SDPPL Logo

SDPPL - SD Polymer Pvt Ltd

TECHNICAL DATA SHEET

PP-IM (Impact Modified Polypropylene)

Empowering Plastics Through Technology

High Impact Strength • Low Temperature Performance • Excellent Toughness

45+ Years of Excellence in Polymer Compounding

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Product Overview

SDPPL’s Impact Modified Polypropylene (PP-IM) compounds deliver superior toughness and impact resistance across wide temperature ranges. These grades are specially formulated with elastomeric impact modifiers to provide excellent balance of stiffness, toughness, and processability for applications requiring high impact strength, especially at low temperatures.

Product Family: PP Compounds
Grade Series: SDPP-IM Series
Applications: Automotive bumpers, appliance housings, packaging, consumer goods
Certifications: ISO 9001:2015, IATF 16949:2016, ISO 14001:2015

Key Features & Benefits

Feature	Benefit
Excellent Impact Resistance	Superior toughness even at low temperatures (-20°C to -40°C)
Balanced Properties	Optimal combination of stiffness and toughness
Good Flow Characteristics	Easy processing and fast cycle times
Dimensional Stability	Maintains shape under load and temperature variations
Wide Processing Window	Forgiving processing with consistent quality
Cost-Effective	Economical solution for impact-critical applications

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Product Grades & Specifications

Standard Impact Modified Grades

Property	Test Method	Unit	PP-IM10	PP-IM15	PP-IM20
Impact Modifier Content	Internal	%	10	15	20
Tensile Strength	ISO 527	MPa	24-28	22-26	20-24
Tensile Modulus	ISO 527	MPa	1200-1400	1000-1200	900-1100
Flexural Strength	ISO 178	MPa	32-38	28-34	25-30
Flexural Modulus	ISO 178	MPa	1100-1300	950-1150	850-1050
Impact Strength (Notched Izod, 23°C)	ISO 180	kJ/m²	8-12	12-16	16-22
Impact Strength (Notched Izod, -20°C)	ISO 180	kJ/m²	4-6	6-9	9-13
Impact Strength (Notched Izod, -40°C)	ISO 180	kJ/m²	2-3	3-5	5-8
Heat Deflection Temperature (0.45 MPa)	ISO 75	°C	85-95	80-90	75-85
Melt Flow Index (230°C, 2.16 kg)	ISO 1133	g/10 min	18-28	15-25	12-22
Density	ISO 1183	g/cm³	0.89-0.91	0.89-0.91	0.88-0.90

High Flow Impact Modified Grades

Property	Test Method	Unit	PP-IM10HF	PP-IM15HF
Impact Modifier Content	Internal	%	10	15
Tensile Strength	ISO 527	MPa	23-27	21-25
Flexural Modulus	ISO 178	MPa	1100-1300	950-1150
Impact Strength (Notched Izod, 23°C)	ISO 180	kJ/m^2	9-13	13-17
Impact Strength (Notched Izod, -20°C)	ISO 180	kJ/m^2	5-7	7-10
Heat Deflection Temperature (0.45 MPa)	ISO 75	°C	83-93	78-88
Melt Flow Index (230°C, 2.16 kg)	ISO 1133	g/10 min	35-50	30-45
Density	ISO 1183	g/cm^3	0.89-0.91	0.89-0.91

Note: HF = High Flow grades designed for thin-wall applications and complex geometries

Impact Modified with Mineral Reinforcement

Property	Test Method	Unit	PP-IM-TF15	PP-IM-TF20
Impact Modifier Content	Internal	%	10	10
Talc Content	Internal	%	15	20
Tensile Strength	ISO 527	MPa	28-32	30-34
Flexural Modulus	ISO 178	MPa	2200-2600	2600-3000
Impact Strength (Notched Izod, 23°C)	ISO 180	kJ/m^2	6-9	5-8
Impact Strength (Notched Izod, -20°C)	ISO 180	kJ/m^2	3-5	2.5-4.5
Heat Deflection Temperature (0.45 MPa)	ISO 75	°C	100-110	105-115
Melt Flow Index (230°C, 2.16 kg)	ISO 1133	g/10 min	20-30	18-28
Density	ISO 1183	g/cm^3	1.00-1.03	1.03-1.06

Note: These grades combine impact resistance with enhanced stiffness for applications requiring both properties

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Impact Modifier Technology

Elastomeric Impact Modifiers:

- **EPR (Ethylene-Propylene Rubber):** Excellent low-temperature impact, good compatibility
- **EPDM (Ethylene-Propylene-Diene Monomer):** Enhanced weathering resistance
- **POE (Polyolefin Elastomer):** Superior impact/stiffness balance, excellent processability
- **Reactor TPO:** In-situ polymerized for optimal dispersion and properties

Morphology & Performance:

- Finely dispersed elastomer particles (0.1-2 microns)

- Optimized particle size distribution for maximum toughness
- Controlled interfacial adhesion for energy absorption
- Minimal impact on stiffness and heat resistance

Typical Applications

Automotive:

- Bumpers and fender systems (painted and unpainted)
- Battery covers and underbody shields
- Interior trim panels requiring impact resistance
- Door panels and pillar trims
- Wheel arch liners
- Air duct systems

Appliances:

- Refrigerator liners and door components
- Washing machine and dishwasher parts
- Vacuum cleaner housings
- Small appliance housings
- Power tool cases

Packaging:

- Reusable containers and crates
- Industrial packaging
- Pallet boxes
- Caps and closures requiring impact resistance

Consumer Goods:

- Luggage and travel cases
- Toys and sporting goods
- Furniture components

- Storage boxes and organizers

Industrial:

