

Environmental Product Declaration



Environmental Product Declaration for ready mix concrete products produced by Holcim Colombia at their Puente Aranda facility in Bogotá, Colombia

ADMINISTRATIVE INFORMATION

International Certified Environmental Product Declaration

Declared Product:	This Environmental Product Declaration (EPD) covers concrete products produced by Holcim Colombia. Declared unit: 1 m3 of concrete
Declaration Owner:	Holcim Colombia
	7-45 Calle 13, Piso 12, Torre B, Ed. Teleport Business Park
	Bogotá, Colombia
	www.holcim.com.co
Program Operator:	Labeling Sustainability
	Address, 11670 W Sunset Blvd.
	City, State, Los Angeles, CA
	www.labelinsustainability.com/
Product Category Rule:	Core PCR: ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services SubPCR: NSF International (March 2020). Product Category Rul (PCR) for Environmental Product Declarations (EPD) PCR for Concrete, v2.1
	Sub PCR Program Operator: NSF International
	Sub-category PCR review was conducted by: Thomas P. Gloria, Ph. D. of Industrial Ecology Consultants: 35 Bracebridge Rd., Newton, MA 02459-1728, t.gloria@industrial-ecology.com . Dr. Michael Overcash of Environmental Clarity: 2908 Chipmunk Lane, Raleigh, NC 27607-3117, mrovercash@earthlink.net . Mr. Bill Stough of Sustainable Research Group: PO Box 1684, Grand Rapids, MI 49501-1684, bstough@sustainableresearchgroup.com . Mr. Jack Geilbig, EcoForm: 2624 Abelia Way, Suite 611, Knoxville, TN 37931, jgeilbig@ecoform.com .
Independent LCA Reviewer and EPD Verifier:	This EPD was independently verified in accordance with ISO 14025 and ISO 21930. The life cycle assessment was independently reviewed in accordance ISO 14044 and the referenced PCR.
	Independent verification of the declaration, according to ISO 14025:2006
	Internal <input type="checkbox"/> ; External X
	Third Party Verifier
	Geoffrey Guest, Certified 3rd Party Verifier under the International EPD Program (www.environdec.com), CSA Group (www.csaregistrries.ca)
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COMPANY DESCRIPTION

Holcim Colombia, as part of Grupo Holcim, a world leader in innovative and sustainable solutions for construction, is making it possible to have greener cities, smarter infrastructures and improve the standard of living of people around the world. With sustainability at the heart of its strategy, Holcim is becoming a Net Zero company, where its people and communities are the foundation of its success. The company is driving circular construction as a world leader in recycling to build more with less.

Holcim Colombia produces and markets cement, ready-mix concrete, aggregates (gravel and sand) and other products and solutions for construction. Additionally, it offers the GacoFlex TechoProtec waterproofing line and the Tector family of adhesives and mortars. The company has a team passionate about building progress for people and the planet. It has a national presence through 1 cement plant, 10 ready-mix concrete plants, 1 Geocycle platform, 1 aggregates plant, its own network of hardware stores, Disensa, with more than 400 stores nationwide; and offers specialized services for transporting materials or products through Transcem.

STUDY GOAL

The intended application of this life cycle assessment (LCA) is to comply with the procedures for creating a Type III environmental product declaration (EPD) and publish the EPD for public review on the website, <http://labelingsustainability.com/>. This level of study is in accordance with EPD Product Category Rule (PCR) for Ready Mix Concrete published by NSF International (2019) and is a sub-PCR of International Standards Organization (ISO) 21930:2017 Sustainability in buildings and civil works - Core rules for EPDs of construction products and services; International Standards Organization (ISO) 14025:2006 Environmental labels and declarations, Type III environmental declarations-Principles and procedures; ISO 14044:2006 Environmental management, Life cycle assessment- Requirements and guidelines; and ISO 14040:2006 Environmental management, Life cycle assessment-Principles and framework. The performance of this study and its subsequent publishing is in alignment with the business-to-business (B2B) communication requirements for the environmental assessment of building products. The study does not intend to support comparative assertions and is intended to be disclosed to the public.

This project report was commissioned to differentiate Holcim Colombia from their competition for the following reasons: generate an advantage for the organization; offer customers information to help them make informed product decisions; improve the environmental performance of Holcim Colombia by continuously measuring, controlling and reducing the environmental impacts of their products; help project facilitators working on Leadership in Energy and Environmental Design (LEED) projects achieve their credit goal; and to strengthen Holcim Colombia's license to operate in the community. The intended audience for this LCA report is Holcim Colombia's employees, their suppliers, project specifiers of their products, architects, and engineers. The EPD report is also available for policy makers, government officials interested in sustainability, academic professors, and LCA professionals. This LCA report does not include product comparisons from other facilities.

DESCRIPTION OF PRODUCT AND SCOPE

This EPD reports on 171 concrete mixes manufactured at the Holcim Colombia, Puente Aranda, concrete facility in Bogotá, Colombia.



This LCA assumes the impacts from products manufactured in accordance with the standards outlined in this report. This LCA is a cradle-to-gate study, and therefore, stages extending beyond the plant gate are not included in this LCA. Excluded stages include transportation of the manufactured material to the construction site; on-site construction processes and components; building (infrastructure) use and maintenance; and "end-of-life" effects.

READY MIX CONCRETE DESIGN SUMMARY

The following tables provide a list of the cement products considered in this EPD along with key performance parameters.

Mix Designs: 0 to 15MPa

Table 1: Declared products with Mix designs: 0 to 15MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day strength, MPa	H ₂ O to cement ratio
1	10073393	0.6 MPa 28d strength ready mix concrete.	Ready Mix Concrete	0.6	2.38095238095238
2	10054309	1 MPa 28d strength ready mix concrete.	Ready Mix Concrete	1.0	7.996
3	10062310	1 MPa 28d strength ready mix concrete.	Ready Mix Concrete	1.0	2.91433333333333
4	10062890	2 MPa 28d strength ready mix concrete.	Ready Mix Concrete	2.0	1.38888888888889
5	10061473	3 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.0	1.28858064516129
6	10054321	3.4 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.4	0.859348837209302
7	10062530	3.4 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.4	0.5770625
8	10052045	3.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.5	0.684148148148148
9	10061333	3.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.5	0.551194029850746
10	10011182	3.6 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.6	0.839818181818182
11	10059677	3.7 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.7	0.73892
12	10011185	3.8 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.8	0.76975
13	10058980	3.8 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.8	0.630526315789474
14	10067589	3.8 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.8	0.5325
15	10053526	3.8 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.8	0.446368421052632
16	10011186	3.9 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.9	0.73896
17	10067355	3.9 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.9	0.610431654676259



18	10062562	3.9 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.9	0.506
19	10068474	3.9 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.9	0.384485981308411
20	10064055	3.9 MPa 28d strength ready mix concrete.	Ready Mix Concrete	3.9	0.332323232323232
21	10011464	4 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.0	0.697056603773585
22	10058743	4 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.0	0.589114754098361
23	10022990	4 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.0	0.471222222222222
24	10062721	4 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.0	0.387223529411765
25	10011201	4.1 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.1	0.635309090909091
26	10054258	4.1 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.1	0.605508196721312
27	10011197	4.1 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.1	0.512861111111111
28	10011208	4.1 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.1	0.406976744186047
29	10045388	4.1 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.1	0.355648535564854
30	10011211	4.2 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.2	0.62606779661017
31	10058304	4.2 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.2	0.551194029850746
32	10061604	4.2 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.2	0.429209302325581
33	10067028	4.3 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.3	0.576501650165017
34	10061334	4.3 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.3	0.513647058823529
35	10047154	4.3 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.3	0.453532467532468
36	10011456	4.3 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.3	0.347303370786517
37	10034707	4.3 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.3	0.328031809145129
38	10011458	4.4 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.4	0.517256097560976
39	10059919	4.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.5	0.5614375
40	10069092	4.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.5	0.488826815642458
41	10025220	4.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.5	0.418740740740741
42	10044992	4.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.5	0.390304347826087
43	10072723	4.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.5	0.307692307692308



44	10064058	4.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.5	0.264957264957265
45	10070476	4.7 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.7	0.47554347826087
46	10062032	4.8 MPa 28d strength ready mix concrete.	Ready Mix Concrete	4.8	0.319398058252427
47	10030613	5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	5.0	0.49232
48	10011468	5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	5.0	0.429232558139535
49	10067588	5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	5.0	0.340600414078675
50	10059953	5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	5.0	0.71604206500956
51	10064059	5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	5.0	0.276319327731092
52	10048422	7 MPa 28d strength ready mix concrete.	Ready Mix Concrete	7.0	1.63463636363636
53	10027896	7 MPa 28d strength ready mix concrete.	Ready Mix Concrete	7.0	1.25755395683453
54	10012713	7 MPa 28d strength ready mix concrete.	Ready Mix Concrete	7.0	0.986302521008403
55	10063459	7.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	7.5	0.946491935483871
56	10011166	9 MPa 28d strength ready mix concrete.	Ready Mix Concrete	9.0	1.08474747474747
57	10011831	10.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	10.5	0.831710526315789
58	10068387	10.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	10.5	0.860252100840336
59	10010796	10.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	10.5	1.03254807692308
60	10049192	10.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	10.5	
61	10033692	12.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	12.5	0.902310924369748
62	10010803	12.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	12.5	0.707388059701493
63	10053316	12.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	12.5	0.66982332155477
64	10062283	12.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	12.5	0.55882183908046
65	10011980	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.75422480620155
66	10058178	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.720836501901141
67	10068388	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.76384328358209
68	10012342	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.902268907563025
69	10068392	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.902268907563025



70	10010819	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.78755033557047
71	10058322	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.814895833333333
72	10068871	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.829328621908127
73	10062271	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.835119453924915
155	10067205	10.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	10.5	1.01142857142857
156	10067126	10.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	10.5	0.930957446808511
157	10067217	10.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	10.5	0.791493212669683
158	10067123	10.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	10.5	0.982832369942197
159	10069210	10.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	10.5	0.771545893719807
160	10067209	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.904468085106383
161	10067127	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.841538461538461
162	10069215	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.673713080168776
163	10067124	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.881088082901554
164	10067200	14 MPa 28d strength ready mix concrete.	Ready Mix Concrete	14.0	0.821830985915493

Mix Designs: 15 to 20 MPa

Table 2: Declared products with Mix designs: 15 to 20MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day strength, MPa	H ₂ O to cement ratio
74	10011982	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.6581597
75	10012044	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.6818705
76	10056677	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.7327304
77	10068389	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.7107292
78	10049057	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.6645455
79	10061469	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.8163878
80	10061511	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.8163878
81	10062026	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.8231136



82	10011195	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.7154268
83	10065359	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.7875168
84	10051243	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.7694025
165	10067219	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.8885787
166	10067201	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.7513734
167	10067207	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.8175962
168	10069218	17.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	17.5	0.6526160

Mix Designs: 21 to 25 MPa

Table 3: Declared products with Mix designs: 21 to 25MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day strength, MPa	H ₂ O to cement ratio
85	10012270	21 MPa 28d strength ready mix concrete.	Ready Mix Concrete	21.0	0.6153247
86	10012271	21 MPa 28d strength ready mix concrete.	Ready Mix Concrete	21.0	0.6360067
87	10068390	21 MPa 28d strength ready mix concrete.	Ready Mix Concrete	21.0	0.6645130
88	10012413	21 MPa 28d strength ready mix concrete.	Ready Mix Concrete	21.0	0.8011567
89	10065284	21 MPa 28d strength ready mix concrete.	Ready Mix Concrete	21.0	0.6833240
90	10065519	24.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	24.5	0.4616142
91	10012276	24.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	24.5	0.6116667
92	10066817	24.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	24.5	0.6145477
169	10066981	21 MPa 28d strength ready mix concrete.	Ready Mix Concrete	21.0	0.6425856
170	10069017	21 MPa 28d strength ready mix concrete.	Ready Mix Concrete	21.0	0.5522145
171	10066984	21 MPa 28d strength ready mix concrete.	Ready Mix Concrete	21.0	0.5933829
172	10069033	21 MPa 28d strength ready mix concrete.	Ready Mix Concrete	21.0	0.5423469
173	10068970	21 MPa 28d strength ready mix concrete.	Ready Mix Concrete	21.0	0.6876113
174	10068955	21 MPa 28d strength ready mix concrete.	Ready Mix Concrete	21.0	0.6252941
175	10068984	21 MPa 28d strength ready mix concrete.	Ready Mix Concrete	21.0	0.5908580



176	10068974	24.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	24.5	0.5627796
177	10069208	24.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	24.5	0.5252716
178	10068986	24.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	24.5	0.5352815

Mix Designs: 26 to 30 MPa

Table 4: Declared products with Mix designs: 26 to 30 MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day strength, MPa	H ₂ O to cement ratio
93	10073805	28 MPa 28d strength ready mix concrete.	Ready Mix Concrete	28	0.4230769
94	10053996	28 MPa 28d strength ready mix concrete.	Ready Mix Concrete	28	0.3945436
95	10012293	28 MPa 28d strength ready mix concrete.	Ready Mix Concrete	28	0.5605917
96	10013341	28 MPa 28d strength ready mix concrete.	Ready Mix Concrete	28	0.3925000
97	10044814	28 MPa 28d strength ready mix concrete.	Ready Mix Concrete	28	0.5880460
98	10068391	28 MPa 28d strength ready mix concrete.	Ready Mix Concrete	28	0.5880460
99	10071899	28 MPa 28d strength ready mix concrete.	Ready Mix Concrete	28	0.4943820
100	10012426	28 MPa 28d strength ready mix concrete.	Ready Mix Concrete	28	0.6970130
101	10066865	28 MPa 28d strength ready mix concrete.	Ready Mix Concrete	28	0.5363551
102	10050630	30 MPa 28d strength ready mix concrete.	Ready Mix Concrete	30	0.7213253
103	10050633	30 MPa 28d strength ready mix concrete.	Ready Mix Concrete	30	0.6615412
104	10061662	30 MPa 28d strength ready mix concrete.	Ready Mix Concrete	30	0.5545397
105	10061663	30 MPa 28d strength ready mix concrete.	Ready Mix Concrete	30	0.4851111
179	10068915	28 MPa 28d strength ready mix concrete.	Ready Mix Concrete	28	0.4925749
180	10068985	28 MPa 28d strength ready mix concrete.	Ready Mix Concrete	28	0.5283333
181	10072618	28 MPa 28d strength ready mix concrete.	Ready Mix Concrete	28	0.3461538



Mix Designs: 31 to 35 MPa

Table 5: Declared products with Mix designs: 31 to 35 MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day strength, MPa	H ₂ O to cement ratio
106	10058012	30.1 MPa 28d strength ready mix concrete.	Ready Mix Concrete	30.1	0.6192617
107	10058019	31.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	31.5	0.7181439
108	10056076	31.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	31.5	0.6491096
109	10032851	31.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	31.5	0.5444242
110	10050580	31.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	31.5	0.5332329
111	10071314	31.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	31.5	0.4714640
112	10061034	32 MPa 28d strength ready mix concrete.	Ready Mix Concrete	32.0	0.3990000
113	10068815	32 MPa 28d strength ready mix concrete.	Ready Mix Concrete	32.0	0.5925413
114	10053551	35 MPa 28d strength ready mix concrete.	Ready Mix Concrete	35.0	0.4765970
115	10043675	35 MPa 28d strength ready mix concrete.	Ready Mix Concrete	35.0	0.6736131
116	10052085	35 MPa 28d strength ready mix concrete.	Ready Mix Concrete	35.0	0.5741118
117	10055955	35 MPa 28d strength ready mix concrete.	Ready Mix Concrete	35.0	0.5444242
118	10058150	35 MPa 28d strength ready mix concrete.	Ready Mix Concrete	35.0	0.4984848
119	10043659	35 MPa 28d strength ready mix concrete.	Ready Mix Concrete	35.0	0.5551359
120	10062371	35 MPa 28d strength ready mix concrete.	Ready Mix Concrete	35.0	0.4300246
121	10060520	35 MPa 28d strength ready mix concrete.	Ready Mix Concrete	35.0	0.5160586
122	10056413	35 MPa 28d strength ready mix concrete.	Ready Mix Concrete	35.0	0.4010722
123	10068093	35 MPa 28d strength ready mix concrete.	Ready Mix Concrete	35.0	0.3836398
124	10071980	35 MPa 28d strength ready mix concrete.	Ready Mix Concrete	35.0	0.3445378



