drawing with cassio 4

spirax sarco

www.spiraxsarco.com/cad

copyright

This document is published by:
Spirax-Sarco Limited
Charlton House
Cheltenham
Gloucestershire
GL53 8ER
UK

acknowledgements

Windows® is a registered trademark of Microsoft Corporation.
AutoCAD® LT is a registered trademark of Autodesk, Inc.
Freehand® is a registered trademark of Macromedia, Inc.
Illustrator® is a registered trademark of Adobe Systems, Inc.
Paint Shop Pro™ is a trademark of Jasc Software, Inc.

update history

This is version 2.0 of the Spirax Sarco 'Drawing with CASSIO' Training Pack. It gives tutorials on how to use CASSIO in conjunction with AutoCAD LT 2002 (though can also cover AutoCAD LT 2000, 2000i and 2004) in order to create high quality CASSIO style application/system drawings.

other documents in the series

'Introduction to AutoCAD LT'

contents

more about smart pipe

exercise 2

finishing a drawing

application drawings

utilising the online libraries

customising and exporting

welcome!

Welcome to the Spirax Sarco 'Drawing with CASSIO 4' training pack!

This is the second training pack in this series, and is designed to inform you what the CASSIO library is, what it can be used for and how to actually use it. This will enable you to make full use of the library and allow you to benefit from the advantages it offers.

The first and most important thing you need to know is that to get the best out of CASSIO, you must first become familiar with the basics of AutoCAD LT. AutoCAD LT is the Computer Aided Design software that supplies the platform on which CASSIO runs - without it you cannot use CASSIO.

If you are already familiar with AutoCAD LT, then you have the correct training pack. However, if you are a newcomer to AutoCAD LT it is recommended that you complete the 'Introduction to AutoCAD LT' training pack first. This is the first training pack in the series and will give you the relevant knowledge of AutoCAD LT required in order to successfully complete this training pack.

using this manual

This training manual has been written with the assumptions that you:

⇒ are familiar with Windows based applications
⇒ have installed AutoCAD LT 2002
⇒ are familiar with using AutoCAD LT 2002
⇒ have installed CASSIO 4

It is not advisable to attempt to use CASSIO if you have no AutoCAD LT experience. Doing so will almost certainly present you with problems and, in turn, will greatly reduce the effectiveness of CASSIO.

Sections 1 and 2 in this manual describe what CASSIO is, what it can be used for and how the library is arranged so that you can easily find the drawings you want.

Sections 3, 4 and 5 will introduce you to actually using CASSIO to create drawings. These sections explain, with examples, how to use

the special features unique to CASSIO, in conjunction with AutoCAD LT commands to produce high quality 'CASSIO style' drawings.

Sections 6, 7, 8 and 9 deal with additional features of CASSIO. Section 6 covers the features of CASSIO used to add the final touches to a drawing - like adding annotations and a border template. Section 7 looks into the application drawing library that comes with CASSIO, while section 8 looks into utilising the online Spirax Sarco CAD Resource Centre and it's libraries. This will become an increasingly important area of CASSIO as updates to products and application drawings are made available.

Finally, section 9 looks at customising templates to suit your specific needs and also exporting CASSIO drawings for use in other Windows applications.

documentation conventions

Within this manual, different bullet point shapes are used to show you whether the bullet is:

⇒ giving you information, or
☞ telling you to do something

These bullets will often be used together and in conjunction with numbers to give clear instructions. For example:

Telling you to do something

☞ Do the following to insert an M10S Ball Valve:

1. Click on ***CASSIO, Pipeline Ancillaries, Ball Valves***
2. Select the ***M10S L Sc*** and click O.K.

Giving you information

⇒ the command line now reads *'Insertion point'*

3. Position it anywhere on the page and click the **left mouse button**

You will also notice that some text in the instructions is either **bold**, *italic* or ***bold and italic***. Specific terms are formatted to distinguish them from the body text. Throughout this manual the following conventions are used:

Text element	Example
Commands/pull-down menu items	***CASSIO, Pipeline Ancillaries, Ball Valves***
Prompts	*'Insertion point'*
Mouse button click	**left mouse button**
Text you enter	Use a 'width' of **1500** and a 'length' of **1000**

things to remember when using autocad lt

One of the main things to remember when using AutoCAD LT is that like many other Windows® applications, commands and procedures can be selected in a number of different ways. The two most common ways in most applications are by utilising pull-down menu's, or by clicking on a specific button in a Toolbar or Toolbox.

AutoCAD LT however, has another important way of entering commands. This, as you may be aware is via the command line located at the bottom of the screen. All AutoCAD commands can be issued by entering the command name or shortcut via the keyboard. At certain stages during some commands, you will be prompted by AutoCAD to enter text to inform the program what you want to do. In these cases, using the keyboard is the only option.

As with the first training pack in this series, whenever a new command is introduced, each way of selecting the command will be shown like this:

Explode Command	
	Toolbox or Toolbar button
Modify, Explode	Pull-down menu and item
EXPLODE	Command name (enter at command line)
X	Shortcut (enter at command line)

CASSIO, however has been designed so that keyboard entry is kept to a minimum, thus making CASSIO easy to learn and easy to use. You will see how this has been done as you work through this manual.

Expert users of AutoCAD LT do not have to worry! The CASSIO program does not alter the way the AutoCAD LT commands work, it simply adds features to allow you to produce 'CASSIO style' drawings easier.

Whether you have just completed the first training pack in this series or you are an expert AutoCAD LT user, you should find that this manual gives you all the information you need in order to get the best out of CASSIO. By following the instructions carefully, you should be up and running using CASSIO to produce high quality drawings in no time!

help!

Further help is available to you at any time while working through this training pack, by any of the following sources:

⇒ By referring to the first training pack in this series - 'Introduction to AutoCAD LT 2002', if you have it.

⇒ By using the web browser based CASSIO help facility. Context sensitive help is available within some CASSIO features – look for the 'Help' button within wizards etc. Help is available on all aspects of CASSIO at any time by clicking ***CASSIO, Support + Additional Resource, CASSIO Assistance***. The contents page has links to specific assistance or you can use the search facility.

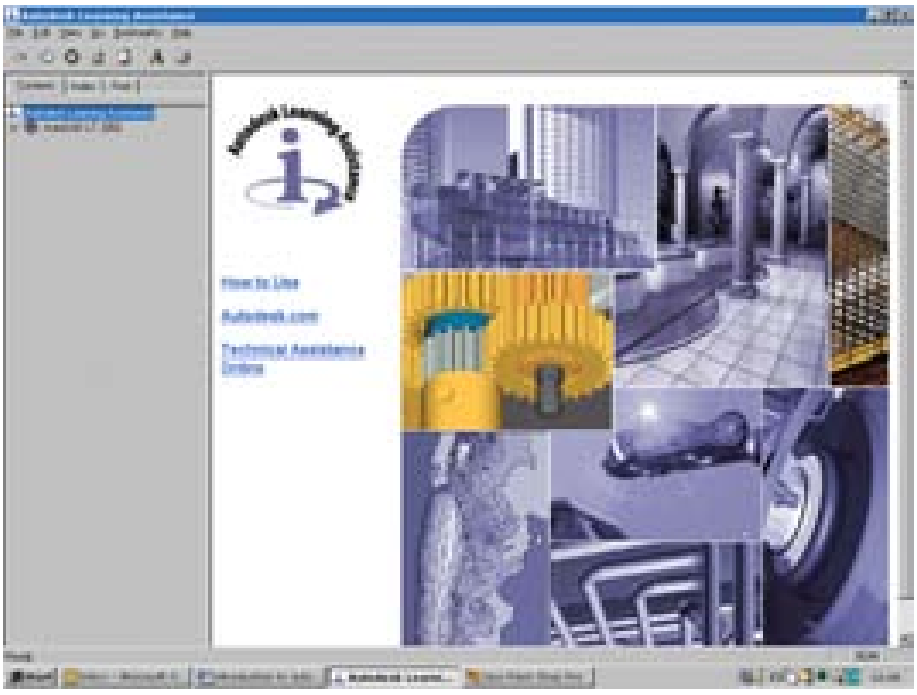
⇒ By utilising AutoCAD LT's help facility. The ***'Search'*** option is most useful. Also, if you would like help on the currently running command, click the 'Help' toolbar button at the top of the screen.

⇒ By holding the cursor over a Toolbar or Toolbox button, a tooltip will be displayed informing you of what command or feature the button activates. Also a brief description of the command appears at the bottom-left of the screen.

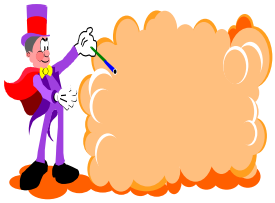
⇒ By referring to the 'AutoCAD LT Users Guide' manual.

