# Appendix E Range of soil properties per soil unit

This appendix presents the range of soil properties per geotechnical unit. The values presented are in the format:

*min / max / **average** / standard deviation / (number of tests)*

*Table E-1 Statistical overview of the strength parameter undrained shear strength per geotechnical unit based on available laboratory tests. Note, that the geotechnical units are based on CPT measurements and geophysical data. Hence, some test results are also given for sand units (i.e., tests performed on clayey/silty specimens present within a sand unit).*

| Geotechnical unit | Undrained shear strength [kPa] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DSS | CAU | CIU | UU | UCS | Hand vane | PP | Vane |
| Holocene Clay | 7/58/**30**/26/(3) | 74/89/**81**/11/(2) | 88/88/**88**/0/(1) | 23/77/**48**/28/(3) | -/-/-/- (0) | 6/95/**40**/30/(20) | 4/103/**46**/32/(21) | 14/17/**15**/2/(3) |
| Holocene Sand | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | 16/30/**23**/10/(2) | 24/83/**64**/34/(3) | -/-/-/- (0) |
| Holocene Mix | 41/41/**41**/0/(1) | -/-/-/- (0) | -/-/-/- (0) | 75/207/**141**/93/(2) | -/-/-/- (0) | 10/125/**94**/39/(7) | 100/283/**189**/76/(8) | 3/3/**3**/0/(1) |
| Late Weichselian Clay | 9/119/**49**/48/(4) | 34/200/**109**/67/(5) | 22/53/**41**/16/(3) | 9/135/**88**/44/(8) | -/-/-/- (0) | 1/175/**70**/48/(66) | 3/275/**97**/61/(60) | 7/31/**18**/9/(5) |
| Late Weichselian Sand | 80/80/**80**/0/(1) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | 88/156/**122**/49/(2) | 42/400/**229**/128/(7) | -/-/-/- (0) |
| Late Weichselian Mix | 90/145/**118**/39/(2) | -/-/-/- (0) | 106/106/**106**/0/(1) | 74/962/**430**/469/(3) | -/-/-/- (0) | 70/225/**156**/45/(11) | 75/333/**213**/74/(21) | -/-/-/- (0) |
| Weichselian Clay | 35/129/**76**/22/(16) | 73/195/**122**/30/(25) | -/-/-/- (0) | 52/277/**147**/64/(16) | -/-/-/- (0) | 20/200/**95**/46/(110) | 46/317/**121**/39/(133) | -/-/-/- (0) |
| Weichselian Sand | 104/181/**143**/54/(2) | 337/1168/**770**/385/(4) | -/-/-/- (0) | 190/1510/**747**/683/(3) | -/-/-/- (0) | 63/175/**94**/46/(5) | 58/200/**128**/60/(8) | -/-/-/- (0) |
| Weichselian Mix | 30/63/**49**/17/(3) | 82/1037/**463**/386/(5) | 60/87/**73**/19/(2) | 30/953/**236**/338/(8) | -/-/-/- (0) | 9/200/**99**/64/(21) | 58/367/**150**/82/(30) | 3/35/**19**/22/(2) |
| Saalian Clay | 83/230/**154**/69/(5) | 76/233/**156**/48/(7) | -/-/-/- (0) | 137/434/**258**/116/(8) | -/-/-/- (0) | 60/225/**126**/39/(29) | 63/413/**239**/78/(85) | -/-/-/- (0) |
| Saalian Sand | 83/156/**109**/41/(3) | 93/108/**100**/11/(2) | -/-/-/- (0) | 177/305/**241**/90/(2) | -/-/-/- (0) | 50/163/**124**/35/(12) | 22/433/**185**/99/(32) | -/-/-/- (0) |