Mix Designs: 36 to 40 MPa

Table 6: Declared products with Mix designs: 36 to 40 MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day strength, MPa	H ₂ O to cement ratio
125	10068395	36 MPa 28d strength ready mix concrete.	Ready Mix Concrete	36.0	0.3681474
126	10012424	38.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	38.5	0.5374462
127	10065309	38.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	38.5	0.5017877
128	10062563	38.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	38.5	0.4456824
129	10058470	38.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	38.5	0.3844540
130	10061664	40 MPa 28d strength ready mix concrete.	Ready Mix Concrete	40.0	0.4595263

Mix Designs: 41 to 45 MPa

Table 7: Declared products with Mix designs: 41 to 45 MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day strength, MPa	H ₂ O to cement ratio
131	10011154	42 MPa 28d strength ready mix concrete.	Ready Mix Concrete	42	0.5074294
132	10048460	42 MPa 28d strength ready mix concrete.	Ready Mix Concrete	42	0.4415584
133	10062413	42 MPa 28d strength ready mix concrete.	Ready Mix Concrete	42	0.4363593
134	10053977	42 MPa 28d strength ready mix concrete.	Ready Mix Concrete	42	0.4904915
135	10067851	42 MPa 28d strength ready mix concrete.	Ready Mix Concrete	42	0.3401559
136	10071981	42 MPa 28d strength ready mix concrete.	Ready Mix Concrete	42	0.3228346
137	10048427	45 MPa 28d strength ready mix concrete.	Ready Mix Concrete	45	0.4677604
138	10062291	45 MPa 28d strength ready mix concrete.	Ready Mix Concrete	45	0.3853201



Mix Designs: 46 to 50 MPa

Table 8: Declared products with Mix designs: 46 to 50 MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day strength, MPa	H ₂ O to cement ratio
139	10049024	45.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	45.5	0.4558629
140	10052793	45.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	45.5	0.4884689
141	10048747	49 MPa 28d strength ready mix concrete.	Ready Mix Concrete	49.0	0.4770284
142	10068713	49 MPa 28d strength ready mix concrete.	Ready Mix Concrete	49.0	0.4442009
143	10072716	49 MPa 28d strength ready mix concrete.	Ready Mix Concrete	49.0	0.3894737
144	10053887	49 MPa 28d strength ready mix concrete.	Ready Mix Concrete	49.0	0.3961359

Mix Designs: 51 to 55 MPa

Table 9: Declared products with Mix designs: 51 to 55 MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day strength, MPa	H ₂ O to cement ratio
145	10072088	52.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	52.5	0.3225806
146	10043923	52.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	52.5	0.4322482
147	10072674	52.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	52.5	0.3894737
148	10072793	52.5 MPa 28d strength ready mix concrete.	Ready Mix Concrete	52.5	0.2735043

Mix Designs: 56 to 60 MPa

Table 10: Declared products with Mix designs: 56 to 60 MPa considered in this environmental product declaration

Mix#	Unique name/ID	Short description	Product type	28 day strength, MPa	H ₂ O to cement ratio
149	10049792	56 MPa 28d strength ready mix concrete.	Ready Mix Concrete	56	0.4322482
150	10061652	56 MPa 28d strength ready mix concrete.	Ready Mix Concrete	56	0.3980994
151	10072853	56 MPa 28d strength ready mix concrete.	Ready Mix Concrete	56	0.3168317
152	10067151	56 MPa 28d strength ready mix concrete.	Ready Mix Concrete	56	0.3315881



153	10058497	56 MPa 28d strength ready mix concrete.	Ready Mix Concrete	56	0.3670473
154	10046379	56 MPa 28d strength ready mix concrete.	Ready Mix Concrete	56	0.2857143

READY MIX CONCRETE DESIGN COMPOSITION

The following figures provide mass breakdown (kg per functional unit) of the material composition of each ready mix concrete design considered. Please note that the presented breakdown has been randomly altered by +/-10%, and is therefore only an approximation; this manipulation is to ensure confidentiality

Table 11: Ready mix concrete composition

Product Components	Raw Material, weight%
Cement	Proprietary
Aggregates	30-60.00
Others	0.01-5.00
Total	100.00

SYSTEM BOUNDARIES

The following figure depicts the cradle-to-gate system boundary considered in this study:

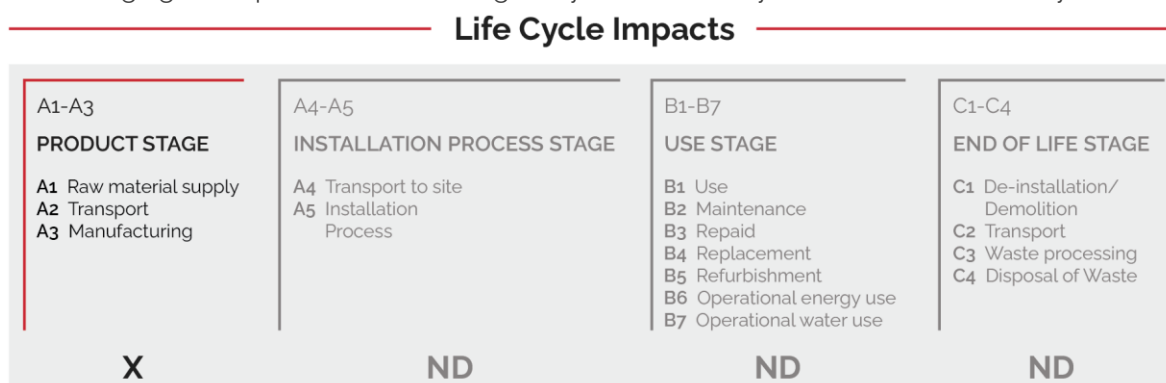


Figure 1: General life cycle phases for consideration in a construction works system

This is a Cradle-to-gate life cycle assessment and the following life cycle stages are included in the study:

- A1: Raw material supply (upstream processes) - Extraction, handling, and processing of the materials used in manufacturing the declared products in this LCA.
- A2: Transportation - Transportation of A1 materials from the supplier to the "gate" of the manufacturing facility (i.e. A3).
- A3: Manufacturing (core processes)- The energy and other utility inputs used to store, move, and manufacturer the declared products and to operate the facility.

As according to the PCR, the following figure illustrates the general activities and input requirements for producing cement products and is not necessarily exhaustive.

System Boundary

Raw Material Supply (A1)	Transport (A2)	Manufacturing (A3)
Cements & SCMs Aggregates Admixtures Batch Water Fibers & Pigments	Truck, Rail, Ship Energy Carriers (fuels)	Energy Carriers (electricity and fuels) Ancillary Materials (lubricants, motor oil, cleaning chemicals, other consumables) Water (manufacturing water, including wash water for cement trucks, but excluding batch water) Waste (end of life treatment of ancillary materials and any packaging) 30% total fleet energy transit mix plants only

Figure 2: **General system inputs considered in the product system and categorized by modules in scope**

In addition, as according to the relevant PCR, the following requirements are excluded from this study:

- Production, manufacture, and construction of A3 building/capital goods and infrastructure.
- Production and manufacture of steel production equipment, steel delivery vehicles, earth-moving equipment, and laboratory equipment.
- Personnel-related activities (travel, furniture, office supplies).
- Energy use related to company management and sales activities.

For this LCA the manufacturing plant, owned and operated by Holcim Colombia, is located at their Planta Puente Aranda facility in Colombia. All operating data is formulated using the actual data from Holcim Colombia's plant at the above location, including water, energy consumption and waste generation. All inputs for this system boundary are calculated for the plant.

This life cycle inventory was organized in a spreadsheet and was then input into an RStudio environment where pre-calculated LCIA results for relevant products/activities stemming from the ecoinvent v3.8 database and a local EPD database in combination with primary data from Holcim Colombia were utilized. Explanations of the contribution of each data source to this study are outlined in the section 'Data Sources and Quality'. Further LCI details for each declared product are provided in the sections 'Detailed LCI tables' and 'Transport tables' of the detailed LCA report. A parameter uncertainty analysis was also performed where key statistical results (e.g. min/mean/max etc.) are provided in the detailed LCA report.

CUT-OFF CRITERIA

ISO 14044:2006 and the focus PCR requires the LCA model to contain a minimum of 95% of the total inflows (mass and energy) to the upstream and core modules be included in this study. The cut-off criteria were applied to all other processes unless otherwise noted above as follows. A 1% cut-off is considered for all renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process where the total of the neglected inputs does not exceed 5%.

DATA SOURCES AND DATA QUALITY ASSESSMENT

The following table summarizes the facility's (i.e. A3) electricity consumption and on-site generation or off-site contractual procurement (if applicable), process/space heating requirements, fuel inputs for on-site machinery, and waste generation.

Table 12: Inputs required by facility from 2021-01-01 to 2021-12-31 (365 days) to produce 63,494.5 m³ of concrete

Activity	Value	Units
Electricity consumption and on-site generation or off-site contractual procurement (if applicable)		
Gross grid electricity:	869,280	kWh
Fuel requirements for machinery		
Diesel	77,767.5	L
Waste generation		
Wash water	3,733.8	m ³
Hazardous waste	4,454.182	kg
Non-hazardous waste	32,953.312	kg
High-level radioactive waste	0	kg

No recovered on-site energy occurs at this facility.

The following statements explain how the above facility requirements/generation were derived:

Raw material transport: Not applicable.

Electricity: Electricity consumption values are for Colombia in calendar year 2021. These values were direct reported from Colombia records. The unit process "market for electricity, medium voltage/electricity, medium voltage/CO/kWh" was used to represent the Colombia grid electricity used by the concrete plant.

Process/space heating: No fuel is used for space heating at this plant.

Fuel required for machinery: Machinery-related fuel requirements were determined from direct Holcim information. The types of machinery used include generators, pumps to pump concrete to higher elevations, and transportation equipment used for moving materials. This plant does not have electricity therefore it uses diesel to power generators.

Waste generation: Waste generation values are directly reported from Holcim operations for bulk waste and hazardous waste. No High-level radioactive waste is generated on-site at this facility. Wash water values are direct reported water use from Holcim Colombia for 2021.

Recovered energy: Not applicable.

Recycled/reused material/components: Not applicable.

Module A1 material losses: Not applicable

Direct A3 emissions accounting: Not applicable.



Waste transport requirements: Not applicable

Product transport requirements: The diesel fuel used by the mixing trucks is direct primary information reported from Holcim Colombia records for the year 2021. Holcim records their fuel for their trucks in L/km and therefore the information was converted with the following formula: (Ave. km to site)* 2 for return L diesel/km /(ave. m3 of concrete in a load) total concrete volume in m3 * fraction allocated to A3. A4 is outside the scope of this study.

The following tables depict a list of assumed life cycle inventory utilized in the LCA modeling to generate the impact results across the life cycle modules in scope. An assessment of the quality of each LCI activities utilized from various sources is also provided.

Table 13: LCI inputs assumed for module A1 (i.e. raw material supply) *Data Quality Assessment Key Fair=1, Good=2, Very Good =3.*

Input	LCI.activity	Data.source	Geo	Year	Technology	Time	Geography	Reliability	Completeness
Water	tap water production, conventional treatment/tap water/RoW/kg	ecoinvent v3.8	Boyacá	v3.8 in 2021	2	3	2	3	3
Additives	market for chemical, organic/chemical, organic/GLO/kg	ecoinvent v3.8	Cundinamarca	v3.8 in 2021	2	3	2	3	3
Cement	HE Cement	Progam Operator: Labeling Sustainability- EPD ID: 6328e320-6cab-4d85-83f4-dca33374d11b	Boyacá	06 January 2023	3	3	3	3	3
Sand	sand quarry operation, extraction from river bed/sand/BR/kg; Note: modifications made (see ecoinvent activity changes table)	ecoinvent v3.8	Cundinamarca	v3.8 in 2021	2	3	2	3	3



DATA QUALITY ASSESSMENT

Data quality/variability requirements, as specified in the PCR, are applied. This section describes the achieved data quality relative to the ISO 14044:2006 requirements. Data quality is judged based on its precision (measured, calculated, or estimated), completeness (e.g., unreported emissions), consistency (degree of uniformity of the methodology applied within a study serving as a data source) and representativeness (geographical, temporal, and technological).

Precision: Through measurement and calculation, the manufacturers collected and provided primary data on their annual production. For accuracy, the LCA practitioner and 3rd Party Verifier validated the plant gate-to-gate data.

Completeness: All relevant specific processes, including inputs (raw materials, energy, and ancillary materials) and outputs (emissions and production volume) were considered and modeled to represent the specified and declared products. The majority of relevant background materials and processes were taken from ecoinvent v3.8 LCI datasets where relatively recent region-specific electricity inputs were utilized. The most relevant EPDs requiring key A1 inputs were also utilized where readily available.

Consistency: To ensure consistency, the same modeling structure across the respective product systems was utilized for all inputs, which consisted of raw material inputs and ancillary material, energy flows, water resource inputs, product, and co-products outputs, returned and recovered Cement materials, emissions to air, water and soil, and waste recycling and treatment. The same background LCI datasets from the ecoinvent v3.8 database were used across all product systems. Crosschecks concerning the plausibility of mass and energy flows were continuously conducted. The LCA team conducted mass and energy balances at the plant and selected process level to maintain a high level of consistency.

Reproducibility: Internal reproducibility is possible since the data and the models are stored and available in a machine readable project file for all foreground and background processes, and in Labeling Sustainability's proprietary Ready Mix Concrete LCA calculator* for all production facility and product-specific calculations. A considerable level of transparency is provided throughout the detailed LCA report as the specifications and material quantity make-up for the declared products are presented and key primary and secondary LCI data sources are summarized. The provision of more detailed publicly accessible data to allow full external reproducibility was not possible due to reasons of confidentiality.

*Labeling Sustainability has developed a proprietary tool that allows the calculation of PCR-compliant LCA results for Ready Mix Concrete product designs. The tool auto-calculates results by scaling base-unit technosphere inputs (i.e. 1 kg sand, 1 kWh electricity, etc.) to replicate the reference flow conversions that take place in any typical LCA software like openLCA or SimaPro. The tool was tested against several LCAs performed in openLCA and the tool generated identical results to those realized in openLCA across every impact category and inventory metric (where comparisons could be readily made).

Representativeness: The representativeness of the data is summarized as follows.



- Time related coverage of the manufacturing processes' primary collected data from 2021-01-01 to 2021-12-31.
- Upstream (background) LCI data was either the PCR specified default (if applicable) or more appropriate LCI datasets as found in the country-adjusted ecoinvent v3.8 database.
- Geographical coverage for inputs required by the A3 facility(ies) is representative of its region of focus; other upstream and background processes are based on US, North American, or global average data and adjusted to regional electricity mixes when relevant.
- Technological coverage is typical or average and specific to the participating facilities for all primary data.

