1. MONITORING AND CERTIFICATION

1.1 SCOPE OF APPLICATION OF REGULATION (EU) NO. 305/2011 OF THE EUROPEAN PARLIAMENT AND THE COUNCIL DATED 9 MARCH 2011 (CONSTRUCTION PRODUCTS REGULATION, CPR)

Assessment system 2+ for verification of constancy of performance and conformity of Factory Production Control (brickwork mortar, aggregates, prefabricated concrete components)

1.1.1 Processing of documents submitted
(FPC handbook, initial testing)

1.1.2 Monitoring & certification under CPR
(FEhS monitoring agent on contract for Güteschutz Beton NRW) including documentation
(Germany only, other countries based on expenses)

1.1.3 Package prices with simultaneous monitoring / certification
under national regulations

1.1.4 Sampling

1.1.5 Product testing

1.2 SCOPE OF APPLICATION OF THE GERMAN MODEL BUILDING REGULATION, (MBO) SECTION 22 (TESTING, MONITORING AND CERTIFICATION BODY, CONSTRUCTION REGULATION LIST PART A) CONFORMITY VERIFICATION PROCESSES,

e.g.: concrete based on properties, concrete based on composition including dry concrete, prefabricated concrete components, etc.)

1.2.1 Processing of documents submitted
(FPC handbook, initial testing)

1.2.2 Initial monitoring / compliance inspection with factory visit and documentation
(Germany only, other countries based on expenses)

1.2.3 Issuing the certification documents

1.2.4 Plausibility assessment (DIN FB 100) including certificate

1.2.5 Testing of residual concrete water according to DIN EN 1008, including certificate

1.3. SCOPE OF APPLICATION UNDER PRIVATE LAW (CONSTRUCTION REGULATIONS OF NORTH RHINE-WESTPHALIA / RAP STRA (GUIDELINES FOR THE RECOGNITION OF TESTING BODIES FOR BUILDING MATERIALS IN ROAD CONSTRUCTION): THIRD-PARTY MONITORING)

e.g. construction site monitoring class 2/3 according to DIN EN 13670 / DIN 1045-3, Appendix ND:
e.g. under the German Technical Delivery Conditions 'TL G SoB-StB 2004 / TL BuB E-StB 09': Aggregates
e.g. under quality requirements of the RAL German Institute for Quality Assurance and Labelling: Aggregates

1.3.1 (Bau O NW): Construction site monitoring 2/3

1.3.1.1 ½ yearly with construction site visit and monitoring report

1.3.1.2 Final report after conclusion of the construction site, without construction site visit

1.3.1.3 Monitoring of construction sites with minimal quantities (max. 16 m³, max. 1 day concreting) including monitoring report

1.3.1.4 Special boundary conditions to be taken into consideration

1.3.1.5 Additional expenses for the processing of documents submitted when concretes are used that deviate from a test age of 28 days (application, QA plan etc.)

1.3.2. RAP Stra: Aggregates
'TL G SoB / TL BuB E' Technical Delivery Conditions / RAL (German Institute for Quality Assurance and Labelling)

1.3.2.1 Processing of documents submitted (FPC handbook, initial testing)

1.3.2.2 Initial monitoring / compliance inspection with factory visit and documentation without sampling (Germany only, other countries based on expenses)

1.3.3 Sampling

1.3.4 Product testing

1.4 PERFORMANCE OF INTERNAL QUALITY CONTROLS (MONITORING CLASS 2/3) FOR CONSTRUCTION SITES ACCORDING TO DIN EN 13670 / DIN 1045-3, APPENDIX NC

1.4.1 Performance of unset concrete tests and manufacture of concrete samples and tests

1.4.2 Consulting and documentation within the framework of internal quality control by the continuous concrete testing body

2. CHEMICAL INVESTIGATIONS

2.1. INORGANIC AND SOLID COMPONENTS

2.1.2 Chemical and physicochemical sample preparation

The chemical and physicochemical sample preparation in the chemical laboratories are handled with particularly great care and attention. In addition to all conventional solubilisation methods (e.g. complete solubilisation in the microwave), there are also special, matrix-specific solubilisation methods available.

2.1.2.7	Extraction method using aqua regia	DIN EN 13346
2.1.2.8	Extraction method using aqua regia	DIN EN 13657
2.1.2.10	Maczkowske solubilisation (HCl, NH_4Cl)	
2.1.2.12	Microwave solubilisation (total solubilisation)	DIN EN 13656
2.1.2.12b	Microwave solubilisation without boric acid	DIN EN 13656
2.1.2.16	Simple acid solubilisation (HNO_3)	
2.1.2.24	Bromine-methanol extraction Ironworks Laboratory Manual Vol. 1	

2.1.3 INSTRUMENTAL ANALYSIS

Instrumental analysis allows a great number of elements to be identified in a short time and with high precision. Depending on the elements, matrix and method, the concentration ranges recorded vary from 100% by weight to ppb (µg/kg). The selection of the analysis method is determined based on the element to be investigated, the matrix, and the degree of precision or detection limit required. Unless otherwise specified, the prices specified do not include any preparation necessary.

UG-210	X-ray fluorescence screening, semi-quantitative (Na to U)	Metal samples
UG-211	X-ray fluorescence screening, semi-quantitative (Na to U)	Powder
UG-135	ICP-OES screening, semi-quantitative (all elements from Li to U excluding N, O, F, Cl, Br, I)	Eluate, solutions, water

2.1.3.5	ICP-OES analysis (all elements from Li to U excluding N, O, F, Cl, Br, I)	ICP-OES EN ISO 11885	per element
2.1.3.10	Graphite tube AAS (Bi, Pb, Cd, Tl, Te)	DIN CEN/TS 16172	per element
2.1.3.12	FIMS-AAS (Hg)	DIN EN ISO 12846	per element
2.1.3.15	FIAS furnace AAS (As, Se, Sb, Sn)	DIN CEN/TS 16172	per element
2.1.3.28	ICP-MS analysis	DIN EN ISO 17294-2	
2.1.3.29	RFA analysis	DIN EN ISO 12677	
2.1.3.30	IR spectrum		

2.1.4 PHYSICOCHEMICAL PARAMETERS

2.1.4.1	pH value	DIN 19 684-1 (1977-02)	
2.1.4.2	Organoleptic evaluation		

2.1.5 TRADITIONAL ANALYSIS METHODS

Traditional analysis methods do not only regularly form the basis for the evaluation of materials under conventional directives and regulations, but are often the only practical option for determining concentrations in special inquiries or matrices. Depending on the elements, matrix and method, the concentration ranges recorded vary from 100% by weight to ppb (µg/kg). Unless otherwise specified, the prices specified do not include any preparation necessary.

