

Quantz 190MPa

Quantz Q190 Properties

Kassel, Thursday, May 1, 2010

The properties of Quantz vary due to G.tecz is developing the material under consideration of local available raw-materials, volume, fiber content, production facilities, environmental conditions and structural requirements. Ensuing, the following UHPC parameters are guideline values:

Concrete		UHPC 1 Water stored	UHPC 1 Heat treated 90°C	UHPC 2 Water stored	UHPC 2 Heat treated 90°C
Compression strength [N/mm ²] Cylinder 150/300 mm	7d 28d	128 153	200 208	140 158	195 205
Centr. tension strength [N/mm ²]	28d	7 (without steel fibres)			
Centr. tension strength [N/mm ²]	28d	15 (with steel fibres)			
Flexural strength [N/mm ²] Beam 700x150x150 mm	7d 28d	11,1 13,3	22,1 22,2	18,3 20,4	18,0 17,9
Prism 160*40*40 mm	7d 28d		34,7 35,7		26,3 29,3
Fracture Energy with 2,5 Vol.-% steel fibres	28d	12.900 - 19.800 N/m			
Young-Modul	28d	48.000 – 55.000 N/mm ²			
Poison Ratio		0,18 – 0,24			
Prosity (total)	28d	about. 6 Vol.-%			
Capillary pores	28d	1,5 – 1,8 Vol.-%			
Autogenic Shrinkage	to 100h	-0,44 to - 0,55 mm/m			
Dehydration Shrinkage	From 2d to 250d	-0,38 to -0,55 mm/m			
Shrinkage (total)	to 250d	-0,71 to -1,06 mm/m			
Creep	$\Phi_{28,90}$	Water stored = 0,5 Heat treated (90°C) = 0,2			
Carbonating (3 years)	weathering Norm	1,5 to 2,5 mm 1,5 to 1,7 mm			
Sulfat		No damages			
Freeze-Thaw-Resistance	28 cycles 56 cycles 112 cycles	18 to 208 g/m ² 31 to 379 g/m ² 155 to 722 g/m ²			
Fire resistance		No damages by adding 0,6 Vol.-% PP-fibres			

MPa = N/mm²

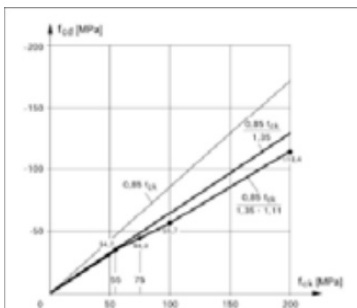


Diagram 1: f_{cd} – f_{ck} for precast units

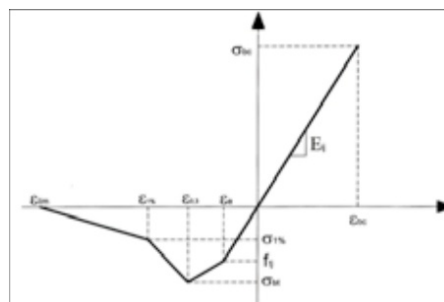


Diagram 2: Stress-Strain curve of the AFGC / SETRA regulations. Recognize the left tension-part of the diagram.

Recommendation for FEM calculations – Q190 MPa

We recommend the following parameters:

Youngs-modulus	45000 [MPa]	
Poisson-Ratio	0.20 [-]	
Strength f_c	165.00 [MPa]	calculate with: $f_c = 0.85 \times 190 / 1.35$
Tens. strength	7.00 [MPa]	WITHOUT Fibres: calculate with $f_{ctm} = 0.4 \times 7$ MPa
Flex. tens. strength	15.00 [MPa]	WITH Fibres: calculate with $f_{ctm} = 0.4 \times 15$ MPa
Weight	25.0 [kN/m ³]	WITH Fibres: up to 27
Temp.elongat.coeff.	1.10 E-05 [-]	
Compr.failure energy	20.00 [kJ/m]	Fracture Energy

The safety factors are referring to the upcoming German pre-version of the “Sachstandsbericht Ultra Hochfester Beton”. The tension safety factors are referring to the FIB-Recommendations and AFGC / SETRA. With these safety factors, calculations are within the linear elastic material properties.

Property requirements

The other way round, G.tecz can develop a Quantz for your structural requirements. In case, the above performed parameters do not fit to your structural calculations, you can send us your preferred parameters and G.tecz will verify if those are hypothetical realizable.

Quantz Q250 - the new cement bonded high-tech material

This material is the next generation of cement bonded materials. Due to nano-optimization of packing density and activation of inert fines that are functioning as nano-reinforcement, we can generate a matrix with a flexural strength of up to 25 MPa - without fibres.

Youngs-modulus	45000 [MPa]	
Poisson-Ratio	0.20 [-]	
Strength f_c	250.00 [MPa]	calculate with: $f_c = 0.85 \times 190 / 1.35$
Tens. strength f_{ctm}	25.00 [MPa]	WITHOUT Fibres

PLEASE contact us for detailed Quantz properties and calculation assistance.