



ZIRCLEAN

Purging Emulsion For Plastics Processing Machines

Application Guide



SAVE

- ☑ Time
- ☑ Raw Material
- ☑ Energy
- ☑ Processing Cost
- ☑ With Easy of Use
- ☑ Labor

PURGING EMULSION FOR PLASTIC MACHINES

ZIRCLEAN: A purging emulsion for all machines and plastic raw materials.

ZIRCLEAN SF: It is now available to the plastics industry with its environmentally friendly formula, which is lemon-scented, solvent-free, and ammonia-free. Besides being a purging emulsion for all machinery and plastic raw materials, it can also be easily used in the manual cleaning of disassembled machine parts and all metal parts.

What are They Used For?

ZIRCLEAN and ZIRCLEAN SF are primarily used for color and material changes, to prepare for preventive maintenance measures, to remove black spots caused by degradation of polymers and during restarting after machine shutdown.

- They maximize production efficiency by minimizing the time spent on color, mold and raw material changes in injection and extrusion machines as well as minimizing raw material, labor, energy consumption, and the number of cleaning operations performed by dismantling machine parts.
- Use of ZIRCLEAN and ZIRCLEAN SF ensures cleanliness on all plastic raw materials and all machines.
- They purge the screw, barrel, nozzle and hot runner systems of extruders and injection machines quickly and inexpensively while the machine is in operation.
- ZIRCLEAN and ZIRCLEAN SF emulsions are used for purging PP, HDPE, LDPE, PS, ABS, PVC, TPU, PA6, PA66, POM, PBT, PET, EVA, PMMA, PC, SAN, SEBS, SBS, CA raw materials from the machine.
- They also prevent wastage when switching to expensive raw materials such as PPS, PSU, PESU, PEI, PPA, PK.

- In extrusion machines - compounding, yarn, pipe, sheet, profile, cable, masterbatch and recycling -
- In Injection molding machines – standard and hot runner –
- And in film and blow molding machines, it is easily used in raw material and color change.
- Besides the use of ZIRCLEAN and ZIRCLAEAN SF for all machines and plastic raw materials, ZIRCLEAN SF is now available to the plastics industry with its environmentally friendly formula, which is lemon-scented, solvent-free, and ammonia-free. Besides being a purging emulsion for all machinery and plastic raw materials, it can also be easily used in the manual cleaning of disassembled machine parts and all metal parts.
- Low purging costs can be achieved by using ZIRCLEAN and ZIRCLEAN SF easily
- Since ZIRCLEAN and ZIRCLEAN SF can be easily mixed with any plastic granules, there is no need to depend on the price increase of plastics.
- ZIRCLEAN is a well-known high-quality product with 20 years of market experience.
- ZIRCLEAN and ZIRCLEAN SF reduce your storage, financing, and logistics costs. While 12 bottles of ZIRCLEAN or ZIRCLEAN SF weigh less than 15 kg, the same amount of granular purging raw materials (720 kg) would require high storage, financing, and logistics costs.
- Anyone who has used ZIRCLEAN and ZIRCLEAN SF once e continues to use it.

The Purging Process in Standard (Cold) Runner Injection Molding Machines

1 Preparation

- At this stage, the granule loader and the dryer are separated from the feeding unit so that the purging mixture can be fed directly to the screw.

2 Preparing the Machine

- All injection screw temperatures are reduced below the current temperatures by 20°C -30°C.
- See TEMPERATURE/RATIO table for purging screw temperatures.
- The nozzle temperature remains constant.

3 Preparation of the Purging Mixture

- Shake the ZIRCLEAN or ZIRCLEAN SF bottle well before use.
- 3%-4% ZIRCLEAN or ZIRCLEAN SF is mixed well into the new granules that you will feed into the machine. See the SCREW DIAMETER/MIXING AMOUNT table for the amount of mixture.

4 Purging

- It is checked that the screw temperatures have dropped by 20°C-30°C.
- The screw material intake speed is reduced by 50% or slightly less. The prepared mixture is fed into the machine from the feeding unit.
- The back pressure is slightly increased.
- The main injection pressure is used for the purging process.
- During the purging process, if necessary, the reduced screw temperatures can be brought back to normal values so that the purging mixture can exit from the nozzle more smoothly.
- The mold can be left open and this mixture can be injected into the cold runner and cleaned in the cold runner if desired.

5 Rinse and Check

- The granules that you will feed into the machine are passed through the machine in a pure form with a minimum of 30% of the purging mixture.
- If the raw material that comes out is clean, the operation is finished and new molding is started. If there is still any residue, steps 2-5 are repeated.

