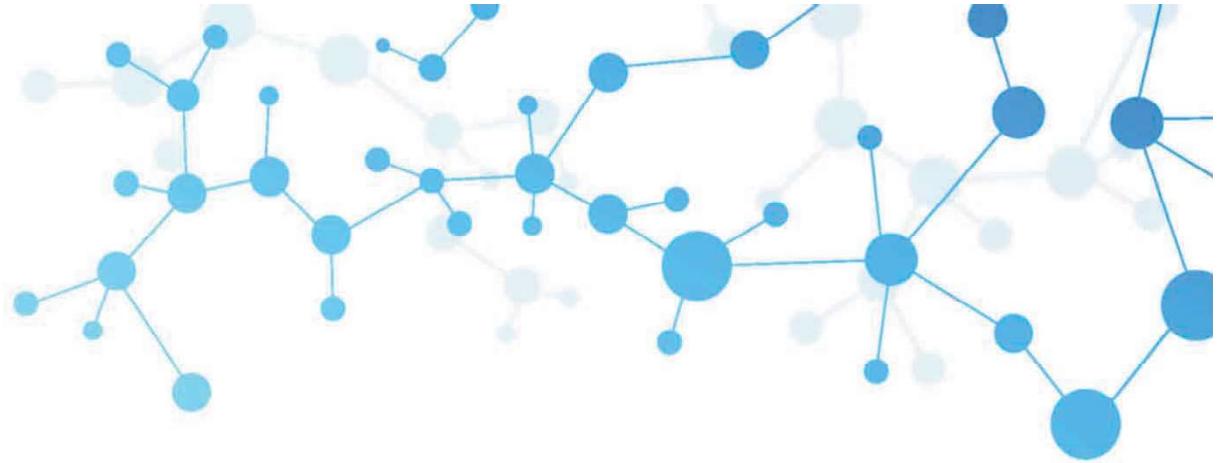


**'TORAY'**  
Innovation by Chemistry



# Medical ABS Resin Introduction

ABS Resin  
**TOYOLAC™**

Feb 2020

Toray Industries, Inc.

ABS resin "TOYOLAC®" Dept



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**TOYOLAC<sup>®</sup>  
FOR MEDICAL APPLICATION**

## Reliable Material for the Healthcare Industry

When the demand from the market increases, Toray will continuously meet not only your biocompatibility needs but also provide necessary support.

As an expert of the ABS resin, Toray delivers reliable technical support along with a packaged service of medical resin.



## With Biocompatibility & Stable Quality




No Change  
"Production Process"  
"Raw Materials and Additives"  
"Test Methods/Equipment"



Comply with  
Regulatory  
Requirements  
"ISO 10993"

# MEDICAL ABS “TOYOLAC<sup>®</sup>” PORTFOLIO

## Opaque ABS and Clear ABS with Standards

	TOYOLAC Opaque ABS	TOYOLAC Clear ABS	
	EtO, Gamma-ray	EtO	EtO
	High Rigidity	Chemical Resistance & High Flow	High Chemical Resistance
	<b>500-322M</b>	<b>950 ME1</b>	<b>950 ME2</b>
ISO 10993 Part 4,5,10,11	✓	✓	✓
USP Class VI	-	✓	✓
FDA Drug Master File	-	File Number 030280	File Number 030280

# MEDICAL ABS “TOYOLAC<sup>®</sup>” PORTFOLIO

## Opaque ABS and Clear ABS Properties

Property	Test Method	Test Condition	Type	TOYOLAC Opaque ABS	TOYOLAC Clear ABS	
				EtO, Gamma-ray	EtO	EtO
				High Rigidity	Chemical Resistance & High Flow	High Chemical Resistance
				500-322M	950 ME1	950 ME2
Flexural Strength	ISO 178	23°C / 50%RH	MPa	89	71	74
Flexural Modulus	ISO 178	23°C / 50%RH	MPa	2690	2180	2340
Tensile Strength	ISO 527	23°C/50%RH	MPa	59	50	53
Tensile Elongation at Break			%	> 10	14	13
Charpy Impact Strength	ISO 179	23°C / 50%RH	kJ/m <sup>2</sup>	14	14	12
Melt Flow Rate	ISO 1133	220°C/98N	g/10min	20	18	7
Density	ISO 1183	23°C	kg/m <sup>3</sup>	1050	1090	1090
Temp. of Deflection Under Load	ISO 75	1.8MPa	°C	85	75	75
Mold Shrinkage	Toray Method	23°C/50%RH	%	0.4-0.6	0.4-0.6	0.4-0.6
Light Transmission	ISO 13468	23°C/50%RH 3mmt	%	-	86	87
Haze	ISO 14782		%	-	3	3





































# TOYOLAC Medical grades properties

Property	Test Method	Test Condition	Supplier	TORAY Medical Clear ABS		COMPETITOR	
						STYRO LUTION	K-Resin
				Type	950 ME1	950 ME2	2802/2822
Category	High Flow	High Chemical Resistance	Standard	High Flow			
Flexural Modulus	ISO 178	23°C / 50%RH	MPa	2180	2340	1810	1500
Charpy Impact Strength	ISO 179	23°C / 50%RH	kJ/m <sup>2</sup>	14	12	4	2
Melt Flow Rate	ISO 1133	220°C/98N	g/10min	<b>18</b>	<b>7</b>	2	8
Light Transmission	ISO 13468	23°C/50%RH 3mmt	%	86	87	88	92
Haze	ISO 14782		%	3	3	5	1