| Saalian Mix | 100/215/**156**/58/(3) | 110/231/**189**/55/(4) | 97/254/**184**/80/(3) | 126/349/**236**/78/(7) | -/-/-/- (0) | 40/163/**98**/37/(19) | 50/392/**210**/70/(76) | -/-/-/- (0) |
| Elsterian Clay | 107/487/**251**/126/(7) | 138/370/**208**/93/(5) | 87/455/**272**/137/(5) | 159/671/**394**/143/(16) | 225/230/**228**/4/(2) | 88/225/**152**/30/(44) | 125/700/**412**/124/(287) | -/-/-/- (0) |
| Elsterian Sand | 302/302/**302**/0/(1) | -/-/-/- (0) | -/-/-/- (0) | 829/829/**829**/0/(1) | -/-/-/- (0) | -/-/-/- (0) | 133/900/**401**/340/(7) | -/-/-/- (0) |
| Elsterian Mix | 451/747/**599**/209/(2) | 443/1450/**1046**/532/(3) | 212/212/**212**/0/(1) | 250/1260/**755**/714/(2) | -/-/-/- (0) | 250/250/**250**/0/(1) | 173/883/**536**/273/(9) | -/-/-/- (0) |
| Elsterian & older Clay | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |
| Elsterian & older Sand | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | 251/251/**251**/0/(1) | -/-/-/- (0) | 90/90/90/0/(1) | 120/300/**204**/91/(3) | -/-/-/- (0) |
| Elsterian & older Mix | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | 450/450/**450**/0/(1) | -/-/-/- (0) |
| Miocene Clay | 216/223/**220**/5/(2) | 323/323/**323**/0/(1) | 344/416/**371**/39/(3) | 189/785/**541**/241/(5) | -/-/-/- (0) | -/-/-/- (0) | 150/867/**535**/148/(79) | -/-/-/- (0) |
| Miocene Sand | 277/277/**277**/0/(1) | -/-/-/- (0) | -/-/-/- (0) | 455/842/**655**/194/(3) | -/-/-/- (0) | -/-/-/- (0) | 167/817/**440**/180/(21) | -/-/-/- (0) |
| Miocene Mix | 105/338/**222**/165/(2) | -/-/-/- (0) | 212/476/**321**/138/(3) | 558/558/**558**/0/(1) | -/-/-/- (0) | -/-/-/- (0) | 250/733/**457**/131/(27) | -/-/-/- (0) |

*Table E-2 Statistical overview of the friction angle and small-strain shear modulus per geotechnical unit. Note, that the geotechnical units are based on CPT measurements and geophysical data. Hence, some CID tests are also performed for clay units (i.e., tests performed on sandy specimens present within a clay unit).*

| Geotechnical unit | Friction angle [°] | Small-strain shear modulus [MPa] | | | |
|---|---|---|---|---|---|
| | CID | Resonant column | SCPT | P-S logging | Bender Element |
| Holocene Clay | 30.8/32/**31.4**/0.9/(2) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |
| Holocene Sand | 31.7/51.6/**38.9**/4.5/(34) | 62/440/**251**/267/(2) | 110/249/**171**/45/(8) | 111/123/**117**/8/(2) | 31/38/**35**/5/(2) |
| Holocene Mix | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |
| Late Weichselian Clay | -/-/-/- (0) | 142/142/**142**/0/(1) | 17/35/**24**/8/(5) | -/-/-/- (0) | 8/27/**18**/14/(2) |
