Portland Gravel

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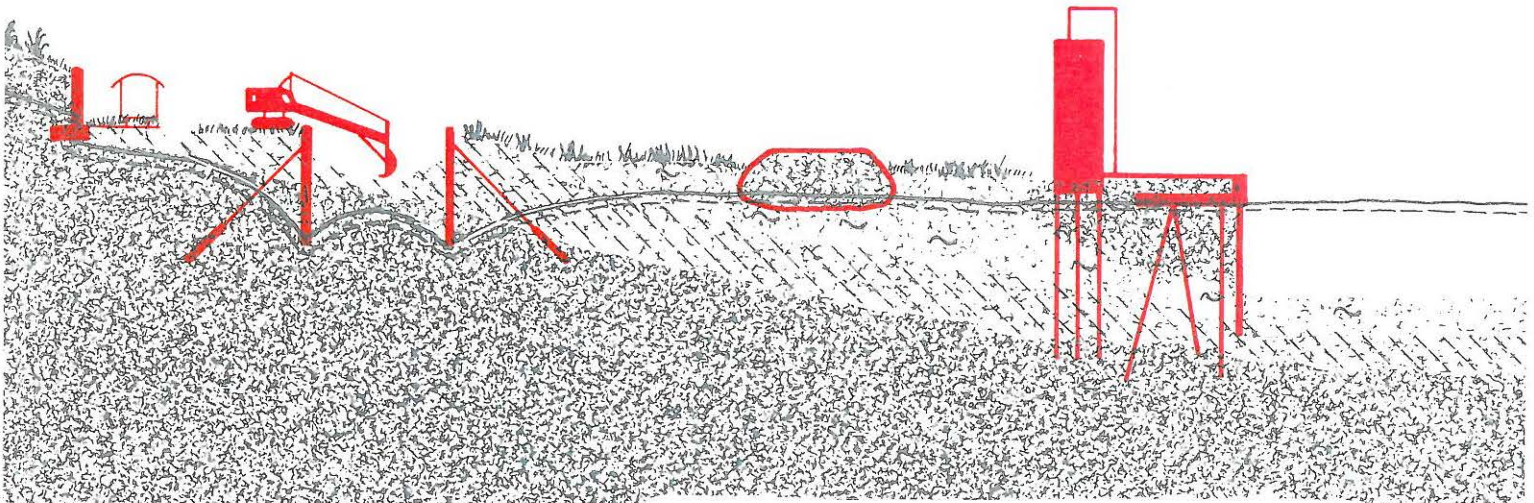

DATA REPORT 9503

Portland gravel

Finn Rosendal Jakobsen
July 1996

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List of symbols.

Latin letters

d = diameter of grain
d_{10} = 10% fractile
d_{50} = 50% fractile
d_{60} = 60% fractile
d_s = grain density

e = void ratio
e_0 = void ratio before test
e_f = void ratio at failure
e_{max} = maximum void ratio
e_{min} = minimum void ratio

I_D = density index

p = mean stress = $1/3(\sigma_1+2\sigma_3)$

q = deviatoric stress = $\sigma_1-\sigma_3$

S_w = degree of saturation

' = effective stress

Greek letters

ε = strain
ε_1 = vertical strain
ε_v = volumetric strain = $\varepsilon_1+2\varepsilon_3$
ε_q = shear strain = $2/3(\varepsilon_1-\varepsilon_3)$

σ = stress
σ_1 = vertical stress
σ_3 = confining pressure

ν = Poisson's ratio = $\frac{\Delta\varepsilon_1-\Delta\varepsilon_v}{2\Delta\varepsilon_1}$
ψ = angle of dilatation = $\sin^{-1}\left(\frac{\Delta\varepsilon_v}{\Delta\varepsilon_v-2\Delta\varepsilon_1}\right)$

' = effective stress

Introduction.

During the last years the Geotechnical Engineering Group (GEG) at Aalborg University has performed triaxial tests with gravel called Portland gravel. Two different types of Portland gravel have been used; Portland gravel 8-16 mm and Portland gravel 16-32 mm.

The strength parameters of Portland gravel are determined by drained triaxial tests have been performed in the Danish Triaxial Cell. The Danish Triaxial Cell prescribes smooth pressure heads and cylindrical specimens with equal height and diameter in order to obtain homogeneous stress and strain conditions during the tests.

Classification of the gravel

For the classification of the gravel the following tests have been performed:

- Sieve test
- Grain density, d_s.
- Maximum, e_{max}, and minimum, e_{min}, void ratio.

Classification of Portland gravel 8-16 mm

From sieve tests the following parameters have been determined /Blanár J. et al., 1993/:

- $d_{50} = 10.96$ mm
- $d_{60}/d_{10} = 1.45$

The grain size distribution is plotted in figure 1.

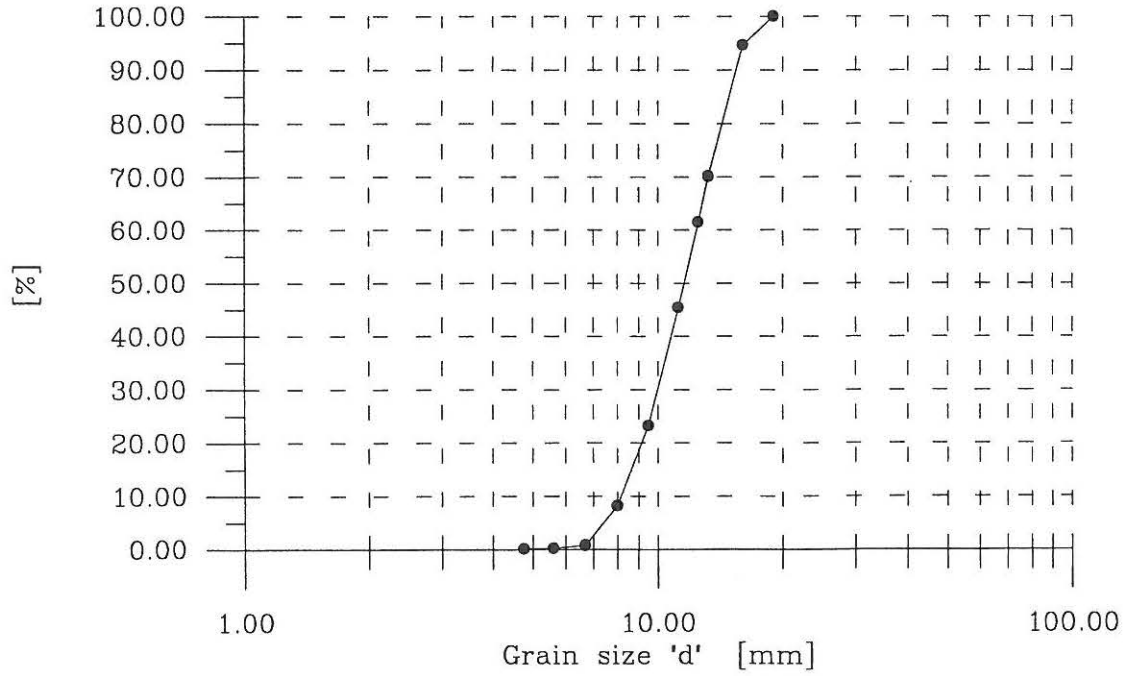


Figure 1 *Grain size distribution for Portland gravel 8-16 mm.*

The grain density, maximum and minimum void ratios have been determined to /Blanár J. et al., 1993/:

- $d_s = 2.642$
- $e_{max} = 0.805$
- $e_{min} = 0.611$

Classification of Portland gravel 16-32 mm

From sieve tests the following parameters have been determined:

- $d_{50} = 20.27$ mm
- $d_{60}/d_{10} = 1.38$

The grain size distribution is plotted in figure 2.

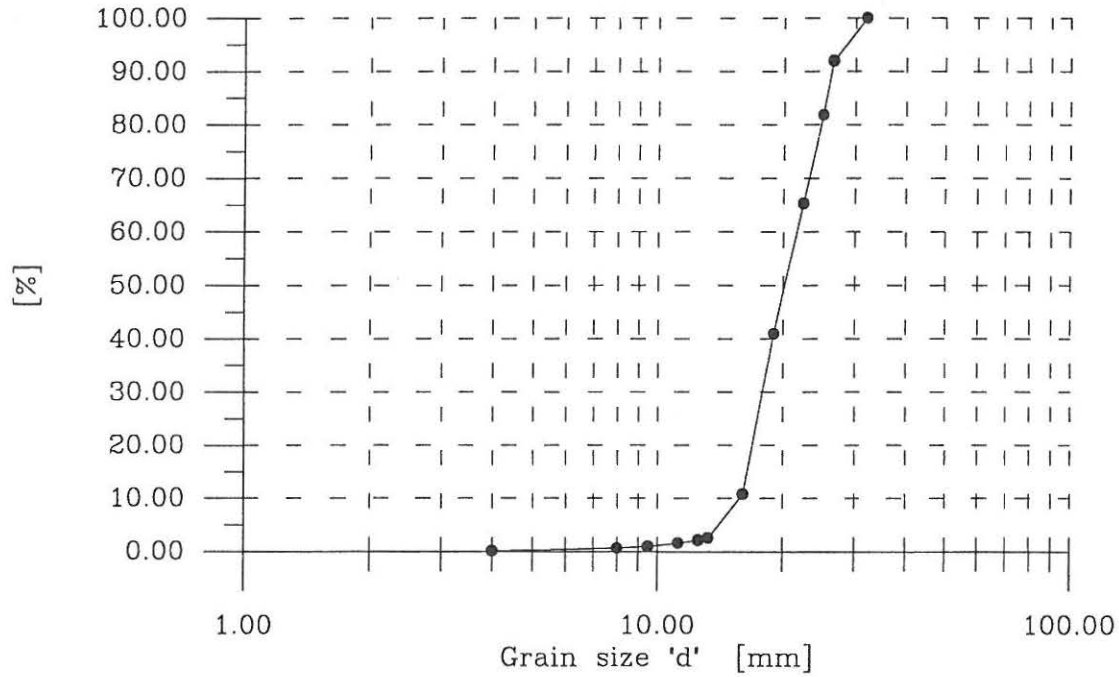


Figure 2 *Grain size distribution for Portland gravel 16-32 mm.*

The maximum and minimum void ratios have been determined to:

- $e_{max} = 0.917$
- $e_{min} = 0.662$

Drained triaxial tests

To investigate the strength parameters of the gravel three series of drained triaxial tests have been performed with both types of gravel. The tests have been performed with 250*250 mm specimens. The three series have been performed with tree different void ratio ranging from a very loose specimen to a dense specimen.

Besides the strength parameters at failure the parameters to describe the characteristic state will also be investigated. This state is defined as $\delta\varepsilon_v=0$ and is called the characteristic line CL.

It can be seen from the test results that when the specimens reaches its maximum bearing capacity, the stress is fluctuating. Due to these stress-fluctuations the values at failure can not be determined directly from the tests. Therefore the test results has been calibrated to the Gamma-distribution, and the values at failure has been evaluated from the maximum of the Gamma-distribution. The Gamma-distribution is defined as:

$$f(x)=\frac{1}{\sigma\Gamma(\lambda)}\left(\frac{x-\mu}{\sigma}\right)^{\lambda-1}\exp\left[-\left(\frac{x-\mu}{\sigma}\right)\right] \quad = \quad A_0\left[\frac{\frac{x-\mu}{\sigma}+\lambda-1}{\lambda-1}\right]^{\lambda-1}\exp\left[-\left(\frac{x-\mu}{\sigma}\right)\right]$$

where $\Gamma(\lambda)$ is the Gamma-function and (μ,A_0) is the maximum of the Gamma-distribution.

In figure 3 and figure 4 test No 9503.01 and test No 9503.05 has been calibrated to the Gamma-distribution. The rest of the tests have been calibrated likewise.

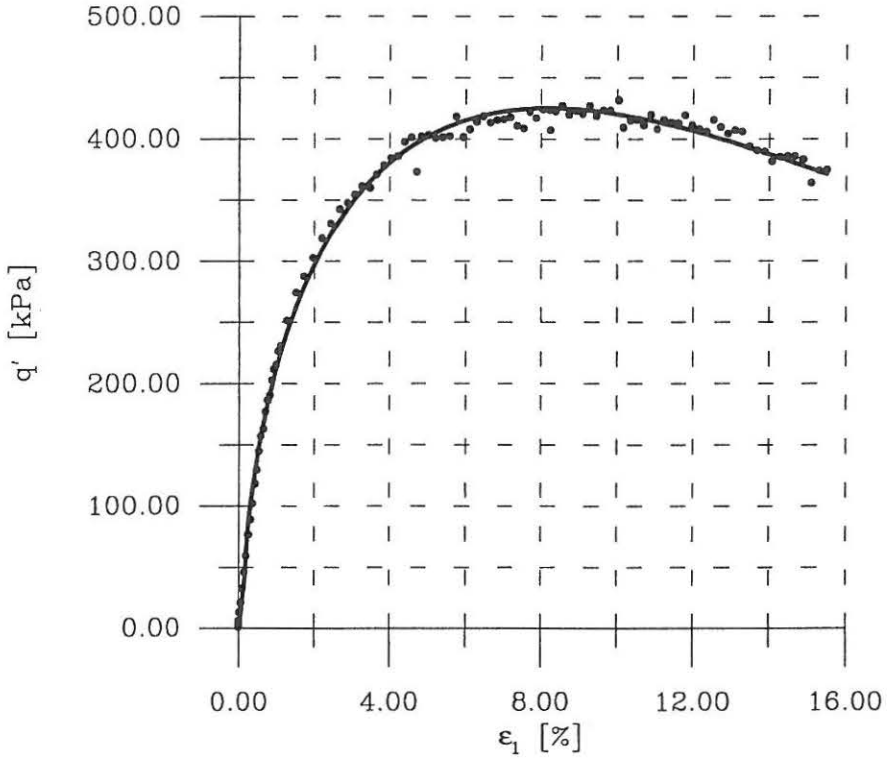


Figure 3 *Drained triaxial test No 9503.01 calibrated to the Gamma-distribution.*

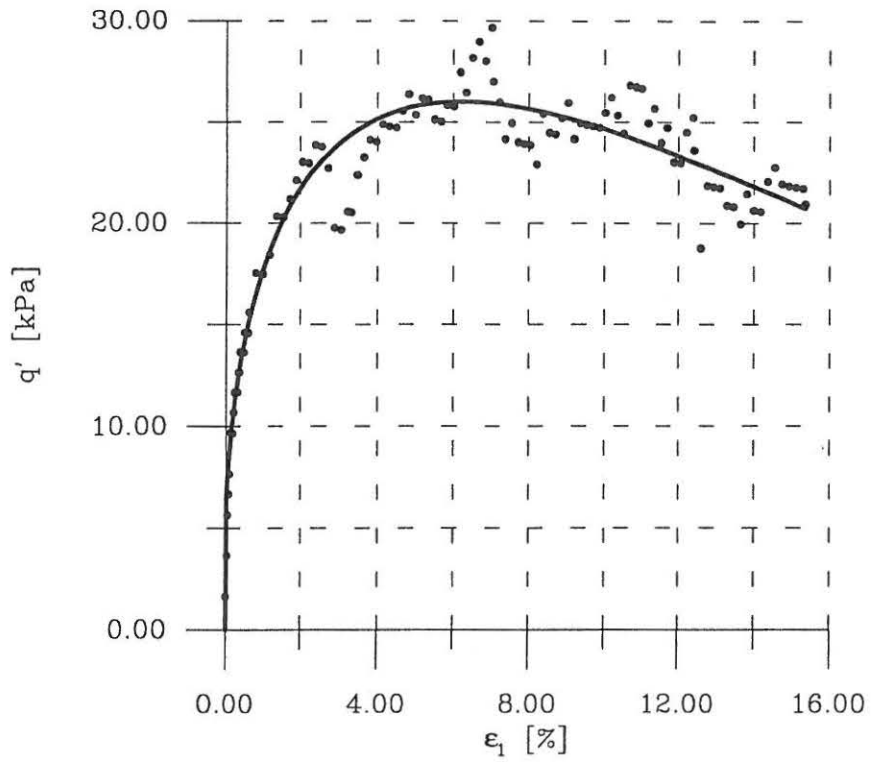


Figure 4 *Drained triaxial test No 9503.05 calibrated to the Gamma-distribution.*

Portland gravel 8-16 mm

The drained triaxial tests performed on Portland gravel 8-16 mm are listed in table 1, where test number, void ratio and stress level are typed.

Stress level, σ_3' [kPa]	Void ratio, e=0.585	Void ratio, e=0.68	Void ratio, e=0.83
5	9503.05	-	-
10	9503.04	9503.07	9503.14
20	9503.03	9503.08	9503.15
40	9503.02	9503.09, 9503.11	9503.16
80	9503.01	9503.10	9503.17
160	9503.06	9503.12, 9503.13	9503.18

Table 1 *Test numbers for the drained triaxial tests performed with Portland gravel 8 - 16 mm.*

The main results from the tests listed in table 1 are listed in the following tables. Three tables are associated to each test series. One tables for values at failure, one table for values at $\delta\varepsilon_v=0$, and one table for the calibration-parameters.

Test series CD, I_d=1.13			Values at failure					
Test No	e_0	e_f	σ_3' (kPa]	p' (kPa]	q' (kPa]	ε_1 [%]	ε_v [%]	ε_q [%]
9503.05	0.592	0.677	5.00	14.15	25.98	6.19	-5.37	7.98
9503.04	0.587	0.679	10.50	32.29	66.85	7.54	-5.82	9.48
9503.03	0.581	0.654	20.00	58.73	118.94	6.87	-4.58	8.40
9503.02	0.590	0.668	40.00	115.86	231.90	8.27	-4.92	9.91
9503.01	0.580	0.634	80.50	221.62	424.66	8.23	-3.42	9.37
9503.06	0.590	0.617	160.50	420.71	785.18	10.88	-1.68	11.44

Table 2.a *Values at failure for Portland gravel 8-16 mm with I_d=1.13.*

Test series CD, I_d=1.13			Values at $\delta\varepsilon_v$=0					
Test No	e_0	e_f	σ_3' (kPa]	p' (kPa]	q' (kPa]	ε_1 [%]	ε_v [%]	ε_q [%]
9503.05	0.592	0.677	6.00	7.88	5.64	0.05	0.05	0.03
9503.04	0.587	0.679	10.50	18.90	24.96	0.31	0.20	0.24
9503.03	0.581	0.654	20.00	38.40	55.20	0.52	0.20	0.45
9503.02	0.590	0.668	39.50	84.08	136.74	1.15	0.18	1.09
9503.01	0.580	0.634	80.00	156.78	230.35	1.11	0.49	0.95
9503.06	0.590	0.617	160.00	324.76	491.29	1.87	0.94	1.56

Table 2.b *Values at $\delta\varepsilon_v$=0 for Portland gravel 8-16 mm with I_d=1.13.*

Test series CD, I_d=1.13				
	Calibration parameters			
Test No	λ	σ	μ	A_0
9503.05	1.41	15.36	6.22	25.98
9503.04	1.45	16.84	7.56	66.85
9503.03	1.46	14.97	6.92	118.94
9503.02	1.52	15.97	8.34	231.90
9503.01	1.52	15.50	8.18	424.66
9503.06	1.51	21.20	10.95	785.18

Table 2.c *Calibration parameters for Portland gravel 8-16 mm with I_d=1.13.*

Test series CD, I_d=0.64			Values at failure					
Test No	e_0	e_f	σ_3' (kPa]	p' (kPa]	q' (kPa]	ε_1 [%]	ε_v [%]	ε_q [%]
9503.07	0.683	0.745	10.10	25.65	46.64	7.12	-3.52	8.29
9503.08	0.681	0.740	20.40	53.16	98.29	7.94	-3.29	9.04
9503.09	0.678	0.733	40.10	101.99	185.68	9.05	-3.12	10.09
9503.11	0.678	0.723	40.10	105.25	195.45	8.01	-2.51	8.85
9503.10	0.679	0.718	80.00	193.46	340.39	9.36	-2.14	10.07
9503.12	0.666	-	160.00	-	-	-	-	-
9513.13	0.683	0.690	160.10	398.38	714.84	12.52	-0.44	12.67

Table 3.a *Values at failure for Portland gravel 8-16 mm with I_d=0.64.*

Test series CD, I_d=0.64			Values at $\delta\varepsilon_v$ =0					
Test No	e_0	e_f	σ_3' (kPa]	p' (kPa]	q' (kPa]	ε_1 [%]	ε_v [%]	ε_q [%]
9503.07	0,683	0,745	9.90	16.91	21.04	0.34	0.16	0.29
9503.08	0,681	0,74	20.00	37.64	52.92	0.68	0.25	0.60
9503.09	0,678	0,733	40.10	75.76	106.98	0.94	0.32	0.83
9503.11	0,678	0,723	39.90	76.64	110.22	1.07	0.40	0.94
9503.10	0,679	0,718	80.10	152.63	217.58	1.57	0.53	1.39
9503.12	0,666	-	160.00	-	-	-	-	-
9513.13	0,683	0,69	160.10	332.76	517.97	3.16	1.07	2.80

Table 3.b *Values at $\delta\varepsilon_v$ =0 for Portland gravel 8-16 mm with I_d=0.64.*

Test series CD, I_d=0.64				
	Calibration parameters			
Test No	λ	σ	μ	A_0
9503.07	1.30	23.15	7.12	46.64
9503.08	1.37	21.34	7.94	98.29
9503.09	1.38	23.63	9.05	185.68
9503.11	1.45	17.48	8.01	195.45
9503.10	1.45	20.67	9.36	340.39
9503.12	-	-	-	-
9513.13	1.53	23.29	12.48	714.84

Table 3.c *Calibration parameters for Portland gravel 8-16 mm with I_d=0.64.*

Test series CD, I_d=0.03			Values at failure					
Test No	e_0	e_f	σ_3' (kPa]	p' (kPa]	q' (kPa]	ε_1 [%]	ε_v [%]	ε_q [%]
9503.14	0.799	0.831	10.20	27.13	50.80	10.53	-1.79	11.13
9503.15	0.805	0.831	20.00	52.74	99.54	14.42	-1.43	14.90
9503.16	0.800	0.814	40.00	97.29	171.87	11.20	-0.51	11.37
9503.17	0.805	0.809	80.10	182.85	306.59	13.88	-0.20	13.95
9503.18	0.798	0.778	160.00	349.44	568.33	14.12	1.13	13.74

Table 4.a *Values at failure for Portland gravel 8-16 mm with I_d=0.03.*

Test series CD, I_d=0.03			Values at $\delta\varepsilon_v$ =0					
Test No	e_0	e_f	σ_3' (kPa]	p' (kPa]	q' (kPa]	ε_1 [%]	ε_v [%]	ε_q [%]
9503.14	0,799	0,831	9.90	19.12	27.67	1.09	0.26	1.00
9503.15	0,805	0,831	20.00	42.48	67.43	2.33	0.61	2.13
9503.16	0,8	0,814	39.90	81.97	126.21	2.67	0.83	2.39
9503.17	0,805	0,809	79.90	159.12	237.67	4.03	1.07	3.67
9503.18	0,798	0,778	160.00	327.64	502.91	6.26	1.51	5.76

Table 4.b *Values at $\delta\varepsilon_v$ =0 for Portland gravel 8-16 mm with I_d=0.03.*

Test series CD, I_d=0.03				
	Calibration parameters			
Test No	λ	σ	μ	A_0
9503.14	1.43	24.37	10.53	50.80
9503.15	1.41	35.07	14.42	99.54
9503.16	1.48	23.24	11.20	171.87
9503.17	1.49	28.50	13.88	306.59
9503.18	1.48	29.15	14.12	568.33

Table 4.c *Calibration parameters for Portland gravel 8-16 mm with I_d=0.03.*

Portland 16-32 mm

The drained triaxial tests performed on Portland gravel 16-32 mm are listed in table 5, where the test number, void ratio and stress level are typed.

Stress level, σ_3' [kPa]	Void ratio, e=0.67	Void ratio, e=0.77	Void ratio, e=0.89
10	9503.31	9503.26	9503.20
20	9503.32	9503.27	9503.19
40	9503.30	9503.25	9503.21
80	9503.33	9503.28	9503.22
160	9503.34	9503.29	9503.23, 9503.24, 9503.35

Table 5 *Test numbers for the drained triaxial tests performed with Portland gravel 16 - 32 mm.*

The main results from the tests listed in table 5 are listed in the following tables. As for Portland gravel 8-16 mm there are three tables associated to each test serie.

Test series CD, I_d=0.97			Values at failure					
Test No	e_0	e_f	σ_3' (kPa]	p' (kPa]	q' (kPa]	ε_1 [%]	ε_v [%]	ε_q [%]
9503.31	0.673	0.748	10.10	38.71	85.83	8.26	-4.82	9.87
9503.32	0.673	0.764	20.10	76.65	169.64	10.59	-5.77	12.51
9503.30	0.667	0.725	40.10	133.56	280.39	9.89	-3.76	11.14
9503.33	0.670	0.713	80.10	243.82	491.17	9.76	-2.91	10.73
9503.34	0.672	0.684	160.10	456.56	889.39	12.74	-1.01	13.08

Table 6.a *Values at failure for Portland gravel 16-32 mm with I_d=0.97.*

Test series CD, I_d=0.97			Values at $\delta\varepsilon_v$ =0					
Test No	e_0	e_f	σ_3' (kPa]	p' (kPa]	q' (kPa]	ε_1 [%]	ε_v [%]	ε_q [%]
9503.31	0,673	0,748	10.00	23.39	40.16	0.57	0.36	0.45
9503.32	0,673	0,764	20.00	47.65	82.95	0.72	0.45	0.57
9503.30	0,667	0,725	40.00	91.52	154.57	1.18	0.70	0.95
9503.33	0,67	0,713	80.00	172.01	276.02	1.03	0.71	0.79
9503.34	0,672	0,684	160.00	370.72	632.16	3.12	1.11	2.75

Table 6.b *Values at $\delta\varepsilon_v$ =0 for Portland gravel 16-32 mm with I_d=0.97.*

Test series CD, I_d=0.97				
	Calibration parameters			
Test No	λ	σ	μ	A_0
9503.31	1.47	17.40	8.26	85.83
9503.32	1.45	23.56	10.59	169.64
9503.30	1.49	20.27	9.89	280.39
9503.33	1.43	22.60	9.76	491.17
9503.34	1.51	24.77	12.74	889.39

Table 6.c *Calibration parameters for Portland gravel 8-16 mm with I_d=0.03.*

Test series CD, I_d=0.60			Values at failure					
Test No	e_0	e_f	σ_3' (kPa]	p' (kPa]	q' (kPa]	ε_1 [%]	ε_v [%]	ε_q [%]
9503.26	0.760	0.861	10.10	32.54	67.32	13.99	-6.11	16.03
9503.27	0.768	0.859	20.10	66.99	140.67	13.36	-5.47	15.18
9503.25	0.769	0.805	40.00	126.96	260.88	10.09	-2.35	10.87
9503.28	0.768	0.797	79.90	231.72	455.45	12.68	-1.92	13.32
9503.29	0.766	0.752	160.00	411.09	753.26	11.23	0.53	11.05

Table 7.a *Values at failure for Portland gravel 16-32 mm with I_d=0.60.*

Test series CD, I_d=0.60			Values at $\delta\varepsilon_v$ =0					
Test No	e_0	e_f	σ_3' (kPa]	p' (kPa]	q' (kPa]	ε_1 [%]	ε_v [%]	ε_q [%]
9503.26	0,76	0,861	9.90	21.22	33.95	0.25	0.27	0.16
9503.27	0,768	0,859	20.00	44.96	74.89	0.50	0.53	0.32
9503.25	0,769	0,805	39.90	90.90	153.01	1.61	0.81	1.34
9503.28	0,768	0,797	80.00	176.88	290.65	1.99	0.92	1.68
9503.29	0,766	0,752	160.00	357.85	593.56	3.49	1.38	3.03

Table 7.b *Values at $\delta\varepsilon_v$ =0 for Portland gravel 16-32 mm with I_d=0.60.*

Test series CD, I_d=0.60				
	Calibration parameters			
Test No	λ	σ	μ	A_0
9503.26	1.31	45.35	13.99	67.32
9503.27	1.28	47.09	13.36	140.67
9503.25	1.48	20.76	10.09	260.88
9503.28	1.48	26.23	12.68	455.45
9503.29	1.50	22.51	11.23	753.26

Table 7.c *Calibration parameters for Portland gravel 8-16 mm with I_d=0.60.*

Test series CD, I_d=0.11			Values at failure					
Test No	e_0	e_f	σ_3' (kPa]	p' (kPa]	q' (kPa]	ε_1 [%]	ε_v [%]	ε_q [%]
9503.20	0.891	0.917	10.00	26.75	50.24	14.18	-1.66	14.73
9503.19	0.888	0.905	20.10	51.77	95.00	15.38	-1.21	15.78
9503.21	0.886	0.904	40.00	100.92	182.76	17.23	-0.94	17.54
9503.22	0.901	0.898	80.10	196.10	347.99	15.27	-0.17	15.33
9503.23	0.888	-	160.00	-	-	-	-	-
9503.24	0,894	-	160.00	-	-	-	-	-
9503.35	0,892	0,842	160.00	373.23	588.94	15.53	2.35	14.75

Table 8.a *Values at failure for Portland gravel 16-32 mm with I_d=0.11.*

Test series CD, I_d=0.11			Values at $\delta\varepsilon_v$ =0					
Test No	e_0	e_f	σ_3' (kPa]	p' (kPa]	q' (kPa]	ε_1 [%]	ε_v [%]	ε_q [%]
9503.20	0,891	0,917	10.00	22.42	37.27	2.80	0.57	2.61
9503.19	0,888	0,905	20.00	42.36	67.07	4.34	0.92	4.03
9503.21	0,886	0,904	39.90	81.92	126.05	3.67	1.15	3.29
9503.22	0,901	0,898	80.10	160.98	242.63	4.51	1.27	4.09
9503.23	0,888	-	160.00	-	-	-	-	-
9503.24	0,894	-	160.00	-	-	-	-	-
9503.35	0,892	0.842	160.00	352.02	576.07	13.16	2.43	12.35

Table 8.b *Values at $\delta\varepsilon_v$ =0 for Portland gravel 16-32 mm with I_d=0.11.*

Test series CD, I_d=0.11				
	Calibration parameters			
Test No	λ	σ	μ	A_0
9503.20	1.38	37.07	14.18	50.24
9503.19	1.50	30.50	15.38	95.00
9503.21	1.43	40.40	17.23	182.76
9503.22	1.54	28.42	15.26	347.99
9503.23	-	-	-	-
9503.24	-	-	-	-
9503.35	1.51	30.37	15.53	588.94

Table 8.c *Calibration parameters for Portland gravel 8-16 mm with I_d=0.11.*

During the tests it was observed, that some of the gravel was crushed. Due to this sieve tests were made with the test serie with Portland gravel 16-32 mm and I_d = 0.97 after the drained triaxial tests were performed. The results from these sieve tests are listed in table 9.

Test No	σ_3' [kPa]	d_{50} [mm]	$U=d_{60}/d_{10}$ [-]
Before tests	-	20.27	1.38
5003.31	10.00	21.32	1.36
9503.32	20.00	20.74	1.35
9503.30	40.00	20.55	1.34
9503.33	80.00	20.86	1.38
9503.34	160.00	19.74	1.44

Table 9 *Results from the sieve tests of the Portland gravel 16-32 mm used for drained triaxial tests.*

As shown in table it is only the results from the material used in test No 9503.34 that differ from the sieve test made with the material which have not been used for drained triaxial tests. Due to the small variation in d_{50} and U between the tests, the crushing of some of the grains is assumed to have none or a very small effect on the values at failure. The grain distribution of test No 9503.34 is shown in figure 5.

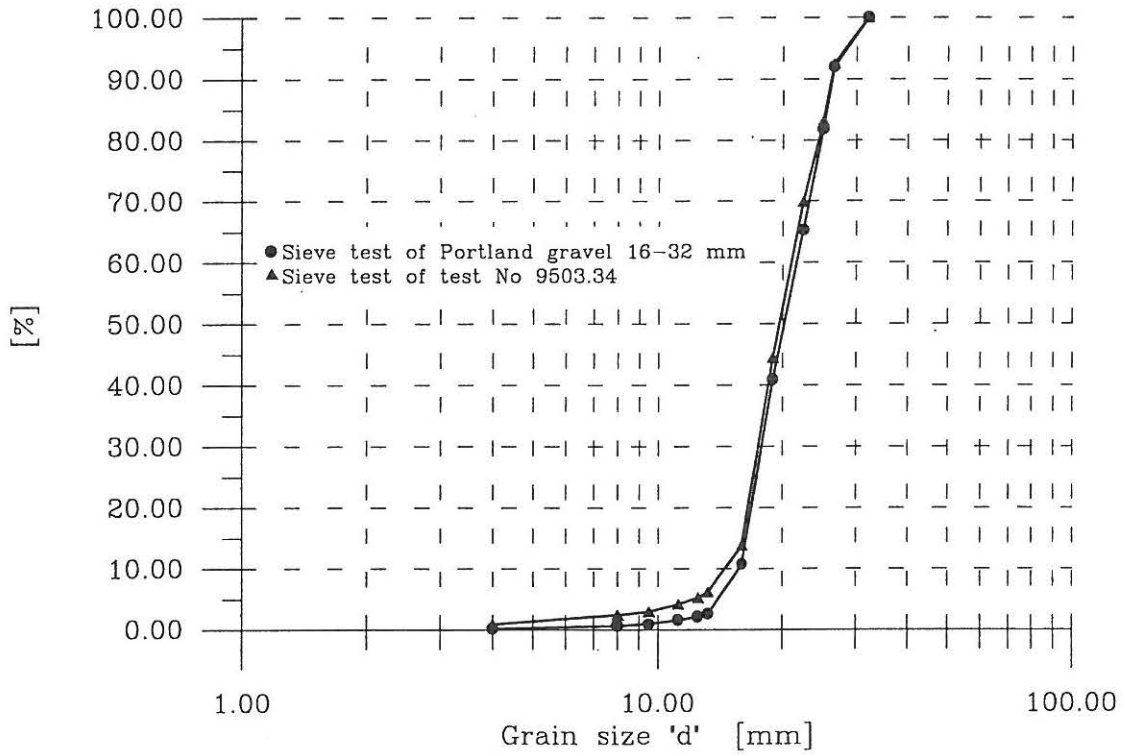
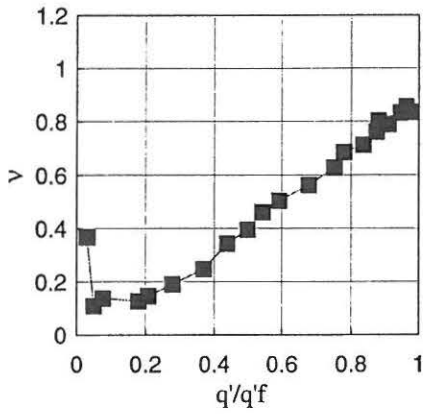


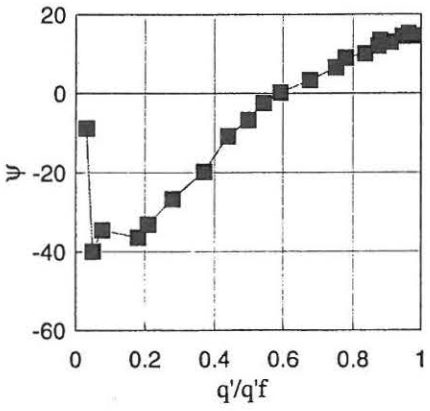
Figure 5 *Distribution of the grains before and after test. Portland gravel 16-32 mm, test No 9503.34, I_d = 0.97, σ'_3 = 160 kPa.*

Description of soil			Before test	At failure
Portland grus 8-16		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.580	0.634
		Saturation	1	
kal_9500	29.12.94	Dimension H mm	252.6	
		D mm	249.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	60-80 kPa
CD - Triaxial test.		ε 1	0.143 %
free ends		ε v	0.587 %
	2.Drained compression.		
	Deformation rate:		4.9 % ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	424.66	kPa	230.35	kPa
Mean normal stress	p'	221.62	kPa	156.78	kPa
Confining pressures	σ3	80.50	kPa	80.00	kPa
Vertical strain	ε 1	8.23	%	1.11	%
Volumetric strain	ε v	-3.42	%	0.49	%