⇒ By utilising AutoCAD LT's 'Learning Assistance' facility shown below). This comes in the shape of an interactive training programme that contains tutorials, fast answers and concepts. A separate CD will have been supplied with your AutoCAD LT software. Refer to the back of the CD case for instructions on installation and use.

AutoCAD LT Learning Assistance…



section 1
introducing cassio

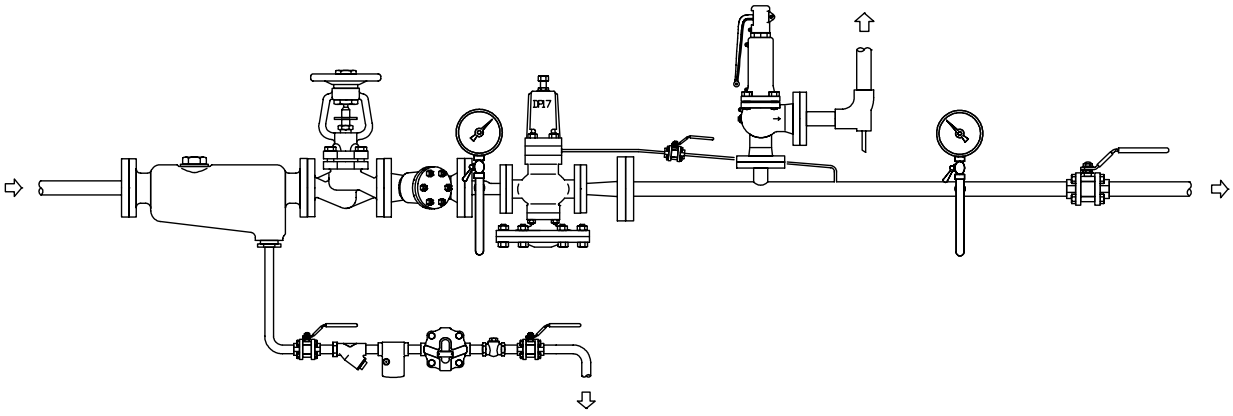


This first section explains what exactly CASSIO is and what it can be used for. There is no point in learning how something works if you don't know what to do with it once you have learnt how to use it!

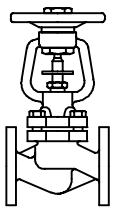
This section illustrates what 'CASSIO style' drawings are and in what situations they can be used for the greatest effect.

what is cassio?

In it's simplest terms CASSIO is a computer/AutoCAD LT based library of 1,600 drawings covering virtually all of Spirax Sarco's world wide products. A further 400 installation/application drawings are available ranging from simple ones, like a pressure reducing valve station, to more complicated examples involving a complete steam and condensate loop. The library is accessed via the Computer Aided Design program AutoCAD LT.



A typical 'CASSIO style' Hook-up drawing



All of the products you see, for example separator, stop valve etc. have been taken from the CASSIO library and joined together to form the final system layout.

You will produce the same drawing yourself later in this manual as practice for when you create your own application drawings.

uses

Once a drawing has been produced using CASSIO it can be used for a number of different purposes. These include:

⇒ ***Quotations.....*** drawings can be easily imported into Microsoft Word or Excel to form part of a quotation. The drawings can be scaled to fit into text.

⇒ ***Sales Literature.....*** drawings can form a basis for artwork to be incorporated into sales literature by importing them into software like Adobe PageMaker.

⇒ ***Slides.....*** drawings can be imported into Macromedia Freehand and/or Microsoft PowerPoint and coloured to produce high quality slides.

⇒ ***Training Literature.....*** a combination of slides and paper copy provide excellent training material.

advantages

Of course, some of these things could be done by hand, without using a computer, so why use CASSIO?

⇒ ***Speed and quality.....*** drawings can be produced in a fraction of the time taken to do them by hand, and to a far superior quality. Professional drawings, done quicker could mean more quotations 'out the door'….and more orders back in?!

⇒ ***Corporate Identity.....*** throughout the world - whether a drawing is in a quotation, in training material or in sales literature, customers all over the world see the same style of high quality drawings which are instantly recognisable as Spirax Sarco work.

⇒ ***Shared Resource.....*** drawings produced by one individual may be passed on to other CASSIO users elsewhere in the organisation.

what cassio is not intended for

CASSIO provides you with Sales and Marketing material. The diagrams are not suitable for use as engineering drawings in production. Although, where possible, all 15mm products in the library have been drawn to scale, once they have been scaled up to represent larger products using the CASSIO scaling convention, these larger products will no longer be 'to scale'. This will become clearer when you read through the remaining sections of this manual.

things to remember when using cassio

cassio rules

As has been mentioned above, one aim of the CASSIO system is to allow new drawings to be shared. This prevents duplication of effort. However, if this is to be successful, all CASSIO users must follow the same set of rules for layout and scaling.

All the drawings in the CASSIO library have been set up using the same layout rules. This allows all CASSIO users to share the same set of drawings easily.

Any drawings that may be useful to other CASSIO users can be added to the Group Marketing Drawing Library and, if agreed, added to the online application drawing library. Any drawings sent to Group Marketing for inclusion in the library must follow the same set of rules.

⇒ Even if you do not believe the drawing you have created will be added to the library, it is worth adopting the standard, in order that:

- ✓ Your drawings present the same style as other Spirax Sarco drawings.
- ✓ You can share drawings locally, because they will be produced in the same way.
- ✓ When you *do* want to add a drawing to the library you do not have to redraw it in the correct style.
- ✓ Your drawings can be added to the library and shared world-wide.

⇒ Examples of the rules are as follows:

- ✓ All product drawings in the library are based on the 15mm version.
- ✓ All product drawings with flanges use flanges of 95mm diameter and 12mm thickness.
- ✓ For 15 and 20mm products the corresponding pipework's outer diameter should be sized to 21mm.

In real life, of course, there are many different sizes of products available and the pipework diameter will increase with the product size. To save including every possible size of every product and cluttering the library with too many drawings, a scaling convention has been devised. This means that you scale the product up to the required size when you insert it into the drawing.

⇒ The scaling convention is as follows:

- ✓ A 15mm product will be used at a scale of 1:1
- ✓ A 25mm product will be used at a scale of 1.10:1 (10% larger)
- ✓ Each additional line size increases by 10% (a scale of 1.1)

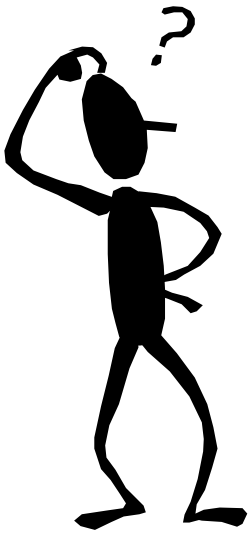
Tip!
You can view the scaling conventions at any time by clicking ***CASSIO, Support + Additional Resource, Smart Scaling Conventions***.

A full list of all of the scale factors and corresponding pipe sizes is shown below.

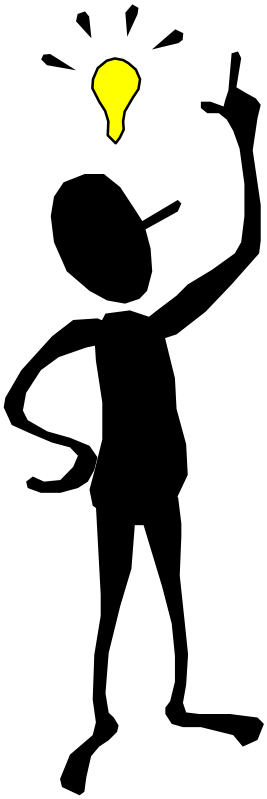
Actual product sizes		CASSIO sizes		
Metric	Inches	Scale factor	Pipe diameter	Flange diameter
15, 20 + fixed	½, ¾	1.00	21.00	95.00
25	1	1.10	23.10	104.50
32	1¼	1.21	25.41	114.95
40	1½	1.33	27.95	126.35
50	2	1.46	30.75	138.70
65	2½	1.61	33.82	152.95
80	3	1.77	37.20	168.15
100	4	1.95	40.92	185.25
125	5	2.14	45.02	203.30
150	6	2.36	49.52	224.20
200	8	2.59	54.47	246.05
250	10	2.85	59.92	270.75
300	12	3.14	65.91	298.30

Early versions of CASSIO required the user to enter the appropriate scale factor via the keyboard for each product inserted. This could get confusing if you were creating a drawing that contained many different sized products.