| Late Weichselian Sand | 32/48/**36.9**/5.8/(6) | -/-/-/- (0) | 52/234/**153**/57/(8) | 83/187/**130**/40/(6) | -/-/-/- (0) |
| Late Weichselian Mix | 32.5/32.5/**32.5**/0/(1) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |
| Weichselian Clay | 34/34/**34**/0/(1) | 64/710/**387**/457/(2) | 39/171/**119**/46/(12) | 32/125/**87**/42/(6) | -/-/-/- (0) |
| Weichselian Sand | 31/41/**35.4**/2.5/(40) | 84/127/**105**/31/(2) | 46/186/**107**/32/(20) | 25/130/**72**/29/(23) | 79/150/**107**/38/(3) |
| Weichselian Mix | 32.0/33.0/**32.4**/0.4/(4) | -/-/-/- (0) | 76/180/**128**/33/(12) | 62/158/**96**/54/(3) | -/-/-/- (0) |
| Saalian Clay | -/-/-/- (0) | 129/129/**129**/0/(1) | 93/230/**134**/51/(10) | 126/136/**131**/5/(3) | 156/156/**156**/0/(1) |
| Saalian Sand | 32.5/40/**34.8**/2.4/(23) | -/-/-/- (0) | 54/180/**136**/32/(22) | 61/312/**139**/62/(13) | -/-/-/- (0) |
| Saalian Mix | 32/32/**32**/0/(1) | -/-/-/- (0) | 97/152/**127**/18/(13) | 76/203/**131**/31/(22) | -/-/-/- (0) |
| Elsterian Clay | 41.4/41.4/**41.4**/0/(1) | 389/411/**400**/15/(2) | 47/171/**101**/39/(11) | 129/255/**202**/37/(19) | 120/120/**120**/0/(1) |
| Elsterian Sand | 31.8/36.2/**33.6**/1.9/(4) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |
| Elsterian Mix | 32.8/32.8/**32.8**/0/(1) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |
| Elsterian & older Clay | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |
| Elsterian & older Sand | 33/41/**36.1**/2.1/(13) | 105/105/**105**/0/(1) | 116/218/**149**/41/(5) | 88/193/**140**/36/(9) | -/-/-/- (0) |
| Elsterian & older Mix | 34/34/**34**/0/(1) | -/-/-/- (0) | 87/137/**112**/35/(2) | 127/189/**150**/34/(3) | 103/103/**103**/0/(1) |
| Miocene Clay | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | 150/265/**232**/42/(7) | -/-/-/- (0) |
| Miocene Sand | 33/36/**33.8**/1.3/(5) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |
| Miocene Mix | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | 128/177/**151**/23/(6) | -/-/-/- (0) |

*Table E-3 Statistical overview of particle size distribution per geotechnical unit based on available laboratory tests.*

| Geotechnical unit | Gravel content [%] | Sand content [%] | Silt content [%] | Clay content [%] | Fines content [%] |
|---|---|---|---|---|---|
| Holocene Clay | 0/5/**1.3**/2.0/(8) | 0/75/**41.0**/28.6/(8) | 16/98/**37.0**/26.5/(8) | 1.2/67.8/**20.7**/23.3/(8) | 21/100/**57.7**/30.1/(8) |
| Holocene Sand | 0/63.1/**3.3**/8.9/(75) | 23.3/99/**90.2**/12.7/(75) | 0.7/52.5/**5.7**/7.2/(75) | 0/22.9/**1.5**/4.0/(37) | 0.7/75.4/**6.4**/9.7/(75) |
