
Tecno**METAL** BIM

USER'S GUIDE



STEEL &

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Capitolo 2. PREFACE

The manual presents concepts and techniques to create designs using Tecnometal so profitable.

Tecnometal a package of procedures able to specialize in software for the needs of AutoCAD ® drawing two-dimensional and three-dimensional metal structures.

TecnoMETAL prodotto from Steel & Graphics LTD is a software for the design of metal structures, which uses the graphics platform of AutoCAD® Implement specific procedures for solving typical problems in the production of construction drawings and design of metal structures such as sheds, multi-storey buildings, pipe racks, bridges , Towers, Ladders, etc. and also you can get data to perform the material lists and files for the production CAM CNC machine.

The application, built primarily in Visual C environment is fully integrated with the graphical environment of AutoCAD ®.

The software was developed in 1984 based on many years of experience in the design of metal structures, and proposes to solve the real problems of design as requested by law.

In addition to graphic design, the program stores the information necessary for the execution of the pieces in the workshop, with the benefit of quality and professionalism of the documentation.
Tecnometal integral part of the production system developed by the steel & graphics for the management of the production of metal structures.

The product Tecnometal BIM, is a further enhancement of earlier versions, that given the demands of users and the new possibilities offered by new platforms.

The product is available in 4 modules:

- **Form Tecnometal 2D:** Manage works, databases, tables, materials, design of 2D profiles and mechanical components, utilities, basic materials lists, sketches workshop and macros for drawing two-dimensional.
- **Form Tecnometal 4D:** Manage works, databases, tables, materials, design of 2D profiles and mechanical components, basic utilities, lists the materials and design three-dimensional (2D Includes Tecnometal).
- **Form Tecnometal Structural Analysis:** For the verification of structures and unions.
- **Form Tecnometal Connections:** To check the unions.

 **Note:** TecnoMETAL consists of:

- Procedures under Windows, which communicate with AutoCAD ® using the Windows service itself: for these processes do you have only the toolbar to activate commands and functions;
- Procedures created with the use of macro menu: these can be accessed only by using the file menu TecnoMETAL;

 **Note:** *If only the active form Tecnometal Structural Analysis, in AutoCAD ® environment only includes profiles and plates without the holes.*

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3.16 caution

The simplicity of use of the program and the synthetic description of the commands of the manual of use cannot replace a good knowledge of AutoCAD that the user has to acquire attentively reading the bibliography furnished with the program and working for an enough time period.

Capitolo 4. INSTALLATION

4.1 Activation code

To use the program must be inserts the code of activation.



START (Avvio) → Programmi → Steel&Graphics → TecnoMETAL BIM → **Activation Code:**

Note: *The code of activation is different for every "Hardlock" possessed key, therefore it will be had to ask for him/it for every license.*

Attention: *The application of the code must have effected with her/it "Key" inserted.*

The following dialog appears:

Every module has a code of application (Request tails) that he is already visualized, pressing the button side Email of the Request tails for the possessed program, a second dialog appears for the insertion of the personal data (obligatory).

Compiled the application, to press on the button "OK", automatically an e_mail will be created with the application of the code and the address to which to send it.

In the case the connection internet was not had, selecting the box I Give created not Email automatically! it produces a text file that can be copied and envoy (from other computer connected to internet) to the e_mail steel@steel-graphics.it or to send him/it through FAX to the n. +39 045 8778576.

Note: *Within maximum 8 man hours you will receive the code of activation.*

If don't receive the code of activation within the pre-arranged time, you directly contact the Steel&Graphics, he could be that the application has not been received.

You will have to insert the code gotten in the space Reply tails of the possessed module, and to press beside the button Activate.

Note: *It is had to ask for the alone code of the purchased modules.*

4.2 Errors of operation of the program


If the program is opened without having correctly installed the key of protection, or if you/he/she is removed, an error message will appear "Hardware key error" or "non cleared User."

The same errors appear if Steel&Graphics System requirements is not installed or the code of activation has not been inserted.

To verify that the device of protection is correctly inserted and connected on the parallel port or USB.

If you have connected a printer or plotter after the device of protection, you verify that this last is power on.

In case of persistence of the error, you contact your retailer.

 **Note:** every type of connection or disconnection of the device of protection connected to the exit of the parallel port, both directly and through any other passing device, must have effected to out machine. In contrary case STEEL & GRAPHICS won't respond of possible breakdowns.

4.3 Device of protection (Key Hardware)

The program is furnished with a device of protection, and it doesn't work if this device is not connected to the computer.

 **You known that every packet contains only a device of protection.**

The device of protection has to be connected to the principal parallel port on your computer. The device is completely transparent in comparison to the system: the printers work without troubles and not manage besides any influence on other programs. If the device didn't have to correctly work, it needs to turn on the possible peripheral connected to it (printing or plotter).

The parallel port to which the device of protection is connected must have shaped in standard formality SPP "two-way" (to plan in the BIOS of system).

4.4 USB Hardlocks

- In the case of key USB, to correctly install the drivers is not enough, it needs that these are first "seen" from the operating system.
- For the installation to proceed in the following way:
- Installare the Steel&Graphics System requirements Having Care not to Insert The Key USB
- Riavviare the PC
- Inserire the key in a door USB frees. It will begin, the automatic procedure of survey hardware from Windows.

4.5 Visualization Solid

In the case that in the TecnoMETAL 4D are not visualized the solid to proceed in the following way:

From the menu "start" to select Program->Steel&graphics -> Steel&graphics Object Enabler -> Unregister Object.


From the menu "start" to select Program->Steel&graphics -> Steel&graphics Object Enabler -> Register Object.

4.6 Raccomendations

The program uses some Database with inserted some typical elements that are used in the steel structures, what shapes, attacks etc., In the installation of default they are found in C:\Steel\TecnoMETAL BIM\BIN\DBF \

They are situated in various subdirectories:

- **ENG** contains the database used in regions of language English;
- **ESP** contains the database used in regions of Spanish language;
- **FRA** contains the database used in regions of French language;
- **ITA** contains the database used in regions of Italian language;
- **USR_M** contains the database used in regions of Brazilian language with metric system;
- **USR_P** contains the database used in regions of Brazilian language with system in thumbs;
- **ARG** contains the database used in Argentina
- **BRA** contains the database used in Brazil
- **RUS** contains the database used in Russia
- **KOR** contains the database used in Korea
- **CHINA** Slope contains the database used in China
- **FULL** contains the whole database precedents;
- **IMPERIAL-BOLTS** contains the database of the bolts in thumbs, that can be replaced in the used database;

 **Note:** The whole Database you/they can be integrated from the user, therefore it recommends him to create an own directory (es: Database) and to copy you to the inside the content of the database to use, to avoid that following installations or updatings cancel everything that inserted by the user.

In the case more users it is opportune to directly create this directory in the Network server (the directory doesn't owe limitations both in reading that writing).

Besides the Database it is opportune to also create a directory CATALOG whether to copy the fileses of the subdir CAT of the TecnoMETAL BIM. In this directory the blocks are inserted created by the user, and if sets online they will be accessible from the various postings.

It is possible to create a directory Bookstore whether to copy the fileses of the subdir LIB of the TecnoMETAL BIM, in this directory the blocks are inserted used by the program and personalizings, if sets online they will be accessible from the various postings.

It is possible to create a directory TEMPLATE whether to copy the fileses of the subdir TEMPLATE of the TecnoMETAL BIM, in this directory the formats are inserted used by the program and personalizings, if sets online they will be accessible from the various postings.

4.7 Temporary Files

In the dialogs for the insertion of the data of the procedures, the last inserted data are proposed, these are memorized in files in the subdirectory of TecnoMETAL BIM BIN\TMP, it is possible to eliminate them or to file them for following inputs.

4.8 Visualizzazione dei solidi senza TecnoMETAL

The drawings created with the TecnoMETAL 4D macaws of the "normal" drawings DWG, that Khan be visualized only from who possesses the program.

To open the drawings without the TecnoMETAL 4D, needs to make to also reach to the recipient the program Steel&Graphics System requirements that allows to visualize the drawings as solid 3D, but not to modify them.

You will owe therefore, to send to the recipient the files of drawing. dwg, but also the folder "Steel&Graphics System requirements" that it is found inside the CD of "TecnoMETAL BIM", and that it will have to be installed performing the file setup.exe.

To this point also the recipient of the files of drawing. dwg, Khan open and to visualize in way The complete all the delivered drawings, also not possessing the application TecnoMETAL 4D. You/he/she Khan proceed besides to the printing of the same.

In the configuration of TecnoMETAL BIM it is also possible to define the visualization in Autocad without having to install the Steel&Graphicses System requirements.

For greater details to see chapter Integrated Environment -> Setup -> Drawing -> Health Preview Proxy.

Capitolo 5. INTRODUCTIONS

5.1 As TecnoMETAL is seen by AutoCAD®

TecnoMETAL BIM is not only an application for AutoCAD that simplifies the operations of drawing but, it as a tool is set for the real planning. In fact TecnoMETAL BIM has an own data base, that the user can increase and to modify to really liking, container a series of necessary information for the one whom plans.

The role of AutoCAD® associated to TecnoMETAL BIM is therefore that to potentially interact with a data base endless from which to withdraw or to add data in more automatic way with the purpose to get a notable help during all the phases of a project, that is departing from the idea of the structure him reaches the complete drawing of plants, views, sections, details and to the list quality.

5.2 Fundamental notions for the 3D use

For the three-dimensional drawing, it is opportune to know the behavior of AutoCAD® in the system coordinated spatial.

In AutoCAD®, they are available two systems of coordinates: a fixed system, denominated System of Global Coordinates (WCS), and a mobile system, denominated System of User coordinates (UCS). In the WCS, the axle X is horizontal, the axle Y is vertical and the axle Z is perpendicular to the plain XY.

The origin is the point in which the axes X and Y intersect him (0,0) in the left inferior angle of the drawing.

The UCS is defined in relationship to the WCS. All the immissions of coordinates of TecnoMETAL4D use the current UCS.

A move of the UCS can facilitate the job on you determine sections of the drawing. The rotation of the UCS helps to define points in the three-dimensional space or to specify rotated sights. The ways snap, grate and garden rotate all in operation ones of the new UCS.

Is possible to reposition the System of User coordinates through:

Move of the UCS defining a new origin.

Alignment of the UCS with an existing object or with the direction of current visualization.

To rotate the system current UCS around one of the axes.

Restoration of a saved UCS.

After having defined an UCS, it is possible to assign a name, therefore to restore it when it is necessary to again use it. The Preceding option of the command UCS restores in sequence up to 10 systems of coordinates precedents used in the current session. When an UCS with name becomes superfluous, can be eliminated. Besides it is possible to restore the UCS, so that coincides with the system WCS.

It is important to activate The icon that points out the orientation of the actual axes of the system UCS with the command ICONAUCS (_UCSICON) it checks the properties of visualization of the icon UCS.

Style icon UCS.

It specifies the visualization of the icon UCS 2D or 3D and the relative aspect.

2D It visualizes the icon 2D without representing the axle Z.

3D It visualizes an icon 3D.

Cone If the option 3D are selected, the points of the arrows of the axes are visualized X and Y as you coin three-dimensional. If the option Cone is de-selected, points of the arrows are visualized 2D.

Width line Checks the thickness of line of the icon UCS if the icon UCS is selected 3D. The possible selections are 1, 2 or 3 pixels.

Preview It visualizes a preview of the icon UCS in the space model.

Dimensions icon UCS Checks the dimension of the icon UCS as percentage of the window size. The value of default is 12 and the valid interval of values it is inclusive among 5 and 95. The dimension of the icon UCS is proportional to the window sizes in which it is visualized.

Color icon UCS Controlla the colors of the icon UCS in the windows of the space model and in the cards of layout.

Color icon space model Checks the color of the icon UCS in the windows of the space model.

Color icon files Layout Checks the color of the icon UCS in the cards of layout.

5.3 Solid 3D of TecnoMETAL BIM

The elements 3D realized by TecnoMETAL4D with a technique proper of the Steel&Graphics they are of the solid in environment AutoCAD®, where you/they are regenerated during the edition of the drawing, in this way

they don't get heavy the dimensions of the DWG, to visualize the three-dimensional drawing in AutoCAD®, the program uses a specific file that he/she takes the name of **AsdkAmodeler**.

During the edition, obviously the visible solid get heavy the file of drawing, to resolve this situation of the commands, has been created for freezing and/or to thaw the solid so that to work only on those parties.

5.4 Concepts base of TecnoMETAL

TecnoMETAL works with some logical mechanisms in the procedures for the drawing of steel structures: it will be well therefore to devote a few minutes to the learning of such concepts, of the used terminology, and of their philosophy of operation.

- **SubAssembly:** it is together an of marks, can be used to for instance define a beam reticular bolted or for a floor of a building etc. is also used for defining the priorities of assemblage of parts of the structure.
The subassembly is able not to be used, however the program will consider an only subassembly for the whole structure with name "Empty".
- **Mark:** it is a piece that can be composed from one or more positions welded among them, are practically the piece to climb on in the yard.
- **Position:** it is a piece that forms the mark (single), welded with other positions it will result in a composed mark.

5.5 Programming Visual-Lisp

With TecnoMETAL, it is possible to create some procedures in Visual-Lisp using the macros of it you command.



In the directory of TecnoMETAL it is present a file Example-Autolisp.lsp with the description for the use

5.6 Description of the commands in the manual

The commands of TecnoMETAL loaded in AutoCAD®, are activated through the icon buttons visualized in the editor of AutoCAD®.

To every command a card is devoted, type that following, container the followings parts:

Name of the comand

Short description	
	Icon
	Line of comand

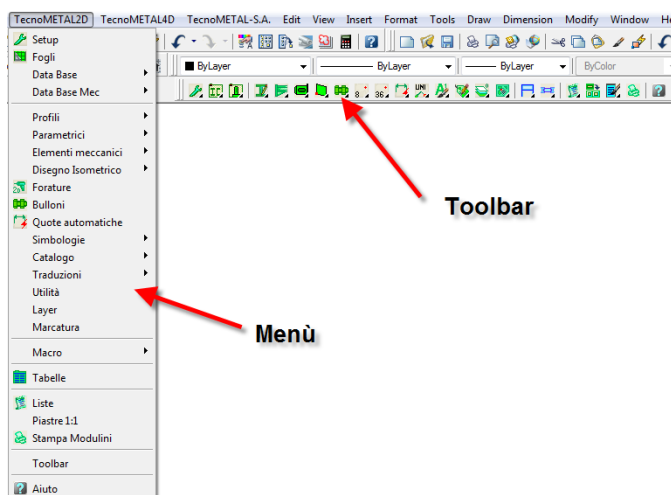
- **Name of the comand:** Is it the name with which the command is pointed out in the documentation of TecnoMETAL.
- **Brief description:** Is it the description of the command.
- **Icon:** Is it the image of the button of the toolbar that allows to perform the command. The toolbar is not specified in how much the user is easily able riposizionare the liking button.
- **Line of command:** Is it the text to be digitized from keyboard to perform the command. Can be employed for the creation of macro and routine (to see Manual of personalization of AutoCAD®) from the most experienced Users.
- **Mode of use:** Complete description of as to use the command
- **Example of use:** An example of as to use the command (if necessary to clarify its use).

5.7 Menu and Toolbar

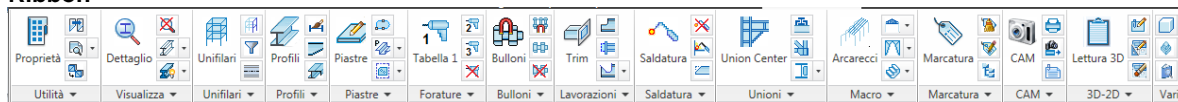
Entering the environment AutoCAD®- TecnoMETAL we have available besides the usual commands AutoCAD®, the procedures for the drawing of steel structures proper of the TecnoMETAL.

These procedures are available is with "Menù" that as "Toolbar" and "Ribbon".

Note: The manual is organized as the menu.



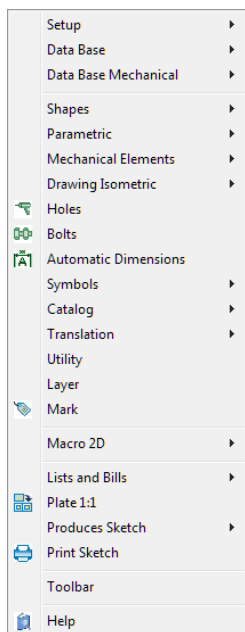
Ribbon



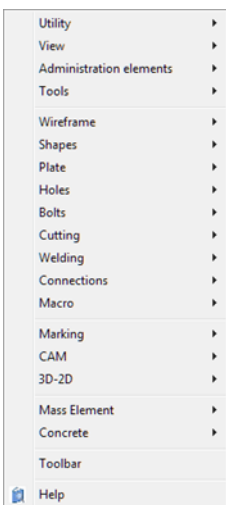
Menù

The "Menù" is it organized in the following mode:

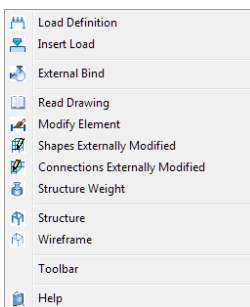
TECNOMETAL 4D



TECNOMETAL 2D

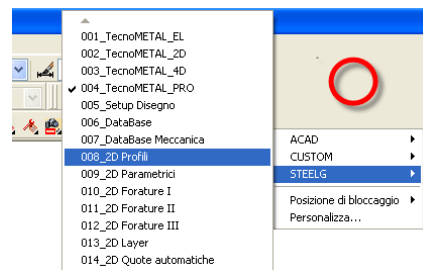


TECNOMETAL S.A.



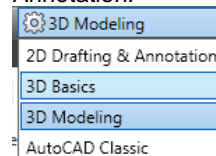
Toolbar

L The toolbars, are activated of menù (only the complete ones for every module) or activating with a click of the right key of the mouse in an empty space of the superior bar.



Ribbon

Active in formality "3D Modeling" "3D Basics" and "2D Draftings & Annotation."

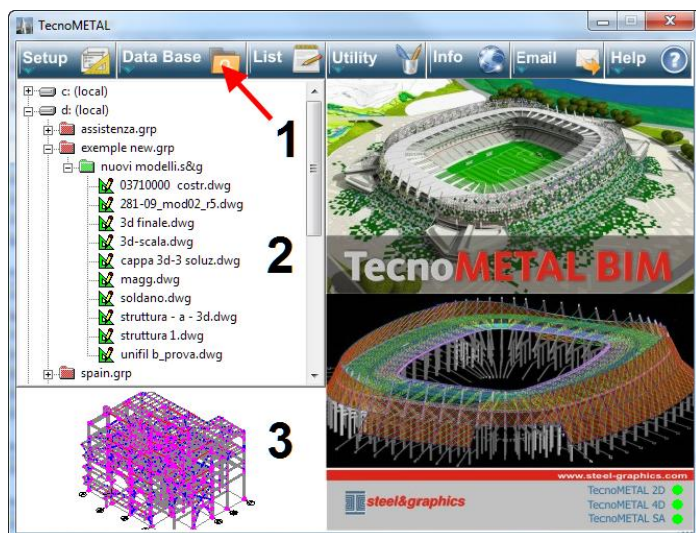


Capitolo 6. INTEGRATED ENVIRONMENT

6.1 Description

The Integrated environment allows a' accurate management of the Jobs.
To every opening of the Integrated environment the last Job is proposed on which is operated.

Launching the program TecnoMETAL BIM from the icon that it is found on the desktop (to video) it opens, therefore, the Integrated environment.



The dialog is divided in three parts:

TOOLBAR;

WORK AREA;

PREVIEW OF THE DRAWINGS;

They are normally had to perform within the same day different elaborations of projects.

To facilitate these operations has been created the Integrated environment a manager of Jobs that has the assignment to divide in base to the nature of the files and the elaborations in folders.

As we will see following the folders that the Integrated environment creates for every Job, are the logical subdivision of the same Job (Jobs Items and Drawings).

The **Integrated environment**, structured through a practical buttons menu, it uses of you dialogs for interacting with the operator.

Is it so possible to access the graphic editor of AutoCAD, to manage the Job and to access all the other modules that compose the application.

The principal characteristics of the Integrated environment are:

- **It facilitates the use of input/output of AutoCAD®;**
- **It allows a correct management of the projects execution;**
- **It saves the state of Job and it proposesto the following entry.**

To manage the Jobs the Integrated environment involves as "Explores Resources" of Windows, automatically proposing the list of all the local disks that there are in the computer (**c:local**) (**d:local**) etc., and all the subdirectory that can be created with the program. Besides from the possibility to be connectedto all the unities of net (**network**) connected to the PC where installed is TecnoMETAL.

6.2 Toolbar



It allows to directly access the commands of external management of the program, it is composed from seven buttons.

6.2.1 Setup

(to see paragraph Setup).

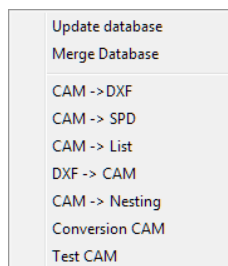
6.2.2 Data Base

(to see chapter Database).

6.2.3 List

(to see chapter Material Lists in the module 2D).

6.2.4 Utility



It allows to enter to the utilities of the program.

6.2.4.1 Upgrade DataBase

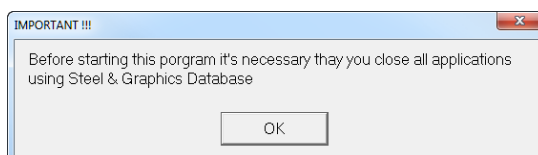
Launching this command departs a program that deals him with to automatically update the database contained inside the Folder (es. ita). You location of the Database that will be updated it is suitable inside the folder Crossed of the Setup Generale of the program.

Note: This command must have launched only in the cases that could be damaged the files of the database for varied motives, or when the program is updated.

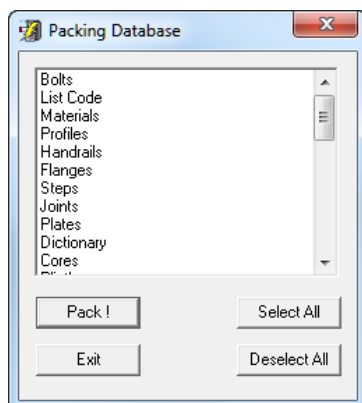
The updating must be made with the drawing of TecnoMETAL BIM / AutoCAD® closed and other programs steel&graphics that the same database uses.

If the Database is online the updating you/he/she must be done only by an user, while the others don't owe to have opened the TecnoMETAL BIM or other programs that the database uses.

Selected the voice "it Updates Database" the following warning appears



With a click of the left button of the mouse on the button "OK" the dialog following appears:



Dialog her central it gives the possibility to select the name of the database that is wanted to update. With a click of the left button of the mouse above the element.

Select All: I feel that allows the selection of the whole database for the following updating.

Deselect All: I feel that allows of deselection all the voices of database previously selected.

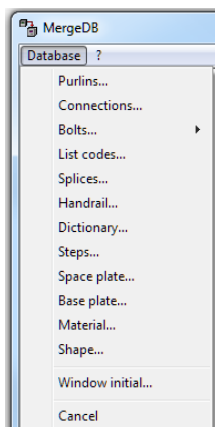
Pack! : I feel that starts the updating of the database selected

Exit: button that allows to close and to go out of the command of updating of the database.

Note: The updating has the duration of a few minutes.

6.2.4.2 Merge Database

This utility serves for caring the data among two date base without owing to manually transcribe them.



With the command you Merge Database it is entered to dialog side.

From the curtain menù Database is chosen the database by to update.

You passes therefore to dialog following.

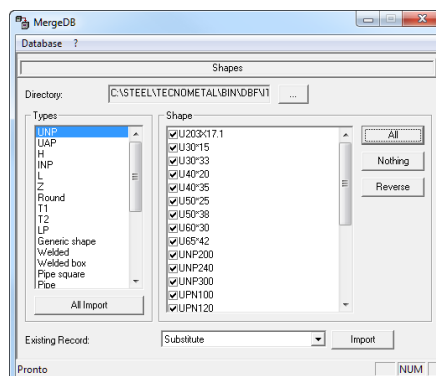
From the **path Database** with the button to the right, the file is selected from which are wanted to care the data.

In the lists under they are selected the elements that are wanted to care (in the list to the left) the typology of the shape is selected "in this example".

In the list to the right the elements can be selected or with the button "Sel. All" all the present elements are selected.

A further choice is that to be able to overwrite the equal voices or to maintain those existing.

With the button "Import" the operation and the selected data it is confirmed will move to the current database of the program.

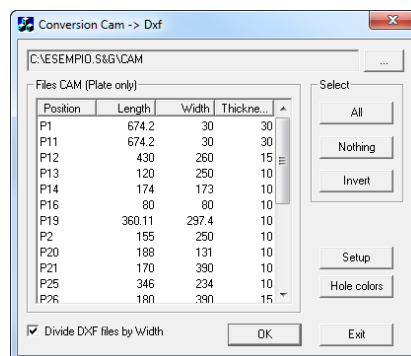


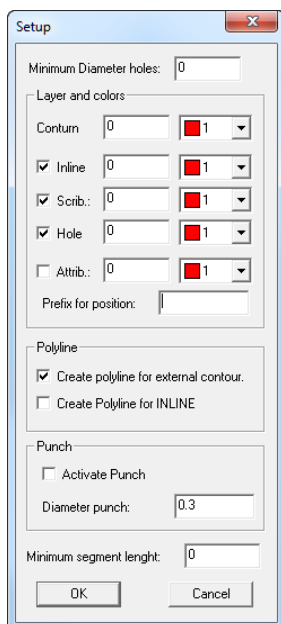
6.2.4.3 CAM -> DXF

This utility converts the files CAM of the plates (produced with TecnoMETAL 2D, 4D or PRO) in file usable DXF in the numerical control machines for cut to laser.

One dialog is proposed where to select the containing directory the files CAM to convert.

