Abstract

Injection Moulding

Careful handling of the polyamide products

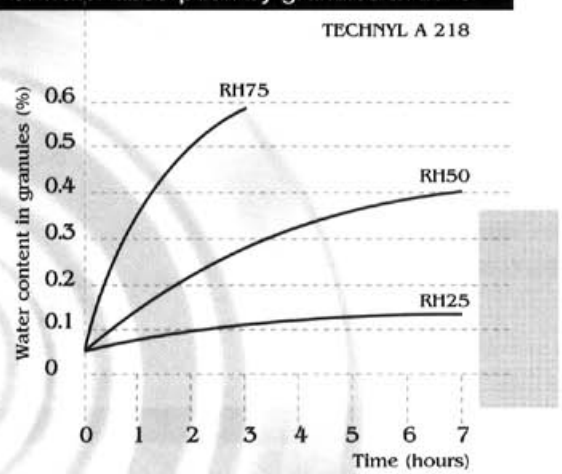
Keep granules in their sealed bags or containers until required

Be sure to use the polymer granules within one hour after opening its sealed packaging

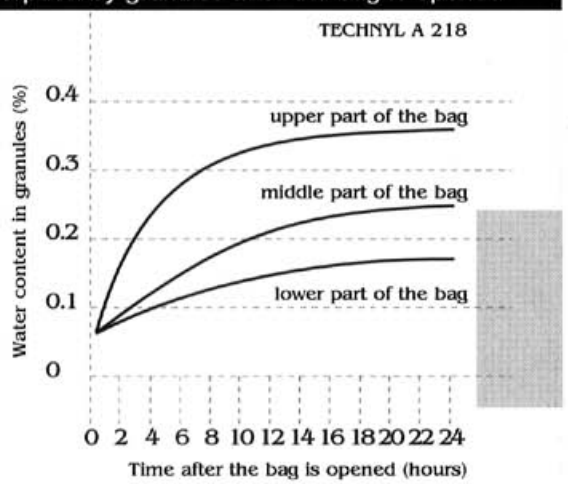
Seal partly finished bags again to reduce any moisture absorption

Dry material prior to processing in case of too high a moisture content

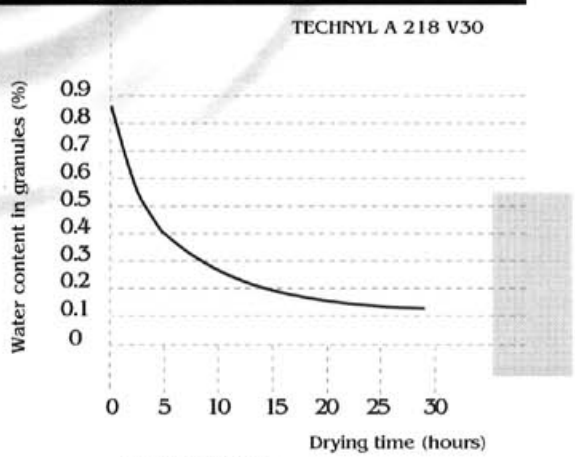
Rate of water absorption by granules at 23°C