| Holocene Mix | 0/38.5/**5.4**/13.4/(8) | 1.3/78/**45.3**/30.5/(8) | 5.5/72.9/**32.6**/21.7/(8) | 1.1/49.3/**19.1**/20.0/(7) | 5.5/96.1/**49.3**/34.8/(8) |
| Late Weichselian Clay | 0/26/**4.0**/8.6/(10) | 0/44.5/**17.5**/17.2/(10) | 19/79.3/**46.5**/16.9/(10) | 12/55.3/**32.0**/15.8/(10) | 31/100/**78.5**/22.7/(10) |
| Late Weichselian Sand | 0/50.4/**5.7**/12.4/(20) | 29.4/98/**78.5**/21.1/(20) | 2/41/**12.8**/10.6/(20) | 0.4/38.9/**7.4**/12.9/(8) | 2/69.8/**15.8**/16.8/(20) |
| Late Weichselian Mix | 0/28.4/**5.2**/9.7/(8) | 0.2/95/**50.2**/37.6/(8) | 2.3/52.6/**26.3**/17.6/(8) | 0.8/59.6/**24.4**/21.9/(6) | 2.3/99.8/**44.6**/37.3/(8) |
| Weichselian Clay | 0/4.9/**0.2**/0.9/(38) | 0/72.3/**7.4**/14.7/(38) | 18.5/87.2/**58.8**/17.5/(38) | 0.4/81/**33.6**/15.4/(38) | 22.8/100/**92.3**/15.4/(38) |
| Weichselian Sand | 0/50.2/**4.0**/10.3/(77) | 0/98.8/**76.2**/29.6/(77) | 1.1/95/**17.1**/25.1/(77) | 0/43.2/**5.5**/9.3/(37) | 1.1/100/**19.8**/29.6/(77) |
| Weichselian Mix | 0/7.2/**0.5**/1.5/(29) | 0/97.4/**12.3**/23.5/(29) | 2.6/98/**67.4**/26.5/(29) | 2/68/**20.6**/18.5/(28) | 2.6/100/**87.3**/24.1/(29) |
| Saalian Clay | 0/1.2/**0.2**/0.4/(10) | 0.7/92.6/**17.3**/29.2/(10) | 6.2/86.5/**48.4**/25.2/(10) | 8.9/63/**37.9**/23.9/(9) | 6.2/99.3/**82.6**/29.6/(10) |
| Saalian Sand | 0/94.8/**5.0**/15.0/(76) | 1.1/98.7/**64.0**/31.5/(76) | 0.2/89.1/**25.0**/24.1/(76) | 0/45.3/**9.9**/12.1/(46) | 0.2/98.9/**31.2**/31.3/(75) |
| Saalian Mix | 0/76.1/**3.3**/15.5/(24) | 0.7/96.2/**29.7**/27.0/(24) | 3/88.5/**48.1**/26.4/(24) | 1.9/61/**20.6**/19.9/(22) | 3.1/99.3/**67.0**/30.1/(24) |
| Elsterian Clay | 0/19.2/**1.4**/4.5/(28) | 0/75.9/**10.1**/14.6/(28) | 4.9/81.1/**42.4**/18.7/(28) | 11.1/76/**47.8**/18.5/(27) | 4.9/100/**88.5**/17.8/(28) |
| Elsterian Sand | 0/52.5/**9.6**/15.3/(17) | 28.9/95.9/**65.3**/21.5/(17) | 3.9/53.7/**19.6**/15.8/(17) | 0.9/37.6/**9.3**/12.9/(10) | 3.8/70.8/**25.1**/22.8/(17) |
| Elsterian Mix | 0/3/**1.0**/1.2/(5) | 13.1/58.9/**45.9**/18.9/(5) | 28/80.9/**43.7**/21.5/(5) | 2.7/18/**9.5**/5.7/(5) | 40.8/86.9/**53.2**/19.3/(5) |
| Elsterian & older Clay | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |
| Elsterian & older Sand | 0/26.9/**2.9**/5.9/(28) | 68.8/96.9/**88.3**/8.6/(28) | 1.8/24.8/**8.4**/6.2/(28) | 0.8/3.8/**1.9**/1.0/(7) | 1.8/28.6/**8.8**/7.0/(28) |
| Elsterian & older Mix | 0/72.4/**19**/35.6/(4) | 21.4/76.6/**57.5**/24.6/(4) | 6.2/32.7/**20.0**/10.9/(4) | 1.1/10.7/**4.7**/5.2/(3) | 6.2/35.1/**23.5**/13.4/(4) |
| Miocene Clay | 0/30.9/**2.6**/8.9/(12) | 1.5/61.9/**15.9**/15.8/(12) | 33.3/90.5/**63.7**/22.5/(12) | 1.2/55.6/**17.8**/19.5/(12) | 38.2/98.5/**81.5**/17.1/(12) |