2.1.5.5	Aluminium oxide (Al_2O_3)	DIN EN 196-2	photometric complexometric
2.1.5.15	Ash content	DIN 51719	gravimetric
2.1.5.20	Alkaline active substances (as CaO)	EN 12945	German Sewage Sludge Ordinance (AbfKlärV), Annex. 1, 1.3.2
2.1.5.26	Calcium oxide (CaO)	DIN EN 196-2	complexometric
2.1.5.27	Calcium oxide (CaO) reactive	DIN EN 197-1 Section 3.1	
2.1.5.30	Chloride (Cl)	DIN EN 196-21	Volhard

2.1.5.40	Chloride (Cl)	DIN EN 1744-1	
2.1.5.45	Chromate (Cr[VI]) standard	DIN EN 196-10	photometric
2.1.5.46	Chromate (Cr[VI]) only for cement (incl. mortar manufacturing)	DIN EN 196-10	photometric
2.1.5.50	Cyanide total (CN_{tot})	DIN 38 405-D13	photometric after distillation
2.1.5.55	Cyanide, weak acid dissociable (CN_{WAD})	DIN 38 405-D13	photometric
2.1.5.60	Iron total (Fe)	DIN EN 196-2	photometric
2.1.5.65	Iron total (Fe)	Handbuch Eisenhüttenlabor (Ironworks Laboratory Manual)	titrimetric
2.1.5.70	Iron metallic (Fe_{met})	Handbuch Eisenhüttenlabor (Ironworks Laboratory Manual)	titrimetric
2.1.5.75	Iron-(II)-oxide, in addition to Fe_{met}	Handbuch Eisenhüttenlabor (Ironworks Laboratory Manual)	titrimetric
2.1.5.80	Iron-(III)-oxide, in addition to Fe_{met} and Iron-(II)-oxide	Handbuch Eisenhüttenlabor (Ironworks Laboratory Manual)	calculated
2.1.5.90	Fluoride (F)	DIN 51084	photometric after distillation
2.1.5.95	Free lime CaO_{free}	DIN EN 1744-1	Franke method
2.1.5.100	Free lime CaO_{free} (slag only)	DIN EN 1744-1	conductometric
2.1.5.105	Fulvic acid	DIN EN 1744-1	
2.1.5.110	Annealing losses at 550°C	DIN ISO 11465	gravimetric
2.1.5.115	Annealing losses at 975°C	DIN EN 196-2	gravimetric
2.1.5.120	Annealing losses calculated as sum of CO_2 and H_2O		IR combustion
2.1.5.125	Annealing losses under nitrogen at 1000°C		gravimetric
2.1.5.135	Carbon (CO_2) inorganically bound (TIC)	DIN 19539	IR combustion
2.1.5.137	Carbon organically bound (TOC)	DIN EN 15936 DIN 19539	IR combustion

2.1.5.140	Carbon, elemental (C_E)	DIN 19539	IR combustion
2.1.5.145	Carbon, total (C_{tot})	DIN 19539	IR combustion
2.1.5.150	Lipophilic substances	LAGA (German State Work Group for Waste) Directive KW/04	
2.1.5.155	Magnesium oxide (MgO) complexometric	DIN EN 196-2	
2.1.5.165	Methylene blue method (fines)	EN 933 - 9	
2.1.5.182	Phosphorus pentoxide (P_2O_5)		gravimetric/ photometric
2.1.5.190	Reactivity (CaO equivalent)	VDLUFA (Association of German Agricultural Analytic and Research Institutes) data sheet II.1, 6.7	titrimetric
2.1.5.192	reactive iron sulphide particles	DIN EN 1744-1	
2.1.5.205	Sulphur, total (S_{tot})		gravimetric after oxidation
2.1.5.210	Silicon dioxide (SiO_2)	DIN EN 196-2 DIN EN ISO 12677	gravimetric using RFA
2.1.5.212	Silicon dioxide, reactive	DIN EN 197-1 Section 3.2	
2.1.5.213	Silicon, water-soluble		
2.1.5.214	Silicon, CAL-soluble		
2.1.5.220	Nitrogen, nitrate (N)		photometric
2.1.5.221	Nitrogen, ammonium (N)		photometric after distillation
2.1.5.225	Sulphate (SO_3)	DIN EN 1744-1	gravimetric
2.1.5.230	Sulphate (SO_3)	DIN EN 196-2	gravimetric
2.1.5.235	Sulphide (S^{2-})	DIN EN 196-2	titrimetric

2.1.5.240	Sulphide (S^{2-}), qualitative		
2.1.5.265	Loss on drying	DIN 38414-2	gravimetric
2.1.5.275	Insoluble residue (HNO_3)	DINV ENV 196-4	
2.1.5.280	Insoluble residue	DIN 52 170-2	gravimetric
2.1.5.285	Insoluble residue	DIN 52 170-3	gravimetric
2.1.5.290	Insoluble residue	DIN EN 196-2	gravimetric
2.1.5.295	Water (H_2O)	DIN 19539	IR combustion
2.1.5.300	Water-soluble alkalis	DIN 1164	
2.1.5.302	Water-soluble components in aggregate	DIN EN 1744-1	
2.1.5.330	Sugars (in mortar, including preparation) residue		qualitative α-naphtol
2.1.5.335	Volatile components		gravimetric

2.2. INORGANIC COMPONENTS,LIQUIDS

2.2.1	Elution processes All conventional elution processes are available, as are some special ones (e.g. under the Dutch BSB regulations).		
2.2.1.2.1	Ammonium nitrate extraction		
2.2.1.2.5	Availability test (NL)	NEN 7371	50 l/kg pH7 and pH4
2.2.1.2.6	Calcium chloride extraction		
2.2.1.2.25	Percolation column procedure (D)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction Part 7.1.3	down-flow
2.2.1.2.27	Percolation column procedure, long thorough Characterisation (D)	DIN 19528	4 fractions up to L/S=4