The version of CASSIO you are using (Version 4) provides an automated way of specifying a product size. The feature is called Smart Scaling and it uses exactly the same scale factors, except you select them from a menu rather than having to type them in.



You will find out more about Smart Scaling and the other special features of CASSIO later in this manual.



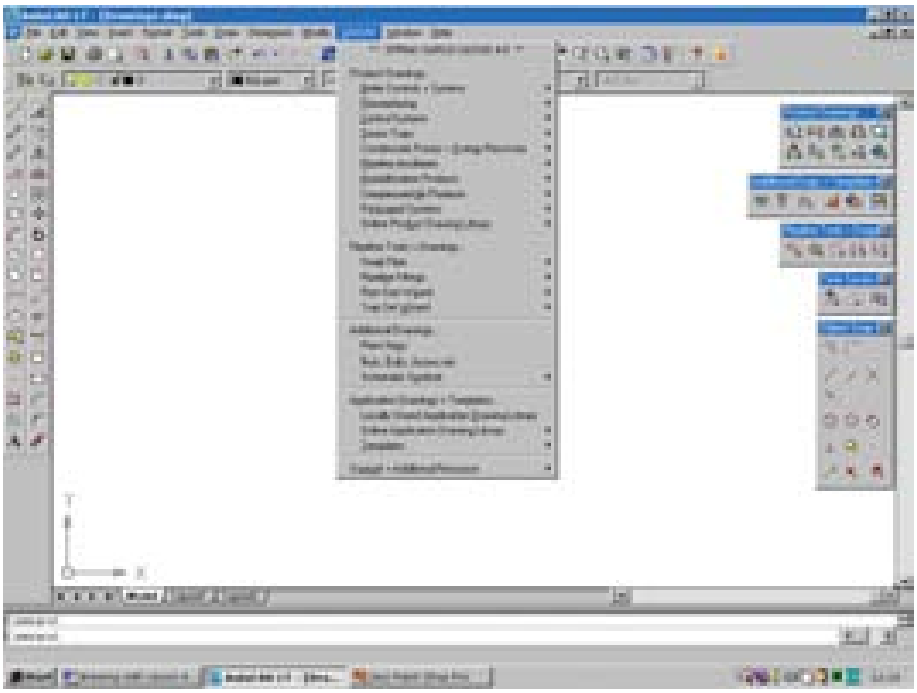
section 2
finding your way around

With over 2,000 drawings in the library, finding the one you want would be a little tricky to say the least if the drawings were not arranged logically. This section of the training pack explains how the library has been arranged, so that you know in which section of the library you need to look to find the drawing you need.

If you have installed CASSIO, you will notice a pull-down menu called ***CASSIO*** located next to the ***Window*** pull-down menu. This is where all of the CASSIO drawings and special features are located. Most of these features will also be available on relevant toolbars. During this manual the 'pull-down menu route' to CASSIO features will be described in the body text, with the associated CASSIO toolbar or toolbutton shown in the margin.

Within the menu a number of multi-level menu's have been created which guide you through the selection process until you can see the product you are interested in. The conclusion being the display of the drawings available in the selected section.

☞ Open AutoCAD LT and click on the ***CASSIO*** menu.



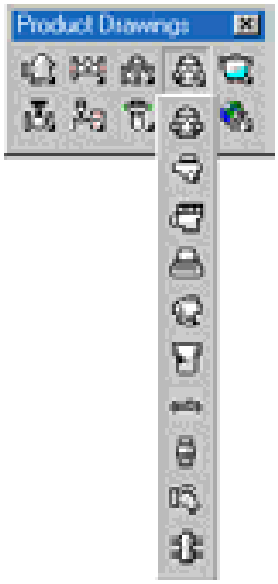
finding the products you need

Tip!
The letters that are underlined are hot-keys. You can navigate via the keyboard by using these.

Those who have used our Product Handbook will instantly recognise the product menu categories. The menu layout for this library uses the same structure as that already used in our Product Handbook. Product drawings are grouped together according to type or function and with similar products sub-divided into sections.

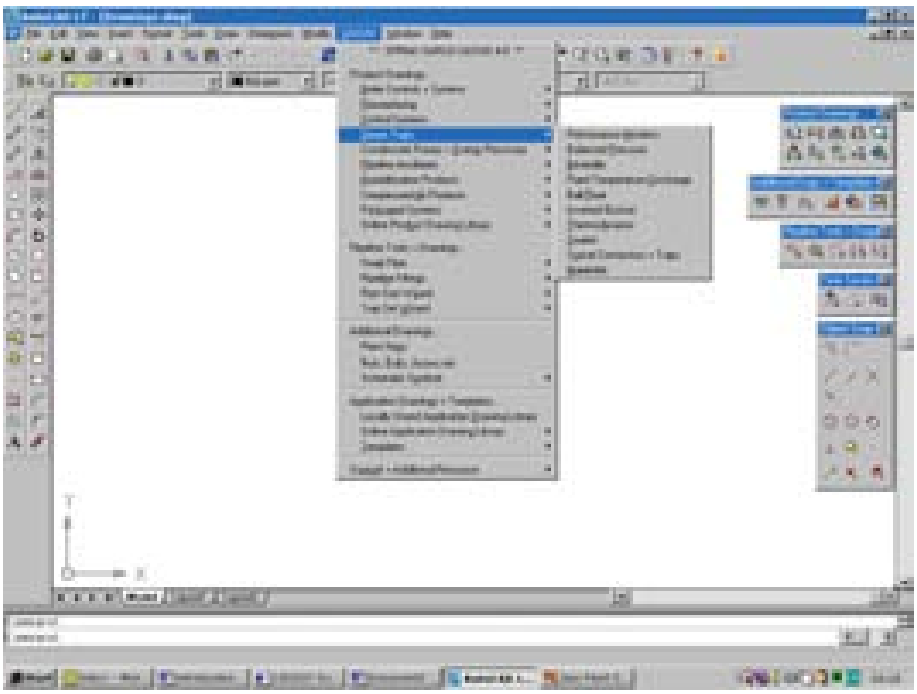
This also ties in with our online libraries (discussed later), which also use this structure, so things are consistent throughout both our literature and our software. This means that if you see a product in the handbook, it will be located in the same place in CASSIO and in the online product library.

You will see that at the end of these items (and some others) is an arrow pointing to the right. This means that there is a sub-menu with more options under this item.



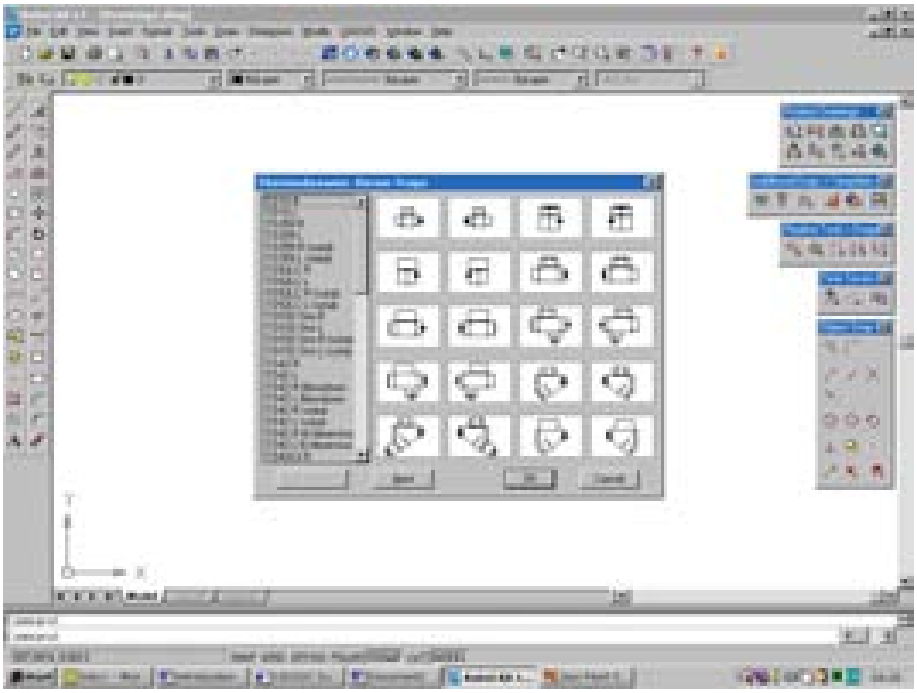
☞ Click on ***Steam Traps*** to view the product groups under this section.

The screen will look like this...



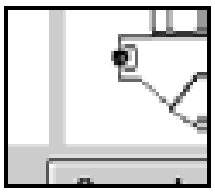
The next mouse click will present you with an array of thumbnail images showing each product in the section you choose.

