## Bladed aerofoil data file format

This document outlines the file format for the aerofoil data. Aerofoil data defines the lift, drag and moment coefficient polars for a range of angles of attack. This document enables users to write a file such that it can be imported into the Bladed GUI via the Aerofoil window. The file is in ASCII human readable format.

The first 7 lines are key value pairs.

## Each line should be written as follows:

The key and the value are tab separated. A carriage return and new line need to be specified at the end of each line.

| Key word | Value | Unit | Data type |
| :--- | :--- | :--- | :--- |
| REFNUM | Name of foil data set. | - | String |
| XA | Pitching moment centre <br> from leading edge along <br> chord line. Input is \% of <br> chord. | $\%$ | Double |
| THICK | Thickness of chord. Input <br> is \% of chord. | $\%$ | Double |
| REYN | Reynolds number. | Dimensionless | Double |
| DEPANG | Deployment angle. <br> Number of data points <br> defining lift, drag and <br> moment coefficient <br> polars. | Degrees | - |
| Number of coefficients <br> defined. | - | Double |  |
| NVALS | Integer |  |  |

Following the first 7 lines, the polar data should be written to the file. The data needs to be a 2 d array with NALPHA rows and (NVALS + 1) columns. The array is defined as follows:

| Column | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ |
| :--- | :--- | :--- | :--- | :--- |
| Data | Angle of attack | Lift coefficient | Drag coefficient | Moment coefficient |
| Unit | Degrees | Dimensionless | Dimensionless | Dimensionless |
| Data type | Double | Double | Double | Double |

Each row should be written to the file in the following manner:
Each row of data (angle of attack and coefficients) is written as a tab separated list of doubles. A carriage return and new line need to be specified at the end of each line.

Once all rows have been written, the final line should read: ENDSECTION and is terminated by a carriage return and new line.

An example of a file with all characters shown (tab separation, carriage return, new line) is provided below.

```
REFNUM }->\mathrm{ demoCRIE
XA }->25.000000\textrm{CRLE
THICK \longrightarrow50.000000CRLE
REYN \longrightarrow10000000.000000CRLE
DEPANG }->5.000000\mathrm{ CRLE
NALPHA }->5\mathrm{ CRIE
NVALS \longrightarrowCRLE
-180\longrightarrow-0.1\longrightarrow0.03\longrightarrow-0.0CRLE
-90.00->0.2>1.2>0.0CRLE
0\longrightarrow0.275\longrightarrow0.1>0.0 CRIE
90.00\longrightarrow-0.2\longrightarrow1.2>-0.0CRIE
180}-0.1\longrightarrow0.03\longrightarrow-0.0\mathrm{ CRLE
ENDSECTIONCRTE
```