2.2.1.2.28	Percolation column procedure, short conformity analysis (D)	DIN 19528	1 fraction up to L/S=2
2.2.1.2.30	Percolation column procedure (EU)	DIN EN 14405	7 fractions up to L/S=10
2.2.1.2.31	Percolation column procedure (EU)	DIN CEN/TS 16637-3	7 fractions up to L/S=10
2.2.1.2.35	Percolation column procedure (NL) BSB	NEN 7383 BSB	2 fractions up to L/S=10
2.2.1.2.40	Percolation column procedure (NL)	NEN 7373	7 fractions up to L/S=10
2.2.1.2.45	Batch test (2:1)	DIN 19529	
2.2.1.2.46	S4 batch test (10:1)	DIN EN 12457-4	
2.2.1.2.50	Batch test (10:1)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction Part 7.1.1	
2.2.1.2.55	Batch test I	EN 12457-1	2l/kg < 4 mm
2.2.1.2.60	Batch test II	EN 12457-2	10l/kg < 4 mm
2.2.1.2.65	Batch test III	EN 12457-3	2+8=10 l/ kg < 4 mm
2.2.1.2.70	Batch test IV	EN 12457-4	10l/kg < 10 mm
2.2.1.2.80	Trough test (NL), 64-day test	NEN 7375	hardened test samples
2.2.1.2.83	Trough test (EU), 64-day test/DSLT	DIN CEN/TS 16637-2	monolithic materials
2.2.1.2.84	Trough test (EU), 64-day test/GLHC	DIN CEN/TS 16637-2, Appendix A	granular samples with low permeability
2.2.1.2.85	Trough test (EU)	DIN EN 1744-3	granular samples < 32mm

2.2.1.2.90	Trough test (D)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction Part 7.1.2	granular samples and hardened test samples
2.2.1.2.105	pH-stat method EU	prEN 14997	per pH value
2.2.1.2.110	pH-stat method pH 4 /pH 11 (D)	LAGA EW98p	
2.2.1.2.115	pH-stat method continuous	DIN EN 14997	8 pH values
2.2.1.2.116	Migration	AP(89)-1	
2.2.1.2.117	Migration	DIN EN 71-3	
2.2.1.2.141	Batch test (1:1)	DIN EN ISO 11127-6/-7	For blasting abrasives

2.2.2 INSTRUMENTAL ANALYSIS

Instrumental analysis allows a great number of elements to be identified in a short time and with high precision. Depending on the elements, matrix and method, the concentration ranges recorded vary up to ppt (ng/l). The selection of the analysis method is determined based on the element to be investigated, the matrix, and the degree of precision or detection limit required.

2.2.2.4	ICP-OES screening, semi-quantitative (all elements from Li to U excluding N, O, F, Cl, Br, I)	DIN EN ISO 11885	Eluate, solutions, water
2.2.2.5	ICP-OES analysis (all elements from Li to U excluding N, O, F, Cl, Br, I)	DIN EN ISO 11885	per element
2.2.2.10	Graphite tube AAS (Pb, Cd, Tl, etc.)	DIN CEN/TS 16172	per element
2.2.2.12	FIMS-AAS (Hg)	DIN EN ISO 12846	per element
2.2.2.15	FIAS furnace AAS (As, Se, Sb, Sn)		per element
2.2.2.16	ICP-MS	DIN EN ISO 17294-2	
2.2.3	Physicochemical Parameters		
2.2.3.2	Colouration SAK 254 nm	DIN 38 404-C3	
2.2.3.4	Colouration SAK 436 nm	DIN 38 404-C3	
2.2.3.6	Density	DIN 38 404-C9	
2.2.3.8	Colouration	EN ISO 7887 (1994-12)	

2.2.3.14	Conductivity	DIN EN 27 888-C8	
2.2.3.16	Temperature	DIN 38 404-C4	
2.2.3.18	pH value	DIN EN ISO 10523	
2.2.3.20	Redox potential		

2.2.4 TRADITIONAL ANALYSIS METHODS

Traditional analysis methods do not only regularly form the basis for the evaluation of materials under conventional directives and regulations, but are often the only practical option for determining concentrations in special inquiries or matrices. Depending on the elements, matrix and method, the concentration ranges recorded vary up to ppb (µg/l).

2.2.4.5	ANC/BNC acid/alkali neutralisation capacity	DIN EN 14997	titrimetric
2.2.4.10	Evaporation residue (R)	DIN 38 409-H1	gravimetric
2.2.4.15	Filterable substances	DIN 38 409-H2	gravimetric
2.2.4.20	Hydrometer analysis	DBV (German Institute for Concrete) data sheet "Mixing water"	volumetric
2.2.4.25	Ammonium		photometric
2.2.4.35	Alkalinity pH 8.2 ($K_{B8,2}$)	DIN 38 409-H7-2-2	titrimetric
2.2.4.40	Bromide (Br^-)	EN ISO 10304-1	IC
2.2.4.45	CSB value	DIN 38 409-H41	photometric, titrimetric
2.2.4.55	Calcium (Ca)	DIN EN 196-2	potentiometric, titrimetric
2.2.4.60	Carbonate hardness		calculated
2.2.4.66	Chloride (Cl)	DIN 38405-1	IC
2.2.4.70	Chloride (Cl^-)	EN 196-21	Volhard
2.2.4.72	Chloride (Cl^-) local		photometric
2.2.4.75	Chromate (Cr[VI]) photometric	DIN 38 405-D24	
2.2.4.85	Cyanide, free		fast method

2.2.4.90	Cyanide, total (CN_{tot})	DIN 38 405-D13	photometric after solubilisation
2.2.4.95	Cyanide, weak acid dissociable (CN_{WAD})	DIN 38 405-D13	Fast method
2.2.4.100	Delta pH value		calculated
2.2.4.105	Detergents		
2.2.4.110	Iron(II) (Fe^{2+})	DIN 38 406-E1	titrimetric
2.2.4.120	Fluoride (F^-)	DIN 38 404 D4-1 EN ISO 10304-1	Potentiometric IC
2.2.4.125	Total hardness (°DGH)	DIN 38 409-H6	calculated (including necessary analysis)
2.2.4.130	Equilibrium pH value		calculated
2.2.4.132	Hardness, carbonate hardness (°DKH)	DIN 38 409-H6	calculated (including necessary analysis)
2.2.4.135	Humic substances		
2.2.4.140	Potassium permanganate index	EN ISO 8467 (H5)	titrimetric
2.2.4.145	Carbon dioxide, aggressive ($CO_{2, aggr}$)	DIN 38 404-C10	calculated (including necessary analysis)
2.2.4.155	Carbon dioxide, free ($CO_{2, free}$)	DIN 38 409-H7-2-2	calculated (including necessary analysis)
2.2.4.160	Carbon dioxide, associated ($CO_{2, assoc}$)	DIN 38 409-H7-2	calculated
2.2.4.340	lipophilic substances	DIN 38 409-H17	
2.2.4.165	Magnesium (Mg)	DIN EN 196-2	potentiometric
2.2.4.170	Manganese (Mn)		photometric
2.2.4.172	MBAS	DIN 38409-H23-1	
2.2.4.180	Nitrate (NO_3^-)	EN ISO 10 304-1	IC
2.2.4.185	Nitrate (NO_3^-)	DIN 38 05-9	photometric