**“TOYOLAC<sup>®</sup>” can contribute for Customer’s Productivity**

# Chemical Resistance Date

 Best
  Good
  Fair
  Poor

Critical strain $\epsilon$ [%]	TOYOLAC 950 ME1	TOYOLAC 950 ME2	STYRO LUTION 2802/2822	General PC
Lipids (10%soybean oil )	 0.9	 $\geq 1.0$	 $\geq 1.0$	 $\geq 1.0$
Rubbing alcohol (EtOH,77%)	 0.3	 0.6	 0.5	 $\geq 1.0$
Oxydol	 NB	 NB	 NB	 $\geq 1.0$
Vaseline	 $\geq 1.0$	 $\geq 1.0$	 $\geq 1.0$	 $\geq 1.0$
Olive oil	 0.6	 0.8	 0.7	 0.8
6% Sodium hypochloride	 NB	 NB	 NB	 $\geq 1.0$
10% Benzalkonium chloride	 $\geq 1.0$	 NB	 NB	 $\geq 1.0$
10% Povidone iodine	 0.8	 0.8	 0.8	 0.8
0.05% Chlorhexidine gluconate	 NB	 NB	 NB	 NB



# SPECIFIC APPLICATIONS

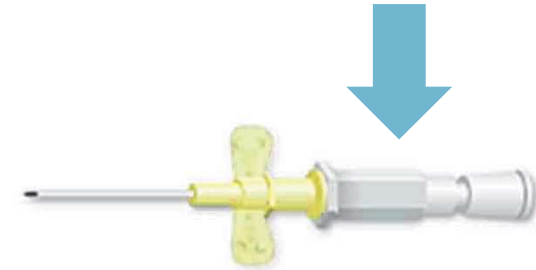
## Adopted Item & Expected Item



Y-shaped connector



Stopcock



IV catheter



Heat and Moisture Exchanger

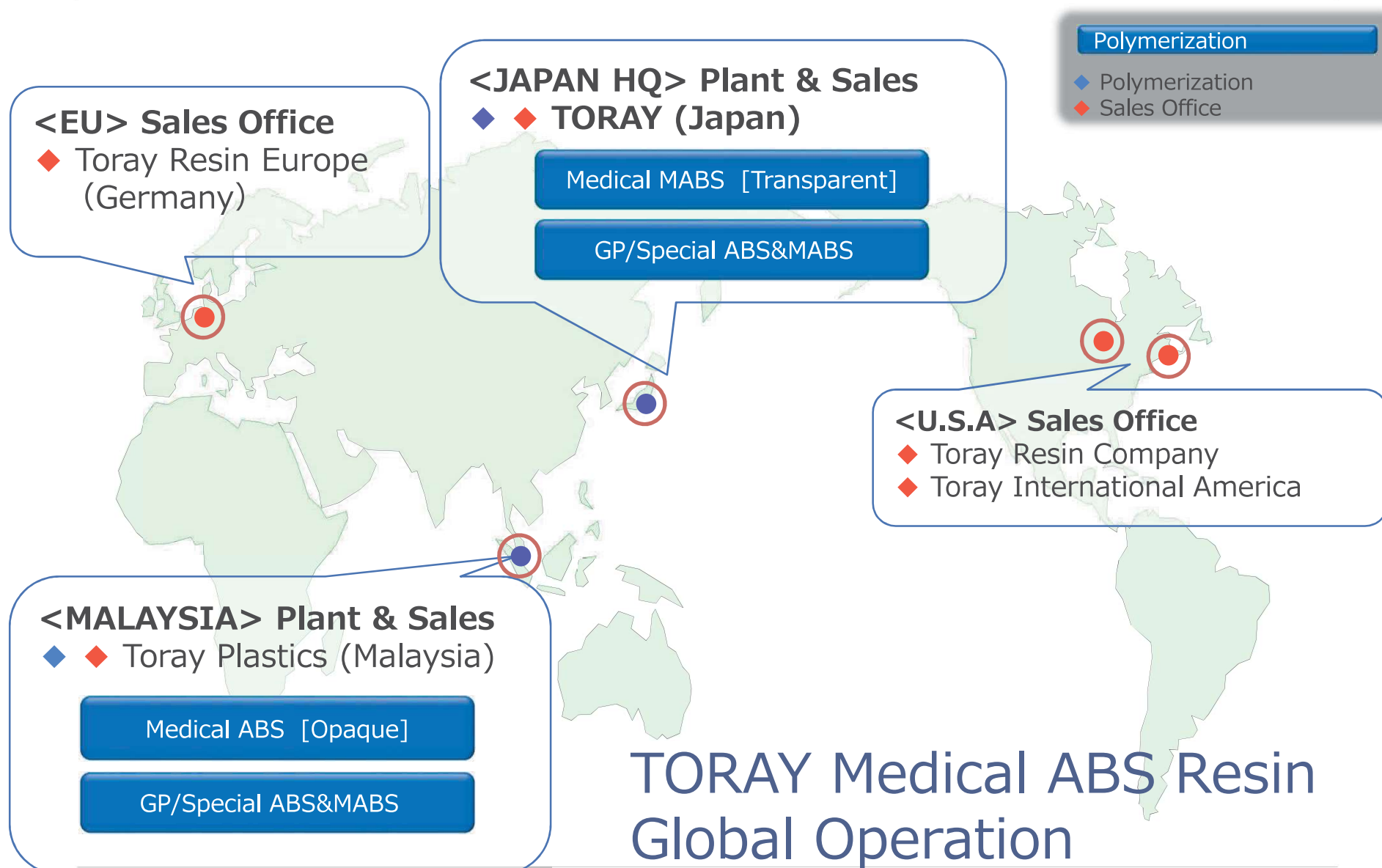


Roller clamps



Injection pen

# 'TORAY' Global Operation & CONTACTS



# MATERIALS CAN CHANGE OUR LIVES.™

素材には、社会を変える力がある。



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