

Area Correction Factors in AccuRate for NCC 2022

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BACKGROUND

NatHERS star rating is based on the adjusted total annual heating and cooling energy of a dwelling. With the update to the NatHERS weather files for the National Construction Code (NCC) 2022, the energy rating star bands and the area correction factors for calculating the adjusted total heating and cooling energy requirement have also been updated accordingly. This note details the area correction factors used in AccuRate for NCC 2022. For the background and history of the area correction factors in previous versions of NatHERS software tools, please refer to [Chen \(2012\)](#).

AREA CORRECTION METHOD

The adjusted annual energy requirement for both detached and attached houses are calculated according to Eq. (1):

$$E_{Adjusted} = E_{Simulated} \times \left(1 - F_{Detached} \times \frac{(A_{TotalOutFabric} - A_{TotalSharedFabric})}{A_{TotalOutFabric}} \right) \quad (1)$$

where $E_{Adjusted}$ and $E_{Simulated}$ are the adjusted annual energy requirement and simulated annual energy requirement (in MJ/m²); $F_{Detached}$ is the dimensionless area correction factor for detached houses which is correlated by a polynomial function of the Net Conditioned Floor Area (NCFA) for each climate. Table 1 lists the latest version of the dimensionless area correction polynomial function parameters for 69 climate zones established for NCC 2022. The dimensionless area correction factor $F_{Detached}$ is obtained using Eq. (2):

$$F_{Detached} = F + Ea_{NCFA} + Da_{NCFA}^2 + Ca_{NCFA}^3 + Ba_{NCFA}^4 + Aa_{NCFA}^5 \quad (2)$$

where A, B, C, D, E, F are the polynomial parameters in Table 1 and a_{NCFA} is the NCFA.

ACCURATE IMPLEMENTATION

In AccuRate, the total out fabric areas include the following aspects:

- Gross area of external walls (including windows, doors, Opaque Louvre and permanent openings if any);
- Gross area of roofs (including roof windows and skylights);

- Gross area of floors above ground and above outdoor air;
- Total areas of the shared (with neighbour) fabric areas;
- All zones including garage, roof space and subfloor zones are considered in the above calculations.

The total areas of the shared (with neighbour) fabrics include

- Gross area of internal walls adjacent to neighbour;
- Gross area of floors adjacent to neighbour; and
- Gross area of ceilings adjacent to neighbour.

REFERENCES

Chen D., Area Correction Factors in AccuRate, note to DCCEE, 2012.

Table 1 AccuRate dimensionless area correction polynomial equation parameters for NCC 2022^{1,2}

