Ultra High Flow Polypropylene Applications

Dr. Sassan Tarahomi, CEO
Mid Michigan Plastics & Tooling, LLC.

2025 SPE TPO Conference
Troy, MI
October 1, 2025

Table of Contents

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Ultra High Flow PP

A Homopolymer or Copolymer PP with melt flow greater than 500 gr/10min.

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Why we need Ultra High Flow PP

- To increase material flow, specially for thin wall parts
- A great lubricant and processing aid
- Good nucleating agent for crystallizable PET (CPET)
- Compatible with TPE, TPU, TPV and many other polymers

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Typical Ultra High Flow PP Properties

Property Data Sheet

Polypropylene Homopolymer

	LMWPP Resin	Conventional PP Resin
Thermal		
Melting Point (°C)	161	162
Molecular Weight		
Peak MW	46,900*	143,000
Mw	50,600*	293,000
Mn	22,800*	47,500
MWD=Mw/Mn	2.22*	6.18
Mechanical		
Modulus (psi)	180,000	193,000
Strength (psi)	5000	6200
Notched Izod (ft-lb/in)	0.14	0.34
Rheology		
Melt Index (g/10 min) (230 °C, 0.0825" ID)	~1500	5.5
Modified MFR (g/10 min) (230 °C, 0.0200" ID)	5.5 ± 0.6	No Flow
Melt Viscosity (Poise) (190°C, 100 sec -1)	61	4800

Property Data Sheet

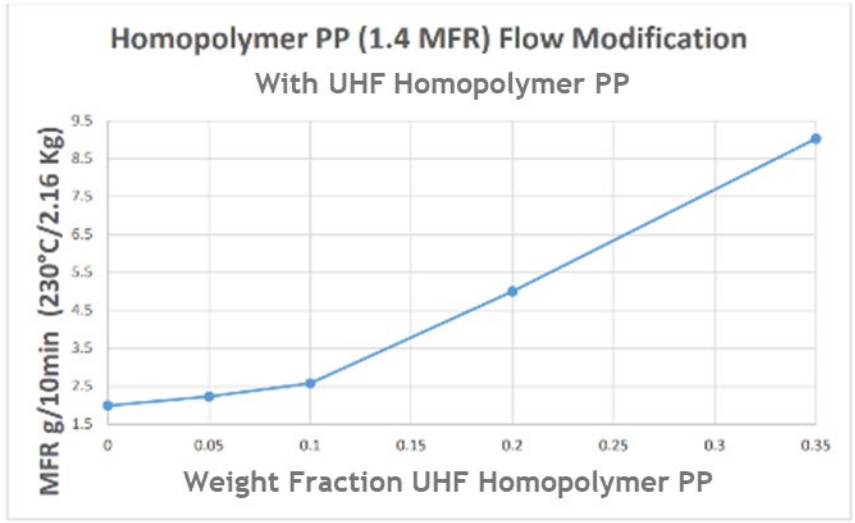
Polypropylene Copolymer

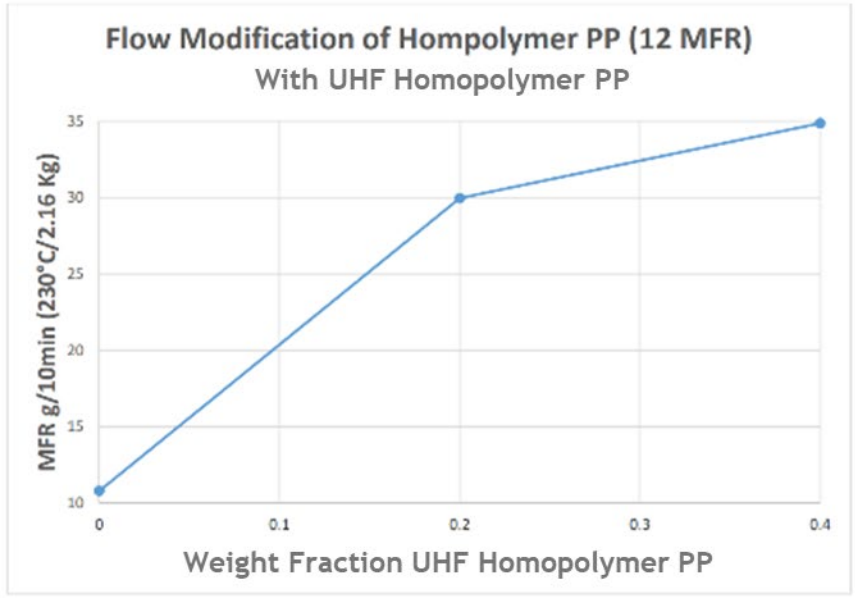
	LMWPP Resin	Conventional E/P Resin
Thermal		
Melting Point (°C)	142	144
Molecular Weight		
Peak MW	42,600*	126,000
Mw	52,900*	302,000
Mn	22,800*	55,400
MWD=Mw/Mn	2.36*	5.46
Mechanical		
Modulus (psi)	110,000	126,000
Strength (psi)	3700	4300
Notched Izod (ft-lb/in)	0.32	0.55
Rheology		
Melt Index (g/10 min) (230 °C, 0.0825" ID)	~1500	4.5
Modified MFR (g/10 min) (230 °C, 0.0200" ID)	5.5 ± 0.6	No Flow
Melt Viscosity (Poise) (190°C, 100 sec -1)	61	5600

