

TECHNICAL REPORT

Our Ref: MS/SG/GEM-TECH

TESTS ON GEM-TECH REPORT REF: CU/F&C LAB

Cubes, Beams and Prisms have been produced in GEM-TECH Materials which were cast at Coventry University on the given date(s)

The 100mm Cubes were cast in accordance with **BS EN 12390-3**

The Beams were cast in accordance with **BS EN 12390-5**

The Prisms were cast in accordance with **BS EN 13412**

The specimen details are given below:

MATERIAL DETAILS

Date Cast	Sand Content Kg/Minute	Cement Content Kg/Minute	Water Content Litres/Minute	Foam Content Litres/Minute	Temp & Humidity	Curing Method
30/06/2009	11.34	2.37	2.88	0.2500	22.4°C/ 49%	Natural

TEST RESULTS

Type of Test	Specimen Ref.	Age at Test (Days)	Strength (N/mm ²)	Machine Setting Density	Dry Density Kg/Mt ³	Comments
Compressive	CU330	56	28.30	1810	1840	Excellent Result
Compressive	CU335	56	24.26	1810	1855	Good
Compressive	CU336	28	27.30	1810	1805	Excellent Result
Compressive	CU337	14	26.56	1810	1830	Very Good Result

**On Behalf of Coventry University, the Department of the Built Environment
Dr. M. Saidani, Reader in Structural Engineering**

**J. GORRELL
SENIOR TECHNICIAN**

TECHNICAL REPORT

Our Ref: MS/SG/GEM-TECH

TESTS ON GEM-TECH REPORT REF: CU/F&C LAB

Cubes, Beams and Prisms have been produced in GEM-TECH Materials which were cast at Coventry University on the given date(s)

The 100mm Cubes were cast in accordance with **BS EN 12390-3**

The Beams were cast in accordance with **BS EN 12390-5**

The Prisms were cast in accordance with **BS EN 13412**

The specimen details are given below:

MATERIAL DETAILS

Date Cast	Sand Content Kg/Minute	Cement Content Kg/Minute	Water Content Litres/Minute	Foam Content Litres/Minute	Temp & Humidity	Curing Method
04/08/2009	11.213	3.79	2.97	0.2190	23.1°C/52%	Natural

TEST RESULTS

Type of Test	Specimen Ref.	Age at Test (Days)	Strength (N/mm ²)	Machine Setting Density	Dry Density Kg/Mt ³	Comments
Compressive	CU590A	56	52.80	2000	2160	Incredible Result Density a little high

**On Behalf of Coventry University, the Department of the Built Environment
Dr. M. Saidani, Reader in Structural Engineering**

**J. GORRELL
SENIOR TECHNICIAN**

TECHNICAL REPORT

Our Ref: MS/SG/GEM-TECH

TESTS ON GEM-TECH REPORT REF: CU/F&C LAB

Cubes, Beams and Prisms have been produced in GEM-TECH Materials which were cast at Coventry University on the given date(s)

The 100mm Cubes were cast in accordance with **BS EN 12390-3**

The Beams were cast in accordance with **BS EN 12390-5**

The Prisms were cast in accordance with **BS EN 13412**

The specimen details are given below:

MATERIAL DETAILS

Date Cast	Sand Content Kg/Minute	Cement Content Kg/Minute	Water Content Litres/Minute	Foam Content Litres/Minute	Temp & Humidity	Curing Method	
12/05/2010	11.04	2.52	2.15	0.0159	18.4°C/54%	Natural	

TEST RESULTS

Type of Test	Specimen Ref.	Age at Test (Days)	Strength (N/mm ²)	Machine Setting Density	Dry Density Kg/Mt ³	Comments
Compressive	CU1270	56	27.06	1810	2096.13	V. Good, Density too high
Compressive	CU1271	28	24.52	1810	2089.83	Good, Density too high
Compressive	CU1272	56	26.58	1810	2081.40	V. Good, Density too high
Compressive	CU1273	28	25.37	1810	2082.90	V. Good, Density too high
Compressive	CU1275	14	22.24	1810	2071.34	V. Good Density too high
						Catalyst/Foam content used was too low

**On Behalf of Coventry University, the Department of the Built Environment
Dr. M. Saidani, Reader in Structural Engineering**

**J. GORRELL
SENIOR TECHNICIAN**

TECHNICAL REPORT

Our Ref: MS/SG/GEM-TECH

TESTS ON GEM-TECH REPORT REF: CU/F&C LAB

Cubes, Beams and Prisms have been produced in GEM-TECH Materials which were cast at Coventry University on the given date(s)