2.2.4.205	Nitrite (NO_2^-)	DIN 38 05-10	photometric
2.2.4.200	Nitrite (NO_2^-)	EN ISO 10304-1	IC
2.2.4.225	Phosphate (PO_4^{3-})	DIN 38 405-D11-1	photometric
2.2.4.315	Acidity pH 4.3 ($K_{S4,3}$)	DIN 38 409-H7-1-2	titrimetric
2.2.4.267	Ammonia nitrogen (NH_4-N)	DIN 38 406-E5-2 after distillation	photometric
2.2.4.270	Ammonia nitrogen (NH_4-N)	DIN 38 406-E5-1	photometric
2.2.4.280	Sulphate (SO_4^{2-})	DIN EN 196-2	Gravimetric
2.2.4.275	Sulphate (SO_4^{2-})	DIN 38405-5	IC
2.2.4.290	Sulphide (S^{2-})	DIN 38 405-D26	titrimetric
2.2.4.300	Sulphite (SO_3)	DEV D6	titrimetric
2.2.4.325	Thiosulphate ($S_2O_3^{2-}$)		titrimetric
2.2.4.320	Thiosulphate ($S_2O_3^{2-}$)	EN ISO 10 304-1	IC
2.2.4.350	Thiocyanate (SCN)	EN ISO 10304-3	IC
2.2.4.335	Sugar		qualitative α-naphtol

2.3 ORGANIC COMPONENTS

The methods used in our laboratories for determining organic constituents generally aim to record groups of organic substances, known as sum parameters. The identification of individual substances is likewise possible after consultation with the laboratory. Depending on the elements, matrix and method, the concentration ranges recorded vary up to ppb (µg/l).

2.3.4	AOX	DIN 38 409 H14 DIN 38414- S 18 solids DIN EN ISO 9562(H14) DIN EN 1485
2.3.14	DOC	DIN EN 1484-H3
2.3.40	EOX	DIN 38 409 H8
2.3.18	KW	E DIN EN 14039
2.3.19	KW C10-C40	GC DIN EN 14039

2.3.34	PAK (TVO)	DIN 38 407 F8	
2.3.30	PAK (EPA)	EPA 610 DIN EN 15308	
2.3.26	PCB	DIN 51 527 GC-MS DIN EN 15308	
2.3.10	PCDD/PCDF (dioxins/furans)	17th German Emissions Control Ordinance (BImSchV) (NATO CCMS)	
2.3.22	Phenol index	DIN EN ISO 14402 (H37)	
2.3.12	TOC	DIN ISO 10694	
2.3.42	LHKW (solids) (eluate)	DIN EN ISO 10301 DIN 38407-F5	
2.3.6	BTEX (benzene and derivatives)	DIN 38407-F9 DIN EN ISO 15680	GC-FID
2.3.56	Chlorophenols, total	DIN EN 12673-F15	GC-MS
2.3.57	Lipophilic substances	LAGA KW/04	

3 MINERALOGICAL/PHYSICAL INVESTIGATIONS

3.1 X-RAY INVESTIGATIONS

3.1.1	Standard analysis (5-75° 2Theta), incl. preparation, equipment costs, qualitative assessment	

3.2 MICROSCOPIC INVESTIGATIONS

3.2.1	Determining glass content of ground granulated blast furnace slag in grain fraction 40/60 µm (incl. preparation, count)	ZKG, 1994 No. 11, S. 658

3.2.2	Determining ground granulated blast furnace slag content of cement in the grain fraction 30/40 µm (incl. preparation)	DIN EN 196-4
3.2.3	Qualitative evaluation of a material sample or microscopic preparation under the microscope	
3.2.4	Grain size distribution (laser granulometer)	
3.2.5	Pore content/distribution (pore-radius 2-7500 nm) using mercury pressure porosimeter	

4 MELT METALLURGY INVESTIGATIONS

4.1 MELTING IN THE TAMMANN FURNACE

4.1.1	Melting in the Tammann furnace (up to 1700°C) for reduced slag in graphite crucible Higher temperature possible on request
4.1.2	Melting in the Tammann furnace (up to 1700°C) for oxidised slag under neutral conditions (ceramic crucible) Higher temperature possible on request
4.1.3.	Variation of cooling conditions Pouring for air cooling, water granulation, indirectly cooled plates, etc. (factory tests also possible)
4.2	Determining the electrical conductivity of liquid slag Manufacturing synthetic slag
4.3	Supervision of field tests (e.g. hot sampling)
4.4	Calculation of viscosity for blast furnace slag
4.5	Calculating thermal capacity
4.6	Calculating thermal conductivity of slag (only in conjunction with hot stage microscopy)

4.7	Tempering in the muffle furnace up to 1400°C, furnace capacity 500 x 500 x 500 mm (FF products, glass, ceramic, ash, slag etc.)		
4.8	Tempering in the muffle furnace up to 1750°C, furnace capacity 200 x 300 x 250 mm (FF products, glass, ceramic, ash, slag etc.)		
4.9	Hot stage microscopy up to 1605°C (oxidising, neutral reducing atmosphere)	DIN 51730	

5. FERTILISER, SOIL AND PLANT INVESTIGATIONS

5.1 FERTILISER INVESTIGATIONS

5.1.1	P_2O_5 water extraction	VDLUFA (Association of German Agricultural Analytic and Research Institutes) data sheet II.1, 4.1.7	photometric
5.1.2	P_2O_5 citric acid extraction	VDLUFA (Association of German Agricultural Analytic and Research Institutes) data sheet II.1, 4.1.3	photometric
5.1.3	P_2O_5 double extraction		photometric
5.1.4	P_2O_5 neutral ammonium citrate extraction	EN 15957:2011-09	photometric
5.1.5	Fertilisers containing lime – Determining the alkaline effective components (neutralisation value)	EN 12945:2014	titrimetric
5.1.6	Reactivity (CaO equivalent) in carbonic and silicate lime fertilisers	EN 13971:2011 potentiometric titration with hydrochloric acid	
5.1.7	Reactivity (CaO equivalent) in carbonic and silicate lime fertilisers	EN 16357:2013-07 potentiometric titration with citric acid	

5.1.8	Fertilisers containing lime – Determining the lime effect in the soil – Soil incubation method	EN 14984:2016-07 potentiometric titration

