

Binder systems for the Cold-Box process

Cold Box are three-components phenolic-urethane systems containing a phenolic resin and an isocyanate resin both dissolved in aromatic or vegetable solvents and an amine catalyst. The two resins are added in percentages varying from 0.5% to 1.0% b.o.s. The flow of amine vapors through the core causes the instantaneous curing of the binders by producing polyurethane resin.

Cavenaghi CB systems have been developed to obtain the following specific requirements:

- low impact on the environment;
- short curing times;
- low sticking and reduced stops for cleaning;
- high productivity;
- excellent sand flowability;
- high cold and hot strengths;
- low gas evolution;
- long bench life of the mixed sand: at least two hours even in the most critical conditions;
- high humidity resistance and long storage life of the cores.

Depending on the specific needs of the foundries, the following grades are available.

Part A – Phenolic Polymer based

Grade	Solvent/Features	Viscosity (cPs at 20°C)
Gioca CB10A/AL10	Aromatic	180-280
Gioca CB11A	Aromatic	50-150
Gioca CB11AS	Aromatic	150-250
Gioca CB12A	Aromatic	50-150
Giocaset® CB110A	No VOC	100-200
Giocaset® CB110A Premium	No VOC	150-350
Giocaset® CB130A	No VOC, Free Phenol < 1%	100-300

Part B – Polymeric Isocyanate based

Grade	Solvent	NCO (%)	Nitrogen (%)	Viscosity (cPs at 20°C)
Gioca CB30BL	Aromatic	24	7.9	10-50
Gioca CB30BL/7	Aromatic	24	7.9	10-50
Gioca CB25B/C	Aromatic	25	9.4	20-70
Giocaset® CB250B/ECO- 2	No VOC	25	8.4	140-240
Giocaset® CB250B/ECO-2S	No VOC	25	8.4	140-240
Giocaset® CB250B/ECO- 3	No VOC	25	8.4	50-150
Giocaset® CB250B/ECO- 3S	No VOC	25	8.8	50-150
Giocaset® CB250B/ECO- 4S	No VOC	25	8.4	50-150
Giocaset® CB150B/S	No VOC	27	8.9	50-150

Features of Cold-Box systems

Based on our experience we can suggest optimal combinations on the following table. Each system is quoted with the main properties achievable.

Part A	Part B	VOC free	Low Sticking	Low Char Build-up	Strength	Amine Consumption	Low Deformation	Humidity Resistance	Sand Mix Life
Gioca CB10A/AL10	Gioca CB30 BL7		✓	✓	✓				✓
Gioca CB11AS	Gioca CB30 BL				✓		✓		
Gioca CB12A	Gioca CB30 BL		✓	✓					
Giocaset® CB110A	Gioca CB250B/ECO-3S ECO3S	✓			✓	✓		✓	✓
Giocaset® CB110A Premium	Gioca CB150 B/S	✓	✓		✓	✓	✓	✓	✓

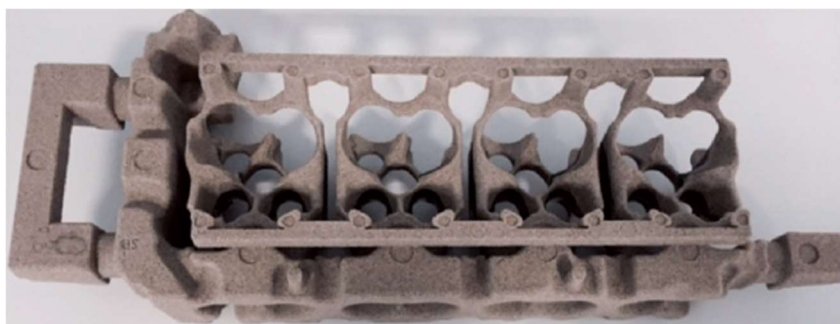


Fig. 1 – Giocaset® CB110A – Giocaset® CB250B/ECO-2