6 Finish

- Check if there is any purging mixture left in the feeding unit.
- The injection screw temperatures, the back pressure, and the screw revolution are adjusted according to the new material.
- The machine is ready for new molding.

The Purging Process in Hot Runner Injection Molding Machines

1 Preparation

- At this stage, the granule loader and the dryer are separated from the feeding unit so that the purging mixture can be fed directly to the screw.

2 Preparing the Machine

- All injection screw temperatures are reduced below the current temperatures by 20°C–30°C.
- See TEMPERATURE/RATIO table for purging screw temperatures.
- Hot runner and nozzle temperatures are increased to 50°C above their current temperatures.

3 Preparation of the Purging Mixture

- Shake the ZIRCLEAN or ZIRCLEAN SF bottle well before use.
- 3%-4% ZIRCLEAN or ZIRCLEAN SF is mixed well into the new granules that you will feed into the machine. See the SCREW DIAMETER/MIXING AMOUNT table for the amount of mixture.

4 Purging

- It is checked that the screw temperatures have dropped by 20°C–30°C. It is checked that the hot runner and nozzle temperatures increase by 50°C.
- The screw material intake speed is reduced by 50% or slightly less. The prepared mixture is fed into the machine from the feeding unit.
- The back pressure is slightly increased.
- The main injection pressure is used for the purging process.
- During the purging process, if necessary, the reduced screw temperatures can be brought back to normal values so that the purging mixture can exit from the nozzle more smoothly.
- The mold can be left open and this mixture can be injected into the hot runner and cleaned in the hot runner if desired.

5 Rinse and Check

- The granules that you will feed into the machine are passed through the machine in a pure form with a minimum of 30% of the purging mixture.
- If the raw material that comes out is clean, the operation is finished and new molding is started. If there is still any residue, steps 2-5 are repeated.

6 Finish

- Check if there is any purging mixture left in the feeding unit.
- The injection screw temperatures, the hot runner and nozzle temperatures, the back pressure, and the screw revolution are adjusted according to the new material.
- The machine is ready for new molding.

The Purging Process in Extrusion (Compounding, Yarn, Pipe, Sheet, Profile, Cable, Masterbatch and Recycling) Machines

1 Preparation

- At this stage, the granule loader and the dryer are separated from the feeding unit so that the purging mixture can be fed directly to the screw.

2 Preparing the Machine

- Remove the filters from the machine.
- Reduce the extruder barrel temperatures and filter zone temperatures below the current temperatures by 20-30°C. For purging temperatures, see the TEMPERATURE/RATIO table.
- Keep temperatures in the mold constant.
- If the filters are inside the extruder, do not lower the temperatures in the filter area.

3 Preparation of the Purging Mixture

- Shake the ZIRCLEAN or ZIRCLEAN SF bottle well before use.
- 3%-4% ZIRCLEAN or ZIRCLEAN SF is mixed well into the new granules that that you will feed into the extruder. See the SCREW DIAMETER/MIXING AMOUNT table for the amount of mixture.

4 Purging

- It is checked that the temperatures of the barrel and filter area have dropped by 20-30°C.
- The prepared mixture is fed into the machine from the feeding units.
- The screw material intake speed is reduced by 50% or slightly less, and the mixture is flowed through the head.
- During the purging process, if necessary, the reduced screw temperatures can be brought back to normal values so that the purging mixture can exit from the nozzle more smoothly.

5 Rinse and Check

- The granules that you will feed into the extruder are passed through the machine in a pure form with a minimum of 30% of the purging mixture.
- If the raw material that comes out is clean, the operation is finished and new production is started. If there is still any residue, steps 2-5 are repeated.

6 Finish

- Check if there is any purging mixture left in the feeding unit.
- The filters are placed back into the machine.
- The extruder barrel and filter zone temperatures and the screw speed are adjusted according to the new material.
- The extruder is ready for new production.

The Purging Process in Film and Blowing Machines

1 Preparation

- At this stage, the granule loader and the dryer are separated from the feeding unit so that the purging mixture can be fed directly to the screw.

2 Preparing the Machine

- Remove the filters from the machine.
- Reduce the machine barrel temperatures and filter area temperatures below the current temperatures by 20-30°C. For purging temperatures, see the TEMPERATURE/RATIO table.
- Keep temperatures in the mold constant.
- If the filters are inside the machine, do not lower the temperatures in the filter area.