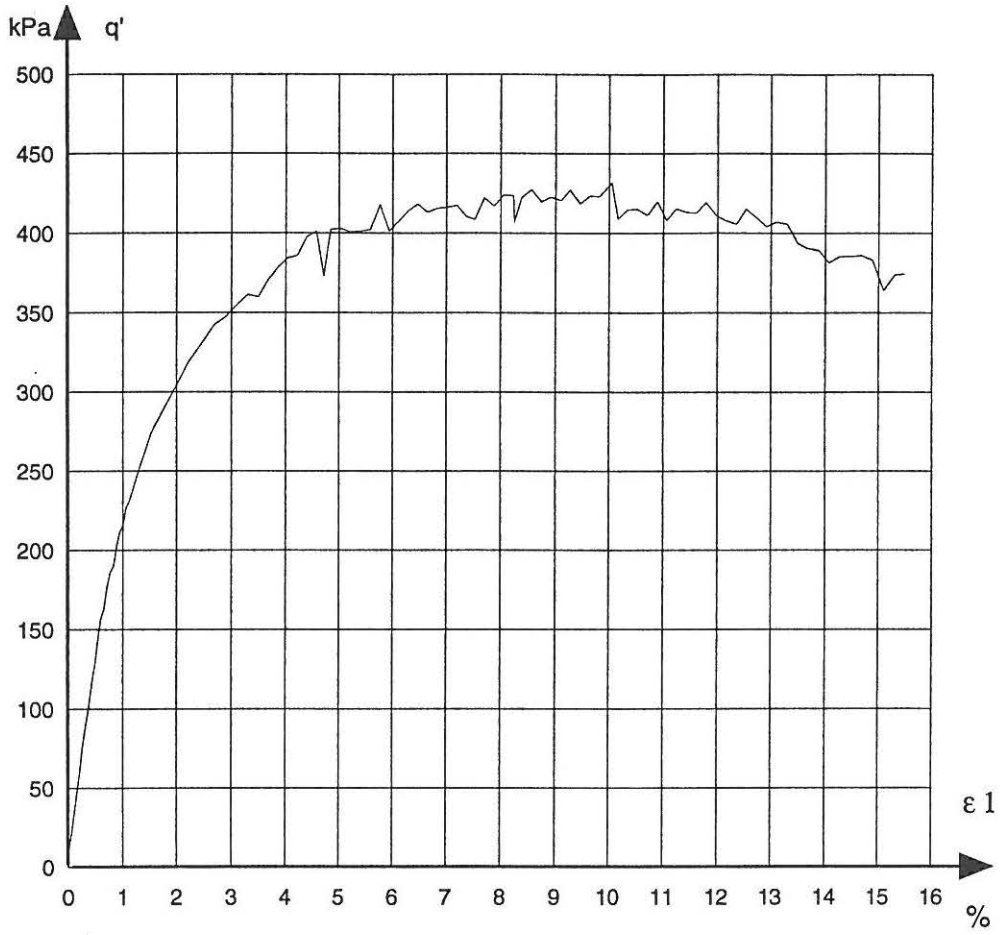


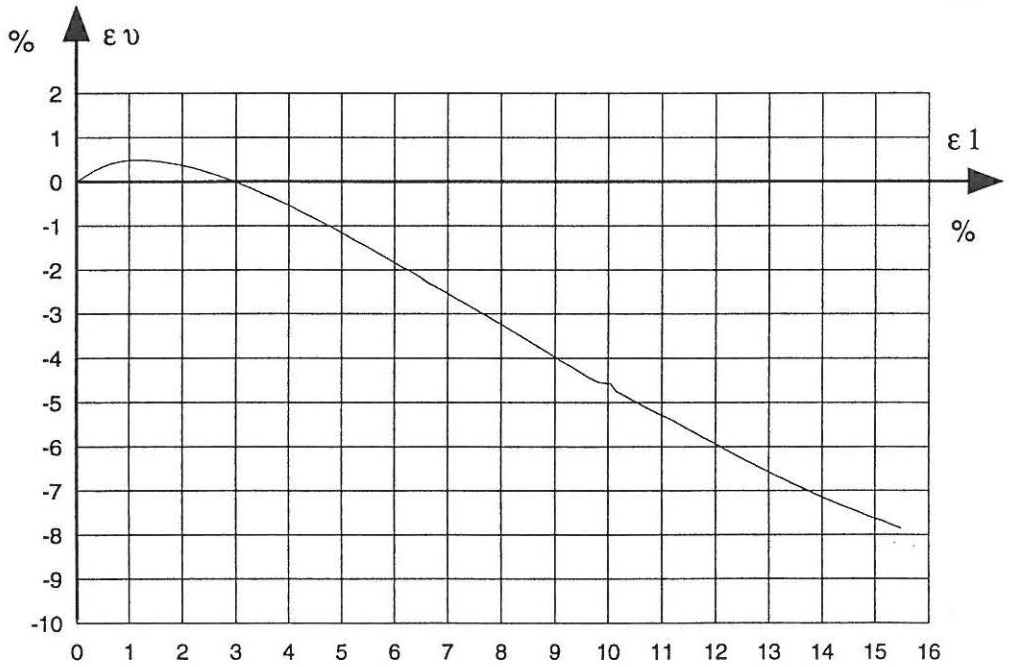


q'	p'	ε 1	ε v
4.71	83.07	-0.00	-0.00
12.89	84.30	0.02	0.00
21.08	86.53	0.06	0.04
32.32	90.27	0.10	0.07
76.27	104.92	0.26	0.19
88.52	109.51	0.32	0.23
118.11	119.37	0.43	0.30
156.80	132.27	0.60	0.38
186.18	142.06	0.77	0.44
211.38	150.46	0.94	0.47
230.35	156.78	1.11	0.49
251.24	164.25	1.29	0.48
287.33	176.28	1.73	0.43
318.67	186.72	2.21	0.31
330.59	190.70	2.46	0.22
354.28	198.59	3.09	-0.05
370.71	203.07	3.67	-0.36
385.90	208.63	4.22	-0.68
373.06	204.35	4.73	-0.98
401.27	214.26	5.94	-1.79
413.86	218.45	6.29	-2.03
408.52	216.67	7.53	-2.91
421.94	220.65	7.70	-3.03
424.66	221.62	8.23	-3.42

Job:	Encl. No
Portland grus 8-16	1
Exc:	Check:
AH & KPJ	AH & KPJ

Remark:
Preparation [%] Δ ε1 = 0.175
Preparation at 20-60 kPa vacuum



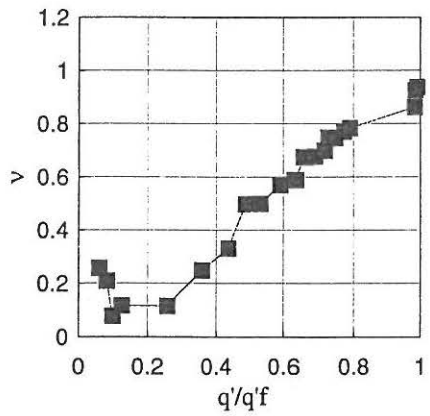


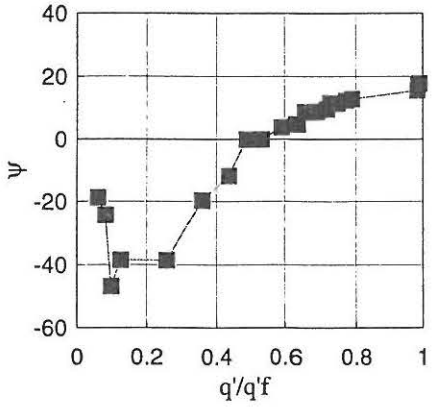
Job: Portland grus 8-16	Encl. No 2
Exc: AH & KPJ	Check: AH & KPJ

Description of soil Portland grus 8-16			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.590	0.668
		Saturation	1	
kal_9501	06.01.95	Dimension H mm	252.6	
		D mm	249.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	60-40 kPa
CD - Triaxial test.		ε 1	-0.019 %
free ends		ε v	-0.236 %
	2.Drained compression.		
	Deformation rate:		5.0 % ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	231.90	kPa	123.04	kPa
Mean normal stress	p'	115.86	kPa	80.51	kPa
Confining pressures	σ3	40.00	kPa	39.50	kPa
Vertical strain	ε 1	8.27	%	0.85	%
Volumetric strain	ε v	-4.92	%	0.22	%

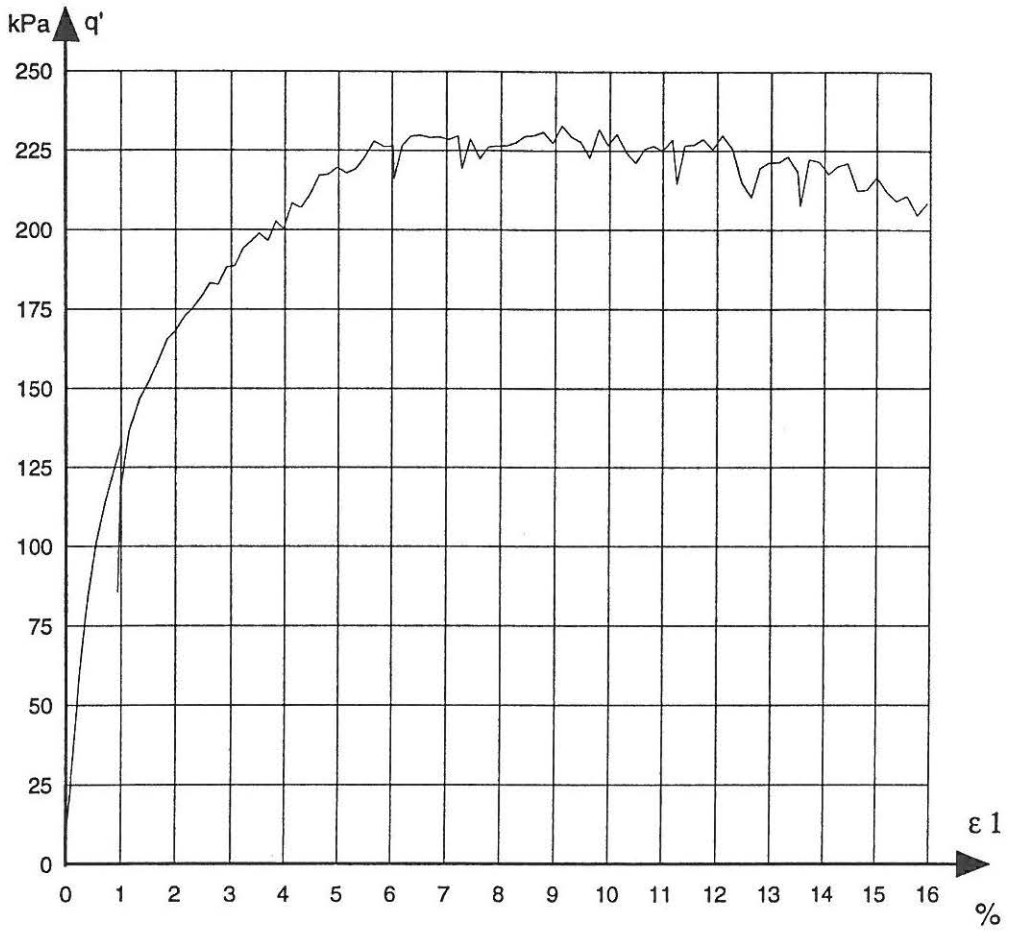


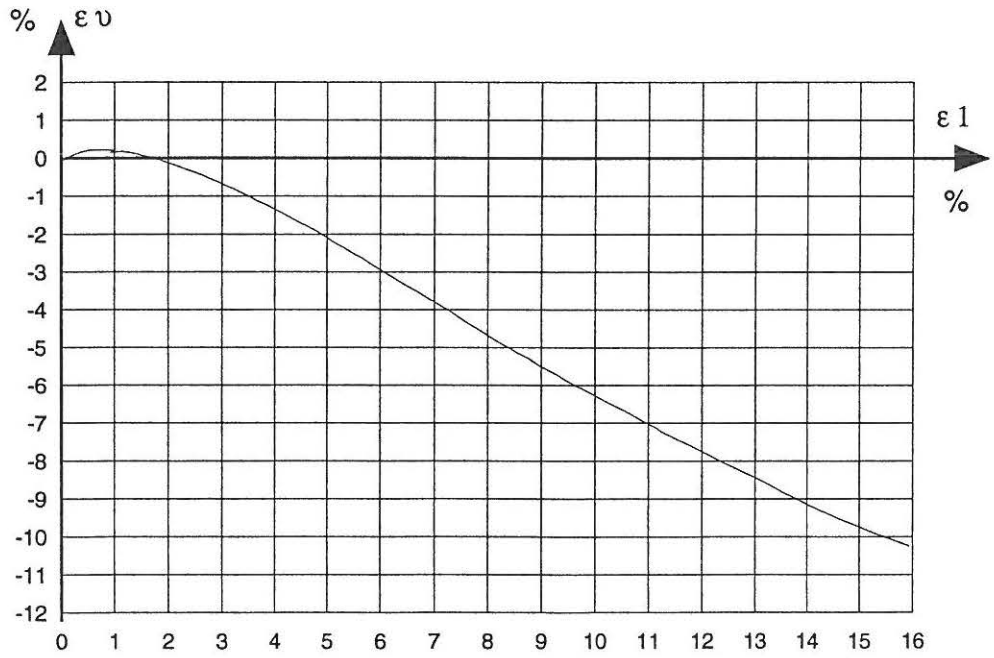


q'	p'	ε 1	ε v
8.76	42.42	0.00	-0.08
13.84	44.11	0.02	-0.07
18.93	45.31	0.04	-0.06
22.99	46.16	0.07	-0.04
29.10	48.70	0.09	-0.02
59.59	58.86	0.23	0.09
82.91	67.64	0.38	0.16
101.10	73.70	0.54	0.22
113.10	78.20	0.69	0.22
123.04	80.51	0.85	0.22
136.74	84.08	1.15	0.18
146.50	88.83	1.33	0.14
152.17	91.22	1.51	0.08
158.81	93.44	1.68	0.02
165.47	95.66	1.83	-0.04
168.07	96.52	1.99	-0.12
172.65	98.05	2.14	-0.19
178.74	99.58	2.45	-0.36
182.78	101.43	2.77	-0.54
227.98	115.99	5.67	-2.64
229.62	116.54	6.36	-3.25
228.51	116.67	7.04	-3.83
219.29	113.10	7.28	-4.03
231.90	115.86	8.27	-4.92

Job:	Encl. No
Portland grus 8-16	3
Exc:	Check:
AH & KPJ	AH & KPJ

Remark:
Preparation [%] Δ ε1 = -0.021
Preparation at 20-60 kPa vacuum



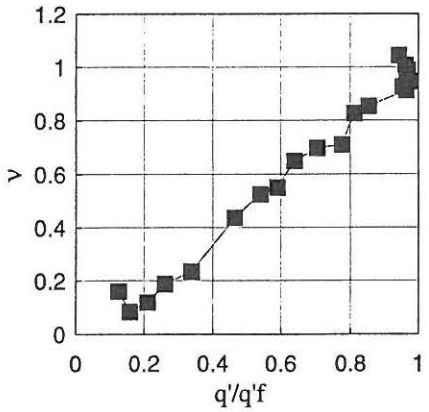


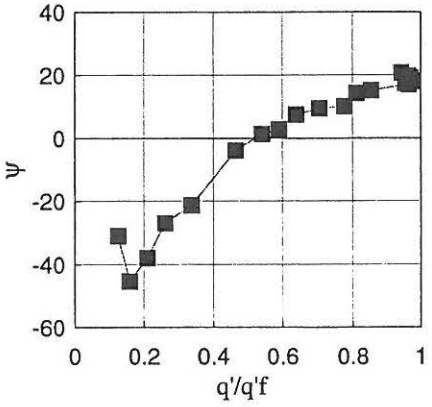
Job: Portland grus 8-16	Encl. No 4
Exc:	Check:
AH & KPJ	AH & KPJ

Description of soil Portland 8-16			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.581	0.654
		Saturation	1	
kal_9501	05.01.95	Dimension H mm	252.6	
		D mm	249.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	60-20 kPa
CD - Triaxial test.		ε 1	-0.183 %
free ends		ε v	-0.802 %
	2.Drained compression.		
	Deformation rate:		5.0 % ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	118.94	kPa	55.20	kPa
Mean normal stress	p'	58.73	kPa	38.40	kPa
Confining pressures	σ3	20.00	kPa	20.00	kPa
Vertical strain	ε 1	6.87	%	0.52	%
Volumetric strain	ε v	-4.58	%	0.20	%

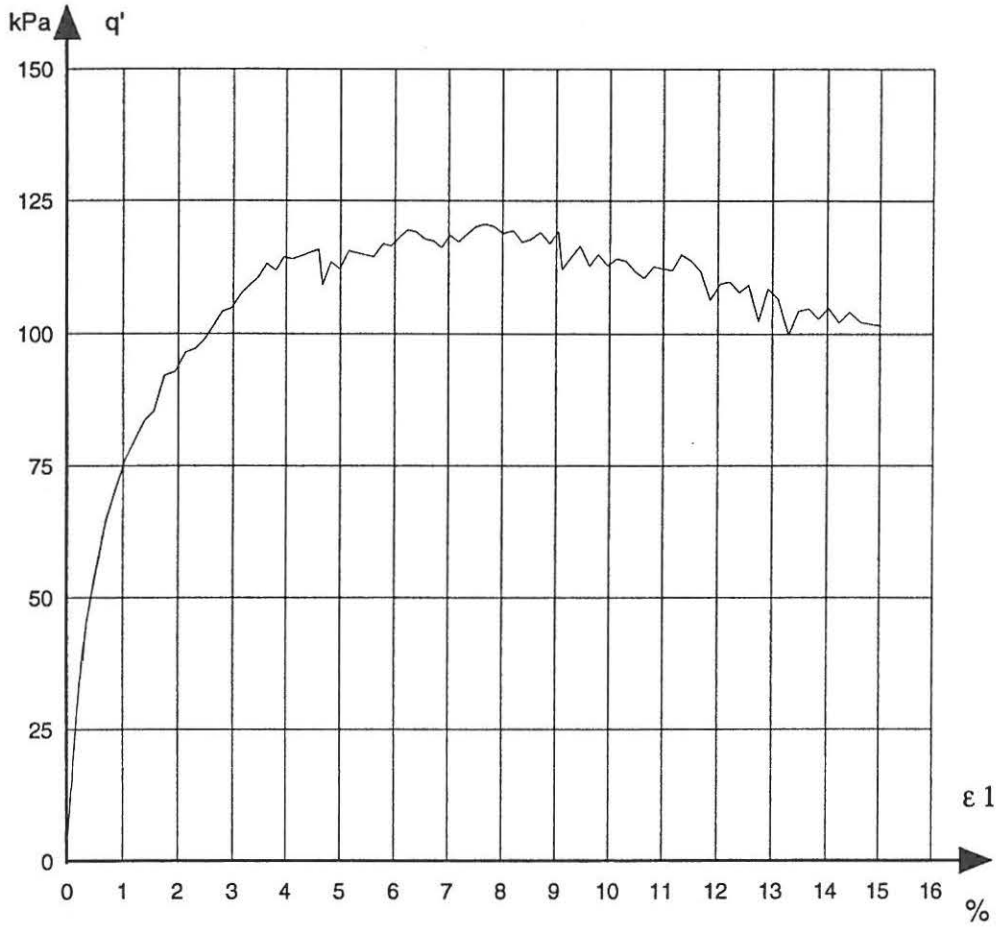


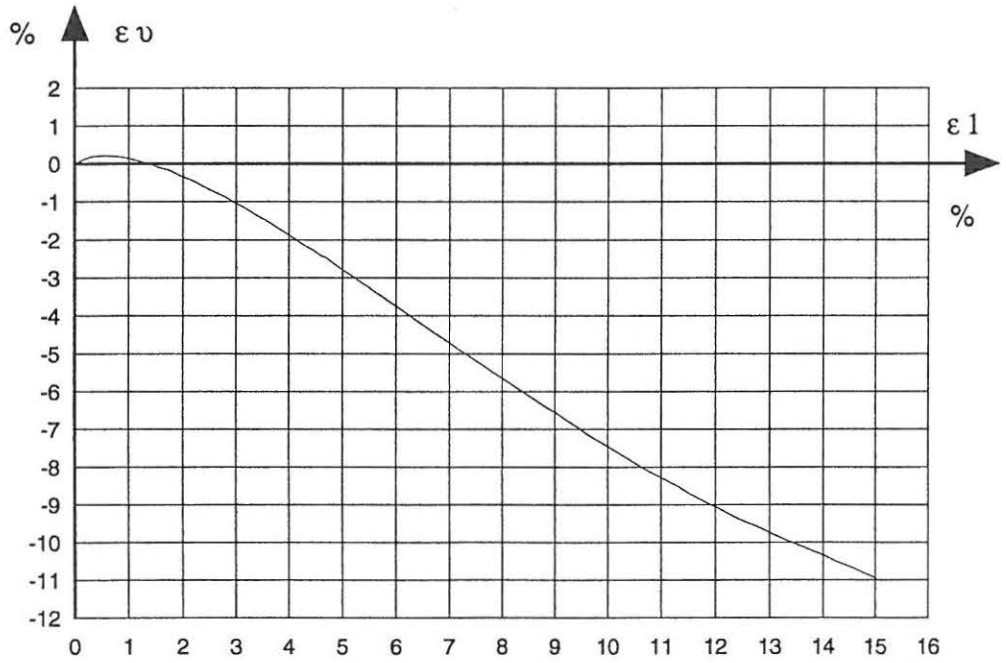


q'	p'	ε 1	ε v
8.73	22.91	0.04	0.01
14.81	24.44	0.08	0.04
18.86	26.29	0.11	0.06
24.94	28.31	0.15	0.10
31.02	30.34	0.20	0.13
40.12	33.37	0.28	0.17
55.20	38.40	0.52	0.20
64.19	41.40	0.69	0.19
70.11	43.87	0.86	0.18
75.98	45.33	1.03	0.12
83.61	47.87	1.38	-0.01
92.12	51.21	1.75	-0.17
96.47	52.16	2.14	-0.42
101.52	53.84	2.64	-0.78
114.65	58.22	4.28	-2.14
115.85	58.62	4.60	-2.42
113.47	58.32	4.83	-2.61
112.16	57.39	4.99	-2.79
115.55	58.52	5.15	-2.93
115.19	58.40	5.31	-3.08
114.83	58.28	5.47	-3.24
114.47	58.16	5.62	-3.39
116.89	58.96	5.78	-3.54
118.94	58.73	6.87	-4.58

Job: Portland grus 8-16	Encl. No 5
Exc: AH & KPJ	Check: AH & KPJ

Remark:
Preparation [%] Δ ε1 = -0.017
Preparation at 20-60 kPa vacuum



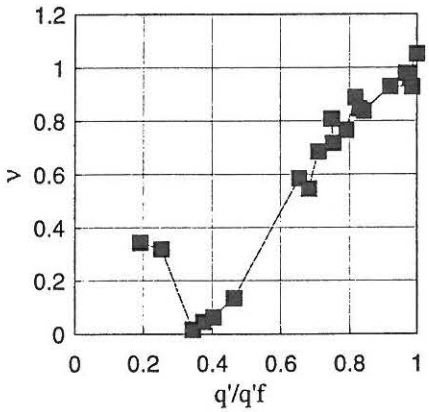


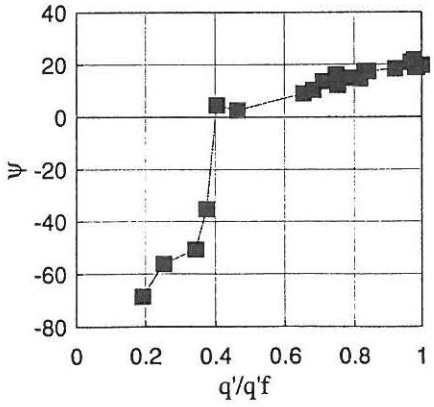
Job: Portland grus 8-16	Encl. No 6
Exc:	Check:
AH & KPJ	AH & KPJ

Description of soil			Before test	At failure
Portland grus 8-16		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.587	0.679
		Saturation	1	
kal_9501	05.01.95	Dimension H mm	252.6	
		D mm	249.8	

TEST-PROGRAM	Drained compression.			
	1. Isotropic compression.	σ3	60-10	kPa
CD - Triaxial test.		ε 1	-0.461	%
free ends		ε v	-0.912	%
	2.Drained compression.			
	Deformation rate:		5.0	% ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	66.85	kPa	24.96	kPa
Mean normal stress	p'	32.29	kPa	18.90	kPa
Confining pressures	σ3	10.50	kPa	10.50	kPa
Vertical strain	ε 1	7.54	%	0.31	%
Volumetric strain	ε v	-5.82	%	0.20	%

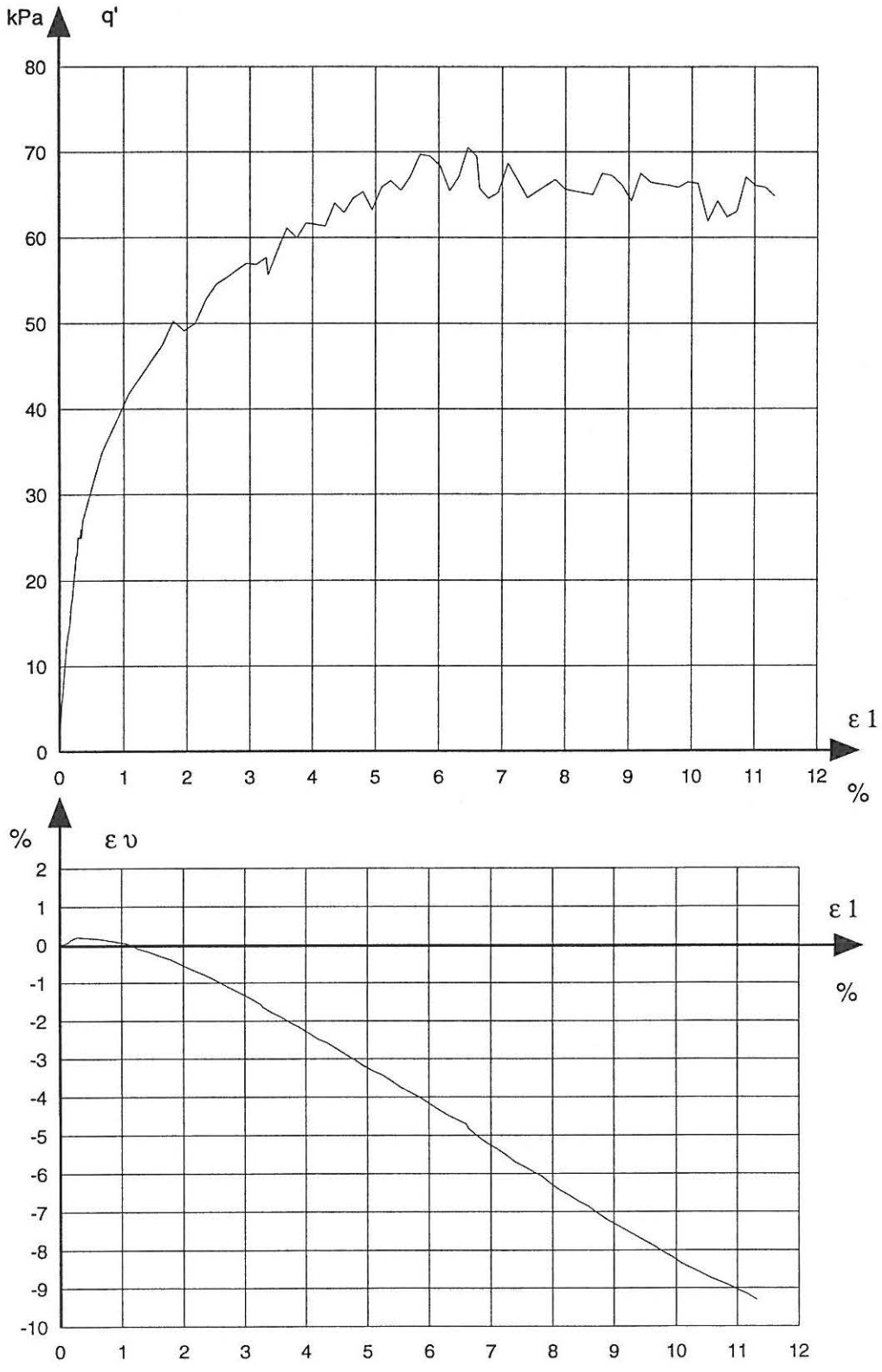




q'	p'	ε 1	ε v
3.66	11.22	0.03	0.00
6.70	12.23	0.06	0.01
10.76	13.09	0.10	0.03
12.79	13.26	0.12	0.05
16.85	15.12	0.18	0.11
22.93	17.64	0.27	0.18
24.96	18.82	0.29	0.20
26.97	18.99	0.37	0.19
30.97	20.32	0.51	0.17
43.67	24.56	1.26	-0.11
45.56	25.69	1.43	-0.18
47.43	26.31	1.61	-0.29
50.28	27.26	1.79	-0.38
49.97	26.66	2.13	-0.65
52.78	27.59	2.30	-0.77
54.60	28.70	2.47	-0.88
55.40	28.97	2.64	-1.03
56.22	28.74	2.79	-1.16
61.54	30.51	4.05	-2.32
65.88	31.96	5.10	-3.32
65.42	31.81	6.17	-4.34
64.58	31.53	6.78	-5.02
65.27	31.76	6.93	-5.20
66.85	32.29	7.54	-5.82

Job:	Encl. No
Portland grus 8-16	7
Exc:	Check:
AH & KPJ	AH & KPJ

Remark:
Preparation [%] Δ ε1 = 0.030
Preparation at 20-60 kPa vacuum
Specimen slipped out after failure.

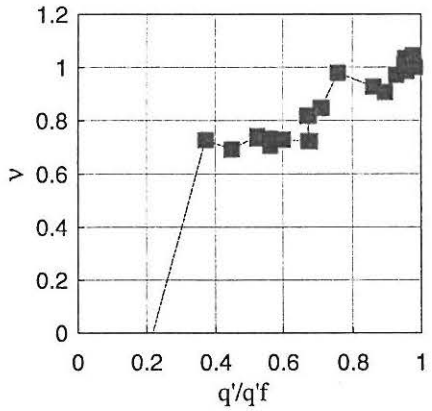


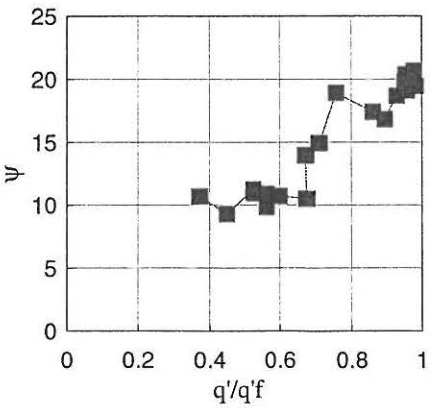
Job: Portland grus 8-16	Encl. No 8
Exc: AH & KPJ	Check: AH & KPJ

Description of soil Portland grus 8-16			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.592	0.677
		Saturation		
kal_9501	07.01.95	Dimension H mm	252.6	
		D mm	249.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	60-5 kPa
CD - Triaxial test.		ε 1	-0.405 %
free ends		ε v	-1.684 %
	2.Drained compression.		
	Deformation rate:		5.0 % ph

Evaluation of test		Values at failure		Values for $\Delta\varepsilon v = 0$	
Deviator stress	q'	25.98	kPa	5.64	kPa
Mean normal stress	p'	14.15	kPa	7.88	kPa
Confining pressures	σ3	5.00	kPa	6.00	kPa
Vertical strain	ε 1	6.19	%	0.05	%
Volumetric strain	ε v	-5.37	%	0.05	%

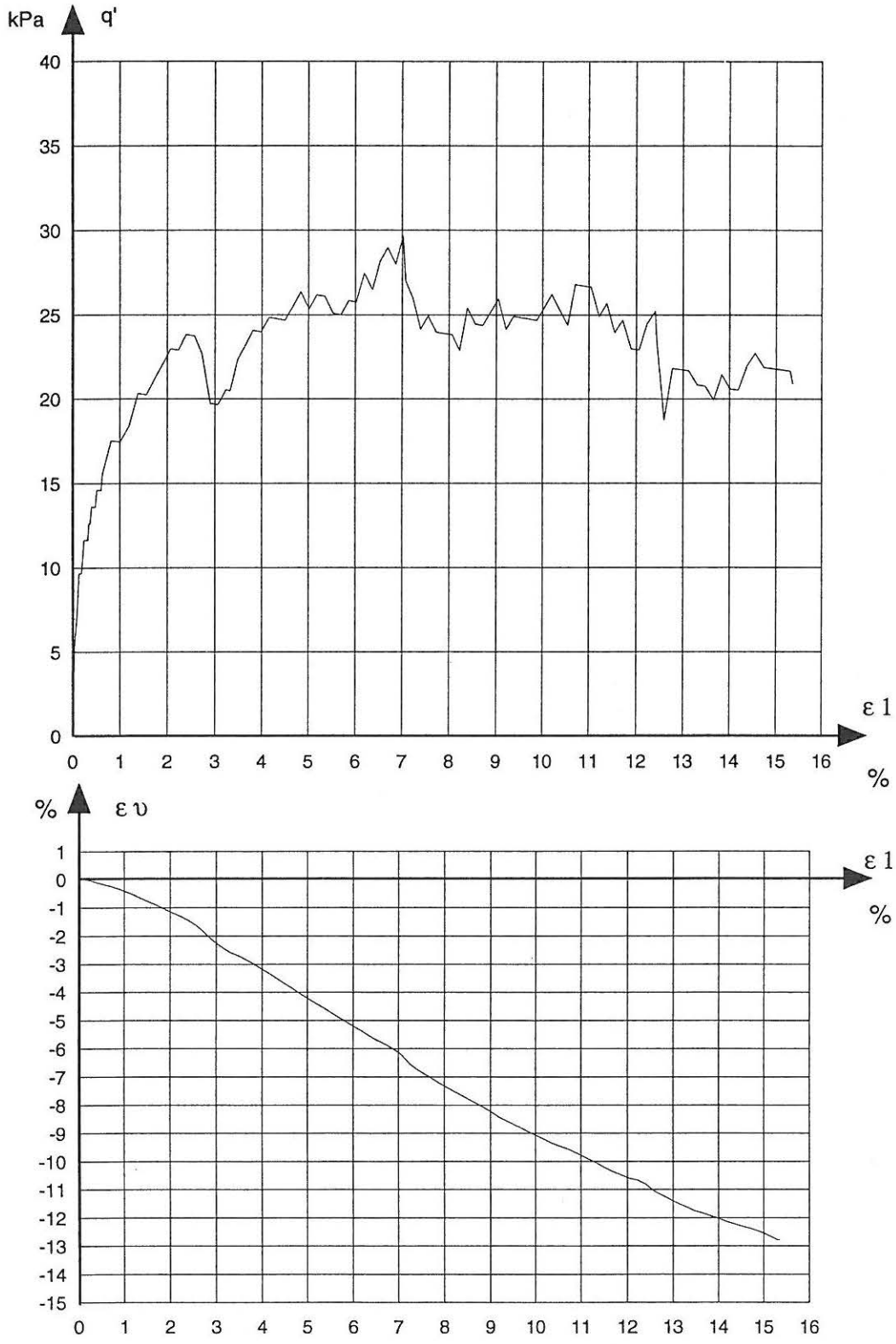




q'	p'	ε 1	ε v
1.62	6.54	0.00	0.00
5.64	7.88	0.05	0.05
9.65	8.22	0.18	-0.01
11.64	8.88	0.32	-0.06
13.61	9.54	0.46	-0.13
13.61	9.54	0.49	-0.14
14.60	9.87	0.52	-0.15
14.60	9.87	0.54	-0.17
15.58	10.19	0.63	-0.21
17.53	11.34	0.82	-0.29
17.47	10.82	1.00	-0.41
18.41	11.14	1.19	-0.54
19.65	11.55	3.07	-2.34
22.34	12.45	3.48	-2.69
23.22	12.74	3.65	-2.83
24.08	13.03	3.81	-2.99
24.86	13.29	4.16	-3.32
24.77	13.26	4.33	-3.50
24.68	13.23	4.50	-3.68
25.52	13.51	4.67	-3.85
25.34	13.45	5.01	-4.22
26.17	13.72	5.18	-4.39
25.09	13.36	5.52	-4.72
25.98	14.15	6.19	-5.37

Job:	Encl. No
Portland grus 8-16	9
Exc:	Check:
AH & KPJ	AH & KPJ

Remark:
Preparation [%] $\Delta\varepsilon 1 =$ 0.096
Preparation at 20-60 kPa vacuum

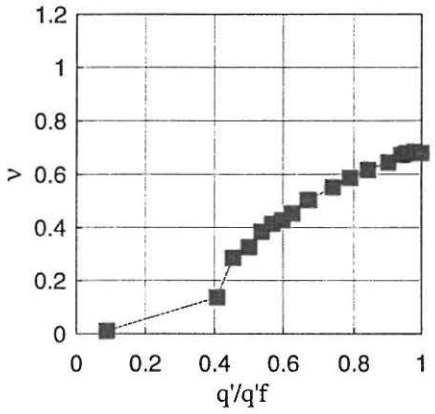


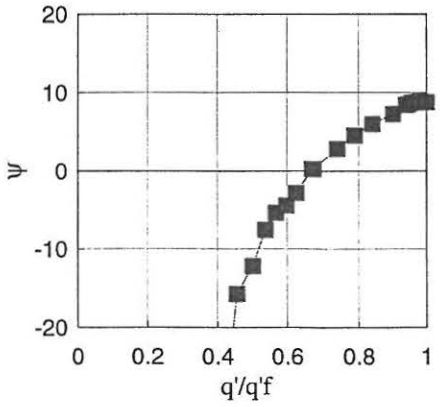
Job: Portland grus 8-16	Encl. No 10
Exc:	Check:
AH & KPJ	AH & KPJ

Description of soil Portland grus 8-16			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.590	0.617
		Saturation	1	
kal_9501	07.01.95	Dimension H mm	253.46	
		D mm	249.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	100-160 kPa
CD - Triaxial test.		ε 1	0.179 %
free ends		ε ν	1.309 %
	2.Drained compression.		
	Deformation rate:		5.0 % ph

Evaluation of test		Values at failure		Values for $\Delta\varepsilon\nu = 0$	
Deviator stress	q'	785.18	kPa	491.29	kPa
Mean normal stress	p'	420.71	kPa	324.76	kPa
Confining pressures	σ3	160.50	kPa	161.00	kPa
Vertical strain	ε 1	10.88	%	1.87	%
Volumetric strain	ε ν	-1.68	%	0.94	%

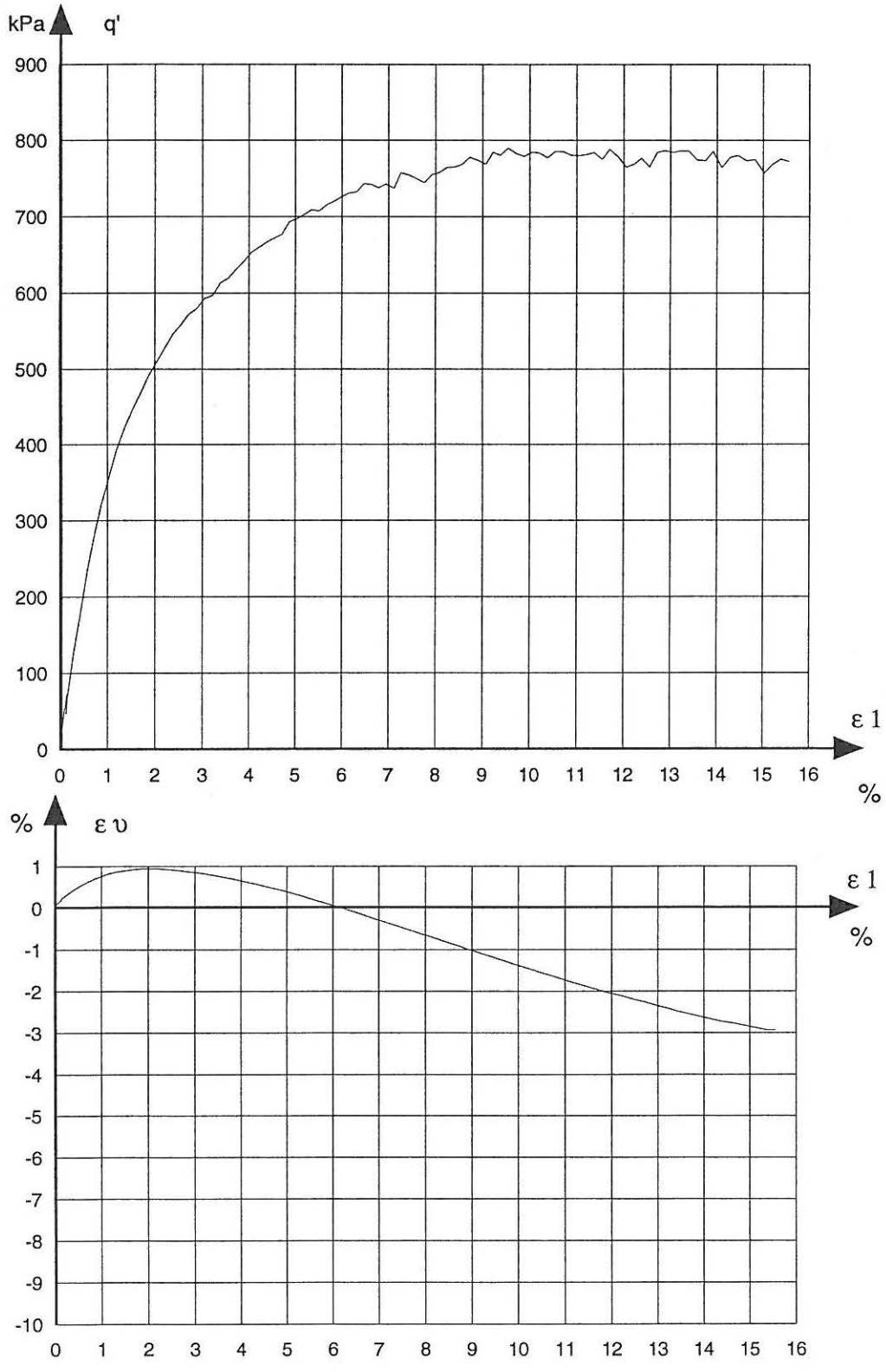




q'	p'	ε 1	ε ν
1.66	153.05	0.00	0.00
14.04	163.68	0.02	0.06
69.78	182.26	0.15	0.18
319.99	266.66	0.87	0.71
356.75	279.42	1.02	0.77
392.36	291.79	1.19	0.83
421.62	301.54	1.35	0.87
445.63	308.54	1.52	0.90
468.50	316.67	1.70	0.92
491.29	324.76	1.87	0.94
527.27	335.76	2.20	0.94
579.86	353.29	2.88	0.87
619.23	366.41	3.56	0.75
659.74	379.91	4.22	0.60
706.97	395.16	5.51	0.22
742.45	407.48	6.95	-0.28
736.93	406.14	7.11	-0.33
749.86	409.95	7.59	-0.50
754.80	411.60	7.92	-0.62
768.33	416.61	8.56	-0.85
768.30	416.10	9.06	-1.04
784.69	421.06	10.05	-1.39
777.28	419.09	10.38	-1.51
785.18	420.71	10.88	-1.68