ENVIRONMENTAL INDICATORS AND INVENTORY METRICS

Per the PCR, this EPD supports the life cycle impact assessment indicators and inventory metrics as listed in the tables below. As specified in the PCR, the most recent US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI), impact categories were utilized as they provide a North American context for the mandatory category indicators to be included in the EPD. Additionally, the PCR requires a set of inventory metrics to be reported with the LCIA indicators (see tables below).

It should be noted that emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in any of the following categories.

TOTAL IMPACT SUMMARY

The following table reports the total LCA results for each product produced at the given cement facility on a per 1m³ of concrete basis.

Mix Designs: 0 to 15 MPa

Table 14: **Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 1 m³ of concrete basis.**

a) Midpoint Impact Categories:

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H ⁺ -Eq	kg N	kg CO ₂ -Eq	kg CFC-11-Eq	kg NO _x -Eq	kg Sb-Eq	MJ, net calorific value
Minimum	20.4	0.206	160	1.78e-05	0.304	0.000528	1310
Maximum	75.6	0.286	612	4.84e-05	1.1	0.00236	3420
Mean	45.9	0.241	370	3.11e-05	0.671	0.00138	2220
Median	44.8	0.24	364	3.12e-05	0.654	0.00137	2220
10073393	27.9	0.216	223	2.22e-05	0.411	0.000797	1630
10054309	20.4	0.206	160	1.78e-05	0.304	0.000528	1350
10062310	23	0.208	181	1.85e-05	0.343	0.000613	1370
10062890	28.5	0.217	224	2.21e-05	0.421	0.000798	1610



10061473	32.3	0.222	259	2.42e-05	0.475	0.000938	1750
10054321	35.5	0.224	286	2.34e-05	0.525	0.00102	1660
10062530	46.4	0.241	376	3.02e-05	0.681	0.00138	2140
10052045	41.7	0.234	337	2.77e-05	0.613	0.00123	1970
10061333	48.1	0.244	389	3.12e-05	0.704	0.00144	2220
10011182	36	0.225	290	2.37e-05	0.532	0.00103	1690
10059677	39.2	0.23	316	2.57e-05	0.577	0.00114	1830
10011185	38.1	0.228	307	2.49e-05	0.561	0.0011	1770
10058980	43.6	0.237	351	2.91e-05	0.64	0.00129	2070
10067589	47.3	0.242	382	3.06e-05	0.693	0.00141	2180
10053526	53.9	0.253	435	3.57e-05	0.787	0.00164	2530
10011186	39.6	0.231	319	2.63e-05	0.583	0.00116	1870
10067355	42.7	0.236	344	2.82e-05	0.627	0.00126	2010
10062562	50.3	0.247	407	3.26e-05	0.735	0.00151	2310
10068474	58	0.259	469	3.74e-05	0.846	0.00177	2640
10064055	65.4	0.27	529	4.23e-05	0.951	0.00202	2990
10011464	40.6	0.232	328	2.65e-05	0.598	0.00119	1880
10058743	45.4	0.24	366	2.99e-05	0.666	0.00135	2120
10022990	51.5	0.249	416	3.39e-05	0.753	0.00156	2410
10062721	57.8	0.259	467	3.73e-05	0.843	0.00176	2640
10011201	42	0.234	339	2.76e-05	0.618	0.00124	1960
10054258	44.7	0.238	363	2.92e-05	0.655	0.00133	2070
10011197	50.5	0.247	409	3.26e-05	0.739	0.00152	2310
10011208	58	0.259	470	3.73e-05	0.846	0.00177	2640
10045388	63.3	0.267	513	4.08e-05	0.922	0.00195	2890
10011211	43.7	0.237	354	2.84e-05	0.643	0.00129	2020
10058304	48.1	0.244	389	3.13e-05	0.705	0.00144	2220
10061604	58	0.259	470	3.73e-05	0.845	0.00177	2640
10067028	45.1	0.239	364	2.96e-05	0.662	0.00134	2100
10061334	48.9	0.245	395	3.2e-05	0.717	0.00147	2270
10047154	52.7	0.25	427	3.35e-05	0.771	0.00159	2370
10011456	59.8	0.262	483	3.84e-05	0.872	0.00183	2720
10034707	65.8	0.271	532	4.21e-05	0.957	0.00203	2980
10011458	47.8	0.243	385	3.13e-05	0.7	0.00143	2220
10059919	46.4	0.241	375	3e-05	0.68	0.00138	2130
10069092	51.5	0.25	415	3.42e-05	0.753	0.00156	2420
10025220	55.6	0.255	449	3.59e-05	0.812	0.00169	2540
10044992	61	0.263	494	3.91e-05	0.888	0.00187	2760
10072723	68.3	0.275	552	4.44e-05	0.993	0.00212	3140
10064058	74.8	0.285	605	4.81e-05	1.09	0.00233	3400
10070476	51.7	0.249	418	3.36e-05	0.756	0.00156	2380
10062032	67.4	0.273	545	4.34e-05	0.979	0.00208	3070
10030613	52.3	0.25	423	3.39e-05	0.764	0.00158	2400
10011468	58.2	0.259	471	3.76e-05	0.848	0.00178	2660
10067588	63.7	0.268	516	4.09e-05	0.927	0.00196	2890
10059953	64.2	0.269	544	4.23e-05	0.922	0.00207	2990
10064059	75.6	0.286	612	4.84e-05	1.1	0.00236	3420
10048422	25.7	0.21	205	1.81e-05	0.385	0.000692	1310
10027896	28.7	0.214	229	1.99e-05	0.427	0.00079	1430
10012713	40	0.234	328	2.94e-05	0.581	0.00123	2110
10063459	41	0.236	337	3e-05	0.596	0.00126	2150



10011166	37.7	0.232	304	2.87e-05	0.55	0.00114	2070
10011831	41.8	0.238	334	3.15e-05	0.609	0.00127	2270
10068387	42.5	0.239	341	3.19e-05	0.619	0.00129	2290
10010796	38.7	0.233	312	2.93e-05	0.565	0.00117	2110
10049192	41.9	0.237	336	3.05e-05	0.613	0.00126	2190
10033692	40.5	0.235	328	2.93e-05	0.591	0.00122	2100
10010803	45.9	0.245	368	3.41e-05	0.668	0.00141	2450
10053316	46.1	0.244	371	3.31e-05	0.672	0.00141	2370
10062283	52.6	0.253	424	3.7e-05	0.764	0.00162	2630
10011980	44.8	0.243	358	3.33e-05	0.652	0.00137	2390
10058178	45.4	0.244	363	3.38e-05	0.661	0.00139	2430
10068388	45.6	0.244	366	3.38e-05	0.664	0.0014	2430
10012342	41.8	0.238	338	3.12e-05	0.609	0.00128	2240
10068392	41.8	0.238	338	3.12e-05	0.609	0.00128	2240
10010819	46.1	0.244	379	3.32e-05	0.669	0.00143	2370
10058322	45.1	0.242	371	3.26e-05	0.654	0.0014	2330
10068871	44.6	0.241	366	3.23e-05	0.647	0.00138	2310
10062271	43.8	0.239	366	3.11e-05	0.634	0.00137	2220
10067126	33.9	0.223	271	2.32e-05	0.501	0.000967	1660
10067209	34.3	0.224	274	2.38e-05	0.508	0.000984	1710
10069215	39.3	0.231	314	2.67e-05	0.579	0.00115	1910

ECOpact 0 to 15 MPa

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H ⁺ -Eq	kg N	kg CO ₂ -Eq	kg CFC-11-Eq	kg NO _x -Eq	kg Sb-Eq	MJ, net calorific value
10067123	32.1	0.22	257	2.19e-05	0.476	0.000904	1570
10067217	37.4	0.228	300	2.55e-05	0.551	0.00109	1820
10067205	31.6	0.219	252	2.16e-05	0.469	0.000887	1550
10069210	36.2	0.226	289	2.48e-05	0.535	0.00104	1770
10067200	36.6	0.227	293	2.5e-05	0.54	0.00106	1790
10067124	34.2	0.223	274	2.33e-05	0.507	0.000977	1670
10067127	36	0.226	288	2.46e-05	0.531	0.00104	1760

b) Inventory Metrics:

Indicator/LCI Metric	TPE	RE	NRE	NRR	RR	WDP	LFW	LFH W	CBW C	CW WC	CHW	CNH W
Unit	MJ-Eq	MJ-Eq	MJ-Eq	kg	m ³	m ³	kg waste	kg waste	m ³	m ³	kg	kg
Minimum	1460	40.3	1390	35.8	0.000624	4.42	161	0.00265	0.158	1.2e-05	0.0143	106
Maximum	3900	242	3680	92.3	0.00169	16.8	235	0.00434	0.393	1.2e-05	0.0143	106



Mean	2500	136	2360	60.2	0.001 1	8.75	193	0.00 344	0.197	1.2e- 05	0.014 3	106
Median	2500	131	2360	60	0.001 09	7.05	193	0.00 346	0.189	1.2e- 05	0.014 3	106
10073393	1780	68.6	1730	44.7	0.00 078	15.1	174	0.00 353	0.262	1.2e- 05	0.014 3	106
10054309	1460	40.3	1400	37	0.00 0624	16.8	164	0.00 347	0.21	1.2e- 05	0.014 3	106
10062310	1510	51.3	1450	37.5	0.00 0658	14.2	165	0.00 323	0.184	1.2e- 05	0.014 3	106
10062890	1770	69.2	1710	44.3	0.00 0779	14.3	174	0.00 348	0.158	1.2e- 05	0.014 3	106
10061473	1940	85.2	1870	47.6	0.00 0855	12.9	178	0.00 344	0.21	1.2e- 05	0.014 3	106
10054321	1870	101	1770	45.1	0.00 0843	6.43	172	0.00 27	0.194	1.2e- 05	0.014 3	106
10062530	2430	139	2280	58	0.001 09	5.85	189	0.00 308	0.194	1.2e- 05	0.014 3	106
10052045	2230	123	2100	53.4	0.00 0986	7.05	184	0.00 304	0.194	1.2e- 05	0.014 3	106
10061333	2520	145	2360	60	0.001 11	5.92	192	0.00 316	0.194	1.2e- 05	0.014 3	106
10011182	1900	103	1800	45.9	0.00 0855	6.34	173	0.00 271	0.194	1.2e- 05	0.014 3	106
10059677	2060	115	1960	49.6	0.00 0923	6.31	178	0.00 284	0.194	1.2e- 05	0.014 3	106
10011185	2000	110	1890	48.1	0.00 0896	6.2	176	0.00 278	0.194	1.2e- 05	0.014 3	106
10058980	2330	129	2200	56.2	0.001 03	7.42	188	0.00 318	0.189	1.2e- 05	0.014 3	106
10067589	2470	143	2330	58.9	0.001 08	5.76	191	0.00 31	0.183	1.2e- 05	0.014 3	106
10053526	2870	164	2710	68.8	0.001 29	7.54	204	0.00 362	0.178	1.2e- 05	0.014 3	106
10011186	2120	115	1990	50.7	0.00 097	7.02	180	0.00 295	0.194	1.2e- 05	0.014 3	106
10067355	2270	125	2140	54.4	0.001 01	6.97	185	0.00 308	0.178	1.2e- 05	0.014 3	106
10062562	2620	153	2480	62.5	0.001 12	5.95	196	0.00 325	0.189	1.2e- 05	0.014 3	106
10068474	3010	180	2830	71.5	0.001 31	5.49	207	0.00 352	0.173	1.2e- 05	0.014 3	106
10064055	3420	206	3200	81	0.001 5	5.89	220	0.00 388	0.173	1.2e- 05	0.014 3	106
10011464	2130	120	2010	51.1	0.00 0939	6.04	180	0.00 287	0.194	1.2e- 05	0.014 3	106
10058743	2420	136	2260	57.7	0.001 09	6.8	189	0.00 317	0.189	1.2e- 05	0.014 3	106
10022990	2720	157	2580	65.5	0.001 16	7.06	200	0.00 346	0.178	1.2e- 05	0.014 3	106
10062721	3000	179	2820	71.6	0.001 32	5.72	207	0.00 354	0.173	1.2e- 05	0.014 3	106



10011201	2200	124	2090	53.2	0.00 098	6.4	183	0.00 298	0.183	1.2e- 05	0.014 3	106
10054258	2350	135	2210	56	0.001 01	6.04	187	0.00 302	0.194	1.2e- 05	0.014 3	106
10011197	2630	155	2480	62.5	0.001 18	5.45	195	0.00 319	0.194	1.2e- 05	0.014 3	106
10011208	3010	181	2830	71.5	0.001 33	5.3	207	0.00 349	0.184	1.2e- 05	0.014 3	106
10045388	3280	198	3100	78.2	0.001 43	5.57	216	0.00 374	0.178	1.2e- 05	0.014 3	106
10011211	2300	131	2150	54.6	0.001 02	5.84	185	0.00 297	0.194	1.2e- 05	0.014 3	106
10058304	2520	146	2360	60.2	0.001 1	5.99	192	0.00 317	0.194	1.2e- 05	0.014 3	106
10061604	3010	181	2820	71.3	0.001 34	5.37	207	0.00 349	0.194	1.2e- 05	0.014 3	106
10067028	2380	134	2250	56.9	0.001 07	6.56	188	0.00 312	0.183	1.2e- 05	0.014 3	106
10061334	2580	149	2430	61.6	0.001 14	6.34	194	0.00 325	0.183	1.2e- 05	0.014 3	106
10047154	2700	163	2530	64	0.001 26	4.42	197	0.00 315	0.183	1.2e- 05	0.014 3	106
10011456	3110	186	2900	73.6	0.001 37	5.29	210	0.00 357	0.162	1.2e- 05	0.014 3	106
10034707	3410	207	3190	80.6	0.001 5	5.03	219	0.00 377	0.173	1.2e- 05	0.014 3	106
10011458	2500	144	2370	60.1	0.001 09	6.51	193	0.00 323	0.178	1.2e- 05	0.014 3	106
10059919	2420	139	2270	57.7	0.001 07	5.69	189	0.00 306	0.189	1.2e- 05	0.014 3	106
10069092	2750	156	2590	65.9	0.001 24	7.49	200	0.00 352	0.184	1.2e- 05	0.014 3	106
10025220	2900	172	2730	68.9	0.001 27	5.68	204	0.00 344	0.178	1.2e- 05	0.014 3	106
10044992	3150	189	2940	75	0.001 38	4.96	211	0.00 356	0.189	1.2e- 05	0.014 3	106
10072723	3590	215	3370	85.2	0.001 61	6.27	225	0.00 405	0.168	1.2e- 05	0.014 3	106
10064058	3880	239	3630	91.9	0.001 69	5.39	234	0.00 42	0.163	1.2e- 05	0.014 3	106
10070476	2710	157	2540	64.4	0.001 18	5.99	198	0.00 332	0.184	1.2e- 05	0.014 3	106
10062032	3490	212	3280	83.3	0.001 54	5.56	223	0.00 391	0.173	1.2e- 05	0.014 3	106
10030613	2720	160	2560	65	0.001 18	5.77	199	0.00 331	0.194	1.2e- 05	0.014 3	106
10011468	3030	181	2850	72.2	0.001 34	5.73	208	0.00 355	0.194	1.2e- 05	0.014 3	106
10067588	3300	201	3100	78	0.001 46	5.19	216	0.00 371	0.173	1.2e- 05	0.014 3	106
10059953	3420	213	3210	81.2	0.001 44	5.44	219	0.00 363	0.393	1.2e- 05	0.014 3	106