☞ Click on ***Thermodynamic*** to see all of the Thermodynamic steam traps available in the library.

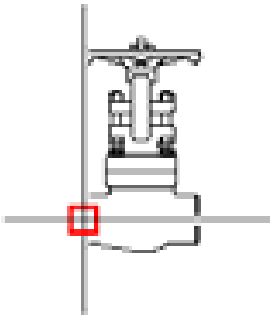


You will notice that the names of the available products are listed on the left hand side of the menu. If you click on the name of the product, the corresponding thumbnail is also highlighted and vice-versa. This means that you can select the product by looking at the image or by selecting the name.

Once you have highlighted the drawing you require, you can insert it into the drawing area by double-clicking on the product or clicking O.K.



It's worth noting at this stage what relevance the small black (or white) dot shown on all images has on proceedings. This dot shows where the drawing will be 'picked-up' by the crosshair. You may remember when using the ***Move*** and ***Copy*** commands - a basepoint was specified to 'pick-up' the image you had selected. The dot represents where this point is on each drawing and will not be displayed when the drawing is inserted onto the drawing sheet.



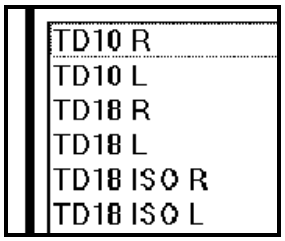
With this point you can accurately *snap* the drawing to another product or section of pipework you have already drawn.

Two drawings of the same product are usually included in the library. One facing from left to right (labelled 'L') and the other from right to left (labelled 'R'). This means that you can build your drawing in

either direction and you will not have to ***Mirror*** each individual drawing to face the correct way.

This will become clear when you start using the library to produce drawings in the next section.

naming conventions



You will notice that as well as the product name and orientation, other abbreviations are often used in the drawing descriptions.

The basic naming convention generally consists of the product name followed by its view or orientation. For example, TD42 L is a TD42 Thermodynamic steam trap shown with flow from left to right.

However, many product titles consist of a number of other naming conventions or abbreviations to help describe a particular drawing. A full list of these is shown below:

This convention/ abbreviation...	Means this...	Example
Product views & orientations		
R	Right to left flow	TD42 R
L	Left to right flow	TD42 L
V or Ver	Vertical flow	FT14 V Cover Sc
Z	Z axis view (for example, the view looking through the centre orifice)	FT14 Z Sc
Fi	Full image (for example,	ILVA Fi L
Connection types		
Sc	Screwed	BPT21 L Sc
Fl	Flange	BPT21 L Fl
Wd	Weld	BTD52 L Wd
Bw	Butt weld	AV45 Bw L
Product Options		
B/down or Bd	Blowdown version	TD42 L Bd+Iso
Iso	Isotub option (for Thermodynamic steam traps)	TD42 L Bd+Iso
H or Hor	Horizontal version	FT54H* L
V or Ver	Vertical version	FT54V*
SLR	Steam lock release option	FT14 L SLR Sc
Other conventions		
*	More than one product shares this drawing (for example, the BSA2 & BSA3 look the same as the BSA1 so use the same drawing)	BSA1* L
#	Insert the drawing using a scale factor of 1:1	BC 3200#

where to find other useful tools and drawings

The next few sections of the ***CASSIO*** menu contain various other useful drawings and tools that have been included to make drawing production easier.

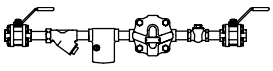
pipeline tools + drawings

This section contains tools and drawings for adding pipework, and pipework ancillaries to your drawings.

The ***Smart Pipe*** tool allows you to add different types of pipework at different line sizes to your drawing quickly and easily.

The ***Pipeline Fittings*** section contains various drawing that you can add to pipework for maximum detail. For example, pipe unions, drain elbows, flanges and pipe cut-sections can all be found here.

The ***Pipe Size Wizard***, as the name suggests, adds an expander or reducer to a section of pipework enabling you to show an increase or decrease in pipe size.

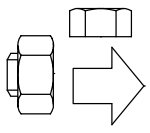


The ***Trap Set Wizard*** lets you create any number of different styles of trap set extremely quickly. The wizard prompts you to choose the products you wish to include and adds them automatically! You can select from most of the steam traps and ancillary products (screwed or flanged) in the CASSIO library.

additional drawings

Here you will find drawings of items that Spirax Sarco may not sell, but are useful to have to hand when creating a system layout.

The ***Plant Items*** section holds drawings of various types of plant equipment, like boiler cross sections, HWS Calorifiers, jacketed pans and heating tanks.



The ***Nut's, Bolts, Arrows etc.*** section is fairly self-explanatory. Other, non-plant related drawings like, direction arrows, nuts/bolts, and a floor sections are a few examples.

You will notice that there is also a ***Schematic Symbols*** section in the menu. This section contains a basic selection of the standard Process and Instrumentation type symbols, so that this style of drawing can also be produced using CASSIO.

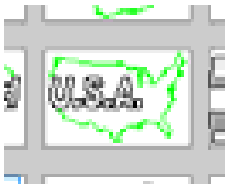
application drawings + templates

This section gives you access to both the locally stored application drawing library and the online (web-based) application library, as well as the drawing border/template tools.

The ***Locally Stored Application Drawing Library*** will be located either on your computers hard disk or the CASSIO CD, depending on your choice during installation. It contains a standard set of system drawings that you may find useful – you can drag-and-drop these drawings into your drawing page and use parts of these drawings to create your own designs. However, or if you're lucky, you may find the drawing you want already drawn!

The ***Online Application Drawing Library*** tools take you to various sections of the online library stored at the Spirax Sarco CAD Resource Centre. The online library works in the same way as locally stored version, but has the advantage of being regularly updated with new drawings.

Both the online and offline libraries are organised in the same way. They both use your web browser to display the information, though you will not be connected to the internet when viewing the locally stored library. The same top-level categories and numerous sub-categories are shown in both versions.



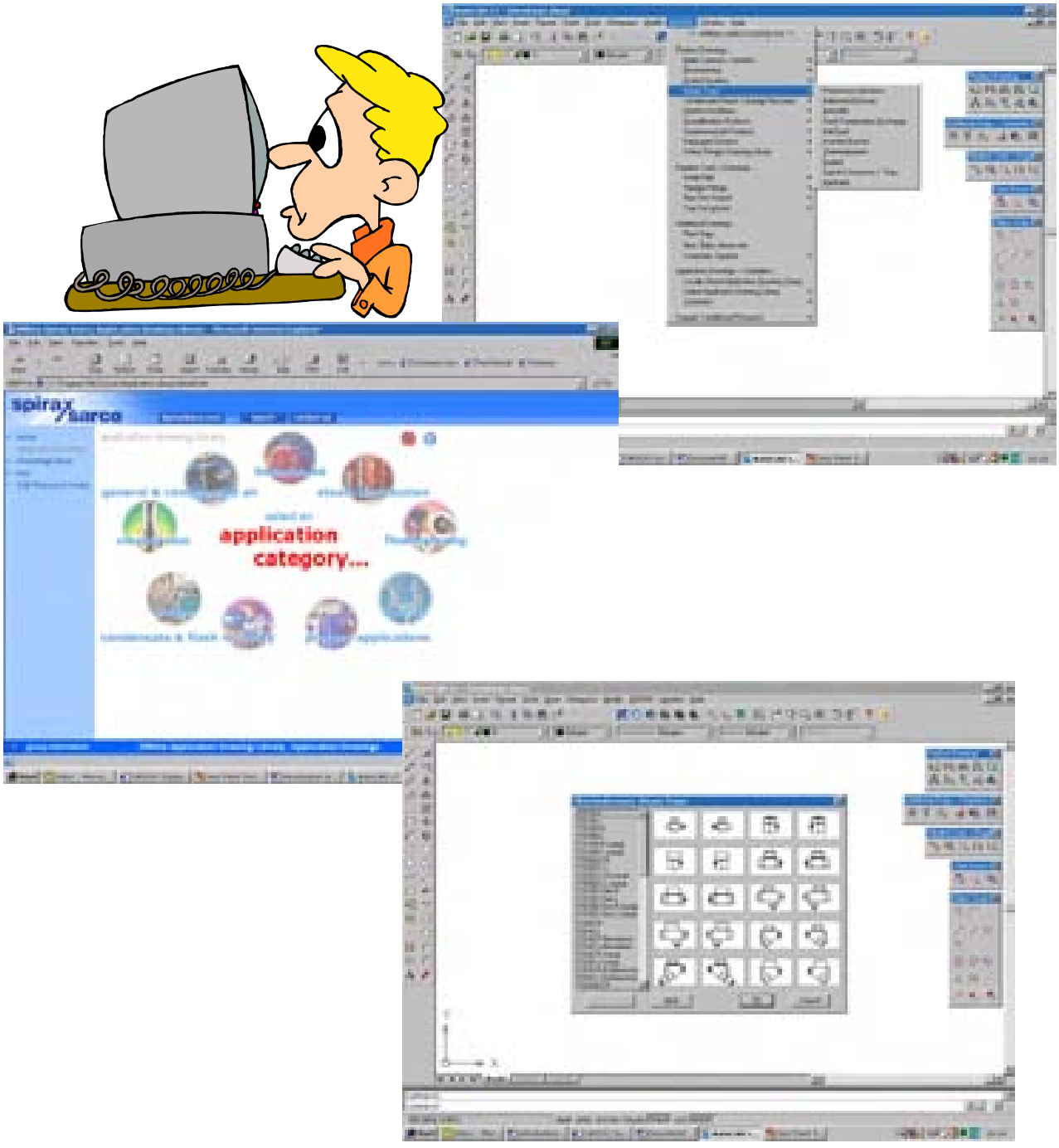
The ***Templates*** section contains wizards for setting up pre-defined border/templates and customising these templates to suit your own requirements. For instance, if you are using CASSIO in a country other than England, you may wish to customise and store a template that contains your contact details and text in your language.