5.2 SOIL INVESTIGATIONS

5.2.1	Determining the pH value	VDLUFA (Association of German Agricultural Analytic and Research Institutes) data sheet I, A 5.1.1
5.2.2	Determining the lime requirements of farmland and grassland soil based on pH value	VDLUFA (Association of German Agricultural Analytic and Research Institutes) data sheet I, A 5.2.2
5.2.3	Determining phosphorus and potassium content using calcium a cetate lactate (CAL) extraction	VDLUFA (Association of German Agricultural Analytic and Research Institutes) data sheet I, A 6.2.1.1
5.2.4	Determining water-soluble phosphorus content by volume (PWater)	VDLUFA (Association of German Agricultural Analytic and Research Institutes) data sheet I, A 6.2.4.1
5.2.5	Determining plant-available magnesium in calcium chloride extraction	VDLUFA (Association of German Agricultural Analytic and Research Institutes) data sheet I, A 6.2.3.2
5.2.6	Determining content of magnesium, sodium and the trace nutrients copper, manganese, zinc and boron in calcium chloride/DTPA extraction	VDLUFA (Association of German Agricultural Analytic and Research Institutes) data sheet I, A 6.4.1
5.2.7	Determining the soluble sulphur in calcium chloride extraction (Smin)	VDLUFA (Association of German Agricultural Analytic and Research Institutes) data sheet I, A 6.3.1

5.2.8.1	Determining the elements in the soil that are soluble in aqua regia at atmospheric pressure in a reflux system	EN 13657
5.2.8.2	Determining the elements in the soil that are soluble in aqua regia using microwave pressure extraction	EN 13657

5.3 PLANT INVESTIGATIONS

5.3.1	Determining phosphorus, potassium, magnesium, sulphur and trace elements in plants using microwave-assisted nitric acid solubilisation	ICP-OES measurement

6. CEMENT AND CONCRETE ENGINEERING INVESTIGATIONS

6.1 LABORATORY CEMENT MANUFACTURING

6.1.1	Preparation of raw material for a specific surface area < 4000 cm²/g	
6.1.2	Preparation of raw material for a specific surface area > 4000 cm²/g	
6.1.3	Manufacturing of test cements	

6.2 PHYSICAL PROPERTIES

6.2.1	Density	
6.2.1.1	True density (pycnometer method)	Journal series of the cement industry, issue 33
6.2.1.2	Bulk density (Böhme)	DIN EN 459-2

6.2.1.3	Gross density	Helium pycnometry
6.2.2	Particle size analysis	
6.2.2.1	Screen analysis (dry screening)	
6.2.2.2	Screen analysis (air jet screening)	
6.2.2.3	Grain size distribution (laser granulometer)	
6.2.2.4	Specific surface area (Blaine)	DIN EN 196-6
6.2.2.5	Specific surface area (according to Blaine) including true density	DIN EN 196-6
6.2.2.6	Specific surface area (according to BET, 5-point measurement)	DIN 66131
6.2.3	Moisture	
6.2.3.1	Intrinsic moisture (drying cabinet)	
6.2.3.2	Intrinsic moisture (drying scale)	
6.2.4	Grindability according to Zeisel	Journal series of the cement industry, issue 14
6.2.5	Hydration heat	
6.2.5.1	Solution calorimeter	DIN EN 196-8
6.2.5.2	Fast method for CEM III	VDZ (Association of German Cement Works) work committee
6.2.5.3	Heat flow calorimeter (TAM Air)	DIN CEN/TR 16632
6.2.6	Porosity (calculated)	
6.2.7	Pouring angle	
6.2.8	Vickers micro-hardness	

6.3 DETERMINING CEMENT CONSTITUENTS

6.3.1	Ground granulated blast furnace slag content	

6.3.1.1	microscopic/chemical	DIN 1164-31
6.3.1.2	chemical without sulphide correction	DIN Technical Report CEN/TR 196-4
6.3.1.3	chemical with sulphide correction	DIN Technical Report CEN/TR 196-4
6.3.1.4	qualitative sulphide test	

6.4 UNSET CEMENT INVESTIGATIONS

6.4.1	Manufacturing and storage of mortar prisms	DIN EN 196-1 DIN EN 1015-2
6.4.1.1	per inspection appointment	Standard conditions At 5/10°C
6.4.2	Water demand	DIN EN 196-3
6.4.3	Setting times	DIN EN 196-3
6.4.4	Volume stability	
6.4.4.1	Le Chatelier	DIN EN 196-3
6.4.4.2	Boiling test	Former DIN 1164-6
6.4.5	Consistency	
6.4.5.1	Flow table	DIN EN 1015-3 DIN EN 413-2 DIN EN 459-2
6.4.5.2	Penetration depth	DIN EN 1015-4 DIN EN 413-2 DIN EN 459-2
6.4.6	Air content (litre jug)	DIN EN 1015-7 DIN EN 413-2 DIN EN 459-2
6.4.7	Gross density (litre jug)	DIN EN 1015-6 DIN 18555-3
6.4.8	Fault correction time	DIN EN 1015-9

6.4.9	Workability time	DIN EN 1015-9	
	6.4.10	Sources of grout	DIN EN 445
6.4.10.1	First inspection appointment		
6.4.10.2	Each additional inspection appointment		
6.4.11	Immersion times for grout	DIN EN 445	
6.4.12	Chromium in cement	DIN EN 156-10	

6.5 HARDENED CEMENT INVESTIGATIONS

6.5.1	Flexural and compressive strength	DIN EN 196-1 DIN EN 1015-11 DIN 18555-3
6.5.2	Dynamic Young‘s modulus or lateral strain modulus	Impulse excitation
6.5.3	Static Young‘s modulus or lateral strain modulus	DIN 18555-4
6.5.4	Gross density (hardened cement)	DIN EN 1015-10
6.5.5	Dry gross density	DIN EN 1015-10
6.5.6	Bond strength minimum bond shear strength)	DIN EN 1052-3
6.5.6.1	First series	
6.5.6.2	each additional series	
6.5.7	Compressive strength in the interstice	DIN 18555-9
6.5.8	Water absorption coefficient	DIN EN 1015-18
6.5.9	C value (including report)	NEN 5970
6.5.10	Air void characteristic values	DIN EN 480-11

6.6 DURABILITY

6.6.1	Sulphate resistance	
6.6.1.1	Wittekind method 20°C	

6.6.1.2	Wittekind method 8°C	
6.6.1.3	Koch / Steinegger	
6.6.1.4	SVA method 20°C	
6.6.1.5	SVA method 8°C	
6.6.2	Alkali-silica reaction quick test (without preparation of starting materials)	DAfStb (German Reinforced Concrete Committee) Alkali Directive T 3