Water absorption by granules after the bag is opened

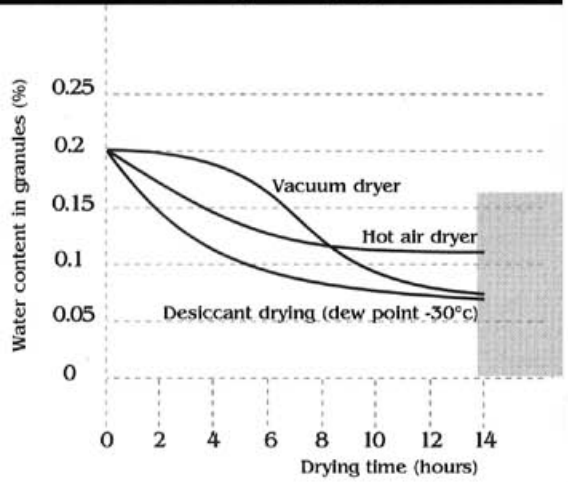


Drying very humid granules



Dessiccant dryer
Temperature: 80°C
Dew point: -35°C

Different ways of drying



Temperature: 80°C

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Moulding recommendations

Abstract

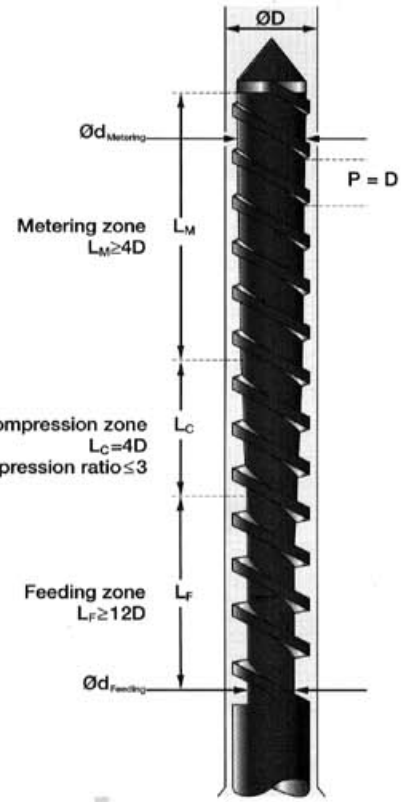
Set injection volumes between 30% and 60% of the maximum injectable volume of the injection unit

Set granules' temperature at 60°C at the feed hopper

Set barrel's temperature profile to increase along the barrel

For large shot weights, set barrel's temperature profile to decrease along the barrel

Three zone screw



Influence of processing parameters

Melt temperature ↗		Mould temperature ↗	
Weld line strength	↗	Shrinkage	↗
Surface aspect	↗	Surface aspect	↗
Cycle time	↗	Weld line strength	↗
Packing phase	↗	Part stabilisation	↗

Holding pressure time ↗		Injection Speed ↗	
Shrinkage	↘	Weld line strength	↗
Sink marks	↘	Surface aspect	↗
Residual stress	↗	Filling facility	↗
Part quality	↗		

Moulding parameters

		Melt Temperature(°C)	Mould Temperature(°C)	Injection speed (cm³/s)	Back pressure (bar)	Peripheral speed of screw (mm/s)
PA 66 TECHNYL A	Standard viscosity	270-290	60-80	50-150	50-100	300-600
	Medium viscosity	270-290	60-80	50-150	50-100	300-600
	GF Reinforced	270-300	80-120	120-170	20-50	200-300
	Mineral filled	270-300	80-120	120-170	50-100	300-400
	Flame retardant	270-280	60-90	80-120	20-50	200-300
	Impact modified	270-290	60-90	80-150	50-100	300-600
PA 6 TECHNYL C	Standard viscosity	230-250	40-80	50-150	50-100	300-600
	Medium viscosity	230-250	40-80	50-150	50-100	300-600
	GF Reinforced	230-260	80-100	120-170	20-50	200-300
	Mineral filled	230-260	80-100	120-170	50-100	300-400
	Flame retardant	230-240	40-80	80-120	20-50	200-300
	Impact modified	230-250	40-80	80-150	50-100	300-600

Variation of mechanical properties with percentage of added reground material

	Unreinforced	Glass fibre reinforced TECHNYL A 218 V30		
	< 30% of reground material	15% of reground material	30% of reground material	100% of reground material
Stress at break	-3%	-3%	-12%	-35%
Elongation	< 25%	+10%	+15%	+35%
Charpy impact	-20%	-10%	-15%	-50%

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Injection Moulding

shrinkage

Abstract

Annealing treatment
to accelerate post shrinkage and thus dimensional stabilisation

Treatment temperature and time:
- 10 to 20°C above the maximum service temperature
- TECHNYL® A: 175°C
- TECHNYL® C: 160°C
- Thick parts: about 45 min
- Parts less than 2 mm thick: 20 min

Heating and cooling must be gradual in order to prevent thermal schocks

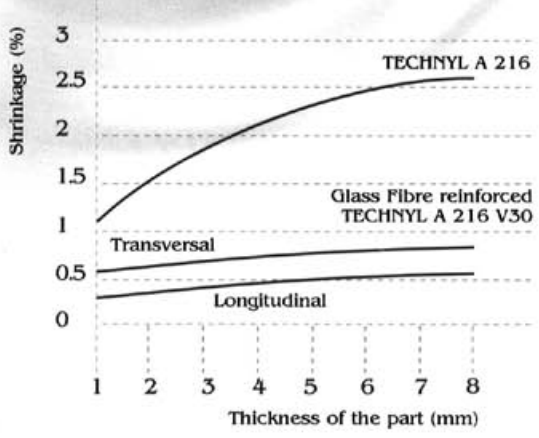
Shrinkage after moulding according to ISO 294-4