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

* PolyVisions generated data

Weight Fraction Data





* PolyVisions generated data

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Applications of Ultra High Flow PP

- ❑ Construction
- ❑ Packaging
- ❑ Wire & Cable
- ❑ Electronics
- ❑ Industrial
- ❑ Compounding
- ❑ Health Care
- ❑ Textiles

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Construction Applications

Construction sheet or film to aid in lubrication through the die, thus increasing the output.

Construction sheet

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Packaging

Thin wall container

Typically, 3-5% added to PP

Reduction in peak pressure by over 10%

5 gal. Pickle Container

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Wire & Cable

Typically, 5-7% added to TPU

Reduction in peak pressure by over 25%

Over Molding of Connectors

Mid Michigan Plastics

651

Electronics

Typically, 4-5% added to TPE

Reduction in peak pressure by over 15%

Over Molding of Electronic Housings

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Industrial

Typically, 3-5% added to TPO

Increase membrane breathability

Breathable Roofing Membrane

Mid Michigan Plastics

651

Compounding

Typically, 2-3% added to glass filled Polypropylene compound

Increase dispersion

Glass Filled PP Fan Housing

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Health Care

Typically, 5-7% added to TPU

Reduction in peak pressure by over 25%

Over Molding of Medical Connectors / Components

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Textiles

Typically, 2-3% added to PP

Improves fabric production

Reduces energy demand

Spunbond / Melt Blown Nonwoven

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Case Study #1 – Flame Retardant PP

Issue: High pressure to fill the part. 15% scrap, short shot and flash.

Process: 950 Ton injection press, single cavity mold, 5 lb part with several gates.

Solution: 7.5% addition of UHF PP to the FR PP resin.

Results: Peak pressure reduced by 17%. Fill time reduced by 10%. Pack time reduced by 50%. Cycle time reduction by 40%. No more short shots or flash. $100K per year ROI.

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Case Study #2 – Over Molding with TPU

Issue: High pressure to fill the part. 17% scrap, sink marks and short shots.

Process: 150 Ton injection press, single cavity hot runner mold.

Solution: 7% addition of UHF PP to the TPU resin.

Results: Peak pressure reduced by 50%. Fill time reduced by 10%. Pack time reduced by 25%. Cycle time reduction by 10%. No more sinks or short shots. $100K per year ROI.

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Case Study #2 – Over Molding with TPU

Defective Part

Good Part

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Case Study #3 – Molding with TPE

Issue: Unable to fill the part.

Process: 400 Ton injection press, 16 cavity hot runner mold.

Solution: 6% addition of UHF PP to the TPE resin.

Results: Peak pressure reduced by 35%. Fill time reduced by 15%. Pack time reduced by 15%. Cycle time from 18 to 16 second a reduction of 10%. No more inside-out ejection. Significant scrap reduction.

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Case Study #3 – Molding with TPE

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Case Study #4 – Molding Tool Box with PP

Issue: High pressure to fill the part. 16% scrap, distortion during ejection and flash.

Process: 750 Ton injection press, single cavity hot runner mold. 3 lb part with several gates.

Solution: 6% addition of UHF PP to the PP resin.

Results: Peak pressure reduced by 25%. Fill time reduced by 10%. Pack time reduced by 20%. Cycle time from 38 to 32 second a reduction of 15%. No more short shots or deformed ejected part. Close to zero % scrap.

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Case Study #4 – Molding Tool Box with PP

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Summary

UHF PP are:

Great flow modifiers for broad range of polymers such as polyolefins, polyesters, elastomers, etc.

Can be a homopolymer or a copolymer PP.

Excellent lubricant as well as nucleating agent.

Superb mold release agent for engineering thermoplastics.

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Acknowledgement

Author would like to recognize the many years of development efforts by PolyVisions research and development team in the area of UHMF PP development as well as follow up testing and molding trials by their engineering and sales team.

Individuals involved with the development, production and sale of UHMF PP at PolyVisions

- **Jim Lochary, President**
- **Rick Wilson, Processing and Sales Engineer**
- **Troy Blankenbiller, Process Technician**

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661

Thank you

Any Questions?

Mid Michigan Plastics
651 Columbus Ave.
West Branch, MI 48661