6.7 SUMMARISED INVESTIGATIONS

6.7.1	Testing supplied cement:	
6.7.1.1	Manufacturing and storage of mortar prisms, true density, spec. surface area (Blaine), PSD water demand, setting times (Vicat), volume stability (Le Chatelier), pressure and flexural strength for 2 inspection appointments	
6.7.1.2	for each additional inspection appointment	
6.7.2	Testing normal cement within the framework of conformity evaluation: as 4.7.1 plus annealing losses, CO_2, Cl^- and SO_3 content, insoluble residues, main constituents, without sampling, incl. inspection report	DIN EN 197-2
6.7.3	Manufacturing a test cement: preparing and mixing the starting components	
6.7.3.1	< 4000 cm²/g	
6.7.3.2	> 4000 cm²/g	
6.7.4	Testing supplied mortar prisms: compressive and flexural strength, dry gross density, test certificate	DIN EN 1015-10 DIN EN 1015-11
6.7.5	Suitability testing for mortar: manufacturing mortar prisms, consistency, gross density and	DIN EN 998-2

	air content of the unset cement, compressive and flexural strength (28 days), dry gross density (28 days), inspection report (alternative scope of testing may be possible)	
6.7.6	Double testing of delayed mortar	DIN EN 998-2
6.7.7	Suitability testing for mortar as 4.7.5 plus compressive strength in the interstice and bond strength, (alternative scope of testing may be possible)	DIN EN 998-2/ DIN V 18580
6.7.8	Double testing of delayed mortar	DIN EN 998-2/ DIN V 18580

7. CONCRETE TESTS

7.1. AGGREGATES

7.1.1	Sampling	DIN EN 932-1
7.1.2	Grain size distribution	DIN EN 933-1
7.1.2.1	Dry screening (up to maximum aggregate size 32 mm)	
7.1.2.2	Dry screening (maximum aggregate size > 32 mm, ≤ 63 mm)	
7.1.2.3	Wet screening	
7.1.2.4	Air jet screen	
7.1.2.5	Fines content (< 0.125 mm) incl. sample preparation	
7.1.3	Intrinsic moisture (water content by kiln drying)	
7.1.4.	Bulk density	DIN EN 1097-3
7.1.5	Gross density and water absorption	DIN EN 1097-6
7.1.5.1	Pycnometer method for aggregates with a maximum grain size up to 32 mm	DIN EN 1097-6

7.1.5.2	Method for aggregates with a maximum grain size over 32 mm	DIN EN 1097-6
7.1.6	Resistance to frost (10 freeze-thaw cycles)	DIN EN 1367-1
7.1.7	Magnesium sulphate test	EN 1367-2
7.1.8	Harmful components	
7.1.8.1	Determining fines content	DIN EN 933-1
7.1.8.2	Elutriable components with the hydrometer analysis	DIN 4226-3
7.1.8.3	Elutriable components with the wash-out test	DIN 4226-3/NEN 5917
7.1.8.4	Soft component content	NEN 5918
7.1.9	Determining organic components	
7.1.9.1	Humus content	DIN EN 1744-1/ NEN 5919
7.1.9.2	Fulvic acid content	DIN EN 1744-1
7.1.9.3	Floating contaminants	DIN EN 1744-1
7.1.9.4	Fe and Va compounds	NEN 5923
7.1.9.5	Seashell content	DIN EN 933-7/ NEN 5922
7.1.10	Acid-soluble sulphates	DIN EN 1744-1, Section 12
7.1.11	Total sulphur content	DIN EN 1744-1, Section 11
7.1.12	Chloride (Volhard, double testing)	DIN EN 1744-1, Section 7
7.1.13	Determining grain geometry	
7.1.13.1	Flakiness index for each grain class	DIN EN 933-3
7.1.13.2	Grain geometry index for each grain class	DIN EN 933-4

7.1.14	Determining the flow coefficient for fine aggregates (incl. gross density measurement)	DIN EN 933-6

7.2 ADDITIVES (FLY ASH/ROCK FLOUR)

7.2.1	Suitability testing for mineral coal fly ash	DIN EN 450

7.3 UNSET CONCRETE

7.3.1	Sampling	DIN EN 12350-1
7.3.2	Designing a concrete mixture for known properties of starting materials	
7.3.3	Manufacturing a laboratory mixture	
7.3.4	Manufacture and storage of samples	DIN EN 12390-2
7.3.5.1	Consistency with a compaction test	DIN EN 12350-4
7.3.5.2	Consistency with the flow table	DIN EN 12350-5
7.3.5.3	Consistency with the slump test	DIN EN 12350-2
7.3.6	Gross density	DIN EN 12350-6
7.3.7	Concrete composition	DIN 52 171
7.3.8	Water-cement ratio by drying unset concrete in a drying vessel	DIN 1048-1
7.3.9	Air content using the pressure equalisation method	DIN EN 12350-7
7.3.10	Pore size distribution and air void characteristic values using DBT device	

7.4 HARDENED CONCRETE

7.4.1	Moisture of hardened concrete	DIN 1048-5

7.4.2	Gross density measurement by weighing underwater	DIN EN 12390-7
7.4.3	Dry gross density of hardened concrete bodies	
7.4.4	Manufacturing a test sample from hardened concrete (sawing work)	
7.4.5	Comparison of test samples with cement paste	
7.4.6	Compressive strength of a test sample supplied ready for testing, incl. storage, geometry, dimensions and hardened concrete gross density	DIN EN 12390-3
7.4.7	Flexural strength of a bar supplied ready for testing, incl. storage, geometry, dimensions and hardened concrete gross density	DIN EN 12390-5
7.4.8	Splitting tensile strength of a concrete body supplied ready for testing, incl. storage, geometry, dimensions and hardened concrete gross density	DIN EN 12390-6
7.4.9	Water impermeability of a slab supplied ready for testing 12 x 20 x 20 mm	DIN EN 12390-8
7.4.10	Water absorption	DAfStb (German Reinforced Concrete Committee), issue 422
7.4.10.1	Water absorption at atmospheric pressure	
7.4.11	Porosity	
7.4.11.1	Total porosity via the ratio gross density/density	DAfStb (German Reinforced Concrete Committee), issue 422
7.4.11.2	Pore content and pore distribution relative to the binding agent, including preparation	Mercury pressure porosimeter
7.4.11.3	Pore content and pore distribution relative to the mortar, including preparation	Mercury pressure porosimeter

7.4.12	Depth of carbonation Phenolphthalein solution	DIN EN 14630
7.4.13	Young's modulus	
7.4.13.1	static	DIN 1048-5
7.4.13.2	dynamic (prismatic test sample)	Impulse excitation
7.4.13.3	dynamic (other geometry)	Impulse excitation
7.4.14	Resistance to freeze-thaw loading, with and without simultaneous de-icing agent loading	
7.4.14.1	Weathering on 2 cubes up to 100 freeze-thaw cycles	VDZ (Association of German Cement Works) cubes, immersion method
7.4.14.2	Weathering on 5 test samples up to 56 freeze-thaw cycles, incl. ultrasound measurement	CIF test
7.4.14.3	Weathering on 5 test samples up to 28 freeze-thaw cycles, incl. ultrasound measurement	CDF test
7.4.15	Removal of concrete cores	
7.4.16	Time expenses and km travelled	
7.4.17	Core bit wear	
7.4.18	Sealing bore holes	
7.4.19	Visual evaluation of core samples, specifying dimensions, aggregate microstructure, position and diameter of reinforcement	
7.4.20	Preparation (sawing and grinding) and testing of core samples for compressive strengths, incl. gross density	DIN EN 12390-3
7.4.20.1	Diameter 50 mm	
7.4.20.2	Diameter 80 mm	