These features will also be covered in more detail later in this manual.

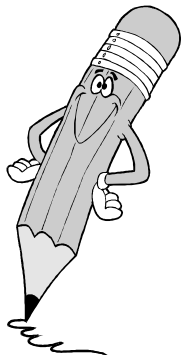
support + additional resource

This section contains links to both CASSIO and company/product information. A full help system for CASSIO is provided that gives you information on all its features. In addition to this, links to the Spirax Sarco website will provide you with local contact information and detailed product information, via our technical library.

All the sections of the CASSIO menu have now been covered. At this point it might be a good idea to spend a few minutes exploring the menu structure again before moving on to the next section and starting to draw. Although full instructions are given in this manual, only by exploring the menu will you gain a better understanding of where to find the drawing or feature you want to use.



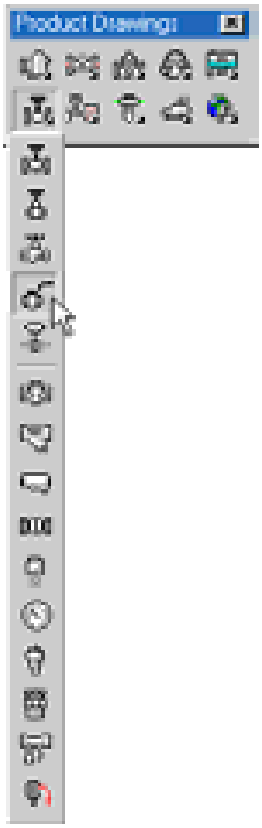
section 3
simple drawing



In this section we will look at creating simple 'CASSIO style' drawings. We will deal with selecting products, sizing them, connecting them together and adding the appropriate sized pipework. By closely following the instructions given you will find that you can build an accurate drawing in a very short space of time.

using flanged products

☞ We will start by inserting some flanged products in order to create a 15mm (½") flanged trap set. Normally, of course, we could use the Trap Set Wizard, but to practice inserting and attaching products, follow the instructions below:



1. Start a ***New*** drawing with a 'width' of **1485** and a 'length' of **1050**

⇒ First we will insert a flanged isolation valve, so...

2. Click ***CASSIO, Pipeline Ancillaries, Ball Valves.*** Select the left fixing flanged valve - ***M10S L Fl*** and click O.K.

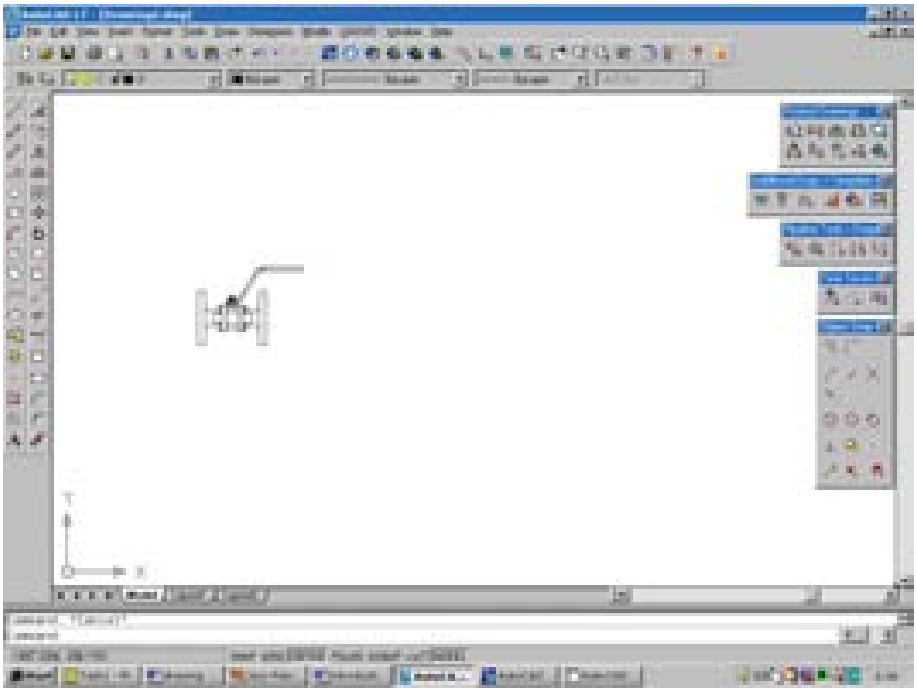
⇒ You should now see the valve attached to the crosshair via it's 'pick-up point'. You will also notice that the command line is prompting for an *'Insertion point'*. The Insertion Point is the point on the drawing sheet at which you are going to place the product you have selected.

3. Use the mouse to move the product to the far left side of the drawing area and click the **left mouse button** once (see next page).

⇒ You will now be presented with the previously mentioned Smart Scaling menu from which you can select a size for the product.

4. Double-click on the ***15mm/½"*** icon or select it and click O.K.

⇒ You will now see the product on the screen sized to 15mm.



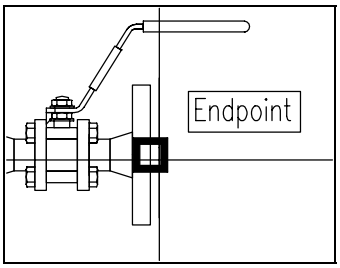
⇒ The next product we need to insert is a flanged strainer.

5. Click ***CASSIO, Pipeline Ancillaries, Strainers.*** Select the ***Fig3* L Sc CAP Ver*** (it is on the second page of strainers).

⇒ On this occasion we need to connect the product to the stop valve. To do this accurately we need to use the ***Endpoint*** Object Snap Mode. If the Object Snap toolbar is not in view, click ***View, Toolbars*** and click it on.

⇒ The command line, as before prompts for an *'Insertion point',* so...

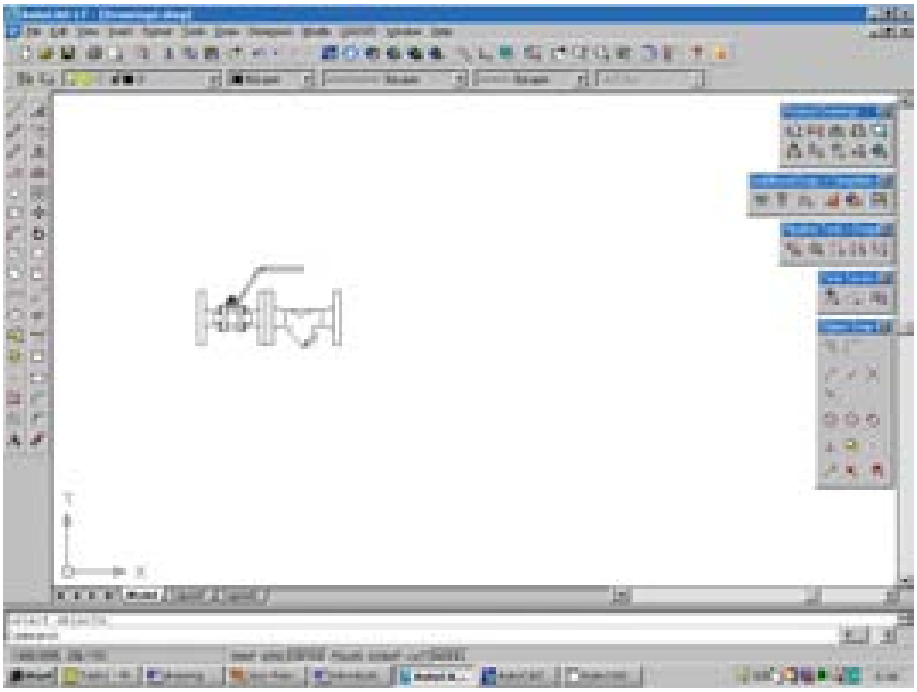
6. Click on the ***Endpoint*** toolbar button.
7. Position the crosshair over the middle of the outer line of the flange on the right of the stop valve. When you see the magenta coloured box appear at this point, click the **left mouse button**.

