Short-Cut Distillation

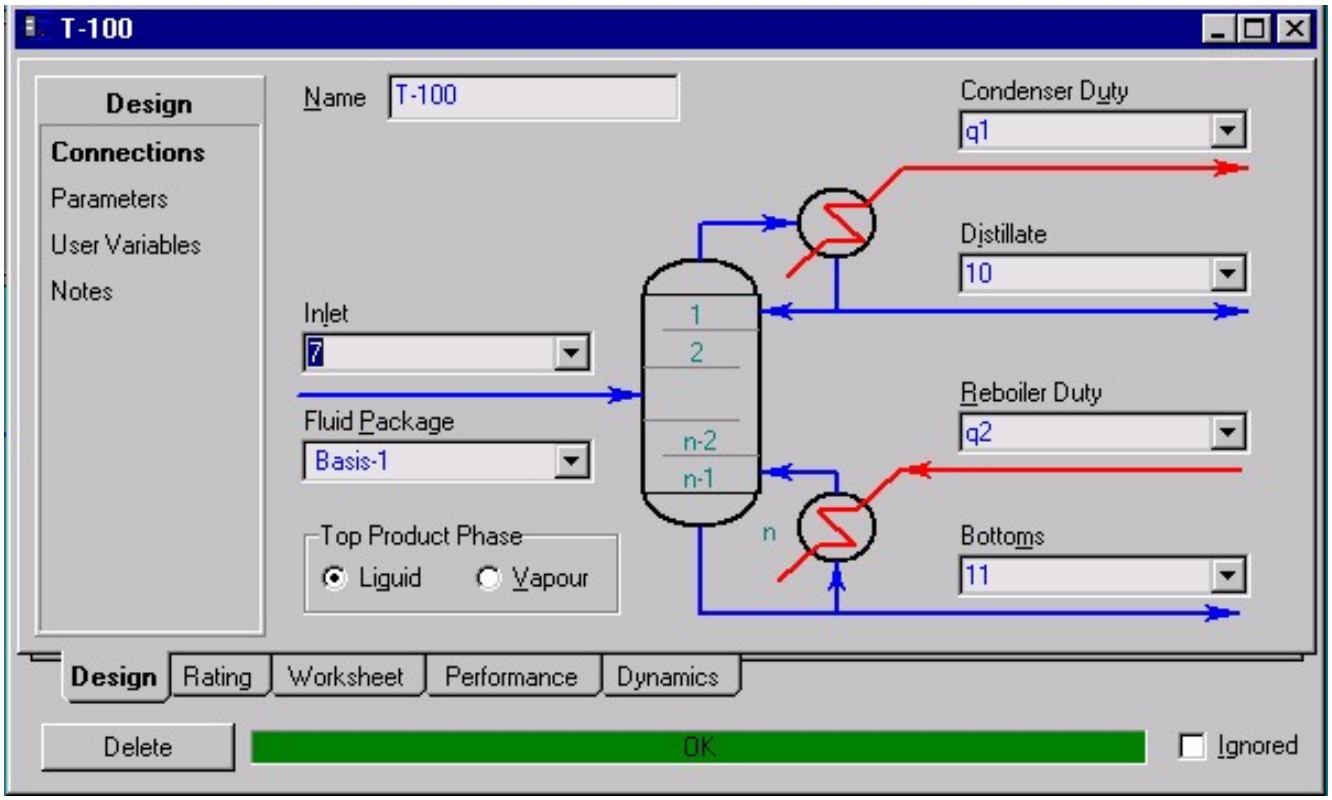
Όταν θέλουμε να προσδιορίσουμε ελάχιστο και θεωρητικό αριθμό βαθμίδων και ελάχιστο λόγο αναρροής χρησιμοποιούμε την στήλη SHORT CUT.  Το UNISIM εφαρμόζει την μέθοδο Fenske Underwood Gilliland.