To press on the button and to select the directory where the files are contained CAM. Pressed OK you/they are visualized the files CAM (only plates) contained inside the order. To select one or more file to be converted.



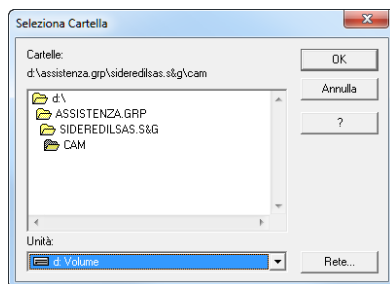


With the button **SETUP** the colors of the elements and the holes can be defined by to insert in the Dxf pointing out the least diameter of those to convert.

Activating the box **Attrib.** Will be inserted in the dxf the variables with value (es. quantity, thickness etc.).

In the box **Prefix for positions** can be inserted some prefixes in the name of the positions inserted with the command Attrib.

In the section "Point" if activated the box, it inserts in the DXF to the place of the holes a circle of the diameter inserted in the box "Diameter standard point." For last is asked the directory where to insert the files DXF.



In the section "Length least segments" it is possible to define the length under which the present segments are eliminated in the DXF, this to allow a correct reading from the car for the cut.

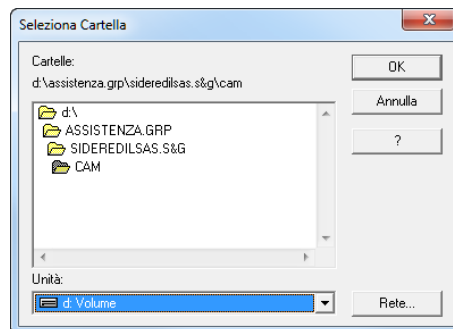
6.2.4.4 CAM -> SPD

This utility serves for converting the files CAM in the formats SPD and SPD Priority.

To activate the format to convert then press to select the directory of the files CAM.

In the case of SPD Priority to select the list quality (subassembly) in the box List full path.

Pressing the button OK will be performed the conversion.



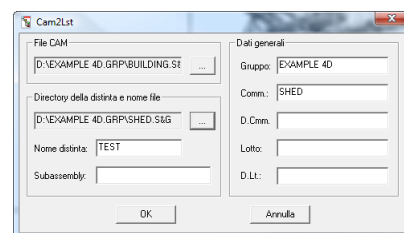
6.2.4.5 CAM -> List

This utility allows to create a list from a series of file selected Cam.

The dialog that he introduces it is the following

In the panels of left they are selected the runs and the name of the list that is wanted to create and from whether to load the files Cam..

In the section to the right they are found some boxes where we can add the information for the list.

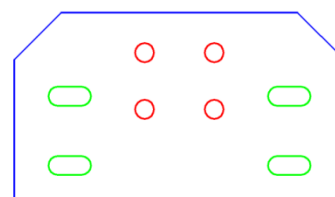


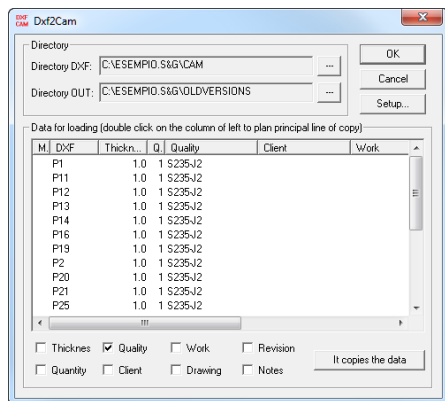
Note: The folder to be selected for the list has to be a folder of an order or a lottery created with TecnoMETAL and to contain the folder Dbf.

6.2.4.6 DXF -> CAM

The procedure allows to convert a file Dxf of a plate with holes and buttonholes in formed CAM to get the sketches of TecnoMETAL BIM.

After having drawn a plate and uniform for colors in es: holes (red), contour (blue), inline (green), attributes (ciano), and saved in Dxf, the procedure recalls him from the utilities of TecnoMETAL BIM and is accessed the following dialog.





You defines the directory where the fileses are dxf to convert and that whether to memorize the files produced Cam "Directory Out." Chosen the directories you/they will be visualized in the central list all the fileses that the program has found.

To enter the Setup and to plan the colors of the elements.

Example:

holes (red), contour (blue), inline (green), attributes (ciano). With a double-click on the elements we can change the values (es. thickness, material etc.).

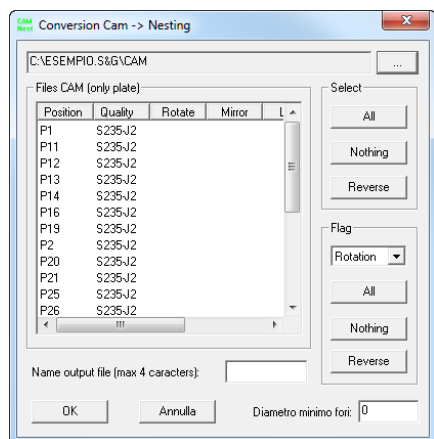
If they are had some elements that are equal (es. same thickness) the piece can be selected by to use as matrix with a click in correspondence of the letter Main so that couples the symbol of it sprouts in front of the element.

Then the pieces are selected by to modify as lines of Windows (**shift/ Ctrl +** button left mouse); done this with a click in the elements to copy (caselline in low) and finally on the button "Copy dates."

Performed all the corrections with the button OK they are produced the files CAM.

6.2.4.7 CAM -> Nesting

This procedure creates a file with extension. PZZ of interchange for the program of nesting StarNesting.



To use this procedure, is owed to have created in a directory is the files CAM that DXF of the plates to treat.

To select the containing directory the files, is possible to define what pieces can be rotated in the nesting with a double click in the column it **Rotates** if everybody it is enough to select in the list **Flag** it Rotates and to press the button All.

Can be defined if the pieces can be mirror with a double click in the column **Mirror** if everybody it is enough to select in the list **Flag** Mirror and to press the button All.

Note: *Le lamiere striate non possono essere specchiate.*

In the box in low to insert the name of the nesting (maximum four characters).

To select the pieces to insert or pressing the button All in the section Selection.

With the button OK they are confirmed the choices and servant the file PZZ in the directory of the files CAM and DXF.

6.2.4.8 Conversion CAM

From shapes plates welded shape: it serves to produce in automatic from the files CAM of shapes welded shape to H, T and beams to large case, the files CAM as plates of the related to the pieces of whichthey are composed (superior flange, web, inferior flange).

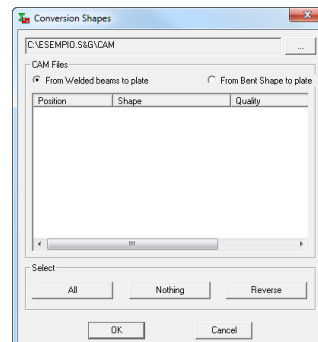
From shapes bent to plates: it serves to produce in automatic from the files CAM of bent shapes the file CAM as developed plate.

Activating the command visualizes the screened following where it is had to select the containing directory the files to convert through the key.

The files CAM of the admitted profiles is visualized only, to select those to convert and to press the key OK.

The keys in low they serve for facilitating the selection of the pieces to convert.

The produced files for shape plate will take the filename CAM of origin with assistant a number (_1 _2 and _3).




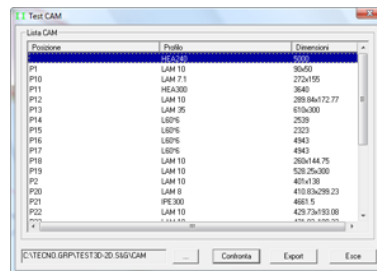
6.2.4.9 Test CAM

This utility serves for comparing if there are files equal CAM (equal pieces otherwise marked).

It is had to select the containing directory the files CAM with the button, then to press the button Compares.

With the button Export is created a report of the result.

 **Note:** It is always opportune to visually verify the equal considered pieces.



6.2.5 Info



Info: It visualizes the information on the program, the version of the same.

6.2.6 Email



- Business contact...
- Support Contact...

Business contact: it gives the possibility to send e-mail to the commercial office of the Steel&Graphics. Launching the command automatically opens "Outlook" with specified the address of e-mail.

Support contact: it gives the possibility to send e-mail to the office for the technical support of the Steel&Graphics. Running the command automatically opens "Outlook" with specified the address of e-mail to ask for technical support on the operation of the product..

6.2.7 Help



- Help
- Tutorial
- Update
- Forum
- Remote Assistance
- Site WEB Steel&Graphics

Help: It opens the manual present in formed PDF.

Tutorial: It visualizes a tape of example on the use of TecnoMETAL BIM.

Update: You directly connects Web to the page to unload the updatings of the program.

Forum: To enter the Forum of the steel&graphics

Remote Assistance: To connect himself to the on-line support through remote assistance.

Site Web Steel&graphics: it allows the connection the site internet of the Steel&Graphics

6.3 Setup


Per rendere la gestione dei lavori più autonoma possibile nel TecnoMETAL esistono due differenti livelli di configurazione:



- General Setup...
- Work Setup...
- General calculation Setup...
- Setup solver...
- Work calculation Setup...
- Profiles management


➤ **General setup:** with this option the data of default are inserted, that is those that as reference in the creation of new directories is taken for the use of the program.

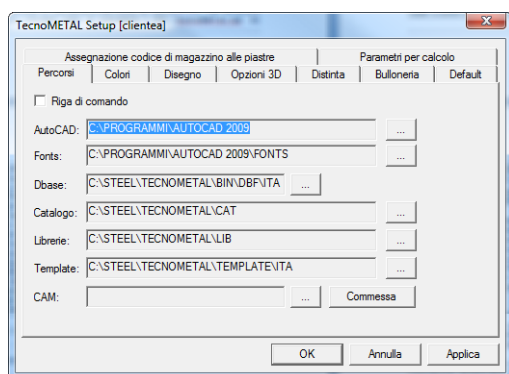
➤ **Work Setup:** with this option the data are inserted related to the order selected for working with different parameters from those of default. In this way we can bring some specific changes for the current order without having to modify the general setup, and besides it allows to be able to work with more orders and each with his own configuration.

 **Note:** Setup dates calculation general, Setup solvers and Setup you date calculation committed they are active only for the computational module TecnoMETAL BIM S.A. it is postponed to the manual of the module for the description.

6.3.1 Paths

This card is possible to find only her if the command is run "Setup Generale".

The user has to verify that the specified paths are correct because the program correctly works. All the paths are only modifiable through the button  to the right of the datum to be modified.



Line of command :If activated this box, it is possible to manually digitize the run of installation of the directory of AutoCAD[®] without pressing to the right the button over that the command of execution of AutoCAD.

- Activating therefore the voice "Line of command", he activates the underlying field "AutoCAD" inside which he proceeds with the manual insertion of the path of connection to the executable of the same. This option has been inserted because could happen to have to connect the opening of the drawings of TecnoMETAL to other programs Autodesk what, for instance: Architectural Desktop, AutoCAD Mechanical etc.


On the line "AutoCAD[®]" that she is activated it is obligatory to insert the executable filename with the addition of i "%1". **Example: c:\Program Files\Autodesk\ACADM 2011\acad.exe %1.**

AutoCAD[®]

It points out the path of installation of the executable one of AutoCAD[®] through which same AutoCAD[®] is connected and launched in association with the application TecnoMETAL. Through the button it is possible to change this path connecting, for instance, TecnoMETAL to AutoCAD[®] 2010 or AutoCAD[®] 2011. **Fonts** Indica il percorso degli stili di testo che sono utilizzati dall'applicativo TecnoMETAL.


Dbase

It points out the run where the database of the program they are present. To correctly plan the run needs to select the folder in the directory where the database they have been installed.

Through the button  it is possible to change this run.

Catalog

It points out the run of connection to the directory "Cat" contained inside the principal directory of TecnoMETAL. The directory "Cat" it is reserved to contain all the dwg related to the blocks personalized by the user

Through the button  it is possible to change this path.

Library

It points out the path of connection of the library used by the TecnoMETAL.

 **Note:** Don't select the subdirectory related to the language of the program used.


Template

It points out the path of connection to the directory where they are found "Template", that is used in 3D - 2D for the drawing. The templates are of the drawings dwg, and you can be custom designed from the use.

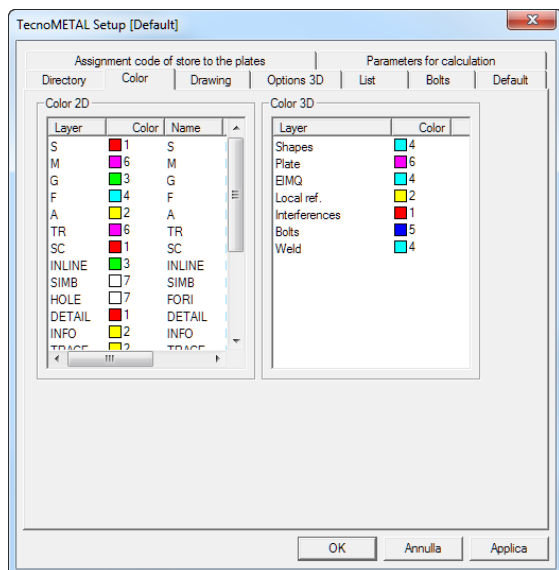
CAM

It points out the run of connection of the folder where is wanted that is put the files CAM created with TecnoMETAL2D, 4D and For.

If it is desired that these are saved in the folder CAM of the relative works all it takes is pressing on the button Order (**recommended**).

Through the button  it is possible to change this run.

6.3.2 Colors



This card is possible to find the command being running "General Setup" that the command "Work Setup" through the pressure of the button "Setup" of the Integrated environment.

In this dialog it is possible to modify the **color**, the **name** and the **line's thickness** of the layers that are used by TecnoMETAL BIM.

To modify the planned values, to perform a double-click with the left button of the mouse on the element, for the colors, the chart is entered to you, for the name the cursor is visualized for the change.

To change the colors of the three-dimensional elements, is entered always with the double click.

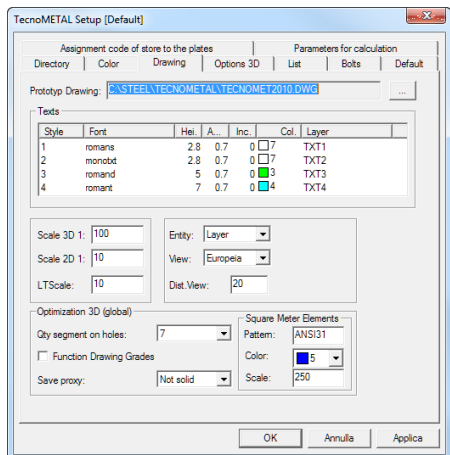
List of layers and colors used from TecnoMETAL 2D(Colors 2D)

S	Slim Line.
M	Middle line.
G	Thick line (es. edges of the shapes).
F	Strong line.
A	Line for the axes (point and line)
TR	Broken line..
SC	Line of scheme for towers.
INLINE	Line for inside cuts of the shapes or plates.
SIMB	Layer where the simbologies are set.
HOLE	Layer where the drilling are inserted.
DETAIL	Layer where the side attacks come in the automatic beams.
INFO	Layer where information are set (cuttings, frameworks etc).
TRACE	Layer where the blocks are inserted for the information of positioning marking and points in the pieces.
GRATING / GRATDIR	Used in the procedure gratings.
LAYOUT	For the drawing of the unifilars.
SBS MARK POS BOLT	Used for the insertion of the markings.

The colors used by TecnoMETAL 4D (Colors 3D)

AXIS	The axes of base in the unifilars.
UNIF	The lines that form the automatic unifilar.
LINES	The numeration of the axes in the unifilar.
SHAPE	The color of the shape.
PLATE	The color of the plate.
ELMQ	The color of the elements to the meter picture.
LOCAL REF	The color of the lines of construction.
INTERFERENCES	The color of the interferences among elements.
BOLTS	The color of the bolts.
WELDING	The color of the welding.


6.3.3 Drawing



This card is possible to find the command being running "General Setup" that the command "Work Setup" through the pressure of the button "Setup" of the Integrated environment. In this dialog it is possible to modify the initial formulations in the creation of a new drawing.


Prototyp Drawing

This card is possible to find the command being running "General Setup" that the command "Work Setup" through the pressure of the button "Setup" of the Integrated environment. In this dialog it is possible to modify the initial formulations in the creation of a new drawing. The "File prototyp" it is contained inside the principal directory of TecnoMETAL. This drawing contains the styles of dimension and the various fit configurations to the correct operation of the application TecnoMETAL.

Through the button  it is possible to change this run to be able to choose another "File Prototyp" personalized by the user. You advises to use:

TECNOMET2007.dwg
TECNOMET2010.dwg

Con AutoCAD® 2007 - 2008 - 2009
 Con AutoCAD® 2010 - 2011

 **Attention:** it is necessary to open the alone drawing with AutoCAD® and not with TecnoMETAL; otherwise they would also save him in the drawing the information of the setup and it would not be more possible to modify then her from the program.

Texts

In this section it is possible to define and to manage the configuration of the four styles (Style) of standard text that they are used by the application TecnoMETAL BIM.

Style	Font	Alt.	A...	Incl.	Col.	Layer
1	romans	2.8	0.7	0	7	TXT1
2	monobd	2.8	0.7	0	7	TXT2
3	romand	5	0.7	0	3	TXT3
4	romant	7	0.7	0	4	TXT4

1. (used in the dimensionings),
2. (usable for creation of charts),
3. (for middle wordings),
4. (for great wordings).

For each of these styles of text it is possible to modify the font (b) the height of printing (c) that the program will adapt in automatic to the scale of the drawing, the amplexness of the text (d) the inclination of the same (e) the color (f) and the name of the layer (g) wherewill be set.

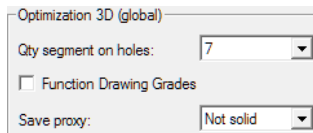
To select a different Style of text, or to change a characteristic of it as the amplexness and the inclination, needs to do a double click, with the left button of the mouse, in proximity of the datum to be edited. It will open so the curtain menu for the choice of the Font or a field to white background for the edition of the values of Amplexness and Inclination.

After having planned the desired value it needs to press the button ENTER, from keyboard to confirm the datum and to pass to the edition of another value.

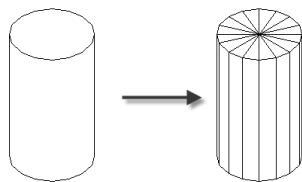
- **Stair 3D** are the stair that will be kept in the drawing 3D in the unifilar.
- **Stair 2D** are the stair that will be kept for the texts, the dimensions and the greatness of the blocks in the marking in the drawing 2D.
- **LTscale** it is the relationship that is adopted for the different lines by the continuous one, this value is multiplied for the adopted scale.
- **Entidad** it is possible to define if the drawing 2D are set on the specific **Layer** or on the attributed.
- **Colors.** For instance if drawing a shape 2D, the contour will be inserted in the layer **G (or with the name defined in the setup you)** if we define **Entity = Layer** while if we define **Entity = Color** will be inserted in the actual layer with the **Green color (or with the color defined in the setup you)**.

- **View** Sights can be opted for the European or American sights, this is used in the drawing 2D, for instance for the import of files CAM or the drawing of beams 2D or columns 2D.
- **Dist. Views** it is the space that will be worth kept among the sights in the drawing 2D of the **View** this value will be multiplied for the scale drawing defined.

In the following section some parameters are defined for the drawing 3D



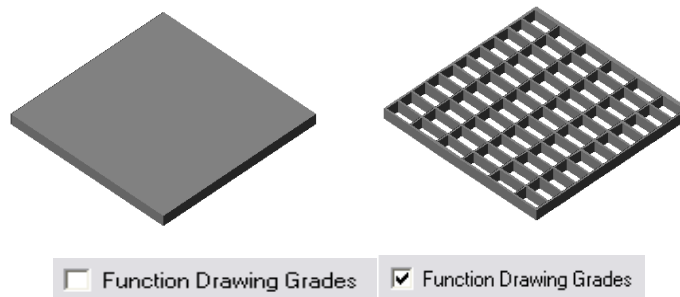
Qty segments on holes it serves to have a best or worse definition of the graphic representation of the holes or cylinders in 3D. In the three-dimensional CAD the solid cylinder doesn't exist, this is formed from a series of cone.



This parameter defines the quantity of wedges to use in the drawing 3D. This value is low anymore greater it will be the speed of generation of the drawing 3D, it is advisable to hold low the value during the job, at the end it is possible to go out of the drawing, to define a number more elevated, therefore to reopen the drawing, this will be regenerated with the new formulations

Considerations: In a middle structure we normally have 2500 bolts. Every bolt is composed from a cylinder, more two cylinders for the washer (washer and hole of the same one) and least two holes on pieces for a total of 5 cylinders, if we have a number of segments of 4 we would have $5 \times 4 \times 2500 = 50.000$ solid, if we have a number of segments of 20 we would have $5 \times 20 \times 2500 = 250.000$ solid, this ago to intend the importance of this parameter for the speeding of the drawing 3D.

Function drawing grade: this parameter if I activate it will draw the drilling in the gratings, also for this operation as the preceding one it is advisable not to activate during the job, at the end it is possible to go out of the drawing, to activate, therefore to reopen the drawing, this will be regenerated with the new formulations.

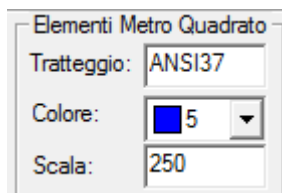


Save proxi:

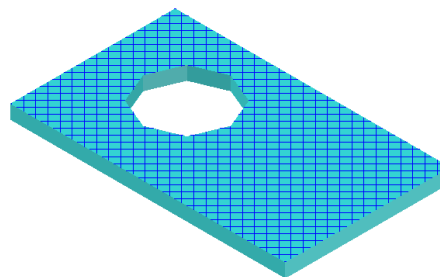
It also allows the visualization of objects 3d to users that don't have the TecnoMETAL BIM.

- **Not solid** in this case if is opened the drawing by an user that it doesn't possess TecnoMETAL, won't succeed in visualizing with the alone AutoCAD®, the dimensions of the DWG they are reduced.
- **Only Wireframe** in this case if is opened the drawing by an user that it doesn't possess TecnoMETAL, will succeed in visualizing with the alone alone Autocad as lines of edge, the dimensions of the DWG they are greater of 15% around.
- **Wireframe + shade** in this case if is opened the drawing by an user that it doesn't possess TecnoMETAL, will succeed in visualizing with the alone shaded Autocad, the dimensions of the DWG they are greater of 40% around.

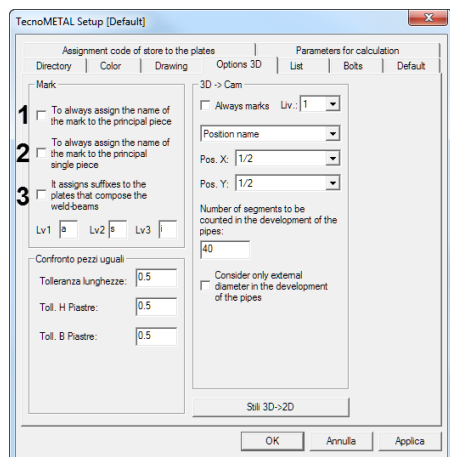
In the following section the landing-nets are defined for the visualization the superior part in the elements to the square meter.



In the box hatching to insert the name of the landing-net (it has to be one of those loaded by AutoCAD®), in the box color to choose the color and in the box it climbs the stair to apply.



6.3.4 Options 3D



This card can be found her/it both launching the command "Setup Generale" that the command "Setup Commessa" pressing the button "Setup" of the Integrated environment. In this dialog it is possible to modify the formulations for the drawing 3D.

Section Marking:

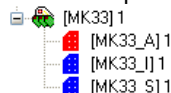
If activated the box (1), in the marking the same name of the mark will be set to the principal position of the composed marks. If it activates the box (2) in the marking the same name of the mark will be set to the position of the single marks.

If activated the box (3) in the case of beams welded beams, the positions of the beam will be set to the suffixes:

I: for the inferior flat arch,

A: for the web,

S: for the superior flat arch).



Sector I Compare equal pieces:

In this section tolerances can be established by to apply to the pieces for the comparison among equal pieces.

Example:

if we have a shape with length 847.00 and one similar but with length 847.03, if in the tolerance length we set 0.1 you/they will be recognized as peers.

For the plates we can point out the tolerance for the height (H) and the width (B).

The algorithm for the recognition of the equal pieces (both marks and positions, verification that the volume (to the clean one of drilling and cuts) is coincident with a tolerance of the 3*1000 of the same volume.

Setting these tolerances among the pieces, they have to reenter in the tolerance of the volume to be declared peers however.

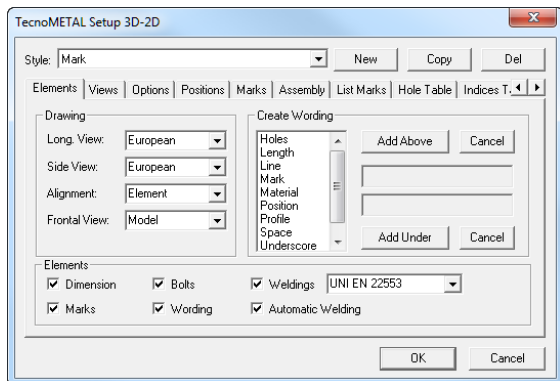
Sector 3D->CAM: If activated the box it always Marks, the information will be inserted for the marking in the file CAM produced in automatic, it is possible to select to the right its level.

It is had to select if in the marking must be sets the name of the position or the mark and the position in the piece X and Y.

In the box "Number of segments to be counted in the development of the pipes" the number of segments is inserted with which the file will be extracted CAM developed of the worked pipe.

With the check "Considers only external diameter in the development of the pipes" can be selected if the development of the pipe has to consider only the points of the external diameter of the pipe or you selects the inside or external points of the thickness of the pipe that are to counted with the surface in comparison to which the pipe is cut.