10064059	3900	242	3680	92.3	0.00168	5	235	0.00417	0.173	1.2e-05	0.0143	106
10048422	1460	65.2	1390	35.8	0.000653	8.99	161	0.00265	0.189	1.2e-05	0.0143	106
10027896	1590	75	1530	38.8	0.00073	8.61	165	0.00272	0.184	1.2e-05	0.0143	106
10012713	2370	115	2250	57.5	0.00104	12.7	191	0.00369	0.246	1.2e-05	0.0143	106
10063459	2410	119	2280	58.4	0.00106	12.6	192	0.00372	0.246	1.2e-05	0.0143	106
10011166	2300	103	2200	56.5	0.000974	14.9	190	0.00392	0.226	1.2e-05	0.0143	106
10011831	2530	115	2410	61.8	0.00114	15.7	198	0.00421	0.199	1.2e-05	0.0143	106
10068387	2570	118	2430	62.3	0.00111	15.3	198	0.00418	0.215	1.2e-05	0.0143	106
10010796	2350	107	2240	57.3	0.00103	14.8	192	0.00395	0.226	1.2e-05	0.0143	106
10049192	2450	119	2330	59.5	0.00109	13.1	194	0.00386	0.199	1.2e-05	0.0143	106
10033692	2360	115	2250	57.3	0.00103	12.2	190	0.00367	0.225	1.2e-05	0.0143	106
10010803	2750	129	2610	66.7	0.00122	15.4	204	0.00434	0.199	1.2e-05	0.0143	106
10053316	2670	132	2520	64.6	0.00116	12.9	200	0.00401	0.199	1.2e-05	0.0143	106
10062283	2970	157	2820	71.5	0.00131	12.1	210	0.00417	0.204	1.2e-05	0.0143	106
10011980	2680	126	2550	65.3	0.00116	15.4	202	0.00428	0.204	1.2e-05	0.0143	106
10058178	2710	129	2590	66.2	0.0012	15.5	203	0.00433	0.199	1.2e-05	0.0143	106
10068388	2720	130	2590	66.2	0.00117	15.1	203	0.00429	0.215	1.2e-05	0.0143	106
10012342	2520	118	2390	61.2	0.00108	14.6	197	0.00406	0.225	1.2e-05	0.0143	106
10068392	2520	117	2390	61.2	0.00107	14.6	197	0.00406	0.225	1.2e-05	0.0143	106
10010819	2650	137	2520	64.4	0.00115	12.2	200	0.00388	0.246	1.2e-05	0.0143	106
10058322	2620	133	2490	63.6	0.00115	12.3	199	0.00385	0.246	1.2e-05	0.0143	106
10068871	2600	132	2460	62.7	0.00114	12.4	198	0.00384	0.246	1.2e-05	0.0143	106
10062271	2500	133	2360	59.9	0.00112	10.4	194	0.00351	0.257	1.2e-05	0.0143	106
10067205	1740	86.8	1640	42.1	0.000772	8.19	169	0.00279	0.178	1.2e-05	0.0143	106
10067126	1870	93.9	1780	45.3	0.000834	8.5	173	0.00292	0.184	1.2e-05	0.0143	106
10067217	2050	106	1950	49.3	0.000934	8.45	179	0.00306	0.184	1.2e-05	0.0143	106



10067123	1760	87.5	1670	42.7	0.00 0787	8.16	170	0.00 28	0.179	1.2e- 05	0.014 3	106
10069210	1990	101	1880	48.2	0.00 089	8.72	178	0.00 306	0.168	1.2e- 05	0.014 3	106
10067209	1910	94.5	1820	46.6	0.00 084	9.27	175	0.00 305	0.179	1.2e- 05	0.014 3	106
10067127	1970	101	1860	47.8	0.00 0866	8.44	177	0.00 301	0.184	1.2e- 05	0.014 3	106
10069215	2140	112	2030	51.7	0.00 0953	8.57	182	0.00 317	0.168	1.2e- 05	0.014 3	106
10067124	1870	95.3	1760	45.3	0.00 0839	8.19	173	0.00 289	0.179	1.2e- 05	0.014 3	106
10067200	2000	103	1900	48.5	0.00 0911	8.57	178	0.00 305	0.184	1.2e- 05	0.014 3	106

Mix Designs: 15 to 20 MPa

Table 15: Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 1 m3 of concrete basis.

a) Midpoint Impact Categories:

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H+-Eq	kg N	kg CO2-Eq	kg CFC-11-Eq	kg NOx-Eq	kg Sb-Eq	MJ, net calorific value
Minimum	34.9	0.224	279	2.39e-05	0.516	0.001	1710
Maximum	49.8	0.25	404	3.64e-05	0.723	0.00154	2600
Mean	44.3	0.241	358	3.19e-05	0.646	0.00135	2280
Median	46.1	0.243	376	3.32e-05	0.669	0.00143	2370
10011982	48	0.248	385	3.54e-05	0.698	0.00148	2540
10012044	47	0.246	376	3.48e-05	0.683	0.00144	2490
10056677	48.1	0.248	387	3.53e-05	0.699	0.00148	2530
10068389	47.7	0.247	383	3.51e-05	0.693	0.00147	2510
10049057	49.8	0.25	400	3.64e-05	0.723	0.00154	2600
10061469	44.4	0.242	359	3.29e-05	0.647	0.00136	2360
10061511	44.4	0.242	359	3.29e-05	0.647	0.00136	2360
10062026	45.2	0.243	366	3.33e-05	0.657	0.00139	2380
10011195	49.2	0.248	404	3.51e-05	0.713	0.00154	2500
10065359	46.1	0.244	379	3.32e-05	0.669	0.00143	2370
10051243	46.4	0.243	387	3.27e-05	0.671	0.00145	2330
10069218	38.9	0.23	313	2.64e-05	0.573	0.00114	1880

ECOpact 15 to 20 MPa

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H+-Eq	kg N	kg CO2-Eq	kg CFC-11-Eq	kg NOx-Eq	kg Sb-Eq	MJ, net calorific value
10067201	38.7	0.23	310	2.64e-05	0.57	0.00113	1880



10067219	34.9	0.224	279	2.39e-05	0.516	0.001	1710
10067207	35.7	0.225	286	2.42e-05	0.528	0.00103	1730

b) Inventory Metrics:

Indicator/LCI Metric	TPE	RE	NRE	NRR	RR	WDP	LFW	LFH W	CBW C	CW WC	CHW	CNH W
Unit	MJ-Eq	MJ-Eq	MJ-Eq	kg	m3	m3	kg waste	kg waste	m3	m3	kg	kg
Minimum	1930	97.4	1820	46.7	0.000861	7.94	175	0.00292	0.162	1.2e-05	0.0143	106
Maximum	2930	149	2780	70.9	0.00127	15.3	210	0.00442	0.257	1.2e-05	0.0143	106
Mean	2560	128	2430	62	0.00113	12.4	197	0.00386	0.213	1.2e-05	0.0143	106
Median	2670	133	2530	64.4	0.00118	14.2	200	0.00412	0.215	1.2e-05	0.0143	106
10011982	2840	137	2700	69.1	0.00124	15.3	207	0.00441	0.199	1.2e-05	0.0143	106
10012044	2800	133	2660	67.9	0.00124	15.3	206	0.00438	0.199	1.2e-05	0.0143	106
10056677	2830	138	2690	68.6	0.00126	14.8	207	0.00434	0.225	1.2e-05	0.0143	106
10068389	2820	137	2690	68.4	0.00125	15	206	0.00435	0.215	1.2e-05	0.0143	106
10049057	2930	144	2780	70.9	0.00127	14.8	210	0.00442	0.215	1.2e-05	0.0143	106
10061469	2650	127	2500	64.2	0.00118	14.5	200	0.00414	0.225	1.2e-05	0.0143	106
10061511	2630	127	2510	64.4	0.00114	14.5	200	0.00414	0.225	1.2e-05	0.0143	106
10062026	2670	130	2560	64.9	0.00116	14.2	201	0.00412	0.236	1.2e-05	0.0143	106
10011195	2810	149	2670	68.2	0.00125	12	205	0.00398	0.246	1.2e-05	0.0143	106
10065359	2670	138	2530	64.4	0.00119	12.2	200	0.00388	0.246	1.2e-05	0.0143	106
10051243	2630	143	2490	63.4	0.00116	10.2	198	0.00359	0.257	1.2e-05	0.0143	106
10067219	1930	97.4	1820	46.7	0.000861	8.62	175	0.00298	0.184	1.2e-05	0.0143	106
10067201	2110	111	2010	50.9	0.000945	8.51	181	0.00313	0.184	1.2e-05	0.0143	106
10067207	1940	101	1840	46.8	0.000881	7.94	175	0.00292	0.179	1.2e-05	0.0143	106
10069218	2120	112	2000	51.2	0.000933	8.29	181	0.0031	0.162	1.2e-05	0.0143	106



Mix Designs: 21 to 25 MPa

Table 16: Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 1 m³ of concrete basis.

a) Midpoint Impact Categories:

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H ⁺ -Eq	kg N	kg CO ₂ -Eq	kg CFC-11-Eq	kg NO _x -Eq	kg Sb-Eq	MJ, net calorific value
Minimum	40.1	0.232	322	2.71e-05	0.59	0.00118	1930
Maximum	64.3	0.27	539	4.3e-05	0.925	0.00206	3050
Mean	48.3	0.246	391	3.35e-05	0.704	0.00148	2390
Median	48.2	0.246	388	3.35e-05	0.704	0.00147	2390
10012270	49.9	0.251	401	3.65e-05	0.725	0.00154	2610
10012271	49	0.25	393	3.61e-05	0.713	0.00151	2580
10068390	49.8	0.25	400	3.64e-05	0.723	0.00154	2600
10012413	44.9	0.243	363	3.32e-05	0.654	0.00138	2380
10065284	50.5	0.249	421	3.52e-05	0.73	0.00159	2500
10065519	64.3	0.27	539	4.3e-05	0.925	0.00206	3050
10012276	51	0.252	409	3.72e-05	0.741	0.00158	2660
10066817	54.7	0.256	455	3.78e-05	0.79	0.00173	2690
10066981	41.9	0.235	336	2.83e-05	0.615	0.00124	2010
10069017	44.9	0.24	360	3.03e-05	0.659	0.00134	2160
10068986	53.6	0.254	433	3.61e-05	0.781	0.00164	2560

ECOpact 21 to 25 MPa

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H ⁺ -Eq	kg N	kg CO ₂ -Eq	kg CFC-11-Eq	kg NO _x -Eq	kg Sb-Eq	MJ, net calorific value
10069033	44.9	0.24	362	3.02e-05	0.658	0.00134	2140
10068955	42.9	0.237	344	2.91e-05	0.63	0.00127	2070
10066984	42.8	0.237	342	2.89e-05	0.628	0.00126	2060
10068970	40.1	0.232	322	2.71e-05	0.59	0.00118	1930
10068984	50	0.248	403	3.38e-05	0.729	0.00152	2400
10068974	47.2	0.244	380	3.18e-05	0.691	0.00142	2260
10069208	47.5	0.244	382	3.22e-05	0.696	0.00143	2290



b) Inventory Metrics:

Indicator/LCI Metric	TPE	RE	NRE	NR R	RR	WD P	LFW	LFHW	CBW C	CWW C	CHW	CNH W
Unit	MJ-Eq	MJ-Eq	MJ-Eq	kg	m3	m3	kg waste	kg waste	m3	m3	kg	kg
Minimum	2180	115	2060	52.8	0.000973	7.11	183	0.00315	0.167	1.2e-05	0.0143	106
Maximum	3480	208	3260	82.5	0.00147	15.2	222	0.00449	0.257	1.2e-05	0.0143	106
Mean	2690	143	2550	64.9	0.00118	10.3	200	0.00375	0.201	1.2e-05	0.0143	106
Median	2700	140	2560	64.8	0.00118	8.75	200	0.00368	0.199	1.2e-05	0.0143	106
10012270	2920	145	2780	71.1	0.00128	14.9	210	0.00444	0.199	1.2e-05	0.0143	106
10012271	2890	140	2770	70.6	0.00128	15.2	209	0.00445	0.199	1.2e-05	0.0143	106
10068390	2920	144	2770	71.1	0.00132	14.8	210	0.00442	0.215	1.2e-05	0.0143	106
10012413	2680	129	2540	64.3	0.00118	14.4	201	0.00415	0.225	1.2e-05	0.0143	106
10065284	2840	157	2680	68	0.00125	9.9	204	0.00373	0.257	1.2e-05	0.0143	106
10065519	3480	208	3260	82.5	0.00147	7.11	222	0.0039	0.246	1.2e-05	0.0143	106
10012276	2990	147	2830	72.4	0.00129	15	212	0.00449	0.204	1.2e-05	0.0143	106
10066817	3040	171	2850	72.9	0.00128	9.73	210	0.00387	0.257	1.2e-05	0.0143	106
10066981	2270	121	2160	54.7	0.00104	8.31	186	0.00323	0.177	1.2e-05	0.0143	106
10069017	2440	131	2300	58.6	0.00107	8.54	191	0.0034	0.168	1.2e-05	0.0143	106
10066984	2320	124	2200	56	0.00103	8.53	188	0.0033	0.168	1.2e-05	0.0143	106
10069033	2420	133	2290	58.1	0.00108	8.05	191	0.00331	0.167	1.2e-05	0.0143	106
10068970	2180	115	2060	52.8	0.000973	8.26	183	0.00315	0.178	1.2e-05	0.0143	106
10068955	2340	125	2210	56.4	0.00103	8.47	188	0.0033	0.179	1.2e-05	0.0143	106
10068984	2720	149	2570	65.4	0.00118	8.94	200	0.00364	0.21	1.2e-05	0.0143	106
10068974	2550	140	2410	61.4	0.00113	8.45	195	0.00347	0.185	1.2e-05	0.0143	106
10069208	2580	139	2450	62.2	0.00115	8.79	196	0.00354	0.173	1.2e-05	0.0143	106



10068986	290 0	16 3	274 0	69. 4	0.00128	8.72	206	0.0037 6	0.21	1.2e- 05	0.014 3	106
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Mix Designs: 26 to 30 MPa

Table 17 Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 1 m³ of concrete basis.

a) Midpoint Impact Categories:

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H ⁺ -Eq	kg N	kg CO ₂ -Eq	kg CFC-11-Eq	kg NO _x -Eq	kg Sb-Eq	MJ, net calorific value
Minimum	40.4	0.233	324	2.74e-05	0.593	0.00119	1950
Maximum	71.3	0.283	577	4.95e-05	1.03	0.00227	3510
Mean	55.4	0.258	447	3.85e-05	0.804	0.00172	2740
Median	53.9	0.256	434	3.88e-05	0.782	0.00167	2770
10073805	71.3	0.283	577	4.95e-05	1.03	0.00227	3510
10053996	69.1	0.28	557	4.84e-05	0.998	0.00219	3440
10012293	53.2	0.256	427	3.87e-05	0.772	0.00165	2760
10013341	57.2	0.262	457	4.15e-05	0.831	0.00178	2960
10044814	53.9	0.257	434	3.9e-05	0.782	0.00168	2780
10068391	53.9	0.257	434	3.9e-05	0.782	0.00168	2780
10071899	63.6	0.271	514	4.48e-05	0.92	0.00201	3190
10012426	49.1	0.249	397	3.57e-05	0.713	0.00152	2550
10066865	58	0.261	481	3.99e-05	0.837	0.00184	2830
10050630	40.4	0.233	324	2.74e-05	0.593	0.00119	1950
10050633	43.7	0.238	352	2.98e-05	0.641	0.0013	2120
10061662	47.5	0.244	382	3.21e-05	0.695	0.00143	2280
10061663	52.2	0.251	420	3.49e-05	0.762	0.00159	2480

