TECHNICAL BULLETIN – TB107

GUIDELINES FOR ESTIMATING QUANTITIES OF ARDEX FLOORING PRODUCTS

Date, Friday, 20 September 2013

INTRODUCTION & SCOPE

A common question Ardex Technical Services receives concerns the quantities and coverage of its flooring products, including levelling cements and primers. In this bulletin we will look at some examples of working out coverage for a range of Ardex products when used in typical applications.

Ardex literature specifies coverage for flooring cements based on a 1mm layer spread over X square metres per 20kg bag. This calculation produces a number called the *coverage factor* or CF, which varies for different products and will be used in the examples we shall look at.

This coverage factor is also numerically the same as the volume of material that results in the bucket after the product is mixed with water, or the latex liquid in the case of Arditex.

CASE 1 - FLOOD COATING

The most common application is a flood coating to produce a smooth flat surface over an area to a specified depth. The products typically used are Ardex K15, K11, Arditex, K10, K80, LQ92, A55, K301 and the imported A46. The CF values are shown in the table –

Product	Mixed Volume in Bucket	Coverage Factor CF
Ardex K15, K11, K12, Arditex NA, K10, K80, A45, A55, K250, K301, K1	Approximately 12 litres	12
Ardex LQ92	Approximately 11.4 litres	11.4
Ardex A46	Approximately 16 litres	16

(*Imported products are supplied in 25kg bags)

Nominally Arditex NA has a volume close to 13, but for simplicity use CF12

Example 1) K15 in a commercial application

A typical installation would be to level an area in a supermarket for the installation of vinyl flooring. These areas are commonly rectangular in plan so the coverage area is floor length x width. We shall assume 50m long and 20m wide which is 1000m^2, to be laid to a thickness of 4mm. How much K15 would be required?

The number of bags of K15 = (Area in m^2 x Thickness in mm) ÷ CF

area = 1000m^2, thickness = 4mm and CF for K15 = 12

20 kg bags of K15 required = 1000 x 4 ÷ 12 = 334 bags

Example 2) Ardex LQ92 to be used for levelling under tiles on a concrete verandah.

This is a common domestic type of installation for LQ92. The area to be covered is 5m long and 3m wide, and the thickness required is 6mm. How much LQ92 will be required for this application?

The number of bags of LQ92 = (Area in m^2 x Thickness in mm) ÷ CF

area = 5m x 3m = $15m^2$, thickness = 6mm and CF for LQ92 = 11.4

20kg bags of LQ92 required = 15 x 6 ÷ 11.4 = 8 bags

CASE 2 - BULK FILLING

Where a deeper area has to be filled prior to topping, either a purpose made bulk fill product is used, or alternatively one of the self smoothing cements can be mixed with an aggregate. The premixed bulk fills have consistent designed coverage, but when using separate aggregates, applicators need to be aware that the mixed volumes will vary somewhat depending on the size and shapes of the aggregate gravel. The figures given in the table below are approximate only –

Product	Mixed Volume in Bucket	Coverage Factor CF
Ardex K005 Bulk Fill	Approximately 10.4 litres	10.4
Ardex K15, K10, or Arditex mixed with 20kg of 2·5mm aggregate 25kg of 2·5mm aggregate	20 kg approximately 18 litres 25kg approximately 20 litres	18 20
Ardex LQ92 mixed with 20kg of 2·5mm aggregate 25kg of 2·5mm aggregate	20 kg approximately 18 litres 25kg approximately 20 litres	18 20

Note Ardex supplies 25kg bags of 2·5mm aggregate so for Ardex supplied materials use the higher CF of 20.