7.4.20.3	Diameter 100 mm	
7.4.20.4	Diameter 150 mm	
7.4.20.5	Diameter 200 mm	
7.4.21	Binding agents containing ground granulated blast furnace slag, qualitative	Sulphide test
7.4.22	Composition of hardened cement mortar (insoluble residue, CO_2, H_2O, dry gross density, grading curve)	
7.4.22.1	Cement content with grain crushing of aggregates	DIN 52 170-2
7.4.22.2	Cement content without grain crushing of aggregates	DIN 52 170-3
7.4.22.3	Grading curve of eluted aggregates	DIN EN 933-1
7.4.23	Composition of hardened concrete (insoluble residue, CO_2, H_2O, dry gross density, grading curve)	
7.4.23.1	Cement content with grain crushing of aggregates	DIN 52 170-2
7.4.23.2	Cement content without grain crushing of aggregates	DIN 52 170-3
7.4.23.3	Grading curve of eluted aggregates	DIN EN 933-1
7.5.24	Elution of steel fibres, determining steel fibre content	
7.5.25.1	SO_3 in concrete, absolute, incl. sample preparation	
7.5.25.2	SO_3 in concrete, calculated for binding agents, incl. sample preparation	
7.5.25.3	SO_3 in concrete, absolute, for analytically pure samples	
7.5.25.4	SO_3 in concrete, calculated for binding agents, in analytically pure samples	

7.5.26.1	Cl^- in concrete, absolute, incl. sample preparation	
7.5.26.2	Cl^- in concrete, calculated for binding agents, incl. sample preparation	
7.5.26.3	Cl^- in concrete, absolute, for analytically pure samples	
7.5.26.4	Cl^- in concrete, calculated for binding agents, in analytically pure samples	
7.5.27	Fly ash qualitative	
7.5.28	Strength testing with the rebound hammer, incl. preparation of test surface	DIN EN 12504-2
7.5.29	Surface/adhesive pull strength	DAfStb (German Reinforced Concrete Committee) directive
7.5.29.1	without drilling a circular groove	
7.5.29.2	with drilling a circular groove	
7.5.30	Tear strength of concrete base layers and applied top layers	ZTV-Ing. (Additional Technical Contract Conditions for Civil Engineering Structures)
7.5.31	Crack survey, setting gypsum marks, shrinkage measurements with extensometer, reinforcement coverage using profometer etc.	
7.5.32	Concrete engineering and handling water-polluting substances	
7.5.32.1	Penetration of test liquid into uncracked concrete	DAfStb (German Reinforced Concrete Committee) directive
7.5.32.2	Defining the damage depth of liquids that attack concrete	DAfStb (German Reinforced Concrete Committee) directive
7.5.32.3	Penetration of test liquid into uncracked concrete (5 hours per day/28 days duration)	TRbF (Technical Regulations for Flammable Liquids) 111
7.5.32.4	Penetration depth in fibre concrete (time until liquid penetrates)	

8 AGGREGATES FOR EARTHWORKS, ROAD CONSTRUCTION AND HYDRAULIC ENGINEERING

8.1 SAMPLE PREPARATION

8.1.1	Sample preparation (crushing grinding)	
8.1.2	Sample division	DIN EN 932-2
8.1.3	Intrinsic moisture (water content by kiln drying)	DIN EN 1097-5

8.2 GENERAL MATERIAL PROPERTIES

8.2.1	Visual evaluation of aggregate samples	DIN EN 932-3
8.2.2	Petrographic and mineralogical investigation	
8.2.3	Substance composition of RC construction materials	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 3.1.5, DIN EN 933-11
8.2.4	Gross density of aggregates ≤ 31.5 mm (pycnometer method)	DIN EN 1097-6, Appendix A.4
8.2.5	Gross density of aggregates > 31.5 mm (wire basket method)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 3.2.2 / DIN EN 1097-6, Appendix A.3
8.2.6	Water absorption of aggregates	DIN EN 1097-6, Appendix B
8.2.7	Gross density and water absorption of armour stones / track ballast (wire basket method)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 3.2.2 / DIN EN 1097-6, Appendix B / DIN EN 13383-2, 13450

8.3 GRANULOMETRIC PROPERTIES

8.3.1	Grain size distribution	
8.3.1.1	Dry screening (maximum grain size ≤ 31.5 mm)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 4.1.2 / DIN EN 933-1
8.3.1.2	Dry screening (maximum grain size > 31.5 mm)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 4.1.2 / DIN EN 933-1
8.3.1.3	Determining fines content of a grains as delivered (washing)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 4.1.2 / DIN EN 933-1
8.3.1.4	Determining fines content of a construction material mixture (washing)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 4.1.2 / DIN EN 933-1
8.3.1.5	Grain size distribution of fine aggregates (air jet screening)	DIN EN 933-10
8.3.1.6	Grain size distribution of filler (air jet screening)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 4.1.4 / DIN EN 933-10
8.3.1.7	Grain size distribution (laser granulometer)	
8.3.1.8	Rock size distribution of armour stones, including rock geometry	DIN EN 13383-2
8.3.2	Mass distribution of armour stones	DIN EN 13383-2
8.3.3	Determining grain geometry	
8.3.3.1	Flakiness index	DIN EN 933-3
8.3.3.2	Grain geometry index	DIN EN 933-4
8.3.4	Angularity	DIN EN 933-5

8.3.5	Determining the flow coefficient for fine aggregates (incl. gross density measurement)	DIN EN 933-6
8.3.6	Bulk density	DIN EN 1097-3
8.3.7	Humus content	DIN EN 1744-1
8.3.8	Fulvic acid content	DIN EN 1744-1
8.3.9	Floating contaminants	DIN EN 1744-1
8.3.10	Acid-soluble sulphates	DIN EN 1744-1
8.3.11	Total sulphur content	DIN EN 1744-1
8.3.12	Chloride	DIN EN 1744-1