6.3.5 Style 3D -> 2D

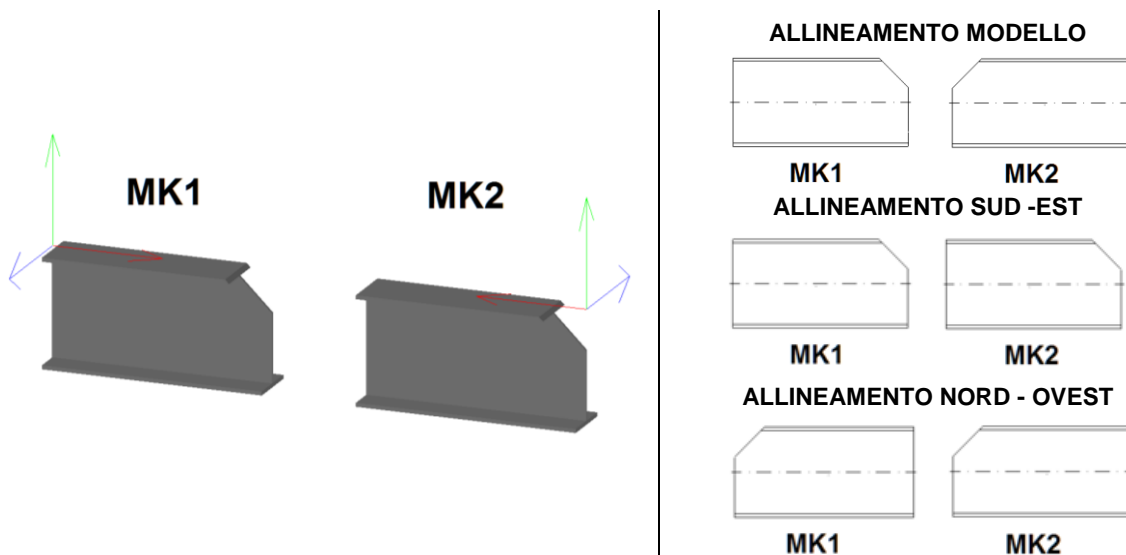


In this section the parameters can directly be defined for the automatic extraction of the drawings 2D from the model 3D.

In the box **Style** the name of a style of extraction can be selected, if the name is **Positionis** associated for default to the positions, if **Mark** will be in partnership to the marks and if **Assembly** to the views of assembly. With the **New** button a new style can be produced, with the button it Copies it is possible to produce a new style with the same options of that asset. With the button it Cancels the active style she can be eliminated.

Elements

In the section **Drawing** is defined the type of view (**European** or **American**) for the longitudinal and side views, for **Alignment** you can be opted for **Element** or **Model** (example: a column with option Model will be vertical, with option Element will be horizontal), for the frontal view you can be chosen among Model (the view will be with to the left the initial point of the principal piece) or choosing **Southeast** will be seen from the lower part or from right (bewareing the model of the tall one), choosing **Northwest** will be seen from the tall one or from left.



In the section **Elements** you can be chosen whether to insert the **Dimensions**, the **Marking**, the **Bolt** and nuts (if welded to the piece) and the **Wording** (defined to the right).

In the section **Creation Wording** the wording can be produced that will be inserted on the shapes in the drawing 2D. From the list to select the desired element and if we want is inserted above the shape, to press the button **Adds Above** or if we want is inserted under to press the button you **Add under**. The buttons it **Cancels** they serve for cancelling the superior or inferior choices.

Example:

Profile Space Line Space Length

nel 2D sar  visualizzato

HEA300 - 3750

Views

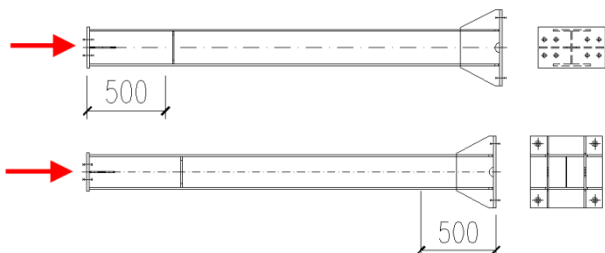
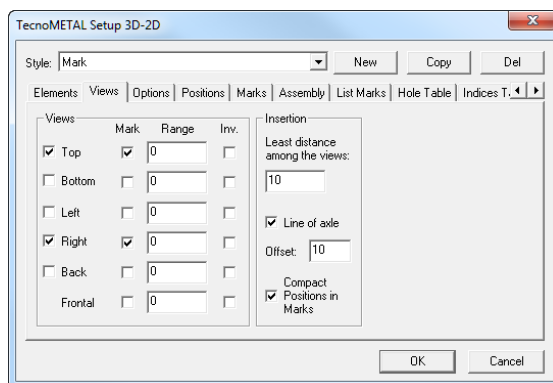
In the section **View** they can be selected what seen to extract in the drawing 2D.

Mark: it is possible to insert in the various views the information to perform a marking of the positions (not in list) with the present commands in the utilities 2D. If used in the Assiemis it is possible to insert it marks her.

Range: with this choice it is possible to see only a portion of a view.

Inv: it considers the final rather than initial Range.

In the section Insertion is defined the distance among the views (you/he/she will be multiplied for the stair of the drawing).



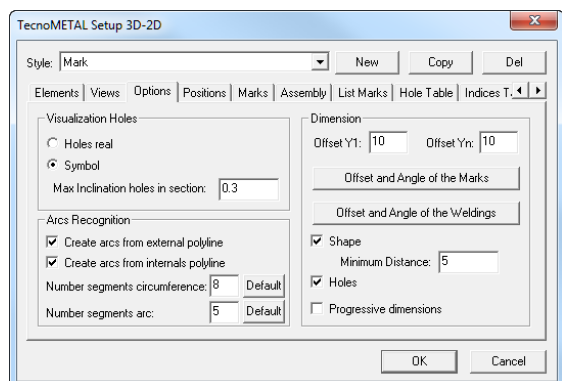
RANGE

RANGE + INV.

Selecting **Line of axle** will be drawn the line of the axle of the piece.

In the **Offset** box the prominence of the line is defined in comparison to the piece.

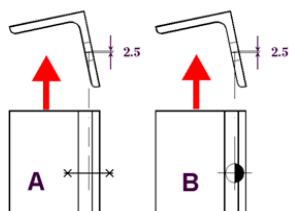
Compact positions in the marks it defines if in the welded marks, for the same position, it has to be insert a bloc for every present position in the drawing with quantity 1 or an unique bloc with the total quantity of the positions.



Options

In the section **Visualization Holes** it is defined if in the views is visible the holes as you look for or with the symbols of the TecnoMETAL.

In the box **Max inclination holes** in section the distance it is defined among initial and final point of the hole, under which the symbol will be that of the holes in section, above the symbol of the hole in view.



Example:

if the defined distance is 3
 $3 > 2.5$ you will be visualized as in A

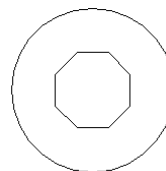
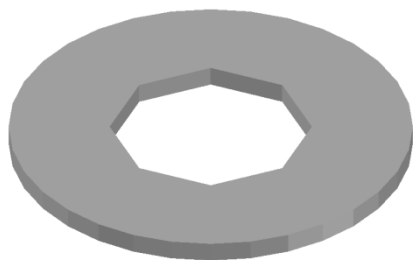
if the defined distance is 2
 $2 < 2.5$ you will be visualized as in B

In the section it Seeks some arcs it is possible to define whether to draw arcs, considering that in the solid the arcs are of the broken lines.

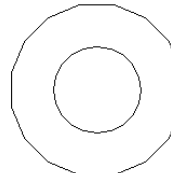
Example:

If activated only the function "it Produces arcs from polygonal day-pupil" he will be drawn in 2D.

Drawing of the solid:



If activated only the function, "it Produces arcs from polygonal inside" you/he/she will be drawn in 2D.



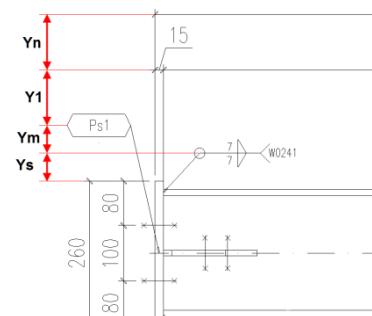
The choice "Number segments circumference" it defines from what I number least of segments it will be considered circumference, under this number it will be considered polygonal.

The choice "Number segments arc" it defines from what I number least of segments it will be considered an arc, under this number it will be considered polygonal.

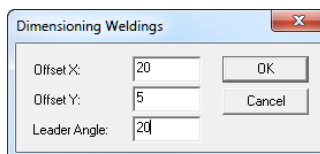
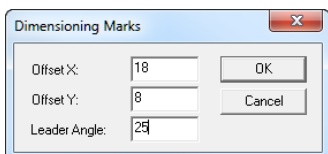
In the section Dimensions it is defined the distance of the dimensionings.

Offset Y1 is the distance between the notepad of the position and the first line of dimension.

Offset Yn is the distance among the dimensions.



Offset and Angle of the Marks and Offset and Angle of the Weldings in these dialogs the dimensions are planned for the positioning of the blocks of the marking and weldings.



Offset Y (Ys) weldings it is the distance among the piece and the block of the welding.

Offset X is the distance among the blocks of the weldings, this measure it allows that the blocks are not surmounted.

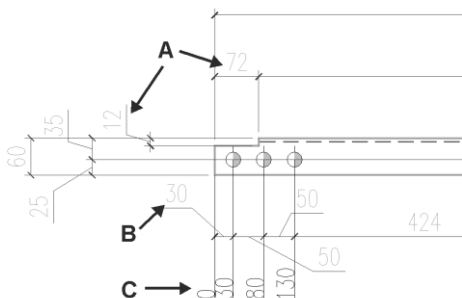
Angle Manager is the inclination of the managers of the positions.

Offset Y (Ym) marks it is the distance between the block of the welding and that of the positions.

Offset X is the distance among the blocks of the positions, this measure it allows that the blocks are not surmounted.

Angle Manager is the inclination of the managers of the weldings.

It is possible to point out if you/he/she must be rates the Outline and the Holes. Least distance serves to eliminate in automatic the dimensions under the dimension planned in the field.

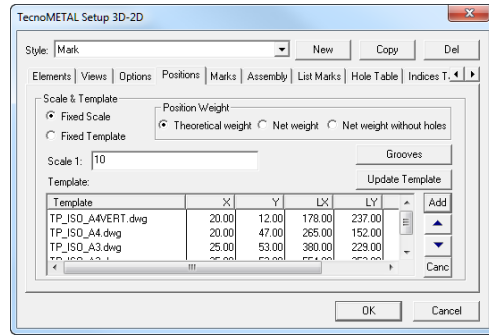


Selecting **Outline (A)** the outline of the piece will be rated, **Holes (B)** the drilling and progressive **Dimensions (C)** will be rated the progressive dimensions will be inserted (only for the drawing of the positions).

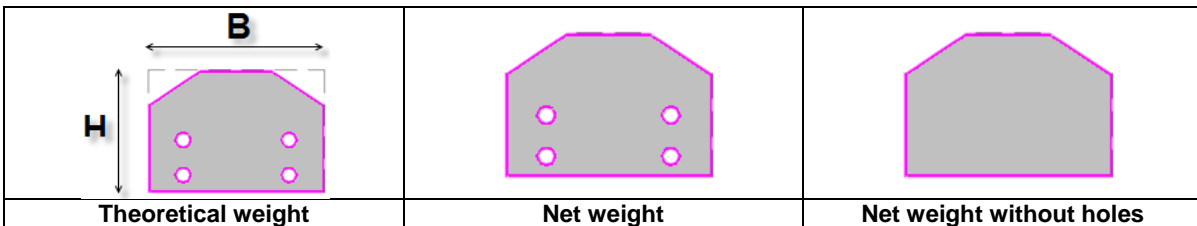
Position

These options are valid only for the drawing 2D of the positions.

You can be opted for Fixed Scale or Fixed Template. With Fixed Scale, the procedure inserts the drawing in the least format defined in the list in low, verification (departing from the first one some list) if the piece with the select views and the dimensionings enters the space delimited by LX (horizontal) and LY (vertical). With **Fixed Template** you can be selected an alone template and in the box Scale you can be inserted by to adopt departing from the young person and separated by comma ex. 10,15,20,25.

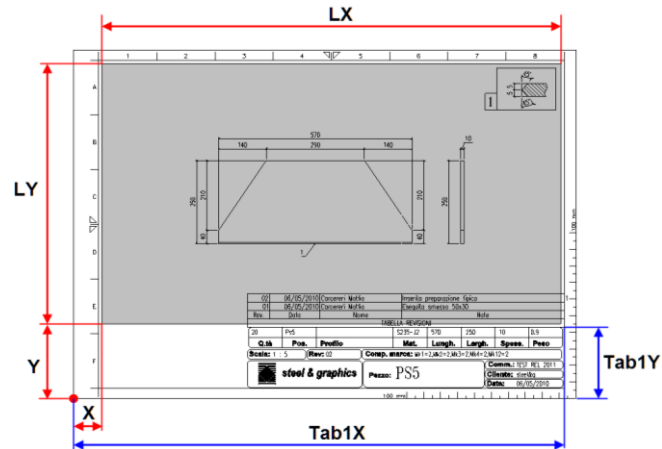


Weight of the position in this section is decided the type of weight that we want that is inserted in the sheet of the position, the choices are I Crush Theoretical, Net weight, Net weight Without Holes.

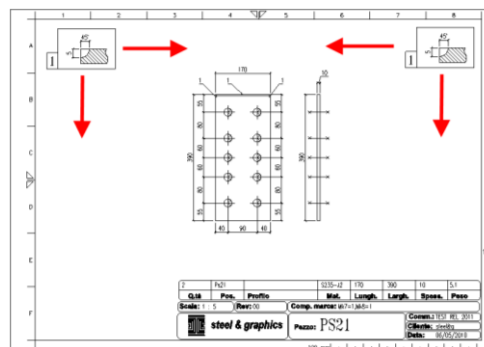


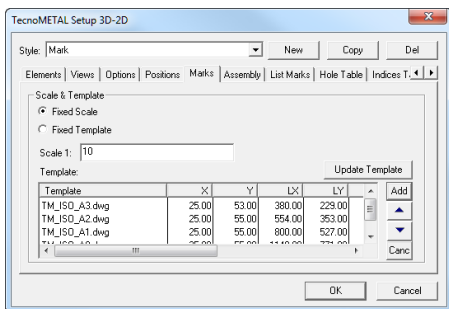
In the inferior list the templates can be defined by to use with the button, **Add** they are added and with the button **Canc** the selected one is eliminated. The buttons they serve for ordering the inserted templates.

The templates are of the definable drawings from the user and inserted in the directory Template\ENG it activates (to see paths Setup). With a double-click in the boxes X,Y,LX,LY the in demand values can be inserted, in alternative you can be defined in the file TemplateDIM.ini it foresees in the directory of the templates and activated through the button Update Template. In the templates of the attributes can be inserted for the insertion of the data of the position (to see appendix is).



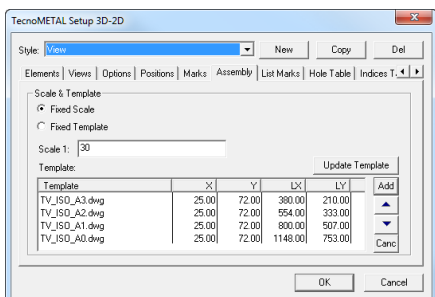
In the templates of the attributes can be inserted for the insertion of the data of the position (to see appendix is). The templates are of the definable drawings from the user and of default they are inserted in the directory C:\STEEL\TECNOMETAL BIM\TEMPLATE\ENG. The Preparations are suitable only in the drawn out positions both in Singledrawing and in Multidrawing. Four types of positioning can be selected that are From the tall one in low, to the right - From the tall one in low, to the left - From left to the right, aloft - From right to the left, aloft. To personalize the blocks is owed to go to the folder c:\Steel\TecnoMETAL BIM\Lib\Groove.





Marks

The formulations of the card marks are the same ones of the card you position.
 The card marks it has in anymore the possibility to insert the Chart you Position and the Chart Weldings.
 The point of insertion of the chart positions you/he/she is defined by TabX and TabY.
 The point of insertion of the chart weldings you/he/she is defined by Tab2X and Tab2Y.
 The values of the Charts make reference to the point of origin of the template that is 0,0,0.

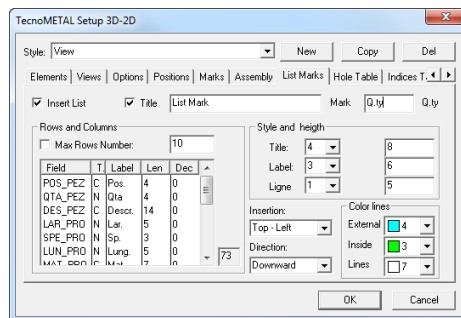


Assembly

The formulations of the card Assembly are the same ones of the card positions and marks.

List Marks

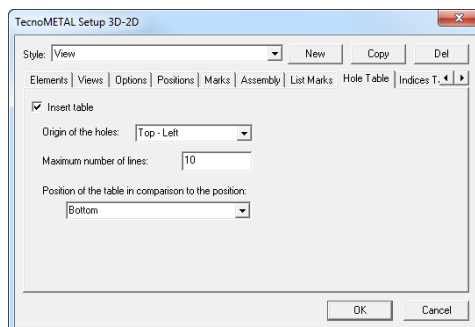
These options are valid only for the drawing 2D of the marks.
 You can be defined whether to insert the chart and whether to insert the title, in this case it is had to insert in the side boxes the desired text.
 In the inferior list you can be defined what information to be inserted in the chart, with a double-click on the field it is possible to edit its value.
 In the box in low the width of the chart is furnished.
 If the width of the column Len is set to 0 you won't be inserted.
 The button they serve for ordering the list.



In the section Style and Height the styles and the height of the lines can be defined for the Title, the title of the columns (**Label**) and the lines of the list.
 In the box **Insertion** is defined the point where the chart will be inserted in the template.
 In the box **Direction** the direction of the list.
 In the section **Color** lines the colors are selected for the lines.
Note: These configurations are inserted in the sub directory DAT of the order (SETUP.XSTYLE) when an order that is created you is inserted defined in the general setup.

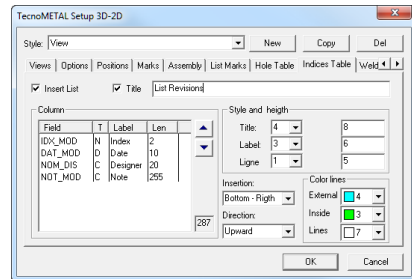
Hole table

The chart in the drawing of the positions and solo is inserted for the plates.
 Origin of the holes: with this option it is defined, where the origin of the holes is found.
 Number of lines: with this option the number of lines of the chart is selected.
 Position of the chart in comparison to the position: it is decided, where the chart will be inserted.



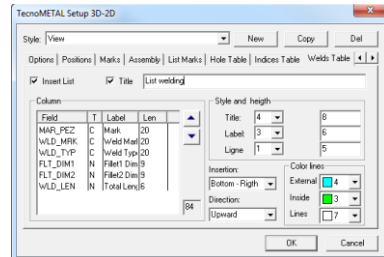
Indices Table

To insert the chart of the revisions.
The formulations are the same ones of the Chart you Position.

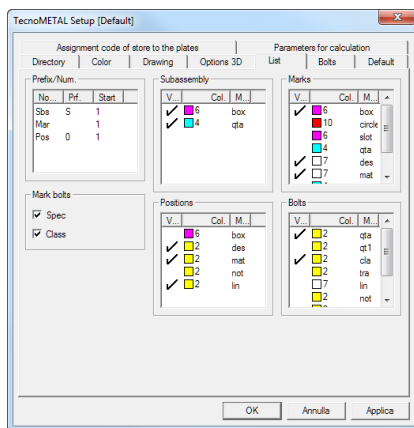


Welds Table

The formulations are the same ones of the Chart you Position.



6.3.6 List



This card is possible to find the command being running "General Setup" that the command "Work Setup" through the pressure of the button "Setup" of the Integrated environment.

In this display it is possible to modify the formulations for all the parameters related to the marking of the drawing.

In the sector "Prefix/Num" they are inserted or the prefixes and the numbers of departure are modified of Sub-assembly, Marks, Positions with a double click of the left button of the mouse, in proximity of the datum to be edit.

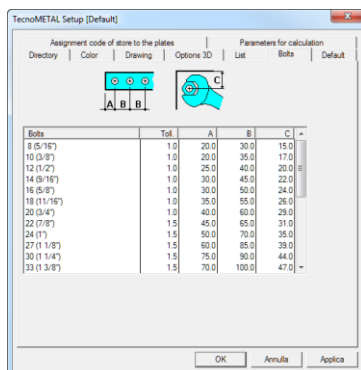
Note: the value to be inserted inside the boxes "Start" can be numerical (es. 1, 2, 3, etc..) or literal (es. a, b, c, etc).

The sectors "Subassembly, Marks, Positions, Screws" they are of the lists in which to freeze/defreeze is possible and to change color to the layers of the blocks of marking.

Note: to modify the parameters in these lists a double-click is necessary with the mouse on the value to change. While activating "V" before the element this results visible or vice versa is extinguished and made not visible.

In the section "Marking bolts" it is chosen if in the wording of the bolt in the together had derived since 3D is assistant Unification and Class.

6.3.7 Bolts



This card is possible to find the command being running "General Setup" that the command "Work Setup" through the pressure of the button "Setup" of the Integrated environment.

In this dialog it is possible to modify the parameters related to the drilling.

For every diameter of bolt it is possible to vary it stings (A) the footstep (B), the tolerance (assistant value to the nominal diameter of the bolt to perform the hole), the space for the button of the bolt (C).

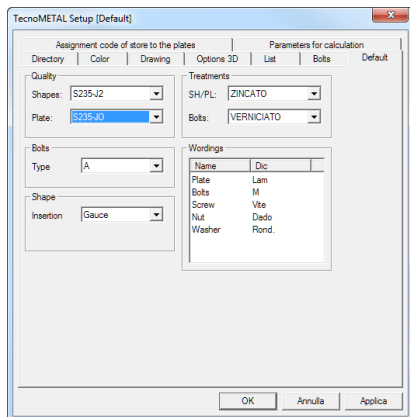
Note: to modify the parameters in this section with a double click of the left button of the mouse in proximity of the datum to be edited.

In various procedures of the program, the diameter of the bolt and the quantity it is in demand, in base to the select diameter, the program will perform the holes with equal diameter to the nominal diameter (8, 10, 12 etc) increased of the value of the column Toll.

And it will assume as I hem the value of A and for footstep the value of B.

For instance if we use a bolt from 5/8" (nominal 16) and in the column Toll. 1 are inserted, a hole of diameter will be performed 17.

6.3.8 Default



This card is possible to find the command being running "General Setup" that the command "Work Setup" through the pressure of the button "Setup" of the Integrated environment.

In this dialog it is possible to modify the values of base produced in the creation of a new drawing.

These values can be changed inside the drawing however.

Note: to modify the parameters in this section needs to do a double click with the left button of the mouse in proximity of the datum to change.

In the sector Quality they are had to define the qualitys for the Shapes and the Plates (plates) the value is selected among those presents in the Database of the qualitys in use.

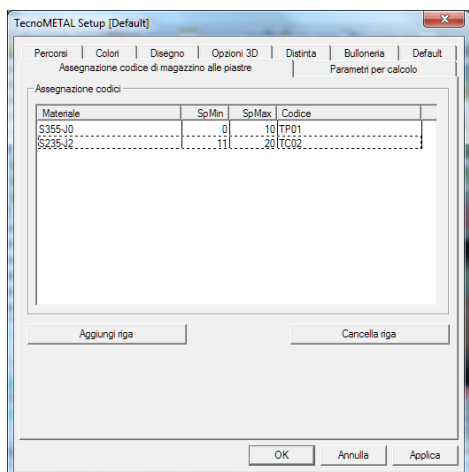
In the sector Bolt and nuts, the typology of the bolts is defined, this is selected by the Database of the bolts in use.

In the sector Shapes, the way of insertion of the shapes is selected if in the Gauce (axle of drilling) or in the baricenter.

In the sector Treatments, are had to define the treatments superficial for the Shapes and the Plates (plates) and for the bolt and nuts, the value is selected among those presents in the Database of the Treatments in use.

In the last sector Wordings, the wordings are defined that will be set in front of the suitable elements in phase of printing of the quality lists (example: for the bolts if we insert M it will be M16 x 55 if not insert nothing will be 16x55).

6.3.9 Assignment code of store to the plates



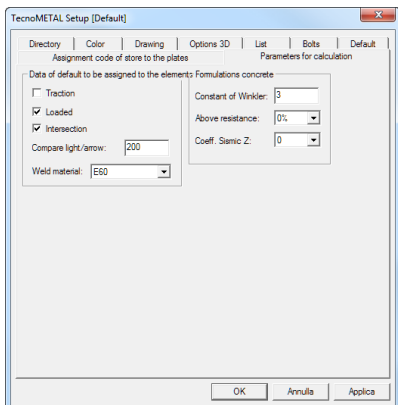
This card is possible to find the command being running "General Setup" that the command "Work Setup" through the pressure of the button "Setup" of the Integrated environment.

In this dialog it is possible to define the code of store for the plates drawn in 3D.

For the shapes, it is possible to directly define a code of store in the database of the shapes, for the plates, it is had to define the codes in the database "codes list" and through this section, to attribute them in base to the thickness and the quality.

They are had to define the quality, the least and maximum thickness and the code to assign. With the button "Delete Line" a line can previously be eliminated inserted.

6.3.10 Parameters for calculation



In this dialog (only for the module TecnoMETAL Structural Analysis) it is possible to define the data of default to assign to the elements in steel and the formulations for the concrete.