Job:	Encl. No
Portland grus 8-16	11
Exc:	Check:
AH & KPJ	AH & KPJ

Remark:
Preparation [%] $\Delta\varepsilon 1 =$ 0.011
Preparation at 20-100 kPa vacuum

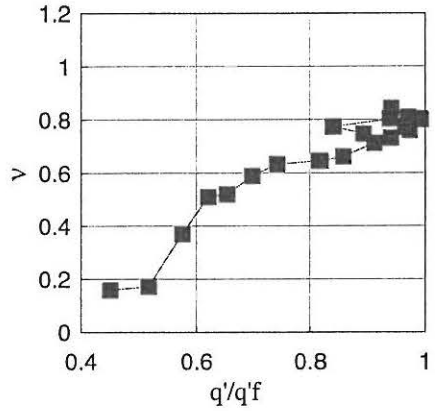


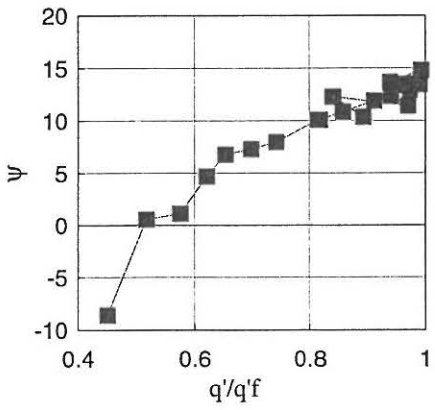
Job: Portland grus 8-16	Encl. No 12
Exc:	Check:
AH & KPJ	AH & KPJ

Description of soil			Before test	At failure
Portland grus 8-16		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.683	0.745
		Saturation	1	
kal_frj	18.04.95	Dimension H mm	252.6	
		D mm	249.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	80-10 kPa
CD - Triaxial test.		ε 1	-0.578 %
free ends		ε ν	-2.026 %
	2.Drained compression.		
	Deformation rate:		4.7 % ph

Evaluation of test		Values at failure		Values for Δε ν = 0	
Deviator stress	q'	46.64	kPa	21.04	kPa
Mean normal stress	p'	25.65	kPa	16.91	kPa
Confining pressures	σ3	10.10	kPa	9.90	kPa
Vertical strain	ε 1	7.12	%	0.34	%
Volumetric strain	ε ν	-3.52	%	0.16	%

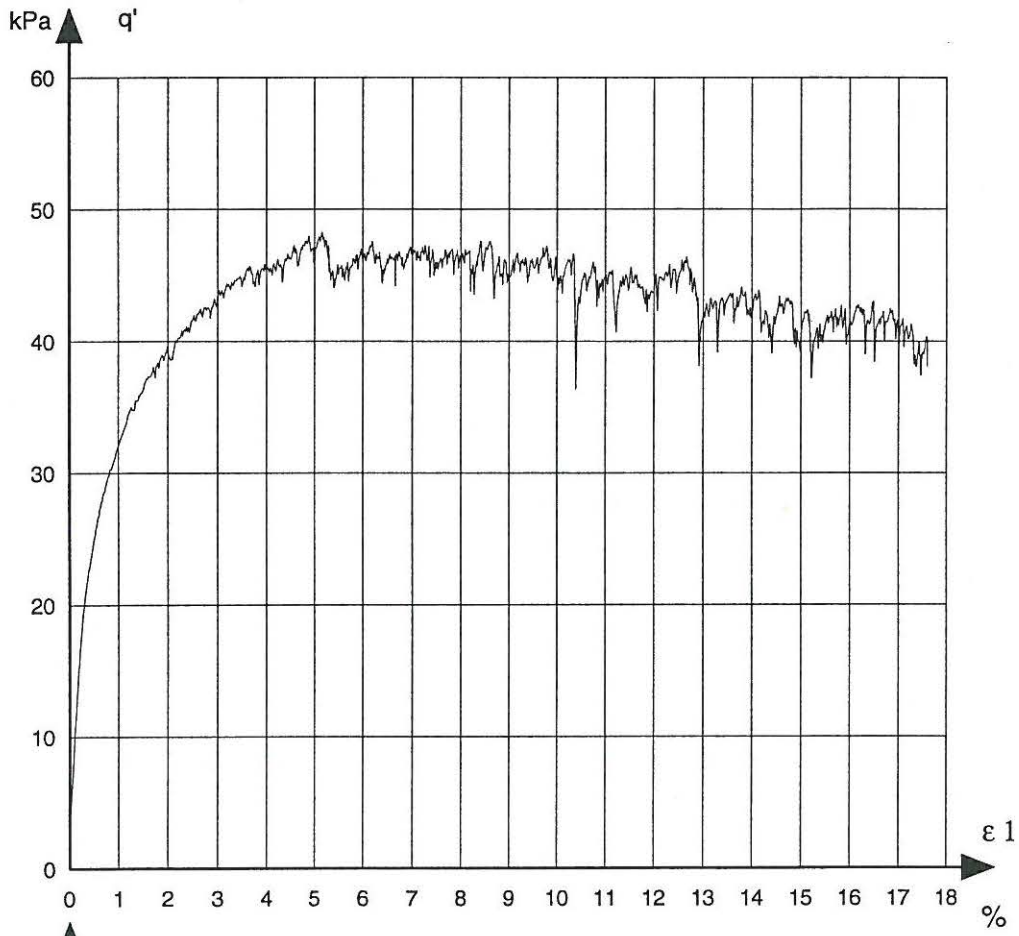




q'	p'	ε 1	ε ν
1.61	10.44	0.00	0.00
2.79	10.83	0.02	0.01
13.60	14.43	0.17	0.11
21.04	16.91	0.34	0.16
24.14	17.95	0.48	0.15
26.85	19.05	0.61	0.15
28.96	19.85	0.74	0.13
30.47	20.36	0.87	0.09
32.54	21.05	1.05	0.04
34.60	21.73	1.22	-0.02
38.03	22.88	1.70	-0.22
39.87	23.39	2.18	-0.44
42.43	24.34	2.66	-0.69
43.81	24.80	3.14	-0.96
45.35	25.32	3.63	-1.23
44.99	25.20	4.11	-1.53
46.67	25.66	4.59	-1.82
46.17	25.59	5.01	-2.07
46.29	25.53	7.12	-3.52
43.73	24.78	8.20	-4.19
43.82	24.71	10.01	-5.18
45.23	25.28	12.24	-6.28
39.09	23.13	14.41	-7.45
41.54	23.95	16.38	-8.32

Job:	Encl. No
Portland grus 8-16	13
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.454
Preparation at 20-80 kPa vacuum

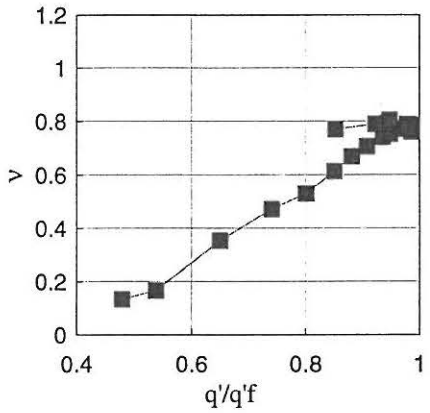


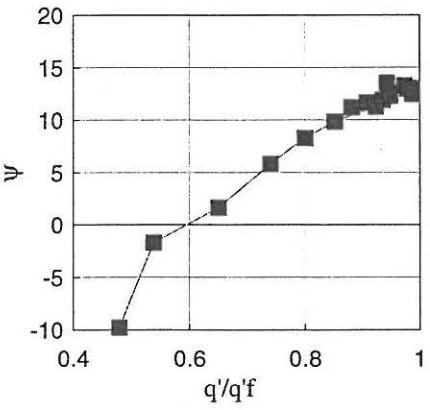
Job: Portland grus 8-16	Encl. No 14
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 8-16		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.681	0.740
		Saturation	1	
kal_frj	10.04.95	Dimension H mm	252.6	
		D mm	249.8	

TEST-PROGRAM	Drained compression.			
	1. Isotropic compression.	σ3	80-20	kPa
CD - Triaxial test.		ε 1	-0.390	%
free ends		ε v	-1.051	%
	2.Drained compression.			
	Deformation rate:		4.6	% ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	98.29	kPa	52.92	kPa
Mean normal stress	p'	53.16	kPa	37.64	kPa
Confining pressures	σ3	20.40	kPa	20.00	kPa
Vertical strain	ε 1	7.94	%	0.68	%
Volumetric strain	ε v	-3.29	%	0.25	%

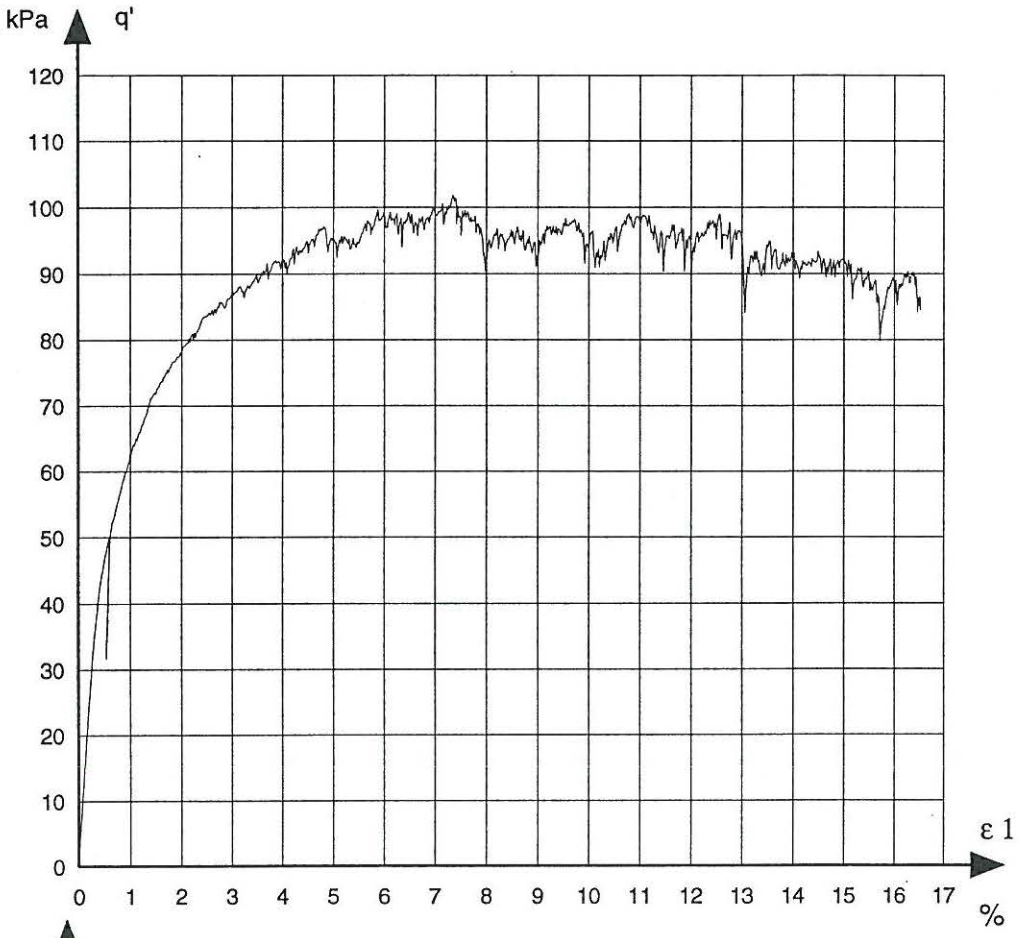


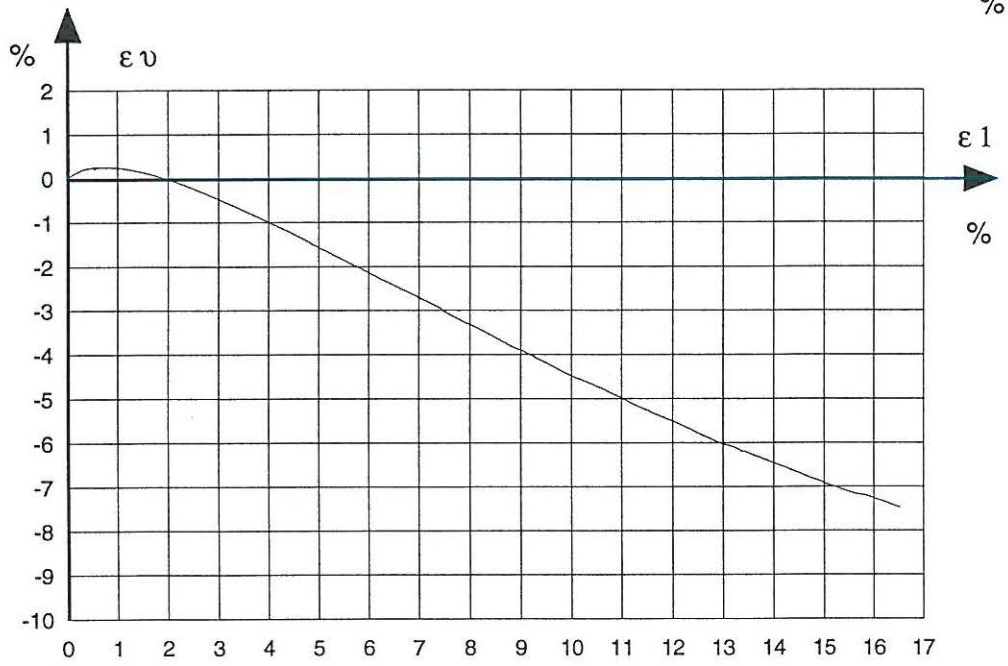


q'	p'	ε 1	ε v
1.62	20.44	0.00	0.00
3.80	21.17	0.02	0.01
29.54	29.95	0.25	0.17
47.08	35.59	0.51	0.24
52.92	37.64	0.68	0.25
63.90	41.70	1.08	0.23
72.72	44.64	1.53	0.13
78.66	46.62	2.02	-0.03
83.53	48.24	2.48	-0.23
86.56	49.15	2.97	-0.46
89.16	49.92	3.44	-0.70
91.90	51.13	3.92	-0.95
93.15	51.45	4.36	-1.19
96.83	52.68	4.76	-1.42
95.64	52.28	5.16	-1.66
96.12	52.44	5.56	-1.89
98.61	53.27	5.96	-2.12
96.33	52.51	6.37	-2.35
96.96	52.72	6.77	-2.58
92.61	51.27	7.95	-3.29
96.31	52.50	9.28	-4.06
93.10	51.43	11.47	-5.25
90.66	50.62	13.58	-6.27
83.72	48.31	15.77	-7.18

Job:	Encl. No
Portland grus 8-16	15
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.438
Preparation at 20-80 kPa vacuum



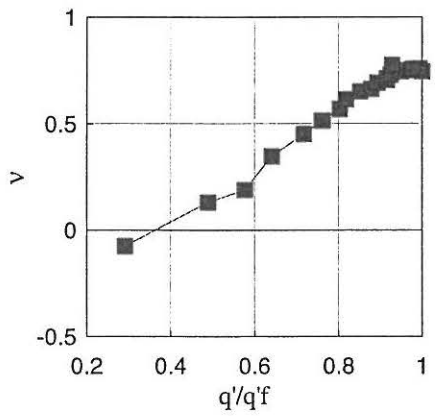


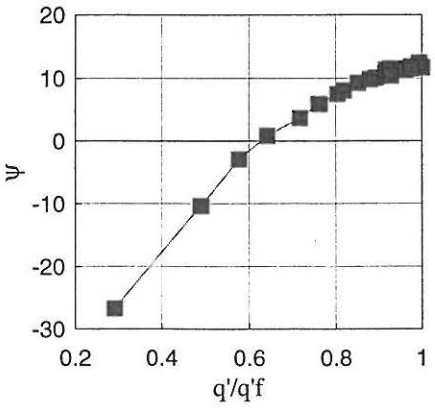
Job: Portland grus 8-16	Encl. No 16
Exc:	Check:
FRJ	FRJ

Description of soil Portland grus 8-16			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.678	0.733
		Saturation	1	
kal_frj	11.04.95	Dimension H mm	252.6	
		D mm	249.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	80-40 kPa
CD - Triaxial test.		ε 1	-0.171 %
free ends		ε ν	-0.315 %
	2.Drained compression.		
	Deformation rate:		4.4 % ph

Evaluation of test		Values at failure		Values for $\Delta\varepsilon\,\nu = 0$	
Deviator stress	q'	185.68	kPa	106.98	kPa
Mean normal stress	p'	101.99	kPa	75.76	kPa
Confining pressures	σ3	40.10	kPa	40.10	kPa
Vertical strain	ε 1	9.05	%	0.94	%
Volumetric strain	ε ν	-3.12	%	0.32	%

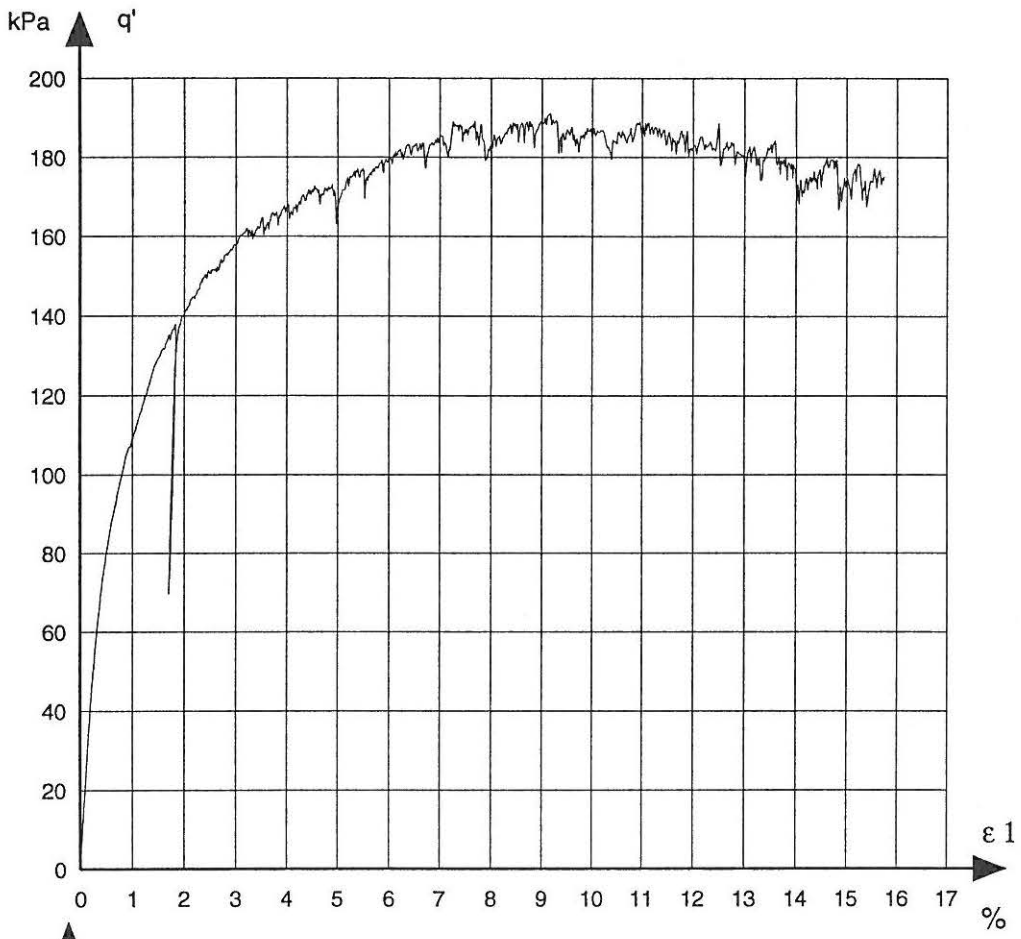


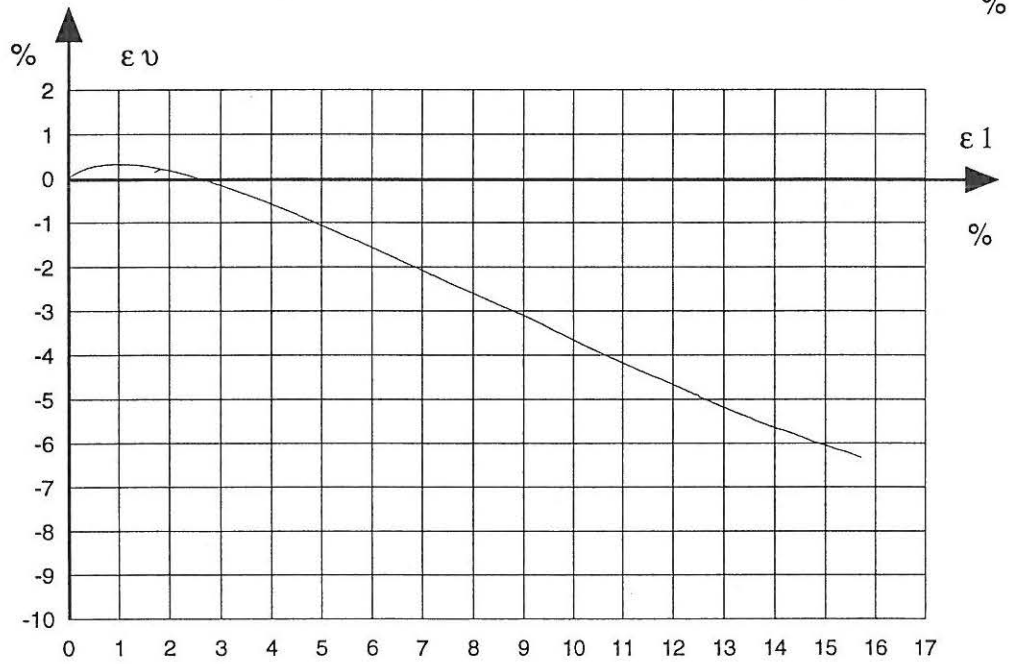


q'	p'	ε 1	ε ν
1.63	40.64	0.00	0.00
3.03	41.11	0.01	0.01
15.38	45.33	0.06	0.05
53.99	58.10	0.27	0.18
90.79	70.36	0.64	0.29
106.98	75.76	0.94	0.32
119.09	80.00	1.23	0.31
133.44	85.08	1.66	0.25
141.40	87.63	2.05	0.17
149.19	90.33	2.36	0.07
151.81	91.20	2.60	-0.01
158.03	92.78	3.03	-0.17
163.15	94.38	3.47	-0.35
165.81	95.37	3.88	-0.53
169.91	96.64	4.29	-0.71
170.18	96.83	4.69	-0.91
171.74	97.35	5.09	-1.11
176.42	98.81	5.50	-1.31
178.47	99.59	5.90	-1.51
180.83	100.38	6.75	-1.95
185.68	102.92	9.04	-3.12
184.36	101.45	10.66	-4.01
181.21	100.50	12.87	-5.12
172.37	97.36	14.87	-6.00

Job:	Encl. No
Portland grus 8-16	17
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] $\Delta\varepsilon 1 =$ 0.399
Preparation at 20-80 kPa vacuum



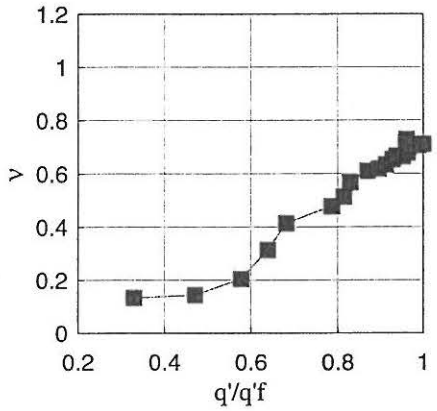


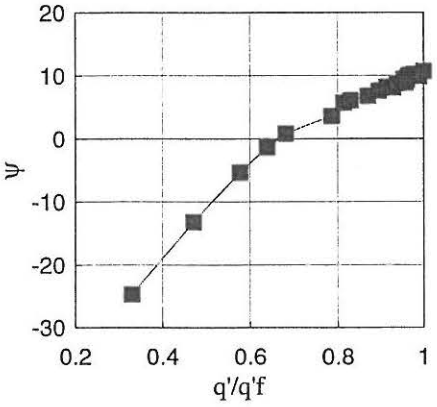
Job: Portland grus 8-16	Encl. No 18
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 8-16		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.679	0.718
		Saturation	1	
kal_frj	20.04.95	Dimension H mm	252.6	
		D mm	249.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	80-80 kPa
CD - Triaxial test.		ε 1	0.015 %
free ends		ε ν	-0.129 %
	2.Drained compression.		
	Deformation rate:		4.5 % ph

Evaluation of test		Values at failure		Values for $\Delta\varepsilon\nu = 0$	
Deviator stress	q'	340.39	kPa	217.58	kPa
Mean normal stress	p'	193.46	kPa	152.63	kPa
Confining pressures	σ3	80.00	kPa	80.10	kPa
Vertical strain	ε 1	9.36	%	1.57	%
Volumetric strain	ε ν	-2.14	%	0.53	%

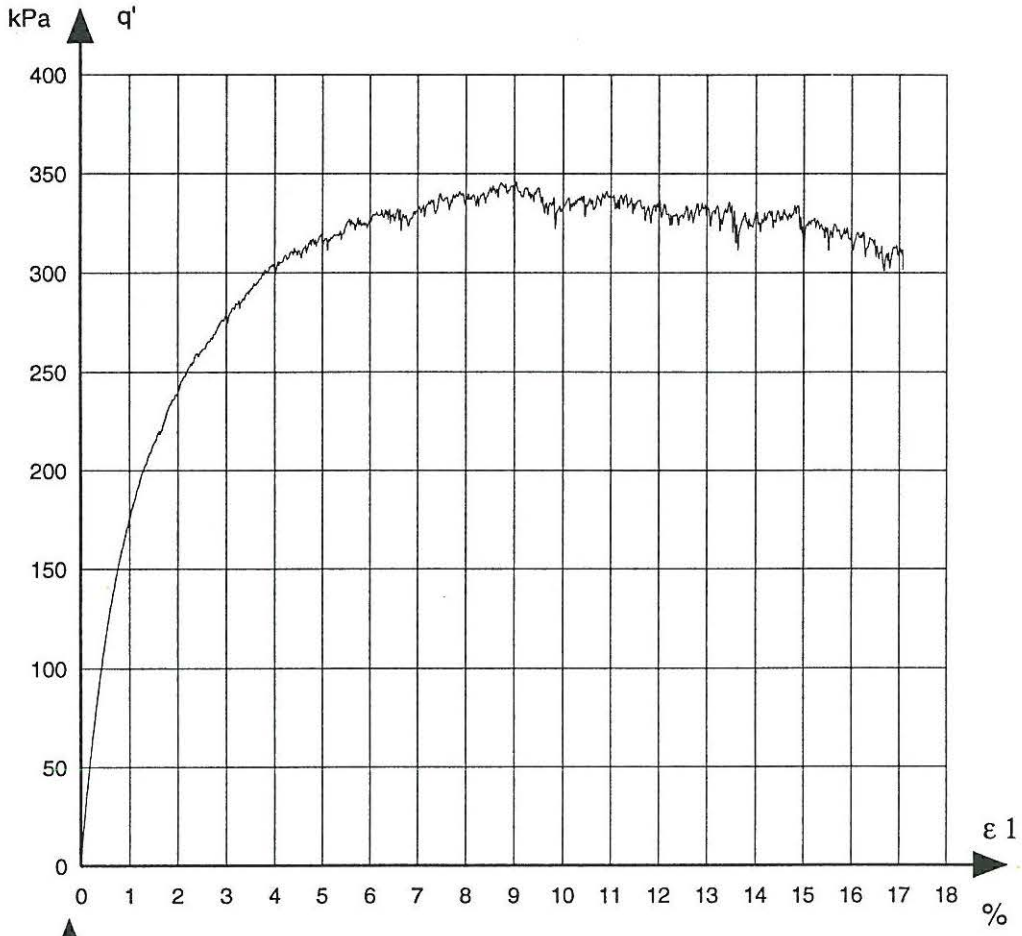


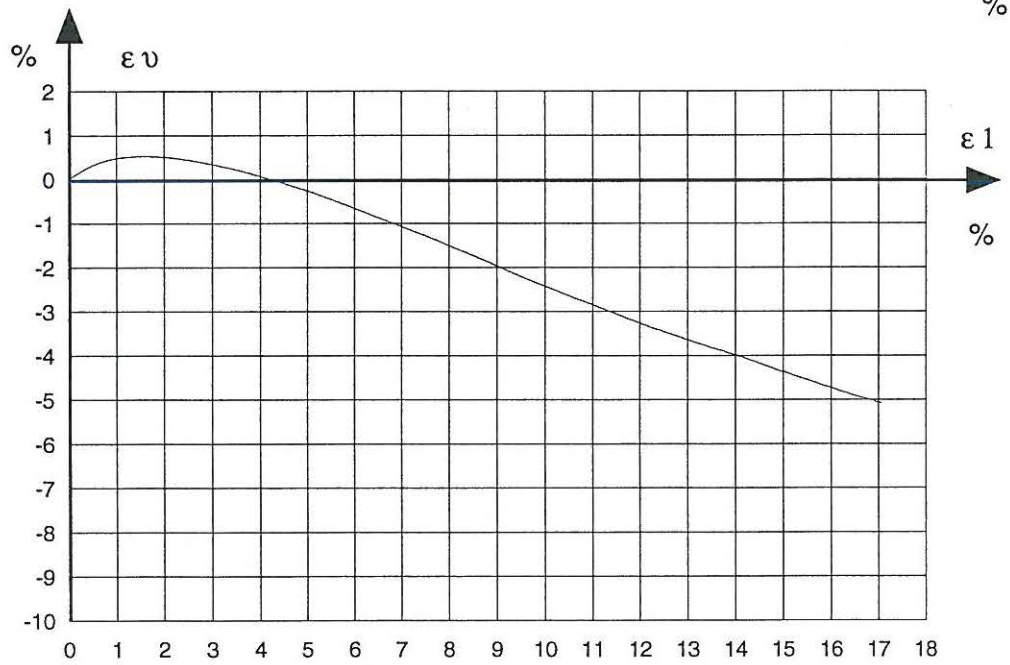


q'	p'	ε 1	ε ν
1.63	80.54	0.00	0.00
16.98	85.66	0.05	0.03
57.01	99.00	0.20	0.14
112.25	117.52	0.49	0.31
160.24	133.41	0.85	0.45
196.51	145.50	1.24	0.51
217.58	152.63	1.57	0.53
232.16	157.49	1.82	0.52
267.68	169.23	2.72	0.40
276.91	172.30	3.04	0.33
282.08	173.93	3.27	0.28
295.84	178.61	3.66	0.17
304.61	181.54	4.05	0.05
310.59	183.53	4.44	-0.08
315.91	185.30	4.83	-0.21
318.84	186.28	5.23	-0.35
324.29	188.10	5.63	-0.50
327.75	189.25	6.04	-0.67
328.56	189.42	6.44	-0.84
336.57	192.19	7.27	-1.19
340.39	193.19	9.35	-2.14
332.19	190.73	11.08	-2.88
327.07	189.02	13.28	-3.74
326.31	188.77	15.28	-4.47

Job:	Encl. No
Portland grus 8-16	19
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] $\Delta\varepsilon 1 =$ 0.380
Preparation at 20-80 kPa vacuum



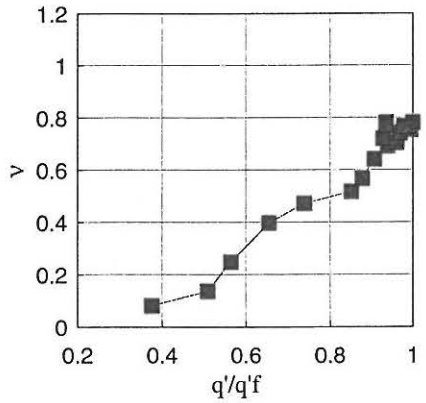


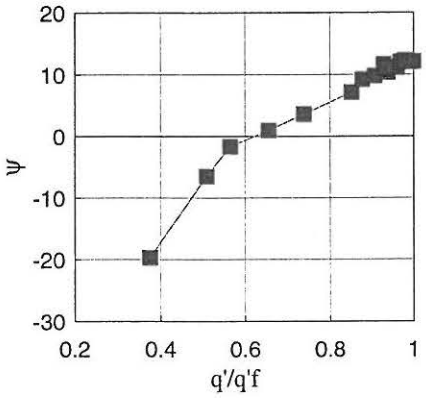
Job: Portland grus 8-16	Encl. No 20
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 8-16		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.678	0.723
		Saturation	1	
kal_frj	25.04.95	Dimension H mm	252.6	
		D mm	249.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	80-40 kPa
CD - Triaxial test.		ε 1	-0.219 %
free ends		ε v	0.000 %
	2.Drained compression.		
	Deformation rate:		4.5 % ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	195.45	kPa	110.22	kPa
Mean normal stress	p'	105.25	kPa	76.64	kPa
Confining pressures	σ3	40.10	kPa	39.90	kPa
Vertical strain	ε 1	8.01	%	1.07	%
Volumetric strain	ε v	-2.51	%	0.40	%

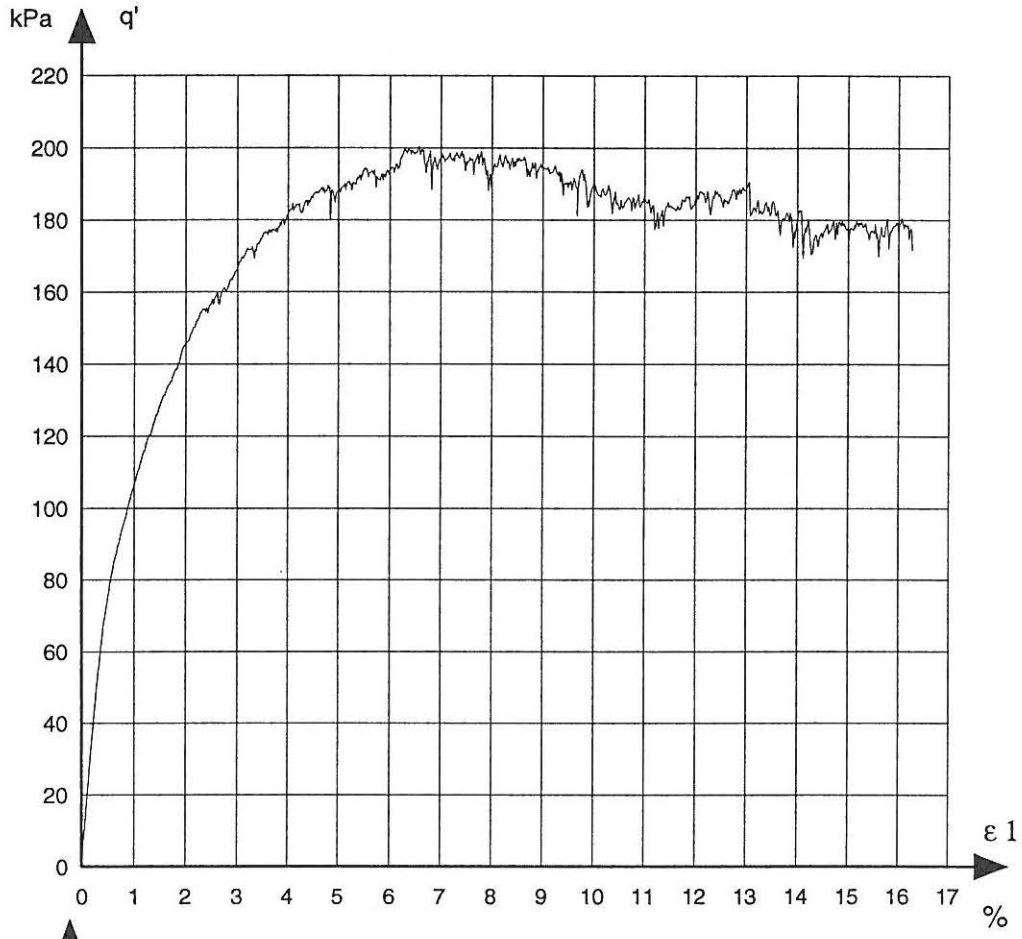


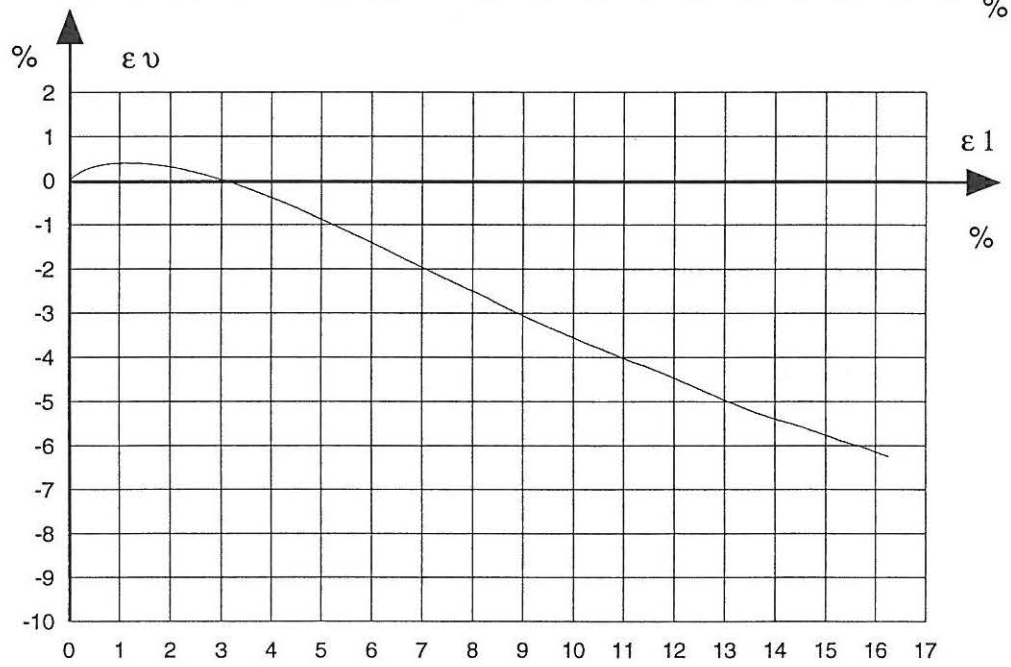


q'	p'	ε 1	ε v
1.64	40.65	0.00	0.00
26.21	48.84	0.14	0.12
40.79	53.70	0.22	0.18
73.26	64.32	0.48	0.31
99.29	73.00	0.86	0.38
110.22	76.64	1.07	0.40
128.13	82.91	1.48	0.38
144.54	88.38	1.95	0.32
166.25	95.52	2.99	0.03
171.33	97.31	3.37	-0.12
177.17	99.26	3.65	-0.23
183.36	101.32	4.13	-0.44
187.68	102.76	4.55	-0.65
181.37	100.76	4.84	-0.79
189.25	103.28	5.10	-0.93
194.37	104.99	5.51	-1.15
193.10	104.57	5.93	-1.37
198.46	106.35	6.34	-1.60
196.22	105.51	6.75	-1.83
195.45	104.43	8.02	-2.51
195.80	105.37	8.48	-2.77
191.22	103.74	9.37	-3.25
182.70	100.80	11.34	-4.16
182.57	100.86	13.61	-5.25

Job:	Encl. No
Portland grus 8-16	21
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.463
Preparation at 20-80 kPa vacuum
Volumetric strain not measured during isotropic compression.