Παρέχει **εκτιμήσεις** για :

- Ελάχιστο αριθμό δίσκων κατά Fenske
- Ελάχιστο λόγο αναρροής κατά Underwood
- Θεωρητικό αριθμό δίσκων (βαθμίδων) κατά Gilliland
- Ενεργειακά Φορτία Αναβραστήρα και Συμπυκνωτή
- Βέλτιστη θέση τροφοδότησης
- Μέση ροή ατμού και υγρού στο τμήμα εμπλουτισμού (rectify) (V, L) και στο τμήμα εξάντλησης (stripping) ($\bar{V}$,$\bar{L}$)

Διαμόρφωση στήλης SHORT CUT

1. Προσθήκη ρευμάτων μάζας (7,10,11 στην εικόνα) και ενέργειας (q1, q2 στην εικόνα) (Tab Connections)

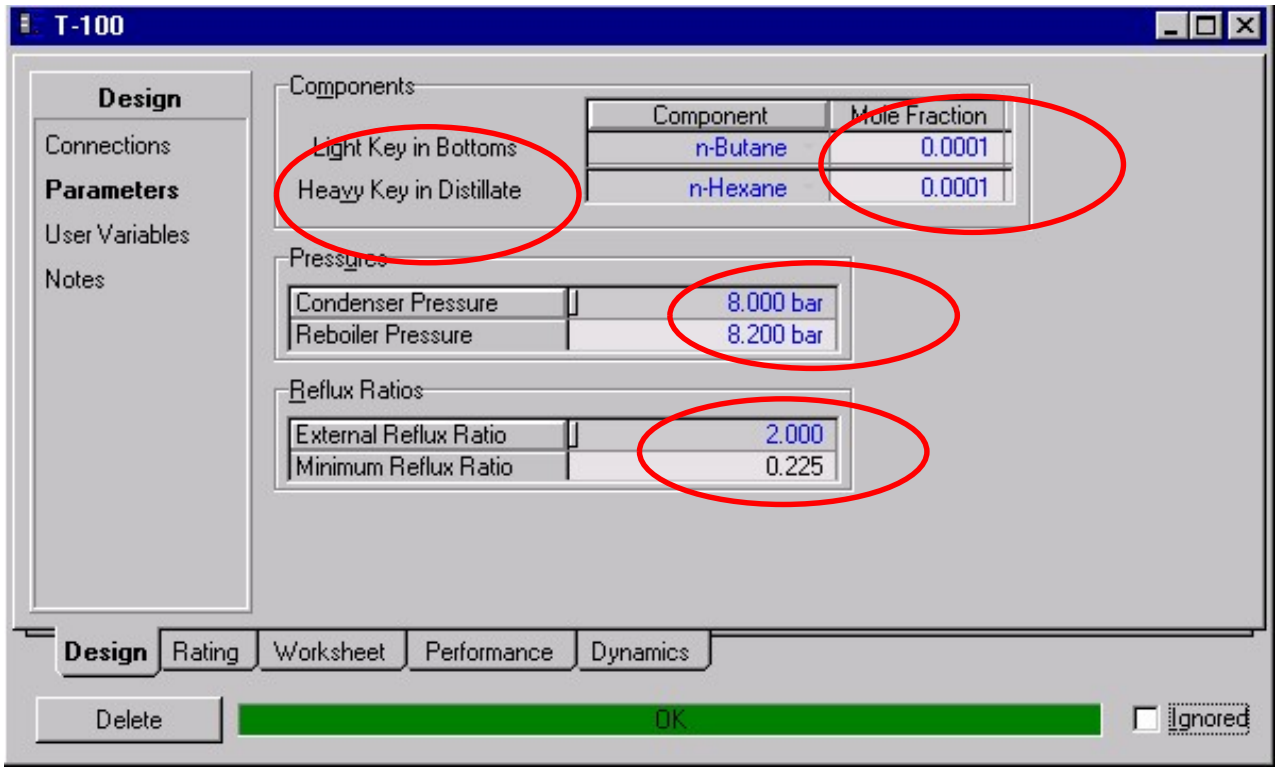


2. Μεταβλητές σχεδιασμού (Tab **Parameters**)