The 100mm Cubes were cast in accordance with **BS EN 12390-3**

The Beams were cast in accordance with **BS EN 12390-5**

The Prisms were cast in accordance with **BS EN 13412**

The specimen details are given below:

MATERIAL DETAILS

Date Cast	Sand Content Kg/Minute	Cement Content Kg/Minute	Water Content Litres/Minute	Foam Content Litres/Minute	Temp & Humidity	Curing Method	
12/07/2010	10.85	2.71	1.96	0.2430	22.9°C/59%	Natural	

TEST RESULTS

Type of Test	Specimen Ref.	Age at Test (Days)	Strength (KN/mm ²)	Machine Setting Density	Dry Density Kg/Mt ³	Comments
Beam Strength	B12	23	38.7	1810	1879.98	The Beam tested at 23 Days, the PhD Student
Steel Re-enforced						miscalculated the 28 Day Test date
						At 56 Days the predicted load applied to this Beam
						before deflection would have been 51Kn/mm ²
						A staggering 5.1 tonnes

On Behalf of Coventry University, the Department of the Built Environment

Dr. M. Saidani, Reader in Structural Engineering

J. GORRELL

SENIOR TECHNICIAN

TECHNICAL REPORT

Our Ref: MS/SG/GEM-TECH

TESTS ON GEM-TECH REPORT REF: CU/F&C LAB

Cubes, Beams and Prisms have been produced in GEM-TECH Materials which were cast at Coventry University on the given date(s)

The 100mm Cubes were cast in accordance with **BS EN 12390-3**

The Beams were cast in accordance with **BS EN 12390-5**

The Prisms were cast in accordance with **BS EN 13412**

The specimen details are given below:

MATERIAL DETAILS

Date Cast	Sand Content Kg/Minute	Cement Content Kg/Minute	Water Content Litres/Minute	Foam Content Litres/Minute	Temp & Humidity	Curing Method	
16/08/2010	10.43	3.13	1.90	0.0159	21.2°C/62%	Natural	

TEST RESULTS

Type of Test	Specimen Ref.	Age at Test (Days)	Strength (N/mm ²)	Machine Setting Density	Dry Density Kg/Mt ³	Comments
Compressive	CU1740	56	24.08	1810	1924.86	Reasonable, Density high
Compressive	CU1750	56	26.15	1810	2066.20	Good, Density high
Compressive	CU1752	56	27.89	1810	2086.35	V. Good, Density high
Compressive	CU1753	28	25.36	1810	2094.35	Excellent, Density high
Compressive	CU1754	56	30.36	1810	2091.14	Excellent, Density high
Compressive	CU1757	56	28.28	1810	2092.59	V. Good, Density high
Compressive	CU1758	56	29.03	1810	2091.78	Excellent, Density high

**On Behalf of Coventry University, the Department of the Built Environment
Dr. M. Saidani, Reader in Structural Engineering**

**J. GORRELL
SENIOR TECHNICIAN**

TECHNICAL REPORT

Our Ref: MS/SG/GEM-TECH

TESTS ON GEM-TECH REPORT REF: GT/F&C LAB

Cubes, Beams and Prisms have been produced in GEM-TECH Materials which were cast by the GEM-TECH Machine and tested at Coventry University on the given date(s)

The 100mm Cubes were cast in accordance with **BS EN 12390-3**

The Beams were cast in accordance with **BS EN 12390-5**

The Prisms were cast in accordance with **BS EN 13412**

The specimen details are given below:

MATERIAL DETAILS

Date Cast	Sand Content Kg/Minute	Cement Content Kg/Minute	Ratio Of Mix	Water Content Litres/Minute	Foam Content Litres/Minute	Temperature °C Humidity %	Curing Method Of Specimens
18 Oct 2013	111.09	28.58	3.89:1	20.78	8.8	19.4° 81%	Natural

TEST RESULTS

Date of Test	Type of Test	Specimen Ref.	Age at Test (Days)	Strength (N/mm ²) (P.S.I.)	Wet Density Kg/Mt ³	*56 Day Density Kg/Mt ³	Comments
TBC	Compressive	GT001		Not Tested Yet			In Abeyance
25 Oct 2013	Compressive	GT002	7	19.06/2764 psi	1970.5		
25 Oct 2013	Compressive	GT003	7	27.90/4045 psi	1872.1		
25 Oct 2013	Compressive	GT010	7	26.18/3797 psi	1912.6		
25 Oct 2013	Compressive	GT011	7	26.10/3785 psi	1908.1		
1 Nov 2013	Compressive	GT004	14	30.44/4413 psi	1798.0		
1 Nov 2013	Compressive	GT005	14	28.68/4160 psi	1913.8		
15Nov 2013	Compressive	GT006	28	33.07/4796 psi	1770.0		
15Nov 2013	Compressive	GT007	28	34.04/4936 psi	1787.3		
13Dec 2013	Compressive	GT008	56	37.11/5382 psi		1731.2	
02 Jan 2014	Compressive	GT009	56	36.77/5332 psi		1800.5	