For the shapes, it is possible to define:

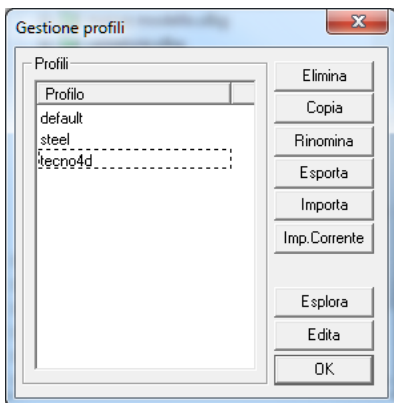
- If a rod withstands traction only with "Connecting rod".
- If a rod can be loads or not to be calculated any distribution of the loads.
- If a rod that intersects another rod has to produce in common a node of intersection or no.

To define for every rod the relationship Light / Arrow of reference.

For the elements in concrete it is possible to define:

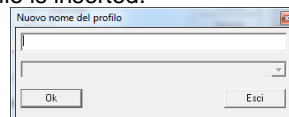
- The constant of Winkler
- The above resistance among the 0% and 40%
- The coefficient Seismic Z among 0, 0,2 and 0,4

6.3.11 Management profile



With this function it is possible to create and to save some different shapes of the general setup and to load them in base to the demands of job or to export them on other postings where is wanted to have the same formulations.

From this screened a new shape is created with the button "**copy**" the name of the new profile is inserted.



Through the general Setup the necessary changes are brought.


Selecting on the left the desired profile, through the button "Current" it makes him active.

It is possible to rename the profile with the button "Rename".

Through the button "Export" and "Import" can be imported or to export the profiles on other postings of work.


The Files of the profiles are found in the following folder:

"C:\WINDOWS\Steel&Graphics_shared\ConfigProfiles\TECNO2005"

 **Note:** Every shape produces a file *. PROFILE and a folder with the name of the containing shape the files for the reports of printing.

Through the button "**Explorer**" it is entered to it explores him resources of windows where the operations of copy can be copy, paste , moves etc.

With the button "**Edit**" it is entered inside the file of the shape where can manually be made some changes.

 **Note:** The change to the file recommends him to experienced users or with the aid of the telephone assistance.

Example of use: We suppose to perform works for various clients, where every client has the demand to have colors, names of layer etc. different, we can create a shape for the client **XXX** another for the client **YYY** etc., these we are able export them in the stations where we require to use them, without every station has to modify the parameters.

6.4 Work area

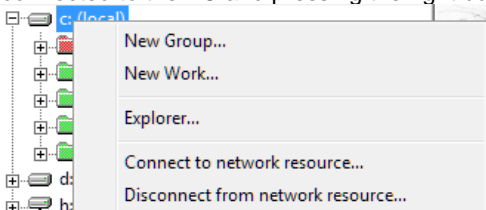
When he launches the program from the icon and is opened the integrated environment, the program automatically proposes, the work area, that we can compare to a file of the performed jobs. The file can be divided on 3 levels:

- **Group**
- **Work**
- **Item**

Note: *The creation of the directories of the TecnoMETAL must exclusively be served as the integrated environment. Inside every directory they are created some subdirectories in automatic necessary to the correct operation of the program.*

6.4.1 Disk

These commands are visualized selecting the voice "c: (local) " or the various ones "network resource" connected to the PC and pressing the right button of the mouse.

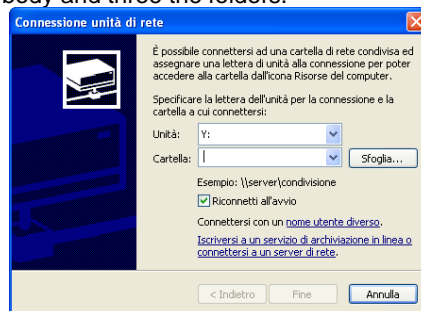


New Group: it contains a whole Jobs (it is not obligatory). If used is created on the disk a red directory with extension (.GRP).

New Work it is the current Job (obligatory). is created on the disk a green directory with extension (.S&G).

Explorer: it automatically opens it directly explores him Resources of Windows in the path of creation of the "GROUP" of job. In this way the possibility will be had to rename, to move or to eliminate the directory of the "GROUP" selected. We remember that this command is found in everybody and three the folders.

Connect to network resource: it allows to be connected online to a shared directory so that to have a direct access, without owing to select if it needs to be used. Launching the command proposes the following dialog:

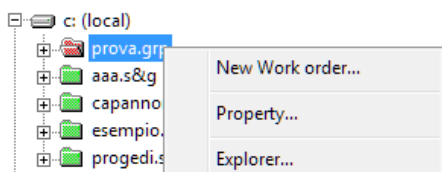


It needs to specify: **Unity:** the letter for the connection of net, **Folder:** the folder to which to be connected, pressing the button "Skims through" and to select therefore the correct path.

Disconnect from network resource: When he launches the command it goes out the same one screened of when the same command recalls him in it Explores Resources, in fact the use is the same.

6.4.2 Group (.grp)

The commands are visualized pressing the right button of the mouse on the "GROUP."

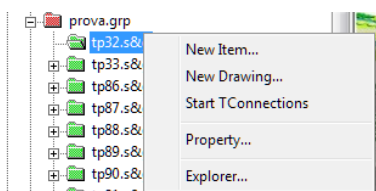


New Work: it is the current Job (obligatory). you/he/she is created on the disk a green directory with extension (.S&G).

Property: it allows to visualize the dialog of the properties of the "GROUP" selected (Name, Description, Notes). The Name is not possible to modify;

6.4.3 Work (.s&g)

The commands are visualized pressing the right button of the mouse on the "Work"



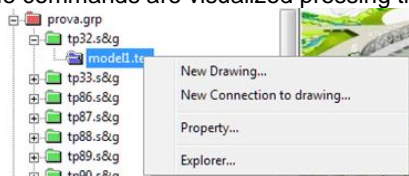
New Item: it is a part of the Job (it is not obligatory). If used you/he/she is created on the disk a blue directory with extension (.TEC).

New Drawing: it allows to create one or newer drawings inside the item.

Start Tconnections: is for launching the module TecnoMETAL for the verification of the unions.

6.4.4 Item (.tec)

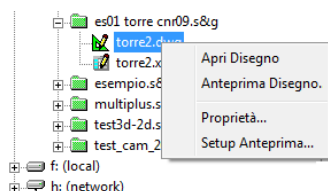
The commands are visualized pressing the right button of the mouse on the "Item."



New Drawing: it allows to create one or newer drawings inside the Item.

6.4.5 Drawing (.dwg)

Questo comando si visualizza selezionando un "Disegno" della Commessa o Lotto corrente premendo il tasto destro del mouse.



Open Drawing: pressing the right button of the mouse on the icon it allows to open the selected drawing automatically launching AutoCAD®, it is possible to also open the drawing with a double-click with the mouse pointer on the icon.

With a double-click with the mouse pointer on the icon si it opens the environment of verification (only with the module Structural Analysis).

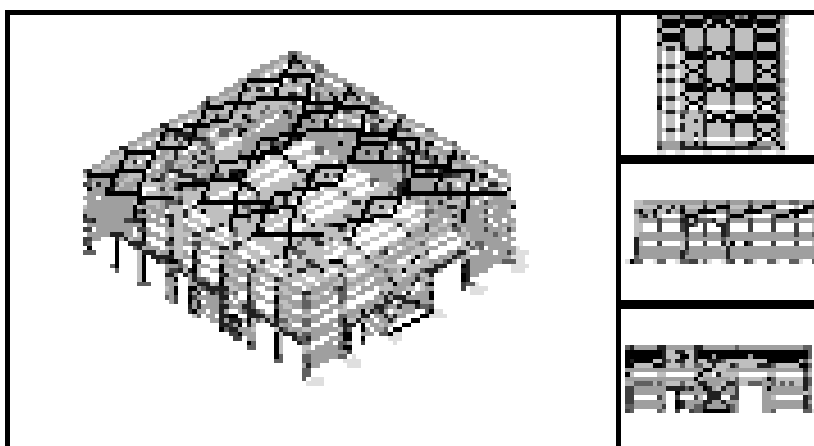
Preview Drawing: to press on this command to open the display device.

Setup Preview: if it is desired to open the drawing to visualize him/it, without opening the Autocad and the TecnoMetal, it is possible with this option to select a display device of Dwg ex. DWG TrueView.

Note: it is not obligatory from the user to create a "Group.grp" or a "Item.tec", but it is also **obligatory** to create one "Work.s&g" and subsequently to create a "Drawing.dwg" to enter so in graphic environment of AutoCAD®, where possible to find will be, besides all the commands of same AutoCAD®, also the commands of the application TecnoMETAL.

6.4.6 Preview of the drawings

It allows to visualize in the panel in low to the left the preview of the drawing selected in the work area of the Integrated environment.



Capitolo 7. INITIAL STEP

7.1 Groups

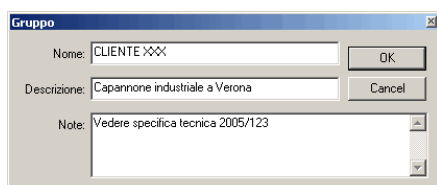
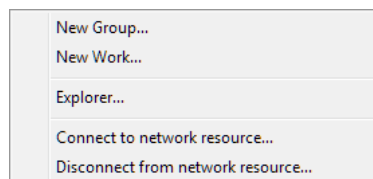
The GROUP is not anything else other than a directory (folder) that it contains to inside all the subdirectories of the works and the Items. This directory assumes an abstention of the type: <name group>. GRP.

7.1.1 Creation

The creation of the group is not obligatory, the GROUP serves for the orderly filing of the works from the user, for instance "Sheds", "Works 2011" "Client XXX" "Towers BT" etc.

After having running the Integrated environment of TecnoMETAL it is possible to create a "GROUP" of work.

To create a new GROUP needs to select the local disk (c: local) or any other "network resource" connected to the PC and to press the right button of the mouse.



Running the command "New GROUP" it will appear screens her/it on which the will be defined "Name", one "Description" and of the "Notes". And' obligatory only the insertion of the "Name" of the GROUP.

7.1.2 Delete

To eliminate a "GROUP" of work container all the subdirectories of the works, to select the folder of the same GROUP "in the work area" of the Integrated environment, to press the right button of the mouse and from the drop-down menu that it appears to run the command "Explorer."

In this way it opens it directly Explores Resources of Windows to the run of creation of the directory of the GROUP. From here it is possible to eliminate the directory, but also to rename, to copy or to move.

To update the work area of the Integrated environment to press the button F5 of the keyboard.

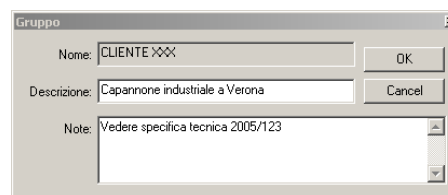
7.1.3 Comments

To change the comments and the other information associated to a GROUP needs:

To select the GROUP and, pressing the right button of the mouse, the drop-down menu is entered to.

To choose the voice "Property."

Visualize dialog that it allows to insert the information or to previously modify those you insert.



7.2 Works

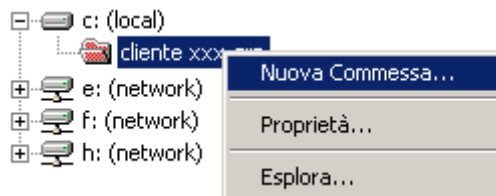
The Order is not a directory (mother) that it contains to its inside the whole files for the management of the drawings. This directory assumes an abstention of the type: <name committed>. s&g.

7.2.1 Creation

After having running the Integrated environment of TecnoMETAL it is possible to create one "New work."

To create a new Work, to select the local disk (c: local) or any other "network resource" connected to the PC or the folder of the "GROUP" previously sees and to press the right button of the mouse.

From the drop-down menu that it appears it is possible to launch the command "New Work."



When a new order is created are assumed for default the contained setting in the General Setup, after having created the new work selecting possible medium the Work Setup it finds to modify its initial formulations.

Note: When a new work is created are assumed for default the contained setting in the General Setup, after having created the new work selecting possible medium the Work Setup it finds to modify its initial formulations.

7.2.2 Delete

To eliminate one "Work" container all the subdirectories for the management of the work, the Items and the drawings.dwg I was, to select the folder of the Work in the work area of the Integrated environment to press the right button of the mouse and from the drop-down menu that it appears to launch the command "Explorer".

It opens it directly Explores Resources of Windows in the directory of the Work. From here it is possible to cancel the directory but also to rename, to copy or to move.

To update the work area of the Integrated environment to press the button F5 of the keyboard.

7.2.3 Comments

To change the comments and the other information associated to a Job needs:

- To select the Work and, pressing the right button of the mouse, the drop-down menu is entered to choose the voice "Property".

Visualize dialog that it allows to insert the information or to previously modify those you insert.

7.3 Items

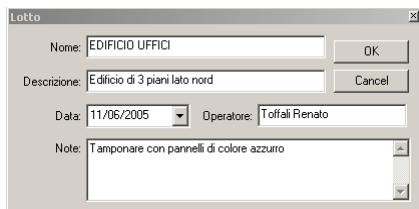
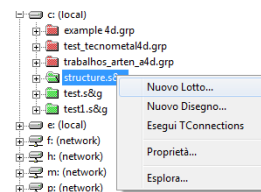
The Items are not anything else other than of the contained subdirectories inside the principal directory of the Work. The directories of the Items contain the files.dwg that are directly connected to the files of management and present defaults inside the principal directory of the Work. This directory assumes an abstention of the type: <name Item>. TEC.

7.3.1 Creation

The creation of the Item is not obligatory, is normally used for dividing in subgroups an work, for instance if the work were "iron Plant", the Items could be "Tall Oven", "Rolling mill" etc.

To create a new Item to select the folder of the "Work" and to press the right button of the mouse.

From the drop-down menu that it appears to launch the command "New Item".



Visualize dialog in which the will be defined "Name" of the Item, one "Description", her "Date", the name "of the operator", and some "Notes" various.

7.3.2 Delete

To eliminate a "Item" container all the subdirectories for the management of the drawings, to select the folder of the Item "in the work area" of the Integrated environment, to press the right key of the mouse and from the drop-down menu to run the command " Explorer".

It opens it directly Explores Resources of Windows in the directory of the Item. From here it is possible to cancel the directory, but also to rename, to copy or to move.

To update "the work area" of the Integrated environment to press the button **F5** of the keyboard.

7.3.3 Comments

To change the comments and the other information associated to a work needs:

- To select the Work and, pressing the right button of the mouse, the drop-down menu is entered to. - to Choose the voice "Property".

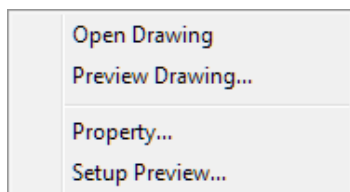
Visualize dialog that it allows to insert the information or to previously modify those you insert.



7.4 Disegni

To the Drawings it is entered by the list of file DWG that is found under the Work or the current Item opened in dialog principal of the Integrated environment (part left: Work area) of TecnoMETAL.

With a click of the right key of the mouse on the icon  that countersigns the Sketch it is possible to open a curtain menù with various options:



Open Drawing: sectioning allows him/it to open a sketch with the AutoCAD® selected in the **general SetUP**.

It is enough to position him on the sketch that is found in the list "of the work area" of the Integrated environment and with a double click of the mouse on the icon of the same sketch.



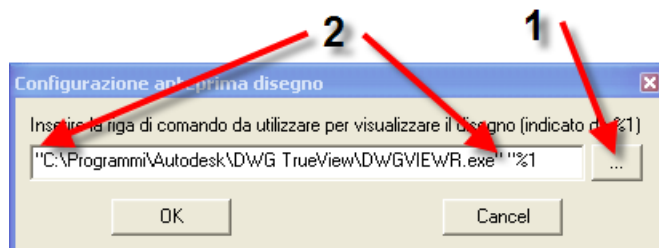
Note: The display device of sketches is not a program furnished by STEEL&GRAPHICS.

An example of display device that is possible to use is "DWG TrueView" of Autodesk and it is free download from Internet.

Don't have the display device it is obligatorily necessary to use the program but it is only an utility to see in clear way a sketch before opening it.

Property ...: With this function it is possible to access the ownerships of the sketch AutoCAD.



Setup Preview...: With this option it is possible to select what display device to use for the preview sketch. Everything to have installed a display device it is necessary of sketches DWG (AutoCAD®) on the Computer. Selecting the voice from the menù the following window appears

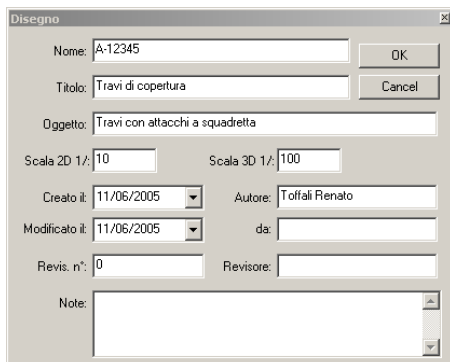


Clic on the suitable button with the number "1" it is entered to it Explores resources of Windows from where the briefcase of installation and the executable File it is selected for starting the Display device (you for example see image "C:\Programmi\Autodesk\DWG TrueView\DWGVIEWR.exe"), once selected the run and with OK inserted in the white line of the screened one it is important to insert from keyboard the character double apex ("") before and after the run (number 2) as represented in figure.

Note: Il visualizzatore da utilizzare può essere anche lo stesso AutoCAD®, in questo caso è necessario specificare il percorso di Autocad presente sul PC.

7.4.1 Creation

To create a new Drawing inside a work or of a Item the respective icons they are selected (Work  or Item ) he presses the right button of the mouse and him it launches the command "New Drawing... ". you creates so a drawing and he automatically enter graphic environment of AutoCAD. Running the command, the dialog following will be visualized:



From here it will be obligatory to give a name to the drawing, while it is being optional to insert the other data.

Pressing the button "OK" it will be open automatically the graphic environment of AutoCAD where all the commands of TecnoMETAL will be found also.

7.4.2 Delete

The procedure of cancellation of the Drawings must have effected with the maximum attention, in how much an operation is "destructive" that can cause the irreversible loss of data, in the case is not performed with the due attention.

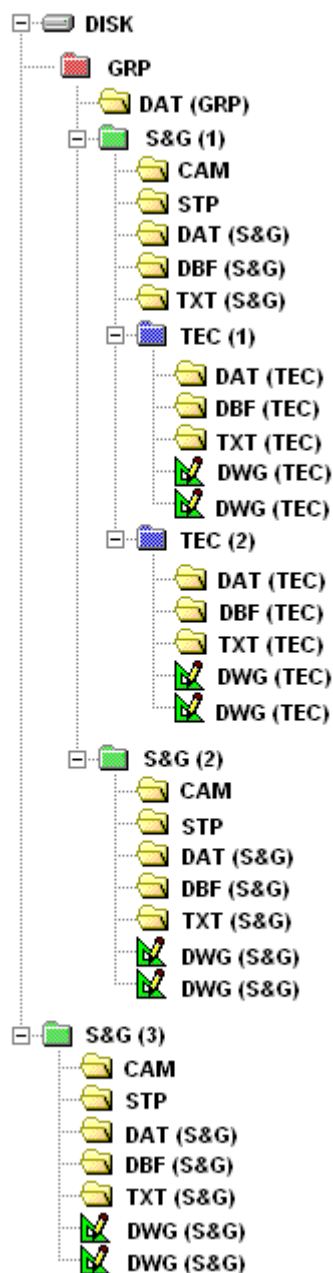
To cancel a Drawing with a click of the right button of the mouse on the icon of the Work or of the Item to choose the option "Explorer".

It will open it respectively explores him Resources of Windows inside the directory of the Work or the same Item where the whole files are contained DWG. From here it is possible to cancel the whole files of drawing that is desired.

From it Explores Resources of Windows it is also possible to rename, to copy and to move the files of the drawings (DWG).

Note: If is cancelled, renamed, copied or moved a drawing with the use of it Explores Resources of Windows inside a Work or of a Item it is possible to update "the work area" of the Integrated environment pressing the button of the keyboard **F5** (it Updates).

7.5 Structure of the folders of TecnoMETAL BIM



DISK: Disk drives (local or of network)

GRP: Group of works (not obligatory)

DAT (GRP): It contains the properties of the group

S&G: Work (obligatory)

(1) Work in the group with Items

(2) Work in the group without Items

(3) Work without group

TEC: Item (not obligatory)

DAT (S&G): It contains the properties of the work.

DAT (TEC): It contains the properties of the Item.

CAM: It contains the files. CAM (for the printing of the sketch and information for the machines CNC).

Note: The files CAMs are always related to the work and not to the item, because every work has to have univocal pieces.

STP: It contains the personalization of the printings of the quality lists.

Note: The files of personalization of the printings are always related to the work and not to the item.

DBF: It contains the files of elaboration of the quality lists.
(S&G) related to the work
(TEC) related to the item

TXT: It contains the files of extraction for the elaboration of the quality lists.
(S&G) related to the work
(TEC) related to the item

DWG: Elaborate drawings.
(S&G) related to the work
(TEC) related to the item

Capitolo 8. DATA BASE

8.1 Action common in the Database

The database of the program they constitute the base of the whole application. They contains the necessary data for the drawing, the elaboration of the lists over that those necessary for the interfacing with other applications produced by the Steel & Graphics.

The database can be activated from the inside of AutoCAD or from the integrated environment.

Almost all the procedures that manage the database have in common some parts that I am:

- All the introduced values have to be in millimeters
- Possibility to modify, to cancel the data presents or to introduce of of it new.
- Pressing the button it allows to select from the list of the elements.
- To select an element from the list to select with a double click, with the mouse pointer (left button).
- Pressing the button SAVE the inserted data are recorded.
- Pressing the button DELETE he cancels the element visualized in the database.
- Pressing the button BROWSE it proposes a list of the inserted elements:

TI...	PROFILO	A	B	C	D
11	HEA120	25.0	40	25.0	25.0
11	HEA140	30.0	0	30.0	30.0
11	HEA160	35.0	0	35.0	35.0
11	HEA180	35.0	0	35.0	35.0
11	HEA200	35.0	50	35.0	35.0
11	HEA220	35.0	50	35.0	35.0
11	HEA240	35.0	50	35.0	35.0
11	HEA260	35.0	50	35.0	35.0
11	HEA280	40.0	50	40.0	40.0
11	HEA300	40.0	60	40.0	40.0
11	IPE120	25.0	0	25.0	25.0
12	IPE120	25.0	50	25.0	25.0
11	IPE140	30.0	0	30.0	30.0
12	IPE140	30.0	50	30.0	30.0
11	IPE160	35.0	0	35.0	35.0
12	IPE160	35.0	50	35.0	35.0

In this list it is possible to select the elements with the classical system of windows, pressing the button "Ctrl" or "↑" (for multiple selections) and through the button "Canc" or "Of the" to cancel the underlined elements.

With a click, with the mouse pointer (left button) on an element is visualized for possible changes.

- Pressing the button EXIT he goes out of the database.
- To move from an a box to use the button Tab or the mouse.
- If in the window of insertion you date near to a letter there is the symbol.

(,*), A[*] it means that that field can contain a lace, that is if we for instance insert 2*100 it means 2 footsteps from 100, if we insert 80, 100, 90 respectively mean 3 footsteps from 80, 100 and 90. Can for instance be combined also 90, 2*100, 3*80, 70, 120 that it respectively means 8 footsteps from 90, 100, 100, 80, 80, 80, 70 and 120

- If in a field we insert 0 it means that the element doesn't exist, for instance in the basic date of the baseplates if we set the height of the stiffenings or the thickness to 0 won't be drawn.
- Some data can be negative
- The field Notes it is very important because will be used in the program during the choice of the element which ago reference in database (have been inserted more types for the same typology) it is therefore convenient to describe the type with unequivocal indications for his/her choice. For instance, choosing the base plates, if in the database they are present more types for that shape, a list will be proposed in which to choose the element desired recognizable from the field notes.
- In the case of problems related to the Database it is possible to start the procedure it Updates Database from the integrated environment -> Utility -> Updates Database that reconstructs the necessary indexes to the correct operation of the Database.

8.2 DataBase steel structures



8.2.1 Shape

Data Base Shape.	
	TEC_LSDBPRO

In this basic date it is possible to insert new shapes or to modify those existing.

The first choice in dialog is that of the form of the shape, if the desired form doesn't exist it will be had to insert as "Generic Shape", in this case in the drawing 2D will be drawn with the commands line or polyline of AutoCAD and the data they will serve for the list of the material.

In the drawing 3D, will be had to define its form with the special command "User profile."

The shapes divide him in three categories:

- Rolled: UNP, UAP, H, INP, L, Z, T, Round, Plate, T
- Fold shape: Omega, L, C, U, Z, Z1, 1, 2, 3
- Tubular: Square pipe, Round pipe
- Composed: Welded shape, Beams to large case
- Generic shape
- You outline with weight to the square meter **Elem. To the Mq** (Gratings, striped plates or bugnate)
- You outline asunder with weight **Elem. Unitary** (Curves, tubular reducing etc.)
- The image in the various cards helps to the choice of the shape to insert or to modify.

Note: The foils are not defined in the database.

As before thing is had to insert the name of the shape in the box "Shape", the name has to be univocal, and can contain spaces or characters * _ - to avoid to insert characters of system (\ / #").

Attention: HEA300 and HEA 300 are two different names.

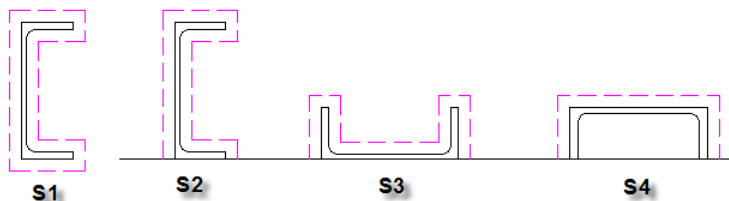
After having inserted the name, to insert the dimensions active A, B, C etc. reported to the figure of the shape.