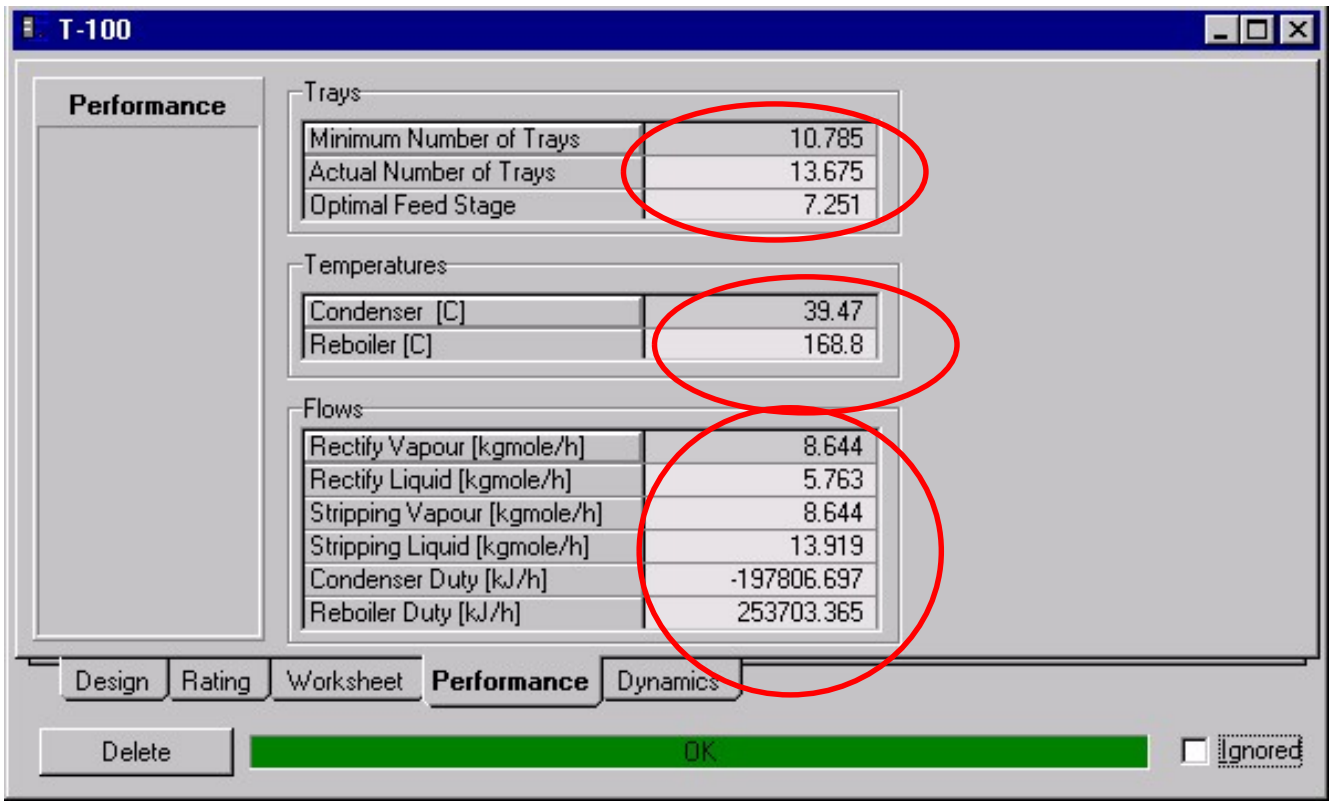
- Light Key in Bottom – Εισάγεται το γραμμομοριακό κλάσμα του πιο πτητικού συστατικού στον πυθμένα της στήλης (ρεύμα
- Heavy Key in Distillate – Εισάγεται το γραμμομοριακό κλάσμα του λιγότερου πτητικού συστατικού στο απόσταγμα
- Εισάγονται τιμές για τις πιέσεις συμπυκνωτή (condenser) και αναβραστήρα (reboiler)

- Εισάγεται η τιμή του επιθυμητού λόγου αναρροής (Reflux Ratio)

Όταν υπάρχει λύση → πράσινο (OK)



