

SANPLAZ GUIDES

Machining SANPLAZ

Introduction

As a semi-finished product, the manufacture of plastic articles from SANPLAZ sheet normally involves secondary fabrication operations, including sawing, milling and drilling and assembling. This guide covers basic parameter of SANPLAZ that need to be taken into account if secondary operations are to be performed successfully. SANPLAZ is a sheet material produced from SAN (Styrene-Acrylo-Nitrile-copolymer).

Guideline

SANPLAZ sheet must be worked with tools used for machining plastics. Tool speeds should be such that the sheet does not melt from frictional heat. In general the highest speed at which overheating of the tool or plastic does not occur will give the best results. It is important to keep cutting tools sharp at all times. Hard, wear-resistant tools with greater cutting clearances than those used for cutting metal are suggested. High speed or carbon-tipped tools are efficient for long runs and provide accuracy and uniformity of finish. Since plastics are poor heat conductors, the heat generated by machining operations must be absorbed by the tool or carried away by coolant. A jet of air directed on the cutting edge aids in cooling the tool and in removing chips. Plain water or soapy water is sometimes used for cooling unless the trim scrap is to be reused. The protective film of sheets should not be taken off during handling and machining in order to prevent scratches or damaging the surface of the sheet. Machining of plastic materials will result in stress build-up in the material. For applications where the treated surface is in contact with active solvents e.g. decorating and cementing, it is recommended to anneal the parts prior to this secondary step.

Milling

Sheet manufactured from SANPLAZ can be machined with standard high-speed milling cutters for soft metals, provided they have sharp edges and adequate clearance at the heel. We strongly recommend using tools designed for plastics e.g. ONSRUD bits and drills.

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Drilling

Suggested drill-point design for drilling plastic. We strongly recommend using tools designed for plastics e.g. ONSRUD bits and drills. Standard twist drills for wood or metal can be used; however they require slower speeds and feed rates to produce a clean hole. Twist drills for plastics should have two flutes, a point with an included angle of 70° to 120°, with the smaller angles for small holes and the larger angles for larger holes. The lip clearance should be between 12° and 15°, as shown in figure 1.

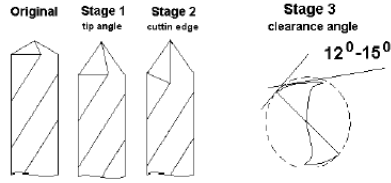


figure 1.

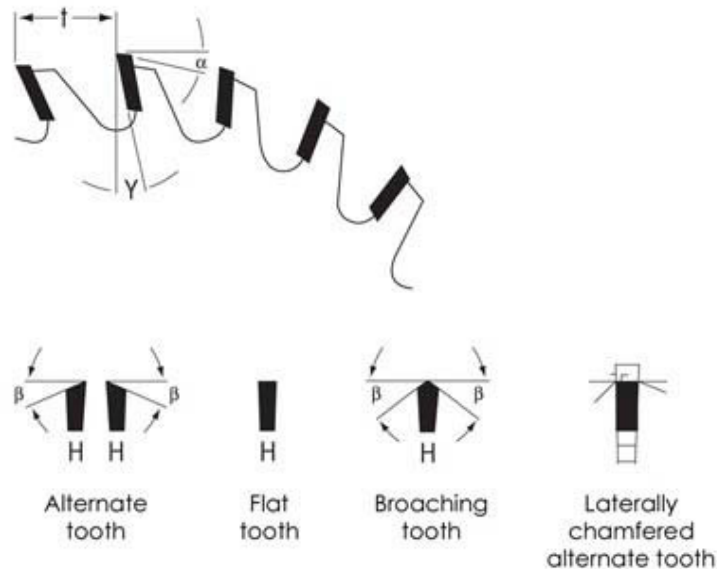
Wide, highly polished flutes are desirable since they expel the chips with low friction and thus tend to avoid overheating and consequent gumming. Drills should be backed out often to free chips, especially when drilling deep holes. Peripheral speeds of twist drills for plastics ordinarily range from "RPM = 11,000 / Drill diameter in mm"

When drilling, be sure to back the panel with a piece of wood and to hold or clamp the part securely to prevent it from cracking or slipping.

Sawing

Following types of sawing operations can be used to saw thermoplastic materials: band saw, circular saw and jig saw as well as hand operated saws.

It is recommended that new or well sharpened tools are used. At very high cutting speeds, the saw blade should be cooled with water or an alternative appropriate cooling emulsion.



Example of Saw blades

Settings		Circular saw	Band saw
Tooth distance	Sheets thickness bellow to 3mm	8 – 12 mm	1 -2 mm
	Sheets thickness greater to 3mm	8 – 12 mm	2 – 3mm
Clearance angle α		15°	30° to 40°
Rake angle ψ		10°	15°
Tooth angle β		15°	
Cutting speed		2500 - 4000 m/min	1200 - 1700 m/min
Feed speed		20 m/min	

Laser cutting

SANPLAZ sheet can be cut by laser beam in a thickness up to 10 mm. However, the cutting edge is not smooth and clean and needs to be polished afterwards.

Routing

SANPLAZ sheet can be routed using the following guidelines:

Router diameter: 4 - 6 mm

Feed speed: ca.1.5 m/min

Velocity: 18,000 – 24,000 rpm.

We strongly recommend using tools designed for plastics e.g. ONSRUD bits and drills.

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