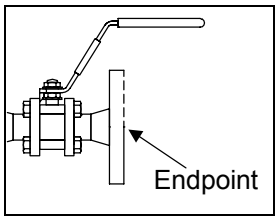


Position the crosshair like this (then click **left mouse button**).

8. Select ***15mm/½"*** from the Smart Scaling menu.

⇒ The screen will look like this (next page)...





⇒ This, of course, seems to conflict with what has been said already about the ***Endpoint*** Object Snap Mode. You might have thought to use ***Midpoint*** to attach something to the middle of a line and this is true. However, <u>all</u> CASSIO product drawings are drawn in the same way - the outer lines on both flanges or screw ports on a product are made up of <u>two</u> lines of equal length that meet in the middle. This means that at what seems to be the middle of one line is, in fact, the ***Endpoint*** of two lines.

⇒ For this reason, whenever you are connecting products together or connecting pipework to products, <u>always</u> use the ***Endpoint*** Object Snap Mode. ***Midpoint*** is used when connecting products to pipework, but we will look this in the 'Using Screwed Products' part of this section.

9. Try adding the remainder of the trap set in the same way using the following products. Don't forget to use ***Endpoint*** and also to size each product to ***15mm/½"***

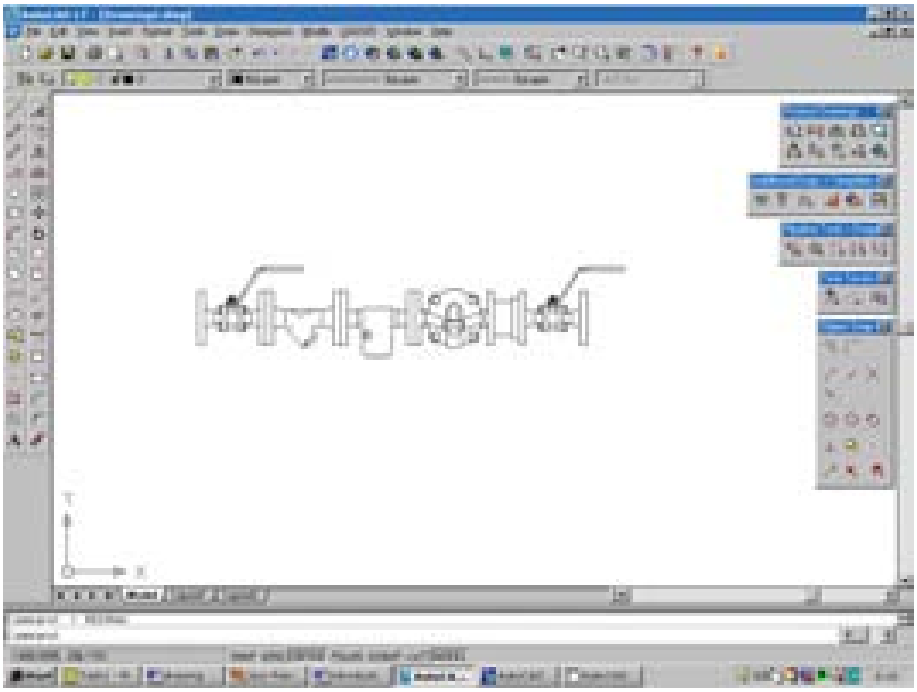
⇒ ***Steam Traps, Performance Monitors, ST14* L Fl***

⇒ ***Steam Traps, Ball Float, FT14 L Base Fl***

⇒ ***Pipeline Ancillaries, Check Valves, DCV1* L***

⇒ ***Pipeline Ancillaries, Ball Valves, M10 L Fl***

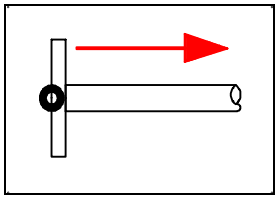
⇒ The drawing should look like this (next page)...



adding pipework

We can now add a short length of pipe at each end of the set to finish the drawing off. To do this we can use the Smart Pipe facility of CASSIO.

☞ Follow the instructions below to add a cut section of pipe to each end of the trap set:



1. Click ***CASSIO, Smart Pipe, Flanged...***

⇒ We will add a flange, then a short length of pipe with a cut section, so...

2. Select the ***Left - right Cut...*** section of pipe from the icon menu.
3. Select ***15mm/½"*** from the Smart Scaling menu.

⇒ A flange will appear on the crosshair and the command line will prompt you to *'Specify insertion point'*

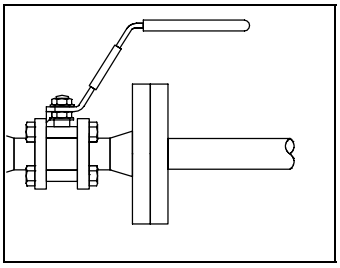
4. Select ***Endpoint*** and click on the outlet port of the valve you inserted last.

⇒ You should see that a line is now 'rubber banding' from the new outlet port. The command line will be prompting you to *'Specify next point'*

⇒ You can drag the mouse to the right in a horizontal plane only.

5. Drag the pipe to the required length and click the **left mouse button**.

⇒ You will see a piece of pipe drawn to the specified length and a cut-section added to the end.

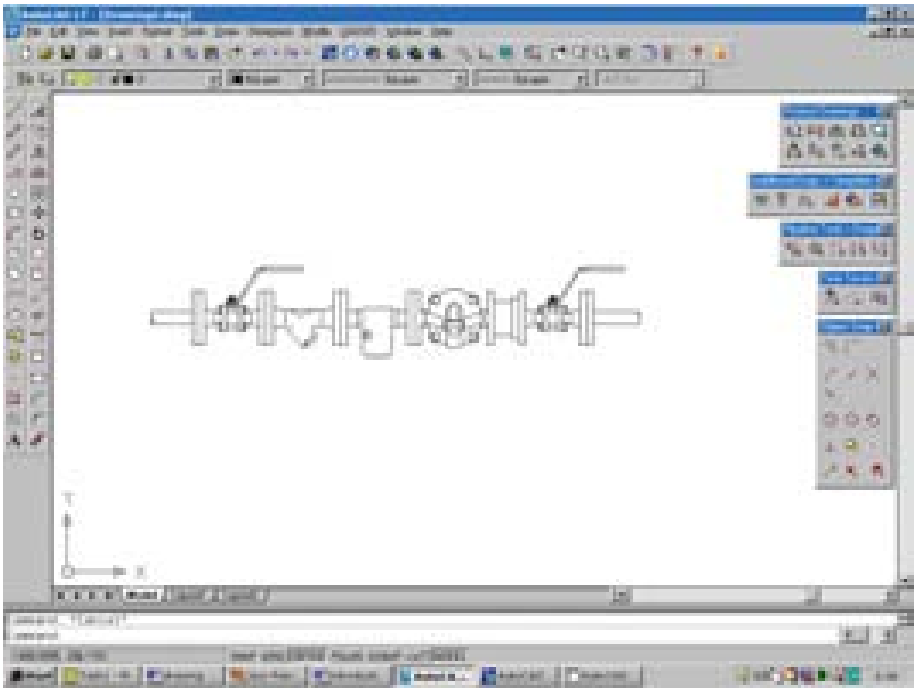


The end of the trap set will look like this once the Smart Pipe has been added

8. Now add a section of Smart Pipe to the other end of the trap set.

⇒ Remember to use the right fixing version - ***Right - left Cut...*** as you are attaching the pipe to the opposite side of the trap set.

⇒ The final drawing should look something like this...



☞ ***Save*** the drawing to any directory as **Pack2_Tutorial1.DWG**

⇒ As you can see, this kind of drawing could be used in a quotation for an FT14 steam trap. As well as the trap, you can also show the products that go together with the trap to make an ideal steam trapping station.

⇒ Cutting and Pasting CASSIO drawings will be covered in section 9.

using screwed products

The final part of this section looks at using screwed products in CASSIO. Creating drawings with screwed products inevitably takes more time, as a short length of pipe has to be placed between each product in the pipeline. However, by using Smart Pipe the time taken can be minimised.