		Shrinkage Longitudinal %	Shrinkage Transverse %
PA 66 TECHNYL® A			
Unreinforced grade	A 216	1.9	1.9
GF reinforced	A 216 V30	0.6	0.85
Mineral filled	A 228 MT40	0.9	1
Flame retardant	A 30H1 V30	0.6	0.8
PA 6 TECHNYL® C			
Standard viscosity	C 216	1.3	1.3
GF reinforced	C 218 V25	0.4	0.7
Mineral filled	C 228 MT30	0.8	1.1
Flame retardant	C 30H1 V30	0.25	0.65

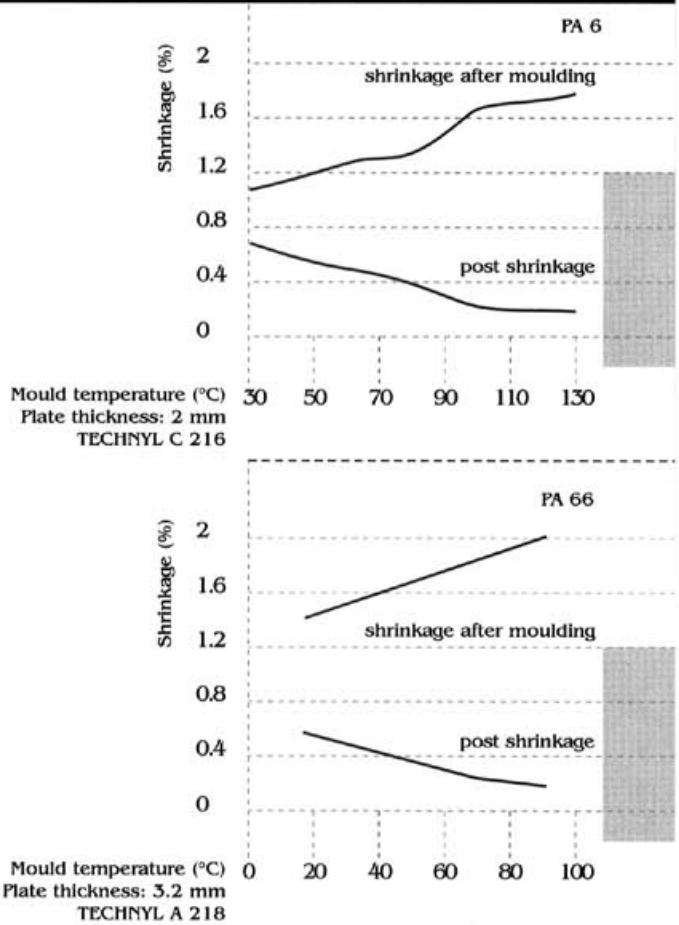
Parameters affecting mould shrinkage

By increasing ...	The shrinkage
Holding pressure	↘
Injection speed	↗
Gate size	↘
Mould temperature	↗
Part thickness	↗

Influence of the thickness of the part on the shrinkage



Influence of mould temperature on shrinkage and post shrinkage



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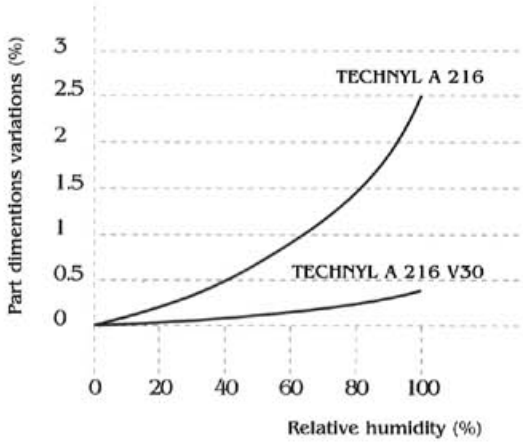
Part conditioning