Climate	A	B	C	D	E	F
1	-9.51090457907993E-15	2.68003937680872E-11	-2.85272962015768E-08	1.44965640584421E-05	-4.09037901462087E-03	4.10786067381584E-01
2	-1.01224366318883E-14	2.87516344786686E-11	-3.07936903060156E-08	1.56059182819645E-05	-4.3525533773930E-03	4.34675471350574E-01
3	-6.93631531510536E-15	1.95414646817332E-11	-2.11530467818078E-08	1.13464514336916E-05	-3.76139763473045E-03	4.22105974773653E-01
4	-1.03965687641384E-14	2.96016845419149E-11	-3.24935987361797E-08	1.77692482671488E-05	-5.35184091673154E-03	5.59139443022376E-01
5	-1.65259595876919E-14	4.67723016645870E-11	-4.91623580292198E-08	2.35801824285873E-05	-5.62961302577417E-03	4.85946597290915E-01
6	-4.17396116098915E-15	1.18048919357644E-11	-1.33968663395436E-08	8.15054267331504E-06	-3.36851814254741E-03	4.17748598326134E-01
7	-1.17216229562395E-14	3.30215025305931E-11	-3.50540924831878E-08	1.76678410890769E-05	-4.84764513814672E-03	4.76861143865945E-01
8	2.77388278568590E-16	3.29661395375676E-13	-3.15451212737186E-09	4.66289715880055E-06	-3.02585503602574E-03	4.30353005768065E-01
9	-1.87986770313142E-15	6.02820512598020E-12	-8.39209272470506E-09	6.50724979766310E-06	-3.08478969540540E-03	4.01945999081520E-01
10	-1.22768668813425E-14	3.42669924624777E-11	-3.61055482849149E-08	1.82416172691079E-05	-5.12205701576832E-03	5.14597998154879E-01
11	6.82414055664360E-16	1.00342679444229E-13	-4.18705076337182E-09	5.95849523381336E-06	-3.36603348100550E-03	4.54546729841025E-01
12	1.19850159999338E-15	-1.67797801610393E-12	-2.02159826082706E-09	4.90771029124146E-06	-3.18944457036042E-03	4.46351829065105E-01
13	3.07006611652762E-15	-6.87576938382159E-12	3.32502963398695E-09	2.37079771433205E-06	-2.75711846900298E-03	4.28227121659226E-01
14	1.26385812949095E-14	-3.19126273059849E-11	2.64209330265717E-08	-6.27655181010535E-06	-1.45092975594210E-03	3.72458724498558E-01
15	5.47027417369611E-15	-1.32037169166290E-11	8.99453842655241E-09	6.62532201065778E-07	-2.66058082260822E-03	4.43309751759075E-01
16	6.87956171619268E-15	-1.71452548972134E-11	1.31999046288728E-08	-1.56253006614987E-06	-2.14667345062771E-03	3.97931670962001E-01
17	6.06454779867648E-15	-1.48389378852218E-11	1.06511331989118E-08	-8.81245456766685E-08	-2.43401255295826E-03	4.21422315864956E-01
18	9.01290342028714E-15	-2.22589064752432E-11	1.71859036888596E-08	-2.48449716735926E-06	-2.12468175611904E-03	4.09500925832858E-01
19	-4.50210072371081E-15	1.29181597369377E-11	-1.47801481761760E-08	8.89977435860015E-06	-3.51037344045535E-03	4.27436664225016E-01
20	7.34768682407484E-15	-1.81820752182129E-11	1.38744331270275E-08	-1.60948778947633E-06	-2.20211162697389E-03	4.10594440875507E-01
21	9.73697963581431E-15	-2.41850457360618E-11	1.90250772501438E-08	-3.23837631051659E-06	-2.02363427791803E-03	4.10914332201570E-01
22	1.31300171224856E-14	-3.30059230890020E-11	2.71233374301390E-08	-6.29872421933024E-06	-1.51908017408278E-03	3.81456880651312E-01
23	1.39886382628637E-14	-3.51749298648623E-11	2.90378999988138E-08	-6.99342857506816E-06	-1.45157816673311E-03	3.84991001445635E-01
24	9.70679957607665E-15	-2.40936171895364E-11	1.90083452782303E-08	-3.38400689993412E-06	-1.91937320518570E-03	3.95731143291489E-01
25	8.24558510145404E-15	-1.99092101354370E-11	1.47921101897559E-08	-1.75371775624472E-06	-1.98314835332702E-03	3.73885777793419E-01
26	1.52389012252397E-14	-3.83131380762807E-11	3.17442760868969E-08	-7.87908297447640E-06	-1.31105198635770E-03	3.77140464463518E-01
27	3.27346899581217E-15	-7.54384059328913E-12	4.08576769603164E-09	2.05321768950082E-06	-2.71555869531689E-03	4.27142346090568E-01
28	4.60827018896534E-15	-1.08278621370391E-11	6.72496804633469E-09	1.44697021331936E-06	-2.69292392346928E-03	4.30695934720305E-01
29	-1.24746565222785E-14	3.45933340753975E-11	-3.58419495888938E-08	1.74172358805257E-05	-4.54532701952770E-03	4.31291395095753E-01
30	-7.50247528835692E-15	2.11976771319314E-11	-2.28551584405008E-08	1.20265624683901E-05	-3.65800371887552E-03	3.88084900012181E-01
31	-2.18456706064028E-14	6.13384253419560E-11	-6.35164574999314E-08	2.95710586790819E-05	-6.58986040711852E-03	5.35429132621674E-01
32	-1.28672322811012E-14	3.61000137761121E-11	-3.79352405270182E-08	1.86860289764597E-05	-4.93749711257220E-03	4.77089167228805E-01
33	-9.71294185379395E-15	2.73840921319189E-11	-2.91372494414695E-08	1.47655549135727E-05	-4.12935089125940E-03	4.13308959116114E-01
34	-7.62763701469676E-15	2.14581484797277E-11	-2.30058881837817E-08	1.20174251435717E-05	-3.75538374726915E-03	4.06433343125489E-01
35	-1.79413624944222E-14	4.98720880208183E-11	-5.15136202322785E-08	2.45744696582358E-05	-5.97035415225628E-03	5.32778588295594E-01
36	-1.39955052116540E-14	3.91905128905964E-11	-4.10056013482881E-08	2.00127483827804E-05	-5.10719874954934E-03	4.70259548082473E-01

¹ Based on Tony Isaacs' spreadsheet of 14/05/2019 for the 69 climates. The correction is a fifth-order polynomial with NCFA as the independent variable. Column F is the constant term, column E the linear term, etc;

² At NCFA less than 50 m² set the NCFA to 50 m²; For NCFA over 1000 m² set the NCFA to 1000 m².