If The weight if is not inserted will be calculated in automatic from the procedure except that for the generic shapes, elements to the square meter and unitary elements.

The static values are calculated in automatic, except that for the generic shapes, these values mainly serve for the computational module, in the TecnoMETAL are used only for proposing the quantities of button in the coupled shapes.

The box "Code" it serves for inserting the code of store of the shape, it is not obligatory to insert him/it, this code will be inserted in automatic in the material lists and in the file CAM.

The boxes S1, S2, S3 and S4 are the surfaces to paint in the various positions of the shape and they are calculated in automatic, except that for the generic shapes, elements to the square meter and unitary elements.

Example:

Note: The boxes "Ex" and "Ey" that they refer to the axes barycentric they are calculated in automatic.

Pressing the button UTILITY three choices are visualized:

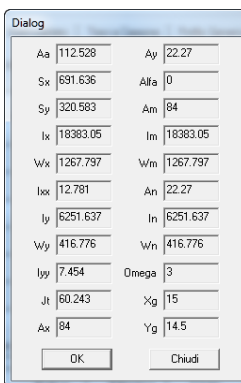
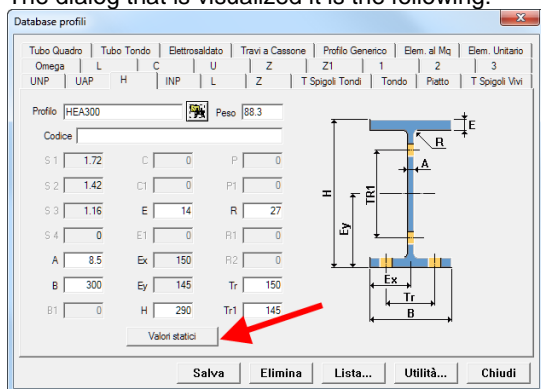
- **Delete Category** With this option all the present shapes of the active form are cancelled.
- **Replay Weight\Estatics** With this option re-calculated the weights and the static values of the active form come.
- **Dolete stock code** With this option all the present Codes of store of the active form are cancelled.

8.2.1.1 Static values of the shapes

The static values are calculated in automatic, except that for the generic shapes.

These values mainly serve for the computational module TecnoMETAL Structural Analysis, in the TecnoMETAL 2D and 4D are used only for proposing the quantities of bottom in the coupled shapes.

The dialog that is visualized it is the following:



All the values are express in cm.

Axle X-X: horizontal or X of the AutoCAD

Axle Y-Y: vertical or Y of the AutoCAD

Axle m-m: principal axle of inactivity, rotation of X-X




Axle n-n: principal axle of inactivity, rotation of Y-Y

Coordinates of the barycenter: system of reference inserted in low to the left (all the points have coordinated greater of zero).

- Aa** Area of the section.
- Sx** Static Moment of half section in comparison to the axle X.
- Sy** Static Moment of half section in comparison to the axle Y.
- Ix** Momento of inactivity in comparison to the axle X.
- Iy** Momento of inactivity in comparison to the axle Y.
- Wx** Elastic Modul in comparison to the axle X.
- Wy** Elastic Modul in comparison to the axle Y.
- Ixx** Raggio of inactivity in comparison to the axle X.
- Iyy** Raggio of inactivity in comparison to the axle Y.
- Jt** Momento of inactivity tork.
- Ax** Area of cut in direction X.

- Ay** Area of cut in direction Y.
- Alpha** Angle of the principal axes of inactivity, between X-X and m-m.
- Im** Momento of inactivity in comparison to the axlem.
- In** Momento of inactivity in comparison to the axlen.
- Wm** Elastic Modul in comparison to the axle m.
- Wn** Elastic Modul in comparison to the axle n.
- Am** Area of cut in direction m.
- An** Area of cut in direction n.
- Omega** you see the choice of the curve in the CNR, and you can be 1, 2, 3, 4 (it corresponds to, b, c, d).
- Xg** Coordinate X of barycenter.
- Yg** Coordinate Y of barycenter.

8.2.2 .Bolts

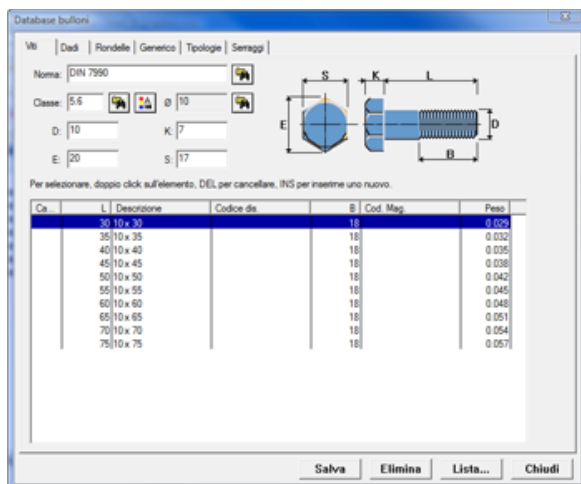
Data Base Bolts	
	
	TEC_LDBBUL

In this basic date it is possible to insert new bolts or to modify those existing.

This database and mixture of 6 elements:

- Screws In this sector the screws are inserted
- Nuts In this sector the nuts are inserted
- Washers In this sector the washers are inserted
- Generic In this sector the elements can be inserted that desire that is inserted in the lists bolts, for instance screws Auto-screws-thread, tensioner etc.
- Typologies In this sector the composition of the bolt is defined, various typologies can be defined, for instance a bolt with Screw, nut and washer; or a bolt with life two washers and a nut etc.
- Thicknes In this sector it is defined for every bolt which is the least and maximum thickness wherecan be used.

8.2.2.1 Screw



This dialog for the insertion of the data allows to insert the grapevines with the geometric characteristics for the graphic representation.

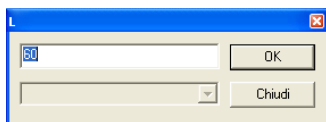
You inserts for first the Norm of the grapevine and subsequently the Class therefore the nominal diameter of TecnoMETAL is selected with the button what it visualizes the list of the nominal diameters.

They inserts then the real dimensions of the grapevine D, E, K and S, correspondents to the figure.

Finished the insertion of the dimensions of the screw, with the mouse the underlying list is selected, pressing from keyboard the button "Ins" an empty line will be created.

Ca.	L	Descrizione	Codice dis.	B	Cod. Mag.	Peso
	0	--	--	0	--	0
	1	2	3	4	5	6

With a double click of the left button of the mouse in the field L (1) the window is visualized for the insertion of the length.



It is had to insert the measure in millimeters of the length of the screw.

Confirming with the button OK, will be memorized.

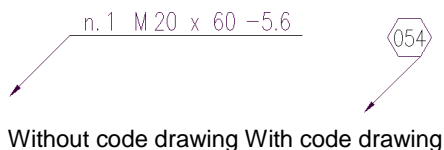
Ca...	L	Descrizione	Codice dis.	B	Cod. Mag.	Peso
	60	--	--	0	--	0

With the same system the other data are inserted:

2 – Description is the description that will be visualized in the drawing and in the list, for instance 20x60 or 20*60 etc.

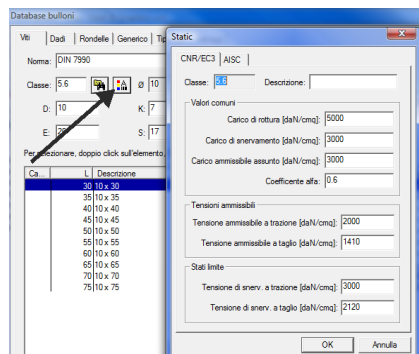
3 – Code drawing is the code that can be used in the drawing as reference to the grapevine (what will be described then in the chart bolts) it is not obligatory.

Example:



- 4 – **Dimension B** the length of the edging.
- 5 – **Code of store** is the code of store used in the material lists, it is not obligatory.
- 6 – **Weight** is had to insert the unitary weight in kg. (of an only piece).

8.2.2.2 Resistance of project of the bolts



With the button to the right some Class visualizes the dialog that allows to insert or to separately visualize all the elements related to the calculation of the bolt. The fields are:
 Class: in partnership class to the bolt: ex. 8.8, 5.6 10.9 etc..
 Description: brief description of the bolt.

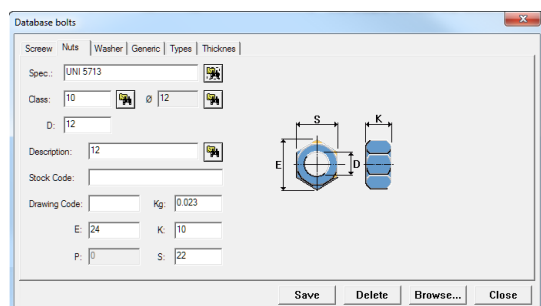
- CNR/EC3
- Load of breakup: the value is express in daN/cm².
- Load of enervation: the value is express in daN/cm².
- Assumed admissible load: the value is express in daN/cm².

Coefficient alpha: is considered when the verifications of the joints with resistant bolts are performed for attrition.
 Admissible tension to traction: the value is express in daN/cm².
 Admissible tension to cut: the value is express in daN/cm².
 Tension of traction enervation: the value is express in daN/cm².
 Tension of enervation to cut: the value is express in daN/cm².

AISC
 Maximum diameter
 Admissible tension: the value is express in daN/cm².
 Tension admissible cut stem: the value is express in daN/cm².
 Tension admissible cut fillet: the value is express in daN/cm².
 Tension of attrition: the value is express in daN/cm².

Note: These values are used only in the module TecnoMETAL Structural Analysis.

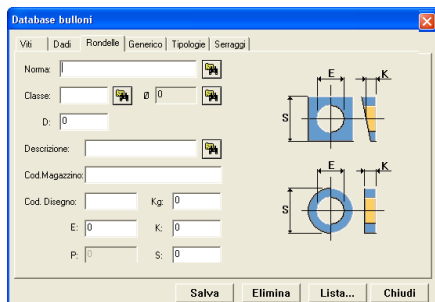
8.2.2.3 Nuts




This dialog for the insertion of the data allows to insert the data with the geometric characteristics for the graphic representation.
 You inserts for first the Norm of the nut and subsequently the Class therefore the nominal diameter of TecnoMETAL is selected, acting on the button it visualizes the list of the nominal diameters.
 They inserts then the real dimensions of the nut D, E, K and S, correspondents to the figure.

The "Description" that it is desired is pointed out in the drawing.
 The unitary weight of a piece in Kg.
 The codes of store and drawing (they are not obligatory), their function is that described for the screw.

8.2.2.4 Washers

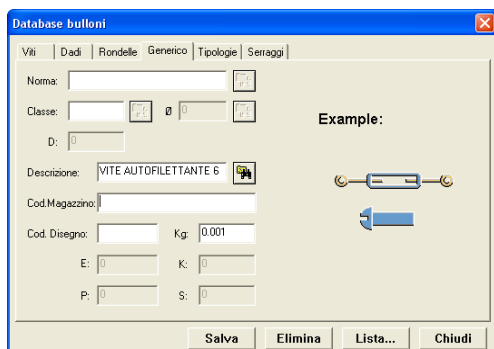


This dialog for the insertion of the data allows to insert the washers with the geometric characteristics for the graphic representation. You inserts for first the Norm of the washer and subsequently the Class therefore the nominal diameter of TecnoMETAL is selected, acting on the button  it visualizes the list of the nominal diameters. They inserts then the real dimensions of the washer S, E, K, correspondents to the figure of the screw.

The "Description" that it is desired is pointed out in the drawing.

The unitary weight of a piece in Kg.
The codes of store and drawing (they are not obligatory), their function is that described for the grapevine.

8.2.2.5 Generic



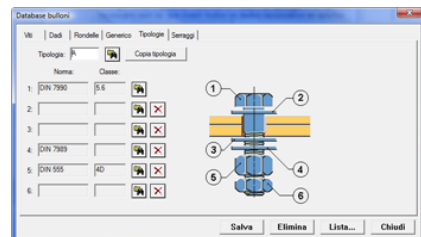
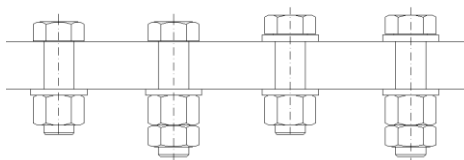
This dilaoq for the insertion of the data allows to insert the generic elements or rather that elements that it is desired is set in the lists of the bolt and nuts.

The Norm and the Class are not compulsory, it is had to insert the description and the codes of store and drawing (they are not obligatory), their function is that described for the screw.

8.2.2.6 Typologies

The typology, is the composition of the bolt, in fact we can have bolts of the same legislation but different.

Examples of typologies:




This dialog for the insertion of the data allows to define the typologies.

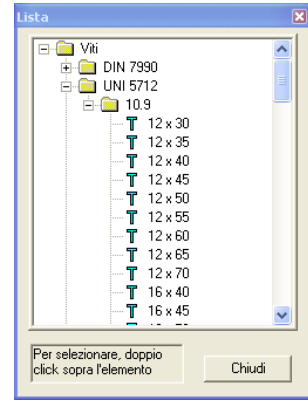
To insert initials some typology A, B, C, C1, etc. this initials it will be that application in the drawing. In the box 1 pressing the button to the right it opens the list of the screws previously inserted, to select with a double-click with the left button of the mouse on an any element screw of the norm and desired class.


Subsequently to repeat the operation in the other boxes 2, 3, 4, 5, 6 that they refer to the right, to the numeration of the image of the bolt to always select only those applications selecting her from the list to activate through the button



to the right, the button  it serves for previously cancelling the choice sort.

The button CODE TYPE it serves for making a copy of an existing typology, this procedure will make a copy of the typology and the relative thicknes, very useful to create new typologies, after having created the new typology, it is possible to modify the data in the typology and in the necessary thicknes without having to insert all the necessary data to the thicknes.





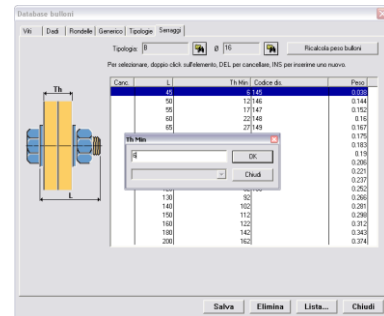
 **Note:** For the solo drawing doesn't serve to compile these further dialog.

8.2.2.7 Thicknes

This dialog for the insertion of the data allows to define the thicknes of every typology, the thicknes are the thicknes least and maximum where possible to use the bolt with the length of the inserted screw is.

You selects for first the typology (previously created) choosing

from the list that it appears pressing to the right the button , then the nominal diameter is selected in the box .



Finished the choice of the typology and nominal diameter, with the mouse the underlying list is selected, pressing from keyboard the button "Ins" an empty line will be created.

With a double click of the left button of the mouse, in the field L is visualized dialog her for the choice of the length of the screw (previously inserted of the norm and class related to the select typology).

Always with a double click of the left key of the mouse, to insert in the field "Th.min" (least thickness to be tightened for the length of the selected grapevine) the maximum thickness of tightening is defined by the least value (Th.min.) of the following grapevine, in the case of the last line of the chart the tightening is calculated in automatic as difference from the next to last one.

Before inserting these data it is advisable to create him a chart with the data to insert.

Example:

	12	16	20	24	27
40	10-14				
45	15-19	6-11			
50	20-24	12-16			
55	25-29	17-21	9-13		
60	30-34	22-26	14-18		
65	35-39	27-31	19-23		
70	40-44	32-36	24-28	16-20	
75	45-49	37-41	29-33	21-25	
80	50-59	42-51	34-43	26-35	20-29
90	60-69	52-61	44-53	36-45	30-39
100	70-79	62-71	54-63	46-55	40-49
110	80-89	72-81	64-73	56-65	50-59
120	90-99	82-91	74-83	66-75	60-69

In demand nominal diameters

Length screw

Thicknes least and maximum in

With a double click, with the mouse pointer (left button), in the field "Code Drawing", it is possible to insert the code drawing (it is not obligatory), its function is that described for the screw.

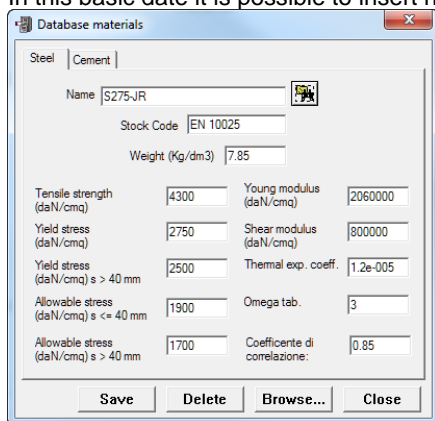
The weight of the bolt, in the last column to the right is calculated, in automatic adding the weights previously inserted in screws, nuts and washers.

The button UPGRADE WEIGHT it serves for re-calculate the weight of the bolts, for instance if we modify the weight of a screw, nut or washer, having already defined the thicknes, with this procedure they will be re-calculate the weights.

8.2.3 Quality

Data Base Quality.	
	TEC_LDBMAT

In this basic date it is possible to insert new qualities or to modify those existing.



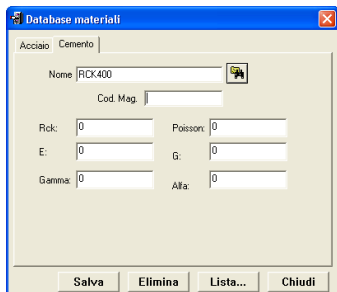
In this dialog for the insertion of the data for first the is inserted "Name" of the material to be inserted (Es.: Fe360B, A36, S355JR etc).

The box "Cod. Mag" it serves for inserting a code of store. In the box "Weight Specific (Kg/dm³)" it is had to insert the specific weight of the material in Kilograms for decimeter cube. For instance if we insert a steel material it will be 7.85 if of aluminum will be of 2.7 etc.

The program, to get the weight of the shapes, will divide the weight in the database of the shapes for 7.85 and it will multiply for the specific weight of the material, while for the plain plates, it calculates the volume of the plate and it multiplies for the specific weight of the quality.

Note: For the solo drawing doesn't serve to compile these further boxes.

- Tension of breakup:** tension of breakup of the material expressed in daN/cm².
- Tension of enervation:** tension of enervation of the material expressed in daN/cm².
- Admissible tension (s>40mm):** admissible tension of the material related to sections aventi thickness >40 express mms in daN/cm² (alone CNR10011)
- Module of Joung:** module of elasticity of the express material in daN/cm².
- Module of cut:** module of express cut in daN/cm².
- Coeff. of thermal expansion:** coefficient of thermal expansion of the express material in 1/°C
- Coefficient of Correlation:** you see the definition in EN 1993-1-8:2005 to the paragraph 4.5.3.2 (6).



The screened second allows the insertion of the data for the material related to the armed cements. For first the is inserted "Name" of the material to be inserted (Es.: RCK400 etc.)

The box "Cod. Mag" it serves for inserting a code of store.

The inferior boxes, related to the Tensions, forms, coefficients etc. they serve for the insertion of the necessary values for the verification of the form of calculation.

8.2.4 Connections

Data Base Normalized connections.	
	TEC_LSDBFLA

In this database 8 typologies of unions can be defined "Standard" to use in the drawing, various types can be defined for every shape.

Note: The area "Type" it is tied up to the Shape1, he can for instance have then "type 1 for shape X" and "type 1 for shape Y."

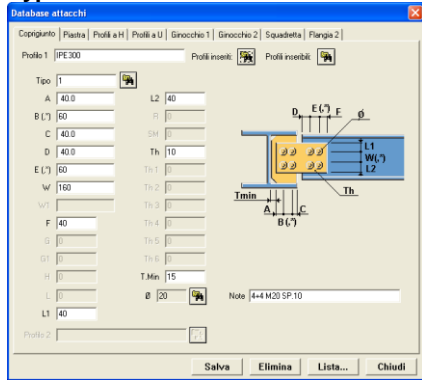
Attenzione: In the box "Notes" it is had to insert a brief description of the union, this description will be that visualized during the drawing for the choice of the type of union.

Note: For the insertion of the "Shape 1", can be digitized or through the button EXISTING SHAPE can be selected among those already inserted for performing a change, or through the button DBASE SHAPE it is selected among those inserted in the database you outline.

In the list with the button to the right the nominal diameter of the bolt is selected.

Note: If in the figure, the letter is followed by the symbol (, *), it means that multiple values can be inserted (to see chapter "common Actions in the database").

Type Joint-Plate



In this typology it is possible to insert the attacks for the shapes UPN, UAP, H, Welded shape U and C fold shape. You inserts for first the name of the shape of the beam. In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button among those inserted for possible changes. They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure. The value "Tmin" it serves for checking the least distance between the butt strap and the core of the beam, if is not respected will have lengthened the plate (fig. 1), if it is greater it will be ignored (fig. 2).

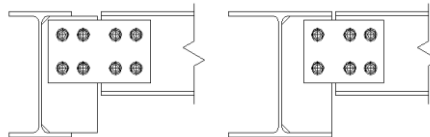
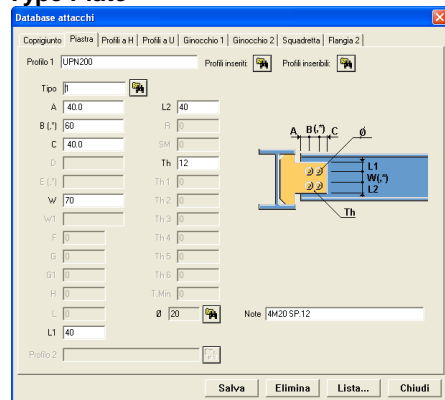


Fig. 1 Fig. 2

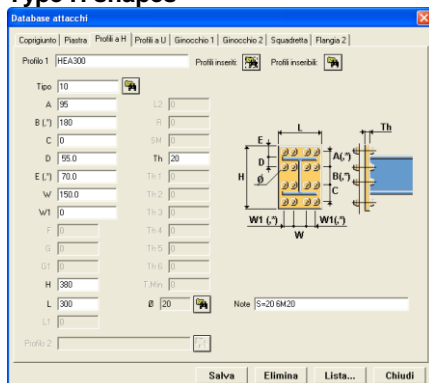
Type Plate



In this typology it is possible to insert the attacks for the shapes UPN, UAP, H, Welded shape U and C fold shape. You inserts for first the name of the shape of the beam. In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button among those inserted for possible changes.

They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.

Type H shapes

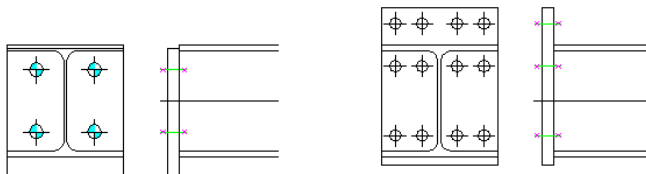


In this typology it is possible to insert the attacks for the shapes H, INP and Welded shape.

You inserts for first the name of the shape of the beam. In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button among those inserted for possible changes.

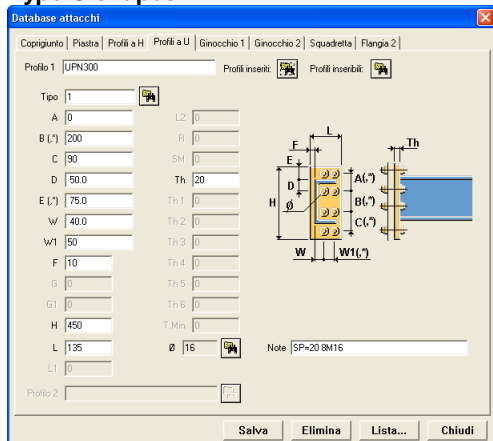
They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure. The dimension "A" can be negative and the dimensions A, B, C and W1 can be with value 0.

Example:



$E = \text{negative} \quad C = 0 \quad W1 = 0 \quad C = 0$

Type U shapes

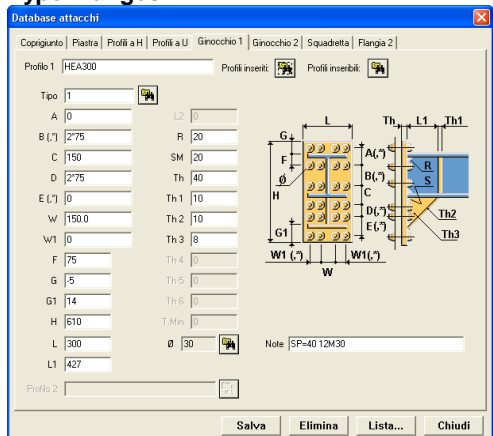


In this typology it is possible to insert the attacks for the shapes UNP, UAP, C and U fold shape.

You inserts for first the name of the shape of the beam. In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button among those inserted for possible changes. They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.

The dimension "E" can be negative and the dimensions A, B, C and W1 can be with value 0.

Type Flanges 1



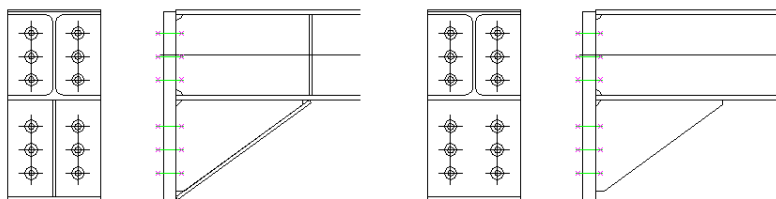
In this typology it is possible to insert the attacks for the shapes H, INP and Welded shape.

You inserts for first the name of the shape of the beam. In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button among those inserted for possible changes. They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.

The dimension "E" can be negative and the dimensions A, B, C, D, And and W1 can be with value 0.