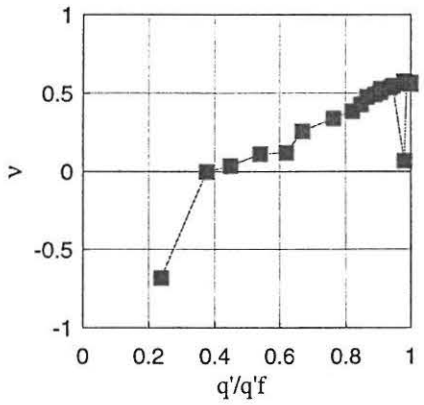


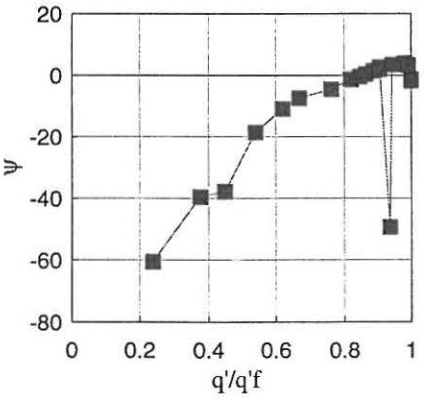
Job: Portland grus 8-16	Encl. No 22
Exc:	Check:
FRJ	FRJ

Description of soil Portland grus 8-16			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.666	
		Saturation	1	
kal_frj	20.04.95	Dimension H mm	252.6	
		D mm	249.8	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	80-160 kPa
CD - Triaxial test.		ε 1	0.428 %
free ends		ε ν	4.584 %
	2.Drained compression.		
	Deformation rate:		3.8 % ph

Evaluation of test		Values at failure	Values for Δε ν = 0
Deviator stress	q'	kPa	kPa
Mean normal stress	p'	kPa	kPa
Confining pressures	σ3	kPa	kPa
Vertical strain	ε 1	%	%
Volumetric strain	ε ν	%	%

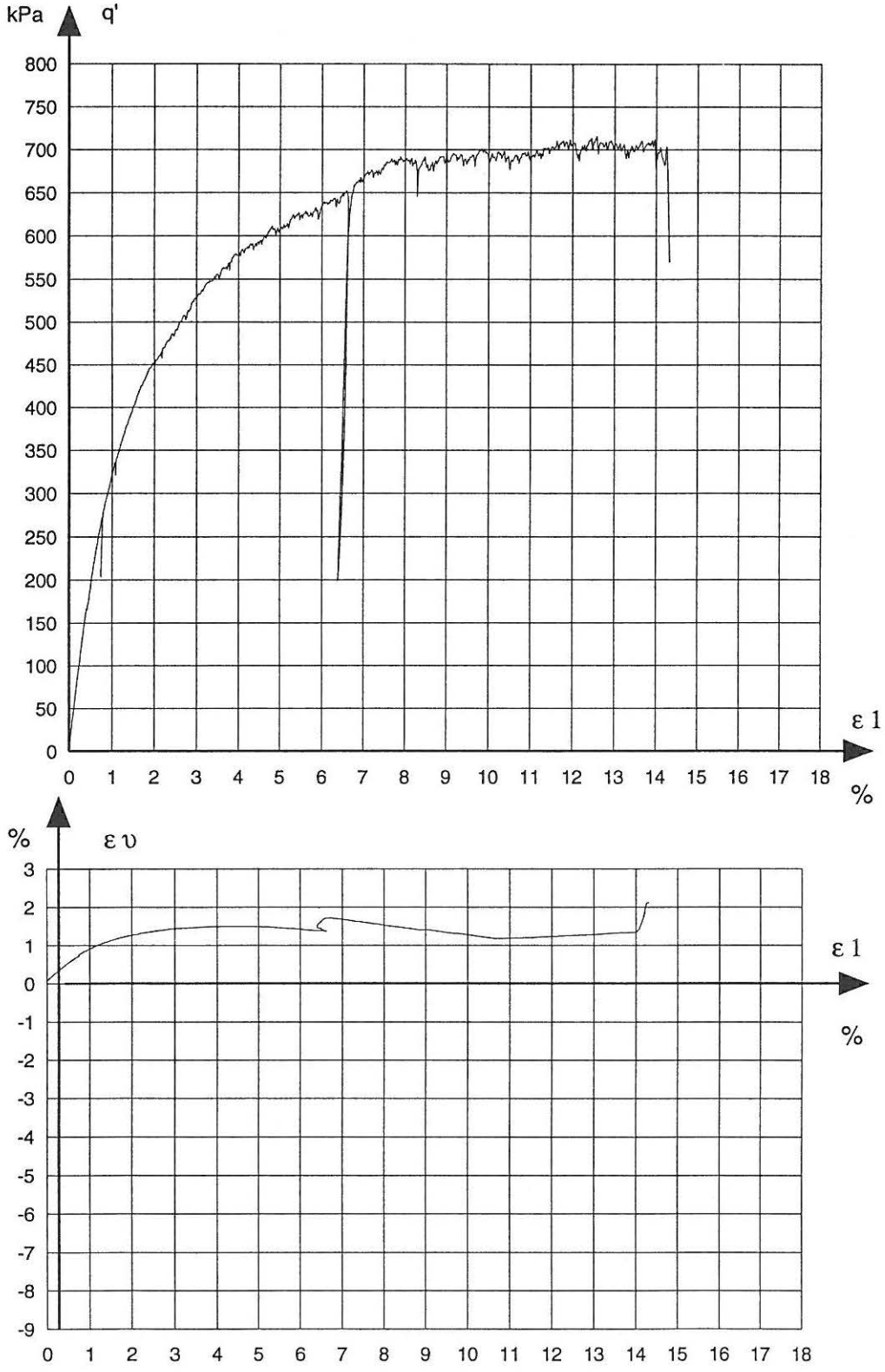




q'	p'	ε 1	ε ν
1.71	160.27	0.00	0.00
29.29	169.66	0.05	0.12
81.32	187.11	0.18	0.25
166.99	215.66	0.40	0.45
263.77	247.92	0.74	0.72
314.98	264.99	0.97	0.89
379.14	286.38	1.36	1.08
435.52	305.17	1.80	1.22
470.49	316.93	2.23	1.32
535.51	338.40	3.14	1.45
576.32	352.21	4.04	1.49
594.91	358.20	4.52	1.50
607.66	362.55	4.83	1.50
624.74	368.85	5.62	1.45
636.52	372.77	6.01	1.43
637.38	372.56	6.40	1.39
658.40	379.07	6.77	1.71
663.32	381.21	6.97	1.69
689.55	389.95	8.03	1.53
694.18	391.09	8.99	1.41
688.73	389.68	9.44	1.35
697.05	391.75	10.86	1.19
703.22	393.91	12.73	1.27
703.29	393.83	13.72	1.33

Job:	Encl. No
Portland grus 8-16	23
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.147
Preparation at 20-80 kPa vacuum
The membrane was penetrated during the test.

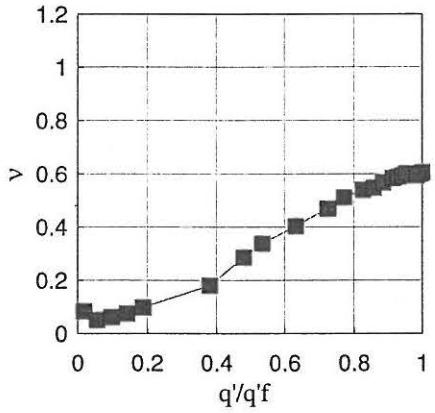


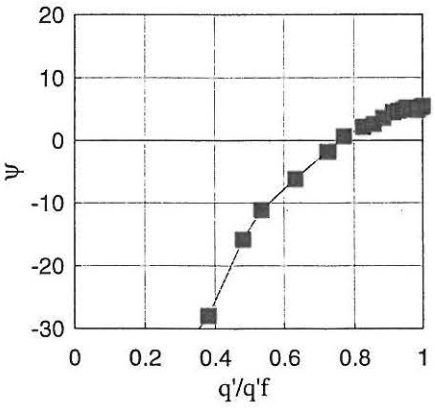
Job: Portland grus 8-16	Encl. No 24
Exc: FRJ	Check: FRJ

Description of soil			Before test	At failure
Portland grus 8-16		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.683	0.690
		Saturation	1	
kal3tri3	11.07.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-160 kPa
CD - Triaxial test.		ε 1	0.556 %
free ends		ε ν	1.669 %
	2.Drained compression.		
	Deformation rate:		4.6 % ph

Evaluation of test		Values at failure		Values for $\Delta\varepsilon\,\nu = 0$	
Deviator stress	q'	714.84	kPa	517.97	kPa
Mean normal stress	p'	398.38	kPa	332.76	kPa
Confining pressures	σ3	160.10	kPa	160.10	kPa
Vertical strain	ε 1	12.52	%	3.16	%
Volumetric strain	ε ν	-0.44	%	1.07	%

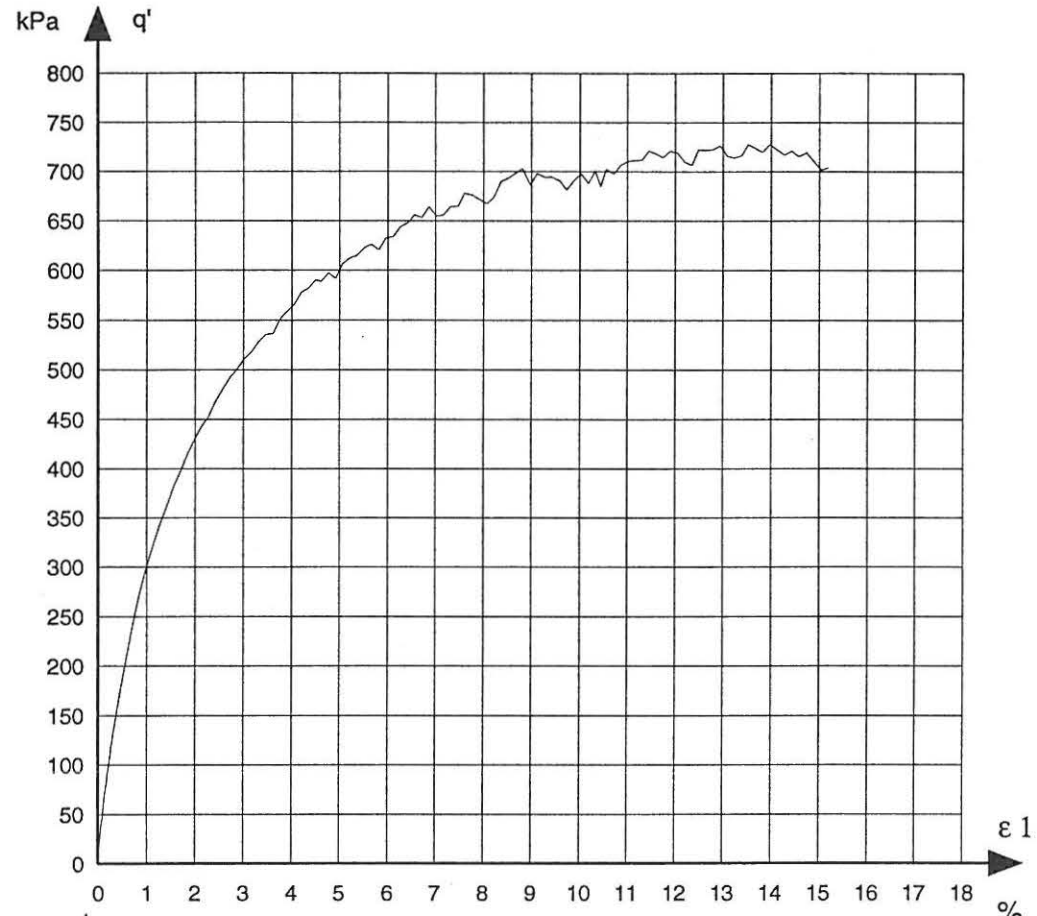


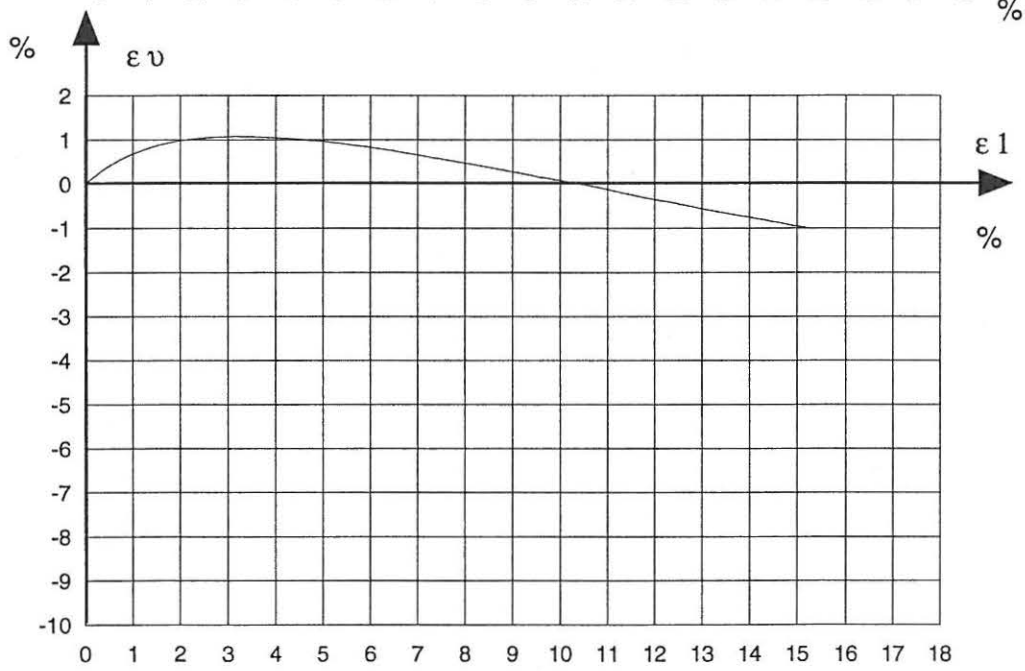


q'	p'	ε 1	ε ν
1.66	160.55	0.00	0.00
13.19	164.30	0.01	0.01
39.90	173.30	0.06	0.05
70.02	183.34	0.13	0.12
101.62	193.87	0.22	0.19
134.81	204.94	0.32	0.27
271.94	250.55	0.85	0.61
342.67	274.22	1.27	0.79
381.67	287.32	1.55	0.88
452.41	310.90	2.28	1.02
517.97	332.76	3.16	1.07
550.88	343.73	3.75	1.06
590.47	356.82	4.50	1.00
612.53	364.28	5.21	0.93
632.75	371.02	5.96	0.83
653.46	377.82	6.71	0.71
664.71	381.57	7.47	0.57
674.28	384.86	8.22	0.43
681.52	387.17	9.73	0.13
711.45	397.15	11.15	-0.16
714.84	400.84	12.49	-0.44
726.19	402.16	12.93	-0.55
722.31	400.77	14.13	-0.78
703.88	394.63	15.18	-0.98

Job:	Encl. No
Portland grus 8-16	25
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] $\Delta\varepsilon 1 =$ 0.032
Preparation at 20-50 kPa vacuum



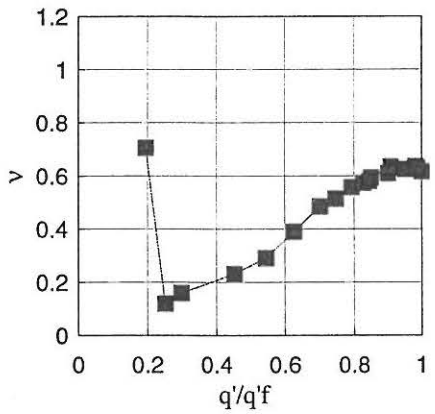


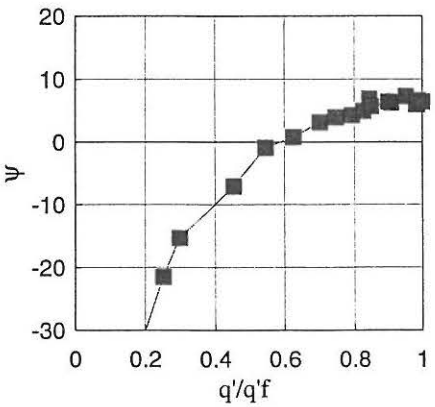
Job: Portland grus 8-16	Encl. No 26
Exc:	Check:
FRJ	FRJ

Description of soil Portland grus 8-16			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.799	0.831
		Saturation	1	
kal1tri3	18.03.96	Dimension H mm	252.6	
		D mm	247.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-10 kPa
CD - Triaxial test.		ε 1	-0.139 %
free ends		ε ν	-0.358 %
	2.Drained compression.		
	Deformation rate:		3.7 % ph

Evaluation of test		Values at failure		Values for $\Delta\varepsilon\nu = 0$	
Deviator stress	q'	50.80	kPa	27.67	kPa
Mean normal stress	p'	27.13	kPa	19.12	kPa
Confining pressures	σ3	10.20	kPa	9.90	kPa
Vertical strain	ε 1	10.53	%	1.09	%
Volumetric strain	ε ν	-1.79	%	0.26	%

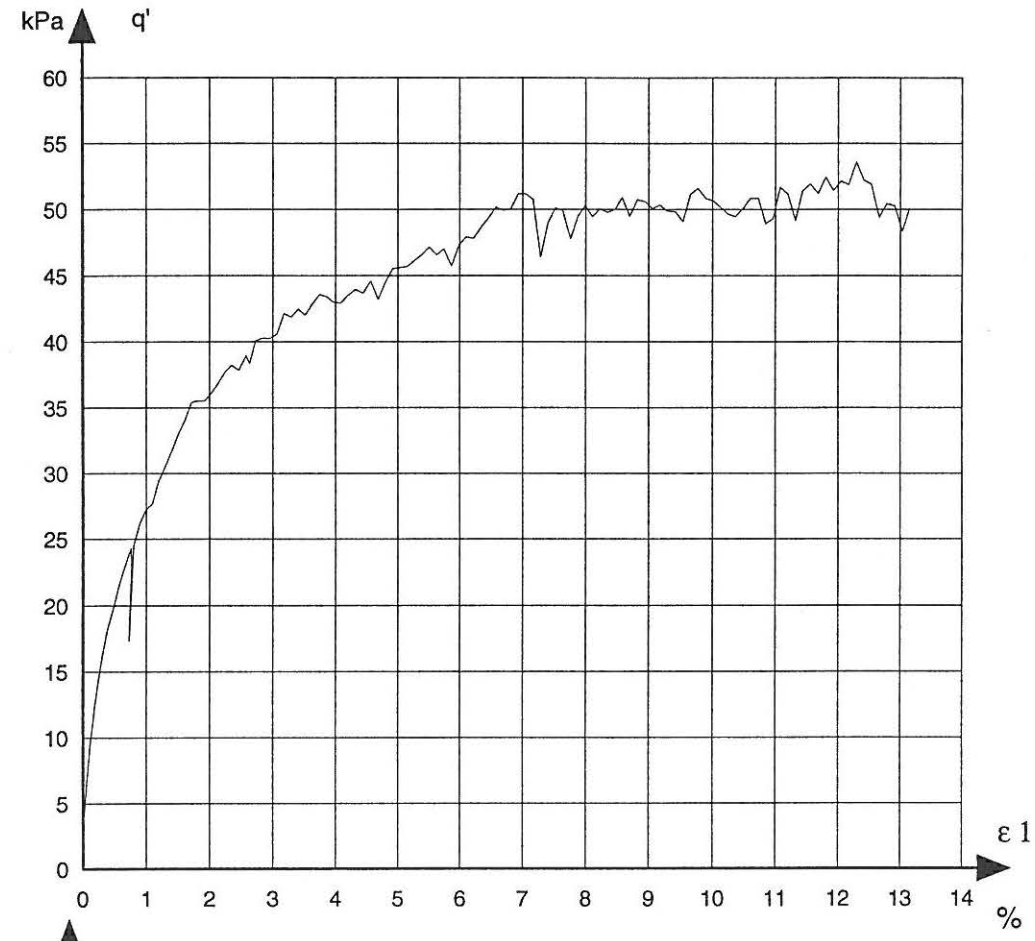


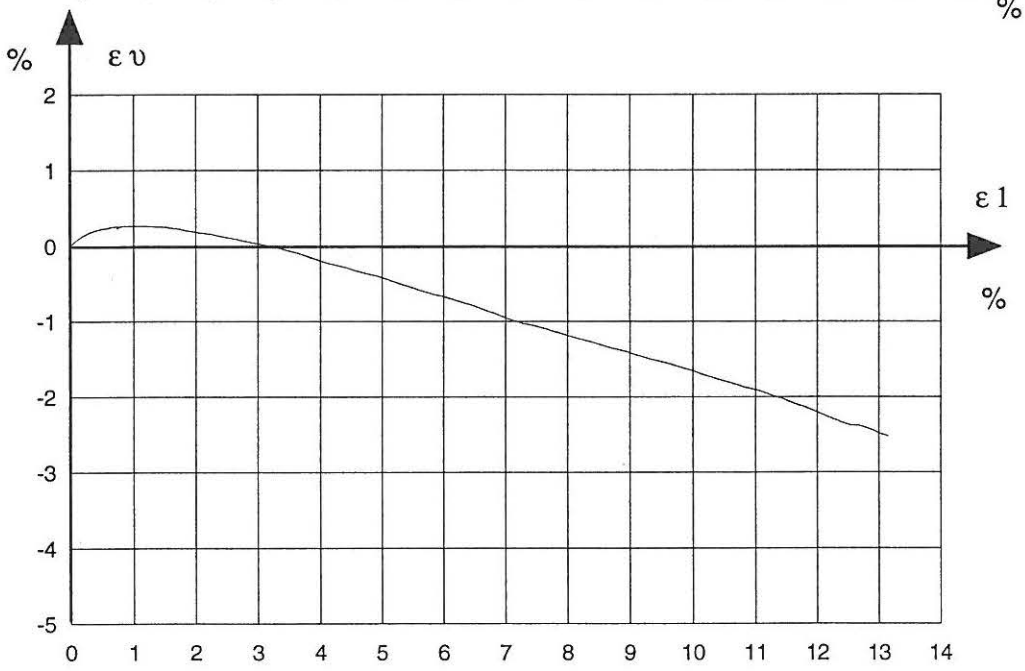


q'	p'	ε 1	ε ν
1.67	10.56	0.00	0.00
1.83	10.61	0.00	-0.00
6.45	12.05	0.07	0.05
9.91	13.20	0.13	0.09
12.76	14.05	0.20	0.13
15.14	14.95	0.27	0.16
22.98	17.56	0.67	0.25
27.67	19.12	1.09	0.26
31.75	20.68	1.41	0.25
35.53	22.04	1.93	0.19
37.85	22.82	2.46	0.12
40.24	23.51	2.96	0.04
41.99	24.20	3.52	-0.07
42.89	24.50	4.08	-0.22
43.17	24.59	4.68	-0.35
46.12	25.47	5.27	-0.50
45.71	25.34	5.86	-0.64
51.19	27.26	7.05	-0.97
50.03	26.88	8.23	-1.24
49.83	26.81	9.41	-1.52
50.80	26.88	10.48	-1.79
52.44	27.68	11.80	-2.13
48.33	26.21	13.03	-2.49
50.11	26.80	13.15	-2.52

Job:	Encl. No
Portland grus 8-16	27
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] $\Delta\varepsilon 1 =$ -0.023
Preparation at 20-30 kPa vacuum



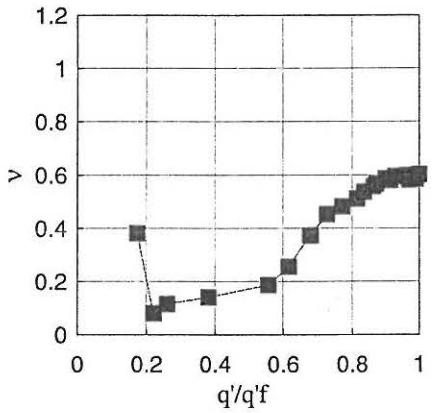


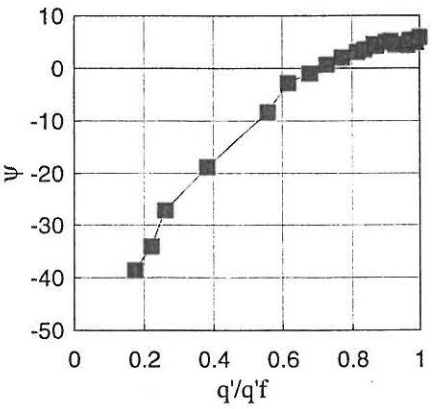
Job: Portland grus 8-16	Encl. No 28
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 8-16		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.805	0.831
		Saturation	1	
kal1tri3	18.03.96	Dimension H mm	252.6	
		D mm	247.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-20 kPa
CD - Triaxial test.		ε 1	0.000 %
free ends		ε ν	0.000 %
	2.Drained compression.		
	Deformation rate:		3.6 % ph

Evaluation of test		Values at failure		Values for $\Delta\varepsilon\nu = 0$	
Deviator stress	q'	99.54	kPa	67.43	kPa
Mean normal stress	p'	52.74	kPa	42.48	kPa
Confining pressures	σ3	20.00	kPa	20.00	kPa
Vertical strain	ε 1	14.42	%	2.33	%
Volumetric strain	ε ν	-1.43	%	0.61	%

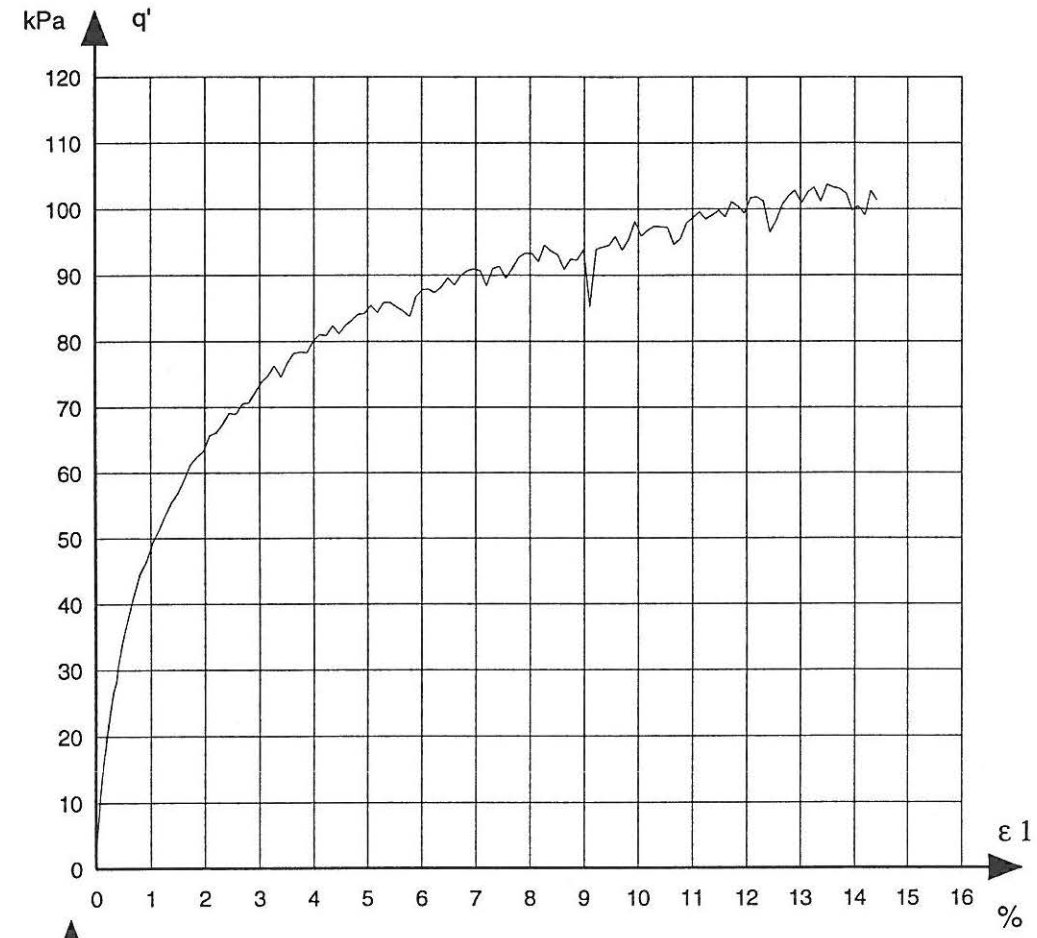


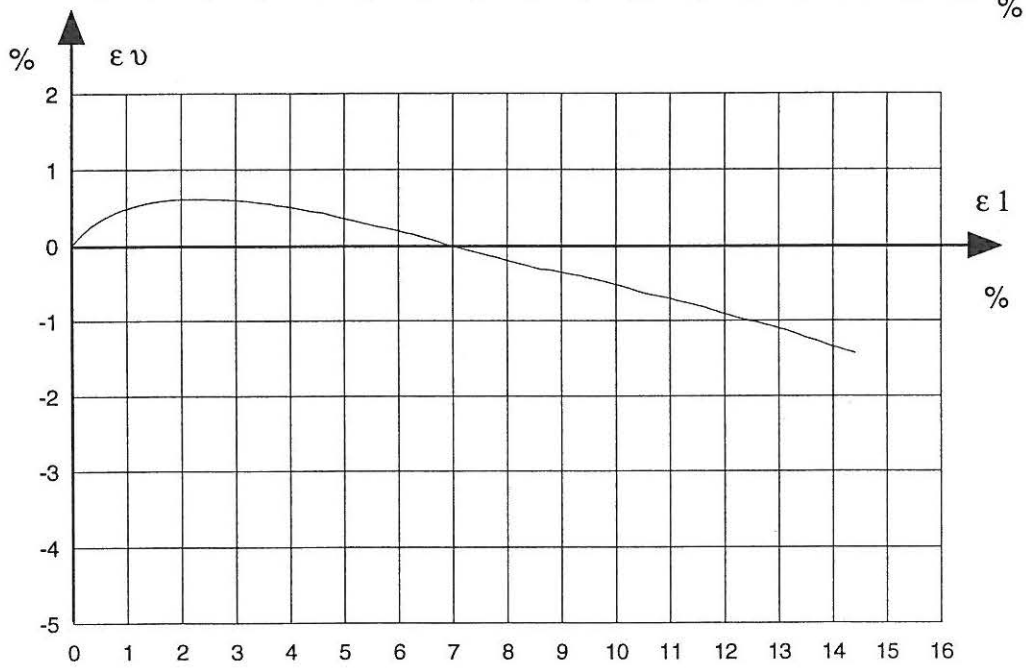


q'	p'	ε 1	ε ν
1.67	20.66	0.00	0.00
2.34	20.68	0.00	0.00
11.08	23.59	0.08	0.06
17.20	25.63	0.15	0.12
21.96	27.22	0.23	0.17
25.95	28.55	0.30	0.22
37.89	32.63	0.59	0.36
55.43	38.38	1.38	0.56
61.26	40.32	1.73	0.59
67.43	42.48	2.33	0.61
72.25	44.18	2.92	0.60
76.70	45.67	3.51	0.56
81.01	47.10	4.11	0.49
83.12	47.81	4.70	0.41
85.87	48.62	5.30	0.31
86.73	49.01	5.90	0.21
89.50	49.83	6.48	0.10
90.94	50.31	7.67	-0.13
92.24	50.75	8.86	-0.34
95.88	51.96	10.06	-0.53
98.48	52.83	11.24	-0.75
96.42	52.14	12.42	-1.00
103.28	54.43	13.61	-1.24
99.54	53.76	14.42	-1.43

Job:	Encl. No
Portland grus 8-16	29
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] $\Delta\varepsilon 1 =$ -0.045
Preparation at 20-30 kPa vacuum



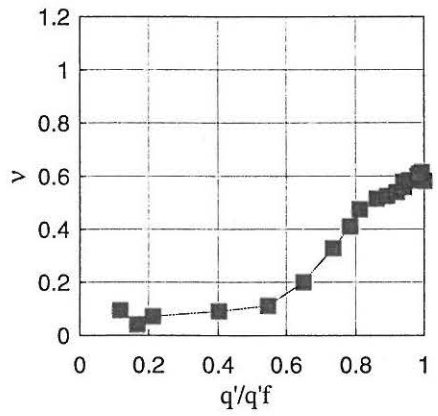


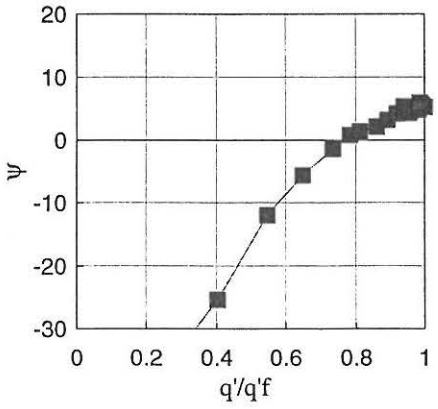
Job: Portland grus 8-16	Encl. No 30
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 8-16		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.800	0.814
		Saturation	1	
kal1tri3	27.03.96	Dimension H mm	252.6	
		D mm	247.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-40 kPa
CD - Triaxial test.		ε 1	0.199 %
free ends		ε ν	0.347 %
	2.Drained compression.		
	Deformation rate:		3.9 % ph

Evaluation of test		Values at failure		Values for $\Delta\varepsilon\,\nu = 0$	
Deviator stress	q'	171.87	kPa	126.21	kPa
Mean normal stress	p'	97.29	kPa	81.97	kPa
Confining pressures	σ3	40.00	kPa	39.90	kPa
Vertical strain	ε 1	11.20	%	2.67	%
Volumetric strain	ε ν	-0.51	%	0.83	%

