

## •Introduction

This processing guidance introduces the application of PLA straw and 3D printing filament extrusion. Hisun has developed extrusion molding grade PLA resins suitable for different requirements such as transparency, heat resistance and toughness. Typical applications include straw, 3D printing filament, etc. These PLA grades can be processed by conventional extrusion machines.

Extrusion is a general processing technology. The process parameters provided in this processing guidance are only for your reference. It is suggested that the above parameters should be adjusted according to your own equipment and processing conditions in order to find the best process conditions suitable for you.

## •Typical Physical Properties

Physical property	Unit	Test standard	Neat PLA		PLA Compound		
			REVOCODE 110	REVOCODE 190	REVOCODE 711B	REVOCODE 161	REVOCODE 171
Application direction			3D printing filament			Straw	
Density	g/cm <sup>3</sup>	GB/T1033.1-2008	1.20-1.30	1.20-1.30	1.25-1.35	1.20-1.30	1.20-1.30
Melt index (190°C/2.16Kg)	g/10min	GB/T3682.1-2018	2~12	2~12	2~8	≤6	≤6
Melting point	°C	GB/T19466.3-2004	155-170	170-180	-	155-175	155-175
Glass transition temperature	°C	GB/T19466.2-2004	56-60	56-60	-	54~60	54~60
Tensile strength	MPa	GB/T1040.1-2018	≥50	≥50	≥30	≥40	≥40
Elongation at break	%	GB/T1040.1-2018	≥3	≥3	≥100	≥200	≥100
Notched impact strength	kJ/m <sup>2</sup>	GB/T1043.1-2008	≥1	≥1	≥3	≥1	≥1

## •Storage conditions

# Processing Guidance

## PLA Straw & 3D Printing Filament Extrusion



PLA resin has been dried before leaving the factory, and is sealed after being packaged in vacuum aluminum-plastic composite bags. Due to water absorption of the resin, long-term opening will lead to an increased material mobility and brittle products during the process. Therefore, the resin shall be used as soon as possible and sealed immediately if it is not used up. It should be stored in a ventilated and dry warehouse, should be kept away from fire sources and direct sunlight, and should not be stacked in the open air. The ambient temperature of the product should not exceed 40°C during storage.

### •Drying

PLA resin has been dried before leaving the factory, and is sealed after being packaged in vacuum aluminum-plastic composite bags. The moisture content is less than 500ppm. Due to water absorption of the resin, long-term opening will lead to an increased material mobility, filament brittle and white spots on the straw wall during processing. Therefore, the resin shall be used as soon as possible and sealed immediately if it is not used up. The drying conditions can refer to the following table:

Drying parameters	Unit	REVODE 110	REVODE 190	REVODE 711B	REVODE 161	REVODE 171
Residence Time	h	2-3	2-3	2-3	2-3	2-3
Air Temperature	°C	70	90	80	70	70
Air Dew Point	°C	-40	-40	-40	-40	-40
Air Flow Rate	m <sup>3</sup> /hr-kg resin	>1.85	>1.85	>1.85	>1.85	>1.85

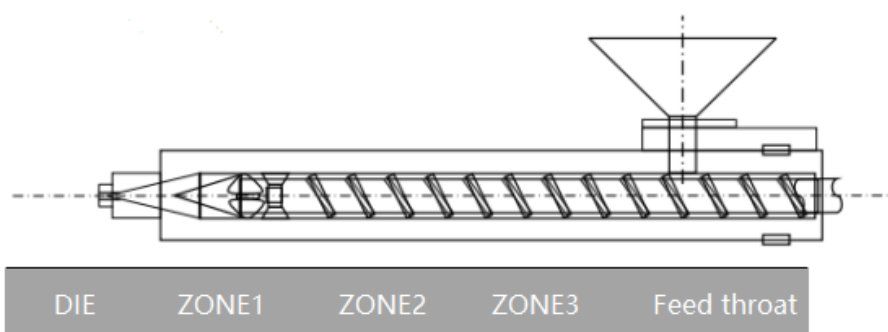
### •Equipment requirements

REVODE PLA can be processed by conventional extrusion type 3D filament drawing machines. The recommended length of the molding section of the extrusion die sizing device is 10-20 mm. L/D ratio is preferably 28:1 to 32:1.

REVODE PLA resins can be processed by conventional PP straw extrusion molding machines.

•Processing temperature

	Unit	RECODE 110	RECODE 190	RECODE 711B	RECODE 161	RECODE 171
Die	°C	210-220	180-200	170-190	180-200	180-200
Zone 3	°C	180-220	180-210	170-190	180-210	180-210
Zone 2	°C	180-220	180-210	170-190	180-210	180-210
Zone 1	°C	160-180	180-210	160-170	180-210	180-210
Feeding throat	°C	20-40	20-40	20-40	20-40	20-40



Note: the above are typical parameters , which shall be optimized according to the equipment and mold conditions.

•Coloring

It is recommended to use special toner or PLA-based masterbatch. Improper toner and masterbatch may cause final products brittle, unsmooth and even cannot be extruded. If the raw material for coloring cannot be processed within 2 hours after being opened, it shall be sealed.