***56 Day Density denotes GEM-TECH Dry Density**

Coventry University, the Department of the Built Environment Dr. M. Saidani BEng, PhD, M.ISruct.E, CEng, Reader in Structural Engineering

Kieran Teeling SENIOR TECHNICIAN

TECHNICAL REPORT

Our Ref: MS/SG/GEM-TECH

TESTS ON GEM-TECH REPORT REF: GT/F&C LAB

Cubes have been produced in GEM-TECH Materials which were cast by the GEM-TECH Machine at Expert Tooling & Automation Limited, the specimens were taken from the GEM-TECH slab of approximately 7Mt³ laid at the Expert Tooling & Automation site, and were tested at Coventry University on the given date(s)

The 100mm Cubes were cast in accordance with **BS EN 12390-3**

The specimen details are given below:

MATERIAL DETAILS

Date Cast	Sand Content Kg/Minute	Cement Content Kg/Minute	Ratio Of Mix	Water Content Litres/Minute	Foam Content Litres/Minute	Temperature °C Humidity %	Curing Method Of Specimens
22/11/2013	113.77	37.92	3:1	25.00	8.8	6.4°C/65%	Natural

TEST RESULTS

Date of Test	Type of Test	Specimen Ref.	Age at Test (Days)	Strength (N/mm ²) (P.S.I.)	Wet Density Kg/Mt ³	Dry Density Kg/Mt ³	Comments
29Nov 2013	Compressive	GT013	7	25.2/3657	1911.0		Excellent Strength
06Dec 2013	Compressive	GT014	14	27.4/3976	1820.2		Excellent Strength
20Dec 2013	Compressive	GT015	28	34.5/5003	1910.5		Excellent Strength
20Dec 2013	Compressive	GT016	28	34.2/4958	1923.4		Excellent Strength
17 Jan 2014	Compressive	GT017	56	28.5/4133		1908.0	Very Good Strength
17 Jan 2014	Compressive	GT018	56	34.2/4952		1927.9	Excellent Strength
17 Jan 2014	Compressive	GT019					
17 Jan 2014	Compressive	GT020	56	29.8/4321		1940.2	Very Good Strength
23 Feb 2014	Explosive	GT021	92				Only Powder Stains
	Compressive	GT022					
	Compressive	GT023					
	Compressive	GT024					

*56 Day Testing denotes GEM-TECH Dry Density

Coventry University, the Department of the Built Environment Dr. M. Saidani, BEng, PhD, M.ISruct.E, CEng, Reader in Structural Engineering

Kieran Teeling SENIOR TECHNICIAN

TECHNICAL REPORT

Our Ref: MS/SG/GEM-TECH

TESTS ON GEM-TECH REPORT REF: GT/F&C LAB

Cubes, Beams and Prisms have been produced in GEM-TECH Materials which were cast by the GEM-TECH Machine and tested at Coventry University on the given date(s)

The 100mm Cubes were cast in accordance with **BS EN 12390-3**

The Beams were cast in accordance with **BS EN 12390-5**

The Prisms were cast in accordance with **BS EN 13412**

The specimen details are given below:

MATERIAL DETAILS

Date Cast	Sand Content Kg/Minute	Cement Content Kg/Minute	Ratio Of Mix	Water Content Litres/Minute	Foam Content Litres/Minute	Temperature °C Humidity %	Curing Method Of Specimens
4 Dec 2013	40.24	40.34	1:1	17.13	8.82	9°C 64%	Natural

TEST RESULTS

Date of Test	Type of Test	Specimen Ref.	Age at Test (Days)	Strength (N/mm ²) (P.S.I.)	Wet Density Kg/Mt ³	Dry Density Kg/Mt ³	Comments
13 Dec 2013	Compressive	GT025	9	33.28/4826	1917.11		Perfect
18 Dec 2013	Compressive	GT026	14	36.51/5294	1923.88		Perfect
18 Dec 2013	Compressive	GT027	14	37.82/5484	1911.58		Perfect
02 Jan 2014	Compressive	GT028	29	36.24/5255	1923.58		Perfect
02 Jan 2014	Compressive	GT029	29	40.04/5806	1925.44		Perfect
29 Jan 2014	Compressive	GT030	56	Not Tested			
29 Jan 2014	Compressive	GT031	56	Not Tested			
29 Jan 2014	Compressive	GT032	56	Not Tested			
29 Jan 2014	Compressive	GT033	56	43.08/6,247	1905.24		Excellent
29 Jan 2014	Compressive	GT034	56	47.02/6,818	1917.87		Excellent
29 Jan 2014	Compressive	GT035	56	43.49/6,306	1931.06		Excellent
29 Jan 2014	Compressive	GT036	56	41.17/5,970	1894.22		Excellent