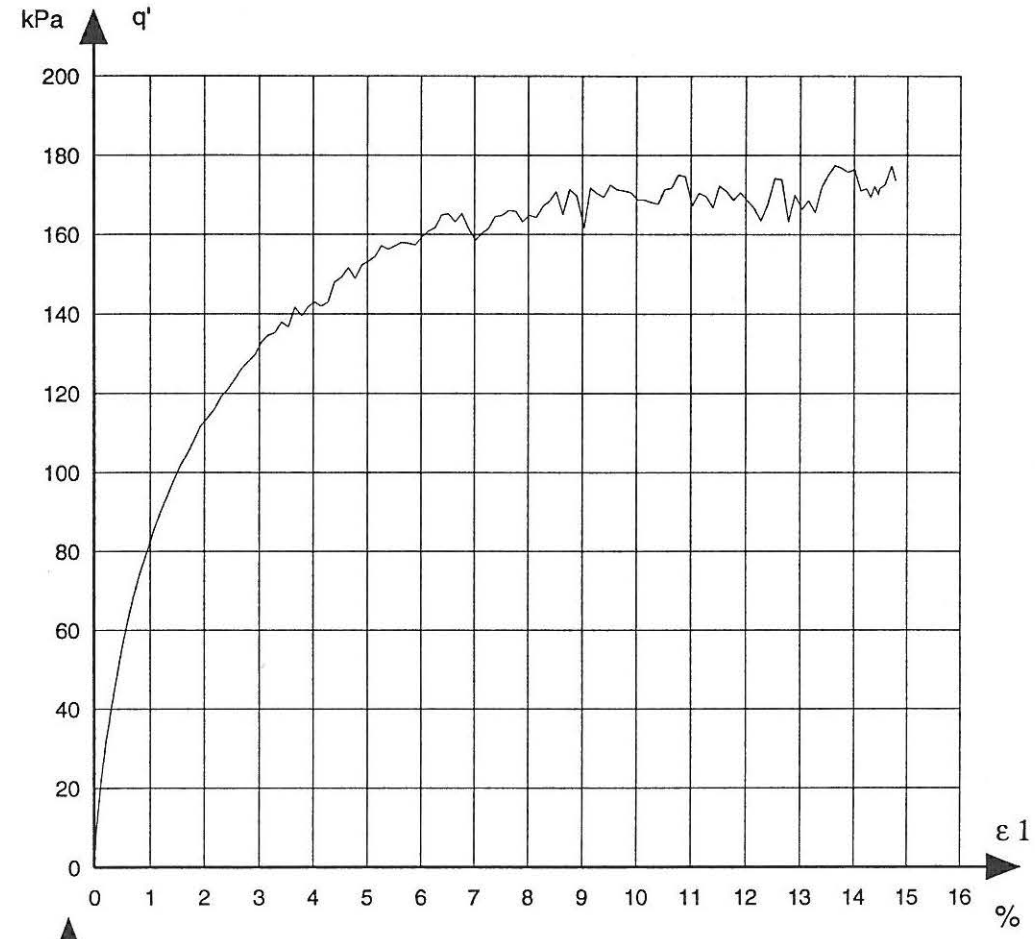


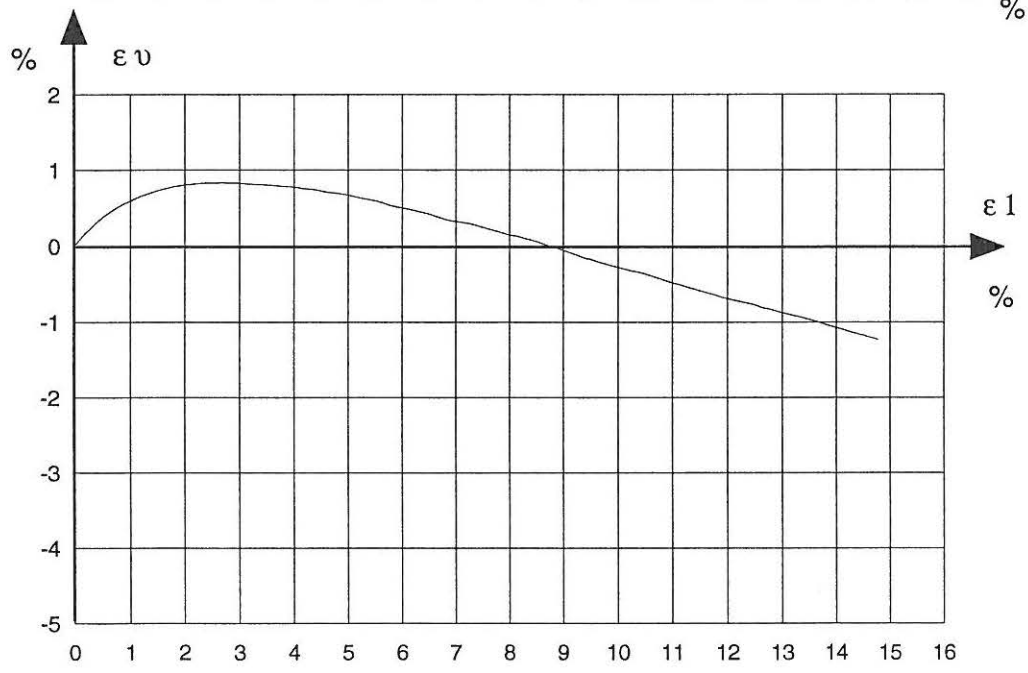


q'	p'	ε 1	ε ν
1.67	40.66	0.00	0.00
9.35	43.12	0.03	0.03
11.93	43.88	0.05	0.04
20.18	46.73	0.11	0.09
28.82	49.61	0.18	0.15
36.58	52.09	0.26	0.21
69.15	63.05	0.71	0.48
93.94	71.21	1.31	0.69
111.66	77.22	1.92	0.80
126.21	81.97	2.67	0.83
134.62	84.97	3.17	0.82
139.43	86.48	3.78	0.79
147.94	89.41	4.40	0.74
153.19	91.16	5.02	0.67
158.02	92.67	5.64	0.57
161.69	93.90	6.26	0.46
161.43	93.81	6.89	0.33
164.23	94.74	8.15	0.13
169.43	96.48	9.40	-0.16
171.87	96.81	11.15	-0.51
170.55	96.85	11.90	-0.67
168.54	96.18	13.15	-0.90
169.29	96.43	14.31	-1.14
173.53	97.84	14.78	-1.23

Job:	Encl. No
Portland grus 8-16	31
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] $\Delta\varepsilon 1 =$ 0.032
Preparation at 20-40 kPa vacuum



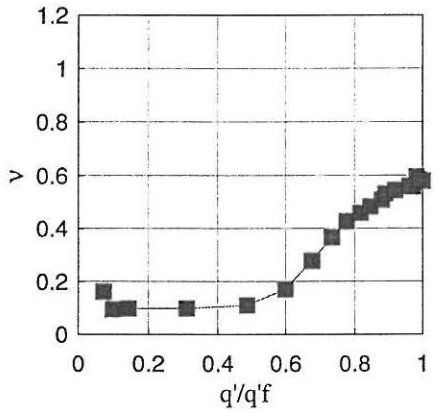


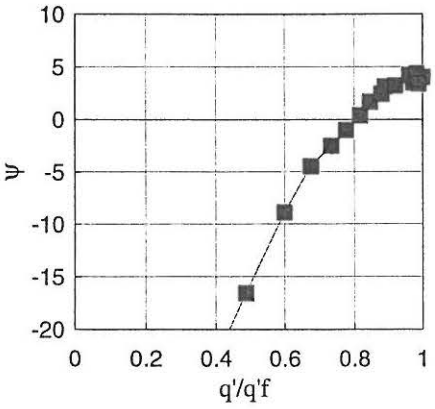
Job: Portland grus 8-16	Encl. No 32
Exc:	Check:
FRJ	FRJ

Description of soil Portland grus 8-16			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.805	0.809
		Saturation	1	
kal2tri3	10.04.96	Dimension H mm	252.6	
		D mm	247.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	30-80 kPa
CD - Triaxial test.		ε 1	0.354 %
free ends		ε ν	1.016 %
	2.Drained compression.		
	Deformation rate:		4.3 % ph

Evaluation of test		Values at failure		Values for $\Delta\varepsilon\nu = 0$	
Deviator stress	q'	306.59	kPa	237.67	kPa
Mean normal stress	p'	182.85	kPa	159.12	kPa
Confining pressures	σ3	80.10	kPa	79.90	kPa
Vertical strain	ε 1	13.88	%	4.03	%
Volumetric strain	ε ν	-0.20	%	1.07	%

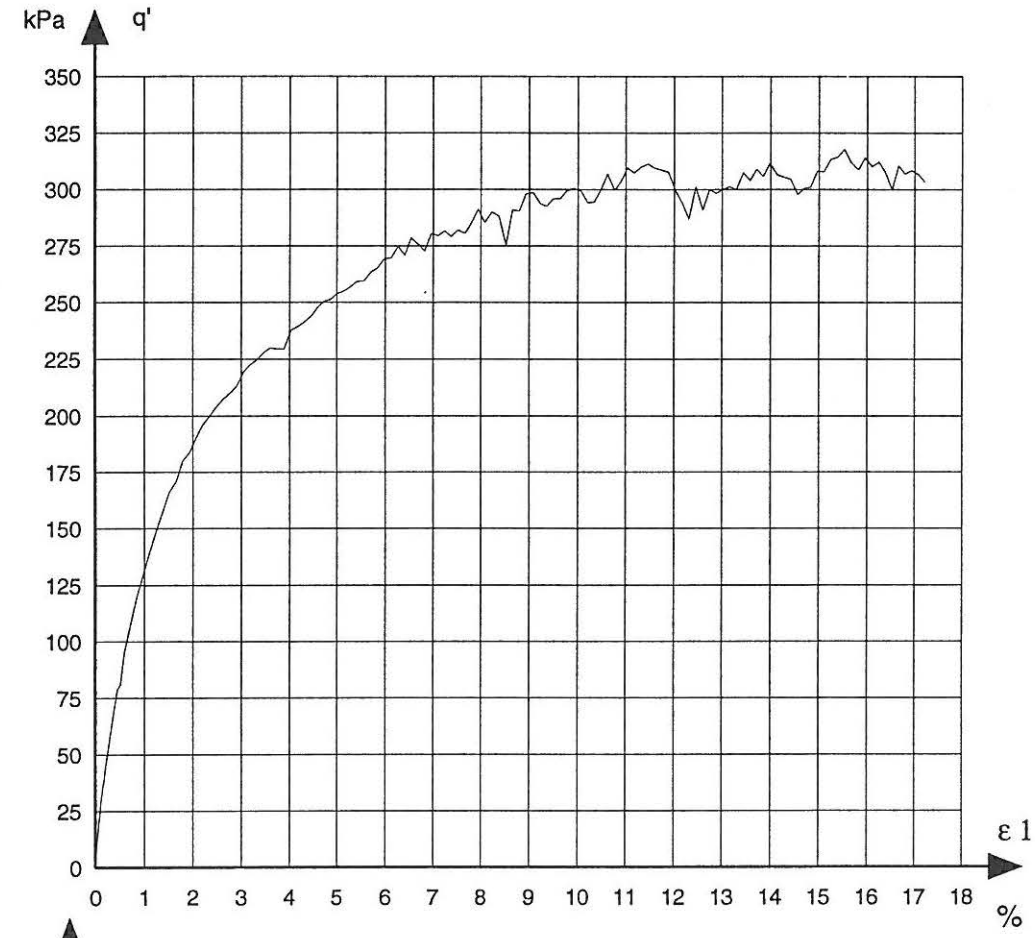


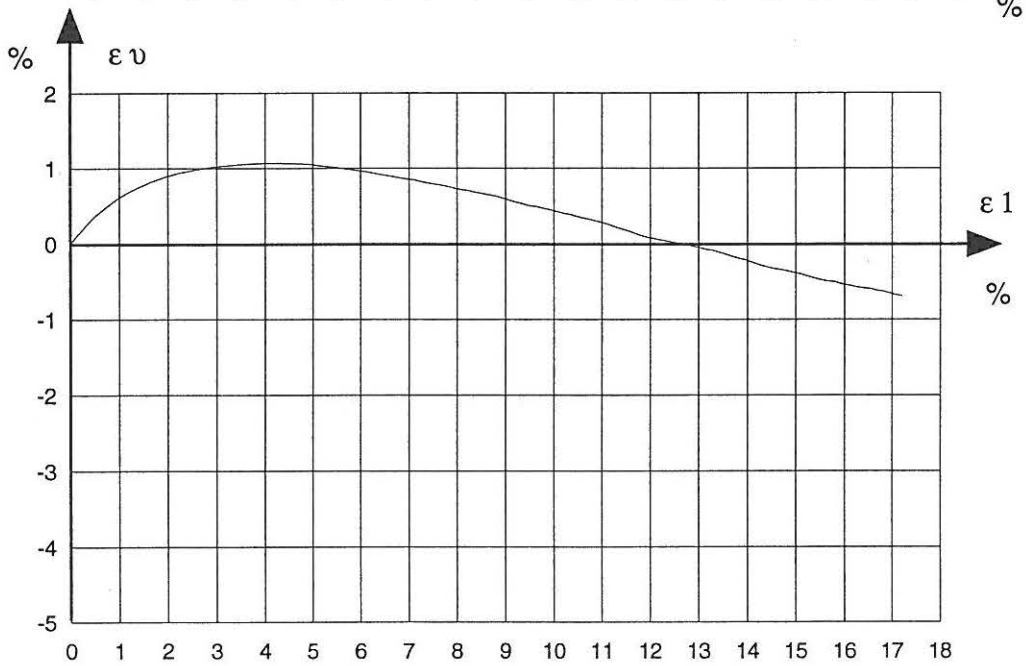


q'	p'	ε 1	ε ν
1.68	80.56	0.00	0.00
6.22	81.97	0.01	0.01
13.67	84.46	0.04	0.03
22.22	87.31	0.07	0.06
30.65	90.12	0.12	0.09
43.97	94.56	0.19	0.15
95.05	111.58	0.59	0.41
148.98	129.56	1.24	0.70
183.59	141.20	1.92	0.88
207.18	148.96	2.62	0.99
224.48	154.73	3.32	1.04
237.67	159.12	4.03	1.07
250.42	163.47	4.73	1.06
259.26	166.32	5.42	1.02
269.68	169.99	6.13	0.95
272.81	170.94	6.82	0.87
281.99	174.10	7.53	0.79
297.83	179.38	8.92	0.61
294.40	178.43	10.34	0.38
308.78	183.03	11.74	0.12
306.59	181.96	13.85	-0.20
301.14	180.38	14.83	-0.36
313.89	184.73	15.95	-0.53
303.08	181.13	17.21	-0.69

Job:	Encl. No
Portland grus 8-16	33
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] $\Delta\varepsilon 1 =$ 0.043
Preparation at 30-50 kPa vacuum



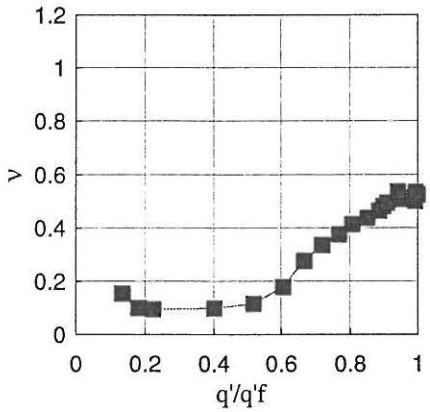


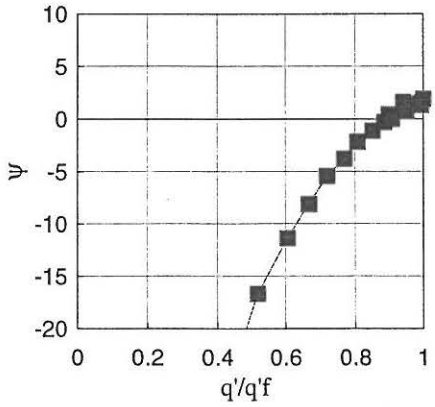
Job: Portland grus 8-16	Encl. No 34
Exc:	Check:
FRJ	FRJ

Description of soil Portland grus 8-16			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.798	0.778
		Saturation	1	
kal2tri3	15.04.96	Dimension H mm	252.6	
		D mm	247.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	30-160 kPa
CD - Triaxial test.		ε 1	0.684 %
free ends		ε ν	1.773 %
	2.Drained compression.		
	Deformation rate:		4.1 % ph

Evaluation of test		Values at failure		Values for Δε ν = 0	
Deviator stress	q'	568.33	kPa	502.91	kPa
Mean normal stress	p'	349.44	kPa	327.64	kPa
Confining pressures	σ3	160.00	kPa	160.00	kPa
Vertical strain	ε 1	14.12	%	6.26	%
Volumetric strain	ε ν	1.13	%	1.51	%

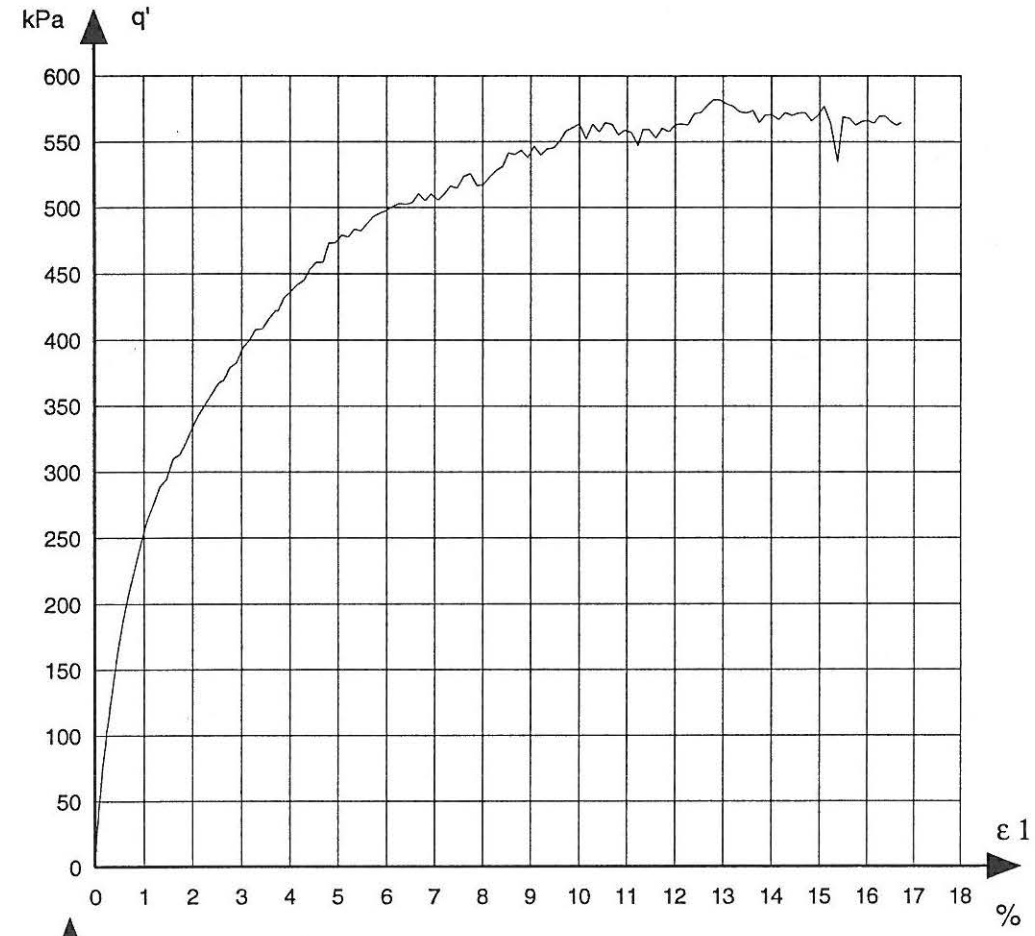


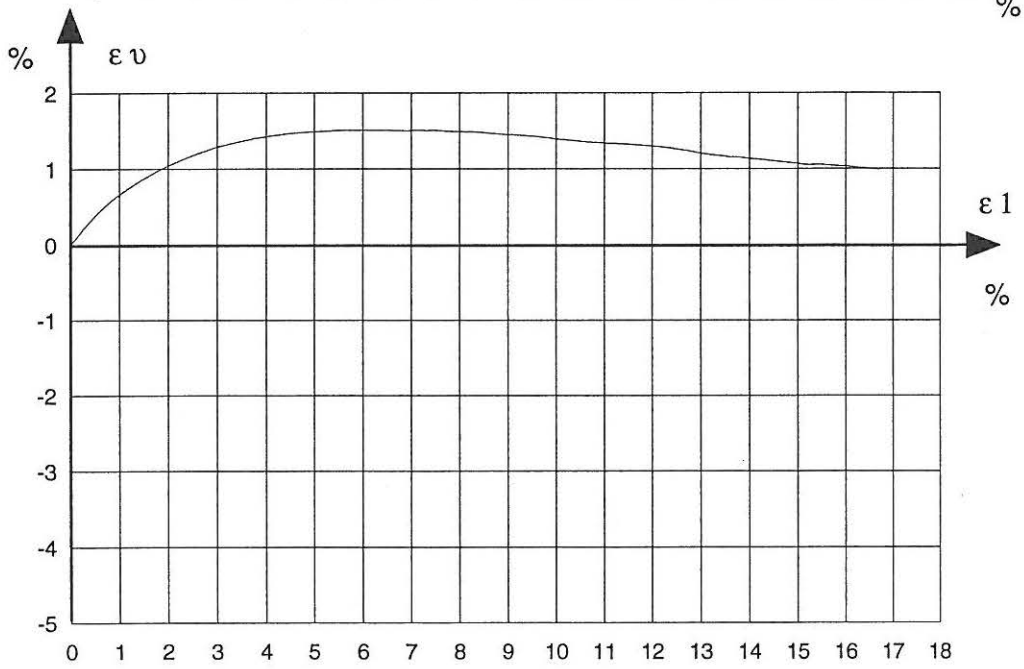


q'	p'	ε 1	ε ν
1.69	160.46	0.00	0.00
14.24	164.65	0.02	0.01
47.19	175.73	0.08	0.06
77.23	185.64	0.15	0.12
103.42	194.47	0.24	0.19
127.38	202.36	0.32	0.25
228.09	236.03	0.82	0.57
294.44	258.15	1.46	0.86
344.02	274.67	2.14	1.08
379.03	286.24	2.76	1.24
408.26	296.09	3.43	1.35
436.55	305.42	4.01	1.43
458.57	312.86	4.68	1.48
483.59	321.10	5.34	1.50
502.91	327.64	6.26	1.51
510.41	330.24	6.66	1.51
516.23	331.98	7.33	1.50
540.19	340.06	8.66	1.47
563.59	347.86	10.00	1.39
559.45	346.58	11.32	1.33
581.83	354.04	12.93	1.21
568.33	348.97	14.15	1.13
534.66	338.22	15.37	1.06
564.57	348.19	16.72	0.99

Job:	Encl. No
Portland grus 8-16	35
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.123
Preparation at 30-50 kPa vacuum



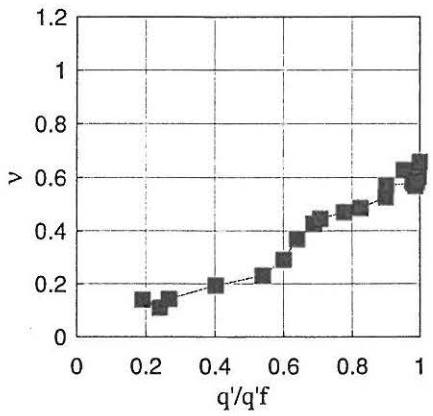


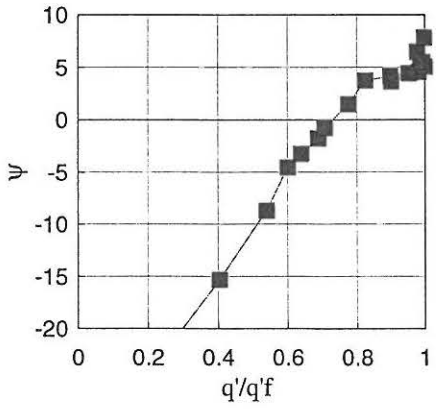
Job: Portland grus 8-16	Encl. No 36
Exc: FRJ	Check: FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.888	0.905
		Saturation	1	
kal2tri3	17.04.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-20 kPa
CD - Triaxial test.		ε 1	0.000 %
free ends		ε v	0.000 %
	2.Drained compression.		
	Deformation rate:		4.6 % ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	95.00	kPa	67.07	kPa
Mean normal stress	p'	51.77	kPa	42.36	kPa
Confining pressures	σ3	20.10	kPa	20.00	kPa
Vertical strain	ε 1	15.38	%	4.34	%
Volumetric strain	ε v	-1.21	%	0.92	%

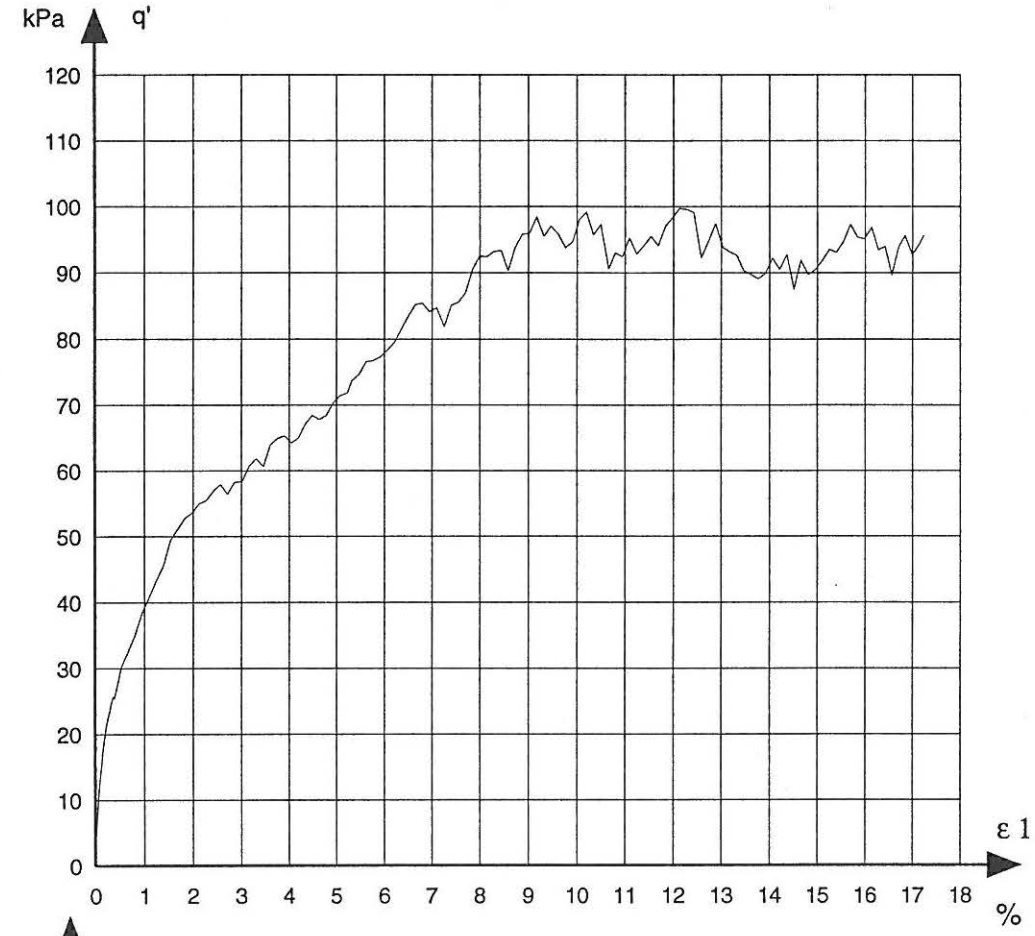


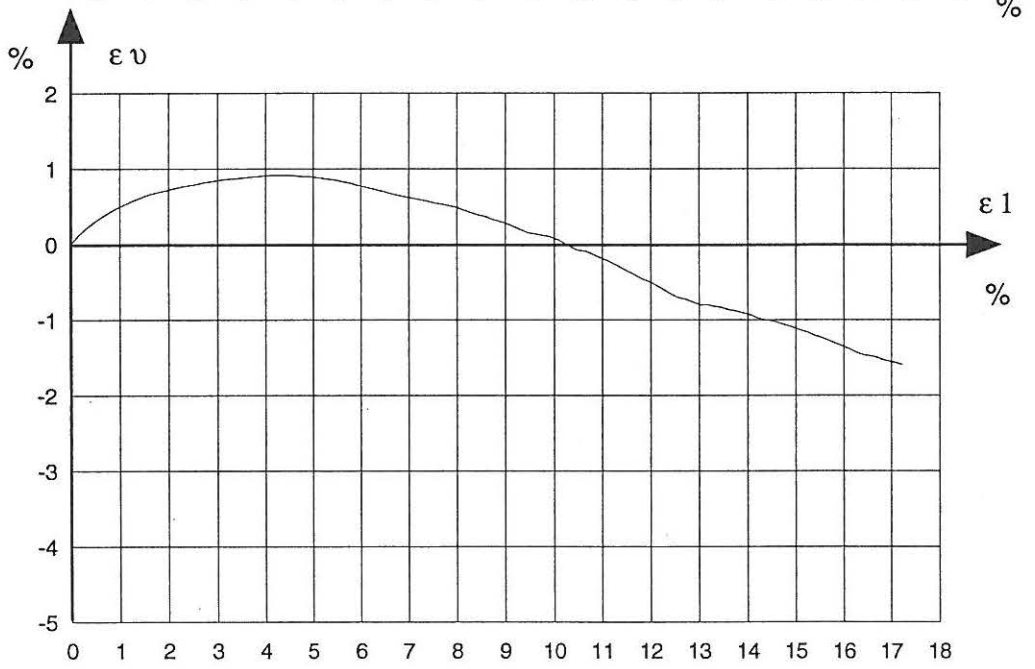


q'	p'	ε 1	ε v
1.64	20.65	0.00	0.00
7.42	22.37	0.03	0.02
10.87	23.52	0.07	0.05
18.05	25.92	0.16	0.12
22.88	27.63	0.26	0.18
25.38	28.36	0.37	0.24
38.28	32.66	0.95	0.48
51.16	36.95	1.68	0.67
56.99	38.90	2.42	0.78
60.70	40.13	3.16	0.86
65.29	41.76	3.90	0.90
67.07	42.36	4.34	0.92
73.65	44.65	5.32	0.86
78.30	46.20	6.06	0.76
85.36	48.55	6.80	0.65
85.53	48.61	7.55	0.54
93.20	51.17	8.29	0.42
93.72	51.24	9.76	0.12
92.84	51.05	11.23	-0.26
94.76	51.69	12.73	-0.73
90.47	50.26	14.21	-0.98
95.00	51.11	15.39	-1.21
94.23	51.51	17.13	-1.57
95.63	51.98	17.23	-1.59

Job:	Encl. No
Portland grus 16-32	37
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.055
Preparation at 20-40 kPa vacuum



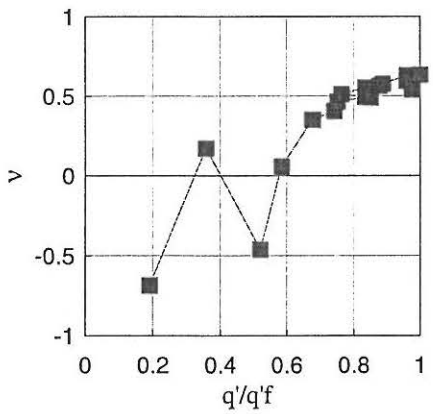


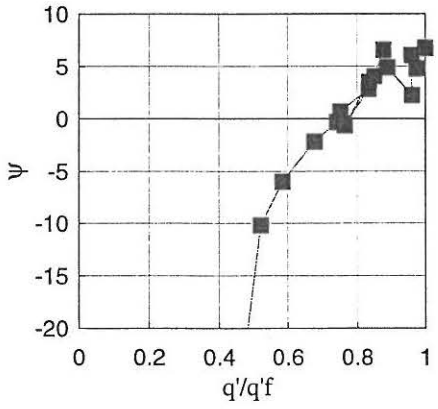
Job: Portland grus 16-32	Encl. No 38
Exc:	Check:
FRJ	FRJ

Description of soil Portland grus 16-32			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.891	0.917
		Saturation	1	
kal2tri3	17.04.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-10 kPa
CD - Triaxial test.		ε 1	-0.130 %
free ends		ε ν	-0.678 %
	2.Drained compression.		
	Deformation rate:		4.0 % ph

Evaluation of test		Values at failure		Values for Δε ν = 0	
Deviator stress	q'	50.24	kPa	37.27	kPa
Mean normal stress	p'	26.75	kPa	22.42	kPa
Confining pressures	σ3	10.00	kPa	10.00	kPa
Vertical strain	ε 1	14.18	%	2.80	%
Volumetric strain	ε ν	-1.66	%	0.57	%

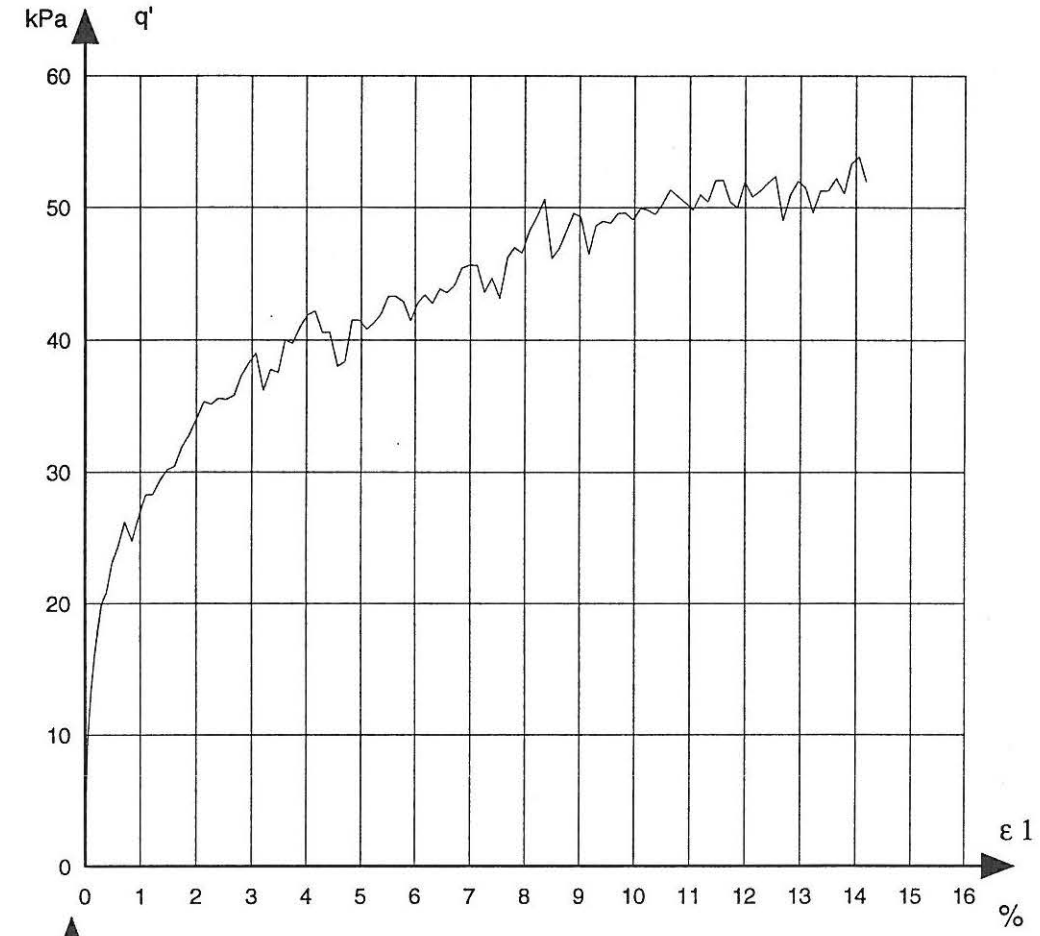


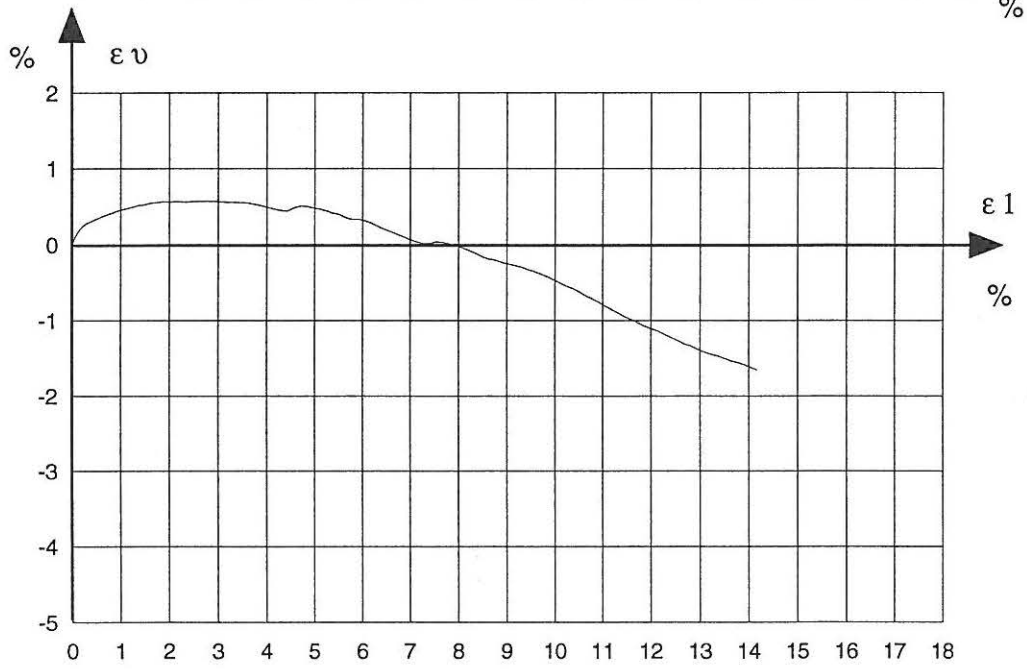


q'	p'	ε 1	ε ν
1.63	10.64	0.00	0.00
2.87	10.86	0.00	0.01
3.77	11.16	0.01	0.01
9.58	13.09	0.06	0.09
17.99	15.90	0.23	0.25
26.14	18.71	0.72	0.39
29.36	19.79	1.35	0.51
34.02	21.34	2.00	0.56
37.27	22.42	2.80	0.57
37.76	22.69	3.34	0.56
41.90	24.07	4.01	0.49
38.36	22.69	4.70	0.50
41.93	24.08	5.37	0.42
42.75	24.35	6.04	0.31
44.09	24.80	6.72	0.14
44.65	24.98	7.40	0.01
48.24	26.18	8.08	-0.04
48.20	26.17	8.75	-0.20
48.97	26.42	9.43	-0.32
50.87	27.06	10.78	-0.71
50.83	27.04	12.13	-1.14
51.27	27.19	13.50	-1.50
53.81	28.04	14.05	-1.62
50.24	27.31	14.18	-1.66

Job:	Encl. No
Portland grus 16-32	39
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.054
Preparation at 20-40 kPa vacuum



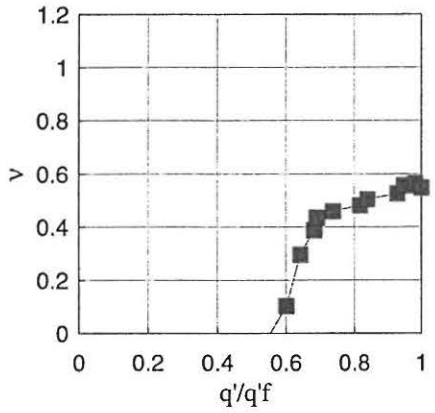


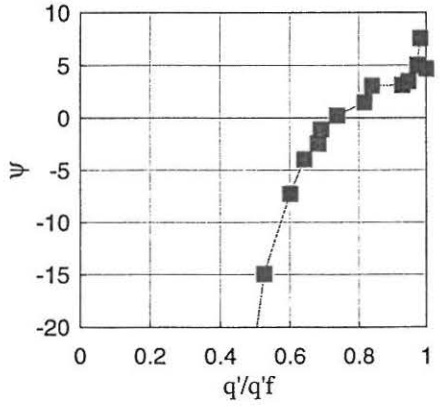
Job: Portland grus 16-32	Encl. No 40
Exc:	Check:
FRJ	FRJ

Description of soil Portland grus 16-32			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.886	0.904
		Saturation	1	
kal2tri3	14.05.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-40 kPa
CD - Triaxial test.		ε 1	0.133 %
free ends		ε v	0.769 %
	2.Drained compression.		
	Deformation rate:		3.9 % ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	182.76	kPa	126.05	kPa
Mean normal stress	p'	100.92	kPa	81.92	kPa
Confining pressures	σ3	40.00	kPa	39.90	kPa
Vertical strain	ε 1	17.23	%	3.67	%
Volumetric strain	ε v	-0.94	%	1.15	%

