MICRO TECHNO

MT-EXCH

MECHANICAL DESIGN OF SHELL & TUBES HEAT EXCHANGERS

MT-MECH : MECHANICAL CODES AT YOUR FINGERTIPS

A COMPLETE SUITE OF PROGRAMS FOR MECHANICALS DESIGN IN CHEMICAL ENGINEERING

- MT-EXCH shell & tube heat exchangers
- MT-VESS horizontal & vertical vessels
- MT-COMP exchangers & vessels components
- MT-LAYOUT tubesheet layout analysis

MT-EXCH allows the mechanical design and the stability check of shell & tubes heat exchangers.
The following main functions are provided:

- Calculation of thicknesses and dimensions of all the exchangers components.
- Assembling and geometrical sizing of the exchanger as a whole.

ALLOWED CODES

- ASME VIII division 1 (U.S.A.)
- AD-MERKBLATT (Germany)
- ISPESL-VSR (Italy)
- BS5500 (App. G) (U.K.) (Brackets)

TEMA (R, C, B) are applied where calculation is not provided by CODES.

EXCHANGERS TYPES

With reference to the TEMA nomenclature, the program MT-EXCH calculates the following exchangers types:

- Channel A/B/N
- Shell E/F/G/H/J/K
- Rear End L/M/N/S/T/U

Both the channel and the rear end can be of conical type.

ANALYSIS CAPABILITIES

- Internal pressure calculation.
  All the exchanger components, shell side and tube side, are calculated to the internal conditions of design and hydraulic test. The components in contact with both the shell side and the tube side are automatically checked to the pressure acting on the external side.

- Geometrical sizing of the exchanger.
  The program provides for a comprehensive geometrical sizing including all quotas, distances and dimensions of each component and of the exchanger as a whole.

- Weight calculation.
  The program calculates the weight of each component and in addition:
  - Empty weight of the exchanger
  - Weight of the tubes bundle
  - Weight of the exchanger full of water

- Check to the external pressure.
  The program allows for the installation of stiffening rings or for thickness increasing or for a combination of the two possibilities.

- Stability check takes in account the combined effects of forces and moments generated by the exchanger weight, wind/earthquake loads, and user specified forces and moments. The resultant forces and moments are applied to the supports for checking the stability and calculating the loads acting over the foundations. The wind and earthquake analysis can be carried out according to the following codes:

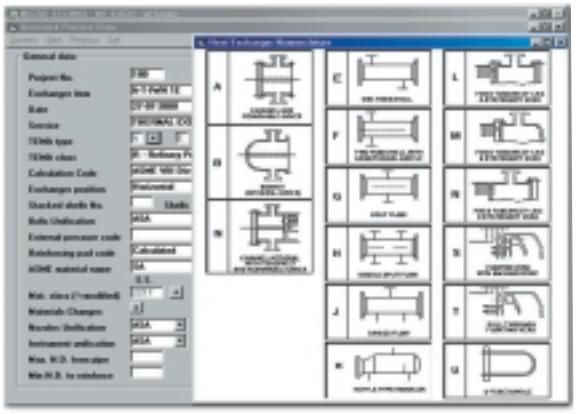
WIND	EARTHQUAKE
ANSI	ANSI 1982
ASCE 7-95	ASCE 7-95
BSI CP3	CNR 1986
CNR 1982	PARASISMIQUE PS92
CNR 1996	UBC 1988
NEIGE ET VENT	UBC 1994
UBC 1994	UBC 1997
UBC 1997	USER
USER	

- Supports positioning and stability check
  - SADDLES The check is carried on according to the method of Prof. Zick
  - BRACKETS The check is carried on according to the method of Prof. Bijlaard and to BS5500

INPUT

The input for MT-EXCH is very easy

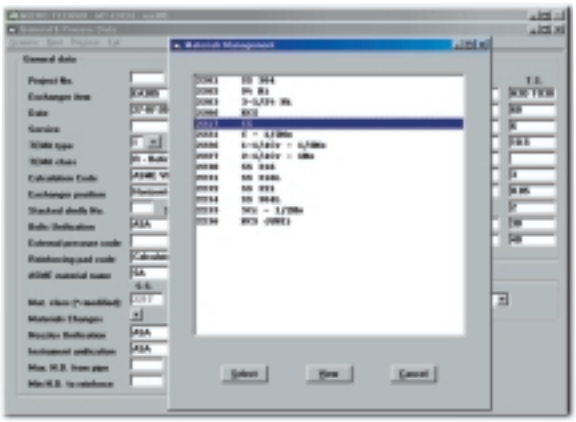
- Most of the data are preset and the user simply selects them from a list
- When needed, drawings are associated to the input fields to make the selection even easier



- Extended data bank are included in the program covering:
  - Materials
    Mechanical properties for over 350 materials (ASME, UNI, EUROMARK)
  - Nozzles (pipes and flanges)
    Tables include data for nominal diameters ranging from 10 mm (3/8") to 1500 mm (60") (ASA and UNI)
  - Gaskets
    Tables include data for 80 gaskets (ASME/VSR and AD-MERKBLATT)
  - ASME charts for external pressure
    All the charts provided by the ASME are included
  - Supports
    - SADDLES For horizontal exchangers
    - BRACKETS For vertical exchangers
  - Shapes for stiffening rings
    - European Standards
    - AISC Standards
  - Bolts
    - ANSI B18.22
    - UNI/ISO
    - DIN 2510

Almost all the data banks are open and customizable by the user.

