Using Form Factors with SilverSchmidt

Why Form Factors?

The compressive strength of an object can be expressed in several ways. The standard compressive strength is determined on standard tests specimens which are typically either cubes or cylinders.
For example EN 206-1 refers to

$f_{ck\ is,cube}$ (characteristic in-situ compressive strength expressed in the equivalent strength of a 150mm cube)

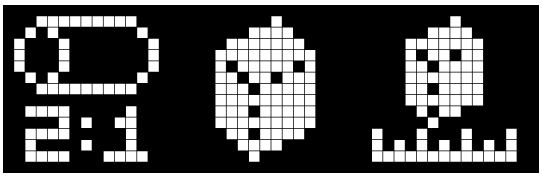
$f_{ck,\ is,\ cyl}$ (characteristic in-situ compressive strength expressed in equivalent strength of a 150mm x 300mm cylinder)

There are many others. It is important to know the form of the standard test specimens which are used to define the compressive strength.

The SilverSchmidt reference curve is based on test data made on 150mm cubes. (See document "The SilverSchmidt Reference Curve" available on www.silverschmidt.com. If it is necessary to give the compressive strength in terms of a standard cylinder or in comparison with a drilled core, for example, then a form factor must be chosen to give the correct value.

Form Factor Implementation in SilverSchmidt

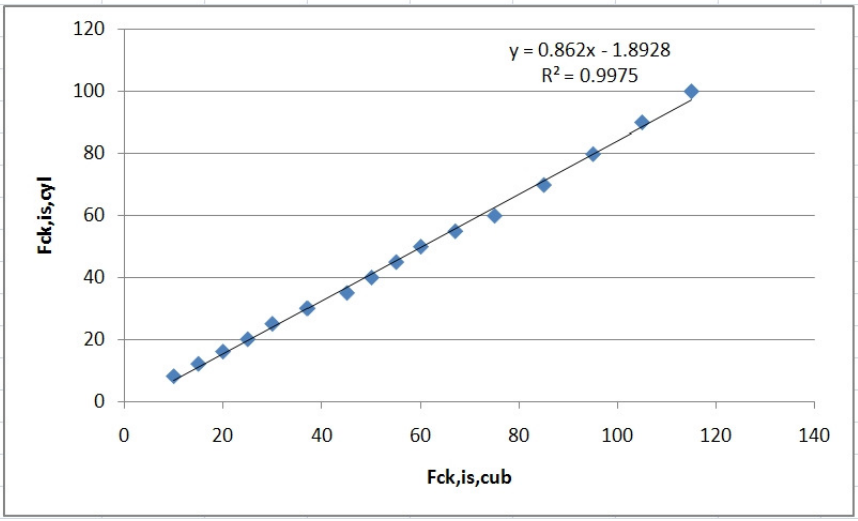
The form factor implementation in the 2nd generation SilverSchmidt has been modified to come into line with the recommendations given in the major standards.



Form Factor Menu with the options:
Standard cylinder, standard cube or user defined

The default value is the standard cube (150mm). This has a form factor of 1. The factor used for the standard cylinder is derived from the information in EN 206-1 Table 7 "Compressive strength classes for normal-weight and heavy-weight concrete." This may be applied for all concrete mixtures above 2000kg/m^3.

Compressive strength classes for normal-weight and heavy-weight concrete		2000 - 2600 kg/m^3, over 2600 kg/m^3
$F_{ck,is,cub}$	$F_{ck,is,cyl}$	Form Factor
10	8	0.80
15	12	0.80
20	16	0.80
25	20	0.80
30	25	0.83
37	30	0.81
45	35	0.78
50	40	0.80
55	45	0.82
60	50	0.83
67	55	0.82
75	60	0.80
85	70	0.82
95	80	0.84
105	90	0.86
115	100	0.87



The third option is a user defined setting which can be freely selected in the range 0.8 – 1.2. This option has been included as the major standards differ on the implementation of form factors.

The user should consult the applicable standards and enter the recommended form factor accordingly.

Some examples are given below.

Recommendations from the standards

- For light-weight concrete please refer to Table 8 of EN 206-1 “Compressive strength classes for light-weight concrete”.
- For drilled cores, ASTM standards and European Standards give different factors.

Core Correction factor corresponding to a 2:1 cylinder as reference		
Length/Diameter	ASTM C42	BS EN 13791
1.75	0.98	0.97
1.5	0.96	0.92
1.25	0.93	0.87
1	0.87	0.80

- The national annex to EN 13791 British version gives a correction factor for converting the actual core result into an equivalent in-situ cube or 2:1 cylinder strength. The actual core strength is multiplied by a factor Kis.

  $K_{is,cube} = 2.5/(1.5 + 1/\lambda)$

  $K_{is,cyl} = 2.0/(1.5+1/\lambda)$

  Where λ = the length/diameter ratio of the core.