# Calibration Formulae

For Sieve calibration microspheres

| Aperture Size | Formula |
|---|---|
| 32 microns | $Y=23.13279+0.28429X-0.00305X^2+(1.51515E-5)X^3$ |
| 38 microns | $Y=30.22078+0.16716X-(3\text{-}05694E-4)X^2$ |
| 45 microns | $Y=51.73461-3.08676X+0.26448X^2-0.00974X^3+(1.82087E-4)X^4$ $-(1.6941E-6)X^5+(6.23323E-9)X^6$ |
| 53 microns | $Y=42.08939+0.37767X-0.00362X^2+(2.02797E-5)X^3$ |
| 63 microns | $Y=51.65012+0.25854X-(5.02498E-4)X^2+(2.5641E-6)X^3$ |
| 75 microns | $Y=61.40679+0.30166X-(8.71129E-4)X^2+(5.59441E-6)X^3$ |
| 90 microns | $Y=69.33816+0.72168X-0.0172X^2$ $+(2.57644E-4)X^3-(1.25326E-6)X^4$ |
| 106 microns | $Y=82.81858+0.43153X-(2.77722E-4)X^2+(2.7972E-6)X^3$ |
| 125 microns | $Y=96.11184+1.17971X-0.02743X^2$ $+(3.77033E-4)X^3-(1.67421E-6)X^4$ |
| 150 microns | $Y=124.63189+0.52697X-0.00115X^2+(1.42191E-5)X^3$ |
| 180 microns | $Y\text{-}150.50817+0.5013X+0.00124X^2+(1.6317E-6)X^3$ |
| 212 microns | $Y=175.12058+0.80736X-(9.49051E-4)X^2+(5.59441E-6)X^3$ |
| 250 microns | $Y=212.13147+0.68008X+0.00193X^2+(3.7296E-6)X^3$ |
| 300 microns | $Y=240.58784+1.63058X-0.0104X^2+(5.52448E-5)X^3$ |

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| | |
|---|---|
| 355 microns | $Y=301.15839+0.92825X+0.0054X^2-(2.37762E-5)X^3$ |
| 425 microns | $Y=350.48172+1.34785X-0.00152X^2+(4.28904E-5)X^3$ |
| 500 microns | $Y=406.53409+1.67603X-(7.98202E-4)X^2+(4.31235E-5)X^3$ |
| 600 microns | $Y=485.86918+2.18924X-0.01138X^2+(1.36597E-4)X^3$ |
| 710 microns | $Y=581.30642+3.69054X-0.02015X^2+(1.18648E-4)X^3$ |
| 850 microns | $Y=715.75255+1.99101X+0.06837X^2-0.00128X^3+(7.19594E-6)X^4$ |

| ***Aperture Size*** | ***Formula*** |
|---|---|
| 1.00 mm | $Y=0.80257+0.00861X-(2.25538E-4)X^2+(3.44029E-6)X^3-(1.70849E-8)X^4$ |
| 1.18 mm | $Y=0.97138+0.00677X-(4.62438E-5)X^2+(2.30769E-7)X^3$ |
| 1.40 mm | $Y=1.16372+0.00694X-(3-02797E-5)X^2+(1.65501E-7)X^3$ |
| 1.70 mm | $Y=1.4044+0.00603X-(3.13586E-5)X^2+(3.56643E-7)X^3$ |
| 2.00 mm | $Y=1.7098+0.0062X+(4.91508E-6)X^2$ |
| 2.36 mm | $Y=2.36951-0.04248X+0.00253X^2-(5.98761E-5)X^3+(6.62663E-7)X^4-(2.73605E-9)X^5$ |
| 2.80 mm | $Y=2.45432+0.00284X+(1.27453E-4)X^2-(5.12821E-7)X^3$ |
| 3.35 mm | $Y=2.71666+0.02007X-(1.38302E-4)X^2+(6.71329E-7)X^3$ |

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# Interpreting the Calibration Formulae

The formulae supplied are written in a standard mathematical syntax and are intended for use in a computer spreadsheet for ease of calculation.

Whilst the formulae are written with terms such as $X^2$ this format cannot be achieved when entering text into a spreadsheet.

Similarly, the numbers involving an E-function are written in a way that a computer will understand.

If we take the 32 micron formula as an example the final part of the equation includes: (1.51515E-5) $X^3$

This can be written as (1.51515 x 10-5) $X^3$.

In words this would be expressed as 1.51515 times (ten to the power minus 5) times X (to the power three).

The whole formula would be entered into a spreadsheet (such as Excel) as follows: +23.13279+(0.28429*X)-(0.00305*POWER(X,2))+((1.51515E-5)*POWER(X,3)) where X is the value of the percentage passing – which might be linked to a cell in the spreadsheet.

It is quite normal for Excel then to automatically expand the number with the E-function in it (e.g. 0.0000151515 x X3) once the formula is entered.

If trouble is still experienced, then the user is recommended to consult someone locally who is familiar with spreadsheet functions.

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