

Equations for Support Optimization Module

1. Block-type Supports

Support Volume = $6991,79410 - 137,65809 \text{ Tooth Height} + 137,90833 \text{ Tooth Top Length} - 5247,51284 \text{ X, Y Hatching} + 71,08333 \text{ Tooth Height} * \text{Tooth Top Length} + 43,15556 \text{ Tooth Height} * \text{X, Y Hatching} - 117,00000 \text{ Tooth Top Length} * \text{X, Y Hatching} - 0,004938 \text{ Tooth Height}^2 - 0,277778 \text{ Tooth Top Length}^2 + 1281,04691 \text{ X, Y Hatching}^2$

Thermal Stress = $6,42084\text{e}+09 + 2,17099\text{e}+07 \text{ Tooth Height} + 1,33333\text{e}+07 \text{ Tooth Top Length} - 2,44480\text{e}+09 \text{ X, Y Hatching} + 1,41667\text{e}+08 \text{ Tooth Height} * \text{Tooth Top Length} + 3,33333\text{e}+07 \text{ Tooth Height} * \text{X, Y Hatching} - 1,66667\text{e}+07 \text{ Tooth Top Length} * \text{X, Y Hatching} - 2,86420\text{e}+07 \text{ Tooth Height}^2 + 2,63889\text{e}+08 \text{ Tooth Top Length}^2 + 4,80988\text{e}+08 \text{ X, Y Hatching}^2$

Supports' Heat Transmission = $1127,30185 - 14,01019 \text{ Tooth Height} + 87,58333 \text{ Tooth Top Length} - 226,57593 \text{ X, Y Hatching} + 22,91667 \text{ Tooth Height} * \text{Tooth Top Length} - 0,555556 \text{ Tooth Height} * \text{X, Y Hatching} + 2,50000 \text{ Tooth Top Length} * \text{X, Y Hatching} - 0,074074 \text{ Tooth Height}^2 - 141,66667 \text{ Tooth Top Length}^2 + 40,59259 \text{ X, Y Hatching}^2$

Overhang Displacement = $0,450624 - 0,011220 \text{ Tooth Height} + 0,035083 \text{ Tooth Top Length} - 0,036707 \text{ X, Y Hatching} - 0,010417 \text{ Tooth Height} * \text{Tooth Top Length} + 0,005222 \text{ Tooth Height} * \text{X, Y Hatching} - 0,014167 \text{ Tooth Top Length} * \text{X, Y Hatching} + 0,002123 \text{ Tooth Height}^2 + 0,006944 \text{ Tooth Top Length}^2 + 0,008494 \text{ X, Y Hatching}^2$

2. Line-type Supports

Support Volume = $3623,77256 - 69,47302 \text{ Tooth Height} + 66,09167 \text{ Tooth Top Length} - 2850,26494 \text{ Cross Line Interval} + 36,91667 \text{ Tooth Height} * \text{Tooth Top Length} + 21,02222 \text{ Tooth Height} * \text{Cross Line Interval} - 57,00000 \text{ Tooth Top Length} * \text{Cross Line Interval} - 0,017284 \text{ Tooth Height}^2 + 0,277778 \text{ Tooth Top Length}^2 + 741,61975 \text{ Cross Line Interval}^2$

Thermal Stress = $1,12473\text{e}+10 + 6,48272\text{e}+07 \text{ Tooth Height} + 2,20667\text{e}+09 \text{ Tooth Top Length} - 7,13657\text{e}+09 \text{ Cross Line Interval} - 1,66667\text{e}+08 \text{ Tooth Height} * \text{Tooth Top Length} + 6,44444\text{e}+07 \text{ Tooth Height} * \text{Cross Line Interval} - 3,33333\text{e}+08 \text{ Tooth Top Length} * \text{Cross Line Interval} - 2,98765\text{e}+07 \text{ Tooth Height}^2 - 1,55556\text{e}+09 \text{ Tooth Top Length}^2 + 1,86272\text{e}+09 \text{ Cross Line Interval}^2$

Supports' Heat Transmission = $1103,19938 - 18,45586 \text{ Tooth Height} + 96,16667 \text{ Tooth Top Length} - 353,07840 \text{ Cross Line Interval} + 14,58333 \text{ Tooth Height} * \text{Tooth Top Length} + 2,55556 \text{ Tooth Height} * \text{Cross Line Interval} - 19,16667 \text{ Tooth Top Length} * \text{Cross Line Interval} + 0,617284 \text{ Tooth Height}^2 - 90,27778 \text{ Tooth Top Length}^2 + 98,46914 \text{ Cross Line Interval}^2$

Overhang Displacement = $0,480020 - 0,006101 \text{ Tooth Height} + 0,007917 \text{ Tooth Top Length} - 0,127547 \text{ Cross Line Interval} - 0,016667 \text{ Tooth Height} * \text{Tooth Top Length} + 0,004444 \text{ Tooth Height} * \text{Cross Line Interval} - 0,011667 \text{ Tooth Top Length} * \text{Cross Line Interval} + 0,002469 \text{ Tooth Height}^2 + 0,051389 \text{ Tooth Top Length}^2 + 0,046321 \text{ Cross Line Interval}^2$

