Supplementary Material

Table S1: Composition and approaches of each sample.

Experiment	Sample	Base material						Bonding material (% w/w relative to the total quantity of base material, 5 g or 100 g)				Water (% w/w relative to the total quantity of base material, 5 g or 100 g)
		Total quantity of base material (g)	Base material composed in weight fraction by (%)									
			300–600 µm	150–300 µm	74–150 µm	20–74 µm	<20 µm	Slow setting gypsum powder	Fast setting gypsum powder	Stearic acid powder	Commercial amide wax of type *N*,*N*-bis-stearyl ethylenediamine	pH 3 hydrochloric acid solution
Disk geometry samples												
Basic consolidation test	D1	5				50	50					6
	D2	5			50		50					6
	D3	5		50			50					6
	D4	5	50				50					6
	D5	5			50	50						6
	D6	5		50		50						6
	D7	5	50			50						6
	D8	5		50	50							6
	D9	5	50		50							6
	D10	5	50	50								6
	D11	5				66.7	33.3					6
	D12	5			66.7		33.3					6
	D13	5		66.7			33.3					6
	D14	5	66.7				33.3					6
	D15	5			66.7	33.3						6
	D16	5		66.7		33.3						6
	D17	5	66.7			33.3						6
	D18	5		66.7	33.3							6
	D19	5	66.7		33.3							6
	D20	5	66.7	33.3								6

Experiment	Sample	Base material						Bonding material (% w/w relative to the total quantity of base material, 5 g or 100 g)				Water (% w/w relative to the total quantity of base material, 5 g or 100 g)
		Total quantity of base material (g)	Base material composed in weight fraction by (%)									
			300–600 µm	150–300 µm	74–150 µm	20–74 µm	<20 µm	Slow setting gypsum powder	Fast setting gypsum powder	Stearic acid powder	Commercial amide wax of type *N*,*N*-bis-stearyl ethylenediamine	pH 3 hydrochloric acid solution
Disk geometry samples												
Basic consolidation test	D21	5				75	25					6
	D22	5			75		25					6
	D23	5		75			25					6
	D24	5	75				25					6
	D25	5			75	25						6
	D26	5		75		25						6
	D27	5	75			25						6
	D28	5		75	25							6
	D29	5	75		25							6
	D30	5	75	25								6
Consolidation by water inmersion	D31	5				50	50					6
Basic wettability test	D32	5				50	50					6
	D33	5	50	50								6
	D34	5				66.7	33.3					6
	D35	5	66.7	33.3								6
	D36	5				75	25					6
	D37	5	75	25								6

Experiment	Sample	Base material						Bonding material (% w/w relative to the total quantity of base material, 5 g or 100 g)				Water (% w/w relative to the total quantity of base material, 5 g or 100 g)
		Total quantity of base material (g)	Base material composed in weight fraction by (%)									
			300–600 µm	150–300 µm	74–150 µm	20–74 µm	<20 µm	Slow setting gypsum powder	Fast setting gypsum powder	Stearic acid powder	Commercial amide wax of type *N*,*N*-bis-stearyl ethylenediamine	pH 3 hydrochloric acid solution
Disk geometry samples												
Basic consolidation test	D38	5				50	50	5				6
	D39	5				50	50	10				6
	D40	5				50	50		5			6
	D41	5				50	50		10			6
	D42	5				50	50			5		6
	D43	5				50	50			10		6
	D44	5				50	50				5	6
	D45	5				50	50				10	6
Consolidation by water immersion	D46	5				50	50	5				6
	D47	5				50	50	10				6
	D48	5				50	50		5			6
	D49	5				50	50		10			6
	D50	5				50	50			5		6
	D51	5				50	50			10		6
	D52	5				50	50				5	6
	D53	5				50	50				10	6
Basic wettability test	D54	5				50	50			5		6
	D55	5				50	50			10		6
	D56	5				50	50				5	6
	D57	5				50	50				10	6

Experiment	Sample	Base material						Bonding material (% w/w relative to the total quantity of base material, 5 g or 100 g)				Water (% w/w relative to the total quantity of base material, 5 g or 100 g)
		Total quantity of base material (g)	Base material composed in weight fraction by (%)									
			300–600 µm	150–300 µm	74–150 µm	20–74 µm	<20 µm	Slow setting gypsum powder	Fast setting gypsum powder	Stearic acid powder	Commercial amide wax of type *N*,*N*-bis-stearyl ethylenediamine	pH 3 hydrochloric acid solution
Plug geometry samples												
Basic wettability test, basic petrophysical test and theoretical porosity calculation	P1	100				50	50				5	6
	P2	100				50	50				5	6
	P3	100	50	50							5	6
	P4	100	50	50							5	6
	P5	100				75	25				5	6
	P6	100				75	25				5	6
	P7	100	75	25							5	6
	P8	100	75	25							5	6