ECOpact 26 to 30 MPa

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H ⁺ -Eq	kg N	kg CO ₂ -Eq	kg CFC-11-Eq	kg NO _x -Eq	kg Sb-Eq	MJ, net calorific value
10068915	49.5	0.247	398	3.32e-05	0.724	0.00149	2360
10068985	54.1	0.254	437	3.64e-05	0.789	0.00166	2590
10072618	69.1	0.277	558	4.56e-05	1	0.00216	3230



b) Inventory Metrics:

Indicator/LCI Metric	TPE	RE	NRE	NR R	RR	WD P	LFW	LFHW	CBW C	CWW C	CHW	CNH W
Unit	MJ-Eq	MJ-Eq	MJ-Eq	kg	m3	m3	kg waste	kg waste	m3	m3	kg	kg
Minimum	2210	116	2090	53	0.00098	7.95	184	0.00319	0.152	1.2e-05	0.0143	106
Maximum	3980	220	3760	94.8	0.00173	15.7	241	0.00508	0.241	1.2e-05	0.0143	106
Mean	3090	166	2930	74.3	0.00135	11.4	213	0.0042	0.202	1.2e-05	0.0143	106
Median	3120	159	2960	75.2	0.00134	11.4	215	0.0043	0.202	1.2e-05	0.0143	106
10073805	3980	220	3760	94.8	0.00169	13	241	0.00505	0.231	1.2e-05	0.0143	106
10053996	3890	212	3660	93.2	0.00173	13.7	239	0.00508	0.204	1.2e-05	0.0143	106
10012293	3110	155	2940	75	0.00133	14.9	215	0.00459	0.199	1.2e-05	0.0143	106
10013341	3310	168	3170	80.2	0.00146	15.7	223	0.00487	0.152	1.2e-05	0.0143	106
10044814	3130	159	2970	75.4	0.00136	14.5	216	0.00456	0.215	1.2e-05	0.0143	106
10068391	3150	159	2970	75.6	0.00136	14.6	216	0.00456	0.215	1.2e-05	0.0143	106
10071899	3590	193	3410	86.9	0.00153	13.5	230	0.00482	0.231	1.2e-05	0.0143	106
10012426	2880	143	2720	69.4	0.00126	14.1	207	0.00429	0.225	1.2e-05	0.0143	106
10066865	3220	183	3040	76.9	0.00141	9.71	215	0.00402	0.241	1.2e-05	0.0143	106
10050630	2210	116	2090	53	0.00098	8.49	184	0.00319	0.189	1.2e-05	0.0143	106
10050633	2390	129	2260	57.5	0.00109	8.9	190	0.00338	0.194	1.2e-05	0.0143	106
10061662	2570	140	2440	61.9	0.00115	8.58	196	0.0035	0.183	1.2e-05	0.0143	106
10061663	2810	157	2640	67	0.00125	8.27	203	0.00365	0.183	1.2e-05	0.0143	106
10068915	2670	147	2510	64	0.00117	8.36	199	0.00355	0.173	1.2e-05	0.0143	106
10068985	2920	164	2770	70.2	0.00126	8.69	207	0.00378	0.21	1.2e-05	0.0143	106
10072618	3670	216	3460	87.4	0.00159	7.95	229	0.0043	0.189	1.2e-05	0.0143	106



Mix Designs: 31 to 35 MPa

Table 18: Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 1 m³ of concrete basis.

a) Midpoint Impact Categories:

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H ⁺ -Eq	kg N	kg CO ₂ -Eq	kg CFC-11-Eq	kg NO _x -Eq	kg Sb-Eq	MJ, net calorific value
Minimum	42.1	0.236	339	2.88e-05	0.618	0.00125	2050
Maximum	76.3	0.288	619	4.99e-05	1.1	0.0024	3530
Mean	53.2	0.253	430	3.54e-05	0.775	0.00162	2510
Median	49.5	0.247	398	3.31e-05	0.724	0.00149	2350
10058012	45.4	0.241	366	3.06e-05	0.665	0.00136	2170
10058019	42.1	0.236	339	2.88e-05	0.618	0.00125	2050
10056076	44.5	0.239	359	2.98e-05	0.652	0.00133	2120
10032851	48.8	0.246	393	3.27e-05	0.714	0.00147	2320
10050580	52.3	0.251	422	3.48e-05	0.763	0.00159	2470
10071314	55.1	0.255	449	3.6e-05	0.803	0.00169	2550
10061034	61.1	0.265	495	4.04e-05	0.888	0.00189	2860
10068815	45.7	0.241	368	3.06e-05	0.67	0.00137	2170
10053551	49.5	0.247	398	3.31e-05	0.724	0.00149	2350
10043675	42.8	0.237	345	2.89e-05	0.628	0.00127	2060
10052085	45.9	0.241	370	3.08e-05	0.671	0.00138	2190
10055955	47	0.242	382	3.04e-05	0.689	0.00141	2150
10058150	49.1	0.246	395	3.3e-05	0.719	0.00148	2340
10043659	52.1	0.251	423	3.47e-05	0.759	0.00159	2460
10062371	56.8	0.258	459	3.78e-05	0.828	0.00174	2680
10060520	59.7	0.262	489	3.97e-05	0.865	0.00186	2810
10056413	66.3	0.274	536	4.48e-05	0.962	0.00207	3180
10068093	69.7	0.278	566	4.57e-05	1.01	0.00218	3230
10071980	76.3	0.288	619	4.99e-05	1.1	0.0024	3530

b) Inventory Metrics:

Indicator/LCI Metric	TPE	RE	NRE	NR R	RR	WD P	LFW	LFHW	CBW C	CWW C	CHW	CNH W
Unit	MJ-Eq	MJ-Eq	MJ-Eq	kg	m ³	m ³	kg waste	kg waste	m ³	m ³	kg	kg
Minimum	2310	121	2190	55.7	0.001	5.37	188	0.00303	0.168	1.2e-05	0.0143	106
Maximum	4020	243	3790	95.2	0.00173	9.93	239	0.00445	0.241	1.2e-05	0.0143	106
Mean	2840	162	2680	68.1	0.00125	7.75	204	0.00361	0.197	1.2e-05	0.0143	106



Median	265 0	149	251 0	64	0.0011 8	7.8	198	0.0035 1	0.194	1.2e- 05	0.014 3	106
10058012	245 0	134	232 0	59	0.0010 8	8.26	192	0.0033 6	0.194	1.2e- 05	0.014 3	106
10058019	2310	121	219 0	55.7	0.001	9.02	188	0.0033 3	0.199	1.2e- 05	0.014 3	106
10056076	240 0	131	226 0	57.4	0.0010 7	7.78	189	0.0032 6	0.199	1.2e- 05	0.014 3	106
10032851	262 0	145	248 0	63.1	0.0011 7	8.08	197	0.0034 8	0.189	1.2e- 05	0.014 3	106
10050580	280 0	159	264 0	67	0.0012	7.8	202	0.0035 8	0.204	1.2e- 05	0.014 3	106
10071314	290 0	172	272 0	69	0.0012 8	6.17	204	0.0034 7	0.2	1.2e- 05	0.014 3	106
10061034	326 0	18 9	307 0	77.3	0.0013 6	7.48	216	0.0039	0.189	1.2e- 05	0.014 3	106
10068815	245 0	135	231 0	59	0.0010 9	7.77	191	0.0033 1	0.189	1.2e- 05	0.014 3	106
10053551	264 0	149	251 0	64	0.0011 8	8.05	198	0.0035 1	0.168	1.2e- 05	0.014 3	106
10043675	232 0	125	219 0	56.1	0.0010 7	8.22	188	0.0032 5	0.194	1.2e- 05	0.014 3	106
10052085	248 0	136	234 0	59. 5	0.0011 1	8.12	192	0.0033 6	0.183	1.2e- 05	0.014 3	106
10055955	244 0	143	230 0	58.3	0.0010 7	5.37	190	0.0030 3	0.189	1.2e- 05	0.014 3	106
10058150	265 0	147	251 0	63.7	0.0011 8	8.42	198	0.0035 5	0.173	1.2e- 05	0.014 3	106
10043659	279 0	159	262 0	66. 7	0.0012 4	7.57	202	0.0035 3	0.215	1.2e- 05	0.014 3	106
10062371	304 0	174	286 0	72.6	0.0013 6	7.86	210	0.0037 9	0.183	1.2e- 05	0.014 3	106
10060520	320 0	18 6	303 0	76.3	0.0013 6	7.52	214	0.0038 2	0.241	1.2e- 05	0.014 3	106
10056413	360 0	20 6	339 0	86.1	0.0015 8	9.93	228	0.0044 5	0.204	1.2e- 05	0.014 3	106
10068093	368 0	219	346 0	87. 5	0.0015 8	7.02	229	0.0041 9	0.215	1.2e- 05	0.014 3	106
10071980	402 0	24 3	379 0	95.2	0.0017 3	6.9	239	0.0044 5	0.215	1.2e- 05	0.014 3	106

Mix Designs: 36 to 40 MPa

Table 19 **Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 1 m³ of concrete basis.**

a) Midpoint Impact Categories:

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
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Unit	moles of H ⁺ -Eq	kg N	kg CO ₂ -Eq	kg CFC-11-Eq	kg NO _x -Eq	kg Sb-Eq	MJ, net calorific value
Minimum	46.7	0.241	379	3.03e-05	0.684	0.0014	2150
Maximum	69.6	0.278	564	4.58e-05	1.01	0.00218	3240
Mean	57	0.258	461	3.77e-05	0.831	0.00175	2670
Median	55.2	0.256	446	3.67e-05	0.806	0.00169	2600
10068395	69.6	0.278	564	4.58e-05	1.01	0.00218	3240
10012424	46.7	0.241	379	3.03e-05	0.684	0.0014	2150
10065309	51.8	0.25	417	3.45e-05	0.756	0.00157	2450
10062563	56.3	0.257	454	3.72e-05	0.82	0.00172	2640
10058470	63.5	0.269	513	4.21e-05	0.923	0.00197	2980
10061664	54.2	0.254	437	3.62e-05	0.791	0.00166	2570

b) Inventory Metrics:

Indicator/LCI Metric	TPE	RE	NRE	NR _R	RR	WD _P	LFW	LFHW	CBW _C	CWW _C	CHW	CNH _W
Unit	MJ-Eq	MJ-Eq	MJ-Eq	kg	m ³	m ³	kg waste	kg waste	m ³	m ³	kg	kg
Minimum	2430	141	2290	58	0.0011	5.62	189	0.00305	0.183	1.2e-05	0.0143	106
Maximum	3700	220	3460	87.5	0.00161	8.13	229	0.00424	0.204	1.2e-05	0.0143	106
Mean	3030	175	2860	72.4	0.00133	7.44	209	0.00373	0.19	1.2e-05	0.0143	106
Median	2950	168	2780	70.6	0.00128	7.69	207	0.00372	0.189	1.2e-05	0.0143	106
10068395	3700	220	3460	87.5	0.00161	7.43	229	0.00424	0.204	1.2e-05	0.0143	106
10012424	2430	141	2290	58	0.0011	5.62	189	0.00305	0.183	1.2e-05	0.0143	106
10065309	2780	156	2610	66.5	0.00123	7.95	202	0.00359	0.189	1.2e-05	0.0143	106
10062563	2990	172	2820	71.3	0.0013	7.43	208	0.00371	0.189	1.2e-05	0.0143	106
10058470	3390	195	3200	81	0.00147	8.06	221	0.00409	0.189	1.2e-05	0.0143	106
10061664	2910	165	2750	69.8	0.00125	8.13	206	0.00372	0.183	1.2e-05	0.0143	106



Mix Designs: 41 to 45 MPa

Table 20 Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 1 m³ of concrete basis.

a) Midpoint Impact Categories:

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H ⁺ -Eq	kg N	kg CO ₂ -Eq	kg CFC-11-Eq	kg NO _x -Eq	kg Sb-Eq	MJ, net calorific value
Minimum	51.2	0.249	413	3.4e-05	0.748	0.00155	2420
Maximum	80.4	0.294	652	5.22e-05	1.16	0.00254	3690
Mean	61.2	0.264	496	4.03e-05	0.89	0.00189	2850
Median	60	0.263	485	3.96e-05	0.874	0.00185	2800
10011154	51.2	0.249	413	3.4e-05	0.748	0.00155	2420
10048460	54.5	0.254	439	3.61e-05	0.796	0.00166	2560
10062413	58.7	0.261	474	3.9e-05	0.854	0.00181	2760
10053977	62.3	0.266	509	4.13e-05	0.903	0.00195	2930
10067851	67.2	0.273	544	4.34e-05	0.976	0.00208	3070
10071981	80.4	0.294	652	5.22e-05	1.16	0.00254	3690
10048427	54.3	0.254	438	3.6e-05	0.792	0.00166	2550
10062291	61.4	0.265	496	4.03e-05	0.893	0.00189	2850

b) Inventory Metrics:

Indicator/LCI Metric	TPE	RE	NRE	NR _R	RR	WD _P	LFW	LFHW	CBW _C	CWW _C	CHW	CNH _W
Unit	MJ-Eq	MJ-Eq	MJ-Eq	kg	m ³	m ³	kg waste	kg waste	m ³	m ³	kg	kg
Minimum	2740	154	2580	65.7	0.0012	5.75	200	0.00353	0.178	1.2e-05	0.0143	106
Maximum	4210	259	3950	99.6	0.00182	7.91	245	0.00456	0.241	1.2e-05	0.0143	106
Mean	3240	191	3050	77.3	0.00142	7.18	215	0.00387	0.196	1.2e-05	0.0143	106
Median	3180	187	3010	76	0.0014	7.5	214	0.00386	0.189	1.2e-05	0.0143	106
10011154	2740	154	2580	65.7	0.0012	7.7	200	0.00353	0.189	1.2e-05	0.0143	106
10048460	2890	166	2740	69.4	0.00124	7.55	205	0.00365	0.178	1.2e-05	0.0143	106
10062413	3130	181	2970	74.8	0.00136	7.91	213	0.00387	0.194	1.2e-05	0.0143	106



10053977	333 0	19 6	313 0	79.2	0.0014 6	7.46	218	0.0039 2	0.241	1.2e- 05	0.014 3	106
10067851	350 0	212	327 0	83	0.0015 7	5.75	222	0.0039 2	0.183	1.2e- 05	0.014 3	106
10071981	421 0	25 9	395 0	99. 6	0.0018 2	6.51	245	0.0045 6	0.215	1.2e- 05	0.014 3	106
10048427	289 0	165	272 0	69. 3	0.0012 7	7.56	205	0.0036 4	0.189	1.2e- 05	0.014 3	106
10062291	324 0	193	305 0	77.3	0.0014 3	6.99	215	0.0038 5	0.183	1.2e- 05	0.014 3	106

Mix Designs: 46 to 50 MPa

Table 21 Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 1 m3 of concrete basis.

a) Midpoint Impact Categories:

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H+-Eq	kg N	kg CO2-Eq	kg CFC-11-Eq	kg NOx-Eq	kg Sb-Eq	MJ, net calorific value
Minimum	54.1	0.253	438	3.55e-05	0.79	0.00165	2520
Maximum	67.3	0.274	547	4.38e-05	0.977	0.0021	3100
Mean	59.8	0.262	484	3.94e-05	0.87	0.00184	2790
Median	58.8	0.261	476	3.9e-05	0.856	0.00182	2760
10049024	55.3	0.256	447	3.66e-05	0.807	0.00169	2600
10052793	57.9	0.26	469	3.86e-05	0.843	0.00179	2730
10048747	54.1	0.253	438	3.55e-05	0.79	0.00165	2520
10068713	59.8	0.262	484	3.94e-05	0.87	0.00184	2790
10072716	64.1	0.269	519	4.24e-05	0.932	0.00199	3000
10053887	67.3	0.274	547	4.38e-05	0.977	0.0021	3100

b) Inventory Metrics:

Indicator/LCI Metric	TPE	RE	NRE	NR R	RR	WD P	LFW	LFHW	CBW C	CWW C	CHW	CNH W
Unit	MJ-Eq	MJ-Eq	MJ-Eq	kg	m3	m3	kg waste	kg waste	m3	m3	kg	kg
Minimum	286 0	16 6	269 0	68.1	0.0012 5	6.25	203	0.0035 2	0.189	1.2e- 05	0.014 3	106
Maximum	352 0	214	331 0	84.1	0.0015 2	7.96	224	0.0040 7	0.214	1.2e- 05	0.014 3	106
Mean	317 0	185	298 0	75. 6	0.0013 9	7.25	213	0.0038 2	0.202	1.2e- 05	0.014 3	106
Median	314 0	182	296 0	74.8	0.0013 8	7.38	212	0.0038 3	0.199	1.2e- 05	0.014 3	106
10049024	295 0	16 9	277 0	70. 5	0.0013 2	7.47	207	0.0036 7	0.189	1.2e- 05	0.014 3	106



10052793	309 0	178	294 0	74.3	0.0013 6	7.96	212	0.0038 3	0.214	1.2e- 05	0.014 3	106
10048747	286 0	16 6	269 0	68.1	0.0012 5	6.71	203	0.0035 2	0.194	1.2e- 05	0.014 3	106
10068713	318 0	185	299 0	75.4	0.0014	7.29	213	0.0038 3	0.204	1.2e- 05	0.014 3	106
10072716	341 0	20 0	321 0	81.3	0.0014 8	7.82	221	0.0040 7	0.194	1.2e- 05	0.014 3	106
10053887	352 0	214	331 0	84.1	0.0015 2	6.25	224	0.0039 9	0.214	1.2e- 05	0.014 3	106

Mix Designs: 51 to 55 MPa

Table 22 **Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 1 m³ of concrete basis.**

a) Midpoint Impact Categories:

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H ⁺ -Eq	kg N	kg CO ₂ -Eq	kg CFC-11-Eq	kg NO _x -Eq	kg Sb-Eq	MJ, net calorific value
Minimum	58.3	0.26	472	3.81e-05	0.849	0.00179	2700
Maximum	76.2	0.288	615	5.01e-05	1.1	0.00239	3550
Mean	67.8	0.275	548	4.45e-05	0.982	0.00211	3150
Median	68.3	0.275	553	4.49e-05	0.99	0.00213	3180
10072088	72.6	0.282	588	4.75e-05	1.05	0.00227	3360
10043923	58.3	0.26	472	3.81e-05	0.849	0.00179	2700
10072674	64	0.269	518	4.22e-05	0.93	0.00198	2990
10072793	76.2	0.288	615	5.01e-05	1.1	0.00239	3550

b) Inventory Metrics:

Indicator/LCI Metric	TPE	RE	NRE	NR R	RR	WD P	LFW	LFHW	CBW C	CWW C	CHW	CNH W
Unit	MJ-Eq	MJ-Eq	MJ-Eq	kg	m ³	m ³	kg waste	kg waste	m ³	m ³	kg	kg
Minimum	305 0	181	288 0	73	0.0013 4	6.52	210	0.0036 6	0.168	1.2e- 05	0.014 3	106
Maximum	405 0	23 9	379 0	95. 9	0.0017 6	7.85	240	0.0045 9	0.194	1.2e- 05	0.014 3	106
Mean	359 0	212	336 0	85.2	0.0015 7	7.24	226	0.0041 5	0.186	1.2e- 05	0.014 3	106
Median	362 0	214	339 0	85. 8	0.0015 8	7.28	227	0.0041 8	0.192	1.2e- 05	0.014 3	106
10072088	385 0	23 0	359 0	90. 9	0.0016 8	7.05	233	0.0043 2	0.189	1.2e- 05	0.014 3	106
10043923	305 0	181	288 0	73	0.0013 4	6.52	210	0.0036 6	0.194	1.2e- 05	0.014 3	106



10072674	340 0	19 9	319 0	80. 8	0.0014 9	7.52	221	0.0040 4	0.194	1.2e- 05	0.014 3	106
10072793	405 0	23 9	379 0	95. 9	0.0017 6	7.85	240	0.0045 9	0.168	1.2e- 05	0.014 3	106

Mix Designs: 56 to 60 MPa

Table 23 Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 1 m³ of concrete basis.

a) Midpoint Impact Categories:

Indicator/LCI Metric	AP	EP	GWP	ODP	PCOP	ADPe	ADPf
Unit	moles of H ⁺ -Eq	kg N	kg CO ₂ -Eq	kg CFC-11-Eq	kg NO _x -Eq	kg Sb-Eq	MJ, net calorific value
Minimum	58.2	0.26	471	3.8e-05	0.849	0.00179	2690
Maximum	87.2	0.304	708	5.65e-05	1.26	0.00276	3990
Mean	71.2	0.28	577	4.66e-05	1.03	0.00223	3290
Median	70.8	0.279	573	4.66e-05	1.03	0.00222	3300
10049792	58.2	0.26	471	3.8e-05	0.849	0.00179	2690
10061652	62.8	0.267	508	4.15e-05	0.913	0.00194	2940
10072853	67.3	0.274	543	4.42e-05	0.978	0.00209	3130
10067151	74.4	0.285	603	4.89e-05	1.08	0.00234	3460
10058497	77.2	0.289	631	5.03e-05	1.11	0.00244	3550
10046379	87.2	0.304	708	5.65e-05	1.26	0.00276	3990

b) Inventory Metrics:

Indicator/LCI Metric	TPE	RE	NRE	NR R	RR	WD P	LFW	LFHW	CBW C	CWW C	CHW	CNH W
Unit	MJ-Eq	MJ-Eq	MJ-Eq	kg	m ³	m ³	kg waste	kg waste	m ³	m ³	kg	kg
Minimum	306 0	182	287 0	72.8	0.0013 5	6.23	209	0.0036 5	0.168	1.2e- 05	0.014 3	106
Maximum	456 0	283	427 0	108	0.002	7.72	255	0.0048	0.236	1.2e- 05	0.014 3	106
Mean	375 0	226	352 0	89. 2	0.0016 4	6.91	231	0.0042 4	0.2	1.2e- 05	0.014 3	106
Median	374 0	222	352 0	89	0.0016 3	6.88	231	0.0042 6	0.197	1.2e- 05	0.014 3	106
10049792	306 0	182	287 0	72.8	0.0013 5	6.44	209	0.0036 5	0.194	1.2e- 05	0.014 3	106
10061652	335 0	196	314 0	80	0.0014 6	7.72	219	0.0040 1	0.194	1.2e- 05	0.014 3	106
10072853	353 0	209	335 0	84. 6	0.0015 2	7.32	225	0.0041 5	0.168	1.2e- 05	0.014 3	106



10067151	394 0	23 5	370 0	93.5	0.0017 3	7.47	237	0.0044 5	0.2	1.2e- 05	0.014 3	106
10058497	406 0	24 9	379 0	96	0.0017 6	6.29	240	0.0043 7	0.236	1.2e- 05	0.014 3	106
10046379	456 0	28 3	427 0	108	0.002	6.23	255	0.0048	0.21	1.2e- 05	0.014 3	106

ADDITIONAL ENVIRONMENTAL INFO

No regulated substances of very high concern are utilized on site.

The PCR allows for the grouping of similar products. Examples of grouping for concrete products include performance categories of compressive strength and high early strength, material characteristics of lightweight concrete, and production categories of ready-mix and central mix. Alternately, if a single value is chosen for each impact category for all products, the value reported should be the highest impact within the range of variation; therefore, the EPD would report the highest single value for each impact category amongst all of the products or plants included in the average EPD analysis." (PCR for Concrete v2.1)

All the ready-mix concrete products manufactured at the plant are listed below. A complete LCA with resulting impacts for the study was performed on all highlighted mixes. The non-highlighted mixes listed below are grouped by characteristics and then the amount of cement. The highest value for the GWP for each mix that was not part of the LCA but is within the 10% range is taken from the LCA mix as part of the study. The table outlines the GWP for all mixes produced at this plant as allowed by the PCR.

Mix Designs: 0 to 15 MPa

Mix	GWP	MPa
10054309	162	1
10073393	162	0,6
10062310	162	1
10034328	162	1
10062890	162	2
10061473	162	3
10062530	162	3,4
10054321	162	3,4
10062449	162	3,4
10061333	162	3,5
10052045	162	3,5
10011182	162	3,6
10018482	162	3,6
10045943	162	3,6
10059677	162	3,7
10061037	162	3,7



10067589	162	3,8
10067676	162	3,8
10053526	162	3,8
10058980	162	3,8
10011185	162	3,8
10035641	162	3,8
10052047	162	3,8
10055648	162	3,8
10058742	162	3,8
10058907	162	3,8
10065277	162	3,8
10063124	162	3,9
10063125	162	3,9
10064440	162	3,9
10044422	162	3,9
10049306	162	3,9
10064055	162	3,9
10068474	162	3,9
10032416	162	3,9
10058080	162	3,9
10058081	162	3,9
10062562	162	3,9
10062650	162	3,9
10053954	162	3,9
10054051	162	3,9
10011186	162	3,9
10011196	162	3,9
10033422	162	3,9
10046452	162	3,9
10052798	162	3,9
10054275	162	3,9
10055753	162	3,9
10056810	162	3,9
10058082	162	3,9
10058640	162	3,9
10065452	162	3,9
10067355	162	3,9
10068671	162	3,9
10070800	162	3,9
10069205	162	3,9
10022990	162	4
10023331	162	4
10035685	162	4
10030509	162	4
10062721	162	4
10048154	162	4



10058981	162	4
10011464	162	4
10045011	162	4
10046543	162	4
10047801	162	4
10052404	162	4
10058743	162	4
10062719	162	4
10063339	162	4
10072770	162	4
10057311	162	4,1
10064056	162	4,1
10071765	162	4,1
10041257	162	4,1
10053314	162	4,1
10011208	162	4,1
10045388	162	4,1
10071712	162	4,1
10075541	162	4,1
10011197	162	4,1
10011201	162	4,1
10011202	162	4,1
10034538	162	4,1
10035635	162	4,1
10050673	162	4,1
10054258	162	4,1
10058542	162	4,1
10058966	162	4,1
10065454	162	4,1
10068234	162	4,1
10068385	162	4,1
10071557	162	4,1
10071558	162	4,1
10074647	162	4,1
10051045	162	4,1
10058304	162	4,2
10023330	162	4,2
10058968	162	4,2
10061382	162	4,2
10070513	162	4,2
10011450	162	4,2
10051184	162	4,2
10065393	162	4,2
10061604	162	4,2
10011211	162	4,2
10033965	162	4,2



10047024	162	4,2
10048157	162	4,2
10026990	162	4,3
10064057	162	4,3
10011455	162	4,3
10011456	162	4,3
10034707	162	4,3
10046986	162	4,3
10047154	162	4,3
10053288	162	4,3
10073454	162	4,3
10053790	162	4,3
10061335	162	4,3
10011451	162	4,3
10023332	162	4,3
10030612	162	4,3
10031623	162	4,3
10046968	162	4,3
10047156	162	4,3
10053079	162	4,3
10059075	162	4,3
10061334	162	4,3
10061828	162	4,3
10067028	162	4,3
10068081	162	4,3
10068733	162	4,3
10053021	162	4,3
10053022	162	4,3
10011458	162	4,4
10062561	162	4,5
10074623	162	4,5
10025220	162	4,5
10064058	162	4,5
10016093	162	4,5
10042828	162	4,5
10051183	162	4,5
10053940	162	4,5
10058457	162	4,5
10058458	162	4,5
10062840	162	4,5
10072722	162	4,5
10011463	162	4,5
10044992	162	4,5
10053729	162	4,5
10062722	162	4,5
10062841	162	4,5



10072723	162	4,5
10011459	162	4,5
10034430	162	4,5
10034432	162	4,5
10011462	162	4,5
10031117	162	4,5
10031622	162	4,5
10033174	162	4,5
10033576	162	4,5
10033698	162	4,5
10052406	162	4,5
10053982	162	4,5
10059919	162	4,5
10061847	162	4,5
10062265	162	4,5
10062266	162	4,5
10062373	162	4,5
10062450	162	4,5
10062720	162	4,5
10065278	162	4,5
10068386	162	4,5
10069092	162	4,5
10072724	162	4,5
10073492	162	4,5
10062561	162	4,5
10074623	162	4,5
10025220	162	4,5
10064058	162	4,5
10016093	162	4,5
10042828	162	4,5
10051183	162	4,5
10053940	162	4,5
10058457	162	4,5
10058458	162	4,5
10062840	162	4,5
10072722	162	4,5
10011463	162	4,5
10044992	162	4,5
10053729	162	4,5
10062722	162	4,5
10062841	162	4,5
10072723	162	4,5
10011459	162	4,5
10034430	162	4,5
10034432	162	4,5
10011462	162	4,5



10031117	162	4,5
10031622	162	4,5
10033174	162	4,5
10033576	162	4,5
10033698	162	4,5
10052406	162	4,5
10053982	162	4,5
10059919	162	4,5
10061847	162	4,5
10062265	162	4,5
10062266	162	4,5
10062373	162	4,5
10062450	162	4,5
10062720	162	4,5
10065278	162	4,5
10068386	162	4,5
10069092	162	4,5
10072724	162	4,5
10073492	162	4,5
10070475	162	4,7
10070476	162	4,7
10062032	162	4,8
10033423	162	4,8
10075052	162	4,8
10059953	546	5
10064059	546	5
10060234	546	5
10067900	546	5
10033497	546	5
10048604	546	5
10068592	546	5
10011468	546	5
10030613	546	5
10034951	546	5
10067588	546	5
10052750	546	5,7
10048428	330	7
10048422	330	7
10012771	330	7
10027896	330	7
10010823	330	7
10012713	330	7
10053831	330	7
10074561	343	7,5
10063459	343	7,5
10063460	343	7,5



10063512	343	7,5
10049972	343	8
10011166	305	9
10063753	336	10,5
10068338	336	10,5
10010907	336	10,5
10062921	336	10,5
10072676	336	10,5
10011831	336	10,5
10074596	336	10,5
10010904	336	10,5
10010907	336	10,5
10072676	336	10,5
10061119	342	10,5
10075113	342	10,5
10068387	342	10,5
10045441	342	10,5
10049192	342	10,5
10012642	356	10,5
10074493	342	10,5
10064662	342	10,5
10075112	342	10,5
10061119	364	10,5
10075112	364	10,5
10075113	364	10,5
10069213	364	10,5
10011831	364	10,5
10068387	364	10,5
10049192	364	10,5
10010796	364	10,5
10012471	364	10,5
10062283	364	10,5
10053316	364	10,5
10010803	369	12,5
10054122	369	12,5
10074492	369	12,5
10011891	369	12,5
10050766	369	12,5
10052250	353	12,5
10053303	353	12,5
10053315	353	12,5
10056720	353	12,5
10033692	353	12,5
10012294	366	12,5
10049804	344	12,5
10010815	389	12,5