- All data can be stored and shared by all the exchangers belonging to the same project.
- Measurement Units are completely free and customizable. The user can insert new units, define new unit systems or modify on the fly a single unit on the input data sheet.
- Import data from thermal rating. Through the use of a neutral file MT-EXCH can import data generated by the thermal rating of the exchanger.
- Definition of materials classes avoids the user the need of specifying the materials for all the components of the exchanger



OUTPUT

The results of the exchanger calculation consist of a tabular report, exchanger drawings, Bill of Materials and the Audit Reports Book.

- **Tabular Report**
  All relevant data of the exchanger are printed out including the results of numerical calculations and geometrical dimensions.
- **Bill Of Material**
  All components belonging to the exchanger under design are summarized in a table with dimensions, weights, number of items.

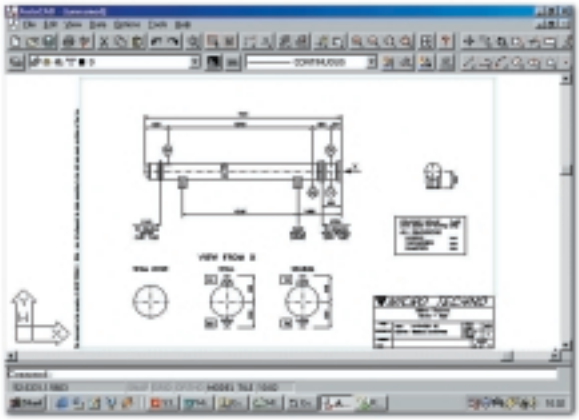
The table can be viewed on screen, printed or exported as Excel file for further processing.

- **Drawings**

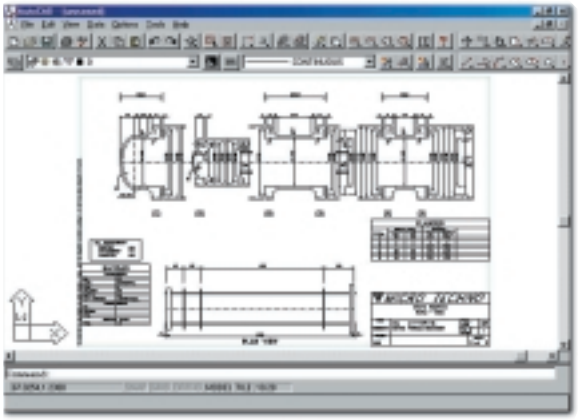
  Drawings are automatically generated by the program and include three or four sheets, depending on the presence of cladding on one or more components:

  - The first sheet is alphanumeric and includes tables related to: Design data, Tubes bundle, Loadings & weights data, Nozzles, General Notes, Standards, Revisions, Materials.

  - Setting plan and nozzles positioning
    The drawing is scaled in order to show the relative dimensions of the exchanger. The nozzles are shown both in longitudinal and circumferential views.



  - Constructive drawing and baffles positioning. All the exchanger components are drawn with quotas and dimensions.

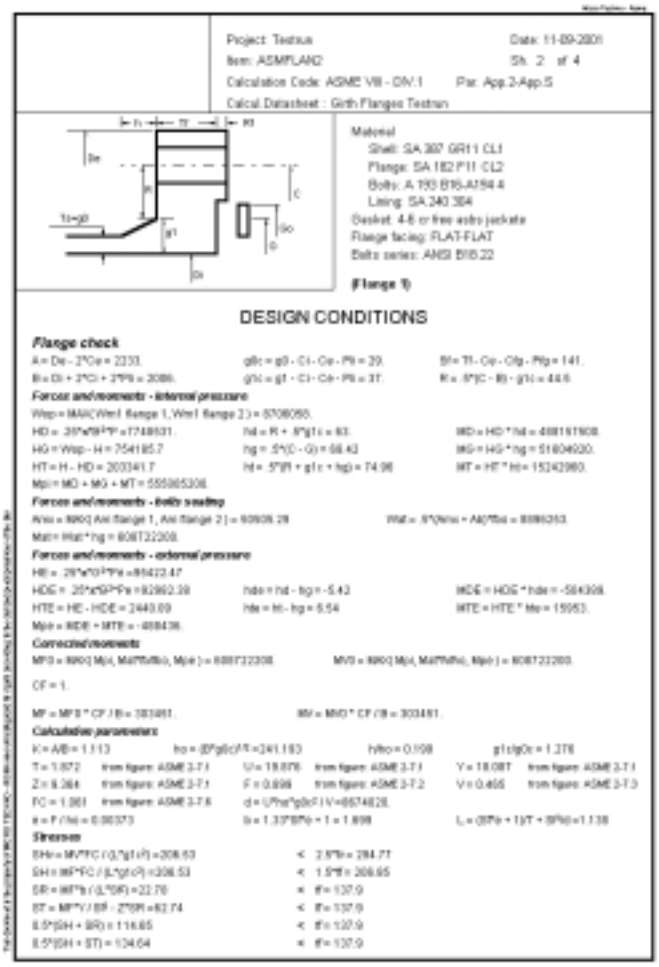


  - Cladding details
    All the exchanger components with cladding are drawn with the cladding details.

Drawings can be generated in English or in Italian language (Additional languages can be easily implemented) in DXF format and can be imported by the most common and diffused CAD programs (AUTOCAD, MICROSTATION etc.). System units are user definable.

- **Audit Reports Book**

  For all the exchanger components datasheets reporting formulas and substitutions are shown on the screen and can be printed or saved on a file.
  Datasheets can be produced in english or italian languages, selecting S.I. or English system of measurement units.



DESIGN CONDITIONS

MICRO TECHNO
tel. +39.0679365177
fax +39.0679365178
e-mail: info@microtechno.net
web site: www.microtechno.net