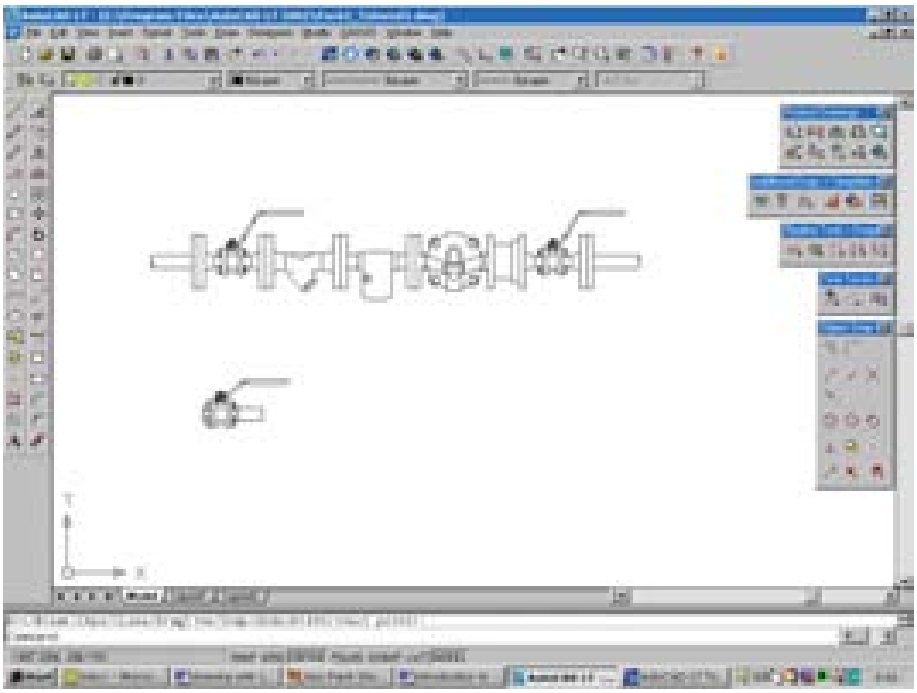
☞ Follow these instructions to create a screwed 15mm/½" FT14 trap set:

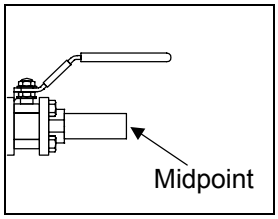
1. ***Move*** the flanged trap set up to the top of the drawing area to make room for the screwed version.
2. Click ***CASSIO, Pipeline Ancillaries, Ball Valves.*** Select the left connecting, screwed M10S valve - ***M10S L Sc***
3. Position it below the flanged trap set and size it to ***15mm/½".***

⇒ Now we need to add a short length of pipe to the ball valve outlet.

4. Click ***CASSIO, Smart Pipe, Screwed...*** and select the ***Single length of Pipe***.
5. Size the pipe to ***15mm/½"***
6. Select ***Endpoint*** and start the pipe at the outlet of the ball valve (you may need to ***Zoom*** in to make sure you select the correct ***Endpoint***).
7. Drag the pipe a short distance to the right, then click the **left mouse button.**

⇒ The drawing should look like this...





⇒ Now we can add the next product in the set - a screwed strainer.

9. Click ***CASSIO, Pipeline Ancillaries, Strainers*** and select the ***FIG1 L Sc CAP Ver*** (located in the top-right of the first page of strainers).

⇒ As mentioned earlier in this section, the ***Midpoint*** Object Snap Mode is used to connect products to pipework, rather than ***Endpoint*** which is used to connect pipework to products.

⇒ ***Midpoint*** needs to be used at this stage because, unlike product ports, pipe ends are made up of only one line. You will not have any problems if you remember the following rules:

Use this...		to do this...
	Endpoint	connect products, or pipework to products
	Midpoint	connect products to pipework

10. Select ***Midpoint*** and connect the strainer to the end of the pipe.
11. Bearing the above rules in mind, try adding the remainder of the trap set in the same way using the following products. Don't forget to use a line size of ***15mm/½"***

⇒ ***Pipeline Ancillaries, Performance Monitors, ST14* L Sc***

⇒ ***Steam Traps, Ball Float, FT14 L BASE Sc***

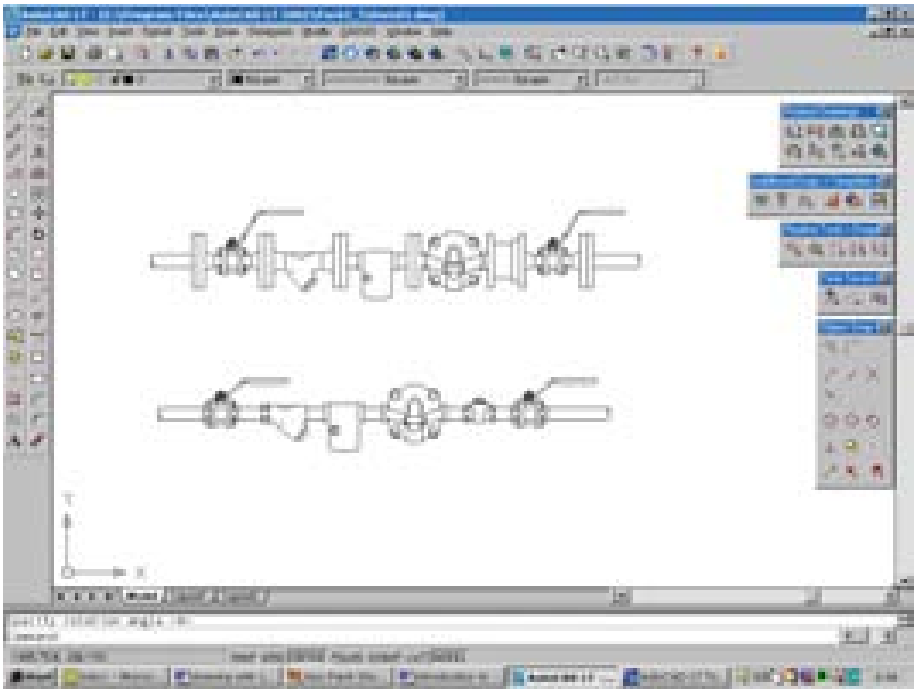
⇒ ***Pipeline Ancillaries, Check Valves, Mushroom L***

⇒ ***Pipeline Ancillaries, Ball Valves, M10S L Sc***

12. Add a piece of cut-section Smart Pipe to each end of the trap set, as before.

Tip!
You will find it easier to accurately select the ***Endpoints*** of products if you ***Zoom*** in to the drawing for a closer look.

⇒ The final drawing should look like this (next page)...



☞ ***Save*** the drawing (overwriting the **Pack2_Tutorial1.DWG** file).

The following exercise will give you more practice in finding different types of product and connecting them together to form your own system/application drawings.

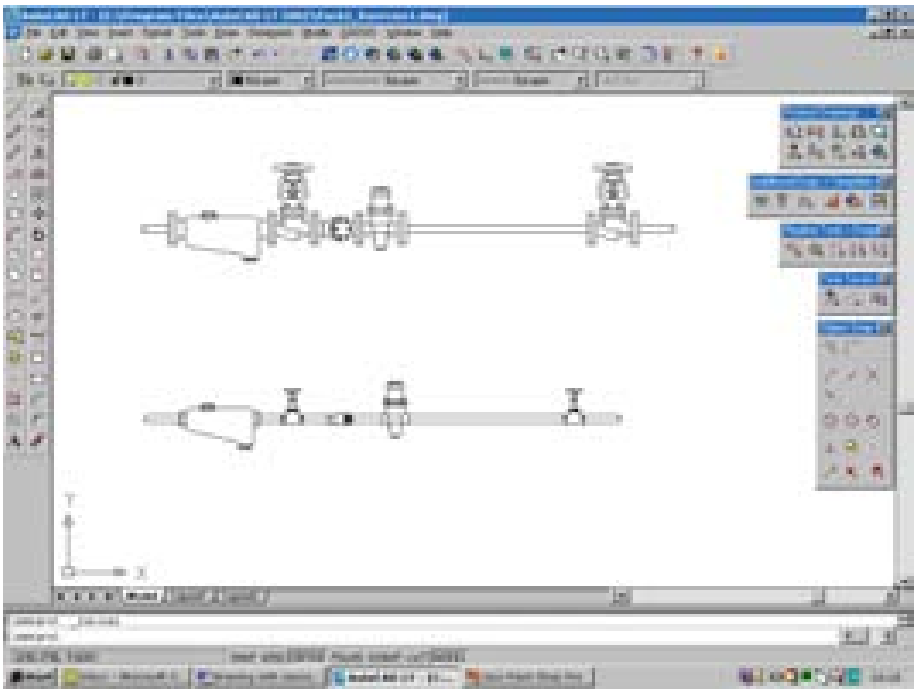
However, if you are unsure of any of the aspects covered so far, feel free to go back and run through the relevant sections again to familiarise yourself further. The following sections deal with slightly more complex drawings, so it is better to have a solid base of knowledge to build on.

exercise 1

During this first exercise you will produce the drawing shown below. While producing the drawing you should incorporate all of the features of CASSIO we have covered so far in this training pack.

