologies including low-pressure injection molding, gas-assist injection molding, and blow molding. This expertise is invaluable as we recommend the optimum processing technology and molding equipment for your specific IP application.



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Technology such as CAD, CAE and FEA enables designers, molders and automakers to determine optimum use of materials throughout the IP system. While issues such as energy management and cost control are always in focus, our technical capabilities enable us to address structural integrity, weight reduction, electrical/electronic pathways, HVAC flow and aesthetics long before major investments in modeling and tooling.



Optimizing *Performance* with P U L S E 2 0 0 0 E Z

One of our most recent innovations, PULSE 2000EZ engineering resin provides dramatic productivity increases for molders and greatly enhanced design flexibility, aesthetic value and low-temperature impact performance for OEMs.

The new IP workhorse

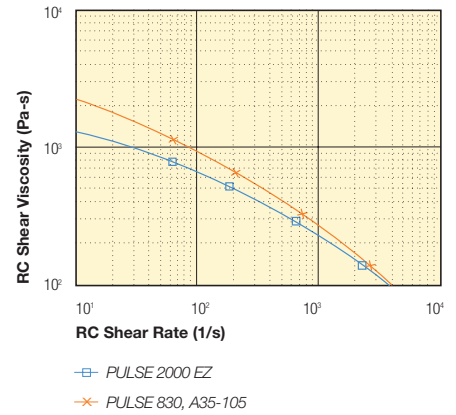
A commitment to improve materials already considered to be best-in-class has made Dow Automotive a leading global supplier of engineering resins. It's this commitment that drove us to develop PULSE 2000EZ.

While equivalent material properties make PULSE 2000EZ a virtual drop-in resin for the IP tasks accomplished so well by PULSE 830 and PULSE A35-105, this new engineering resin brings far more speed and flexibility to IP design and manufacturing. Though it pulls the same weight as PULSE 830 and PULSE A35-105, PULSE 2000EZ is also a racehorse.

Faster cycle times, lower temperatures, better parts

PULSE 2000EZ is built for speed. Created with a proprietary technology that enables it to melt at lower temperatures and fill intricate molds at lower injection pressures via fewer gates, PULSE 2000EZ increases throughput by reducing cycle times. Alternatively, it lowers the clamp force requirements of the molding machine and reduces the tooling investment costs. PULSE 2000EZ produces interior components with the physical and thermal properties that made PULSE 830 and PULSE A35-105 so popular. But now you can have components with reduced polymer heat history, less molded-in stress, broad temperature performance, thinner walls, fewer weld lines and excellent paintability, plus the lower odor and emission values inherent in products from Dow Automotive. And you can have it all faster than ever.

Shear Viscosity Comparison



PULSE 2000EZ demonstrates a significantly lower resistance to flow than PULSE 830 and PULSE A35-105 throughout the entire shear rate range shown. This reduced viscosity means PULSE 2000EZ can be processed at lower temperatures to cut cycle times, out-performing the traditional workhorse PULSE 830 and PULSE A35-105.





Converting to *PULSE 2000EZ* is easy – a n d h a r d.

Many of our Tier One molder customers have a strong allegiance to the material they've used successfully for engineering components for more than 10 years—our workhorse IP resins, PULSE 830 and PULSE A35-105. What did it take to convert one of them to PULSE 2000EZ? Complete Technical Service & Development (TS&D) support—one of the things you can always count on from Dow Automotive. TS&D supported the molder through trials that clearly demonstrated the superior flow characteristics and improved aesthetics provided by the new material. The fact that PULSE 2000EZ engineering resin was a virtual drop-in for PULSE 830 and PULSE A35-105 helped ease the transition, as did the significant reduction in cycle times. The clincher was likely the day the OEM approved the new material for full production on a high-volume 2001 platform. But it was still like leaving an old and trusted friend.

We Listen. We Deliver.



Dow Automotive

World Headquarters

Dow Automotive

1250 Harmon Road

Auburn Hills, Michigan 48326

Phone: 248-391-6300

Fax: 248-391-6417

Email: dowautomotive@dow.com

www.dowautomotive.com

European Headquarters

Dow Automotive

Am Kronberger Hang 4

65824 Schwalbach

Germany

Phone: + 06196 566 606

Fax: + 06196 566 432