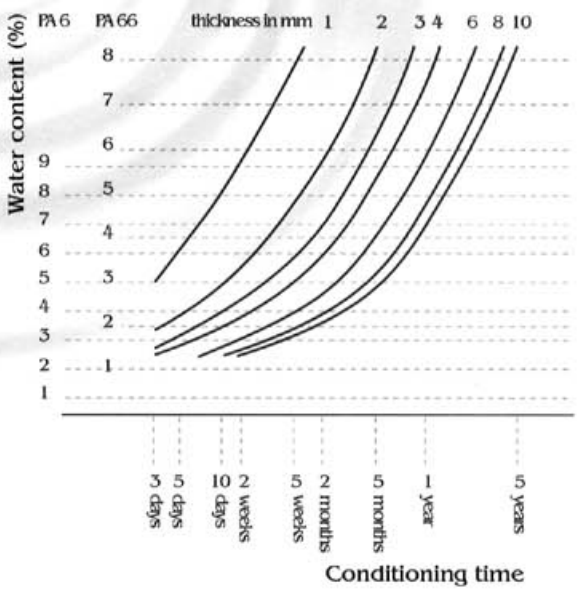
Use water absorption treatment for:
- Facilitated assembling
- Stabilisation of part dimensions in service conditions
- Adjustment of impact resistance properties

Influence of humidity on part dimensions

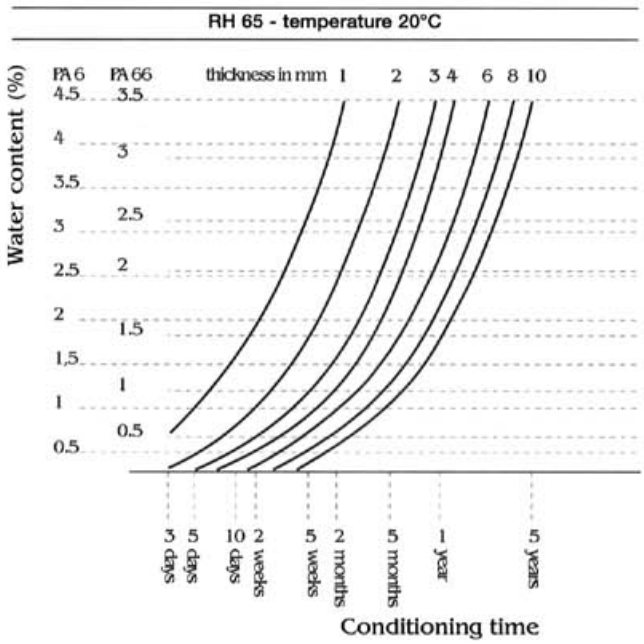


Conditioning TECHNYL®

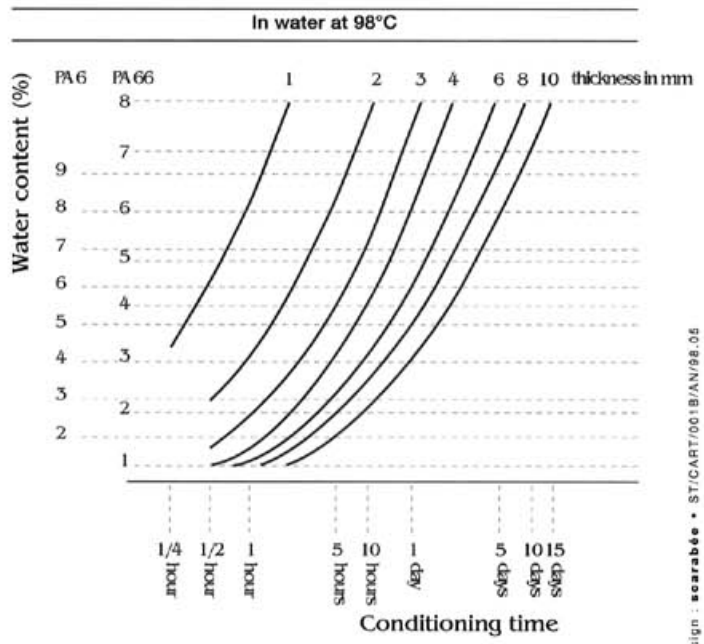
In water at 20°C



RH 65 - temperature 20°C



In water at 98°C



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