3 Preparation of the Purging Mixture

- Shake the ZIRCLEAN or ZIRCLEAN SF bottle well before use.
- 3%-4% ZIRCLEAN or ZIRCLEAN SF is mixed well into the new granules that that you will feed into the extruder. See the SCREW DIAMETER/MIXING AMOUNT table for the amount of mixture.

4 Purging

- It is checked that the temperatures of the barrel and filter area drop by 20-30°C.
- The prepared mixture is fed into the machine from the feeding unit.
- The screw material intake speed is reduced by 50% or slightly less, and the mixture is flowed through the head.
- During the purging process, if necessary, the reduced screw temperatures can be brought back to normal values so that the purging mixture can exit from the nozzle more smoothly.

5 Rinse and Check

The granules that you will feed into the machine are passed through the machine in a pure form in an amount of at least 30% of the purging mixture.

If the raw material that comes out is clean, the operation is finished and new production is started. If there is still any residue, steps 2-5 are repeated.

6 Finish

- Check whether there is any purging mixture left in the feeding unit.
- The filters are placed back into the machine.
- The machine barrel and filter zone temperatures and the screw speed are adjusted according to the new material.
- The machine is ready for new production.

ZIRCLEAN and ZIRCLEAN SF Temperature/Ratio

		Processing Temperature (°C)
Acrylnitrile-butadienes styrene	ABS	200-220
Styrene-acrylonitrile	SAN	200-220
Thermopasticpolyurethane	TPU	200-220
Polyethylene	HDPE/LDPE	180-220
Polypropylene	PP	180-220
Polycarbonate	PC	240-280
Polyethyleneterephatalate	PET	180-220
Polybutyleneterephatalate	PBT	230-270
Polyvinylchloride	PVC	160-180
Polystyrene	PS	200-220
Polyoxymethylene	POM	170-210
Polyamide 6	PA6	220-260
Polyamide 6-6	PA66	260-290
Polymethyl methacrylate	PMMA	200-230
Styrene-butadiene-styrene	SBS	170-180
Styrene-ethylene-butadiene	SEBS	180-200
Cellulose-acetate	CA	230-260
Polyphenylenesulfide	PPS	310-340
Polyether ether ketone	PEEK	350-380
Polysulfone	PSU	350-370
Polyphtalamide	PPA	310-330
Ethylene vinil acetate	EVA	200-220
Polyether sulfone	PESU	350-380
Polyetherimide	PEI	350-380
Polyketone	PK	240-260

Purging Screw Temperature (°C)	Amount of ZIRCLEAN or ZIRCLEAN SF in the Purging Mixture (%gr/1 kg)	
170-190	3-4	30-40
170-190	3-4	30-40
180-200	3-4	30-40
150-190	3-4	30-40
150-190	3-4	30-40
210-250	3-4	30-40
150-190	3-4	30-40
200-240	3-4	30-40
-	4	40
170-190	3-4	30-40
140-180	3-4	30-40
200-230	3-4	30-40
230-260	3-4	30-40
170-200	3-4	30-40
140-150	3-4	30-40
150-170	3-4	30-40
200-230	3-4	30-40
280-310	3-4	30-40
320-350	3-4	30-40
320-340	3-4	30-40
280-300	3-4	30-40
180-200	3-4	30-40
320-350	3-4	30-40
320-350	3-4	30-40
220-230	3-4	30-40

ZIRCLEAN and ZIRCLEAN SF Screw Diameter/Mixture Quantity Chart

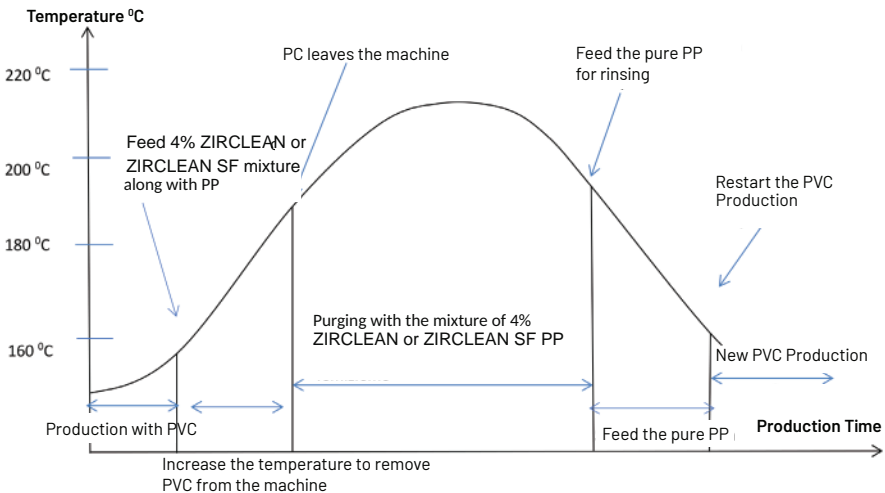
Screw Diameter (mm)	20-40	40-50	50-60	60-80	80-100	100-120	120-150	150-175	175-200
Amount of carrier plastic raw material, kg	0,5-1kg	1-3 kg	3-5kg	5-10 kg	10-25 kg	25-35kg	35-70 kg	70-90kg	90-150 kg
Amount of ZIRCLEAN , gr. 3-4 % of the total carrier polymer, gr.	15-40 gr	30-120 gr	90-200 gr	150-400 gr	300-1000 gr	750-1400 gr	1050-2080 gr	2100-3600 gr	2700-6000 gr