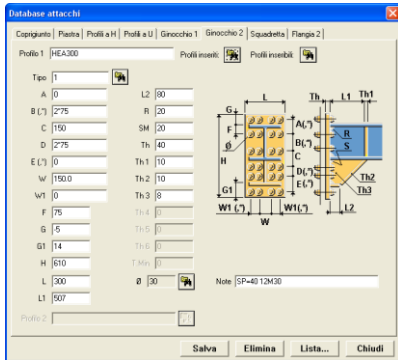
If they are defined one or more values of TH1, TH2, TH3 to 0 means that they don't exist.

Exemples:




$TH1 = 8 \quad TH2 = 8 \quad TH3 = 10 \quad TH1 = 0 \quad TH2 = 0 \quad TH3 = 10$

Type Flanges 1



In this typology it is possible to insert the attacks for the shapes H, INP and Welded shape.

You inserts for first the name of the shape of the beam.

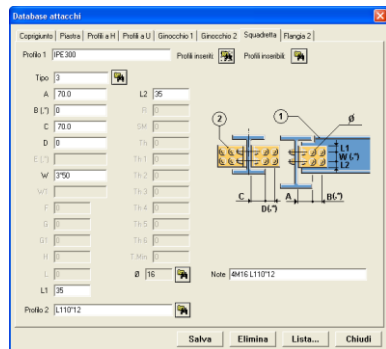
In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button  among those inserted for possible changes.

They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.

The dimension "E" can be negative and the dimensions A, B, C, D, And and W1 can be with value 0.


If they are defined one or more values of TH1, TH2, TH3 to 0 means that they don't exist.

Type angle



In this typology it is possible to insert the attacks for the shapes H, INP, Welded shape, UNP, UAP, C and U fold shape.

You inserts for first the name of the shape of the beam.

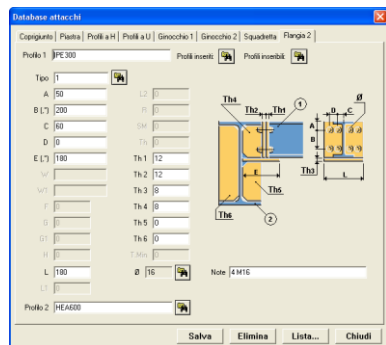
In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button  among those inserted for possible changes.

They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.

The dimension "E" can be negative and the dimensions A, B, C, D, and W can be with value 0.


If the dimension A and B it is for instance defined = to 0 it means that the angles are welded to the beam.

Type Flanges 3




In this typology it is possible to insert the attacks for the shapes H, INP, Welded shape, UNP and UAP.

You inserts for first the name of the shape of the beam.




In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button  among those inserted for possible changes.

They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.

If they are defined one or more values of TH5, TH6 to 0 means that they don't exist.

In the box **Shape2** is inserted the name of the beam 2 or through the button to the right  be selected among those presents in the database.

8.2.5 Base Plate

Data Base Base Plate	
	
	TEC_LSDBPIA

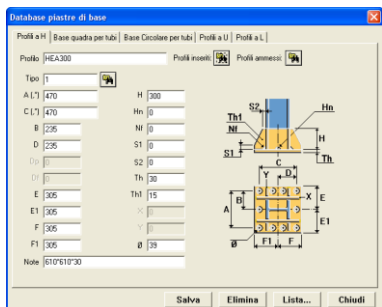
In this database 5 typologies of base plate can be defined for columns "Standard" to use in the drawing, various types can be defined for every shape.


The field "Type" it is tied up to the Shape1, he can for instance have then "type 1 for shape X" and "type 1 for shape Y."

Attention: In the box "Notes" it is had to insert a brief description of the baseplate, this description will be that visualized during the drawing for the choice of the type of plate.

For the insertion of the "Shape", can be digitized or through the button EDITING SHAPE can be selected among those already inserted for performing a change, or through the button DBASE SHAPE it is selected among those inserted in the database you outline.
 In the box the diameter of the holes is inserted. Se la lettera è seguita dal simbolo (*), significa che si possono inserire valori multipli (vedere capitolo "Azioni comuni nei database").

Type H Shape

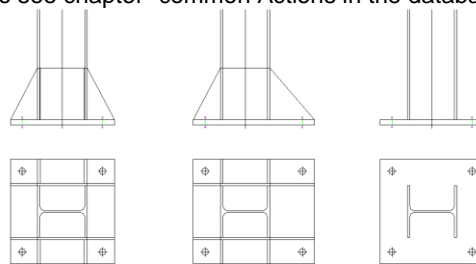


In this typology it is possible to insert the attacks for the shapes H, INP and Welded shape.
 You inserts for first the name of the shape of the beam.
 In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button  among those inserted for possible changes.
 They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.

If the value of TH1 is defined to 0 it means that the stifners don't exist.

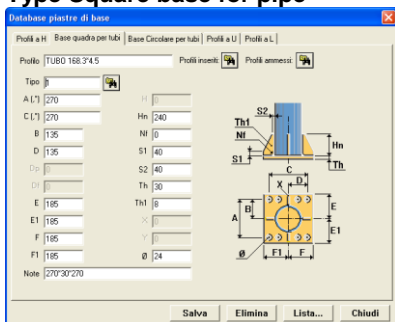
In the dimensions A and C multiple values can be inserted (to see chapter "common Actions in the database").


Exemples:



Dimensione F > F1 Dimensione TH1 = 0

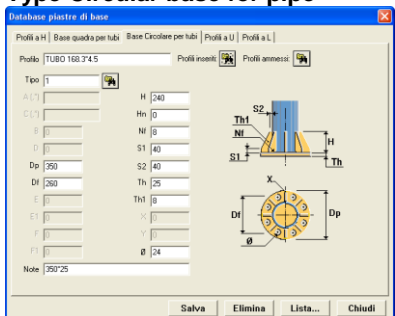
Type Square base for pipe




In this typology it is possible to insert the base plate for the tubular shapes both circles and pictures.
 You inserts for first the name of the shape of the beam.
 In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button  among those inserted for possible changes.
 They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.
 If the value of TH1 is defined to 0 it means that the stiffenings don't exist

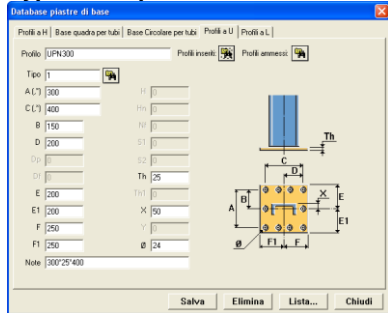
In the dimensions A and C multiple values can be inserted (to see chapter "common Actions in the database").

Type Circular base for pipe



In this typology it is possible to insert the baseplates for the round tubular shapes.
 You inserts for first the name of the shape of the beam.
 In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button  among those inserted for possible changes.
 They owes therefore to compile the dimensions are reported to the right to the figure.
 If the value of TH1 is defined to 0 it means that the stifners don't exist. In the box Nf are had to insert the quantity of holes, the stifners will be mails in mean among the holes.


Type U Shape



In this typology it is possible to insert the baseplates for the shapes UNP, UAP, C and U fold shape.

You inserts for first the name of the shape of the beam.

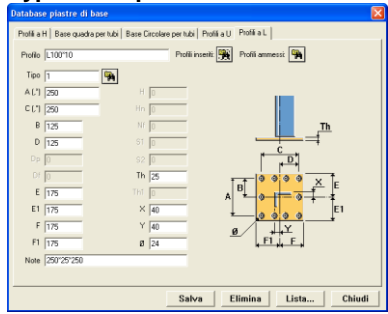
In the box "Type" to digitize its name, alphanumeric value (maximum 6

characters) or to select to the right it through the button  among those inserted for possible changes.

They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.

In the dimensions A and C multiple values can be inserted (to see chapter "common Actions in the database").

Type L Shape



In this typology it is possible to insert the base plates for the shapes L both laminates and fold shape.




You inserts for first the name of the shape of the beam.

In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button among those inserted for possible changes.

They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.


In the dimensions A and C multiple values can be inserted (to see chapter "common Actions in the database").

8.2.6 Joints

Data Base Giunti	
	
	TEC_LSDBGIU

In this database 5 typologies of Joints can be defined "Standard" to use in the drawing, various types can be defined for every shape.

The area "Type" it is tied up to the Shape1, he can for instance have then "type 1 for shape X" and "type 1 for shape Y."

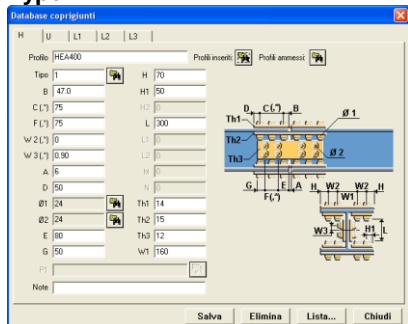
 **Attention: In the box "Notes" it is had to insert a brief description of the joint, this description will be that visualized during the drawing for the choice of the type of joint.**

Note: For the insertion of the "Shape", can be digitized or through the button can be selected among those already inserted for performing a change, or through the button it is selected among those inserted in the database you outline.

In the boxes through the button to the right the nominal diameter of the bolts is selected.

Note: If the letter is followed by the symbol (, *), it means that multiple values can be inserted (to see chapter "common Actions in the database").


Type H



In this typology it is possible to insert the joints for the shapes H, INP and Welded shape.

You inserts for first the name of the shape of the beam.

In the box "Type" to digitize its name, alphanumeric value (maximum 6

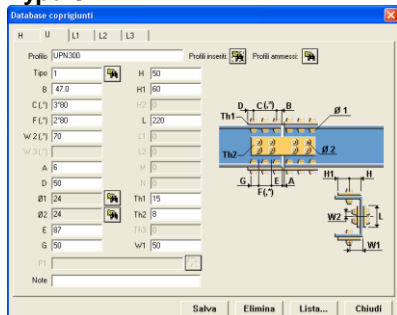
characters) or to select to the right it through the button  among those inserted for possible changes.

They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.

The dimension W2 can be with value 0.


If the dimension of TH2 is defined to 0 it means that the inside plates don't exist.

Type U

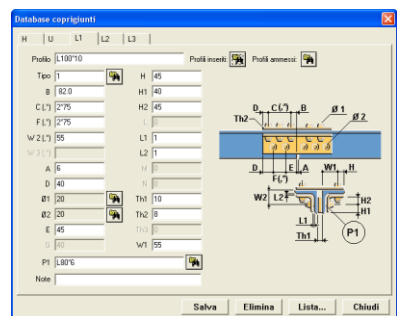


In this typology it is possible to insert the joints for the shapes UNP, UAP, C and U fold shape.

You inserts for first the name of the shape of the beam.

In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button  among those inserted for possible changes. They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.


Type L1



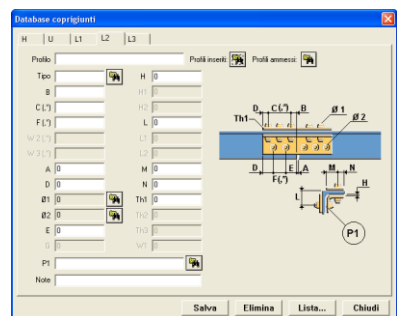
In this typology it is possible to insert the joints for the shapes L both laminates and fold shape.

You inserts for first the name of the shape of the beam.

In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button among those inserted for possible changes.


They owes therefore to compile the active boxes, the dimensions are reported  to the right to the figure.

Type L2



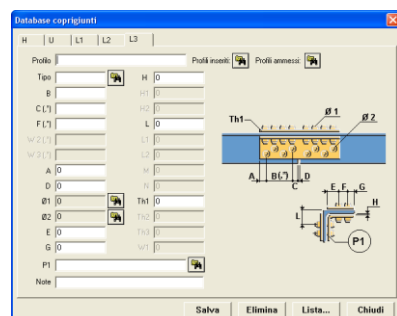
In this typology it is possible to insert the joints for the shapes L both laminates and fold shape.

You inserts for first the name of the shape of the beam.

In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button  among those inserted for possible changes.


They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.

Type L3






In this typology it is possible to insert the joints for the shapes L both laminates and fold shape.

You inserts for first the name of the shape of the beam.


In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button  among those inserted for possible changes.


They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.

8.2.7 Purlins

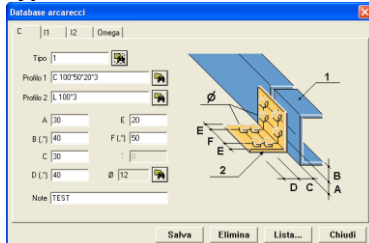
Data Base Arcarecci	
	
	TEC_LSDBARC

In this database it is possible to insert the union for the purlins according to four typologies.

 **Note:** The area "Type" it is tied up to the Shape1, he can for instance have then "type 1 for shape X" and "type 1 for shape Y."


 **Attention:** n the box "Notes" it is had to insert a brief description of the union purlin, this description it will be that visualized during the drawing for the choice of the type of union.


Type C



Typology "C", in this it is possible to insert the unions for the shapes UPN, UAP, U and C fold shape.


You compiles for first the area Type, can be a name up to 10 characters.

In the box Shape1 is inserted the name of the shape of the purlin or through the button to the right  be selected among those presents in the database of the shapes.

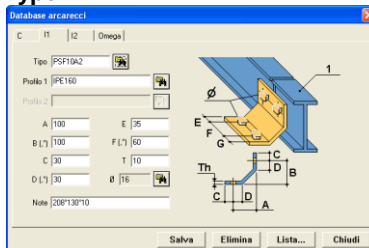
In the box **Shape2** is inserted the name of the shape of the angle of support or through the button to the right  be selected among those presents in the database, it has to be a shape type L (rolled or fold shape).

Subsequently they are had to compile the fields remainders making reference to the figure to side.

If it is inserted 0 in the boxes A B C D, the bolts you/they won't be inserted and in the boxes B F and D multiple values can be inserted (to see chapter "common Actions in the database").


In the list  with the button to the right the nominal diameter of the bolt is selected.

Type H1




Typologia "H1", in questa è possibile inserire gli attacchi per i profili H, INP, Z, Z1 ed elettrosaldati.

Si compila per primo il campo **Type**, può essere un nome fino a 10 caratteri.

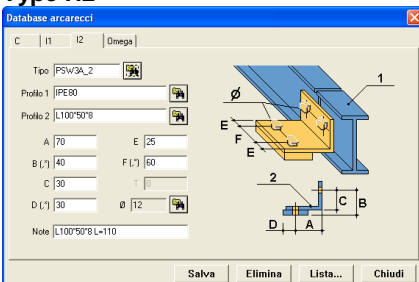
Nella casella **Profilo 1** si inserisce il nome del profilo dell'arcareccio o tramite il tasto a destra  lo si seleziona tra quelli presenti nel database dei profili.

Successivamente si devono compilare i campi restanti facendo riferimento alla figura a lato.

Se si inserisce 0 nelle caselle A B, non saranno inseriti i bullonie nelle caselle B e F si possono inserire valori multipli (vedere capitolo "Azioni comuni nei database").


Nella lista  con il tasto a destra si seleziona il diametro nominale del bullone.

Type H2




Typology "H2", in this it is possible to insert the attacks for the shapes H, INP, Z, Z1 and welded shape.

You compiles for first the area **Type**, can be a name up to 10 characters.

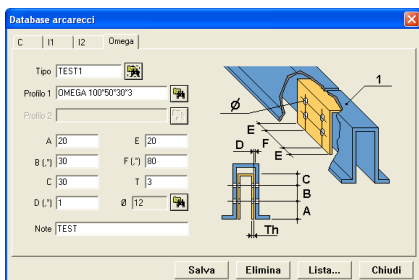
In the box **Shape1** is inserted the name of the shape of the purlin or through the button to the right  be selected among those presents in the database of the shapes.

Subsequently they are had to compile the fields remainders making reference to the figure to side.

If it is inserted 0 in the boxes A B, the bolts won't be inserted and in the boxes B and F multiple values can be inserted (to see chapter "common Actions in the database").


In the list  with the button to the right the nominal diameter of the bolt is selected.

Type Omega

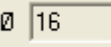



Typology "Omega", in this it is possible to insert the unions for the shape Omega.




You compile for first the area **Type**, can be a name up to 10 characters.

In the box **Shape1** is inserted the name of the shape of the purlin or through the button to the right  be selected among those presents in the database of the shapes.


Subsequently they are had to compile the fields remainders making reference to the figure to side. If it is inserted 0 in the boxes A B, the bolts won't be inserted and in the boxes B and F multiple values can be inserted (to see chapter "common Actions in the database").


In the list  with the button to the right  the nominal diameter of the bolt is selected.

8.2.8 Steps

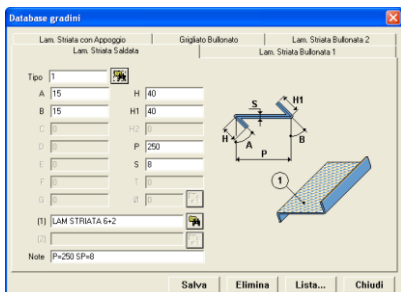
Data Base steps	
	
	TEC_LSDBGRA

In this database 5 typologies of Steps can be defined "Standard" to use in the drawing of the stairs.


 **Note:** In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button among those inserted for possible changes.

 **Attention:** In the box "Notes" it is had to insert a brief description of the joint, this description will be that visualized during the drawing for the choice of the type of joint.

Welding Corrugates plate

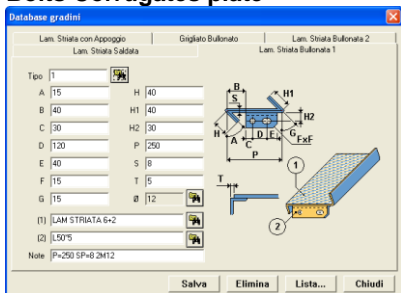


To insert to the right the values corresponding to the letters of the figure.


The shape (1) it is an element to the square meter can be digitized or through the button to the right  to choose from the list of those inserted in the database outlines.


The values of A and B are had to express in degrees sexagesimal.

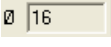

Bolts Corrugates plate




To insert to the right the values corresponding to the letters of the figure.

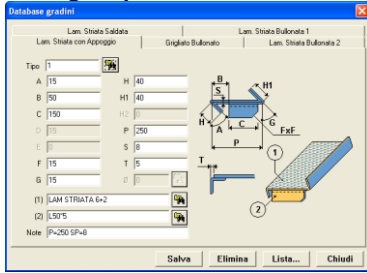
The values of A and G are had to express in degrees sexagesimals. The shape (1) it is an element to the square meter can be digitized or through the button to the right  to choose from the list of those inserted in the database outlines.

The shape (2) can be a shape L (rolled or fold shape), can be digitized or through the button to the right  to choose from the list of those inserted in the database outlines.

In the box  through the button to the right  the nominal diameter of the bolts is selected.

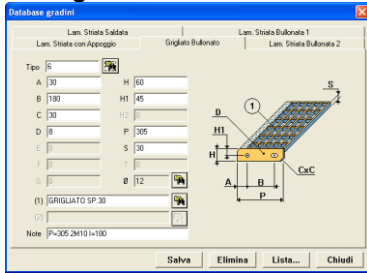
 **Note:** The length of the buttonhole is considered two diameters of the hole.

Corrugate plate



To insert to the right the values corresponding to the letters of the figure. The values A and G are had to insert in degrees sexagesimals. The shape (1) it is an element to the square meter can be digitized or through the button to the right to choose from the list of those inserted in the database outlines. The shape (2) can be a shape L (rolled or fold shape), can be digitized or through the button to the right to choose from the list of those inserted in the database outlines.

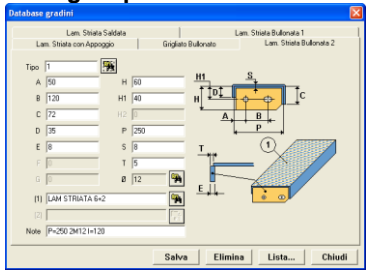
Grating



To insert to the right the values corresponding to the letters of the figure. The shape (1) it is an element to the square meter can be digitized or through the button to the right to choose from the list of those inserted in the database outlines. In the box through the button to the right the nominal diameter of the bolts is selected.

Note: The length of the buttonhole is considered two diameters of the hole.




Corrugate plate 2



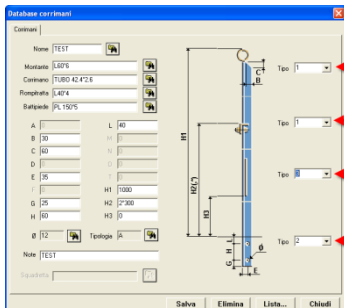
To insert to the right the values corresponding to the letters of the figure. The shape (1) it is an element to the square meter can be digitized or through the button to the right to choose from the list of those inserted in the database outlines. In the box through the button to the right the nominal diameter of the bolts is selected.

Note: The length of the buttonhole is considered two diameters of the hole.

8.2.9 Handrails

Data Base Handrails	
	
	TEC_LSDBCOR2

In this database the handrails can be defined "Standard" to use in the drawing. In the box "Name" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button among those inserted for possible changes.



To choose the shape of the Upright, writing or choosing to the right it from the list through the button the upright can be shapes L (rolled or fold shape, round pipes or square and flat). To choose the shape of the Handrail, writing or choosing to the right it from the list through the button the shape of the handrail depends on the choice of the shape of the upright. To choose the shape of the Divide Shape, writing or choosing to the right it from the list through the button the shape of the divide shape they depend on the choice of the shape of the upright.

To choose the shape of the Terminal Shape, writing or choosing to the right it from the list through the button the shape of the terminal shape can be only flat shape.




Following they have to insert to the right the dimensions in the boxes active correspondents to the letters in the figure.

Note: The dimension H2 is followed by the symbol (, *), it means that multiple values can be inserted (to see chapter "common Actions in the database").

Attention: In the box "Notes" it is had to insert a brief description of the handrail, this description will be that visualized during the drawing for the choice of the type of handrail.

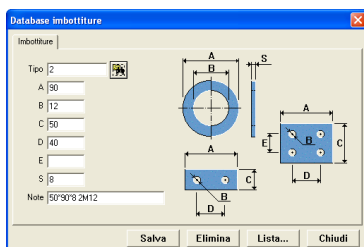
In the boxes of right (1 2 3 4) it is had to define the position and connection of the element, choosing a type will be modified the image allowing to effect the desired choice.

8.2.10 Imbottiture

Data Base Imbottiture	
	
	TEC-LSDBIMB

In this database 3 typologies of cross Stifners can be defined "Standard" to use in the drawing.

Attention: In the box "Notes" it is had to insert a brief description of the stuffing, this description will be that visualized during the drawing for the choice of the type of cross Stifners.






In the box "Type" to digitize its name, alphanumeric value (maximum 6 characters) or to select to the right it through the button among those inserted for possible changes.

They owes therefore to compile the active boxes, the dimensions are reported to the right to the figure.

Note: If the dimensions C-D-E they are void or 0 mean circular type, if only the dimension is it is void or 0 mean that it is the rectangular type with 2 holes.

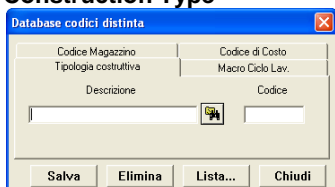
8.2.11 Code list

Data Base Codici Distinta	
	
	TEC-LSDBCOD

This database serves for having additional information in the material lists for the management of the orders the insertion of the codes it happens in the **marking** of the pieces.


Note: Their use is not obligatory. The use of these codes can be for any use (for instance to define the color of the pieces or the precedence in the construction etc.)

Construction Type



For constructive typology he intends the typology of the pieces. We could for instance define various typologies of columns (to unique stem, with supports of reinforcement, etc.) and for every typology to associate a code (es.: C1 C2 etc.).

The list can furnish us the total weight for every constructive typology, that dividing for the time of hourly production, can furnish us the time esteemed of execution.


In the box "Description" to insert a brief description (max. 30 characters) or through the button to the right  to choose from the list of those inserted for possible change. In the box "Code" to insert the desired code (max. 3 characters).


Macro Work Cicle




For macro cycle of work he intends all the types of workmanship that it has to suffer the position, for instance drilling, welding, folding etc. Now for every work we associate a code (es.: S for welding P for folding etc.). You list can furnish us a list of the positions divided for code.

In this way we can for instance get a list of the pieces that must be works in the department welding or folding etc.

In the box "Description" to insert a brief description (max. 30 characters) or through the button to the right  to choose from the list of those inserted for possible change.
In the box "Code" to insert the desired code (max. 1 character).


 **Note:** In this way we can for instance get a list of the pieces that must be works in the department welding or folding etc.

In the box "Description" to insert a brief description (max. 30 characters) or through the button to the right  to choose from the list of those inserted for possible change.
In the box "Code" to insert the desired code (max. 1 character).

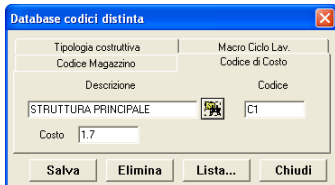
Quality Code




This code serves for associating a code of store for the plates, in how much us not being the database as for the shapes would not be possible to define its code. You remembers that the code of store is not obligatory to insert, this code will be inserted in automatic in the material lists and in the file CAM.

In the box "Description" to insert a brief description (max. 30 characters) or through the button to the right  to choose from the list of those inserted for possible change.
In the box "Code" to insert the desired code (max. 25 characters).




Cost Code

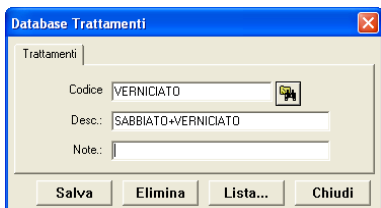


This code can serve for getting some separated lists for code of cost. We for instance suppose that our order is sold with different costs related to principal Structure, streets of run, stairs, gangways etc. we can establish that the code of cost is A. for principal structures, B for the streets of run etc. You list will furnish us the general weight of the code A, B etc.