| Miocene Sand | 0/49.4/**3.5**/10.1/(25) | 14/96.9/**78.8**/21.9/(25) | 3.1/73.4/**15.9**/17.9/(25) | 0/18.6/**3.9**/5.1/(11) | 3.1/86/**17.6**/21.1/(25) |
| Miocene Mix | 0/2.1/**0.4**/0.6/(12) | 0/69.8/**16.5**/18.4/(12) | 27.5/91.8/**51.8**/19.0/(12) | 2.2/62.3/**31.3**/20.6/(12) | 29.9/100/**83.2**/18.4/(12) |

*Table E-4 Statistical overview of densities from classification tests per geotechnical unit based on available laboratory tests.*

| Geotechnical unit | Bulk density [kN/m3] | Dry density [kN/m3] | Particle density [Mg/m3] | Maximum dry density [kN/m3] | Minimum dry density [kN/m3] |
|---|---|---|---|---|---|
| Holocene Clay | 16.6/23.1/**20.0**/1.2/(35) | 12.2/18.8/**15.9**/1.4/(32) | 2.6/2.7/**2.7**/0.0/(6) | -/-/-/- (0) | -/-/-/- (0) |
| Holocene Sand | 16.1/22.9/**19.8**/0.8/(251) | 12.4/19.8/**16.2**/0.8/(251) | 2.6/2.7/**2.7**/0.0/(69) | 13.8/23.4/**16.2**/1.4/(49) | 10.8/14.6/**12.8**/0.9/(49) |
| Holocene Mix | 18.4/20.9/**19.9**/0.8/(20) | 14.5/17.2/**15.9**/0.9/(17) | 2.6/2.7/**2.7**/0.0/(8) | 16/16/**16**/0/(1) | 12/12/**12**/0/(1) |
| Late Weichselian Clay | 12.2/23/**19.7**/2.4/(60) | 8.8/20.3/**16.0**/3.1/(56) | 2.6/2.8/**2.7**/0.0/(10) | -/-/-/- (0) | -/-/-/- (0) |
| Late Weichselian Sand | 18.6/22.1/**20.2**/0.8/(48) | 14.6/19.3/**16.8**/0.9/(48) | 2.6/2.7/**2.6**/0.0/(15) | 15.6/17.7/**16.8**/0.8/(9) | 12/13.7/**13.1**/0.5/(9) |
| Late Weichselian Mix | 18.5/23.7/**20.4**/1.2/(26) | 15.2/21.1/**17.0**/1.4/(26) | 2.6/2.7/**2.7**/0.0/(7) | -/-/-/- (0) | -/-/-/- (0) |
| Weichselian Clay | 16.9/22.8/**19.8**/1.0/(201) | 12.7/19.2/**15.8**/1.5/(156) | 2.6/2.8/**2.7**/0.0/(33) | 14.7/14.7/**14.7**/0/(1) | 11.3/11.3/**11.3**/0/(1) |
| Weichselian Sand | 16.4/23.3/**19.7**/0.9/(313) | 12.7/21.4/**16.1**/0.9/(306) | 2.6/2.7/**2.7**/0.0/(69) | 14.6/18.2/**16.5**/0.8/(48) | 10.9/18.1/**13.4**/1.0/(48) |
| Weichselian Mix | 16.5/22.3/**19.4**/1.0/(114) | 13/19.6/**15.3**/1.3/(105) | 2.6/2.8/**2.7**/0.0/(21) | 14.7/17.7/**16.2**/2.1/(2) | 11.1/14.3/**12.7**/2.3/(2) |
| Saalian Clay | 17.9/22.5/**20.4**/1.0/(69) | 12.3/18.9/**16.5**/1.3/(58) | 2.6/2.7/**2.7**/0.0/(10) | -/-/-/- (0) | -/-/-/- (0) |
| Saalian Sand | 16.1/23.3/**19.7**/1.0/(278) | 13.6/19.8/**16.0**/1.1/(270) | 2.6/2.7/**2.6**/0.0/(56) | 15/18.4/**16.8**/0.8/(29) | 11.9/14.5/**13.3**/0.7/(29) |
| Saalian Mix | 17.2/22.3/**19.6**/1.2/(116) | 13.1/19.7/**15.6**/1.5/(95) | 2.6/2.7/**2.7**/0.0/(18) | 16.5/16.5/**16.5**/0/(1) | 12.7/12.7/**12.7**/0/(1) |
| Elsterian Clay | 16.3/22.5/**20.1**/0.9/(256) | 12.6/20.4/**16.2**/1.2/(224) | 2.6/2.8/**2.7**/0.0/(20) | -/-/-/- (0) | -/-/-/- (0) |