Example 3) A bulk fill is required to provide a base for a K15 smoothing coat under plank flooring, where the newly laid concrete subfloor suffered severe rain damage and has been heavily scabbled down ~25mm to remove unsound material. The nominal depth of the fill is 20mm and the smoothing coat is around 3·4mm. The slab area to be filled is $40m^2$. Either K15 and aggregate or K005 would be suitable bulk fills, the choice being based on cost vs drying times.

a) First choice is K15 with added aggregate

Area = $40m^2$, thickness = 20mm and the CF = 20

20kg bags of K15 = 40 x 20 ÷ 20 = 40 bags

For 20kg bag of K15, a 25kg bag of aggregate is also required, so the total bags of material are 40 bags of K15 and 45 bags of aggregate.

b) The second choice is Ardex K005 which has a CF of 10.4

20kg bags of K005 = 40 x 20 ÷ 10.4 = 77 bags

The final 3-4mm K15 smoothing coat is applied as a flood coat, and would require approximately 12 bags of material, the calculation being the same as Case 1.

CASE 3 – RAMPING

The amount of material required for ramps is based on the volume of a triangular prism. Ramps are commonly made from products with less flow such as Ardex K10 and Ardex A45, (aggregates can be used also). Bulk fill mixes such as Ardex K15 or Arditex with aggregate, K005, or LQ92 with coarse sand can also be used for this application. LQ92 is suitable for external ramps under tiles, and the bulk fill mixes are more appropriate for larger jobs. The following table gives mix volumes and CF values for ramping materials.

Product	Mixed Volume in Bucket	Coverage Factor CF
Ardex LQ92 mixed with 6.5 litres of 0.3mm sand	Approximately 15.5 litres	15.5
Ardex K10 or Ardex A45	Approximately 12 litres	12
Ardex K10, K15, or Arditex mixed with 2-5mm aggregate	Approximately 18 or 20 litres	18 or 20
Ardex K005	Approximately 10.4 litres	10.4

The calculation for the volume of a triangular prism is shown in the following figure -
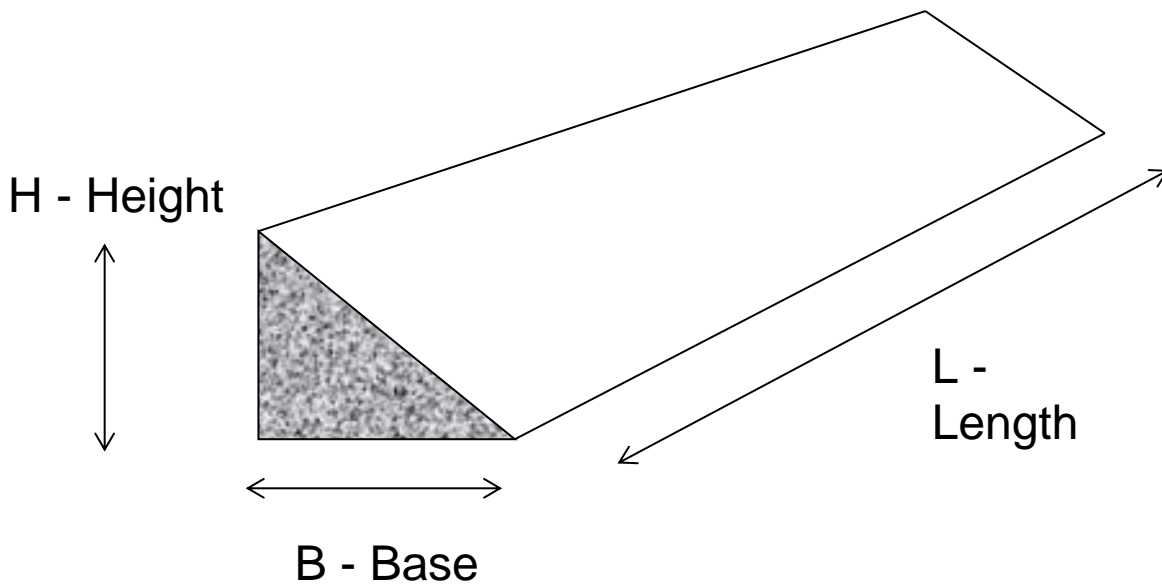
The volume is (0.5 x Base) x Height x Length or (0.5 x B) x H x L

Example 4) A nursing home requires a ramp to be installed from one room to another with a difference in height of 15mm. The ramp needs to be at a low angle that will allow elderly residents to move with their walking aids. The ramp is going to be 1000m long and 800mm wide. How much Ardex A45 would be required to build up this ramp?
The number of bags of Ardex A45 is calculated by using the following method –

The ramp volume is (0.5 x B) x H x L where B = 1000m or 1m, L = 800mm or

0.8m and H = 15mm. The CF for Ardex A45 is 12.