In the box "Description" to insert a brief description (max. 30 characters) or through the button to the right  to choose from the list of those inserted for possible change.
In the box "Code" to insert the desired code (max. 3 characters)
In the box "Cost" the cost can be inserted to the Kg. (not obligatory).

8.2.12 Treatments

Data Base Treatments	
	
	TEC_LSDBTRT



In this database the cycles of superficial treatments are inserted what to Sandblast, Painting, Galvanization etc., to apply to shapes, plates or bolt and nuts.
In the box "Code" to insert the desired code (max. 20 characters) or through the button to the right to choose from the list of those inserted for possible change.

In the box "Desc" a description can be inserted (max. 40 characters) of the treatment (not obligatory).

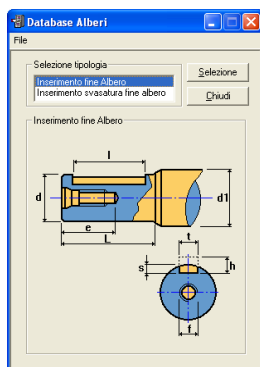
In the box "Notes" can be inserted some notes (max. 80 characters) particular of the treatment (not obligatory).

8.3 Data Base parts standard mechanical



8.3.1 Alberi normalizzati

Data Base Axix	
	TEC_LSDBMECALB



In this database Shafts and lodgings can be defined for normalized Shafts. It is had to choose, selecting the interested typology, therefore to press the button "Selection"

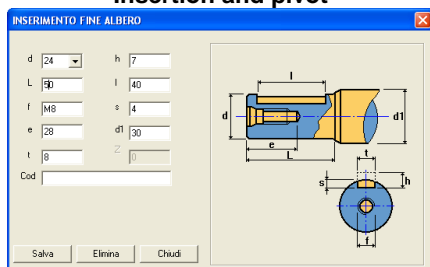
Is visualized dialog her for the insertion of the data.

To insert the diameter or to select through the button to modify one previously inserted.

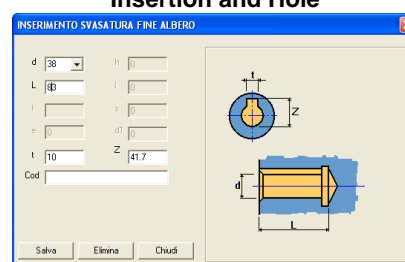
To insert to the right the values corresponding to the letters of the figure.

The box "Cod" it serves for inserting the code of the element (not obligatory).

Insertion and pivot

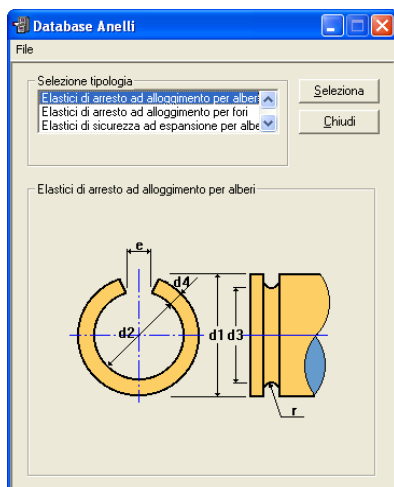


Insertion and Hole



8.3.2 Elastic Washer

Data Base Elastic Washer	
	TEC_LSDBMECANE



In this database Elastic washer of arrest or safety can be defined normalized.

It is had to choose, selecting the interested typology, therefore to press the button "Selection".

Is visualized dialog her for the insertion of the data.

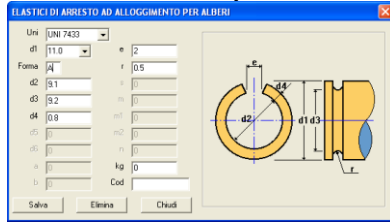
To insert the norm in the box Uni or to select through the button to modify one previously inserted.

To insert the diameter of the pivot in the box d1 or to select through the button to modify one previously inserted of it.

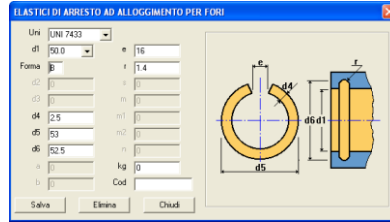
To insert to the right the values corresponding to the letters of the figure.

The box "Cod" it serves for inserting the code of the element (not obligatory).

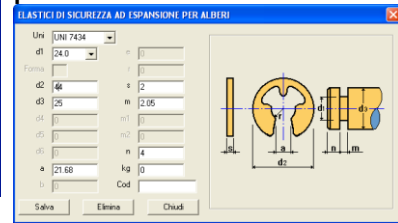
Elastic of arrest for pivots



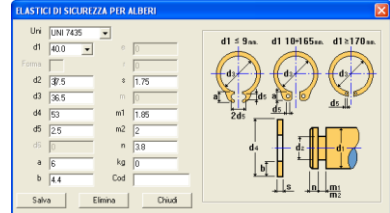
Elastic of arrest for hole



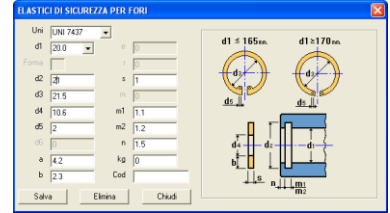
Elastic safety to expansion for pivots



Elastic safety for pivots

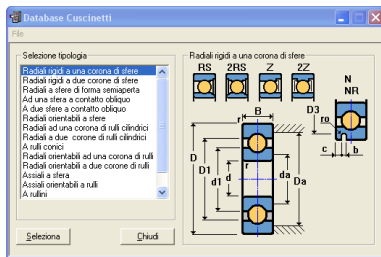


Elastic safety for holes



8.3.3 Bearing

Data Base Bearing	
TEC_LSBMECCUS	



In this database normalized Bearings can be defined. It is had to choose, selecting the interested typology, therefore to press the button "Selection".

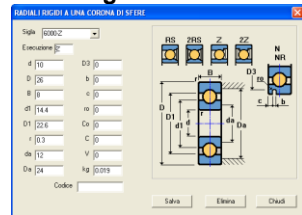
Is visualized dialog her for the insertion of the data. The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece.

To insert the name in the box "it Initials" (max 20 characters) or to select through the button to modify one previously inserted of it.

To insert to the right the values corresponding to the letters of the figure.

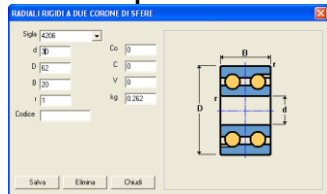
Note: The box "Co" it serves for inserting the static load, the box "C" the dynamic load and the box "V" the admissible maximum speed, these data are not obligatory, they serve only for information.

Radial rigid to a crown of spheres

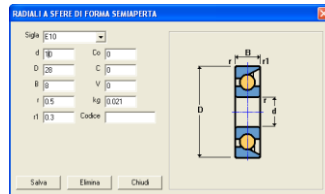


In the box "Execution" to insert the reported typology to the image RS, 2RS, Z, 2Z, N or NR.

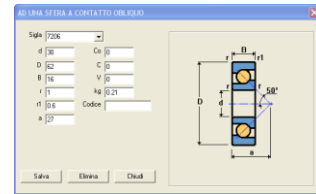
Radial rigid to two crown of spheres



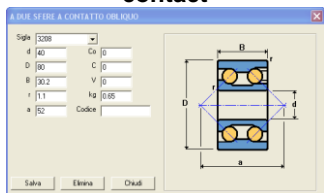
Radial to spheres of half-open form



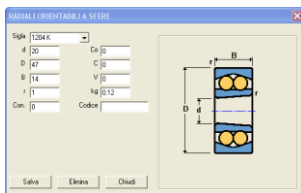
To a sphere to oblique contact



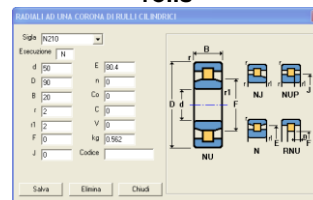
To two sphere to oblique contact



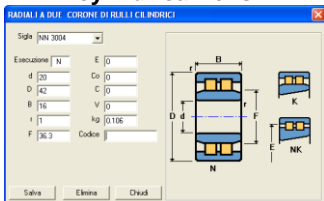
Radial spheres orientables



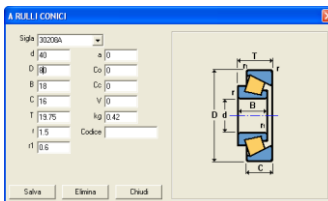
Radial to a crown of cylindrical rolls



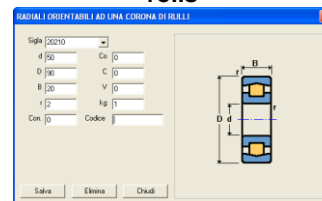
Radial to two crown of cylindrical rolls



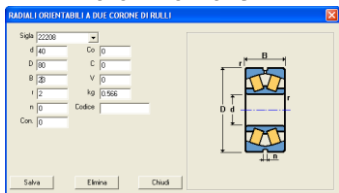
To conic rolls



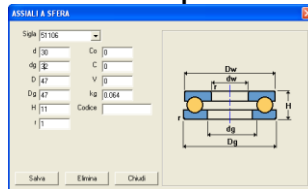
Radial orientables to a crown of rolls



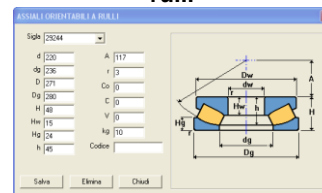
Radial orientables to two crown of rolls



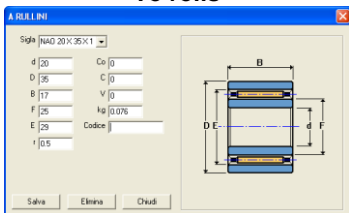
Axial to sphere



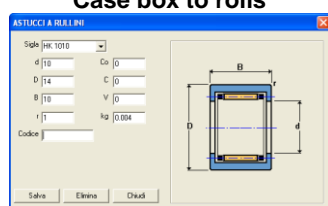
Assiali Axial orientables to rolls



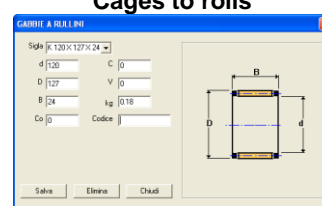
To rolls





Case box to rolls

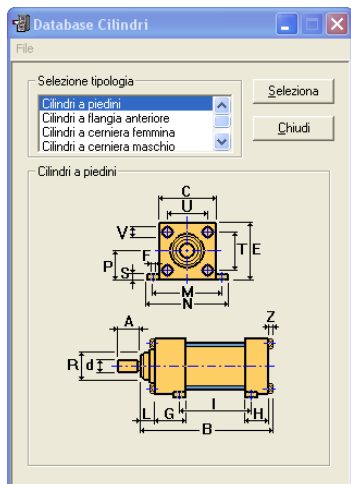


Cages to rolls




8.3.4 Cylinders

Data Base Cylinders	
	
TEC_LSDBMECCIL	




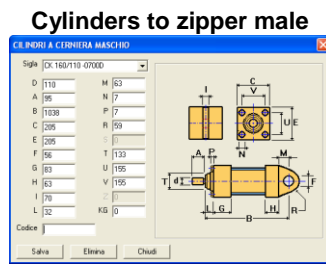
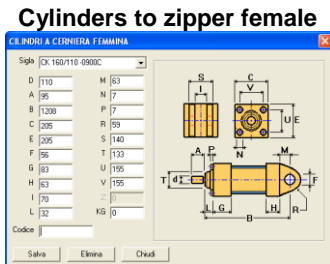
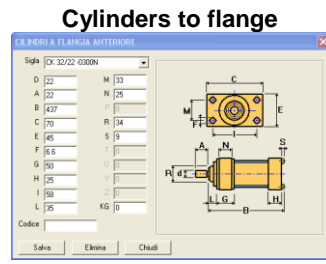
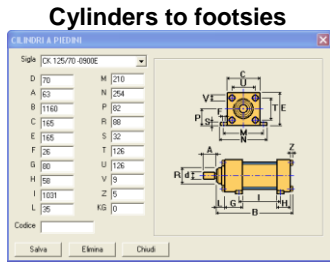
In this database 4 typologies of hydraulic Cylinders can be defined. It is had to choose, selecting the interested typology, therefore to press the button "Selection".

It is visualized dialog her for the insertion of the data.

To insert the name in the box "it Initials" (max 20 characters) or to select through the button  to modify one previously inserted of it.

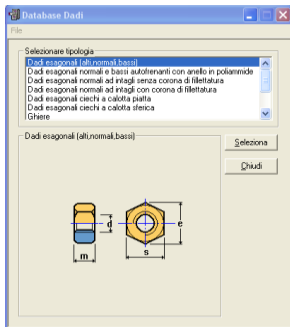
To insert to the right the values corresponding to the letters of the figure.

 **Note:** The box "Cod" it serves for inserting the code of the element (not obligatory).



8.3.5 Nuts, metal ring and washers

Data Base nuts, metal ring and washers	
TEC_LSDBMECDAD	



In this database 10 typologies of nuts, metal ring and washers can be defined.

It is had to choose, selecting the interested typology, therefore to press the button "Selection".

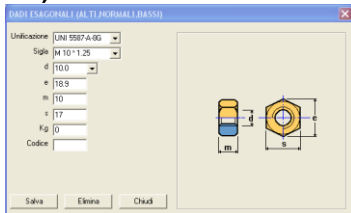
Is visualized dialog her for the insertion of the data.

To insert the norm in the box "Unification" (max 15 characters) or to select through the button to modify one previously inserted of it.

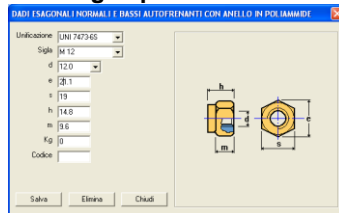
To insert the name in the box "it Initials" (max 20 characters) or to select through the button to modify one previously inserted of it. To insert to the right the values corresponding to the letters of the figure

Note: The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece.

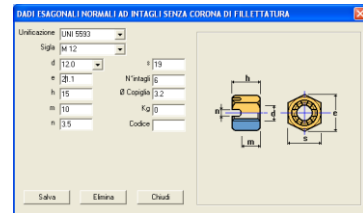
Hexagonal dice tall, normal, low)



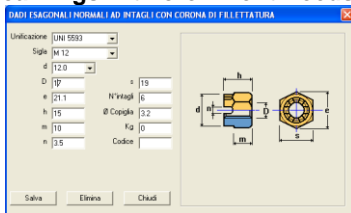
Dice hexagonal normal and low with ring in poliammide



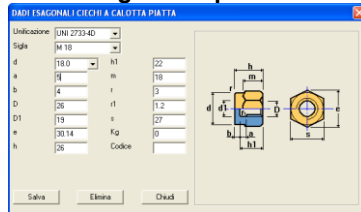
carvings without crown of threads.



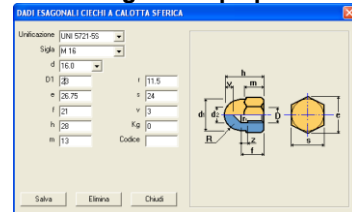
Normal hexagonal dice to carvings with crown of threads

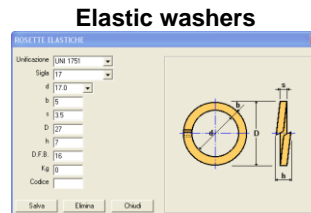
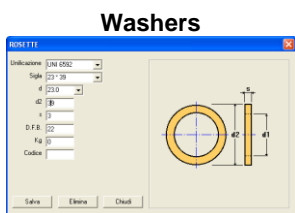
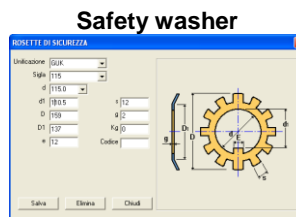
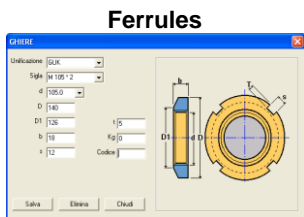


Dice hexagonal cap flat






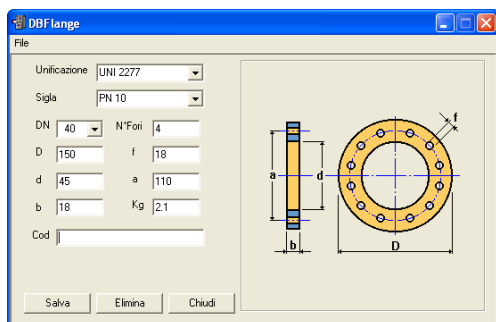
Dice hexagonal cap spherical





8.3.6 Flange

Data Base flange	
	
	TEC_LSDBMECFLT






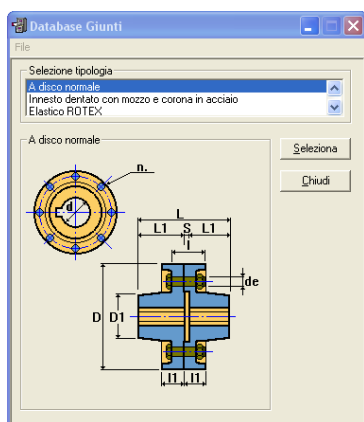
In this database the circular flanges can be defined. To insert the norm in the box "Unification" (max 15 characters) or to select through the button to modify one previously inserted of it. To insert the name in the box "it Initials" (max 20 characters) or to select through the button to modify one previously inserted of it.

Inserire i valori corrispondenti alle lettere della figura a destra. La casella "Cod" serve per inserire il codice dell'elemento (non obbligatorio). Nella casella Kg. Inserire il peso in chilogrammi di un pezzo.

To insert to the right the values corresponding to the letters of the figure.

8.3.7 Joints

Data Base joints	
	
	TEC_LSDBMECGIT



In this database 3 typologies of Joints mechanics can be defined. It is had to choose, selecting the interested typology, therefore to press the button "Selection".

Is visualized dialogs her for the insertion of the data. To insert the name in the box "it Initials" (max 20 characters) or to select through the button to modify one previously inserted of it.

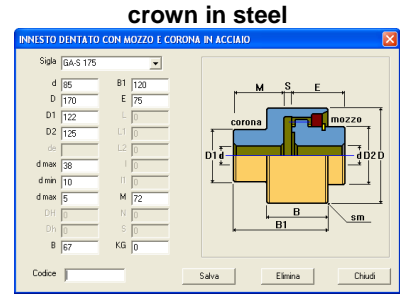
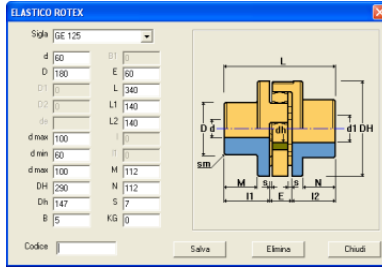
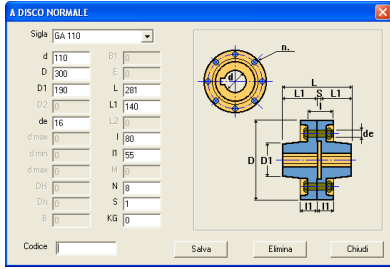
To insert to the right the values corresponding to the letters of the figure.

Note: The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece.

The normal disk

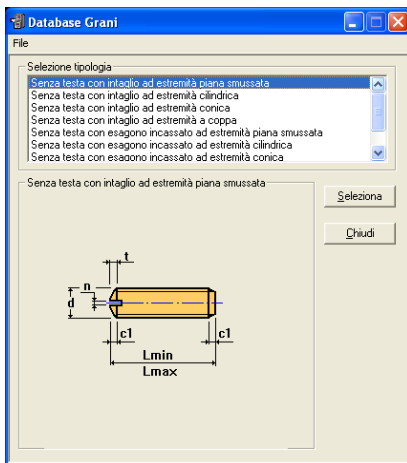
Elastic ROTEX

Toothed graft with ship boy and



8.3.8 Studs

Data Base studs	
TEC_LSDBMECGRA	



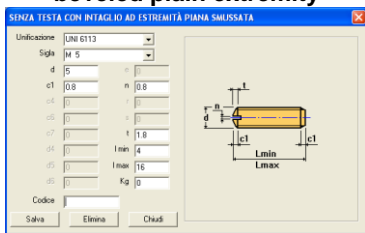
In this database 8 typologies of mechanical Dowels can be defined. It is had to choose, selecting the interested typology, therefore to press the button "Selection".

Is visualized dialog her for the insertion of the data.

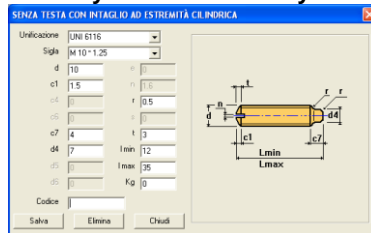
To insert the norm in the box "Unification" (max 10 characters) or to select through the button to modify one previously inserted of it. To insert the name in the box "it Initials" (max 20 characters) or to select through the button to modify one previously inserted of it. To insert to the right the values corresponding to the letters of the figure.

The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece. The boxes "Lmin" and "Lmax" they respectively serve for defining the least length and available motto, if in the drawing it was had to select a length that doesn't reenter among these, won't be drawn.

Without head with carving to beveled plain extremity



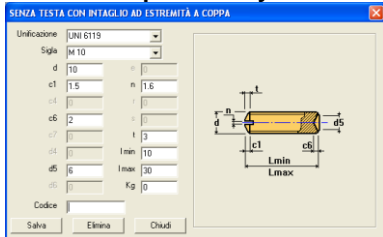
Without head with carving to cylindrical extremity



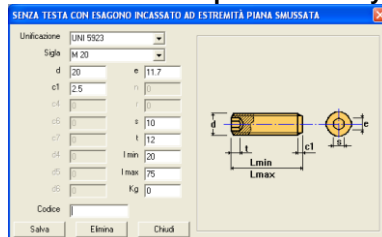
Without head with carving to conic extremity



Without head with carving to cup extremity



Without head with hexagon boxed to beveled plain extremity

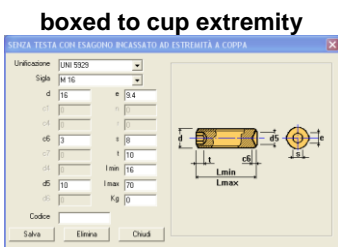
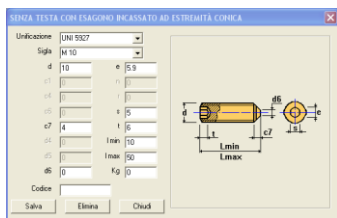


Without head with hexagon boxed to cylindrical extremity



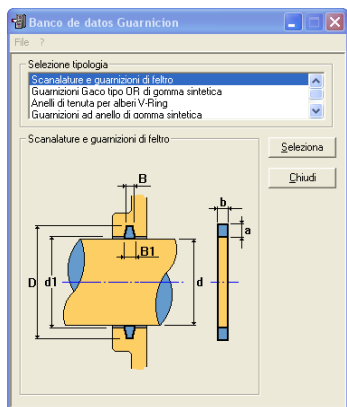
Without head with hexagon boxed to conic extremity

Without head with hexagon



8.3.9 Guarnizioni

Data Base guarnizioni	
	TEC_LSDBMECGUA



In questo database si possono definire 4 tipologie di Guarnizioni meccaniche.

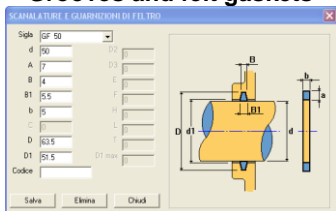
Si deve scegliere, selezionandola la tipologia interessata, quindi premere il tasto "Selezione", è visualizzata la schermata per l'inserimento dei dati.

Inserire il nome nella casella "Sigla" (max 20 caratteri) o selezionarla tramite il tasto per modificarne una inserita precedentemente.

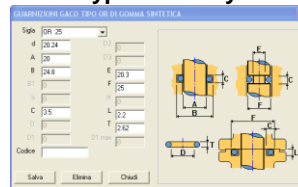
Inserire i valori corrispondenti alle lettere della figura a destra.

La casella "Cod" serve per inserire il codice dell'elemento (non obbligatorio). Nella casella Kg. Inserire il peso in chilogrammi di un pezzo.

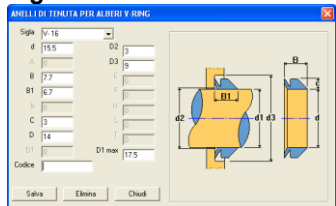
Grooves and felt gaskets



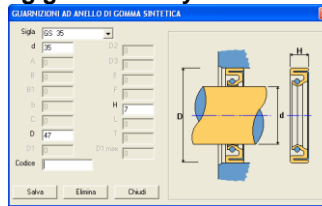
Gaskets Gaco type OR of synthetic rubber



Rings of estate for trees V-Ring

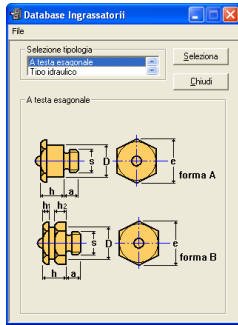


Ring gaskets of synthetic rubber



8.3.10 Lubrificators

Data Base lubrificators	
	TEC_LSDBMECING



In this database 2 typologies of Lubricators can be defined.

It is had to choose, selecting the interested typology, therefore to press the button "Selection."

Is visualized dialog her for the insertion of the data.

To insert the norm in the box "Unification" (max 10 characters) or to select through the button to modify one previously inserted of it.

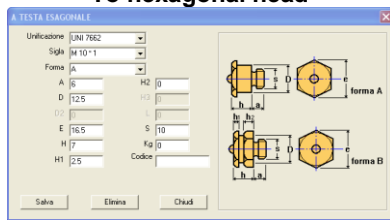
To insert the name in the box "it Initials" (max 20 characters) or to select through the button to modify one previously inserted of it.