3. Contour-type Supports

Support Volume = $3545,32790 - 69,64716 \text{ Tooth Height} + 66,00000 \text{ Tooth Top Length} - 2661,23210 \text{ Contour Offset} + 37,00000 \text{ Tooth Height} * \text{Tooth Top Length} + 21,11111 \text{ Tooth Height} * \text{Contour Offset} - 56,66667 \text{ Tooth Top Length} * \text{Contour Offset} - 0,012346 \text{ Tooth Height}^2 + 0,555556 \text{ Tooth Top Length}^2 + 666,79506 \text{ Contour Offset}^2$

Thermal Stress = $6,47756e+09 - 2,08025e+06 \text{ Tooth Height} + 6,43333e+08 \text{ Tooth Top Length} - 3,03683e+09 \text{ Contour Offset} + 9,16667e+07 \text{ Tooth Height} * \text{Tooth Top Length} + 2,22222e+06 \text{ Tooth Height} * \text{Contour Offset} - 1,83333e+08 \text{ Tooth Top Length} * \text{Contour Offset} - 1,28395e+07 \text{ Tooth Height}^2 - 7,22222e+08 \text{ Tooth Top Length}^2 + 8,81975e+08 \text{ Contour Offset}^2$

Supports' Heat Transmission = $1137,57253 - 19,26790 \text{ Tooth Height} + 125,25000 \text{ Tooth Top Length} - 276,45802 \text{ Contour Offset} + 20,00000 \text{ Tooth Height} * \text{Tooth Top Length} + 1,55556 \text{ Tooth Height} * \text{Contour Offset} - 31,66667 \text{ Tooth Top Length} * \text{Contour Offset} + 0,691358 \text{ Tooth Height}^2 - 111,11111 \text{ Tooth Top Length}^2 + 56,98765 \text{ Contour Offset}^2$

Overhang Displacement = $0,437369 - 0,000096 \text{ Tooth Height} - 0,015917 \text{ Tooth Top Length} - 0,013870 \text{ Contour Offset} - 0,018333 \text{ Tooth Height} * \text{Tooth Top Length} + 0,002889 \text{ Tooth Height} * \text{Contour Offset} - 0,005000 \text{ Tooth Top Length} * \text{Contour Offset} + 0,002370 \text{ Tooth Height}^2 + 0,070833 \text{ Tooth Top Length}^2 + 0,000593 \text{ Contour Offset}^2$

4. Cones-type Supports

Support Volume = $777,36969 + 725,50333 \text{ Contact Platform} + 3853,23333 \text{ Contact Part} - 1597,69062 \text{ Spacing} - 286,00000 \text{ Contact Platform} * \text{Contact Part} - 93,00000 \text{ Contact Platform} * \text{Spacing} - 561,33333 \text{ Contact Part} * \text{Spacing} - 13,24444 \text{ Contact Platform}^2 - 3076,11111 \text{ Contact Part}^2 + 484,51358 \text{ Spacing}^2$

Thermal Stress = $1,27083e+11 - 9,02523e+10 \text{ Contact Platform} - 3,92625e+11 \text{ Contact Part} + 2,67620e+10 \text{ Spacing} + 9,97750e+10 \text{ Contact Platform} * \text{Contact Part} - 2,75233e+10 \text{ Contact Platform} * \text{Spacing} - 8,01500e+10 \text{ Contact Part} * \text{Spacing} + 2,75200e+10 \text{ Contact Platform}^2 + 5,09500e+11 \text{ Contact Part}^2 + 1,55733e+10 \text{ Spacing}^2$

Supports' Heat Transmission = $764,77870 - 45,93333 \text{ Contact Platform} + 363,00000 \text{ Contact Part} - 66,52593 \text{ Spacing} - 17,50000 \text{ Contact Platform} * \text{Contact Part} + 11,66667 \text{ Contact Platform} * \text{Spacing} - 155,00000 \text{ Contact Part} * \text{Spacing} + 11,33333 \text{ Contact Platform}^2 + 83,33333 \text{ Contact Part}^2 + 23,70370 \text{ Spacing}^2$

Overhang Displacement = $0,496003 - 0,024433 \text{ Contact Platform} + 0,030333 \text{ Contact Part} - 0,027511 \text{ Spacing} + 0,002500 \text{ Contact Platform} * \text{Contact Part} + 0,001667 \text{ Contact Platform} * \text{Spacing} - 0,001667 \text{ Contact Part} * \text{Spacing} + 0,004000 \text{ Contact Platform}^2 + 8,25825e-16 \text{ Contact Part}^2 + 0,007111 \text{ Spacing}^2$