20kg bags of A45 required = (0.5 x 1) x 15 x 0.8 ÷ 12 = 0.5 bags

Example 5) A timber floored area requires a fall of 30mm over a base of 2m and a width of 3m prior to laying of carpet. How much Arditex would be required to do this application?
Since Arditex has a recommended single application thickness of approximately 12mm, an aggregate mix will be required. The surface could then be topped by 3mm of Arditex (reducing the fill height to 27mm), or a thick skim coat of Feather Finish if the bulk filled Arditex is ground or cut back. Remember that the aggregate reduces the ability of the smoothing cement to feather out so this estimate is approximate only.
The quantity of Arditex required is estimated as follows –

The ramp volume is (0.5 x B) x H x L where B = 2m, L = 3m, H = 30mm and the CF

for bulk filled Arditex is 20.

20kg bags of Arditex required = (0.5 x 2) x 3 x 30 ÷ 20 = 4.5 bags

For each 20kg bag of Arditex, one 4.8kg bottle of Arditex Latex and one 25kg bag of 2-

5mm aggregate will be required.

CASE 4 ESTIMATING THE AMOUNT OF MATERIAL REQUIRED FOR A SHOWER AREA

Showers areas with falls creates, a more complex problem again because of the shape, which is really a hyperbolic dish in most cases. Assuming that the shower base is square, the volume of material can be roughly determined by subtracting an area equivalent to that of an upside down rectangular pyramid from a simple rectangular prism which would be formed if the shower base were filled with screed to the fall depth.

In this case the maximum fall height is considered to be equivalent to the height of the inverted pyramid. The initial calculation is a simple one for a square prism, this would form the base area.

Volume is Length x Width x Height. (LxW = b^2 below)

The amount material that would need to be removed to model the sloped floor is derived from a rectangular pyramid with sides having the dimensions of the wall enclosure and the height is the fall from the drainage hole to the top of the screed.

Volume of a rectangular pyramid is
$V = 1/3b^2 \times h$

It should be noted that the volume calculated for the screed is an approximation and is effected by the degree of curvature in the sloping base sides, but also whether the drainage hole is centrally located or not.

Example 6) A screed is required to fill a shower base 1m x 1m square with a fall of 15mm from the edges to the centrally located floor waste.
The initial rectangular prism is calculated as follows
$V = L \times W \times H$

Where L = 1m

W = 1m

H = 15mm or 0.015m (1mm = 1/1000m)

∴V = 1x1x0.015

V = 0.015m^3 or 15 litres (1m^3 = 1000 litres)

The inverted pyramidal volume to be removed is calculated as follows

V = 1/3b^2 x h

Where b = 1m

h = 15mm or 0.015m

∴V = 1/3 x 12 x 0.015

V = 0.005m^3 or 5 litres

The required screed volume is therefore the volume of the rectangular prism minus the pyramid

V prism = 15 litres

V pyramid = 5 litres

∴Screed = 15 · 5 litres = 10 litres

With our standard screed mortar of CF 12 we would need around 1x 20 kg bag because 10÷12 = 0.83.

CASE 5 – SKIM COATING

The simplest process in floor finishing is a basic skim coating to smooth out the surface prior to laying a resilient floor. A skim coat need only be 0.25-0.5mm thick depending on the surface roughness.

Product	Mixed Volume in Bucket/Bag	Coverage Factor CF
Ardex Feather Finish	4.5kg ≅ 9 litres	9
	10kg ≅ 20 litres	20

Example 7) A 100m^2 concrete floor requires a smoothing skim coat of Feather Finish approximately 0.5mm thick prior to laying vinyl flooring. How many bags would be required?