In the box "Form" can be selected through the button the form as in the image to the right (A or B).

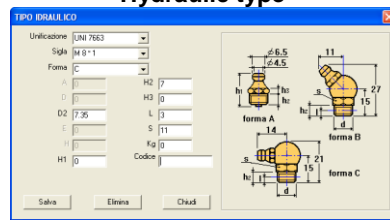
To insert to the right the values corresponding to the letters of the figure.

The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece.

To hexagonal head

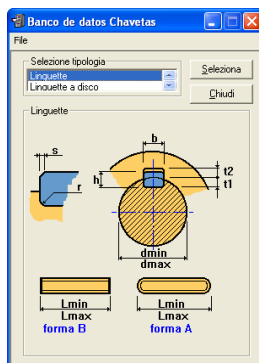


Hydraulic type



8.3.11 Tongues

Data Base tongues	
TEC_LSDBMECLIN	



In this database 2 typologies of Tongues can be defined (or Switches).

It is had to choose, selecting the interested typology, therefore to press the button "Selection."

Is visualized dialog her for the insertion of the data.

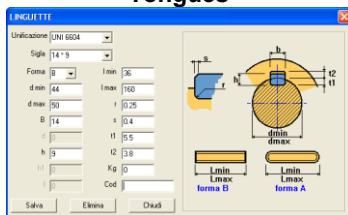
The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece.

The boxes "Lmin" and "Lmax" they respectively serve for defining the least length and available motto, if in the drawing it was had to select a length that doesn't reenter among these, won't be drawn.

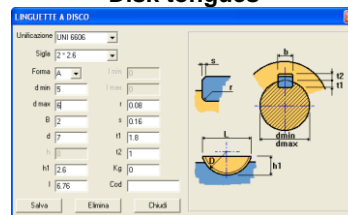
To insert the norm in the box "Unification" (max 10 characters) or to select through the button to modify one previously inserted of it. To insert the name in the box "it Initials" (max 20 characters) or to select through the button to modify one previously inserted of it. In the box "Form" can be selected through the button

the form as in the image to the right (A or B). To insert to the right the values corresponding to the letters of the figure.




Tongues

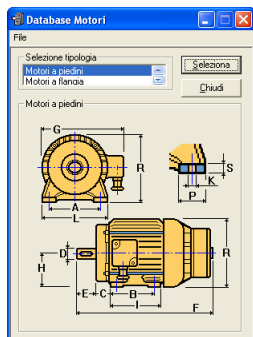


Disk tongues



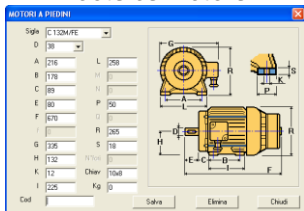
8.3.12 Motors

Data Base motors	
	
	TEC_LSDBMECLIN

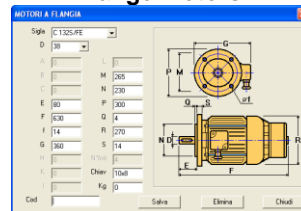


In this database 2 typologies of electric Motors can be defined. It is had to choose, selecting the interested typology, therefore to press the button "Selection." Is visualized dialog her for the insertion of the data. To insert the name in the box "it Initials" (max 20 characters) or to select through the button to modify one previously inserted of it. To insert to the right the values corresponding to the letters of the figure. The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece.




Footies motors

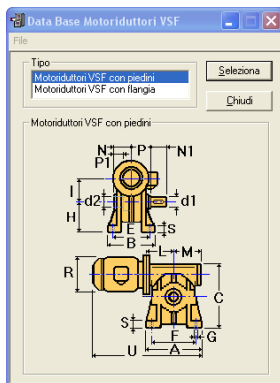



Flange motors



8.3.13 Geared motor SWE

Data Base Geared motor SWE	
	
	TEC_LSDBMECMT2

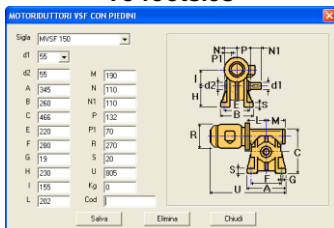


In this database 2 typologies of Geared motor can be defined to Life without end. It is had to choose, selecting the interested typology, therefore to press the button "Selection". To insert the name in the box "it Initials" (max 20 characters) or to select through the button  to modify one previously inserted of it.

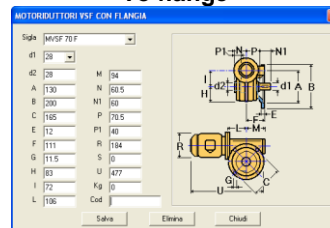
To insert to the right the values corresponding to the letters of the figure. Is visualized dialog her for the insertion of the data.

The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece.



To footies

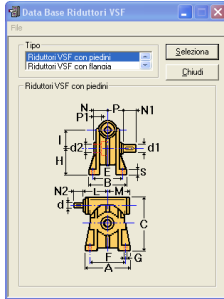


To flange




8.3.14 Reducing WSE

Data Base Reducing WSE.	
	
TEC_LSDBMECRD3	



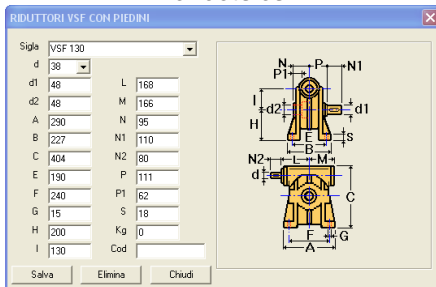
In this database 2 typologies of Reducing gears can be defined to screw without end. It had to choose, selecting the interested typology, therefore to press the button "Selection."

To insert the name in the box "it Initials" (max 20 characters) or to select through the button  to modify one previously inserted of it.

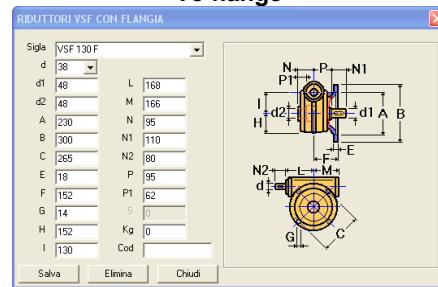
To insert to the right the values corresponding to the letters of the figure. Is visualized dialog her for the insertion of the data.

The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece.



To footsies

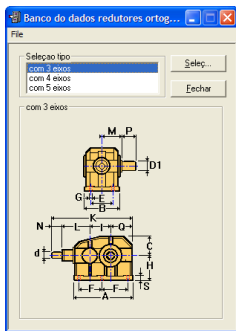


To flange



8.3.15 Orthogonal reducing

Data Base Orthogonal reducing	
	
TEC_LSDBMECRD2	



In this database 3 typologies of Reduction gears Orthogonal can be defined.

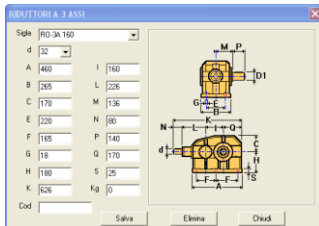
It is had to choose, selecting the interested typology, therefore to press the button "Selection."

To insert the name in the box "it Initials" (max 20 characters) or to select through the button to modify one previously inserted of it.

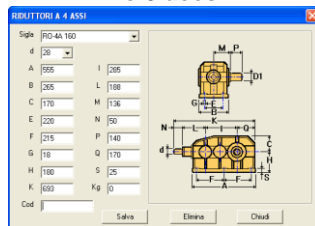
To insert to the right the values corresponding to the letters of the figure. Is visualized dialog her for the insertion of the data.

The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece.

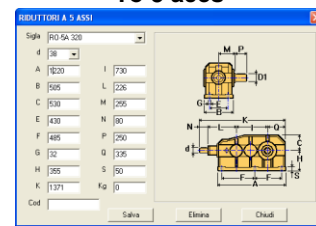
To 3 axes



To 3 axes

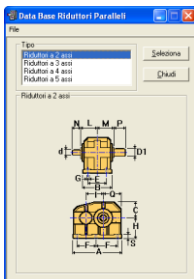


To 3 axes

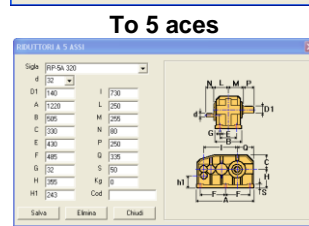
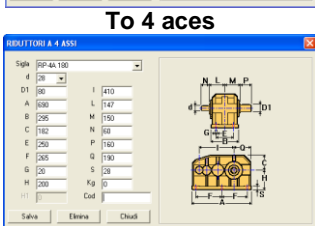
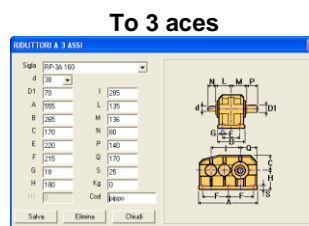
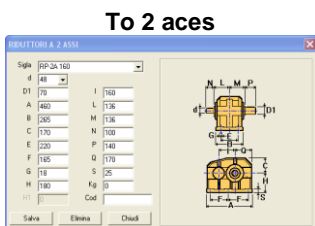


8.3.16 Parallel reducing

	TEC_LSDBMECRD1

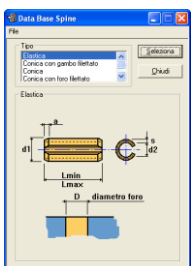


In this database 4 typologies of Parallel Reduction gears can be defined. It is had to choose, selecting the interested typology, therefore to press the button "Selection."
 Is visualized dialog her for the insertion of the data.
 To insert the name in the box "it Initials" (max 20 characters) or to select through the button to modify one previously inserted of it.
 To insert to the right the values corresponding to the letters of the figure.
 The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece.



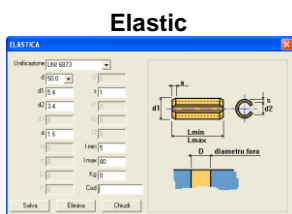
8.3.17 Pins

	TEC_LSDBMECSPI

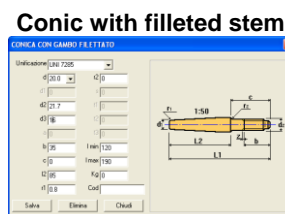


In this database 4 typologies of Pins can be defined. It is had to choose, selecting the interested typology, therefore to press the button "Selection."
 Is visualized dialog her for the insertion of the data.
 The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece.
 The boxes "Lmin" and "Lmax" they respectively serve for defining the least length and available motto, if in the drawing it was had to select a length that doesn't reenter among these, won't be drawn.

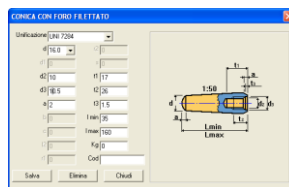
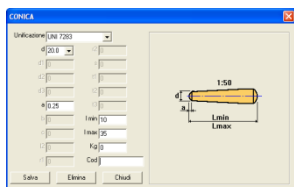
To insert the norm in the box "Unification" (max 10 characters) or to select through the button to modify one previously inserted of it.
 To insert to the right the values corresponding to the letters of the figure



Conic

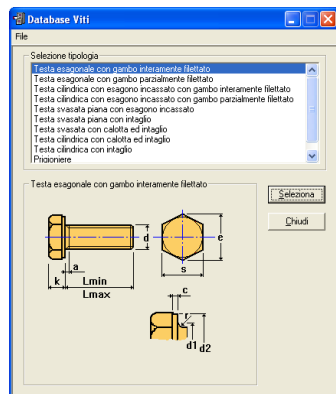


Conic with filled hole



8.3.18 Screw

Data Base viteria	
TEC_LSDBMECVIT	



In this database 10 typologies of Screws can be defined. It is had to choose, selecting the interested typology, therefore to press the button "Selection".

Is visualized dialog her for the insertion of the data. The box "Cod" it serves for inserting the code of the element (not obligatory). In the box Kg. To insert the weight in kilograms of a piece.

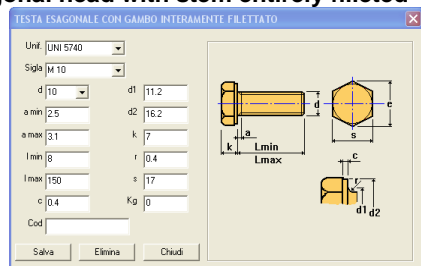
The boxes "Lmin" and "Lmax" they respectively serve for defining the least length and available motto, if in the drawing it was had to select a length that doesn't reenter among these, won't be drawn.

To insert the norm in the box "Unification" (max 10 characters) or to select through the button to modify one previously inserted of it.

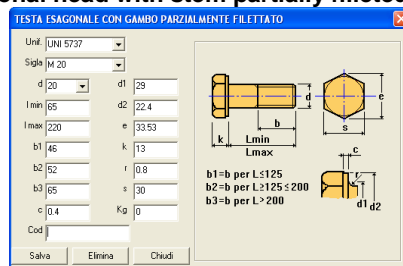
To insert the name in the box "it Initials" (max 20 characters) or to select through the button to modify one previously inserted of it.

To insert to the right the values corresponding to the letters of the figure.

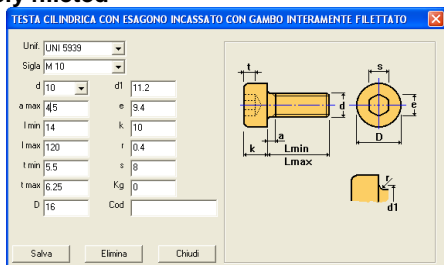
Hexagonal head with stem entirely filleted



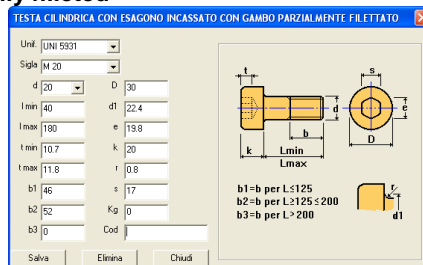
Hexagonal head with stem partially filleted



Cylindrical head with hexagonal boxed with stem entirely filleted

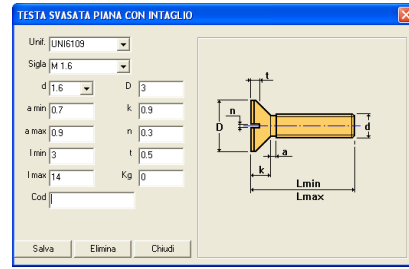
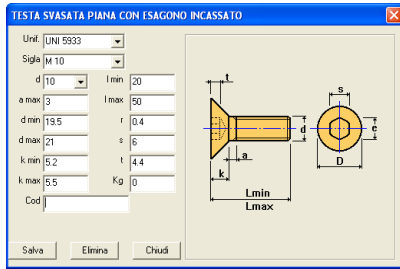


Cylindrical head with hexagonal boxed with stem partially filleted



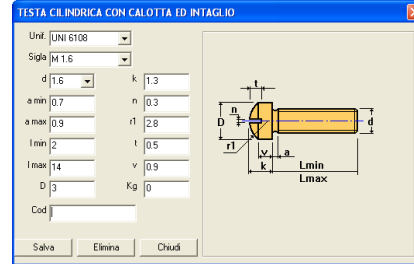
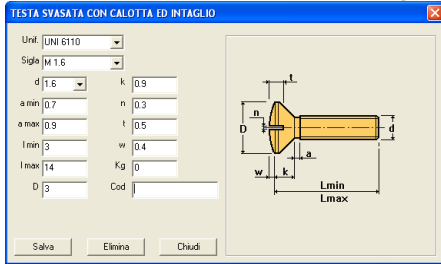
Head flared plain with boxed hexagon

Head flared plain with carving



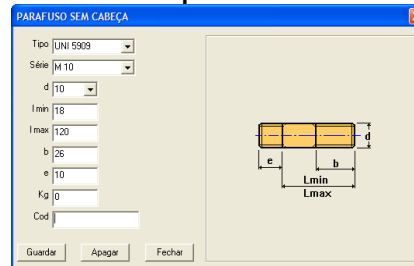
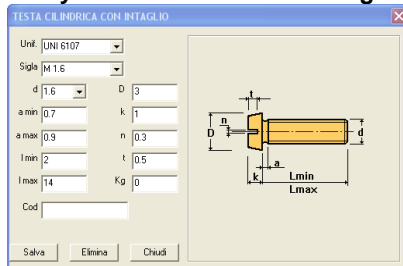
Head flared with cap and carving

Cylindrical head with cap and carving



Cylindrical head with carving

Imprisoned



Capitolo 9. APPENDIX

9.1 Levels and local coordinates of the elements

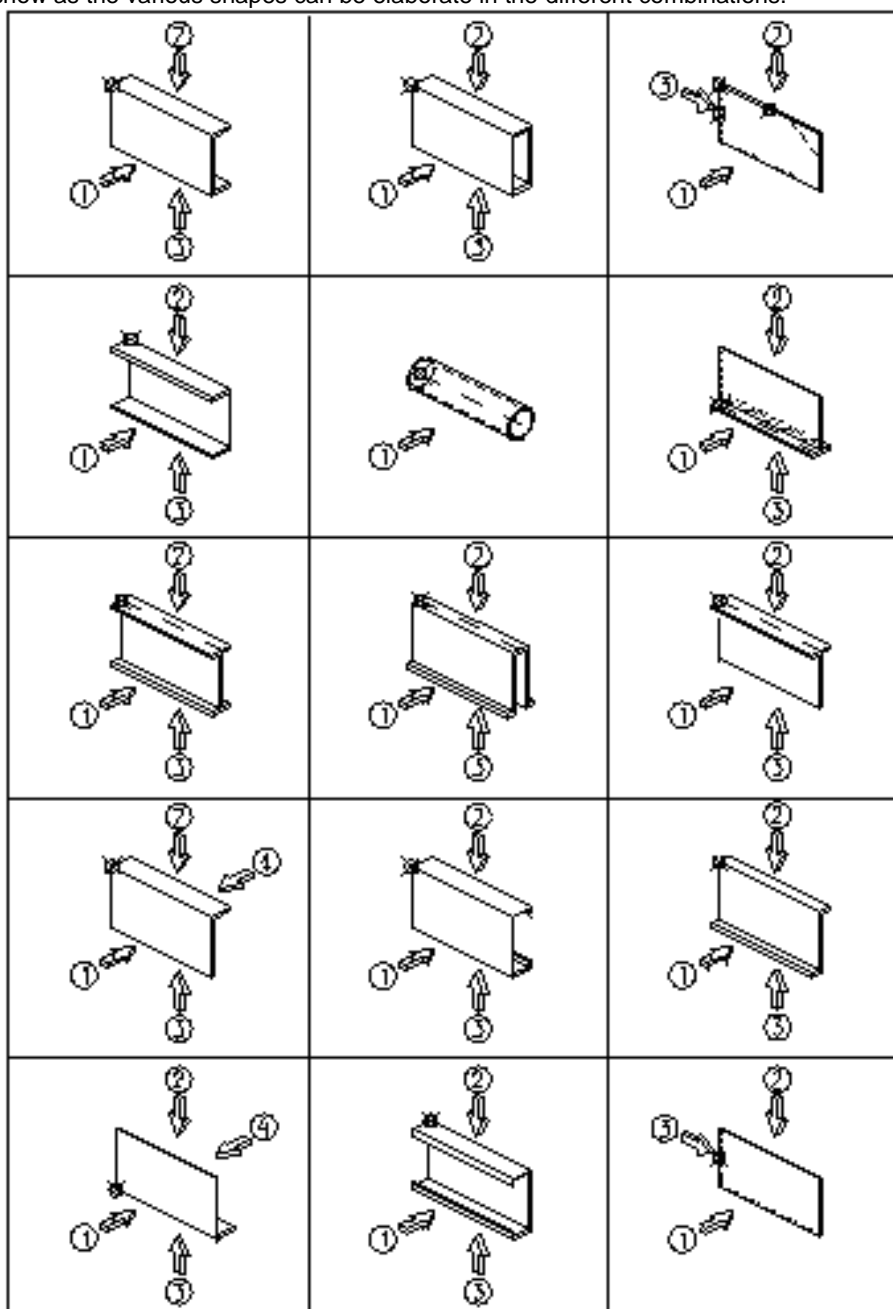
shapes	scheme	shapes	scheme
H		T	
U		Round	
L		Omega	
Pipe square		C	
Pipe round		Z	
Plates		Weld beam	

9.2 Record used in the material lists

Name	Type	Length	Dec.	Description
FLG_REC	Character	2		1 = SubAssembly 2 = Mark Single 3 = Mark compote 4 = Position 5 = Position repeated 6 = Bolts 7 = Screws
NUM_COM	Character	40		Work
DES_COM	Character	50		Description work
LOT_COM	Character	40		Item
DLO_COM	Character	50		Description item
CLI_COM	Character	25		Client
IND_COM	Character	25		Address
DT1_COM	Character	12		Date Work
NUM_DIS	Character	40		Number drawing
DES_DIS	Character	50		Description drawing
NOM_DIS	Character	10		Designer
REV_DIS	Character	5		Revision
DAT_DIS	Character	12		Date drawing
TRA_PEZ	Character	25		Treatment
SBA_PEZ	Character	25		SubAssembly
TIP_PEZ	Character	3		Constructive typology
MAR_PEZ	Character	25		Mark
MBU_PEZ	Character	25		Mark or SubAssembly bolt
DES_PEZ	Character	35		Description
POS_PEZ	Character	25		Position
NOT_PEZ	Character	25		Notes
ING_PEZ	Character	20		Volume
QTA_PEZ	Numeric	7	0	Quantity
QT1_PEZ	Numeric	7	0	Quantity bolts of workshop
MCL_PEZ	Character	6		Macro Cycle of Workmanship
COD_PEZ	Character	25		Code of store
COS_PEZ	Character	3		Code of cost
NOM_PRO	Character	40		Shape
LUN_PRO	Numeric	10	2	Length
LAR_PRO	Numeric	10	2	Width
SPE_PRO	Numeric	5	2	Thickness
MAT_PRO	Character	35		Material
TIP_BUL	Character	2		Typology bolt
DIA_BUL	Numeric	5	2	Diameter bolt
LUN_BUL	Numeric	6	2	Length bolt
PRB_BUL	Character	4		Prefix bolt
PUN_LIS	Numeric	11	3	Unitary weight
SUN_LIS	Numeric	9	3	Unitary surface
PRE_LIS	Character	6		Prefix plates
FLG_DWG	Character	40		Filename DWG

9.3 Available views on the shapes for extraction of the sketch

The figures show as the various shapes can be elaborate in the different combinations.



9.4 Comparison of the steels in the various legislations

UNI EN 10025-95	ITALY UNI 7070	GERMANY DIN 17100	FRANCE AFNOR NF A 35.501	G.B. B.S. 4360	SPAIN UNE 36080	USA ASTM
S185	Fe 320	St 33	A 33	-	A 310-0	-
S235JR	Fe 360B	St 37-2	E 24-2	40 A	-	A 283 GR.C/GR.B
S235JRG2	-	RSt 37-2	-	40 B	AE 235 B-FN	-
S235J0	Fe 360C	St 37-3U	E 24-3	40 C	AE 235 C	-
S235J2G3	Fe 360D	St 37-3N	E 24-4	40 D	AE 235 D	-
S235J2G4	-	-	-	-	-	-
S275JR	Fe 430B	St 44-2	E 28-2	43 B	AE 275 B	A 36/A 283 D
S275J0	Fe 430C	St 44-3U	E 28-3	43 C	AE 275 C	-
S275J2G3	Fe 430D	St 44-3N	E 28-4	43 D	AE 275 D	A 633 GR. A
S275J2G4	-	-	-	-	-	-
S355JR	Fe 510B	-	E 36-2	50 B	AE 355 B	A 572 GR.50/A 678 GR.A
S355J0	Fe 510C	St 52-3U	E 36-3	50 C	AE 355 C	-
S355J2G3	Fe 510D	St 52-3N	-	50 D	AE 355 D	-
S355J2G4	-	-	-	-	-	-
S355K2G3	Fe 510DD	-	E36-4	50 DD	-	-
S355K2G4	-	-	-	-	-	-
E295	Fe 490	St 50-2	A 50-2	-	A 490	-
E355	Fe 590	St 60- 2	A 60-2	-	A 590	-
E360	Fe 690	St 70-2	A 70-2	-	A 690	-

9.5 Variables inserted in the files CAM

Variable	Description	Variable	Description
\$NUM_COM	Number of the work	\$ING_PEZ	Encumbrance
\$DES_COM	Description of the work	\$QTA_PEZ	Quantity
\$LOT_COM	Number of the item	\$MAR_PEZ	Mar
\$DLO_COM	Description of the item	\$POS_PEZ	Position
\$CLI_COM	Client	\$COS_PEZ	Code of cost
\$IND_COM	Address	\$NOM_PRO	Shape
\$DAT_COM	Date	\$TIP_PRO	Type in shape
\$NUM_DIS	Number of the drawing	\$LUN_PRO	Length
\$DES_DIS	Description of the drawing	\$LAR_PRO	Width
\$DAT_DIS	Date of the drawing	\$SPE_PRO	Thickness
\$REV_DIS	Revision	\$MAT_PRO	Material
\$NOM_DIS	Designer	\$PES_PRO	Weight to the meter
\$CMP_MAR	Composition marks	\$SUP_PRO	Surface to the meter
\$SBA_PEZ	SubAssembly	\$CPE_LIS	Weight coefficient
\$TIP_PEZ	Constructive typology	\$NOT_PEZ	Notes
\$MCL_PEZ	Macro cycle of Workmanship	\$PUN_LIS	Unitary weight
\$DES_PEZ	Description piece	\$SUN_LIS	Unitary surface
\$COD_PEZ	Code of store	\$TRA_PEZ	Treatment
\$CSU_LIS	Coefficient surface	\$SPD_NOT	Notes SPD
\$CMP_SBS	Composition Subassembly	\$CMP_TOT	Composition marks total