***56 Day Density denotes GEM-TECH Dry Density**

Coventry University, the Department of the Built Environment Dr. M. Saidani, BEng, PhD, M.I Struct.E, CEng, Reader in Structural Engineering

Kieran Teeling SENIOR TECHNICIAN

Freeze/Thaw Testing of Various Concrete Specimens at Hulland Ward

Chamber Started on 5th September 2008 until 4th October 2008

Reference No's	No of Cycles	Test Area mm	Test Area M ²	Weight of Scale (grams)	Weight of Scale (Kg/M ²)	Comments
T916	28	180 X 77	0.01386	28.45	2.053	
T917	28	180 X 80	0.01440	36.51	2.535	
T918A	28	200 X 100	0.02	1284.00	64.20	Total Loss of Specimen
T918B	28	200 X 100	0.02			Total Loss of Specimen
T918C	28	200 X 100	0.02			Total Loss of Specimen
T919A	28	200 X 100	0.02	1195.00	59.75	Total Loss of Specimen
T919B	28	200 X 100	0.02			
T919C	28	200 X 100	0.02			
T950	28	190 X 75	0.01425	11.39	0.799	
T951	28	185 X 90	0.01665	1.76	0.106	
T952	28	180 X 97	0.01566	1.24	0.079	
T953A	28	183 X 83	0.015189	0.73	0.048	
T943B	28	175 X 89	0.015575	3.24	0.208	
T954	28	194 X 94	0.018236	3.43	0.188	
T812	28	182 X 88	0.016016	5.50	0.343	
T813	28	191 X 80	0.015280	25.49	1.668	
T814	28	185 X 88	0.016280	10.74	0.660	
T815	28	190 X 85	0.016150	9.74	0.603	
T816	28	190 X 85	0.016150	2.63	0.163	
T817	28	195 X 85	0.016575	0.59	0.036	
T983	28	185 X 85	0.015725	0.06	0.004	Gem Tech Specimen

NOTES:-

T916 & T917 cast at M.D. Central St. Giles

T812 to T817 cast at IGD ASH Annual Tests

T918A,B,C & T919A,B,C cast at M.D. Cenin Trials - Bradstone Wet Cast

T950 to T954 cast at IGD CX Annual Tests

T983 cast 7th July 2008 CU201 Gem-Tech Specimen

TECHNICAL REPORT

Our Ref: PC/AMI/DOCS

Morgan Samuel Ltd
P.O.Box 244
Coventry CV5 6TF

For the attention of Sam George

**BIRMINGHAM CITY
LABORATORIES**

20 Howe Street
Birmingham B4 7XW
Tel: 0121-235 3819
Fax: 0121-236 6174

TESTS ON HARDENED CONCRETE
REPORT REF: CE/ 96/618594

As requested strength tests have been carried out on cubes, cylinders and beams of the above material which were cast by yourselves.

The 100mm cubes were tested in accordance with British Standard 1881: Part 116: 1983.

The 150mm diameter cylinders were tested in accordance with British Standard: 1881: Part 117: 1983.

The beams were tested in accordance with British Standard 1881: Part 118: 1983.

The sample details and test results are given below.-

Material Details

Date Cast	Sand Content kg/Minute	Cement Content kg/Minute	Foam Content (Litres/Minute)	Water Content (Litres/Minute)	Fibre (kg/m ³)
24/09/96	7.5	2.5	2	3.5	1.8

Test Results

Type of Test	Sample Ref	Age at Test (Days)	Strength (N/mm ²)	Moist Density (kg/m ³)	Dry Density (kg/m ³)	Comments
Compressive Strength	CU263	56	27.0	1881	1752	Cling Film
Compressive Strength	CU264	56	32.0	1917	1803	Dry Surfaces
Tensile Splitting	CY265	56	2.4	1945	1796	Cling Film
Flexural Strength	B20	56	3.0	1863	1728	Cling Film

ON BEHALF OF BIRMINGHAM CITY LABORATORIES
(Including Industrial Research Laboratories)

P.DAVIS
SENIOR TECHNICIAN

(Authorised Signatories) C.K. Hickman (), J.E. Freeth