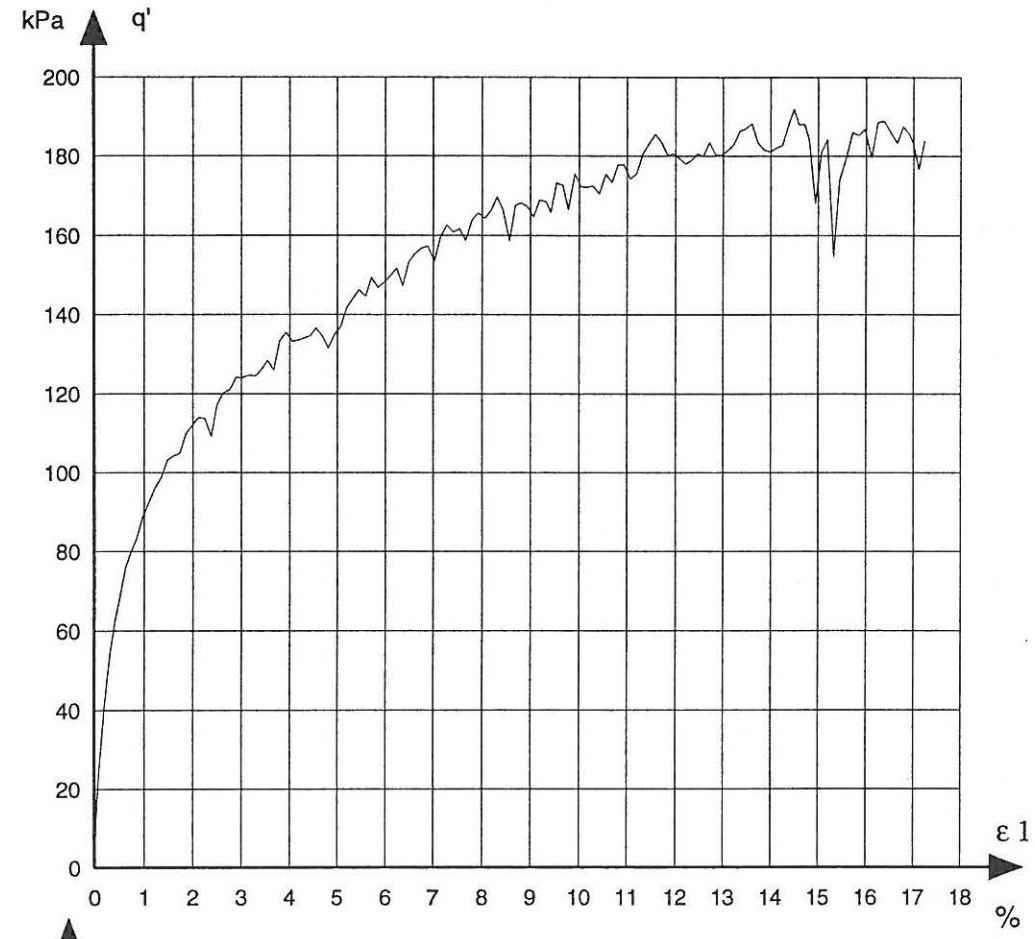


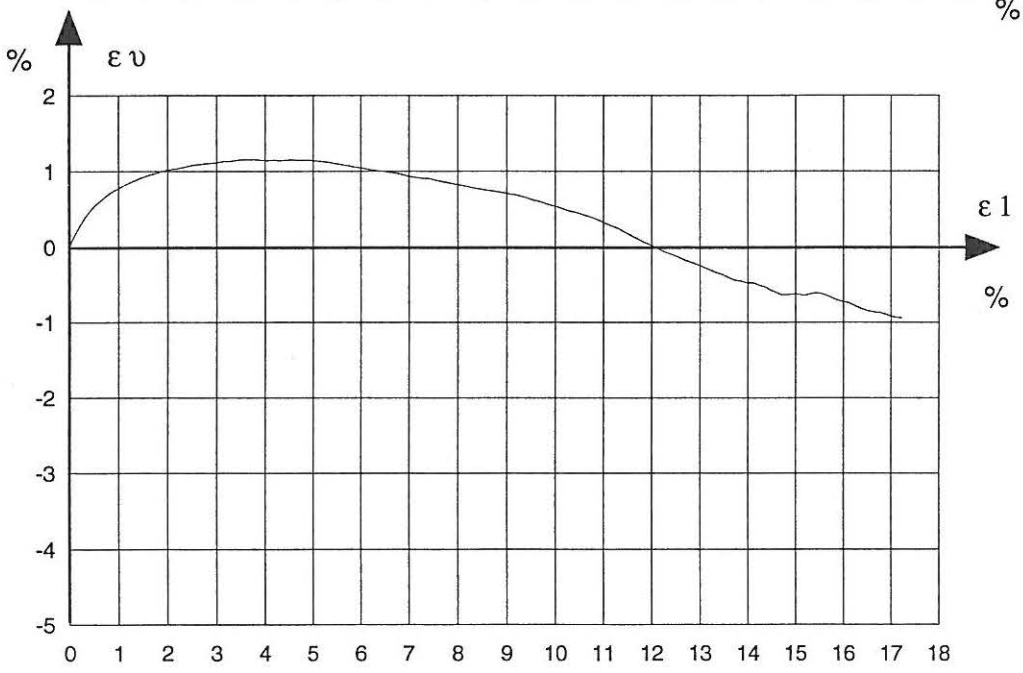


q'	p'	ε 1	ε v
1.65	40.65	0.00	0.00
6.46	42.15	0.01	0.01
18.86	46.29	0.05	0.08
27.88	49.19	0.11	0.15
36.88	52.19	0.17	0.23
45.54	55.08	0.23	0.30
75.78	65.16	0.62	0.61
96.01	71.90	1.22	0.85
109.82	76.51	1.86	1.00
117.26	79.09	2.50	1.08
124.70	81.57	3.15	1.13
126.05	81.92	3.67	1.15
134.71	84.70	4.43	1.15
149.30	89.97	5.71	1.08
153.38	91.13	7.02	0.93
169.66	96.55	8.30	0.78
173.18	97.73	9.53	0.63
177.85	99.28	10.80	0.38
179.44	99.81	12.08	-0.01
186.27	101.99	13.35	-0.34
191.93	103.98	14.49	-0.58
184.17	101.39	15.19	-0.65
185.24	101.75	15.84	-0.70
182.76	101.34	17.23	-0.94

Job:	Encl. No
Portland grus 16-32	41
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.012
Preparation at 20-40 kPa vacuum



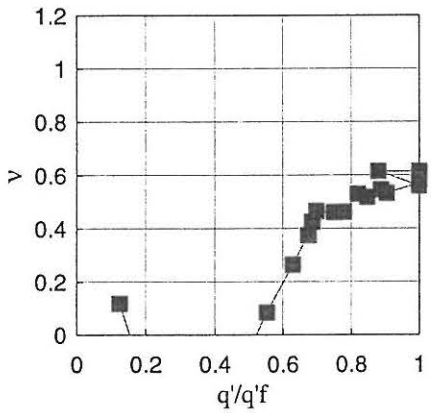


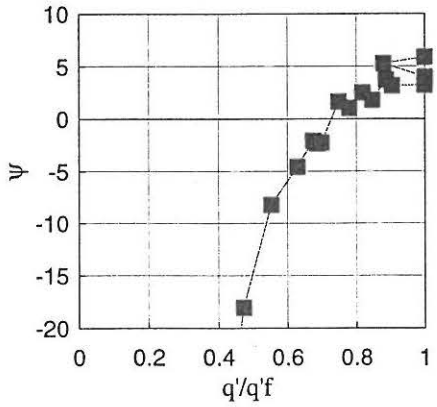
Job: Portland grus 16-32	Encl. No 42
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.901	0.898
		Saturation	1	
kal2tri3	20.05.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-80 kPa
CD - Triaxial test.		ε 1	0.288 %
free ends		ε v	1.434 %
	2.Drained compression.		
	Deformation rate:		4.0 % ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	347.99	kPa	242.63	kPa
Mean normal stress	p'	196.10	kPa	160.98	kPa
Confining pressures	σ3	80.10	kPa	80.10	kPa
Vertical strain	ε 1	15.27	%	4.51	%
Volumetric strain	ε v	-0.17	%	1.27	%

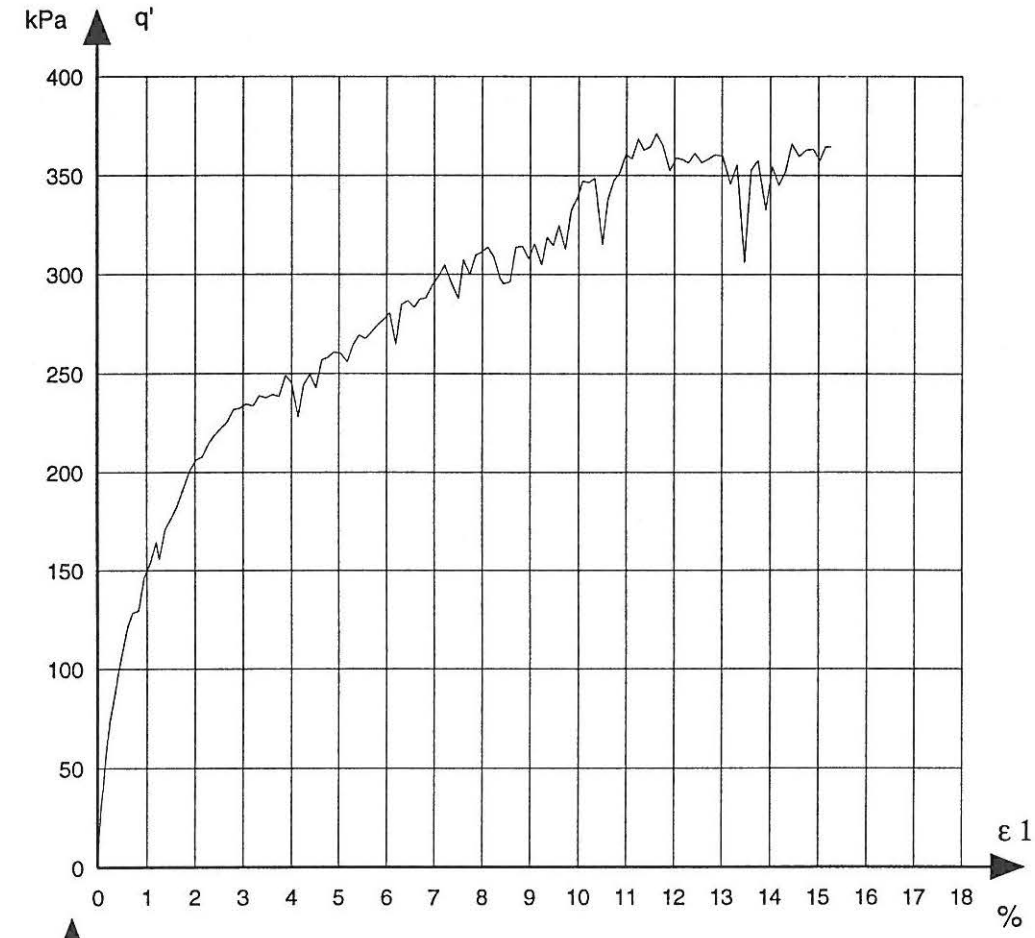


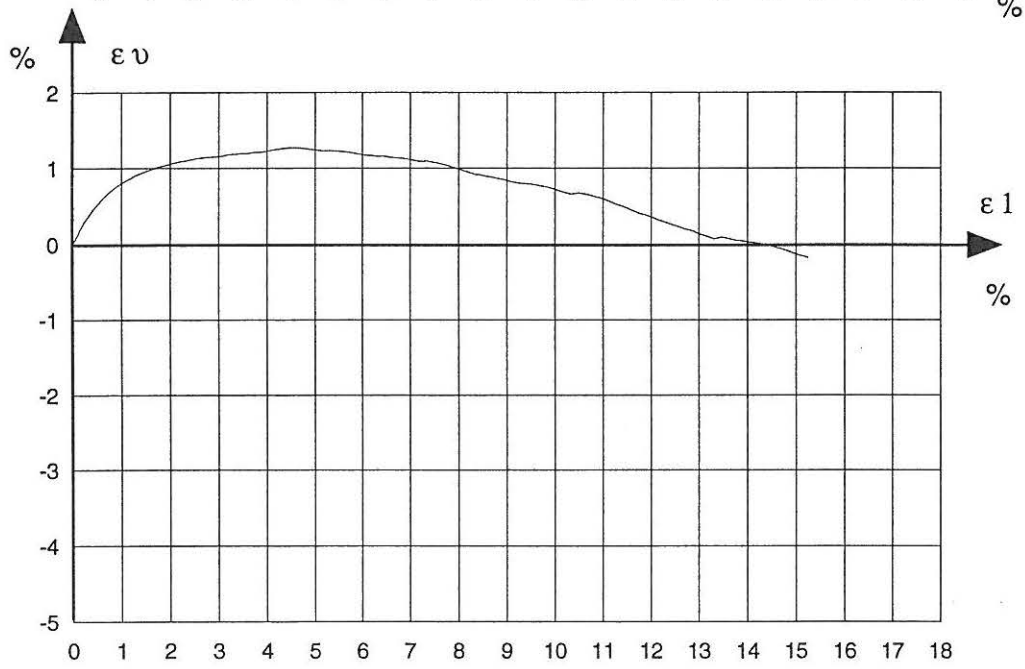


q'	p'	ε 1	ε v
1.66	80.55	0.00	0.00
5.58	81.86	0.00	0.00
28.14	89.38	0.06	0.06
43.49	94.50	0.12	0.14
58.22	99.21	0.17	0.21
70.41	103.47	0.23	0.28
120.94	120.21	0.61	0.60
164.43	134.81	1.19	0.87
192.22	143.97	1.76	1.02
219.00	152.90	2.41	1.11
234.67	158.22	3.06	1.16
238.40	159.47	3.74	1.21
242.63	160.98	4.51	1.27
260.30	166.87	5.03	1.24
270.96	170.42	5.68	1.22
284.71	175.00	6.31	1.16
294.61	178.30	6.95	1.12
308.71	182.90	8.24	0.94
314.54	184.95	9.47	0.80
347.52	196.04	10.73	0.65
371.08	203.89	11.62	0.44
347.52	196.04	10.73	0.65
306.02	182.01	13.47	0.09
347.99	201.59	15.27	-0.17

Job:	Encl. No
Portland grus 16-32	43
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = -0.015
Preparation at 20-50 kPa vacuum



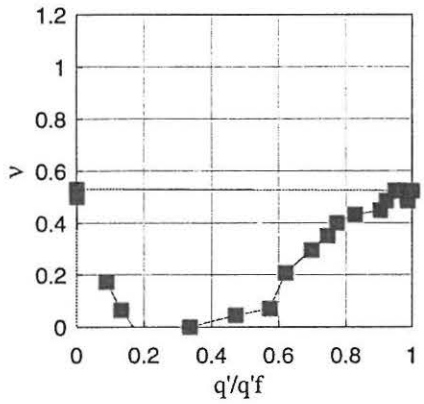


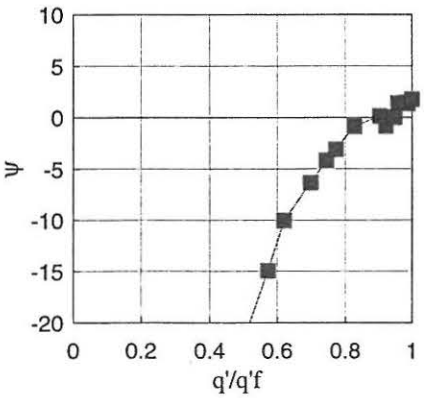
Job: Portland grus 16-32	Encl. No 44
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.888	
		Saturation	1	
kal2tri3	22.05.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-160 kPa
CD - Triaxial test.		ε 1	0.469 %
free ends		ε v	3.199 %
	2.Drained compression.		
	Deformation rate:		4.1 % ph

Evaluation of test		Values at failure	Values for Δε v = 0
Deviator stress	q'	kPa	kPa
Mean normal stress	p'	kPa	kPa
Confining pressures	σ3	kPa	kPa
Vertical strain	ε 1	%	%
Volumetric strain	ε v	%	%

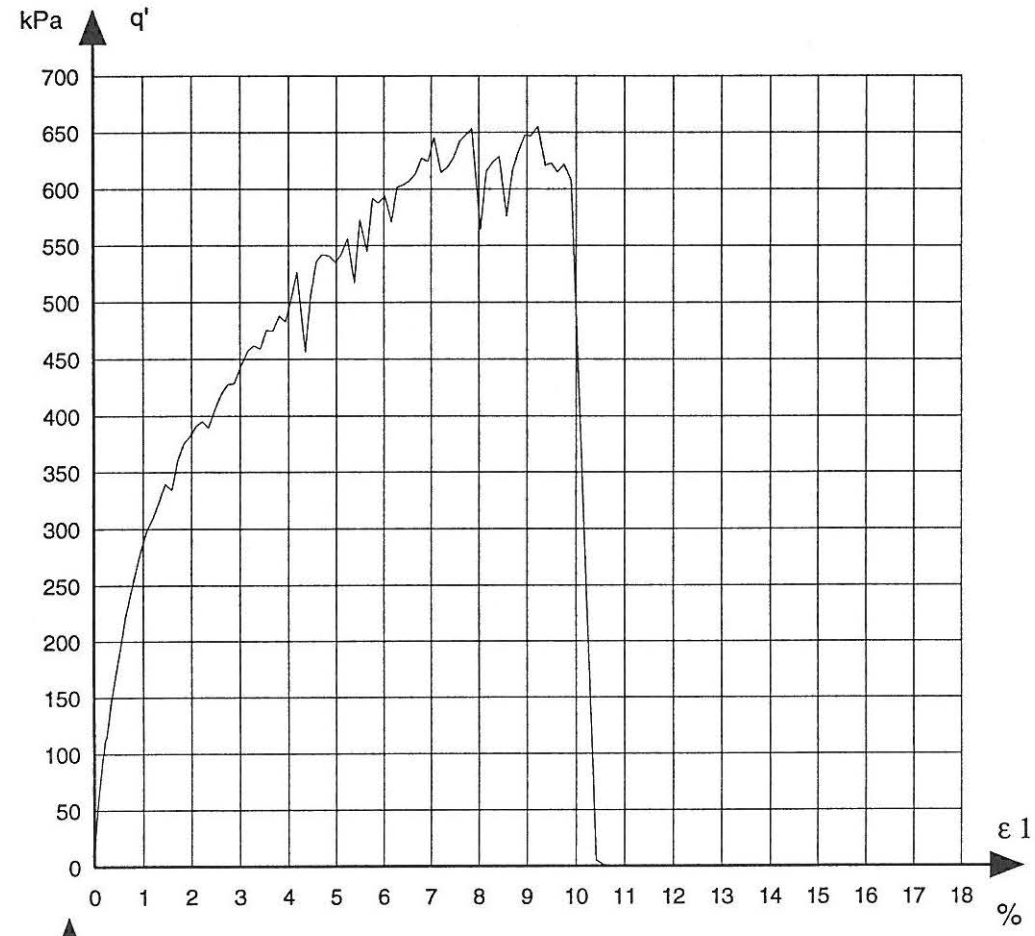


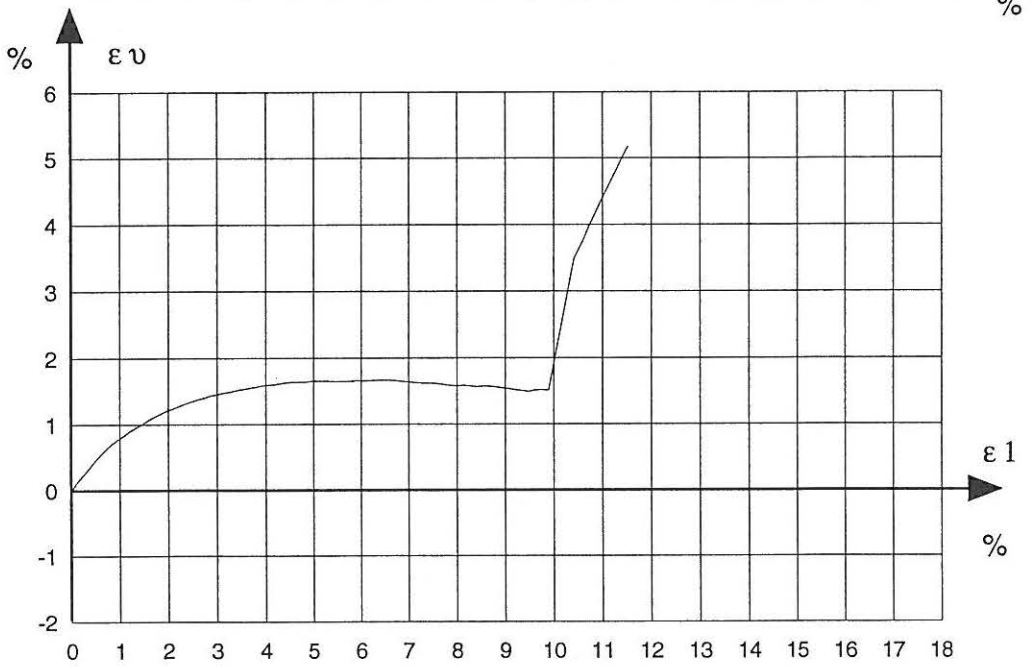


q'	p'	ε 1	ε v
1.69	160.56	0.00	0.00
4.04	161.25	0.00	0.00
27.18	168.96	0.03	0.02
58.29	179.33	0.08	0.08
86.84	188.85	0.15	0.14
112.47	197.39	0.22	0.21
219.41	233.04	0.63	0.56
308.61	262.67	1.20	0.89
375.04	284.91	1.84	1.16
405.78	295.06	2.48	1.35
457.12	312.27	3.15	1.48
487.93	322.54	3.81	1.57
505.75	328.38	4.46	1.63
541.84	340.61	5.10	1.65
591.83	357.28	5.76	1.65
603.71	361.24	6.41	1.67
645.31	375.20	7.06	1.63
646.90	375.73	7.72	1.60
628.41	369.47	8.42	1.57
655.15	378.58	9.21	1.52
621.59	367.10	9.75	1.52
0.19	1.56	10.87	4.21
0.73	1.84	11.31	4.86
0.05	1.42	11.51	5.17

Job:	Encl. No
Portland grus 16-32	45
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.046
Preparation at 20-50 kPa vacuum
The membrane was penetrated during the test.



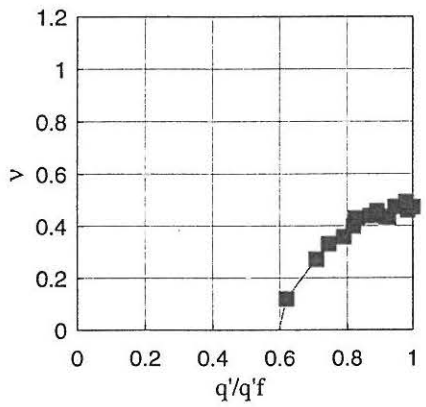


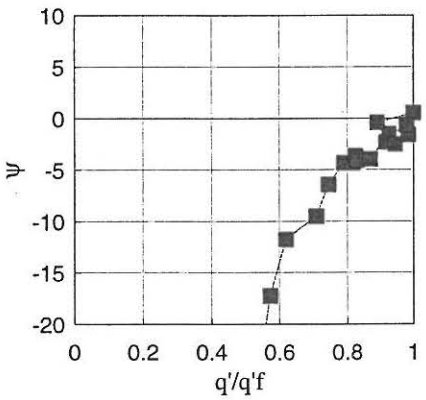
Job: Portland grus 16-32	Encl. No 46
Exc:	Check:
FRJ	FRJ

Description of soil Portland grus 16-32			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.894	
		Saturation	1	
kal2tri3	30.05.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-160 kPa
CD - Triaxial test.		ε 1	0.325 %
free ends		ε v	1.364 %
	2.Drained compression.		
	Deformation rate:		4.1 % ph

Evaluation of test		Values at failure	Values for Δε v = 0
Deviator stress	q'	kPa	kPa
Mean normal stress	p'	kPa	kPa
Confining pressures	σ3	kPa	kPa
Vertical strain	ε 1	%	%
Volumetric strain	ε v	%	%

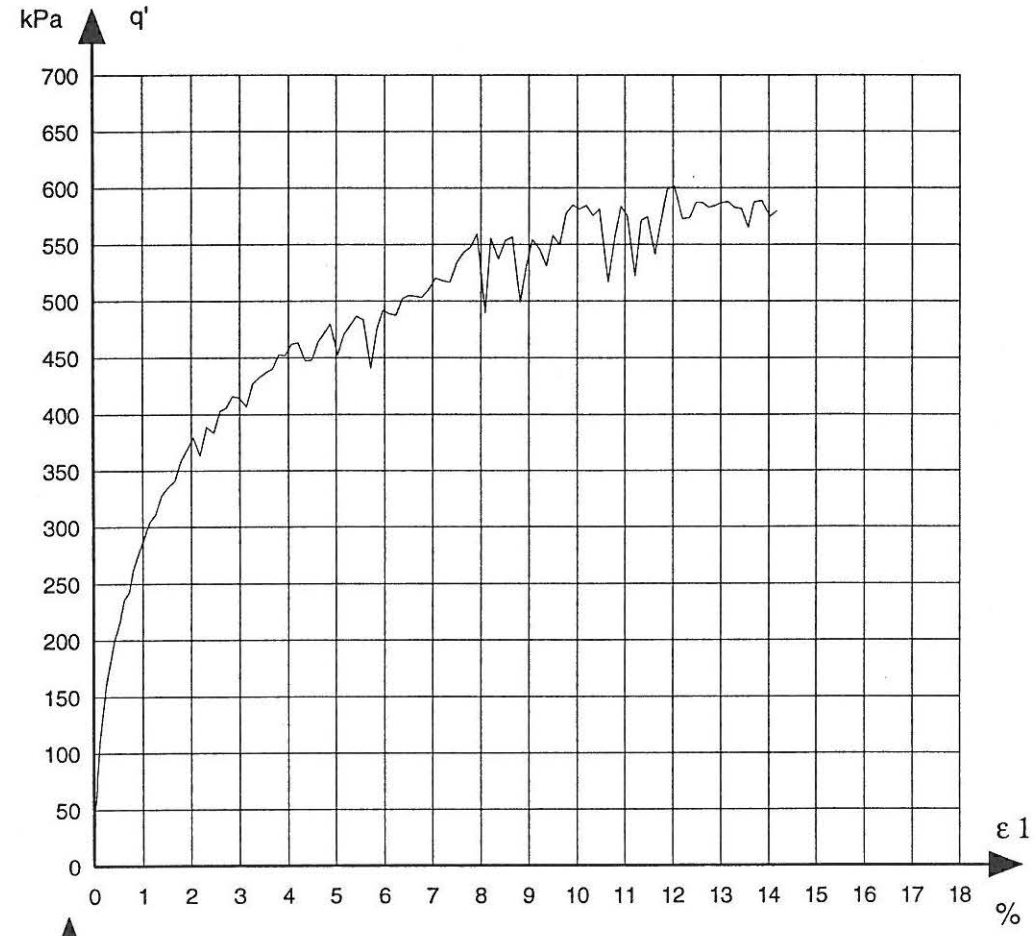


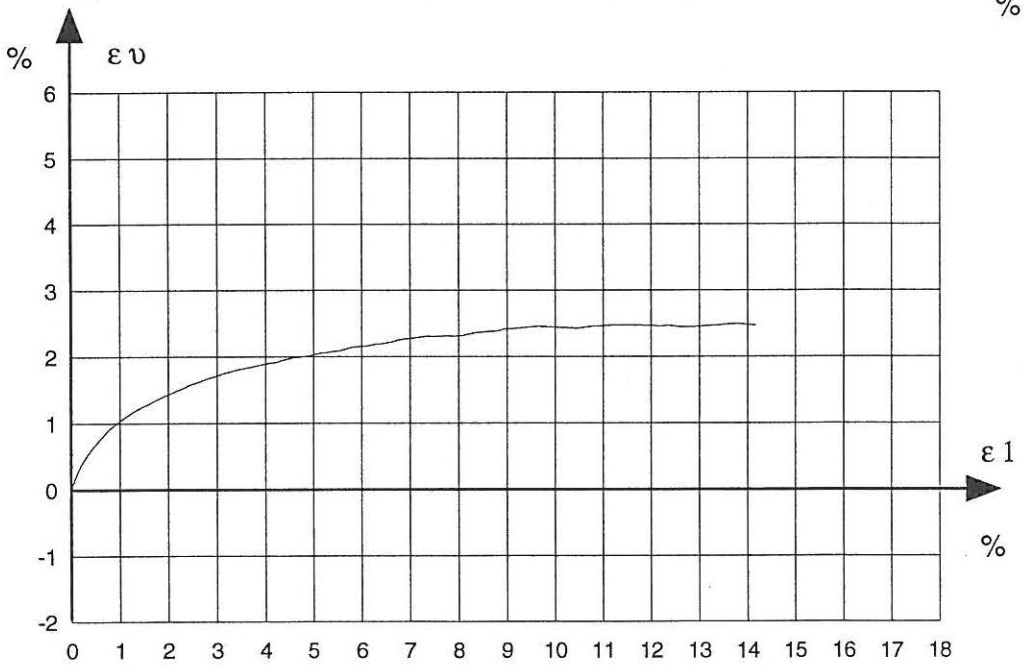


q'	p'	ε 1	ε v
1.66	160.55	0.00	0.00
2.65	160.88	0.00	0.00
31.58	170.43	0.01	0.03
57.67	179.22	0.04	0.09
85.66	188.55	0.07	0.16
108.87	196.19	0.12	0.23
199.69	226.56	0.42	0.61
276.90	252.30	0.92	0.99
335.55	271.75	1.52	1.27
363.10	281.03	2.18	1.49
415.59	298.53	2.85	1.68
436.67	305.56	3.54	1.82
463.27	314.42	4.20	1.91
479.90	319.87	4.88	2.01
483.26	320.99	5.56	2.09
487.61	322.44	6.24	2.18
509.76	329.92	6.92	2.27
543.08	341.03	7.64	2.30
537.25	338.98	8.36	2.36
554.19	344.63	9.06	2.42
577.54	352.41	9.76	2.46
522.05	333.92	11.21	2.48
586.71	355.67	12.62	2.45
574.54	351.51	14.02	2.48

Job:	Encl. No
Portland grus 16-32	47
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.002
Preparation at 20-50 kPa vacuum
The membrane was penetrated during the test.



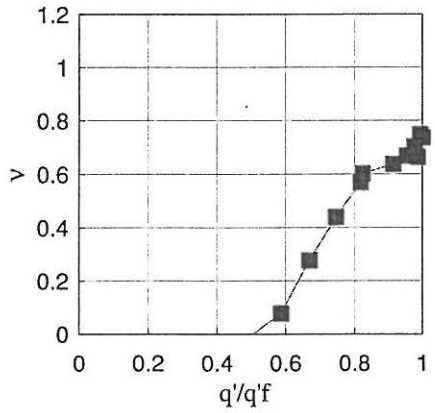


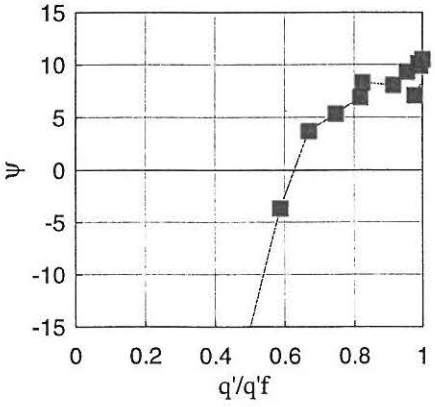
Job: Portland grus 16-32	Encl. No 48
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.769	0.805
		Saturation	1	
kal3tri3	28.05.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-40 kPa
CD - Triaxial test.		ε 1	-0.007 %
free ends		ε v	0.305 %
	2.Drained compression.		
	Deformation rate:		4.0 % ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	260.88	kPa	153.01	kPa
Mean normal stress	p'	126.96	kPa	90.90	kPa
Confining pressures	σ3	40.00	kPa	39.90	kPa
Vertical strain	ε 1	10.09	%	1.61	%
Volumetric strain	ε v	-2.35	%	0.81	%

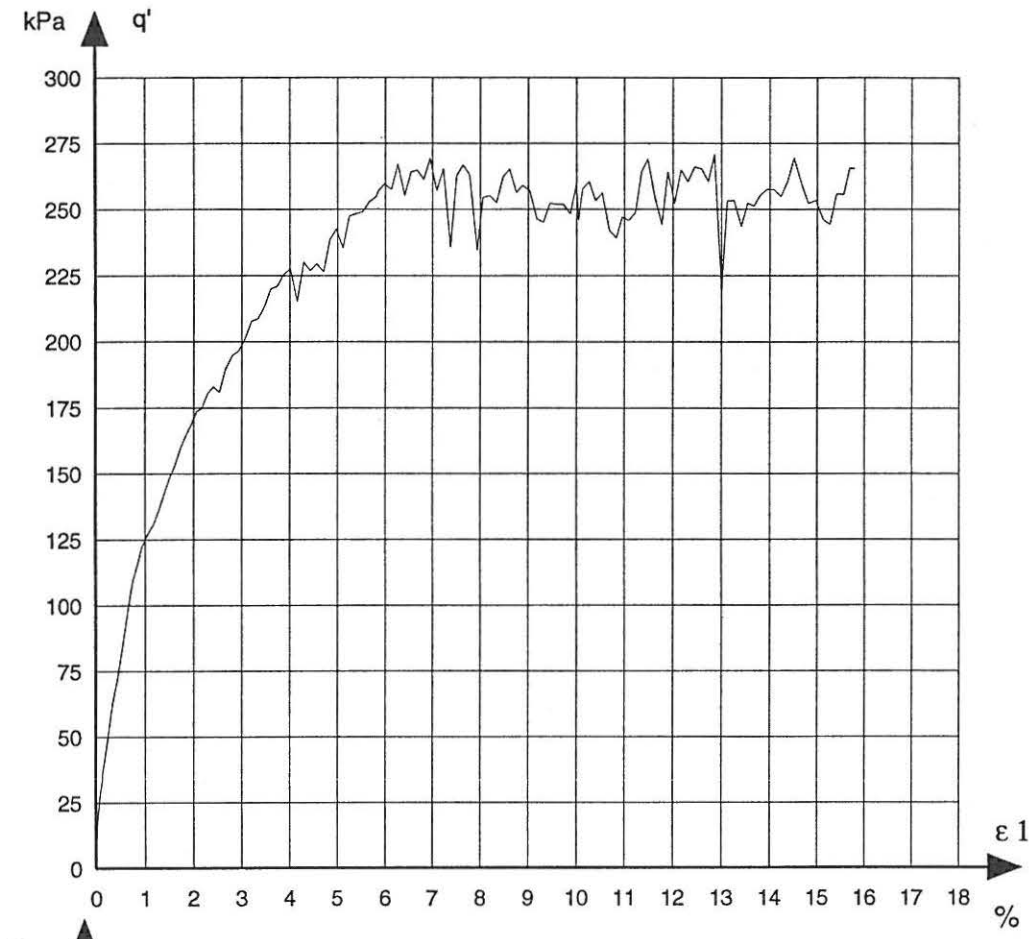


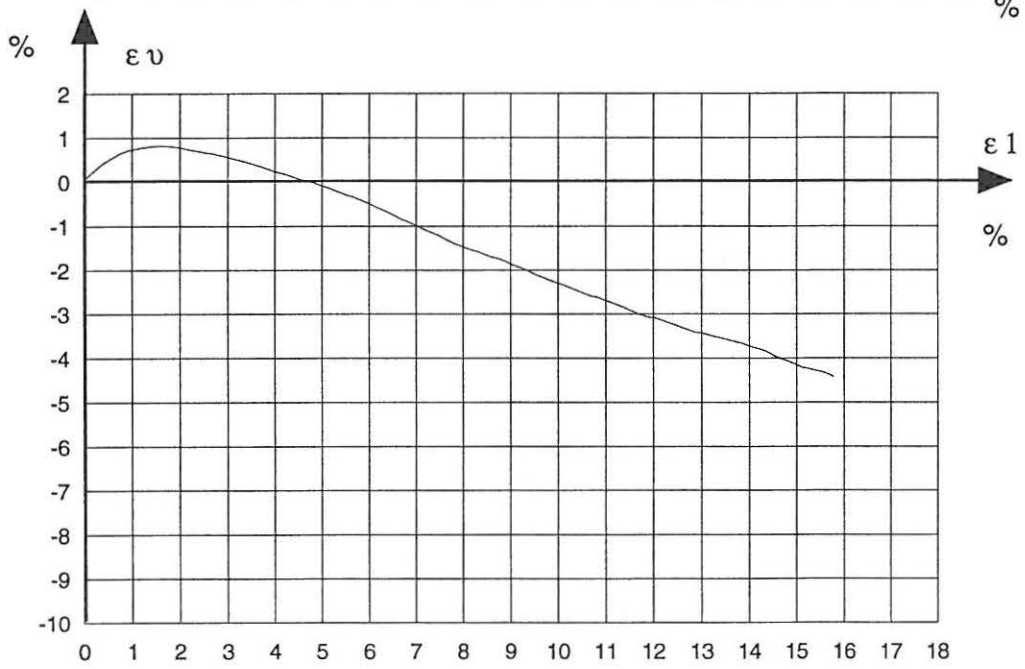


q'	p'	ε 1	ε v
1.65	40.45	0.00	0.00
2.09	40.70	0.00	0.00
10.19	43.30	0.01	0.02
22.43	47.48	0.05	0.08
33.65	51.12	0.12	0.16
85.55	68.42	0.55	0.52
127.03	82.34	1.05	0.74
153.01	90.90	1.61	0.81
174.68	98.43	2.17	0.73
194.52	104.94	2.79	0.61
213.24	111.18	3.47	0.42
215.08	111.59	4.16	0.19
238.63	119.54	4.84	-0.03
249.10	123.13	5.52	-0.30
257.59	125.96	6.13	-0.56
261.33	127.11	6.82	-0.90
262.67	127.56	7.50	-1.22
259.06	126.45	8.88	-1.80
260.88	125.94	10.12	-2.35
269.04	129.78	11.48	-2.90
270.74	130.35	12.85	-3.41
254.78	125.03	14.23	-3.80
265.57	128.52	15.67	-4.37
265.38	128.46	15.80	-4.43

Job:	Encl. No
Portland grus 16-32	49
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.011
Preparation at 20-50 kPa vacuum



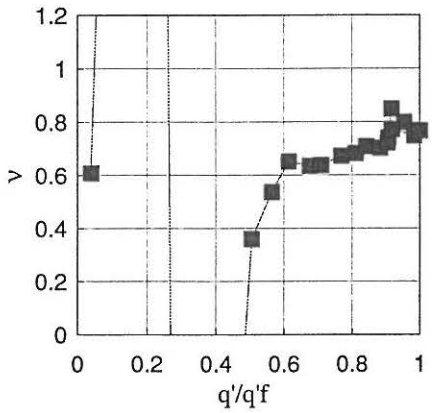


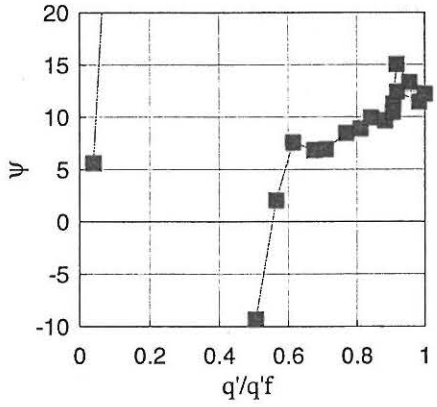
Job: Portland grus 16-32	Encl. No 50
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.760	0.861
		Saturation	1	
kal3tri3	02.06.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-10 kPa
CD - Triaxial test.		ε 1	-0.045 %
free ends		ε v	-0.635 %
	2.Drained compression.		
	Deformation rate:		3.7 % ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	67.32	kPa	33.95	kPa
Mean normal stress	p'	32.54	kPa	21.22	kPa
Confining pressures	σ3	10.10	kPa	9.90	kPa
Vertical strain	ε 1	13.99	%	0.25	%
Volumetric strain	ε v	-6.11	%	0.27	%

