APPENDIX C.

RHEOLOGY

Rheometer

Only 10%	Rheometer		Rheometer divided by specific gravity	
	Yield stress [Pa]	**Plastic viscosity [Pa.s]**	**Yield stress [Pa]**	**Plastic viscosity [Pa.s]**
K101	**8.362**	**0.0753**	**4.729**	**0.043**
K102	**6.95**	**0.082**	**3.934**	**0.046**
K103	**5.6287**	**0.0758**	**3.166**	**0.043**
K104	**9.3173**	**0.089**	**5.278**	**0.050**
K105	**7.884**	**0.1111**	**4.456**	**0.063**
K106	**8.4693**	**0.0802**	**4.784**	**0.045**
K107	**6.5189**	**0.092**	**3.689**	**0.052**
K108	**11.033**	**0.104**	**6.245**	**0.059**
K109	**13.747**	**0.102**	**7.770**	**0.058**

Table 1. Rheological parameters from the rheometer for 10% of added filler.

Only 20%	Rheometer		Rheometer divided by specific gravity	
	Yield stress [Pa]	**Plastic viscosity [Pa.s]**	**Yield stress [Pa]**	**Plastic viscosity [Pa.s]**
K101	**11.181**	**0.1288**	**5.986**	0.069
K102	**14.568**	**0.1368**	**7.811**	0.073
K103	**11.214**	**0.1297**	**5.942**	0.069
K104	**13.404**	**0.1355**	**7.199**	0.073
K105	**8.6318**	**0.1405**	**4.616**	0.075
K106	**17.242**	**0.1996**	**9.209**	0.107
K107	**11.185**	**0.1202**	**5.995**	0.064
K108	**26.323**	**0.2799**	**14.114**	0.150
K109	17.903	0.1475	9.573	0.079

Table 2. Rheological parameters from the rheometer for 20% of added filler.

Only 30%	Rheometer		Rheometer divided by specific gravity	
	Yield stress [Pa]	Plastic viscosity [Pa.s]	Yield stress [Pa]	Plastic viscosity [Pa.s]
K101	**18.46**	**0.2388**	**9.381**	**0.121**
K102	**22.737**	**0.3237**	**11.581**	**0.165**
K103	**15.042**	**0.1778**	**7.533**	**0.089**
K104	**17.696**	**0.2333**	**9.033**	**0.119**
K105	**20.187**	**0.2689**	**10.242**	**0.136**
K106	**19.524**	**0.3787**	**9.889**	**0.192**
K107	**22.234**	**0.3139**	**11.318**	**0.160**
K108	**38.229**	**0.9838**	**19.471**	**0.501**
K109	**30.281**	**0.7181**	**15.363**	**0.364**
K110	**29.164**	**0.5504**	**14.837**	**0.280**
K111	**13.745**	**0.2138**	**6.973**	**0.108**
K112	**23.273**	**0.3067**	**11.827**	**0.156**
K113	**34.46**	**0.3813**	**17.502**	**0.194**
K114	**22.065**	**0.2685**	**11.232**	**0.137**
K115	**21.205**	**0.3214**	**10.776**	**0.163**
K116	**33.908**	**0.5117**	**16.954**	**0.256**
K117	**24.98**	**0.3871**	**12.709**	**0.197**
K118	**23.443**	**0.3737**	**11.918**	**0.190**
K119	**30.381**	**0.4205**	**15.439**	**0.214**
K120	**28.396**	**0.3396**	**14.301**	**0.171**
K121	**27.614**	**0.3121**	**13.907**	**0.157**
K122	**22.905**	**0.2504**	**11.627**	**0.127**
K123	**19.249**	**0.2251**	**9.771**	**0.114**
K124	**29.511**	**0.3342**	**14.989**	**0.170**
K125	**21.442**	**0.3082**	**10.799**	**0.155**
K126	**37.266**	**0.8006**	**18.927**	**0.407**
K127	**25.136**	**0.3475**	**12.781**	**0.177**

Table 3. Rheological parameters from the rheometer for 30% of added filler.

Only 40%	Rheometer		Rheometer divided by specific gravity	
	Yield stress [Pa]	Plastic viscosity [Pa.s]	Yield stress [Pa]	Plastic viscosity [Pa.s]
K101	23.739	1.0461	11.482	0.506
K102	23.455	0.8347	11.377	0.405
K103	25.373	0.6636	12.047	0.315
K104	21.493	0.4709	10.455	0.229
K105	26.336	0.6424	12.710	0.310
K106	32.949	0.9556	15.868	0.460
K107	26.841	0.7985	13.010	0.387
K108	59.91	1.6248	29.059	0.788
K109	38.872	1.0648	18.761	0.514
K110	37.355	1.0484	18.092	0.508
K111	23.01	0.5441	11.105	0.263
K112	28.254	0.9949	13.665	0.481
K113	41.267	0.9195	19.944	0.444
K114	29.425	0.5784	14.262	0.280
K115	35.425	1.3079	17.133	0.633
K116	39.965	1.3173	18.935	0.624
K117	32.146	0.9712	15.570	0.470
K118	24.255	0.6923	11.740	0.335
K119	48.137	1.2861	23.282	0.622
K120	26.53	0.5288	12.685	0.253
K121	21.25	0.4634	10.161	0.222
K122	27.865	0.7278	13.458	0.351
K123	24.756	0.422	11.956	0.204
K124	32.417	0.7574	15.667	0.366
K125	29.736	0.7767	14.218	0.371
K126	57.958	2.1804	28.011	1.054
K127	24.919	0.6968	12.061	0.337

Table 4. Rheological parameters from the rheometer for 40% of added filler.