| Elsterian Sand | 18/21.6/**19.7**/0.7/(45) | 13.8/18.4/**16.1**/1.0/(45) | 2.6/2.7/**2.6**/0.0/(16) | 15.6/18.1/**17.1**/0.9/(7) | 12.6/14.3/**13.6**/0.7/(7) |
| Elsterian Mix | 19.2/23.7/**21.7**/1.4/(22) | 15.5/21.8/**18.8**/2.1/(21) | 2.6/2.8/**2.7**/0.0/(5) | 17.9/17.9/**17.9**/0/(1) | 12.7/12.7/**12.7**/0/(1) |
| Elsterian & older Clay | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |
| Elsterian & older Sand | 17.1/21.3/**19.6**/0.7/(145) | 12.5/18.4/**16.1**/0.8/(145) | 2.6/2.7/**2.6**/0.0/(21) | 15.9/20.3/**17.1**/1.0/(15) | 12.7/14.4/**13.5**/0.5/(15) |
| Elsterian & older Mix | 18.8/21.6/**20.3**/1.5/(4) | 15.1/19.3/**17.2**/2.0/(4) | 2.6/2.6/**2.6**/0.0/(2) | -/-/-/- (0) | -/-/-/- (0) |
| Miocene Clay | 18.4/22/**20.1**/0.7/(62) | 14.3/19/**16.3**/0.9/(60) | 2.6/2.7/**2.7**/0.0/(9) | -/-/-/- (0) | -/-/-/- (0) |
| Miocene Sand | 17.1/21.8/**19.4**/0.9/(97) | 12.9/18.9/**15.6**/1.0/(96) | 2.6/2.7/**2.6**/0.0/(21) | 14.4/17.1/**15.7**/0.7/(12) | 11.3/13.4/**12.4**/0.6/(12) |
| Miocene Mix | 17.7/22.3/**20.0**/1.0/(38) | 13.3/18.5/**16.1**/1.1/(38) | 2.6/2.7/**2.7**/0.0/(10) | -/-/-/- (0) | -/-/-/- (0) |

*Table E-5 Statistical overview of classification properties per geotechnical unit based on available laboratory tests. Note, that the geotechnical units are based on CPT measurements and geophysical data. Hence, some test results are also given for sand units (i.e., tests performed on clayey/silty specimens present within a sand unit) even though Atterberg limits are generally only performed on silty/clayey soils.*

| Geotechnical unit | Liquid limit [%] | Plastic limit [%] | Plasticity index [%] |
|---|---|---|---|
| Holocene Clay | 24/65/**36.3**/15.6/(6) | 14/23/**17.7**/3.3/(6) | 8/42/**18.7**/12.6/(6) |
| Holocene Sand | 31/39/**34.3**/4.2/(3) | 15/20/**17.3**/2.5/(3) | 11/22/**17**/5.6/(3) |
| Holocene Mix | 49/49/**49**/0/(1) | 24/24/**24**/0/(1) | 25/25/**25**/0/(1) |
| Late Weichselian Clay | 27/68/**49.8**/17.1/(8) | 12/29/**21**/5.8/(8) | 15/44/**28.8**/11.7/(8) |
| Late Weichselian Sand | 21/40/**34.8**/9.2/(4) | 13/19/**16.8**/2.6/(4) | 8/23/**18**/6.9/(4) |
| Late Weichselian Mix | 23/45/**36**/9.3/(4) | 11/21/**16.5**/4.1/(4) | 12/24/**19.5**/5.3/(4) |
| Weichselian Clay | 27/58/**37.9**/7.2/(38) | 12/24/**19.2**/3.2/(38) | 11/34/**18.7**/5.4/(38) |
| Weichselian Sand | 21/47/**30.3**/6.8/(10) | 13/25/**18.3**/3.7/(10) | 6/28/**12**/6.5/(10) |
| Weichselian Mix | 29/63/**37.9**/8.9/(22) | 15/32/**21.5**/3.4/(22) | 8/37/**16.5**/8.0/(22) |
| Saalian Clay | 30/58/**45.2**/8.6/(9) | 16/28/**21.1**/3.7/(9) | 14/30/**24.1**/5.8/(9) |
| Saalian Sand | 26/64/**37**/10.5/(12) | 11/30/**19.1**/5.2/(12) | 7/34/**17.9**/6.9/(12) |