37	-1.06978926677849E-14	2.95612556335360E-11	-3.06271159526565E-08	1.50376668103815E-05	-4.16865829771455E-03	4.13462453681418E-01
38	-8.90901643603908E-15	2.46401935794894E-11	-2.56968065603450E-08	1.28646190921690E-05	-3.82659476313427E-03	4.03336752389026E-01
39	-8.60620254164242E-15	2.36824058186854E-11	-2.46257574548600E-08	1.24020319756850E-05	-3.74902291698205E-03	3.98850676906008E-01
40	-7.74740730321712E-15	2.15699204250527E-11	-2.29672647611578E-08	1.20860719218149E-05	-3.92719070676570E-03	4.38302856363312E-01
41	-8.47114230486322E-15	2.36583765108423E-11	-2.51569441819932E-08	1.30484073716551E-05	-4.19018675903443E-03	4.62091000020507E-01
42	-6.43364632770097E-15	1.77760094010728E-11	-1.89196759169601E-08	1.01425263196815E-05	-3.61951733189926E-03	4.23798251490985E-01
43	-4.49344534458029E-15	1.29300704965867E-11	-1.48600387571704E-08	8.99587940933633E-06	-3.58118129601177E-03	4.37393947578605E-01
44	2.64978825532690E-15	-6.42090389406388E-12	3.76159542850301E-09	1.72064780677295E-06	-2.57595937846207E-03	4.13583256747607E-01
45	1.78351283676625E-15	-3.81272154791421E-12	8.87337630300453E-10	3.08196337088836E-06	-2.84636668781980E-03	4.31163238643707E-01
46	2.88837423289397E-16	3.06543782904928E-13	-3.15603361711118E-09	4.69202792312137E-06	-3.05492795165556E-03	4.32722690516826E-01
47	6.80031754049434E-15	-1.67054637540093E-11	1.24289740997938E-08	-9.77626716672738E-07	-2.24852309925188E-03	4.05405371492177E-01
48	6.93414103440263E-15	-1.74978711113831E-11	1.37336148668501E-08	-1.78527187933118E-06	-2.18432131788744E-03	4.15820867805354E-01
49	1.06502257814988E-14	-2.70425590954125E-11	2.23042978542725E-08	-4.86478867734877E-06	-1.71215993745030E-03	3.90464390683502E-01
50	4.62743050149440E-15	-1.07317581795388E-11	6.49446617510705E-09	1.53485507440317E-06	-2.76622135664561E-03	4.46457256671645E-01
51	5.70224324785895E-15	-1.43197645302677E-11	1.09791502797114E-08	-1.00803291117613E-06	-2.13340298786809E-03	3.90541994314726E-01
52	9.82005092915033E-16	-1.49553076722397E-12	-1.69673879626818E-09	4.53006152053126E-06	-3.08962440752541E-03	4.39257249601734E-01
53	8.39183373661598E-15	-2.12486230756577E-11	1.71566217120304E-08	-3.10850447849663E-06	-1.92400708269994E-03	3.94330876604553E-01
54	3.10418884993717E-15	-6.65398203303509E-12	2.56015197545286E-09	3.18347109374003E-06	-2.97994862688755E-03	4.45232593841338E-01
55	1.73853315067403E-14	-4.42508996403663E-11	3.75493750021851E-08	-1.01075813520508E-05	-1.05880079650452E-03	3.80469104542204E-01
56	7.64686640935750E-15	-1.90034990522470E-11	1.44505021982958E-08	-1.38496349961461E-06	-2.32201601108114E-03	4.30860933880441E-01
57	1.33194574125952E-14	-3.41018718982507E-11	2.88485782971132E-08	-7.23658854809782E-06	-1.37675871622888E-03	3.80573935098638E-01
58	2.01312004178601E-14	-5.13247535154894E-11	4.38281673236378E-08	-1.21880449712581E-05	-8.63722895888381E-04	3.82934455024952E-01
59	1.12904420358335E-14	-2.79641205465775E-11	2.22448236904161E-08	-4.44038552561819E-06	-1.74184605872440E-03	3.85611364166380E-01
60	1.19472161014126E-14	-2.99449960714824E-11	2.43166672476579E-08	-5.22216633423813E-06	-1.74022006497837E-03	4.01058708137408E-01
61	1.49413474245523E-14	-3.75976084869004E-11	3.11446625775022E-08	-7.66008729114957E-06	-1.37701715410568E-03	3.84421862570799E-01
62	1.28520368079144E-14	-3.21765690686215E-11	2.61304378117853E-08	-5.67985662770812E-06	-1.77333500469417E-03	4.12764403140874E-01
63	1.53922313514166E-14	-3.89969378748295E-11	3.27440294919499E-08	-8.45906074428089E-06	-1.21758814382216E-03	3.72770852292113E-01
64	1.72267620128181E-14	-4.35142024081954E-11	3.65122623193037E-08	-9.61012605762238E-06	-1.09869483029531E-03	3.74597183524776E-01
65	9.12168487734128E-15	-2.22506674207282E-11	1.68918956383900E-08	-2.34410564788588E-06	-2.05481048802969E-03	3.95758127301106E-01
66	1.06262670258619E-14	-2.62340381363947E-11	2.06287963271144E-08	-3.78530571059076E-06	-1.87807527538332E-03	3.94610192747716E-01
67	1.67187231415464E-14	-4.22174827734959E-11	3.54252585853020E-08	-9.35086821206340E-06	-1.04458084634849E-03	3.60584732497080E-01
68	1.28616771314514E-14	-3.20869876853616E-11	2.60393825053635E-08	-5.82393210350043E-06	-1.55283894337695E-03	3.79418533983423E-01
69	8.55248040205823E-15	-2.07617782559128E-11	1.56450774779785E-08	-2.11256438826626E-06	-1.92613813402146E-03	3.71192873712770E-01