- Material handling equipment
- Protective covers and housings
- Agricultural equipment components
- Construction equipment parts

Processing Guidelines

Injection Molding Parameters

Parameter	Recommended Range	Notes
Drying	Not required*	*If moisture > 0.1%, dry at 80°C for 2 hours
Barrel Temperature - Rear	190-200°C	Gradual temperature increase
Barrel Temperature - Middle	200-210°C	Maintain uniform melt
Barrel Temperature - Front	210-220°C	Optimize flow
Nozzle Temperature	210-220°C	Prevent premature solidification
Mold Temperature	20-40°C	Lower temp increases cycle time but improves impact
Injection Pressure	50-100 MPa	Lower pressure than unfilled PP
Holding Pressure	40-60% of injection	Optimize for dimensional stability
Back Pressure	3-10 MPa	Ensure melt homogeneity
Screw Speed	60-180 rpm	Higher speeds acceptable due to good flow

Processing Recommendations

- **Purging:** Use virgin PP or commercial purging compound when switching grades
- **Regrind:** Up to 25-30% regrind can be incorporated without significant property loss
- **Colorants:** Compatible with standard PP masterbatches (1-3% addition)
    - Impact modifiers may affect color intensity; higher loading may be needed
    - White and light colors may show slight yellowing at high processing temperatures
- **Mold Design:**
    - Standard PP mold design principles apply
    - Gate size: 50-70% of wall thickness
    - Adequate venting to prevent gas traps
    - Smooth flow paths to minimize weld lines
- **Cycle Time:** Comparable to standard PP; cooling time may be slightly longer due to lower thermal conductivity
- **Temperature Control:** Avoid overheating which can degrade impact modifiers

Special Considerations

- **Weld Lines:** Impact strength at weld lines is typically 50-70% of base material; optimize gate location
- **Wall Thickness:** Uniform wall thickness recommended; impact strength decreases with very thin walls (< 1.5mm)
- **Surface Finish:** Slight reduction in gloss compared to homopolymer PP; use higher mold temperatures for improved finish
- **Painting:** Excellent paint adhesion after appropriate surface treatment (flame, plasma, or primer)

Quality Control & Testing

Incoming Material Inspection:

- Visual inspection for contamination and color consistency

- Melt flow index verification
- Moisture content check

Process Monitoring:

- Real-time temperature and pressure monitoring
- Cycle time tracking
- Dimensional checks on production parts
- Surface quality inspection

Property Testing:

- Mechanical properties per ISO standards (tensile, flexural, impact at multiple temperatures)
- Thermal properties (HDT, Vicat softening point)
- Rheological properties (MFI, viscosity)
- Impact testing at 23°C, 0°C, -20°C, and -40°C as required
- Weld line strength testing for critical applications
- Long-term aging and weathering tests (for outdoor applications)

Certifications:

- ISO 9001:2015 Quality Management System
- IATF 16949:2016 Automotive Quality Management
- ISO 14001:2015 Environmental Management
- RoHS & REACH Compliance
- Food contact approval (available for specific grades on request)

Packaging & Storage

Standard Packaging:

- 25 kg polyethylene bags
- 1000 kg (1 MT) big bags / super sacks
- Bulk delivery in tankers (for high-volume customers)

Storage Conditions:

- Store in dry, cool, well-ventilated area
- Keep away from direct sunlight and heat sources
- Temperature: 5-35°C
- Relative Humidity: < 70%
- Shelf Life: 12 months from manufacturing date under proper storage conditions
- Keep bags sealed until use to prevent moisture absorption and contamination

Handling:

- Use appropriate material handling equipment
- Avoid dropping or damaging bags
- Follow FIFO (First In, First Out) inventory management
- Impact modifiers are stable in storage; no special precautions needed

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Safety & Environmental Information

Health & Safety:

- PP-IM compounds are thermoplastic materials with low toxicity
- Impact modifiers (elastomers) are non-toxic and safe for normal use
- Use standard industrial hygiene practices
- Avoid inhalation of dust during handling
- Ensure adequate ventilation during processing

Personal Protective Equipment:

- Safety glasses or face shield
- Dust mask (if dust is generated during handling)
- Heat-resistant gloves (during processing)
- Protective clothing as appropriate

Fire Hazard:

- Combustible material - avoid open flames and ignition sources
- Fire Extinguishing: Water spray, foam, dry chemical, or CO_2
- Decomposition products may include carbon monoxide and carbon dioxide

Environmental:

- Material is recyclable - collect and reprocess production scrap
- Impact modifiers remain effective after recycling
- Dispose of waste according to local environmental regulations
- No hazardous substances under normal use conditions
- RoHS and REACH compliant
- Suitable for sustainable product design and circular economy initiatives

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Technical Support & Custom Solutions

SDPPL offers comprehensive technical support for PP-IM applications:

Services Available:

- Grade selection assistance based on application requirements and impact specifications
- Low-temperature impact testing and validation
- Processing optimization and troubleshooting support
- Custom compound development for specific performance needs
- Color matching and appearance optimization
- Weld line strength optimization
- Part design consultation for impact-critical applications
- On-site technical support and training
- Failure analysis and quality issue resolution
- Drop test and impact simulation support

Custom Formulations: We can develop custom PP-IM grades with:

- Specific impact modifier content (5-30%)

- Combined properties (impact + talc, impact + glass fiber, impact + UV)
- Enhanced low-temperature impact (-40°C to -60°C)
- Special color requirements
- Flame retardant variants (UL94 V-2, V-0)
- Conductive or anti-static grades
- Food contact approved formulations
- Enhanced surface appearance (high gloss)
- Improved weld line strength
- Specific MFI for thin-wall or thick-wall applications

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