| Saalian Mix | 20/55/**37.4**/9.0/(19) | 7/27/**19.9**/5.9/(19) | 8/34/**17.5**/7.7/(19) |
| Elsterian Clay | 38/83/**59.6**/12.1/(19) | 18/33/**24.7**/4.4/(19) | 20/51/**34.9**/7.9/(19) |
| Elsterian Sand | 23/27/**25**/2.8/(2) | 12/19/**15.5**/4.9/(2) | 8/11/**9.5**/2.1/(2) |
| Elsterian Mix | 24/49/**36.5**/17.7/(2) | 14/19/**16.5**/3.5/(2) | 10/30/**20**/14.1/(2) |
| Elsterian & older Clay | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |
| Elsterian & older Sand | 26/51/**38.5**/17.7/(2) | 9/23/**16**/9.9/(2) | 17/28/**22.5**/7.8/(2) |
| Elsterian & older Mix | 23/58/**40.3**/15.7/(4) | 15/30/**22.3**/8.4/(4) | 8/28/**18**/8.2/(4) |
| Miocene Clay | 36/73/**53.4**/12.5/(7) | 18/29/**25.1**/3.9/(7) | 18/45/**28.3**/9.2/(7) |
| Miocene Sand | 33/40/**36.5**/4.9/(2) | 20/23/**21.5**/2.1/(2) | 10/20/**15**/7.1/(2) |
| Miocene Mix | 32/62/**45.5**/9.7/(13) | 20/35/**24.1**/4.1/(13) | 9/31/**21.5**/7.4/(13) |

*Table E-6 Statistical overview of classification properties per geotechnical unit based on available laboratory tests.*

| Geotechnical unit | Carbonate content [%] | Organic content [%] | Acid soluble chloride [%] | Water soluble chloride [%] | Acid soluble sulphate [%] | Water soluble sulphate [%] | Thermal conductivity [W/(mK)] |
|---|---|---|---|---|---|---|---|
| Holocene Clay | 2.3/6.1/**3.7**/1.5/(5) | 2.4/2.4/**2.4**/0/(1) | 0.3/0.4/**0.4**/0.0/(4) | 1800/2100/**1950**/129.1/(4) | 0.1/1.2/**0.3**/0.5/(5) | 290/3300/**966**/1308.4/(5) | -/-/-/- (0) |
| Holocene Sand | 2.3/18.8/**2.7**/2.3/(54) | -/-/-/- (0) | 0.1/0.4/**0.3**/0.1/(47) | 100/3100/**1441.5**/478.1/(47) | 0.0/0.4/**0.1**/0.1/(46) | 140/1700/**340.9**/240.0/(46) | 1.7/3.2/**2.7**/0.3/(29) |
| Holocene Mix | 2.3/6.4/**4.0**/1.8/(5) | -/-/-/- (0) | 0.3/0.5/**0.4**/0.1/(5) | 240/1600/**1268**/580.6/(5) | 0.1/0.7/**0.2**/0.2/(5) | 320/1900/**692**/681.0/(5) | 1.5/2.4/**1.9**/0.5/(3) |
| Late Weichselian Clay | 2.3/12.0/**6.5**/3.5/(10) | -/-/-/- (0) | 0.2/0.6/**0.3**/0.1/(8) | 330/2300/**1355**/596.3/(8) | 0.0/0.3/**0.1**/0.1/(8) | 100/630/**336.3**/168.3/(8) | 2.0/2.0/**2.0**/0/(1) |
| Late Weichselian Sand | 2.3/8.4/**3.4**/2.1/(17) | 6.4/30/**18.2**/16.7/(2) | 0.1/0.6/**0.3**/0.1/(16) | 250/1800/**1130.6**/383.2/(16) | 0.0/1.5/**0.2**/0.4/(16) | 170/2400/**489.4**/562.2/(16) | 1.8/2.4/**2.1**/0.4/(2) |
| Late Weichselian Mix | 2.3/16.8/**6.1**/5.3/(8) | -/-/-/- (0) | 0.2/0.4/**0.3**/0.0/(8) | 48/1700/**1207.3**/568.1/(8) | 0.1/0.3/**0.1**/0.1/(8) | 180/1300/**470**/366.5/(8) | -/-/-/- (0) |