3. Τα αποτελέσματα παρουσιάζονται στο Tab Performance



A. SHORT CUT METHOD (FENSKE UNDERWOOD GILLILAND)

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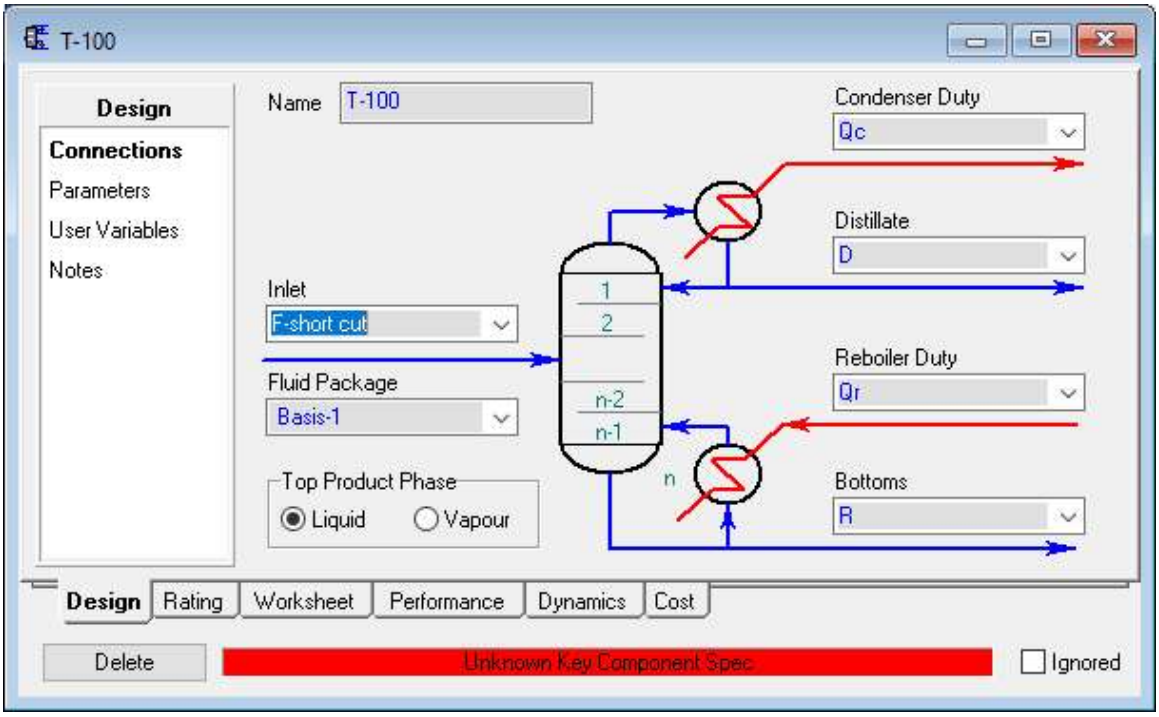
1. Add a Short Cut Distillation Column

- Drag and Drop the Short Cut Distillation icon from the Object Palette.
- Double-click the Short Cut Distillation icon
- The Short Cut Distillation property view appears