- The recommended approximate values depend on screw configuration and the level of contamination.
- **ZIRCLEAN** and **ZIRCLEAN SF** are compatible with all known commercial polymers and processing temperatures up to 400°C.

The Purging Process in PVC Production Machines

In injection and extrusion machines using PVC in production, it provides perfect purging without stopping production by using “PP” polypropylene as the carrier polymer of the purging mixture.

- 1 Remove the nozzle and clean it by hand.
- 2 Feed the purging mixture into the operating machine by adding 4% ZIRCLEAN or ZIRCLEAN SF to natural PP (see the SCREW DIAMETER/MIXTURE AMOUNT table for the amount of purging mixture.)
- 3 Continue until all traces of PVC are removed from the machine.
- 4 Perform the purging process by increasing the temperatures to 200-220 °C.
- 5 Perform the rinsing after a small amount of pure PP is passed through the machine, and continue the PVC production by reducing the temperatures to 165-185°C.



When purging a machine using PVC in production, we recommend using “PP” polypropylene as a carrier polymer in the purging mixture. Using “PP” as a carrier polymer during the purging process enables you to reach the temperature range of 200-220°C. Therefore, “PP” is quite stable at this temperature. When rinsing is done with pure “PP”, the temperature will be reduced to 165-185°C, and the machine is ready to work with PVC again.

How is the Purging Performed in Special Cases and Inadequate Purging Results?

Special Case	Solution
In machines with a screw diameter smaller than 30 mm	Maintain the proportions of carrier plastic raw material and ZIRCLEAN and ZIRCLEAN SF for the purging mixture. If there is a feeding problem, reduce the amount of ZIRCLEAN and increase the screw speed slightly.
In degasser machines	If there is a purging problem, the purging effect of the ZIRCLEAN and ZIRCLEAN SF mixture in the degasser area is greatly reduced since there is no back pressure. A better result can be achieved through the following precautions. a. Temperatures are reduced a little more in the degasser zone. b. Purging is performed according to the standard procedure. c. In addition, the purging mixture is fed from the degasser zone.
Material changes where the temperature increases from 180 oC to 290 oC. Example: Transition from PE to PC or PA66	You can achieve the best result by using PP (Polypropylene) natural granules in the purging mixture.
When expensive raw materials, such as PPS and PPA, are used	For the best results, PP natural granules should be used with 4% ZIRCLEAN and ZIRCLEAN SF In this case, the purging mixture costs will be further reduced. PP is stable up to 320 oC, so it can be used as a carrier polymer in the purging of almost all plastics.

Protection: Generally, preventive purging with ZIRCLEAN and ZIRCLEAN SF are performed once every 2-4 weeks.

How to Handle Insufficient Purging Results

Special Case	Cause	Solution
If there is residue in the solution after purging with ZIRCLEAN and ZIRCLEAN SF	Stubborn dirt	Apply the standard purging procedure. Lower the machine barrel temperatures a little more.
	Serious damage to the screw (grooves, pockets, porous areas)	Get the screw repaired.
	If the head, nozzle, and die have negative flow characteristics due to design or wear	Get these parts repaired or replaced with correctly designed parts.
	Damage to the inner walls of the barrel (cracks, gouges, depressions)	Get the barrel repaired.
if the hot runner has not been sufficiently purged	The hot runner temperatures are low.	Increase the hot runner temperatures.

if there is still stubborn dirt and color fluctuations after the purging process is completed, stop the screw for 15 minutes and wait for the ZIRCLEAN SF. to become active in the extruder or hot runner, and then restart the screw. ZIRCLEAN SF is perfectly suitable for manual purging and polishing of metal tools, molds, and stainless-steel surfaces as well as being suitable for purging machines.



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