L-Box

Only 10%	L-box	
	Um [cm]	T [seg]
K101	20.7	0.194
K102	17.9	0.191
K103	21.3	0.236
K104	17.05	0.308
K105	16.9	0.178
K106	16.8	0.22
K107	17.9	0.19
K108	15.5	0.189
K109	13.1	0.26

Table 5. Final spread length (Um) and dynamic parameter (T) from the L-Box and for the tests with 10% of added filler.

Only 20%	L-box	
	Um [cm]	T [seg]
K101	13	0.1977
K102	11.9	0.151
K103	14.2	0.197
K104	13.3	0.227
K105	15.2	0.185
K106	10.4	0.16
K107	14.1	0.298
K108	7.8	0.139
K109	11.6	0.171

Table 6. Final spread length (Um) and dynamic parameter (T) from the L-Box and for the tests with 20% of added filler.

Only 30%	L-box	
	Um [cm]	T [seg]
K101	9.1	0.1391
K102	10	0.154
K103	11.5	0.139
K104	9.3	0.137
K105	8.5	0.12
K106	7.7	0.188
K107	7.3	0.187
K108	2.8	0.857
K109	3.5	0.294
K110	5.2	0.201
K111	12	0.243
K112	7.1	0.394
K113	3.9	0.268
K114	8.2	0.266
K115	7.2	0.285
K116	4.1	0.276
K117	6	0.347
K118	6.2	0.265
K119	5.5	0.232
K120	6.5	0.236
K121	6.6	0.184
K122	7.8	0.233
K123	8.6	0.24
K124	5.1	0.296
K125	7.4	0.315
K126	2.3	0.623
K127	6.2	0.265

Table 7. Final spread length (Um) and dynamic parameter (T) from the L-Box and for the tests with 30% of added filler.

Only 40%	L-box	
	Um [cm]	T [seg]
K101	3	1.08
K102	4.75	0.556
K103	4.3	0.267
K104	6.25	0.239
K105	4.8	0.2
K106	2.6	0.974
K107	3.75	0.419
K108	Inv	Inv
K109	2.25	0.837
K110	2.5	0.697
K111	5.9	0.366
K112	4	0.52
K113	2.2	0.647
K114	4	0.285
K115	Inv	Inv
K116	Inv	Inv
K117	2.5	1.181
K118	5.6	0.48
K119	Inv	Inv
K120	5.7	0.38
K121	7.2	0.412
K122	4.3	0.548
K123	6	0.366
K124	3.6	0.601
K125	3.1	0.585
K126	Inv	Inv
K127	4.2	0.501

Table 8. Final spread length (Um) and dynamic parameter (T) from the L-Box and for the tests with 40% of added filler. Some cells read Inv because there was no flow at all, i.e. Um=0. Thus, T could not be calculated either.

Microcone

Only 10%	Spread diameter [cm]
K101	**14.5**
K102	**13.6**
K103	**14.8**
K104	**13**
K105	**13.5**
K106	**13.4**
K107	**13.75**
K108	**12.7**
K109	**12.5**

Table 9. Measured diameter of the microcone spread for the tests with 10% of added filler.

Only 20%	Spread diameter [cm]
K101	**12**
K102	**11.4**
K103	**12.2**
K104	**11.8**
K105	**12.5**
K106	**10.7**
K107	**11.85**
K108	**9.5**
K109	**11.1**

Table 10. Measured diameter of the microcone spread for the tests with 20% of added filler.

Only 30%	Spread diameter [cm]
K101	10.45
K102	10.8
K103	11.5
K104	10
K105	9.9
K106	9.8
K107	9.2
K108	7.2
K109	7.8
K110	7.7
K111	10.7
K112	8.5
K113	8
K114	9.5
K115	9.3
K116	7.4
K117	8.3
K118	8.4
K119	8
K120	8.4
K121	8.5
K122	8.8
K123	9.4
K124	7.9
K125	8.7
K126	6.2
K127	8.2

Table 11. Measured diameter of the microcone spread for the tests with 30% of added filler.

Only 40%	Spread diameter [cm]
K101	7.3
K102	7.8
K103	8.1
K104	8.7
K105	8.3
K106	6.9
K107	7.6
K108	Inv
K109	6.9
K110	6
K111	8.5
K112	7.3
K113	6
K114	7.5
K115	6.3
K116	6.8
K117	6.5
K118	7.6
K119	Inv
K120	7.8
K121	8.8
K122	7.3
K123	8.3
K124	6.6
K125	6.7
K126	Inv
K127	7.3

Table 12. Measured diameter of the microcone spread for the tests with 40% of added filler. Some cells read Inv because the spread did not fulfill the criteria conditions.