

Latent Hardeners and Latent Accelerators in Epoxy Resin Curing

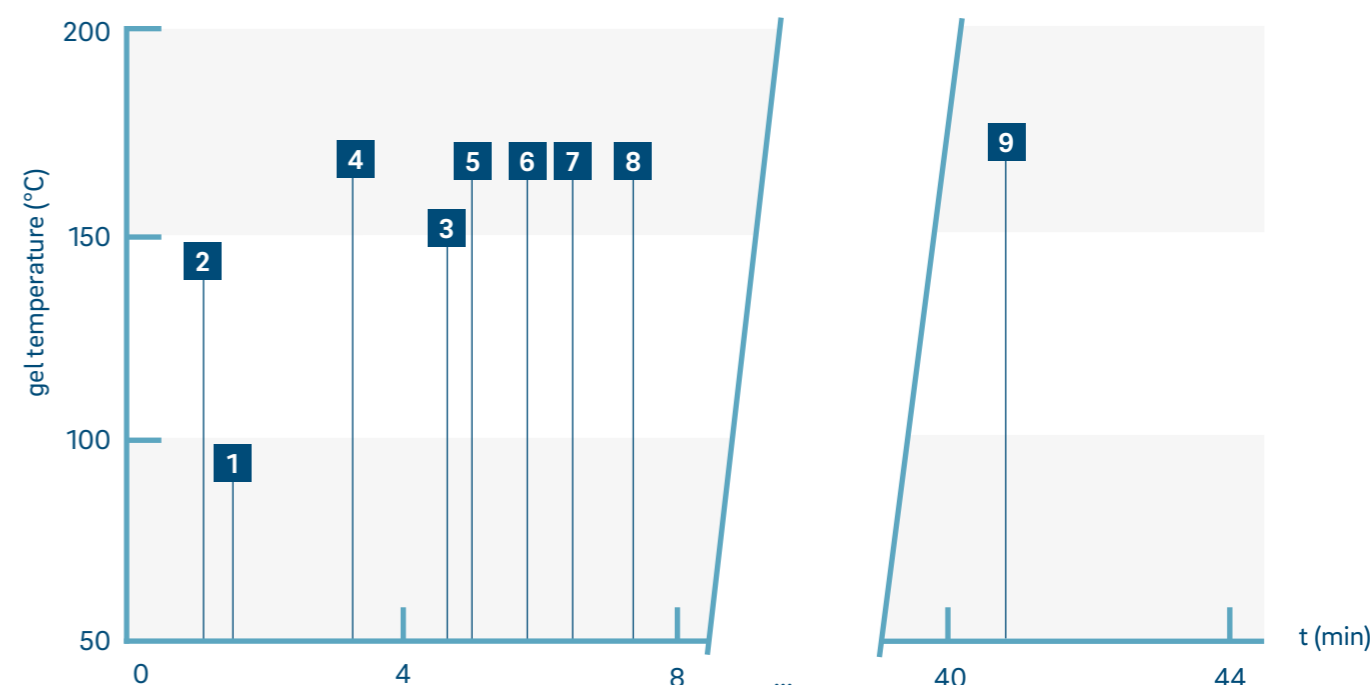
Available Compounds

Laborchemie Apolda GmbH offers a broad variety of different BF₃ amine complexes. Each of these complexes is well defined in quality. Tailor-made solutions of each pure compound in several solvents can be prepared.

No.	BF ₃ Amine complexes	CAS	hardness point (°C)	curing time (gel temperature)	solubility in resin	structure
1	BF ₃ Aniline complex (solved in PEG 400)	660-53-7	103.0	1.63 min (90°C)	good	
2	BF ₃ 2,4-Dimethylaniline complex (solved in Butanediol)	28879-19-8	146.3	1.30 min (140°C)	good	
3	BF ₃ Benzylamine complex	696-99-1	162.7	4.75 min (140°C)	poor	
4	BF ₃ Ethylamine complex	75-23-0	182.1	3.32 min (160°C)	poor	
5	BF ₃ Isopropylamine complex	3776-04-3	187.8	5.02 min (160°C)	form suspension	
6	BF ₃ Piperidine complex	592-39-2	182.7	5.87 min (160°C)	good	
7	BF ₃ Isophoronediamine complex (solved in MeOH)	192.4	192.4	6.40 min (160°C)	form emulsion	
8	BF ₃ Dibutylamine complex (solved in PEG 400)	676-10-8	192.6	7.33 min (160°C)	good	
9	BF ₃ N-methyl cyclohexylamine complex	658-19-5	189.2	40.17 min (180°C)	good	

Under development

No.	BF ₃ Amine complexes	CAS	hardness point (°C)	curing time (gel temperature)	solubility in resin	structure
	BF ₃ Diphenylamine complex	1495-72-3	-	-	-	-
	BF ₃ 2-Chloroaniline complex	16430-03-6	-	-	-	-
	BF ₃ Triethanolamine complex	673-24-5	-	-	-	-



Applications

All BF₃ amine complexes can be used as a latent curing agent or a latent accelerator for epoxy resins or for anhydride pre-cured epoxy resins. They can be used in a broad field of epoxy resin application like adhesives, coatings, epoxy castings, composite matrixes and electronic components and insulation materials.

Generally, boron trihalides amine complexes are used to generate resins which exhibit high glass transition temperatures. As an advantage of this class of curing agents, they are used in relatively low levels (1–5 % as an accelerator, 5–15 % as a pure curing agent) compared to other curatives.