10012710	402	12,5
10055721	356	12,5
10064413	393	12,5
10060550	393	12,5
10062339	350	12,5
10053953	360	14
10068084	360	14
10070640	360	14
10074617	360	14
10010908	360	14
10047000	360	14
10056073	360	14
10063673	360	14
10067954	360	14
10068339	360	14
10069475	360	14
10070689	360	14
10072677	360	14
10061150	360	14
10069215	360	14
10011980	360	14
10058178	365	14
10068388	368	14
10011892	368	14
10049195	368	14
10052795	368	14
10055933	368	14
10057738	368	14
10062273	368	14
10073833	368	14
10012342	339	14
10068392	339	14
10010819	381	14
10058322	372	14
10062271	368	14
10049783	368	14,5
10049784	368	14,5
10068537	368	15
10055954	368	15

ECOpact 0 to 15 MPa

Mix	GWP	MPa
10067129	257	10,5
10067123	257	10,5



10067202	257	10,5
10067126	271	10,5
10066968	271	10,5
10067217	271	10,5
10066968	271	10,5
10067205	252	10,5
10067214	252	10,5
10069210	289	10,5
10069213	342	10,5
10067200	293	14
10067124	274	14
10067127	288	14
10067206	274	14
10067203	274	14
10066969	274	14
10067209	274	14
10069215	274	14

Mix Designs: 16 to 20 MPa

Mix	GWP	MPa
10059549	386	17,5
10062922	386	17,5
10068380	386	17,5
10010771	386	17,5
10059548	386	17,5
10048445	386	17,5
10065218	386	17,5
10050075	386	17,5
10010957	386	17,5
10010958	386	17,5
10061011	386	17,5
10069476	386	17,5
10072689	386	17,5
10052875	386	17,5
10011070	386	17,5
10011165	386	17,5
10011469	386	17,5
10074153	386	17,5
10050076	386	17,5
10074620	386	17,5
10074621	386	17,5
10012044	378	17,5



10030924	378	17,5
10032165	378	17,5
10074579	378	17,5
10012141	378	17,5
10010765	378	17,5
10069218	378	17,5
10011982	386	17,5
10056677	388	17,5
10068389	385	17,5
10034324	385	17,5
10049057	402	17,5
10049062	402	17,5
10071930	402	17,5
10012383	402	17,5
10061469	361	17,5
10061511	361	17,5
10062026	368	17,5
10065299	361	17,5
10067345	361	17,5
10011195	406	17,5
10065359	381	17,5
10051243	389	17,5
10052352	389	17,5
10058447	389	17,5
10052354	389	17,5
10052351	389	17,5
10052353	389	17,5
10062643	389	17,5
10062644	389	17,5
10062724	389	17,5
10068682	389	20
10068828	389	20

ECOPACT

Mix Designs: 16 to 20 MPa

Mix	GWP	MPa
10067201	310	17,5
10067219	279	17,5
10067125	279	17,5
10066980	279	17,5



10067128	279	17,5
10067204	279	17,5
10066980	279	17,5
10067207	286	17,5
10069218	286	17,5

Mix Designs: 21 to 25 MPa

Mix	GWP	MPa
10047062	402	21
10059631	402	21
10053430	402	21
10059630	402	21
10011472	402	21
10048448	402	21
10050556	402	21
10052965	402	21
10053324	402	21
10057164	402	21
10059572	402	21
10062927	402	21
10063639	402	21
10063988	402	21
10065219	402	21
10068085	402	21
10069860	402	21
10035476	402	21
10052757	402	21
10068382	402	21
10050077	402	21
10067955	402	21
10068381	402	21
10052915	402	21
10052891	402	21
10052916	402	21
10048839	402	21
10049797	402	21
10050605	402	21
10012298	402	21
10051979	402	21
10067507	402	21
10058973	402	21



10045014	402	21
10010825	402	21
10010826	402	21
10011135	402	21
10049276	402	21
10053717	402	21
10048462	402	21
10048463	402	21
10048465	402	21
10051245	402	21
10052848	402	21
10052990	402	21
10060867	402	21
10061848	402	21
10063569	402	21
10063987	402	21
10048446	402	21
10048447	402	21
10052006	402	21
10059524	402	21
10060958	402	21
10061339	402	21
10061826	402	21
10068655	402	21
10069479	402	21
10069507	402	21
10069600	402	21
10070130	402	21
10070703	402	21
10074618	402	21
10013433	402	21
10069981	402	21
10010970	402	21
10010971	402	21
10010972	402	21
10010973	402	21
10010974	402	21
10033444	402	21
10070091	402	21
10070790	402	21
10010987	402	21
10010993	402	21
10011003	402	21



10011007	402	21
10035115	402	21
10035116	402	21
10045184	402	21
10052347	402	21
10054255	402	21
10056074	402	21
10064020	402	21
10070008	402	21
10070793	402	21
10072678	402	21
10052876	402	21
10052877	402	21
10054251	402	21
10052878	402	21
10052879	402	21
10054253	402	21
10011159	402	21
10059688	402	21
10069685	402	21
10069847	402	21
10018393	402	21
10057218	402	21
10011169	402	21
10048838	402	21
10057306	402	21
10044854	402	21
10058431	402	21
10065271	402	21
10069688	402	21
10069902	402	21
10070181	402	21
10011470	402	21
10068230	402	21
10011471	402	21
10011473	402	21
10054246	402	21
10035120	402	21
10053403	402	21
10053404	402	21
10053525	402	21
10053826	402	21
10052296	402	21



10062781	402	21
10011771	402	21
10062783	402	21
10051908	402	21
10011108	402	21
10062208	402	21
10010672	402	21
10052684	402	21
10056100	402	21
10060631	402	21
10073887	402	21
10056743	402	21
10010821	402	21
10010824	402	21
10027310	402	21
10045183	402	21
10048503	402	21
10053446	402	21
10072700	402	21
10048464	402	21
10058929	402	21
10061220	402	21
10069478	402	21
10073456	402	21
10073458	402	21
10074645	402	21
10074646	402	21
10016094	402	21
10012862	402	21
10063351	402	21
10072701	402	21
10074597	402	21
10012718	402	21
10052890	402	21
10011158	402	21
10057301	402	21
10060280	402	21
10061709	402	21
10069039	402	21
10011168	402	21
10056057	402	21
10058983	402	21
10060446	402	21



10061570	402	21
10018317	402	21
10052699	402	21
10054062	402	21
10057305	402	21
10058716	402	21
10060245	402	21
10069091	402	21
10074013	402	21
10074435	402	21
10063173	402	21
10011481	402	21
10050582	402	21
10052277	402	21
10054064	402	21
10060989	402	21
10061231	402	21
10053912	402	21
10052349	402	21
10063344	402	21
10053405	402	21
10070184	402	21
10012270	402	21
10012271	395	21
10068390	402	21
10012146	402	21
10033170	402	21
10053317	402	21
10055934	402	21
10049759	402	21
10049760	402	21
10049805	402	21
10052000	402	21
10012716	402	21
10051696	402	21
10062647	402	21
10072030	402	21
10072726	402	21
10011133	402	21
10057039	402	21
10056414	402	21
10063175	402	21
10062751	402	21



10066993	402	21
10050887	402	21
10029084	402	21
10052742	402	21
10058417	402	21
10063081	402	21
10064014	402	21
10010777	402	21
10010787	402	21
10010812	402	21
10010816	402	21
10010817	402	21
10050508	402	21
10062699	402	21
10063764	402	21
10067959	402	21
10068091	402	21
10072679	402	21
10072703	402	21
10060243	402	21
10060372	402	21
10071931	402	21
10056453	402	21
10064795	402	21
10069110	402	21
10071932	402	21
10035769	402	21
10060863	402	21
10055854	402	21
10011482	402	21
10052350	402	21
10052380	402	21
10053413	402	21
10011713	402	21
10063885	402	21
10066967	402	21
10012413	365	21
10049814	365	21
10060634	365	21
10065284	423	21
10072727	423	21
10044572	423	21
10066992	423	21



10073494	423	21
10057112	423	21
10072702	423	21
10067817	423	21
10011593	423	21
10053519	423	21
10070075	423	21
10057131	423	21
10060298	423	21
10060299	423	21
10075011	423	21
10056815	423	21
10063884	423	21
10060730	423	21
10060731	423	21
10068398	423	21
10058030	423	21
10074619	423	24
10055004	541	24,5
10068070	541	24,5
10054506	541	24,5
10054507	541	24,5
10068071	541	24,5
10065519	541	24,5
10074754	541	24,5
10012657	541	24,5
10012764	541	24,5
10061787	541	24,5
10070010	541	24,5
10070394	541	24,5
10029083	541	24,5
10010829	541	24,5
10068223	541	24,5
10010773	541	24,5
10044535	541	24,5
10063910	541	24,5
10012482	541	24,5
10010832	541	24,5
10063911	541	24,5
10072656	541	24,5
10050885	541	24,5
10048466	541	24,5
10048467	541	24,5



10059632	541	24,5
10062928	541	24,5
10063116	541	24,5
10067752	541	24,5
10070166	541	24,5
10070756	541	24,5
10073459	541	24,5
10048449	541	24,5
10053083	541	24,5
10056814	541	24,5
10059521	541	24,5
10059633	541	24,5
10062929	541	24,5
10068086	541	24,5
10069461	541	24,5
10073500	541	24,5
10021892	541	24,5
10066851	541	24,5
10055712	541	24,5
10011009	541	24,5
10011027	541	24,5
10011030	541	24,5
10011041	541	24,5
10011043	541	24,5
10044029	541	24,5
10070097	541	24,5
10010738	541	24,5
10011044	541	24,5
10011050	541	24,5
10011067	541	24,5
10011068	541	24,5
10044044	541	24,5
10068383	541	24,5
10070096	541	24,5
10073453	541	24,5
10075410	541	24,5
10075411	541	24,5
10057302	541	24,5
10071680	541	24,5
10011175	541	24,5
10070086	541	24,5
10041255	541	24,5
10058736	541	24,5



10068873	541	24,5
10070182	541	24,5
10071732	541	24,5
10061338	541	24,5
10061337	541	24,5
10056075	541	24,5
10051048	541	24,5
10051049	541	24,5
10062739	541	24,5
10011486	541	24,5
10034872	541	24,5
10060300	541	24,5
10060335	541	24,5
10061010	541	24,5
10061232	541	24,5
10067499	541	24,5
10067660	541	24,5
10068986	541	24,5
10071555	541	24,5
10053074	541	24,5
10072802	541	24,5
10053075	541	24,5
10059360	541	24,5
10041261	541	24,5
10051946	541	24,5
10053028	541	24,5
10053364	541	24,5
10053365	541	24,5
10054115	541	24,5
10054116	541	24,5
10057914	541	24,5
10069979	541	24,5
10034861	541	24,5
10051256	541	24,5
10052324	541	24,5
10053026	541	24,5
10053027	541	24,5
10053078	541	24,5
10057034	541	24,5
10057036	541	24,5
10062924	541	24,5
10070040	541	24,5
10070542	541	24,5



10032882	541	24,5
10058963	541	24,5
10058964	541	24,5
10061400	541	24,5
10066817	457	24,5
10062249	457	25
10068816	457	25

ECOPACT

Mix Designs: 21 to 25 MPa

Mix	GWP	MPa
10068970	322	21
10069024	322	21
10069026	322	21
10069027	322	21
10069033	362	21
10069035	362	21
10066984	342	21
10069015	342	21
10069029	362	21
10069030	362	21
10069034	362	21
10069036	362	21
10068973	362	21
10068978	362	21
10068979	362	21
10068983	362	21
10069008	362	21
10069009	362	21
10069016	362	21
10069018	362	21
10069019	362	21
10066981	362	21
10068955	344	21
10069025	344	21
10069028	344	21
10069031	344	21
10068956	344	21
10069013	344	21
10069020	344	21



10069012	344	21
10069014	344	21
10069017	344	21
10069021	344	21
10069022	344	21
10069023	344	21
10069012	344	21
10069010	344	21
10068984	403	21
10069211	380	24,5
10069219	380	24,5
10069214	380	24,5
10068972	380	24,5
10068974	380	24,5
10068981	380	24,5
10068971	380	24,5
10068975	380	24,5
10069206	380	24,5
10069207	380	24,5
10069209	380	24,5
10069212	380	24,5
10069206	380	24,5
10066982	380	24,5
10069212	380	24,5
10069208	382	24,5

Mix Designs: 26 to 30 MPa

Mix	GWP	MPa
10068153	579	25
10068150	579	25
10068151	579	25
10058013	579	27,3
10060632	579	28
10063693	579	28
10056994	579	28
10061141	579	28
10070237	579	28
10064200	579	28
10067138	579	28
10058760	579	28



10056907	579	28
10049203	579	28
10050557	579	28
10050559	579	28
10052143	579	28
10052144	579	28
10057692	579	28
10058609	579	28
10059609	579	28
10062744	579	28
10062746	579	28
10067045	579	28
10067665	579	28
10068486	579	28
10068642	579	28
10068866	579	28
10072721	579	28
10011143	579	28
10018504	579	28
10049243	579	28
10050674	579	28
10057073	579	28
10057678	579	28
10057808	579	28
10058039	579	28
10058132	579	28
10059608	579	28
10059978	579	28
10061542	579	28
10062745	579	28
10064202	579	28
10064794	579	28
10067133	579	28
10070744	579	28
10075307	579	28
10075391	579	28
10051180	579	28
10057547	579	28
10066841	579	28
10010759	579	28
10062640	579	28
10065279	579	28
10074755	579	28



10067675	579	28
10063177	579	28
10010699	579	28
10044630	579	28
10048790	579	28
10050243	579	28
10052020	579	28
10052297	579	28
10053913	579	28
10056680	579	28
10060610	579	28
10061788	579	28
10063709	579	28
10071551	579	28
10071552	579	28
10035686	579	28
10054808	579	28
10029081	579	28
10043686	579	28
10052743	579	28
10056798	579	28
10058416	579	28
10064013	579	28
10010835	579	28
10010837	579	28
10063694	579	28
10063752	579	28
10070795	579	28
10071897	579	28
10072710	579	28
10010839	579	28
10010840	579	28
10050078	579	28
10058453	579	28
10058454	579	28
10059470	579	28
10063761	579	28
10068080	579	28
10068090	579	28
10072705	579	28
10010842	579	28
10057307	579	28
10062956	579	28



10063759	579	28
10070239	579	28
10072711	579	28
10072715	579	28
10010843	579	28
10010844	579	28
10049872	579	28
10050632	579	28
10056283	579	28
10063758	579	28
10065159	579	28
10072706	579	28
10072708	579	28
10058408	579	28
10063762	579	28
10059211	579	28
10069171	579	28
10048469	579	28
10048470	579	28
10048471	579	28
10058444	579	28
10058867	579	28
10059634	579	28
10059635	579	28
10060869	579	28
10061843	579	28
10062623	579	28
10062833	579	28
10063691	579	28
10063754	579	28
10064021	579	28
10064816	579	28
10072406	579	28
10073501	579	28
10074607	579	28
10074681	579	28
10074696	579	28
10074714	579	28
10074925	579	28
10048452	579	28
10048453	579	28
10053325	579	28
10055758	579	28



10058445	579	28
10059573	579	28
10059636	579	28
10059637	579	28
10060868	579	28
10060959	579	28
10061370	579	28
10061827	579	28
10062309	579	28
10062834	579	28
10063690	579	28
10063692	579	28
10063756	579	28
10064022	579	28
10064712	579	28
10064765	579	28
10065270	579	28
10067153	579	28
10068088	579	28
10068656	579	28
10068657	579	28
10068836	579	28
10069508	579	28
10069601	579	28
10069602	579	28
10069861	579	28
10073502	579	28
10073832	579	28
10074598	579	28
10074612	579	28
10074643	579	28
10074644	579	28
10074680	579	28
10074695	579	28
10074713	579	28
10074924	579	28
10035609	579	28
10013252	579	28
10019087	579	28
10035684	579	28
10045101	579	28
10013251	579	28
10069980	579	28



