Powder Phenolic Resins in Bonded Abrasives

The Benefits of SG-3378 in Bonded Abrasives

Bonded abrasive manufacturers around the world commonly use powder phenolic resins as part of the primary bonding medium in cutting discs, grinding discs, grinding wheels, snagging wheels and polishing blocks. Epoxy-modified powder phenolic resin brings some unique features to bonded abrasives, contributed to the intrinsic characteristics of epoxy resin:

- Resistance to mechanical stress
- Improved toughness
- Improved crack resistance
- Superior adhesion to glass fiber
- Soft grinding action
- Improved cutting efficiency
- Increased resistance to alkaline grinding fluid
- Improved aging/water resistance

SG-3378, epoxy-modified powder phenolic resin, can help to formulate bonded abrasives with high bursting speed and high stock removal rates.

SG-3378 Properties

SG-3378 powder has a medium flow, medium hexamine level, fine particle size and medium cure rate.

Grade	Flow	Hexamine	Cure Time 160°C
SG-3378	27-32 mm	8.8-9.2 %	20-40 seconds

The resin must be stored away from heat sources and moisture.

SG-3378 Characteristcs

SG-3378 softens rapidly under the influence of liquid resin, after which it portrays the tack character of epoxy resin.

Abrasive Mix Characteristics

- Increased mix binding property
- Balanced wetness and green strength
- Good flow into glass fiber mesh during pressing

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Formulatory Guidelines

IG-3378 is ideal for use in, but not limited to

- Cutting discs
- Grinding discs
- Grinding wheels
- Snagging wheels

SG-3378 is best used in conjunction with

- CR-2632 water-based liquid resol resin
- Conventional water-based liquid resol resin
- Unmodified powder phenolic resin of short flow and high hexamine level

In terms of additives, the use of grinding aids (other than cryolite and pyrite) are optional and remain at the discretion of the formulator. The use of hardening agents has proven very useful.

Typical Formulations

2.5 mm Cutting Disc, 6 mm Grinding Disc

	Parts by Weight
Aluminium oxide mixture	100
Water-based liquid resol resin	4.90
SG-3378	**12.50**
Cryolite and pyrite	9
Filler	0.50
Hardening agent	0.05

6 mm Grinding Disc, 2.5 mm Cutting Disc

	Parts by Weight
Aluminium oxide mixture	100
CR-2632 water-based liquid resol resin	4.70
SG-3378	**13.10**
Sodium or potassium cryolite	2.41
Calcium fluoride	2.41
Pyrite	4.48
Red iron oxide	2.99
Packing density promotor	0.16

2.5 mm Cutting Disc, 6 mm Grinding Disc

	Parts by Weight
Aluminium oxide mixture	100
Water-based liquid resol resin	5.10
SG-3378	**6.25**
SG-3145	6.25
Cryolite and pyrite	9
Filler	0.50
Hardening agent	0.05

Curing Schedules

Many different oven curing schedules exist, varying according to the thickness of the discs, resin systems used and other physical requirements. In general, cutting discs would employ an oven schedule of about 28 hours, for example:

Temperature Gradient	Time	Holding Time
Ambient to ca. 85°C (185°F)	2 Hours	1 Hour
To 100°C (212°F)	2 Hours	2 Hours
To 120°C (248°F)	2 Hours	2 Hours
To 140°C (284°F)	2 Hours	2 Hours
To 185°C (365°F)	4 Hours	7 Hours
Cool Down	2 Hours	0 Hours

Grinding discs would employ an oven schedule of about 30-38 hours, for example:

Temperature Gradient	Time	Holding Time
Ambient to ca. 85°C (185°F)	2 Hours	1 Hour
To 100°C (212°F)	7 Hours	0 Hours
To 120°C (248°F)	3 Hours	0 Hours
To 140°C (284°F)	5 Hours	0 Hours
To 185°C (365°F)	3 Hours	7 Hours
Cool Down	2 Hours	0 Hours

What this means for you

ASK Chemical's SG-3378 offers unique benefits as the primary bonding medium in cutting discs, grinding discs, grinding wheels, snagging wheels and polishing blocks. If sharp cutting action and fast stock removal is necessary, SG-3378 will provide added benefit. Please contact your sales representative for additional information regarding SG-3378.

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