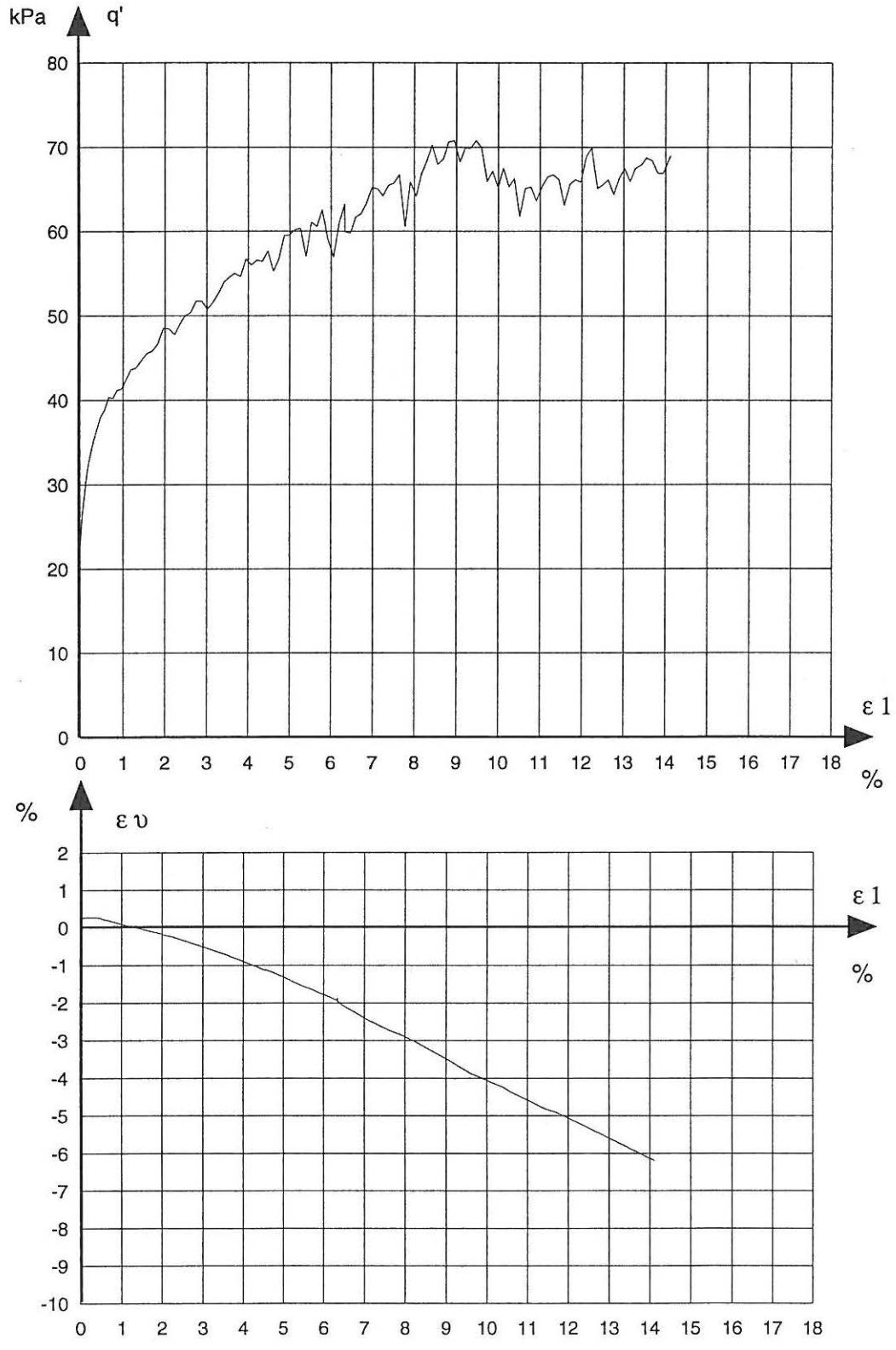




q'	p'	ε 1	ε v
1.63	10.64	0.00	0.00
2.63	10.78	-0.00	0.00
7.81	12.40	-0.01	0.06
11.75	13.82	-0.02	0.10
16.50	15.50	-0.03	0.15
19.89	16.53	-0.02	0.20
33.95	21.22	0.25	0.27
37.97	22.76	0.47	0.26
41.30	23.87	0.96	0.11
45.48	25.26	1.56	-0.05
47.72	26.01	2.22	-0.23
51.72	27.34	2.87	-0.46
54.55	28.18	3.54	-0.70
56.61	28.97	4.20	-0.98
59.45	29.92	4.86	-1.25
61.08	30.36	5.53	-1.57
60.94	30.41	6.19	-1.86
61.68	30.56	6.59	-2.14
64.20	31.50	7.24	-2.53
69.96	33.42	9.21	-3.61
61.77	30.69	10.51	-4.32
66.16	32.15	11.84	-4.98
67.32	32.39	13.94	-6.11
68.96	33.09	14.12	-6.19

Job:	Encl. No
Portland grus 16-32	51
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = -0.009
Preparation at 20-50 kPa vacuum

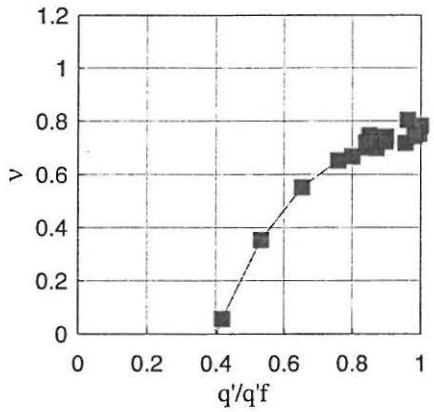


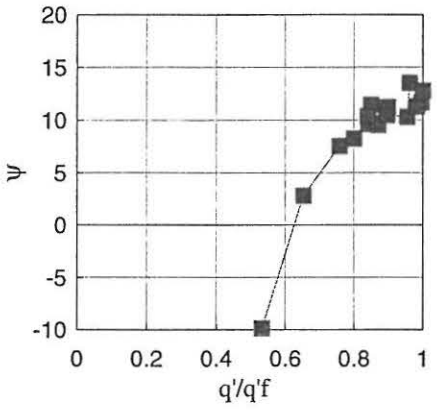
Job: Portland grus 16-32	Encl. No 52
Exc:	Check:
FRJ	FRJ

Description of soil Portland grus 16-32			Before test	At failure
		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.768	0.859
		Saturation	1	
kal3tri3	05.06.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-20 kPa
CD - Triaxial test.		ε 1	0.000 %
free ends		ε ν	0.000 %
	2.Drained compression.		
	Deformation rate:		4.0 % ph

Evaluation of test		Values at failure		Values for Δε ν = 0	
Deviator stress	q'	140.67	kPa	74.89	kPa
Mean normal stress	p'	66.99	kPa	44.96	kPa
Confining pressures	σ3	20.10	kPa	20.00	kPa
Vertical strain	ε 1	13.36	%	0.50	%
Volumetric strain	ε ν	-5.47	%	0.53	%

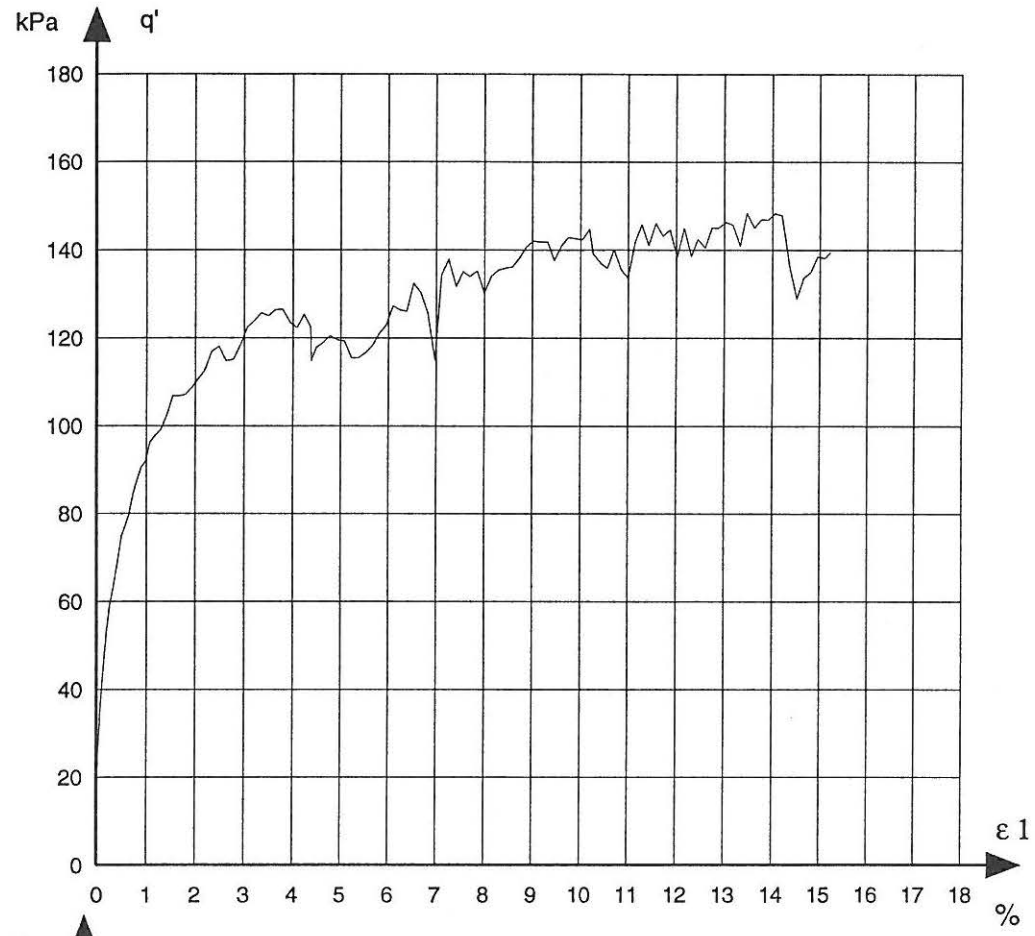


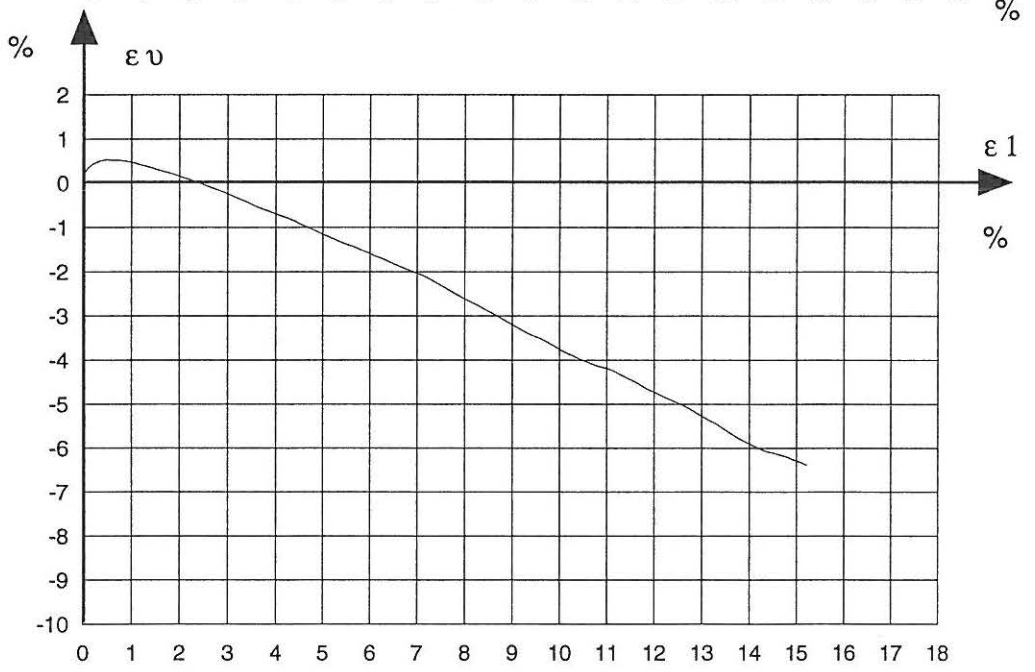


q'	p'	ε 1	ε ν
1.64	20.65	0.00	0.00
16.67	25.56	0.00	0.10
20.19	26.73	0.01	0.13
29.01	29.67	0.04	0.21
32.66	30.89	0.05	0.24
40.62	33.54	0.10	0.32
58.83	39.51	0.25	0.46
74.89	44.96	0.50	0.53
91.84	50.71	0.98	0.48
106.71	55.67	1.53	0.31
112.51	57.60	2.19	0.09
118.35	59.55	2.92	-0.20
126.34	62.11	3.64	-0.55
122.37	60.89	4.37	-0.84
119.55	59.95	4.92	-1.11
118.20	59.50	5.66	-1.44
126.09	62.13	6.38	-1.76
134.27	64.76	7.11	-2.08
135.19	65.16	7.85	-2.53
141.80	67.37	9.31	-3.38
140.00	66.77	10.70	-4.08
144.83	68.28	12.16	-4.81
140.67	67.05	13.32	-5.47
138.14	66.15	15.10	-6.33

Job:	Encl. No
Portland grus 16-32	53
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = -0.015
Preparation at 20-50 kPa vacuum



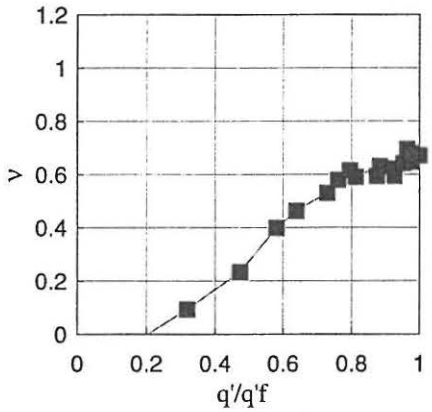


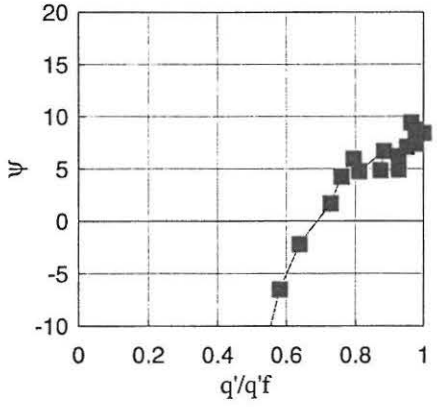
Job: Portland grus 16-32	Encl. No 54
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.768	0.797
		Saturation	1	
kal3tri3	17.06.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-80 kPa
CD - Triaxial test.		ε 1	0.268 %
free ends		ε v	1.883 %
	2.Drained compression.		
	Deformation rate:		4.1 % ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	455.45	kPa	290.65	kPa
Mean normal stress	p'	231.72	kPa	176.88	kPa
Confining pressures	σ3	79.90	kPa	80.00	kPa
Vertical strain	ε 1	12.68	%	1.99	%
Volumetric strain	ε v	-1.92	%	0.92	%

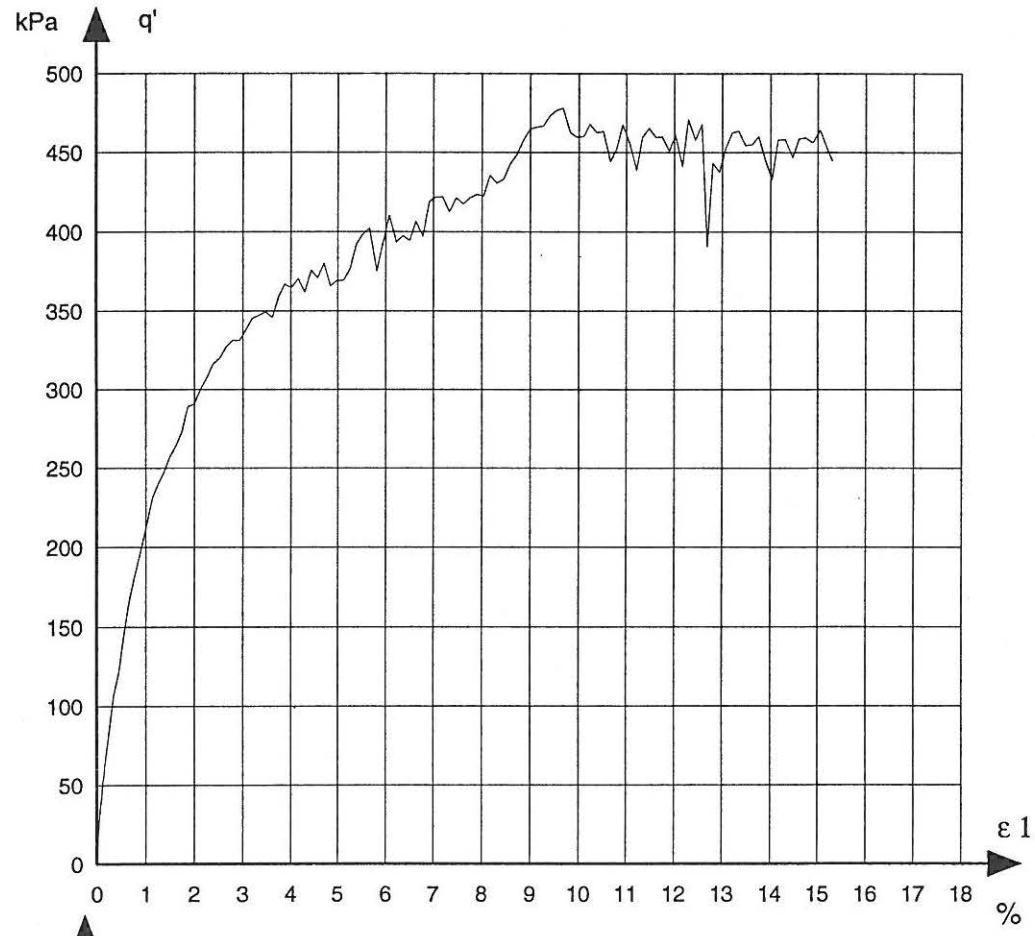


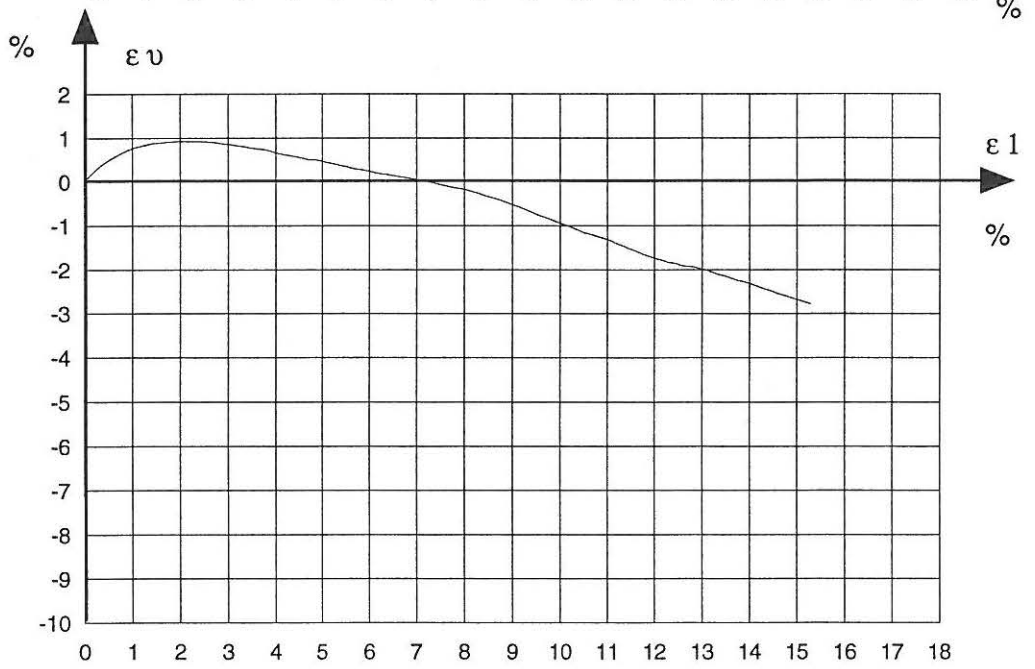


q'	p'	ε 1	ε v
1.67	80.56	0.00	0.00
7.12	82.27	0.01	0.01
22.64	87.55	0.03	0.04
40.10	93.27	0.08	0.10
57.89	99.20	0.14	0.17
84.45	108.05	0.24	0.27
144.54	128.18	0.54	0.52
215.37	151.79	1.03	0.78
264.19	167.96	1.62	0.90
290.65	176.88	1.99	0.92
331.28	190.43	2.93	0.87
345.99	195.33	3.61	0.76
361.84	200.61	4.30	0.60
369.24	203.08	4.98	0.48
402.21	214.37	5.66	0.30
397.66	212.65	6.36	0.17
421.82	220.71	7.05	0.04
421.51	220.60	7.75	-0.13
433.34	224.55	8.44	-0.32
477.82	239.27	9.67	-0.81
438.71	226.44	11.20	-1.41
455.45	210.13	12.68	-1.92
444.96	228.32	13.89	-2.27
444.58	228.29	15.30	-2.78

Job:	Encl. No
Portland grus 16-32	55
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.068
Preparation at 20-50 kPa vacuum



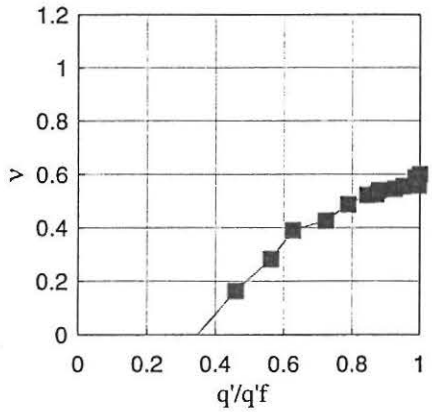


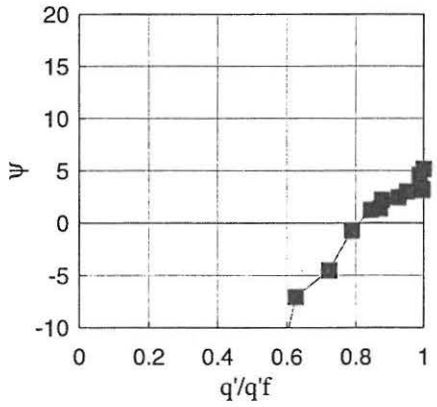
Job: Portland grus 16-32	Encl. No 56
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.766	0.752
		Saturation	1	
kal3tri3	19.06.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-160 kPa
CD - Triaxial test.		ε 1	0.253 %
free ends		ε v	2.781 %
	2.Drained compression.		
	Deformation rate:		4.2 % ph

Evaluation of test		Values at failure		Values for Δε v = 0	
Deviator stress	q'	753.26	kPa	593.56	kPa
Mean normal stress	p'	411.09	kPa	357.85	kPa
Confining pressures	σ3	160.00	kPa	160.00	kPa
Vertical strain	ε 1	11.23	%	3.49	%
Volumetric strain	ε v	0.53	%	1.38	%

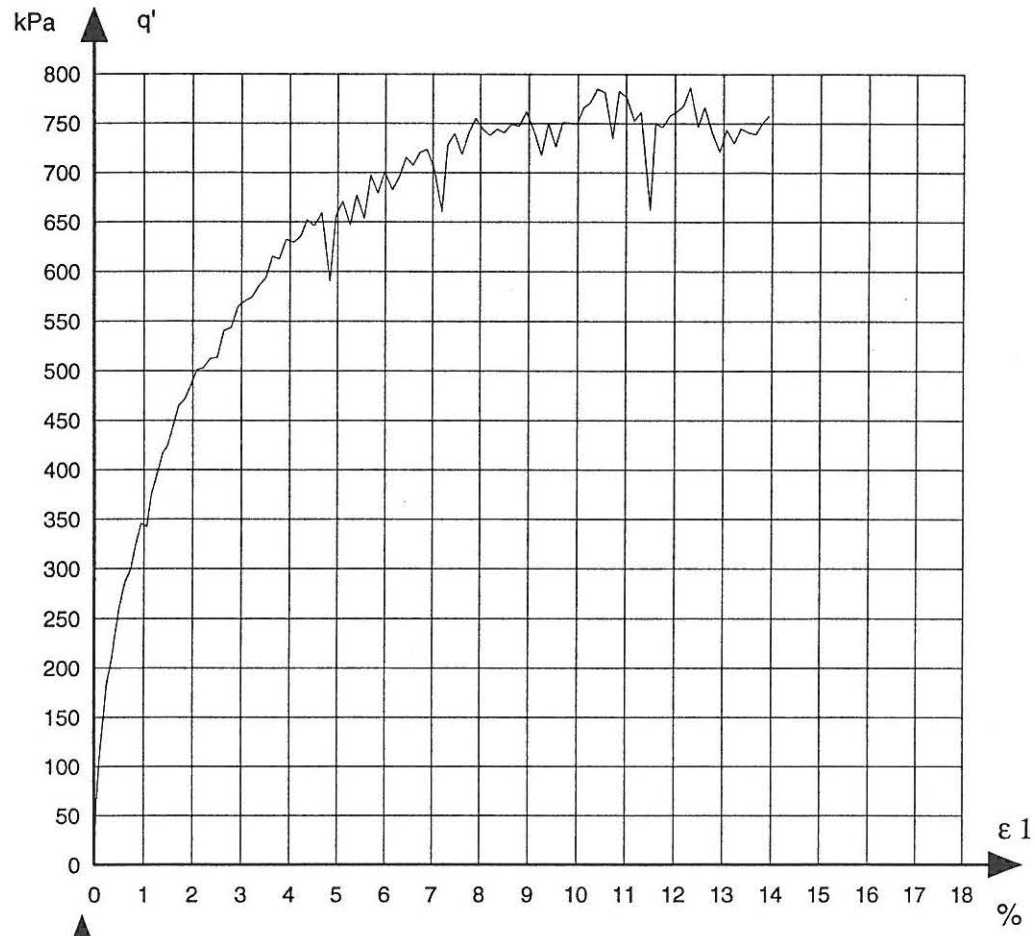


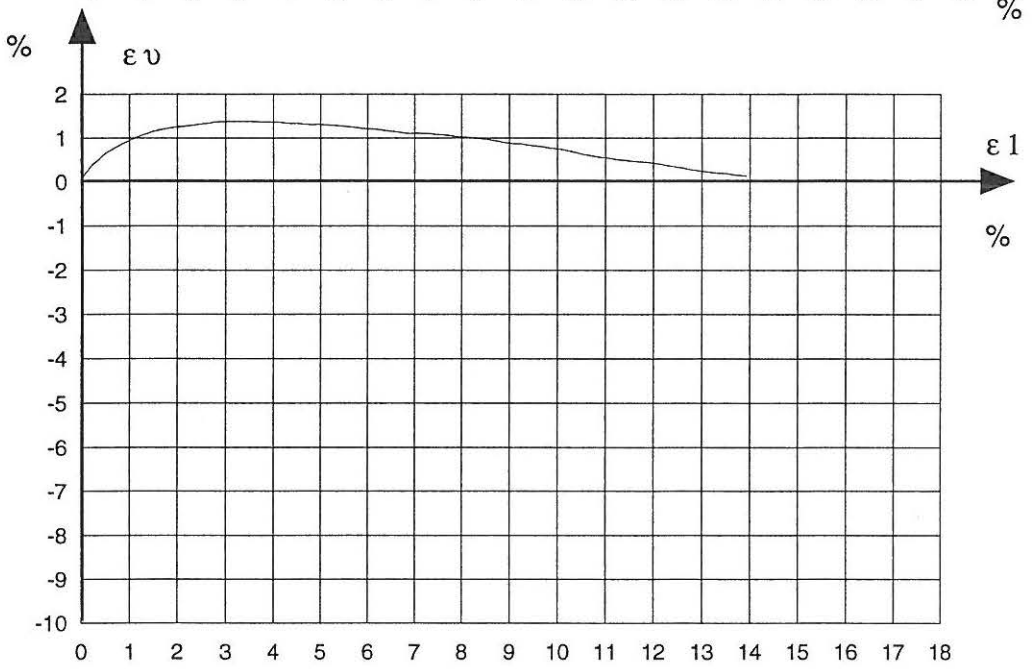


q'	p'	ε 1	ε v
1.69	160.56	0.00	0.00
19.49	166.50	0.01	0.02
33.44	171.05	0.02	0.04
57.61	179.20	0.03	0.09
85.12	188.37	0.06	0.15
113.66	197.89	0.11	0.22
234.79	238.16	0.42	0.56
345.95	275.32	0.94	0.91
423.56	301.29	1.48	1.14
471.61	317.20	1.84	1.22
543.43	341.24	2.78	1.36
593.56	357.85	3.49	1.38
635.43	371.81	4.22	1.35
655.98	378.66	4.96	1.31
697.26	392.42	5.69	1.24
715.55	398.52	6.43	1.16
660.43	380.14	7.19	1.10
754.81	411.60	7.89	1.03
749.49	409.83	8.64	0.95
766.15	415.48	10.12	0.73
753.26	410.83	11.15	0.53
786.55	422.18	12.31	0.37
743.63	407.98	13.06	0.24
750.26	410.19	13.79	0.15

Job:	Encl. No
Portland grus 16-32	57
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.026
Preparation at 20-50 kPa vacuum



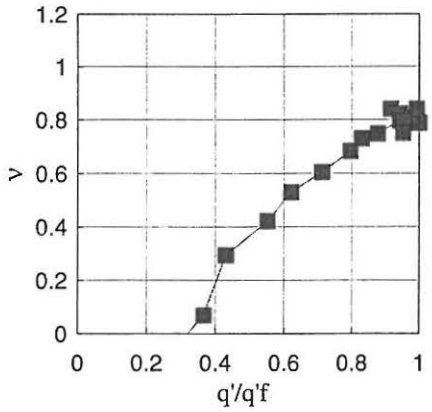


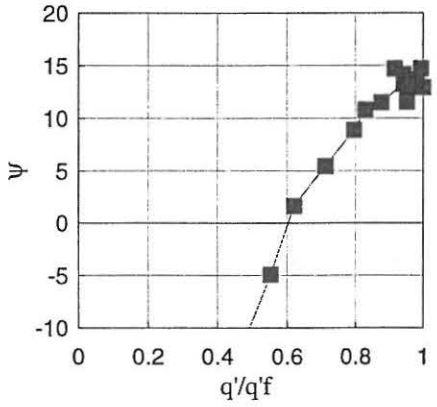
Job: Portland grus 16-32	Encl. No 58
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.667	0.725
		Saturation	1	
kal3tri3	24.06.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-40 kPa
CD - Triaxial test.		ε 1	0.058 %
free ends		ε ν	0.269 %
	2.Drained compression.		
	Deformation rate:		4.2 % ph

Evaluation of test		Values at failure		Values for Δε ν = 0	
Deviator stress	q'	280.39	kPa	154.57	kPa
Mean normal stress	p'	133.56	kPa	91.52	kPa
Confining pressures	σ3	40.10	kPa	40.00	kPa
Vertical strain	ε 1	9.89	%	1.18	%
Volumetric strain	ε ν	-3.76	%	0.70	%

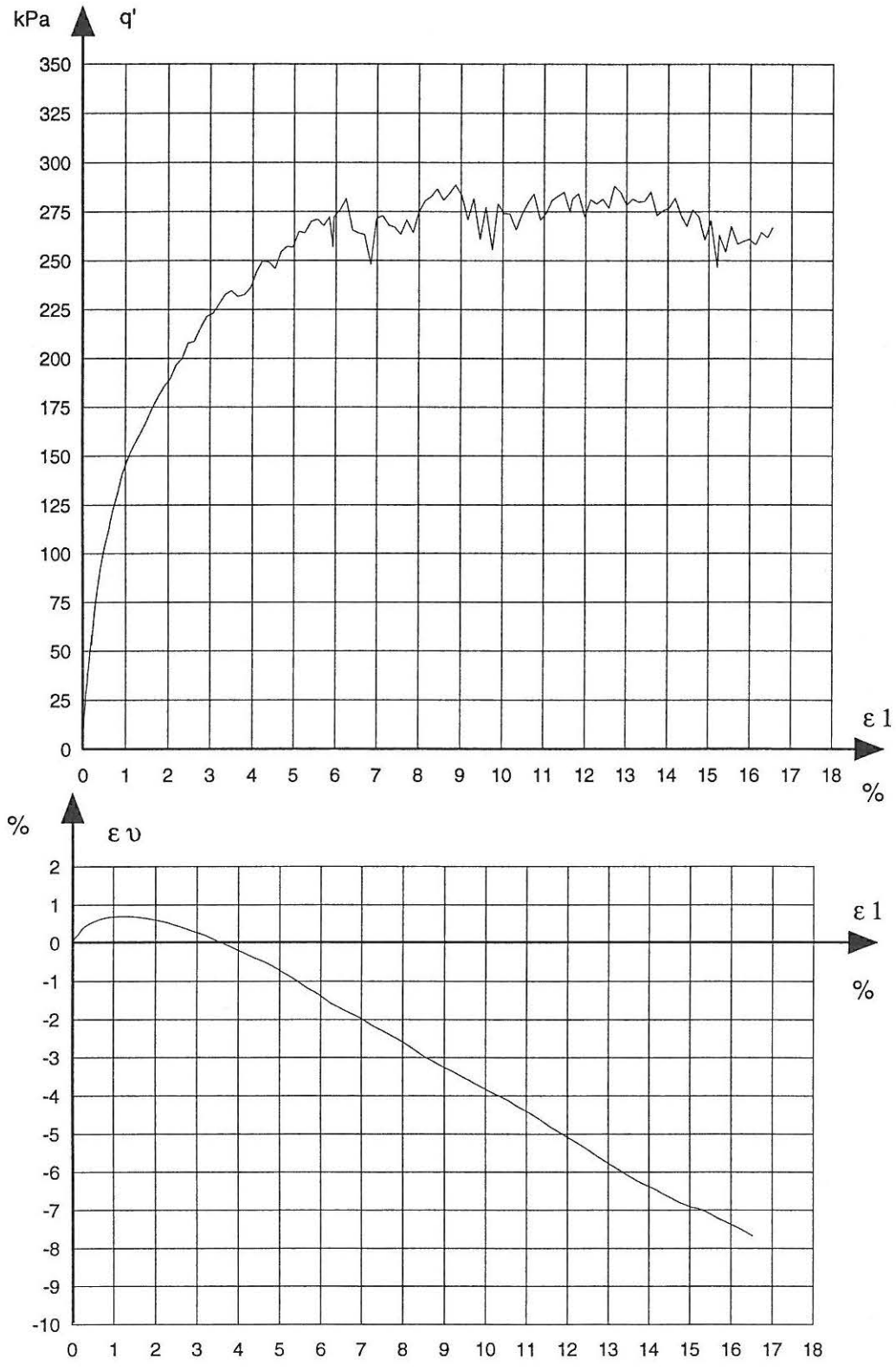




q'	p'	ε 1	ε ν
1.65	40.55	0.00	0.00
8.96	42.99	0.01	0.02
15.72	45.24	0.03	0.05
26.80	48.93	0.06	0.11
41.05	53.68	0.13	0.20
55.91	58.54	0.19	0.28
102.94	74.31	0.50	0.54
120.81	80.27	0.69	0.62
154.57	91.52	1.18	0.70
173.88	98.06	1.61	0.67
199.67	106.66	2.32	0.52
222.92	114.41	3.06	0.26
232.54	117.61	3.80	-0.09
245.82	122.04	4.53	-0.45
264.23	128.08	5.26	-0.88
256.79	125.70	5.93	-1.34
264.13	128.14	6.55	-1.74
268.20	129.50	7.27	-2.16
284.24	134.85	8.72	-3.09
280.39	133.07	9.88	-3.76
274.73	131.58	11.61	-4.83
278.35	132.88	13.00	-5.77
267.44	129.35	14.46	-6.63
267.01	129.00	16.54	-7.68

Job:	Encl. No
Portland grus 16-32	59
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = -0.022
Preparation at 20-50 kPa vacuum

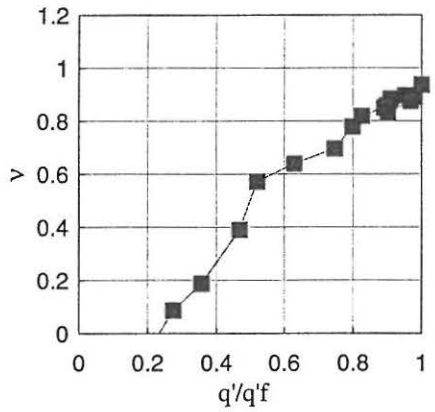


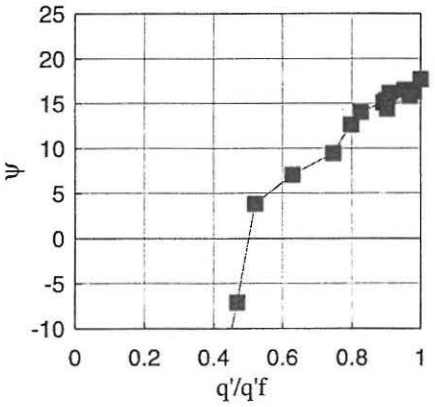
Job: Portland grus 16-32	Encl. No 60
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.673	0.748
		Saturation	1	
kal3tri3	26.06.96	Dimension H mm	252.6	
		D mm	249.2	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-10 kPa
CD - Triaxial test.		ε 1	-0.090 %
free ends		ε ν	-0.499 %
	2.Drained compression.		
	Deformation rate:		4.0 % ph

Evaluation of test		Values at failure		Values for Δε ν = 0	
Deviator stress	q'	85.83	kPa	40.16	kPa
Mean normal stress	p'	38.71	kPa	23.39	kPa
Confining pressures	σ3	10.10	kPa	10.00	kPa
Vertical strain	ε 1	8.26	%	0.57	%
Volumetric strain	ε ν	-4.82	%	0.36	%