The quantity required is calculate by Area x Thickness ÷ CF

Area = 100m^2, thickness = 0.5mm and CF for Feather Finish = 9

4.5kg bags of Feather Finish required = 100 x 0.5 ÷ 9 = *6 bags*

CASE 6 – SPECIALISED PRODUCTS

There are two specialised products which may be required for particular jobs.
Ardex A38
The first material is Ardex A38 which is a rapid cure screed. A mix contains 20kg of binder powder and 100kg of specially graded sand-gravel. The CF for A38 is 60 on a 120kg batch (wet specific gravity ~2).

Ardex TerrazzoMicro
This is a feature floor product based on a binder and coloured aggregate. The materials are supplied in 20kg bags and have a CF of 18.

The coverages for Ardex primers are changed by the surface roughness and also surface porosity. The table below gives *approximate* coverages for Ardex primers.

Primer	Supplied Volumes	Surface	Dilution	Mixed Quantity in litres/kg	Coverage/litre	Coverage
Ardex P51 5kg ~ 5 litres		Porous concrete	2:1	15 litres	~3.3m^2	~50m^2
		Highly porous concrete	3:1	20 litres	~5m^2	~100m^2
		Over 1:3	1:1	10 litres	~1.5m^2	~15m^2

Primer	Supplied Volumes	Surface	Dilution	Mixed Quantity in litres/kg	Coverage/ litre	Coverage
Ardex P82 Ultraprime	1kg A +1kg B	Timber, Ceramic tiles, Moisture Barrier	Nil	2kg ~ 2 litres	~5-10m^2 (Nominally 7.5m^2/litre)	10-20m^2
	4kg A + 4kg B			8kg ~ 8 litres		40-80m^2

Primer	Supplied Volumes	Surface	Dilution	Mixed Quantity in litres/kg	Coverage/ litre	Coverage
Ardex WPM300 Hydrepoxy with broadcast sand	4 or 10kg A 4 or 10 kg B	Concrete	Nil	4 or 20 litres >700gms sand per sqm	3m^2 (per coat)	12 or 60m^2

Example 8) A porous concrete floor of 200m^2 area needs to be primed with Ardex P51 prior to laying K12 levelling cement. The surface has been lightly diamond ground. How much primer is required?
For porous concrete the Ardex P51 is diluted 2:1 and the coverage is 3.3m^2/litre or 50m^2 per 5kg bottle.

Bottles of P51 required = Area ÷ Coverage = 200 ÷ 50 = 4 bottles
This is diluted with 40 litres of clean water.

Alternatively - 200m^2 ÷ 3.3m^2/litre = 60 litres of diluted P51 which at 2:1 dilution equals 60 litres ÷ 3 = 20 litres or 4 x 5kg bottles.

Example 9) A floor has been coated with Ardex Moisture Barrier prior to laying of Ardex K15 levelling cement. The primer required is Ardex P82 and the area of the floor is 55m^2. How much P82 is required?

Kg/ Litres of mixed P82 required = Area ÷ Coverage = 55 ÷ 7.5 = *7.3 litres or 1 x 8kg kit comprising 4kg of Part A and 4 kg of Part B.*

WASTAGE

It is always a good idea to allow for material wastage which is bound to occur on a job site. A reasonable figure to allow for is 10%, but may be a below 5%. To allow for wastage, the final estimated figure has a percentage added to it.

For example – A job requires 250 bags of Ardex K15. Allowing 10% wastage how much is required?
 250 bags x 10% = 250 x 10 ÷ 100 = 25 bags.

Experience of installations and product usage will allow installers to better tailor their estimate of wastages.

CONCLUSIONS

Determining coverages for floor levelers is not difficult and basically requires working out the volume of the area to topped. Once this volume is known the coverage factors for each product can be applied.

Primer coverage is simply working out the area to be primed and then applying the coverages for each type of primer. Remember that primer coverage is effected by surface roughness and porosity, and the more porous the surface, or extreme the surface texture, the greater the primer usage will be.