| Weichselian Clay | 2.3/17.7/**11.5**/3.8/(29) | -/-/-/- (0) | 0.2/0.5/**0.3**/0.1/(17) | 22/2600/**1386.6**/532.6/(17) | 0.1/0.2/**0.1**/0.0/(17) | 85/910/**296.2**/209.3/(17) | 2.0/2.1/**2.1**/0.1/(2) |
| Weichselian Sand | 2.3/17.9/**3.8**/3.3/(53) | 4.3/30/**17.1**/18.2/(2) | 0.1/0.4/**0.3**/0.1/(27) | 570/3300/**1491.5**/466.3/(27) | 0.0/0.3/**0.1**/0.1/(27) | 30/1100/**272.6**/203.9/(27) | 2.0/2.0/**2.0**/0/(1) |
| Weichselian Mix | 2.3/15.4/**10.0**/4.0/(28) | 62/62/**62**/0/(1) | 0.2/0.5/**0.3**/0.1/(26) | 100/2300/**1379.6**/632.1/(26) | 0.1/0.9/**0.1**/0.2/(26) | 100/970/**362.7**/222.7/(26) | 1.5/2.1/**1.8**/0.3/(4) |
| Saalian Clay | 2.3/11.3/**5.3**/3.3/(14) | -/-/-/- (0) | 0.2/0.5/**0.3**/0.1/(13) | 62/3700/**1507.8**/819.8/(13) | 0.1/0.4/**0.2**/0.1/(13) | 330/810/**506.2**/157.4/(13) | -/-/-/- (0) |
| Saalian Sand | 2.3/12.5/**3.1**/1.9/(64) | -/-/-/- (0) | 0.1/0.5/**0.3**/0.1/(44) | 76/2200/**1302.4**/409.7/(44) | 0.0/0.3/**0.1**/0.1/(44) | 110/760/**332.0**/155.9/(44) | 1.6/2.8/**2.1**/0.6/(4) |
| Saalian Mix | 2.3/19.5/**6.3**/4.7/(17) | -/-/-/- (0) | 0.2/0.5/**0.3**/0.1/(13) | 840/2600/**1556.9**/496.1/(13) | 0.1/0.3/**0.2**/0.1/(13) | 230/1100/**512.3**/279.6/(13) | 3.0/3.0/**3.0**/0/(1) |
| Elsterian Clay | 2.3/22.7/**10.0**/4.5/(16) | -/-/-/- (0) | 0.3/0.4/**0.3**/0.0/(3) | 1700/1900/**1800**/100/(3) | 0.1/0.3/**0.2**/0.1/(3) | 350/500/**400**/86.6/(3) | -/-/-/- (0) |
| Elsterian Sand | 2.3/8.2/**2.8**/1.5/(16) | -/-/-/- (0) | 0.2/0.3/**0.3**/0.1/(5) | 910/1600/**1322**/264.4/(5) | 0.1/0.2/**0.1**/0.0/(5) | 10/890/**360**/325.6/(5) | -/-/-/- (0) |
| Elsterian Mix | 3.2/9.1/**6.6**/2.8/(5) | -/-/-/- (0) | 0.2/0.3/**0.2**/0.0/(2) | 950/1300/**1125**/247.5/(2) | 0.1/0.2/**0.1**/0.1/(2) | 170/630/**400**/325.3/(2) | -/-/-/- (0) |
| Elsterian & older Clay | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |
| Elsterian & older Sand | 2.3/6.8/**2.6**/1.0/(29) | -/-/-/- (0) | 0.2/0.4/**0.3**/0.1/(23) | 930/1900/**1451.3**/282.3/(23) | 0.0/0.2/**0.1**/0.0/(23) | 160/690/**329.1**/141.4/(23) | -/-/-/- (0) |
| Elsterian & older Mix | 2.3/3.4/**2.8**/0.6/(4) | 33/75/**54**/29.7/(2) | 0.2/0.5/**0.3**/0.1/(4) | 970/3900/**1842.5**/1383.4/(4) | 0.1/1.5/**0.4**/0.7/(4) | 260/4700/**1390**/2206.8/(4) | -/-/-/- (0) |
| Miocene Clay | 2.3/4.1/**2.9**/0.9/(6) | -/-/-/- (0) | 0.3/0.3/**0.3**/0/(1) | 1800/1800/**1800**/0/(1) | 0.1/0.1/**0.1**/0/(1) | 480/480/**480**/0/(1) | -/-/-/- (0) |
| Miocene Sand | 2.3/5.5/**2.7**/0.9/(19) | 2.1/9.7/**5.9**/5.4/(2) | 0.3/0.4/**0.4**/0.1/(2) | 1200/1700/**1450**/353.6/(2) | 0.2/0.2/**0.2**/0.0/(2) | 650/720/**685**/49.5/(2) | -/-/-/- (0) |
| Miocene Mix | 2.3/2.3/**2.3**/0.0/(8) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) | -/-/-/- (0) |