2. Specifying Short Cut Column connections

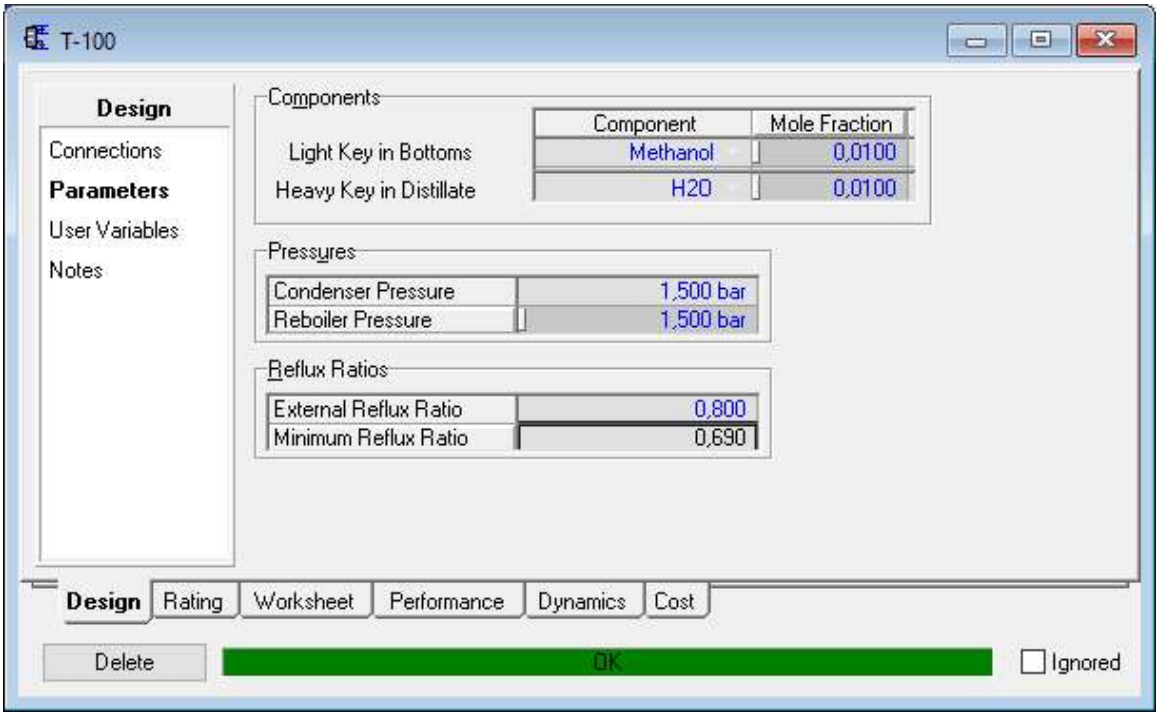
- Click on the Design tab.
- Click on the Connections page.
- In the Name field, specify a name for the Short Cut Column. (Optional)
- In the Inlet drop-down list either type in the name of the stream or if you have pre-defined your stream select it from the drop-down list.
- In the Condenser Duty drop-down list either type in the name of the stream or if you have pre-defined your stream select it from the drop-down list.
- In the Reboiler Duty drop-down list either type in the name of the stream or if you have pre-defined your stream select it from the drop-down list.
- In the Bottoms drop-down list either type in the name of the stream or if you have pre-defined your stream select it from the drop-down list.
- In the Top Product Phase group, click either the Liquid or Vapour radio button.
- In the Distillate drop-down list (when the Liquid radio button is selected) or the overhead Vapour drop-down list (when the Vapour radio button is selected) either type in the name of the stream or if you have pre-defined your stream select it from the drop-down list.



3. Specifying Short Cut Column parameters

- Click on the Parameters page.
- In the Light Key in Bottoms Component drop-down list, select the component you want to define as the light key.
- Specify the Mole Fraction of the light key in the Light Key in Bottoms Mole Fraction field.

- In the Heavy Key in Distillate Component drop-down list, select the component you want to define as the heavy key.
- Specify the Mole Fraction of the heavy key in the Heavy Key in Distillate Mole Fraction field.
- Specify the condenser and reboiler pressures in the appropriate fields in the Pressures group.
- Specify the external reflux ratio in the External Reflux Ratio field. The External Reflux must be greater than the Minimum Reflux Ratio.



4. Viewing Short Cut Column Results

- Click on the Performance tab.

The **Performance** tab contains the following groups:

- The Trays group displays the following results: Minimum Number of Trays, Actual Number of Trays, and Optimal Feed Stage.
- The Temperatures group displays the following results: Condenser Temperature and Reboiler Temperature.
- The Flows group displays the following results: Rectify Vapour, Rectify Liquid, Stripping Vapour, Stripping Liquid, Condenser Duty, and Reboiler Duty.

  Minimum Number of Trays: This is the Fenske minimum number of trays, which is not affected by the External Reflux Ratio specification

  Actual Number of Trays: This is calculated using a using the Gilliland method

  Optimal Feed StageTop down feed stage for optimal separation

  Rectify Vapour, Rectify Liquid: These are the estimated average flow rates above the feed location

  Stripping Vapour, Stripping Liquid: These are the estimated average flow rates below the feed location