

Costs do not
exist to be
calculated,
costs exist to be
reduced

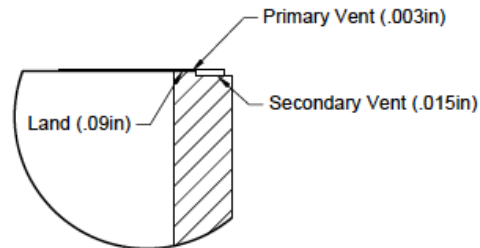
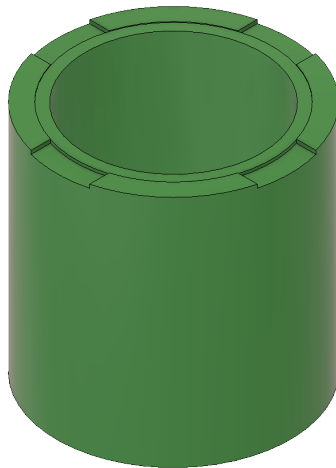
- Taiichi Ohno

Continuously
Improving
Your Designs

**MAKE
PROMISES,
KEEP
PROMISES**

GAP
IMPROVEMENTS

VENTING



Example of a vent for an
Amorphous filled material

Vent Design

The intent of vent's are to exhaust gases out of the mold as the mold is filling with molten plastic. Failure to vent the gases can cause shorts, burns, poor surface finish, and local corrosion of the mold steel.

The burning and corrosion of mold steel is the result of dieseling which is the compression of 'gas', in this case the air we breathe mixed with the volatiles from the molten plastic, to the point of ignition.



Geometric Dimensions Rules

Following are the mathematical relationships and design notes that can improve the aesthetics of the part:

1. The higher the materials viscosity, the deeper the vent
2. Low viscosity materials - sample or CAE to determine vent locations
3. Steel safe vents are easier to open than repairing flashed vents
4. Vent's can be located on parting lines, ejector pins, and static pins; static pins are not 'self-cleaning' and may clog
5. An alternative for static pins are porous steel inserts
6. Full perimeter venting is recommended
7. Specifications for venting are the same regardless of the geometry (e.g. parting lines, ejector pins, etc...)
8. Runner venting can improve material flow and part cosmetics

Description	Specification
Parts with large surfaces	Place vents every 1 to 2 inches along parting line
Vent location	At end of fill and at weld line
Vent land length	0.09in
Vent width	0.25in (min.)
Vent dump (vent depth to atmosphere)	0.015 - 0.030in
Primary vent depths - Crystalline materials	0.0005 - 0.00075in
Primary vent depths - Amorphous, glass filled materials	0.003in

Trouble-shooting

Following are trouble-shooting suggestions to improve the following issues.

Issue	Cause	Correction
Gas burns	Vents too shallow or missing	Increase depth of primary vent or add venting
Shorts	Vents too shallow or missing	Increase depth of primary vent or add venting
Bubbles	Insufficient venting	Increase depth of primary vent or add venting
Splay	Insufficient venting	Increase depth of primary vent or add venting

Venting Guide

Material	Primary Vent* (in)	Vent Land (in)	Vent Width** (in)	Dump Vent Depth (in)
ABS (Acrylonitrile Butadiene Styrene)	.001 - .003	.150 - .300	.125	.040
PC (Polycarbonate)	.001 - .002	.010	.125	.030
PC/ABS	.001 - .002	.010	.125	.030
TPE (Thermoplastic Elastomers - SBC)	.0008 - .0010	.040 - .060	.250	.005 - .010
TPU (Polyurethane Elastomers)	.001 - .002	.100 - .150	.500	.400
PA (Nylon)	.0005 - .0008	.030 - .060	.120	.010 - .013
PA (Nylon) - Glass & Mineral Filled	.001 - .002	.030 - .050	.120	.010 - .050
PE & HDPE (High Density & Polyethylene)	.0005 - .0010	.010 - .500	.060 - .500	.003
LCP (Liquid Crystal Polymer) - High Flow	.001 - .002 H	.030 - .060	.125	.500
LCP (Liquid Crystal Polymer) - Low Flow	.003 - .004 L	.030 - .060	.125	.500
PBT (Polybutylene Terephthalate)	.0005 - .0008	.030	.250	.020
PBT (Polybutylene Terephthalate) - Filled	.0010 - .0015	.030	.120	.020
PEI (Polyetherimide)	.001 - .003			
PEEK (Polyether Ether Ketone)	.0005 - .0010			
PES (Polyethersulfone)	.0005 - .0007			
PET (Polyester - Polyethylene Terephthalate)	.0005 - .0008		.120	
PFA (Polyfluorothermoplastic)	.002 - .003			
PMMA (Acrylic - Polymethyl Methacrylate)	.002 max	.060	0.375	
PP (Polypropylene)	.001 - .002	.005 - .040	AWAP***	.005 - .010
PPS (Polyphenylene Sulfide)	.0005	.080	.250	
PS (Polystyrene)	.001 - .002	.125 - .250	.250 - .500	.125 - .250
PSU (Polysulfone)	.001 - .002	.030 - .060	.125	.050
POM (Acetal - Polyoxymethylene)	.0005 - .0012	.040	.080	.030
SAN (Styrene Acrylonitrile)	.0004	.125 - .250	.250 - .500	.125 - .250

*For materials requiring minimal flash, reduce the upper vent depth by .0005in

**Greater than or equal to the given value

*** As Wide As Possible

Material Performance

Performance	Amorphous	Crystalline
Ultra Performance	PI (Polyimide)	PAI (Polyamidimide)
	PBI (Polybenzimidazole)	VespeI (Polyimide)
High Performance	PEI (Polyetherimide)	ECTFE (Ethylene Chlorotrifluoroethylene)
	PES (Polyethersulfone)	FEP (Fluorinated Ethylene Propylene)
	PPSU (Polyphenylsulfone)	PPS (Polyphenylene Sulfide)
	PSU (Polysulfone)	PVDF (Polyvinylidene Fluoride)
		PEEK (Polyetheretherketone)
		PFA (Perfluoroalkoxy)
		PTFE (Polytetrafluoroethylene)
Engineered Plastics		PCTFE (Polychlorotrifluoroethylene)
	PC (Polycarbonate)	PA (Polyamide - Nylon)
	TPU (Thermoplastic Polyurethane)	UHMW PE (Ultra High Molecular Weight Polyethylene)
	PPO (Polyphenylene Oxide)	PET-P (Polyethylene Terephthalate)
	PMMA (Polymethyl Methacrylate - Acrylic)	POM (Polyoxymethylene - Acetal)
Commodity Plastics		PBT (Polybutylene Terephthalate)
	PVC (Polyvinyl Chloride)	HDPE (High Density Polyethylene)
	CAB (Cellulose Acetate Butyrate)	LDPE (Low Density Polyethylene)
	PS (Polystyrene)	
	PETG (Polyethylene Terephthalate)	
	ABS (Acrylonitrile Butadiene Styrene)	