

Fixed Trade Calculator

Frequently asked questions and collated user queries

This FAQ document collated answers to questions which have arisen so far during testing and development of the ATI Fixed Trade Calculator. It is not exhaustive, please see the “Further help” (page 2) for details of how to follow up if this does not resolve your query.

Contents

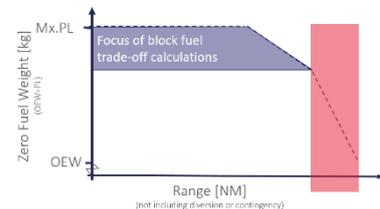
(1) I have selected a flight range which this aircraft type is capable of – why is the Fixed Trade Calculator declaring it an invalid input?	1
(2) Why is my selected utilisation unreasonable?	1
(3) Why can I not make a larger trade variable input?	1
(4) Why can I not edit the average flight distance for the aircraft? I think this default value is wrong.	2
(5) Why can I not change some of the other assumptions (e.g. fuel density and CO ₂ emissivity)?	2
Further help	2

(1) I have selected a flight range which this aircraft type is capable of – why is the Fixed Trade Calculator declaring it an invalid input?



For a year 2015 EIS narrow body, a reasonable ferry range may be in excess of 4000NM. Why is the range input to the calculator limited to 3200 NM? (image left).

The Fixed Trade Calculator relies on block fuel trades. The methodology used for block fuel trades is only valid in the take-off weight limited segment of the aircraft payload range chart. The schematic representation of a conventional payload range chart (right) shows in blue the focus area available for block fuel trade calculations using the ATI Fixed Trade Calculator.

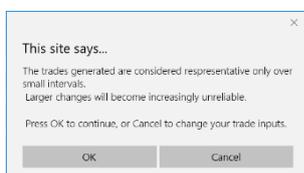


The ranges highlighted in red on the schematic, beyond the corner point limited by tank volume and maximum take-off weight (MTOW) cannot be captured using this type of fixed trade methodology. It is possible to carry out tank limited fixed trade calculations using a different methodology not implemented in this calculator. The impact of the trade variables on tank limited fixed trades would be different to those calculated for the take-off weight limited portion of the aircraft’s capability.

(2) Why is my selected utilisation unreasonable?

The Fixed Trade Calculator uses a utilisation table for each aircraft which relates flight range and flights per year, making assumptions on reasonable turn times and daily schedules. The fixed trade calculator will not allow utilisations outside the table (which would require extrapolation).

(3) Why can I not make a larger trade variable input?

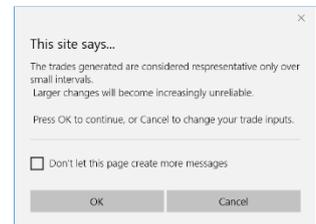


If you attempt to carry out a calculation using the Fixed Trade Calculator using a trade variable input representing more than a 3% change from the baseline you will receive a pop up warning (left) stating “The trades generated are considered representative only over small interval. Larger changes will become

increasingly unreliable.” This warning does not prevent you from continuing with the calculation. Users should note that choosing to apply larger trade variables will result in potentially meaningless results.

This warning is in place because the calculation process used within the fixed trade calculator and in the modelling conducted at the ATI making the Fixed Trade Calculator possible are only useful and representative over small changes in the order of 2-3%.

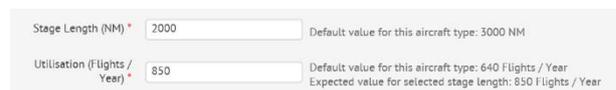
If you attempt several calculations with inputs above this limit, an option will appear (right) to prevent the fixed trade calculator from producing pop-ups. This option disables the JS layer within the browser which enables the Fixed Trade Calculator to work. Doing so will result in the Fixed Trade calculator malfunctioning. If you press this by mistake, you will need to log out and restart your browser to re-initialise the fixed trade calculator.



(4) Why can I not edit the average flight distance for the aircraft? I think this default value is wrong.

The default value is intended for organisations/users who do not have a view on a suitable representative range or utilisation value to use in calculations.

Each calculation can be made with a user selected (input) range and/or utilisation where the user either has a different opinion or wants to query a specific distance (image right).



The trade calculation compares the change in weight, drag or s.f.c back to the calculated fuel burn, CO₂ operating cost for the selected aircraft utilisation and mission (not back to the default range and utilisation for that aircraft).

(5) Why can I not change some of the other assumptions (e.g. fuel density and CO₂ emissivity)?

Changing fuel density or CO₂ emissivity will not give the any real benefit.

The fuel density varies depending on source of supply. This is a standard value common for aerospace analysis assuming a Jet-A type fuel. The modelling behind the fixed trade calculator is not suitable for varying the density to represent different fuel types. The fixed trade calculator would not be the right place for more detailed analysis considering different fuel types and the implications at whole aircraft level.

The CO₂ emissivity is a feature of the chemical formulation of the fuel, again the modelling and assumptions inherent to the Fixed Trade Calculator are suitable for Jet-A type fuels only and varying this assumed value would not have the impact of representing different fuel types.

(6) Why have the results changed when I redo a calculation using the 2015 EIS aircraft, compared with the previous 2000 EIS aircraft?

The aircraft at two different technology levels do not necessarily show the same trends in response to the fixed trades and therefore in some instances the same calculation may show a bigger or smaller impact on the aircraft attributes. The 2015 EIS aircraft are representative of current technology levels and are therefore more relevant to current and future technology research and development activities.

Further help

If you still have questions or for more information, please contact the Whole Aircraft team at the ATI by emailing info@ati.org.uk using "Fixed Trade Calculator" as your subject line.