10010995	579	28
10011069	579	28
10011073	579	28
10011074	579	28
10011076	579	28
10033427	579	28
10041260	579	28
10050242	579	28
10061207	579	28
10062926	579	28
10069689	579	28
10070095	579	28
10070792	579	28
10072709	579	28
10072713	579	28
10011078	579	28
10011079	579	28
10011082	579	28
10011093	579	28
10012719	579	28
10027981	579	28
10035306	579	28
10044417	579	28
10049802	579	28
10049979	579	28
10054256	579	28
10061208	579	28
10064110	579	28
10067956	579	28
10067957	579	28
10068384	579	28
10069504	579	28
10070009	579	28
10070794	579	28
10072704	579	28
10072707	579	28
10072760	579	28
10074599	579	28
10052885	579	28
10052917	579	28
10054252	579	28
10054254	579	28
10072560	579	28



10017778	579	28
10057303	579	28
10058715	579	28
10059534	579	28
10060244	579	28
10060248	579	28
10060371	579	28
10061571	579	28
10065274	579	28
10065358	579	28
10069090	579	28
10069687	579	28
10069848	579	28
10071934	579	28
10074012	579	28
10074040	579	28
10057219	579	28
10011178	579	28
10051941	579	28
10051942	579	28
10071933	579	28
10027860	579	28
10051940	579	28
10051943	579	28
10058432	579	28
10060249	579	28
10064004	579	28
10065272	579	28
10065349	579	28
10070924	579	28
10074436	579	28
10074562	579	28
10054547	579	28
10071458	579	28
10071459	579	28
10060254	579	28
10060255	579	28
10060256	579	28
10060258	579	28
10060259	579	28
10060360	579	28
10062737	579	28
10063765	579	28



10011477	579	28
10053885	579	28
10063174	579	28
10063757	579	28
10059628	579	28
10061233	579	28
10062798	579	28
10063075	579	28
10067661	579	28
10067662	579	28
10070540	579	28
10062076	579	28
10072089	579	28
10050360	579	28
10051948	579	28
10053821	579	28
10055941	579	28
10057209	579	28
10062799	579	28
10068637	579	28
10068638	579	28
10070216	579	28
10070227	579	28
10072142	579	28
10072718	579	28
10073850	579	28
10011772	579	28
10050362	579	28
10051533	579	28
10052314	579	28
10053550	579	28
10053611	579	28
10057035	579	28
10068082	579	28
10068639	579	28
10069477	579	28
10069892	579	28
10070048	579	28
10070129	579	28
10070224	579	28
10070225	579	28
10072617	579	28
10072717	579	28



10072807	579	28
10073982	579	28
10069217	579	28
10073805	579	28
10053996	559	28
10068391	436	28
10071899	516	28
10045354	516	28
10012426	399	28
10069953	483	28
10050995	483	28
10051060	483	28
10052002	483	28
10058962	483	28
10062706	483	28
10071389	483	28
10071550	483	28
10074254	483	28
10032181	483	28
10051242	483	28
10052001	483	28
10057652	483	28
10060635	483	28
10062705	483	28
10072808	483	28
10073031	483	28
10066865	483	28
10064820	483	30
10050631	483	30
10050633	483	30
10050599	483	30
10050630	483	30
10029377	483	30
10061662	483	30
10061663	483	30

ECOPACT Mix Designs: 26 to 30 MPa

Mix	GWP	MPa
10068914	398	28
10068915	398	28
10068953	398	28



10066985	398	28
10068916	398	28
10068917	398	28
10068950	398	28
10068951	398	28
10068952	398	28
10068954	398	28
10068957	398	28
10068976	398	28
10068977	398	28
10068989	398	28
10069000	398	28
10069003	398	28
10069004	398	28
10069005	398	28
10066983	398	28
10068918	398	28
10069001	398	28
10069002	398	28
10069006	398	28
10069007	398	28
10068980	398	28
10068982	398	28
10068985	437	28
10068959	437	28
10070039	437	28
10069217	437	28
10072618	558	28

Mix Designs: 31 to 35 MPa

Mix	GWP	MPa
10058012	366	30,1
10058019	339	31,5
10012962	339	31,5
10043682	339	31,5
10048472	339	31,5
10048473	339	31,5
10048455	339	31,5
10048456	339	31,5
10063738	339	31,5
10069509	339	31,5



10069603	339	31,5
10030712	339	31,5
10011125	339	31,5
10011126	339	31,5
10012850	339	31,5
10012855	339	31,5
10070090	339	31,5
10011127	339	31,5
10011129	339	31,5
10041259	339	31,5
10051134	339	31,5
10069506	339	31,5
10070094	339	31,5
10052911	339	31,5
10021898	339	31,5
10065410	339	31,5
10070183	339	31,5
10047430	339	31,5
10063564	339	31,5
10045332	339	31,5
10035117	339	31,5
10056076	353	31,5
10061034	495	31,5
10050580	442	31,5
10060862	442	31,5
10061230	442	31,5
10032252	442	31,5
10041264	442	31,5
10041930	442	31,5
10045319	442	31,5
10010863	442	31,5
10063603	442	31,5
10024162	442	31,5
10073554	442	31,5
10058166	442	31,5
10058734	442	31,5
10062081	442	31,5
10071622	442	31,5
10050589	442	31,5
10064971	442	31,5
10045331	442	31,5
10067770	442	31,5
10061371	442	31,5



10051110	442	31,5
10055026	442	31,5
10060318	442	31,5
10044144	442	31,5
10049812	442	31,5
10072425	442	31,5
10071314	449	31,5
10061094	449	31,5
10062641	449	31,5
10065388	449	31,5
10071750	449	31,5
10062359	449	31,5
10058349	449	31,5
10065068	449	31,5
10032851	393	31,5
10068815	368	32
10053551	368	32
10043675	345	35
10052085	370	35
10061846	370	35
10064340	370	35
10071281	370	35
10055955	370	35
10060640	370	35
10062019	370	35
10061098	370	35
10053780	370	35
10063149	370	35
10057031	370	35
10034867	370	35
10051047	370	35
10053347	370	35
10053822	370	35
10056653	370	35
10069505	370	35
10055647	370	35
10028491	370	35
10058415	370	35
10017971	370	35
10050998	370	35
10010789	370	35
10059062	370	35
10068089	370	35



10011026	370	35
10057115	370	35
10010886	370	35
10052086	370	35
10052091	370	35
10053907	370	35
10061181	370	35
10048475	370	35
10048476	370	35
10057048	370	35
10062084	370	35
10064023	370	35
10068711	370	35
10073831	370	35
10074923	370	35
10048457	370	35
10048458	370	35
10052315	370	35
10057046	370	35
10060426	370	35
10061651	370	35
10062295	370	35
10062296	370	35
10062298	370	35
10062308	370	35
10064766	370	35
10068658	370	35
10069060	370	35
10069604	370	35
10069850	370	35
10074630	370	35
10074642	370	35
10074922	370	35
10032850	370	35
10032356	370	35
10010874	370	35
10011134	370	35
10011136	370	35
10012884	370	35
10025176	370	35
10033428	370	35
10035447	370	35
10062923	370	35



10070092	370	35
10071665	370	35
10072763	370	35
10074756	370	35
10011145	370	35
10011147	370	35
10018040	370	35
10031234	370	35
10033966	370	35
10041258	370	35
10052313	370	35
10070093	370	35
10052912	370	35
10071658	370	35
10052913	370	35
10060281	370	35
10017770	370	35
10056056	370	35
10057304	370	35
10058735	370	35
10060247	370	35
10061559	370	35
10063716	370	35
10065357	370	35
10069686	370	35
10069849	370	35
10070085	370	35
10070272	370	35
10071731	370	35
10011180	370	35
10060282	370	35
10050073	370	35
10060283	370	35
10062027	370	35
10069903	370	35
10074014	370	35
10056397	370	35
10056400	370	35
10061661	370	35
10070020	370	35
10071500	370	35
10062738	370	35
10058150	395	35



10052402	395	35
10054894	395	35
10067663	395	35
10067664	395	35
10075363	395	35
10072140	395	35
10047081	395	35
10050196	395	35
10051577	395	35
10055027	395	35
10062301	395	35
10062754	395	35
10067638	395	35
10070228	395	35
10070375	395	35
10072720	395	35
10074217	395	35
10043659	423	35
10075362	423	35
10011778	423	35
10049940	423	35
10050182	423	35
10051532	423	35
10062293	423	35
10062300	423	35
10063158	423	35
10063886	423	35
10063887	423	35
10067886	423	35
10070185	423	35
10070226	423	35
10062371	459	35
10070415	459	35
10072719	459	35
10075361	459	35
10062294	459	35
10068093	459	35
10050996	459	35
10051061	459	35
10062780	459	35
10072809	459	35
10060636	459	35
10062782	459	35



10056413	536	35
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Mix Designs: 36 to 40 MPa

Mix	GWP	MPa
10068395	564	36
10065309	417	38,5
10072812	417	38,5
10075221	417	38,5
10073537	417	38,5
10058470	417	38,5
10058471	417	38,5
10058472	417	38,5
10058473	417	38,5
10061308	417	38,5
10058216	417	38,5
10058217	417	38,5
10058713	417	38,5
10072672	417	38,5
10072673	417	38,5
10073538	417	38,5
10058499	417	38,5
10062563	454	38,5
10067174	454	38,5
10061664	437	40

Mix Designs: 41 to 45 MPa

Mix	GWP	MPa
10048460	439	42
10064999	439	42
10050246	439	42
10050424	439	42
10048680	439	42
10051137	439	42
10052077	439	42
10052079	439	42
10059471	439	42
10068712	439	42
10060429	439	42



10068659	439	42
10041240	439	42
10011031	439	42
10011152	439	42
10034113	439	42
10035112	439	42
10050245	439	42
10035111	439	42
10035113	439	42
10041239	439	42
10070098	439	42
10069900	439	42
10069901	439	42
10062609	439	42
10053977	509	42
10052794	509	42
10069474	509	42
10071668	509	42
10073886	509	42
10047946	509	42
10052759	509	42
10067430	509	42
10033779	509	42
10044113	509	42
10052092	509	42
10052093	509	42
10042671	509	42
10073455	509	42
10048443	509	42
10073471	509	42
10048461	509	42
10069605	509	42
10070132	509	42
10073491	509	42
10035114	509	42
10071666	509	42
10074632	509	42
10011154	509	42
10045443	509	42
10072765	509	42
10052914	509	42
10027316	509	42
10058732	509	42



10061711	509	42
10062413	509	42
10063478	509	42
10068108	509	42
10071621	509	42
10062823	509	42
10063510	509	42
10056398	509	42
10056401	509	42
10058130	509	42
10051218	509	42
10024559	509	42
10053709	509	42
10053720	509	42
10067851	544	42
10067139	544	42
10050354	544	42
10052094	544	42
10052095	544	42
10063345	544	42
10060211	544	42
10058347	544	42
10063530	544	42
10064015	544	42
10048322	544	42
10065460	544	42
10071332	544	42
10074437	544	42
10072619	544	42
10053848	544	42
10071981	652	42

Mix Designs: 46 to 50 MPa

Mix	GWP	MPa
10048747	438	49
10049788	438	49
10049789	438	49
10049786	438	49
10068713	484	49
10074641	484	49
10054818	484	49



10058212	484	49
10068710	484	49
10069647	484	49
10070133	484	49
10044384	484	49
10049785	484	49
10050183	484	49
10072716	519	49
10052062	519	49
10061645	519	49
10068109	519	49
10056402	519	49
10049810	519	49
10055613	519	49
10049787	519	49
10055042	519	49
10067823	519	49
10072161	519	49
10057653	519	49
10062734	519	49
10062735	519	49
10062736	519	49
10056399	519	49
10074491	519	49
10053887	547	49
10075220	547	49
10060210	547	49

Mix Designs: 51 to 55 MPa

Mix	GWP	MPa
10072088	588	52,5
10062534	588	52,5
10072674	588	52,5
10043923	588	52,5
10072793	615	52,5

Mix Designs: 56 to 60 MPa

Mix	GWP	MPa
10058497	631	56
10046379	708	56
10035230	708	56



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- ASTM A108 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
- ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- ASTM A184 Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
- ASTM A307 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength
- ASTM A416/A416M Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
- ASTM A555/A555M Standard Specification for General Requirements for Stainless Steel Wire and Wire Rods
- ASTM A615/A615M Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- ASTM A666 Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
- ASTM A706/A706M Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
- ASTM A767/A767M Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
- ASTM A775/A775M Standard Specification for Epoxy-Coated Steel Reinforcing Bars
- ASTM A820/A820M Standard Specification for Steel Fibers for Fiber-Reinforced Concrete
- ASTM A884/A884M Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
- ASTM A934/A934M Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
- ASTM A1064/A1064M Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- ASTM C33/C33M Standard Specification for Concrete Aggregates
- ASTM C94 Standard Specification for Ready-Mixed Concrete
- ASTM C150/C150M Standard Specification for Portland Cement
- ASTM C260/C260M Standard Specification for Air-Entraining Admixtures for Concrete
- ASTM C595 Standard Specification for Blended Hydraulic Cements
- ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- ASTM C979/C979M Standard Specification for Pigments for Integrally Colored Concrete



- ASTM C989/C989M Standard Specification for Slag Cement for Use in Concrete and Mortars
- ASTM C1017/C1017M Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
- ASTM C1116/C1116M Standard Specification for Fiber-Reinforced Concrete
- ASTM C1157/C1157M Standard Performance Specification for Hydraulic Cement
- ASTM C1240 Standard Specification for Silica Fume Used in Cementitious Mixtures
- ASTM C1602/C1602M Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
- ASTM G109 Standard Test Method for Determining Effects of Chemical Admixtures on Corrosion of Embedded Steel Reinforcement in Concrete Exposed to Chloride Environments
- ASTM C330/C330M Standard Specification for Lightweight Aggregates for Structural Concrete
- ASTM C494/C494M Standard Specification for Chemical Admixtures for Concrete

CSA Standards:

- CAN/CGSB-1.40 Anticorrosive Structural Steel Alkyd Primer
- CAN/CSA G30.18 Carbon steel bars for concrete reinforcement
- CAN/CSA A3000 Cementitious Materials Compendium
- CAN/CSA G40.20/G40.21 General requirements for rolled or welded structural quality steel / Structural quality steel
- CAN/CSA A23.1/A23.2 Concrete Materials and Methods of Concrete Construction/Test methods and Standard Practices for Concrete
- CAN/CSA A23.4 Precast concrete - Materials and construction
- CSA S806 Design and construction of building structures with fiber-reinforced polymers

ISO Standards:

- ISO 6707-1: 2014 Buildings and Civil Engineering Works - Vocabulary - Part 1: General Terms
- ISO 14021:1999 Environmental Labels and Declarations - Self-declared Environmental Claims (Type II Environmental Labeling)
- ISO 14025:2006 Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures
- ISO 14040:2006 Environmental Management - Life Cycle Assessment - Principles and Framework
- ISO 14044:2006 Environmental Management - Life Cycle Assessment - Requirements and Guidelines
- ISO 14067:2018 Greenhouse Gases - Carbon Footprint of Products - Requirements and Guidelines for Quantification
- ISO 14050:2009 Environmental Management - Vocabulary
- ISO 21930:2017 Sustainability in Building Construction - Environmental Declaration of Building Products



EN Standards:

- EN 16757 Sustainability of construction works - Environmental product declarations - Product Category Rules for concrete and concrete elements
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