The processed results files contain a number of parameters. This file describes how they were measured or calculated.

t [s]: Time at which measurement was performed, in number of seconds since the start of the test. Measured by the fatigue machine.

N [cycles]: Number of cycles. Measured by the fatigue machine.

P [N]: Force. Measured by the fatigue machine.

d [mm]: Displacement. Measured by the fatigue machine.

C [mm/N]: Compliance. Calculated by assuming that the P-d behaviour is linear between d_{min} and d_{max} and applying: $C = \frac{d_{\max} - d_{\min}}{P_{\max} - P_{\min}}$.

a [mm]: Crack length. Calculated by a power-law curve fit through the measured a vs N data. I.e. $a = \alpha N^{\beta}$.

dadN [mm/cycle]: Crack growth rate, calculated by taking the derivative of the power-law fit of the crack length. I.e. $\frac{da}{dN} = \alpha \beta N^{(\beta - 1)}$.

G_max [N/mm]: Strain energy release rate (SERR) at maximum displacement. Calculated following ASTM D5528-01 according to: $G = \frac{nPd}{2wa}$ where w is the specimen width and n is a calibration parameter equal to the slope of the log C vs log a line (see ASTM D5528-01) determined separately for each specimen.

Delta_sqrt(G) [N/mm]: SERR range, calculated as: $\Delta\sqrt{G} = \left(\sqrt{G_{\max}} - \sqrt{G_{\min}}\right)^2$.

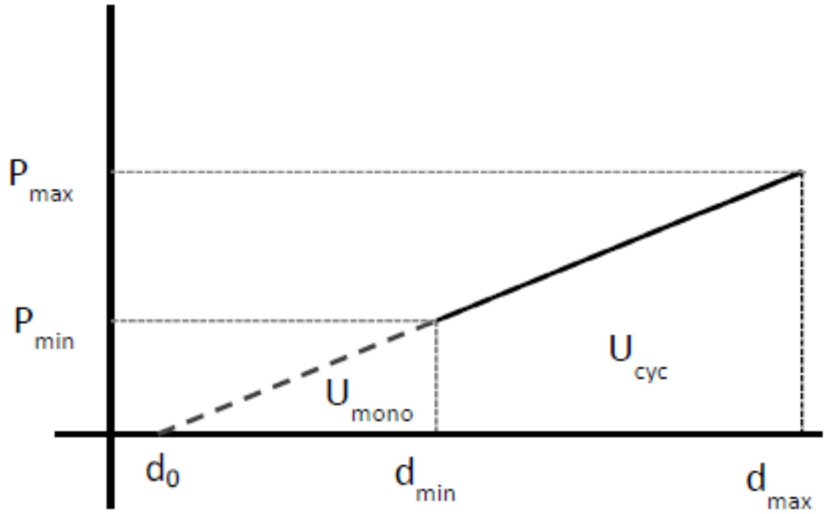
R [-]: Stress ratio, calculated as $\frac{P_{\min}}{P_{\max}}$.

Cyclic_energy [mJ]: Cyclic energy, calculated as $\frac{1}{2}\left[\left(P_{\max} - P_{\min}\right)\left(d_{\max} - d_{\min}\right) + P_{\min}\left(d_{\max} - d_{\min}\right)\right]$.

Monotonic_Energy [mJ]: Monotonic energy, calculated as $\frac{1}{2} P_{\min}\left(d_{\min} - d_0\right)$, where d_0 is the displacement for which P is zero; found by extrapolation of a linear fit between (d_{min},P_{min}) and (d_{max},P_{max}).

Total_Energy [mJ]: Sum of cyclic energy and monotonic energy.

See also the figure on the next page for the definition of the cyclic energy (U_{cyc}) and the monotonic energy (U_{mono}).



dU_cyc/dN [mJ]: Cyclic strain energy dissipation. Obtained by fitting a curve fit parameter through the cyclic energy vs cycle number data and then taking the derivative, i.e:

$$U_{cyc} = \alpha N^{\beta}$$

$$\frac{dU_{cyc}}{dN} = \beta \alpha N^{(\beta - 1)}$$

(note that strictly speaking dU_cyc/dN is negative, however since it make sense to work with the strain energy dissipation from a physical point of view, -1*dU_cyc/dN is given in the data file)

dU_tot/dN [mJ]: Total energy dissipation. Obtained in the same way as dU_cyc/dN, only using U_{tot}, rather than U_{cyc}.