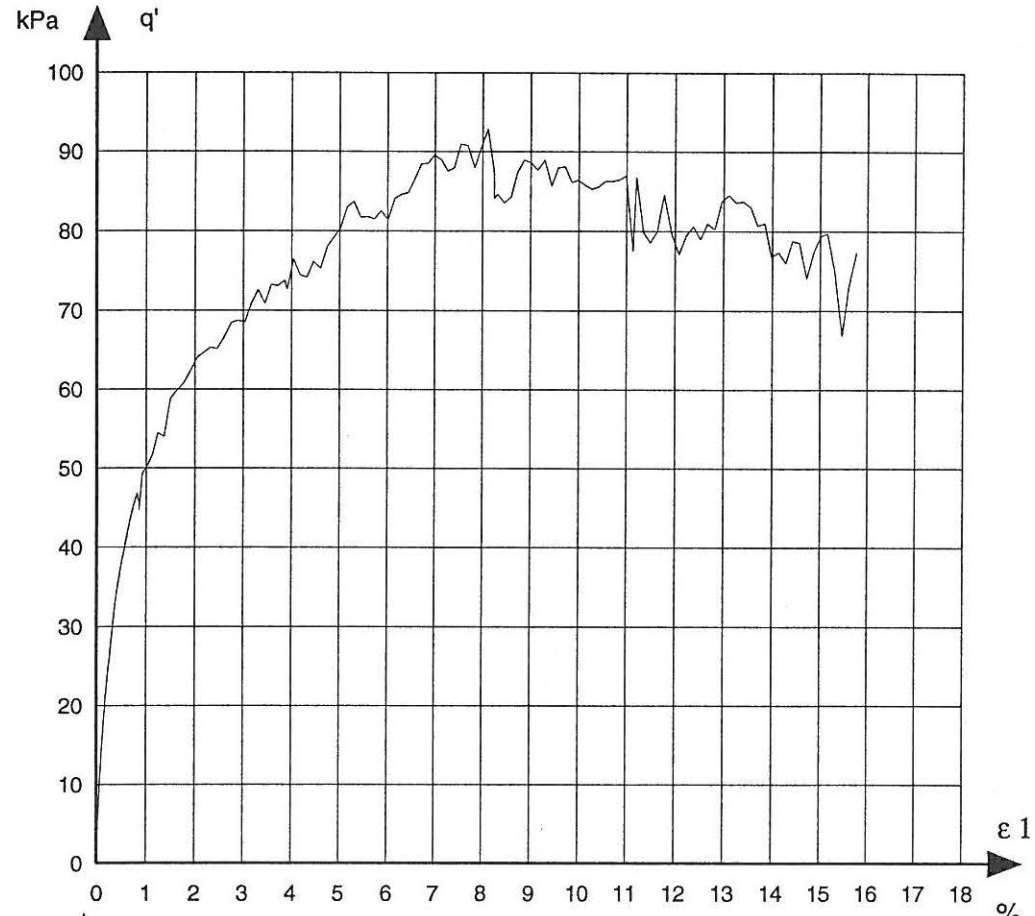


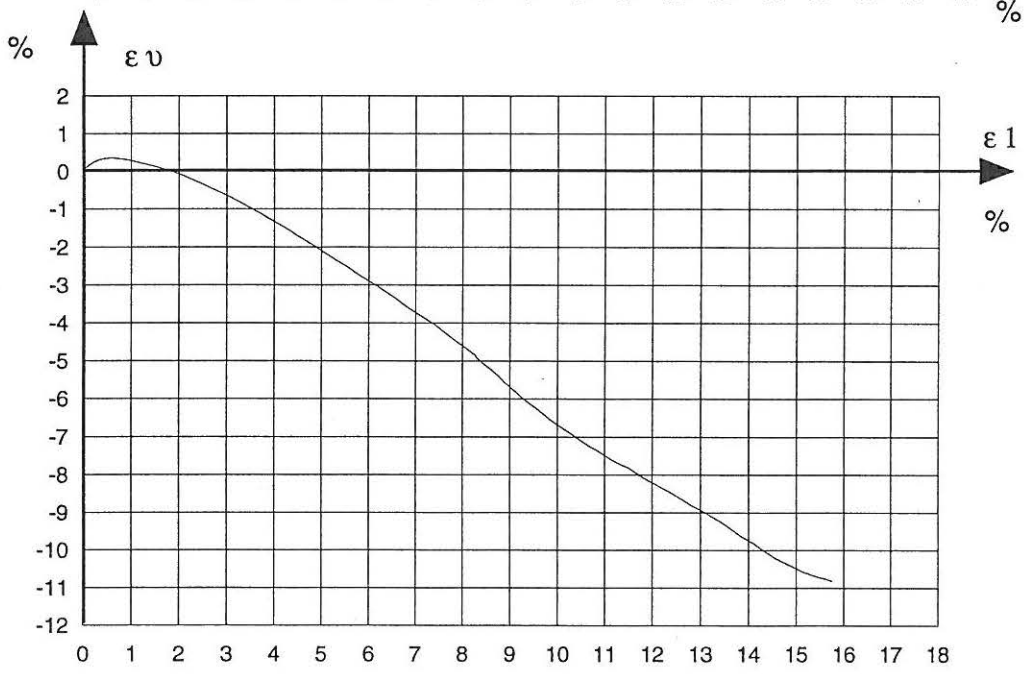


q'	p'	ε 1	ε ν
1.64	10.55	0.00	0.00
3.61	11.10	0.01	0.01
6.43	12.14	0.03	0.04
12.11	13.94	0.07	0.10
19.11	16.37	0.15	0.18
23.56	17.75	0.21	0.23
30.61	20.20	0.33	0.30
40.16	23.39	0.57	0.36
44.63	24.88	0.85	0.31
54.01	28.10	1.36	0.17
64.07	31.36	2.05	-0.10
68.45	32.92	2.75	-0.49
70.86	33.72	3.45	-0.94
76.45	35.48	4.04	-1.35
78.04	36.11	4.74	-1.90
81.71	37.24	5.44	-2.45
84.08	38.13	6.15	-3.01
88.47	39.49	6.85	-3.61
85.83	38.13	8.24	-4.82
88.89	39.63	9.28	-6.00
86.28	38.86	10.69	-7.26
77.11	35.80	12.08	-8.26
83.06	37.79	13.55	-9.36
77.36	35.79	15.76	-10.82

Job:	Encl. No
Portland grus 16-32	61
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = -0.010
Preparation at 20-50 kPa vacuum



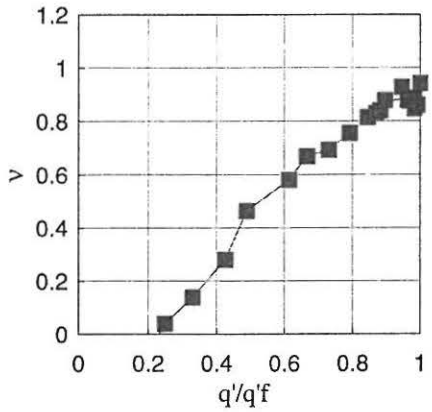


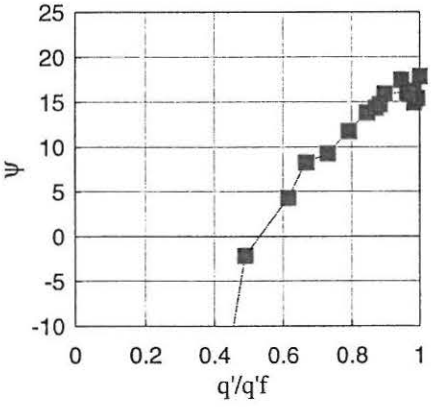
Job: Portland grus 16-32	Encl. No 62
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.673	0.764
		Saturation	1	
kal3tri3	01.07.96	Dimension H mm	252.6	
		D mm	249.2	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-20 kPa
CD - Triaxial test.		ε 1	0.000 %
free ends		ε ν	0.000 %
	2.Drained compression.		
	Deformation rate:		3.8 % ph

Evaluation of test		Values at failure		Values for Δε ν = 0	
Deviator stress	q'	169.64	kPa	82.95	kPa
Mean normal stress	p'	76.65	kPa	47.65	kPa
Confining pressures	σ3	20.10	kPa	20.00	kPa
Vertical strain	ε 1	10.59	%	0.72	%
Volumetric strain	ε ν	-5.77	%	0.45	%

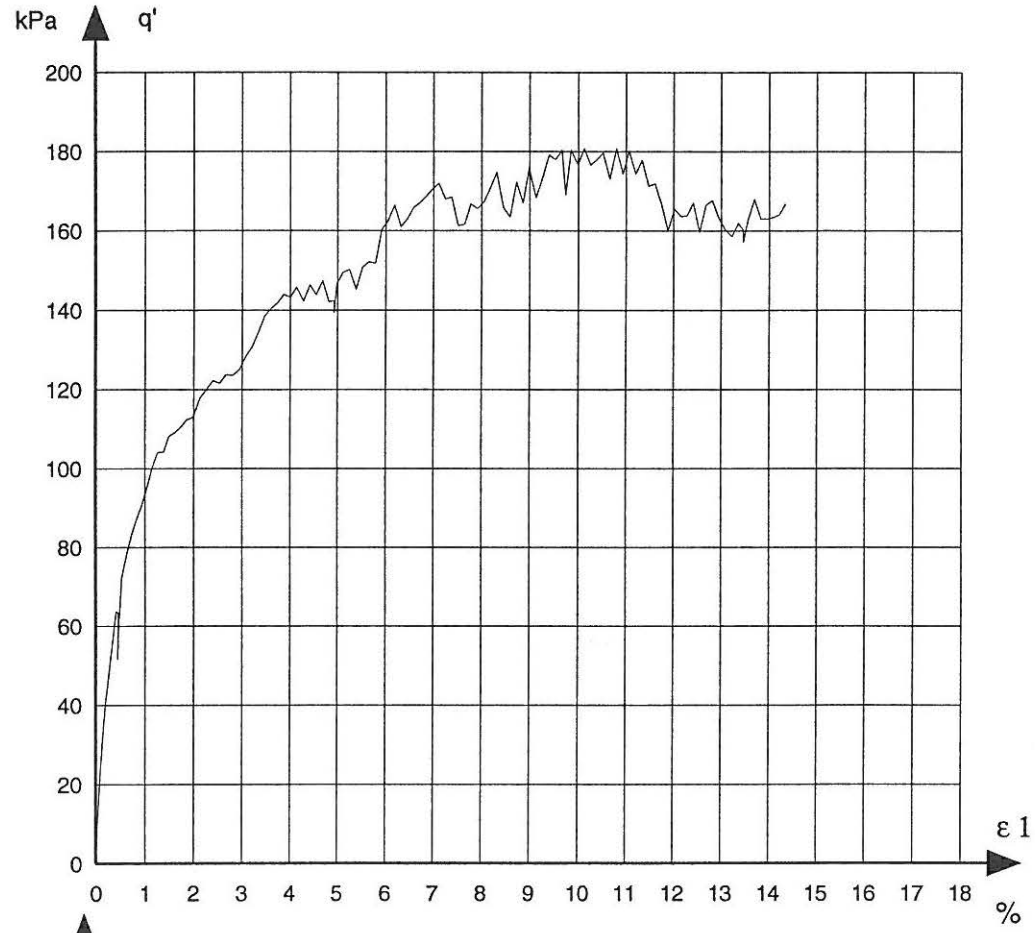


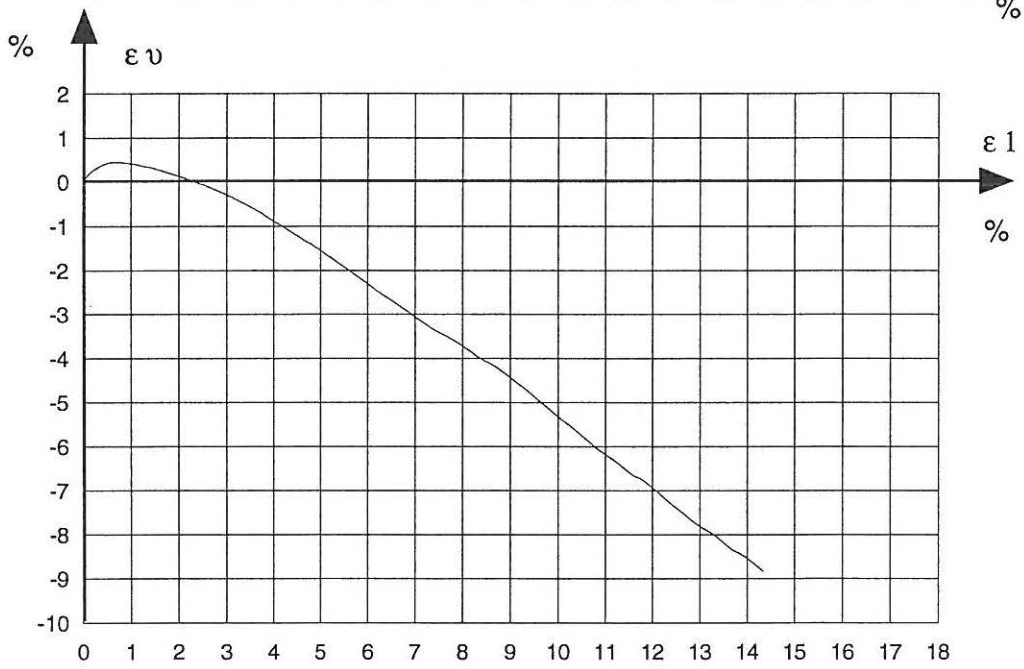


q'	p'	ε 1	ε ν
1.65	20.55	0.00	0.00
7.71	22.57	0.02	0.02
12.28	23.99	0.03	0.05
21.03	26.91	0.07	0.11
33.46	31.15	0.14	0.19
42.37	34.02	0.21	0.25
55.95	38.65	0.34	0.35
72.27	44.09	0.53	0.43
82.95	47.65	0.72	0.45
104.22	54.84	1.39	0.34
113.05	57.68	1.99	0.13
123.79	61.36	2.66	-0.13
134.23	64.84	3.33	-0.47
143.24	67.75	4.00	-0.89
147.37	69.12	4.68	-1.33
149.46	69.92	5.11	-1.63
151.83	70.61	5.79	-2.14
163.08	74.46	6.45	-2.65
166.76	75.69	7.77	-3.56
168.38	76.33	9.12	-4.54
169.64	79.96	10.52	-5.77
166.62	75.64	11.74	-6.72
160.21	73.50	13.08	-7.87
164.07	74.79	14.22	-8.72

Job:	Encl. No
Portland grus 16-32	63
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = -0.029
Preparation at 20-50 kPa vacuum



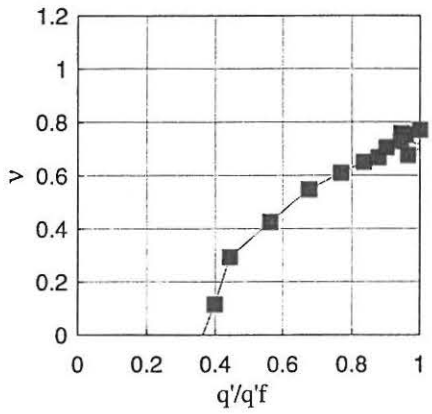


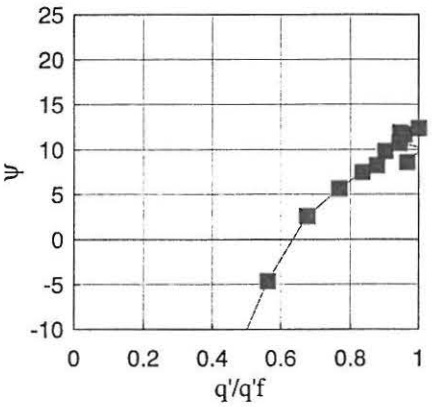
Job: Portland grus 16-32	Encl. No 64
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.670	0.713
		Saturation	1	
kal3tri3	03.07.96	Dimension H mm	252.6	
		D mm	249.2	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-80 kPa
CD - Triaxial test.		ε 1	0.238 %
free ends		ε ν	1.122 %
	2.Drained compression.		
	Deformation rate:		3.9 % ph

Evaluation of test		Values at failure		Values for Δε ν = 0	
Deviator stress	q'	491.17	kPa	276.02	kPa
Mean normal stress	p'	243.82	kPa	172.01	kPa
Confining pressures	σ3	80.10	kPa	80.00	kPa
Vertical strain	ε 1	9.76	%	1.03	%
Volumetric strain	ε ν	-2.91	%	0.71	%

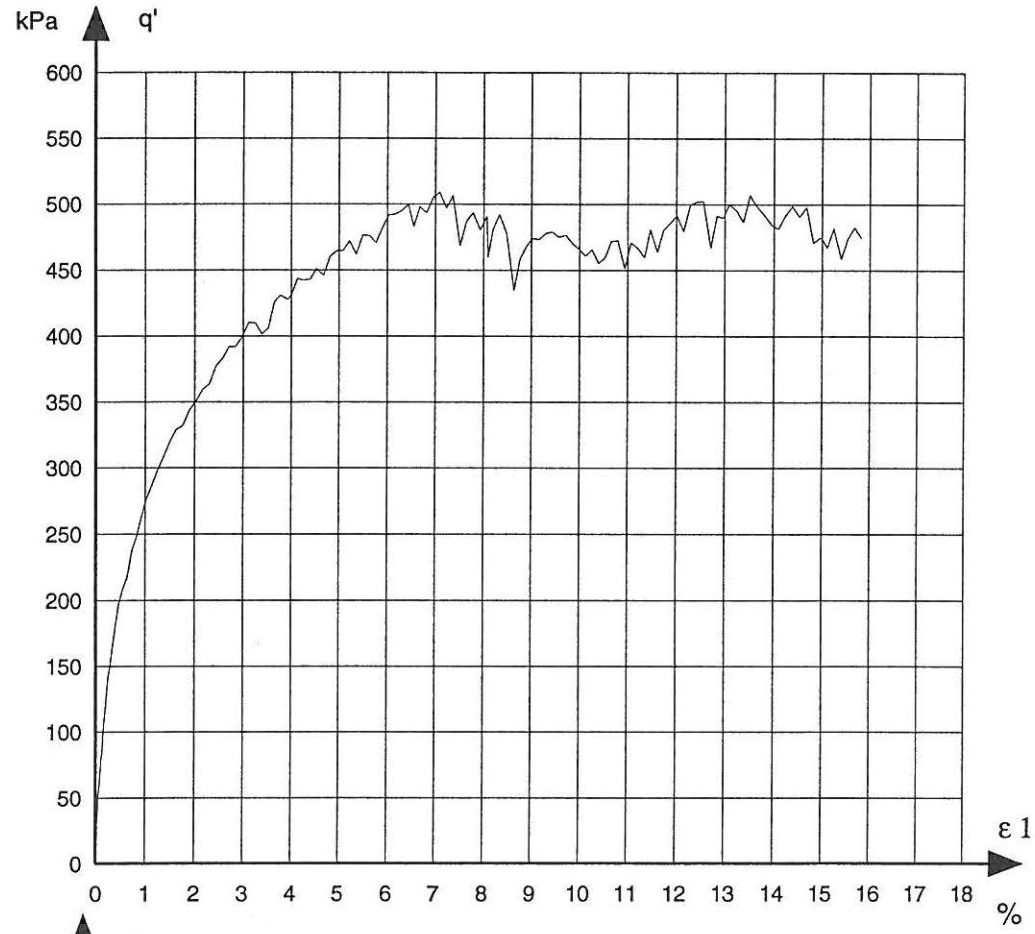


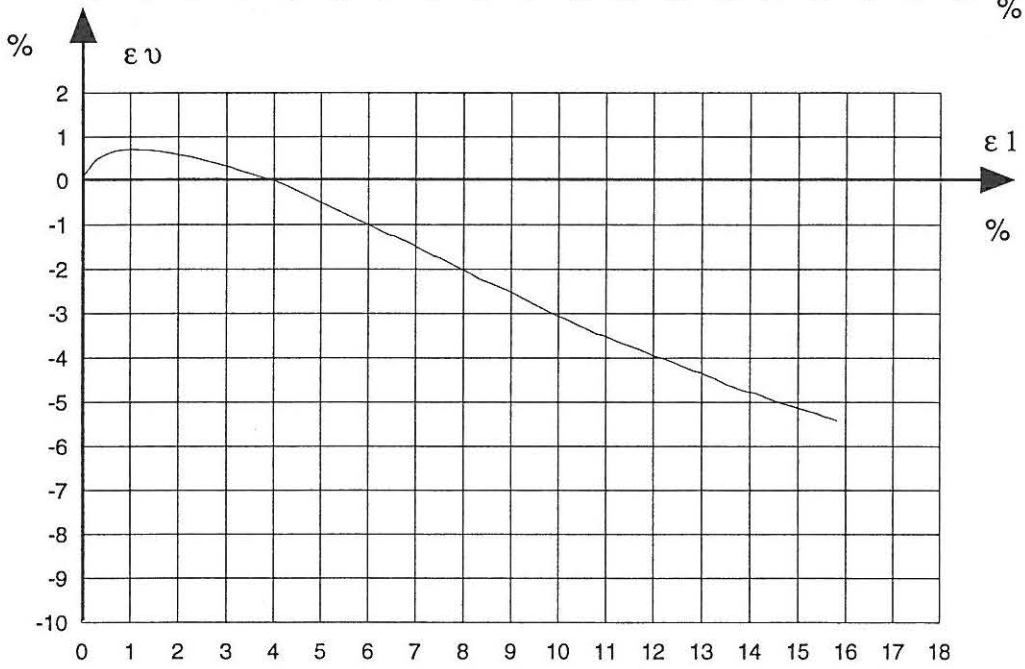


q'	p'	ε 1	ε ν
1.66	80.45	0.00	0.00
7.31	82.24	0.00	0.00
17.20	85.63	0.01	0.02
42.42	94.14	0.03	0.08
60.43	100.04	0.07	0.15
77.64	105.78	0.10	0.20
140.43	126.81	0.24	0.41
196.04	145.35	0.46	0.58
217.54	152.41	0.64	0.65
276.02	172.01	1.03	0.71
332.08	190.69	1.76	0.64
377.12	205.81	2.43	0.49
410.08	216.79	3.11	0.29
430.95	223.65	3.78	0.07
442.65	227.65	4.40	-0.19
464.59	234.96	5.08	-0.54
470.58	236.86	5.77	-0.89
499.60	246.53	6.44	-1.23
493.48	244.59	7.78	-1.90
467.84	236.05	8.89	-2.46
491.17	238.95	9.71	-2.91
463.58	234.53	11.61	-3.78
498.67	246.32	13.65	-4.65
474.33	238.11	15.82	-5.42

Job:	Encl. No
Portland grus 16-32	65
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = 0.011
Preparation at 20-50 kPa vacuum



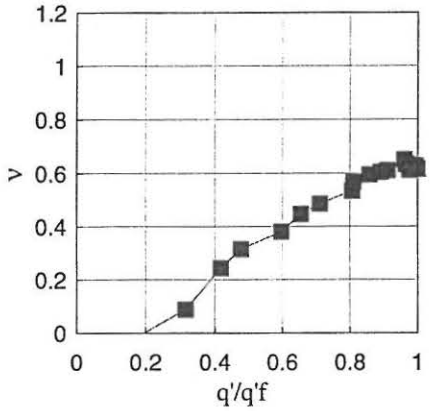


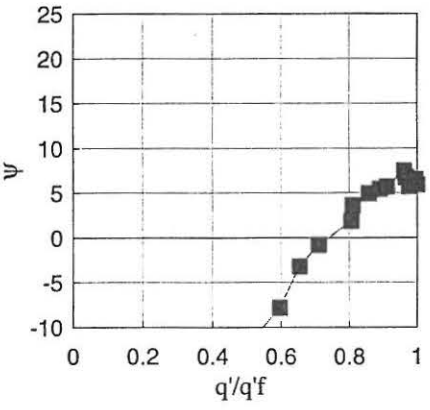
Job: Portland grus 16-32	Encl. No 66
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.672	0.684
		Saturation	1	
kal3tri3	08.07.96	Dimension H mm	252.6	
		D mm	249.2	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-160 kPa
CD - Triaxial test.		ε 1	0.470 %
free ends		ε ν	2.176 %
	2.Drained compression.		
	Deformation rate:		4.3 % ph

Evaluation of test		Values at failure		Values for Δε ν = 0	
Deviator stress	q'	889.39	kPa	632.16	kPa
Mean normal stress	p'	456.56	kPa	370.72	kPa
Confining pressures	σ3	160.10	kPa	160.00	kPa
Vertical strain	ε 1	12.74	%	3.12	%
Volumetric strain	ε ν	-1.01	%	1.11	%

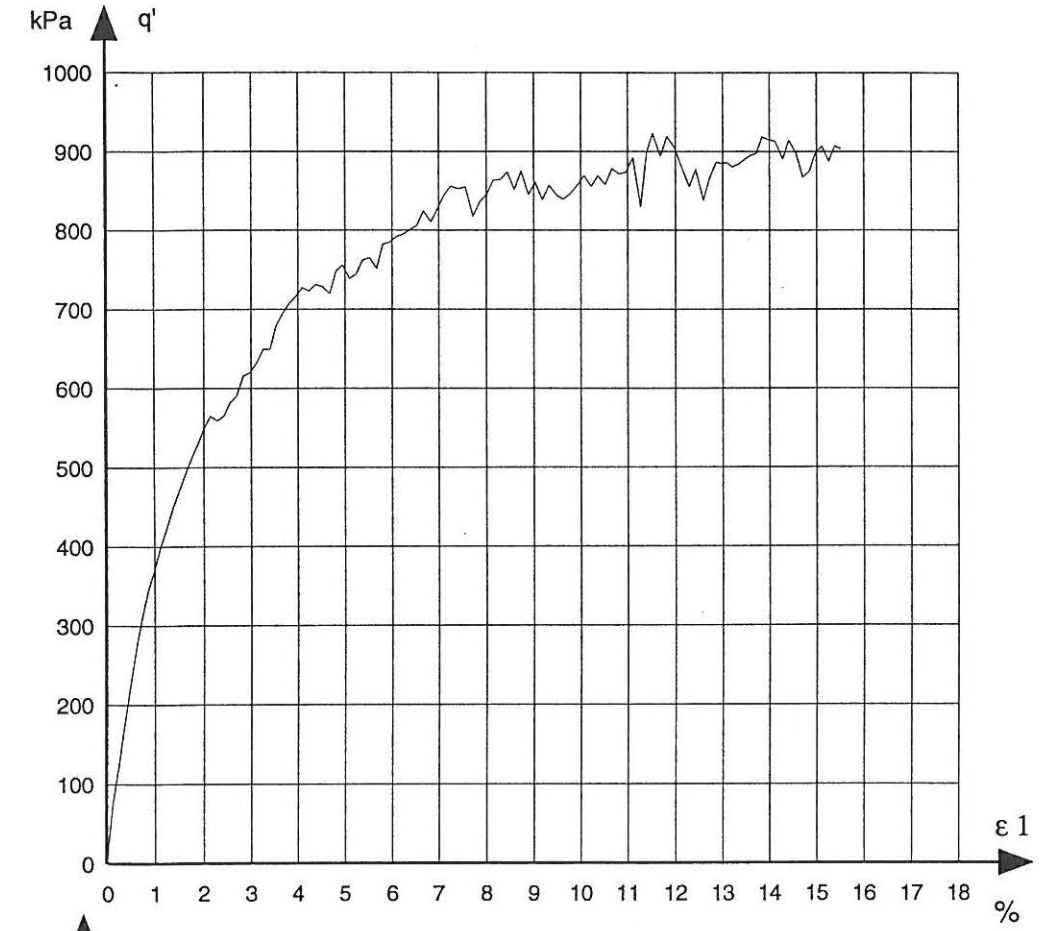


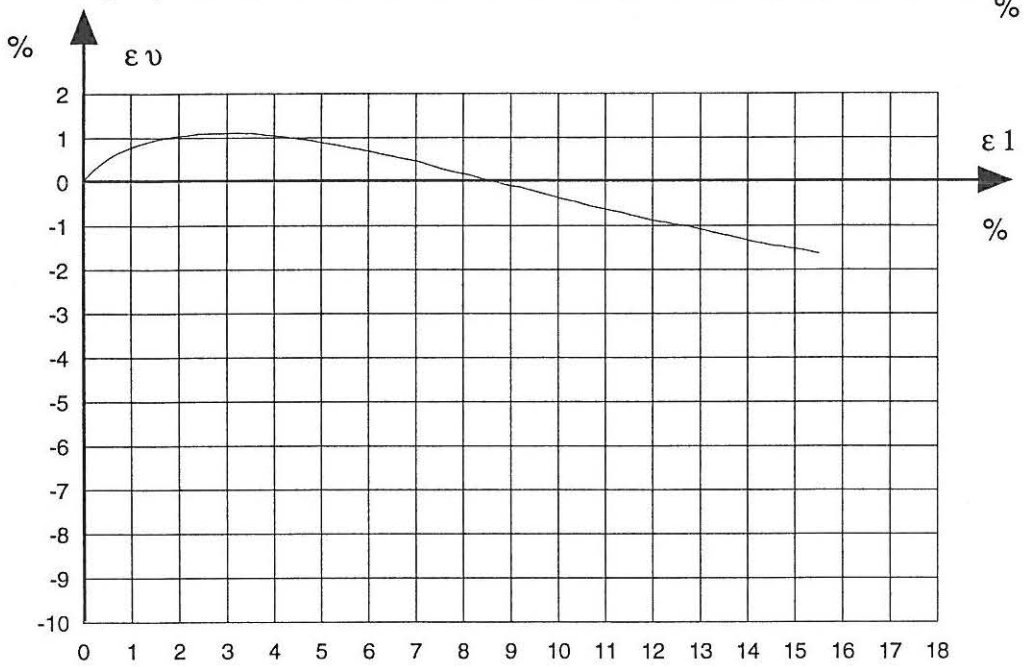


q'	p'	ε 1	ε ν
1.68	160.56	0.00	0.00
23.61	167.87	0.02	0.02
36.22	171.97	0.04	0.05
65.68	181.79	0.09	0.11
91.77	190.69	0.15	0.18
117.06	198.92	0.22	0.25
279.75	253.35	0.63	0.59
371.02	283.87	0.99	0.78
424.25	301.32	1.25	0.87
529.85	336.52	1.87	1.02
582.04	354.41	2.56	1.09
632.16	370.72	3.12	1.11
716.26	398.85	3.95	1.05
719.64	399.78	4.67	0.96
761.93	414.08	5.38	0.82
791.42	423.81	6.09	0.67
810.29	430.10	6.83	0.51
854.59	444.86	7.56	0.29
860.83	447.04	9.03	-0.10
857.97	446.09	10.52	-0.50
889.39	448.75	12.72	-1.01
884.21	455.24	13.35	-1.17
867.18	448.96	14.71	-1.47
903.68	461.23	15.52	-1.64

Job:	Encl. No
Portland grus 16-32	67
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = -0.063
Preparation at 20-50 kPa vacuum



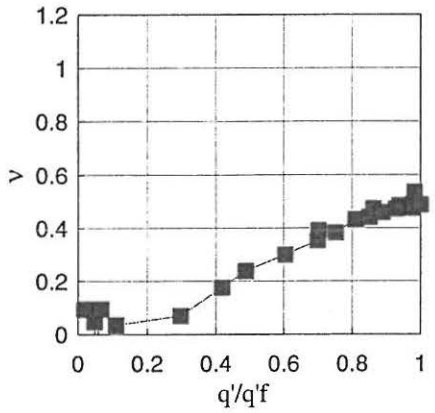


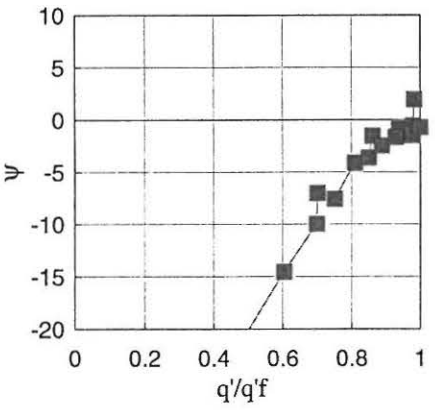
Job: Portland grus 16-32	Encl. No 68
Exc:	Check:
FRJ	FRJ

Description of soil			Before test	At failure
Portland grus 16-32		Water content %		
		Grain density	2.642	
Calibration file	Date	Void ratio	0.892	0.842
		Saturation	1	
kal3tri3	10.07.96	Dimension H mm	252.6	
		D mm	249.5	

TEST-PROGRAM	Drained compression.		
	1. Isotropic compression.	σ3	20-160 kPa
CD - Triaxial test.		ε 1	0.683 %
free ends		ε ν	2.686 %
	2.Drained compression.		
	Deformation rate:		4.5 % ph

Evaluation of test		Values at failure		Values for Δε ν = 0	
Deviator stress	q'	588.94	kPa	576.07	kPa
Mean normal stress	p'	373.23	kPa	352.02	kPa
Confining pressures	σ3	160.10	kPa	160.00	kPa
Vertical strain	ε 1	15.53	%	13.16	%
Volumetric strain	ε ν	2.35	%	2.43	%

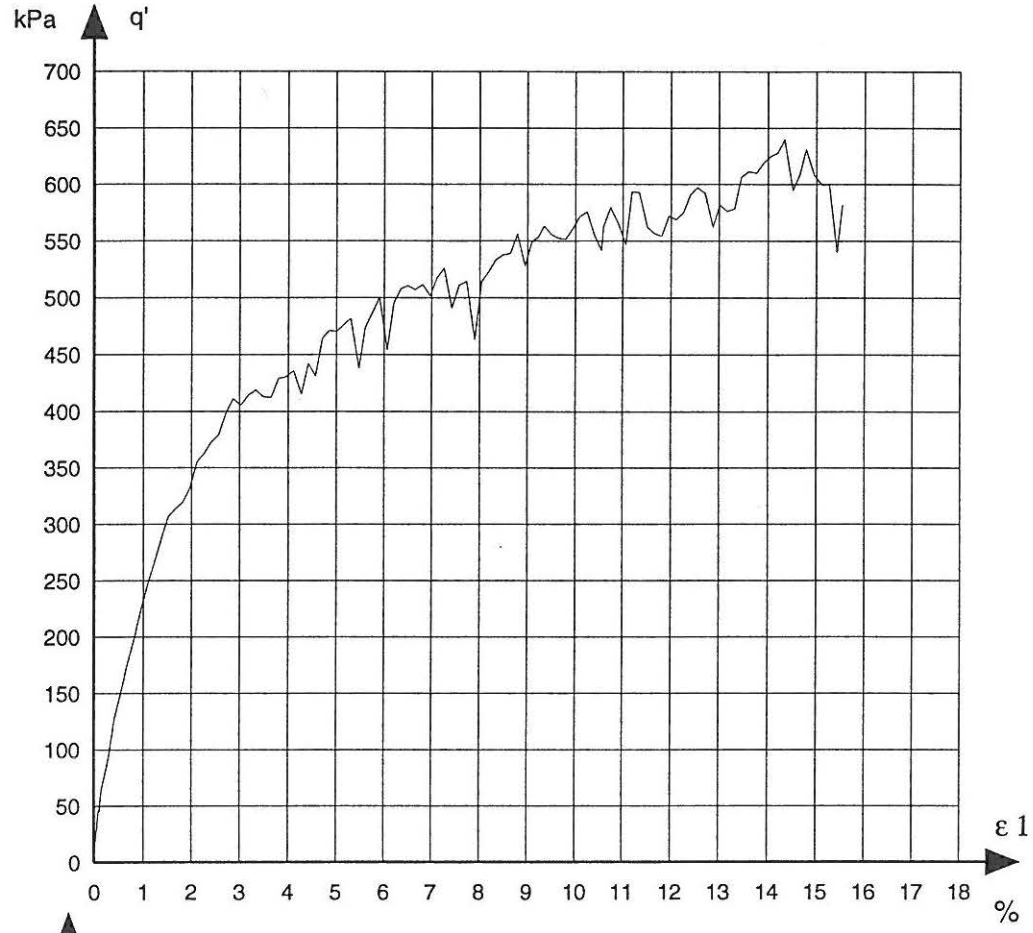


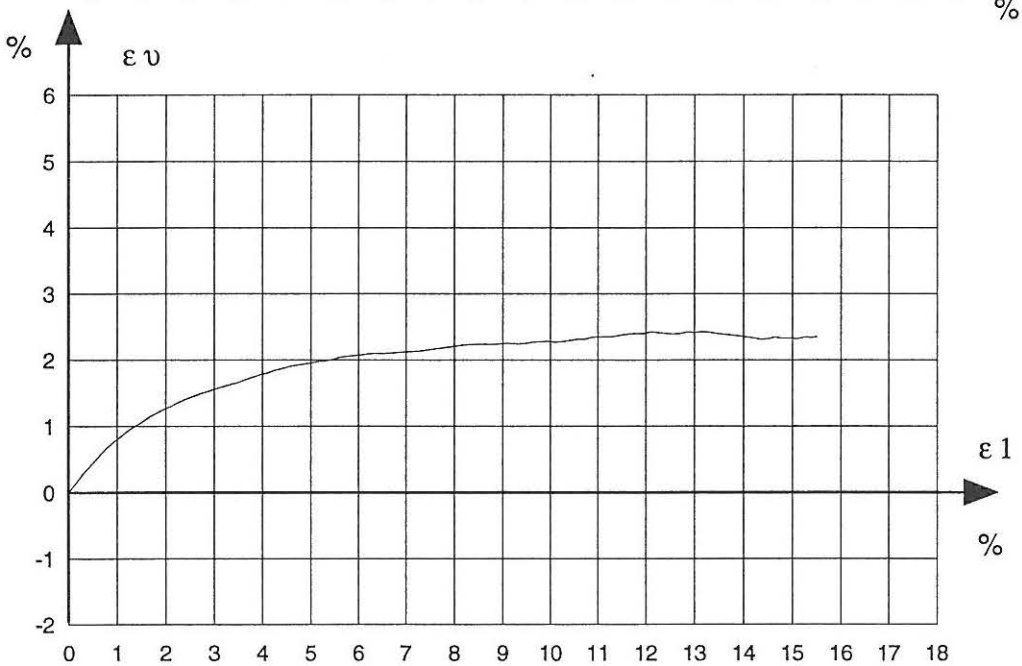


q'	p'	ε 1	ε ν
1.68	160.56	0.00	0.00
11.38	163.79	0.01	0.01
28.54	169.41	0.04	0.04
29.58	169.86	0.05	0.05
39.57	173.09	0.07	0.06
64.73	181.58	0.15	0.14
175.25	218.32	0.68	0.59
246.43	242.14	1.09	0.86
287.72	255.81	1.37	1.01
355.23	278.41	2.11	1.30
411.27	296.99	2.86	1.52
412.75	297.58	3.49	1.66
441.99	307.33	4.41	1.87
476.54	318.85	5.15	1.97
500.26	326.75	5.90	2.06
507.16	329.05	6.66	2.10
523.10	334.37	8.18	2.23
552.30	344.10	9.64	2.27
546.66	342.22	11.05	2.35
574.59	351.53	12.26	2.41
576.07	352.02	13.16	2.43
578.18	352.73	13.31	2.42
594.59	358.20	14.51	2.32
588.94	353.97	15.53	2.35

Job:	Encl. No
Portland grus 16-32	69
Exc:	Check:
FRJ	FRJ

Remark:
Preparation [%] Δ ε1 = -0.033
Preparation at 20-50 kPa vacuum





Job: Portland grus 16-32	Encl. No 70
Exc:	Check:
FRJ	FRJ