8.4 RESISTANCE TO WEATHERING

8.4.1	Volume stability	
8.4.1.1	Steam test on steel mill slag (24 h) including sample preparation	DIN EN 1744-1
8.4.1.2	Steam test on steel mill slag (24 h) on prepared aggregate sample	DIN EN 1744-1
8.4.1.3	Steam test on steel mill slag (168 h) including sample preparation	DIN EN 1744-1
8.4.1.4	Steam test on steel mill slag (168 h) on prepared aggregate sample	DIN EN 1744-1
8.4.1.8	Free lime content CaOfree including sample preparation	
8.4.1.9	Lime decomposition of blast furnace slag	DIN EN 1744-1
8.4.1.10	Iron decomposition of blast furnace slag	DIN EN 1744-1
8.4.1.11	Boiling test on armour stones	DIN EN 13383-2
8.4.2	Resistance to frost loading	

8.4.2.1	Freeze-thaw cycle trial on coarse aggregates (grain size 4 to 63 mm)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 6.3.1 / DIN EN 1367-1
8.4.2.2	Freeze-deicing salt cycle trial on coarse aggregates (grain size 4 to 63 mm)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 6.3.4 / DIN EN 1367-6
8.4.2.3	Freeze-thaw cycle trial on fine aggregates (sand)	'TP Gestein-StB' Technical Test C onditions for Aggregates in Road Construction 6.3.3
8.4.2.4	Freeze-thaw cycle trial on armour stones	DIN EN 13383-2
8.4.3	Magnesium sulphate test	'DIN EN 1367-2
8.4.4	Resistance to heat loading (plus impact and Los Angeles abrasion test)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 6.5.1 /DIN EN 1367-5
8.4.5	Water sensitivity of fine aggregates (batch abrasion method)*	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 6.6.3

8.5 RESISTANCE TO MECHANICAL LOADING

8.5.1	Aggregate crushing value grit (8/12.5 mm), plus gross density calculation	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 5.1.2 /DIN EN 1097-2
8.5.2	Aggregate crushing value crushed aggregate (> 31.5 mm), plus gross density calculation	DIN 52 115-2 / DIN EN 13450
8.5.3	Los Angeles abrasion test grit (10/14 mm)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 5.3.1.1 DIN EN 1097-2
8.5.4	Los Angeles abrasion test Crushed aggregate (> 31.5 mm)	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 5.3.1.2

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8.5.5	Pressure test (incl. drilling, cutting, grinding)	DIN EN 1926	
8.5.6	Polished stone value (PSV)*	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 5.4.1 / DIN EN 1097-8	
8.5.7	Micro-Deval test (resistance to abrasion)	DIN EN 1097-1	
8.5.8	Nordic abrasion test (resistance to wear from spiked tyres), including sample preparation	DIN EN 1097-9	
8.5.9	Nordic abrasion test on prepared aggregate sample	DIN EN 1097-9	

8.6 COMPACTION AND LOAD-BEARING CAPACITY

8.6.1	Proctor test Cylinder diameter	Ø = 100 mm Ø = 150 mm Ø = 250 mm	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 8.1.1 / DIN EN 13286-2
8.6.2	Static CBR test	DIN EN 13286-47	
8.6.3	Dynamic CBR test	'TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 5.6	
8.6.4	Plate-loading test where a counterweight is provided by the client	DIN 18134	
8.6.5	Self-hardening of steel slag	'RuA-StB' Guidelines for Environmental-Friendly Utilisation of Industrial By-Products and Recycled Building Materials in Road Construction	
8.6.6	Density calculation for soil		
8.6.6.1	Cutter cylinder method	DIN 18125-2	

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8.6.6.2	Sand replacement method	DIN 18125-2
8.6.6.3	Balloon method	DIN 18125-2

8.7 OTHER TESTS

8.7.1	Skid resistance test (SRT and outflow meter)	'TP Griff-StB' Technical Test Conditions for Traction of Building Materials in Road Construction
8.7.2	Macro-texture depth (sand patch method)	DIN EN 13036-1
8.7.3	Water permeability coefficient when optimal water content is present	DIN 18130-1
8.7.4	Permeability test (field test) (double-ring infiltrometer)	TP Gestein-StB' Technical Test Conditions for Aggregates in Road Construction 8.3.2, 8.3.4
8.7.5	Consistency limits	
8.7.5.1	Flow limits	DIN 18122
8.7.5.2	Roll-out limit	DIN 18122
8.7.5.3	Shrinkage limit	DIN 18122

9 BITUMEN AND ASPHALT

9.1 BITUMEN AND BINDING AGENTS CONTAINING BITUMEN

9.1.1	External structure	DIN EN 1425
9.1.2	Needle penetration	DIN EN 1426
9.1.3	Ring-and-ball softening point	DIN EN 1427
9.1.4	Fraass breaking point	DIN EN 12593
9.1.5	Elastic recovery	DIN EN 13398
9.1.6	Density	DIN EN 15326
9.1.7	Ash content	DIN 52 005

9.1.8	Resistance to hardening under the influence of heat and air (RFT method)	DIN EN 12607-3

9.2 ASPHALT, INDIVIDUAL TESTING

9.2.1	External structure	
9.2.2	Binding agent content	
9.2.2.1	Recovery process	'TP Asphalt-StB' Technical Test Conditions for Asphalt Building Materials in Road Construction, Parts 1 & 3
9.2.2.2	Differential method	'TP Asphalt-StB' Technical Test Conditions for Asphalt Building Materials in Road Construction, Part 1
9.2.3	Determining grain size composition through dry screening	'TP Asphalt-StB' Technical Test Conditions for Asphalt Building Materials in Road Construction, Part 2
9.2.4	Determining the gross density of asphalt	'TP Asphalt-StB' Technical Test Conditions for Asphalt Building Materials in Road Construction, Part 5
9.2.5	Determining the density by volume of asphalt	'TP Asphalt-StB' Technical Test Conditions for Asphalt Building Materials in Road Construction, Part 6
9.2.6	Determining the adhesion between rock and bitumen (affinity)	'TP Asphalt-StB' Technical Test Conditions for Asphalt Building Materials in Road Construction, Part 11
9.2.7	Manufacturing asphalt test samples (MPKs) from mixed materials supplied, using the Marshall compaction device	'TP Asphalt-StB' Technical Test Conditions for Asphalt Building Materials in Road Construction, Part 30
9.2.8	Determining Marshall stability and flow value	'TP Asphalt-StB' Technical Test Conditions for Asphalt Building Materials in Road Construction, Part 34

9.2.9	Manufacturing cast asphalt cubes from mixed materials supplied	'TP Asphalt-StB' Technical Test Conditions for Asphalt Building Materials in Road Construction, Part 20
9.2.10	Penetration depth in cast asphalt cubes	'TP Asphalt-StB' Technical Test Conditions for Asphalt Building Materials in Road Construction, Part 20
9.2.11	Coating thickness on core sample	
9.2.12	Layer separation in core sample	
9.2.13	Layer bond using Leutner adhesion test*	'TP Asphalt-StB' Technical Test Conditions for Asphalt Building Materials in Road Construction, Part 80

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