If you have forgotten how something is done you can always look back to the previous sections where you should find the answer.

- Use a drawing area with a 'width' of **2970** and a 'length' of **2100**
- Copy the drawing, as shown. Products details are given below.
- Once you have completed the drawing ***Save*** it as **Pack2_Exercise1.DWG** (we will use the drawing later).



Flanged Set

Size	Location and product
50mm/2"	*Pipeline Ancillaries, Separators, S3 L*
50mm/2"	*Pipeline Ancillaries, Bellows Sealed Stop Valves, BSA1* L*
50mm/2"	*Pipeline Ancillaries, Strainers, FIG3* L Fl CAP Hor*
50mm/2"	*Control Systems, Direct-acting Valves, BRV2 L Fl*
50mm/2"	*Pipeline Ancillaries, Bellows Sealed Stop Valves, BSA1* L*

Screwed Set

Size	Location and product
40mm/1½"	*Pipeline Ancillaries, Separators, S2 L*
40mm/1½"	*Pipeline Ancillaries, HV3 Stop Valves, HV3 L*
40mm/1½"	*Pipeline Ancillaries, Strainers, FIG14 L Sc CAP Hor*
40mm/1½"	*Control Systems, Direct-acting Valves, BRV2 L Sc*
40mm/1½"	*Pipeline Ancillaries, HV3 Stop Valves, HV3 L*

section 4
more complex drawing

We have now looked at how to create simple CASSIO style drawings by connecting products of the same size together. In this section we will look at creating more complex drawings, by looking at the procedures needed to add such things as reducers, actuators and pressure gauges.

using the pipe size wizard

When designing some systems, various increases and decreases in line size are required. A good example of this is in a pressure/temperature control application where a pressure reducing valve or self-acting control valve is used. Generally the downstream line size is larger than the upstream line size.

In CASSIO, the ***Pipe Size Wizard*** makes it easy to change pipe sizes by providing a step-by-step guide to selecting a concentric or eccentric reducer or expander.

☞ Follow the example below to find out how to reduce a pipe size:

1. Start a ***New*** drawing with a 'width' of **1485** and a 'length' of **1050**
2. Start the drawing by inserting a flanged strainer - ***FIG3* L FI CAP Hor*** (***32mm/1¼"***).
3. Next, click on ***CASSIO, Pipe Size Wizard***.

⇒ You will see that there are two options open to you - ***Screwed*** or ***Flanged***. We have inserted a flanged strainer, so...

4. Click ***Flanged***.

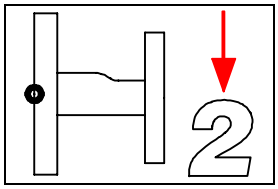
⇒ You will now see that there are two more options to choose from - ***Left Fixing*** or ***Right Fixing***. We are adding products from left to right, so...

5. Click ***Left Fixing***.

⇒ You will now see the final choice - ***Reducer...*** or ***Expander...*** We are going to reduce the pipe size, so...

6. Click ***Reducer...***

⇒ At this point you will see a menu giving you the choice of flanged, left fixing reducers. You can choose between a concentric or



eccentric type and the number of pipe sizes to reduce. We will use an eccentric reducer to reduce the line size by two, so...

7. Select ***Eccentric - 2 line sizes***

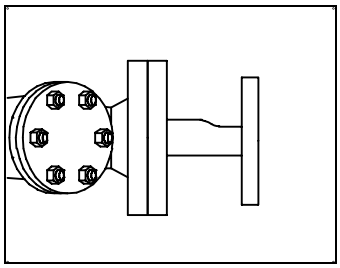
⇒ ***Large*** in the description above means that the reducer will be connected to the larger orifice, therefore the pipe size will be decreased.

8. Connect the reducer to the strainer using ***Endpoint***

⇒ A Smart Scaling menu will now be displayed. The prompt at the top-left of the menu will inform you of which size to pick. On this occasion the prompt should read *'Select the size you are REDUCING FROM...'*. Remember, we are going from a 32mm/1¼" pipe size down to a 15mm/½" pipe size, so...

9. Size the reducer to ***32mm/1¼"***

Tip!
You can insert reducers and expanders in a vertical plane by clicking ***Rotate*** in the Smart Scaling menu.



The reducer should look like this when inserted. The outlet is now 15mm/½"

The next stage of this tutorial deals with adding control valves and actuators. We will increase the line size after inserting a valve with an actuator.

adding control valves with actuators

As different types of valves can be used with different actuators, CASSIO stores them as separate drawings. This means you can insert your preferred valve and then add the appropriate actuator.

This works in the same way as if you were connecting a flanged product to another flanged product - the ***Endpoint*** Object Snap Mode is used.

☞ Follow the instructions below to add a self-acting control valve and actuator:

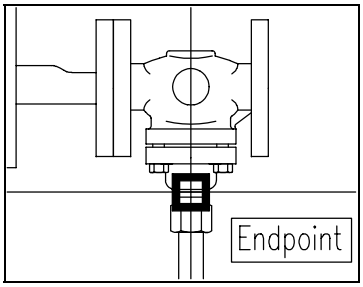
1. Click ***CASSIO***, ***Control Systems, Self-acting Control Valves.***
2. Select ***KA43 L***
3. Attach it to the outlet of the reducer using ***Endpoint*** and size it to ***15mm/½"***

⇒ You will see that immediately you are asked if you would like to add an actuator. As well as having a choice of actuators, you can also change the valve you have just chosen, by clicking ***Back***; add

Tip!
Any image with a # in the description means that it should always be sized to 15mm/½"

the valve only (no actuator), by clicking ***None***; or add a high limit cutout type actuator, by clicking ***HL Actuator***. For this example we will add an actuator, so...

4. Select the ***121* Actuator#***
5. Select ***Endpoint*** and attach the actuator to the bottom of the valve.



Use ***Endpoint*** to connect the actuator to the valve

6. Size the actuator to ***15mm/½"***

⇒ The same procedure is used when adding pneumatic and electric actuators. These actuators are also attached in the same way - by using ***Endpoint***.

increasing the line size

⇒ We will now enlarge the pipe size downstream of the control valve.

7. Click on ***Pipe Size Wizard***, ***Flanged***, ***Left Fixing***, ***Expander...***
8. Select ***Concentric - 3 pipe sizes***.

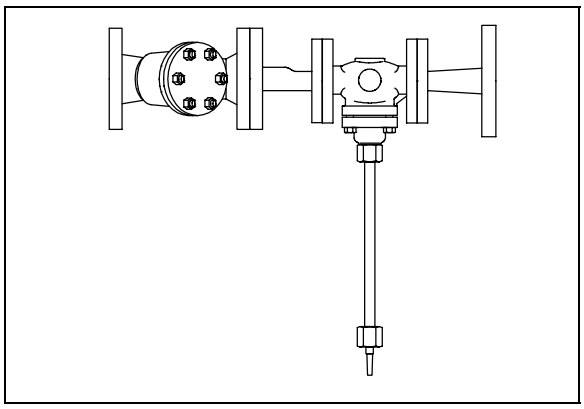
⇒ This will increase the pipe size from 15mm/½" to 40mm/1½"

9. Use ***Endpoint*** to attach it to the valve.

⇒ Remember to follow the instructions given at the top-left of the menu. The prompt should read *'Select the size you are EXPANDING TO...'* We are expanding three pipe sizes to 40mm/1½", so...

10. Select ***40mm/1½"***

⇒ The following page shows how the drawing should look. The outlet is now 40mm/1½"



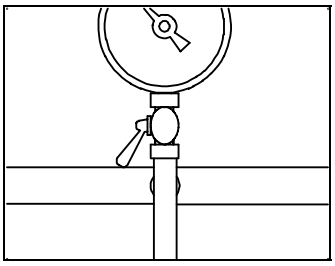
☞ ***Save*** the drawing as **Pack2_Tutorial2.DWG**

Be sure to follow each step of the ***Pipe Size Wizard*** carefully, and you should have no trouble in using this feature to create a more realistic and accurate look to your final system/application drawing.

---

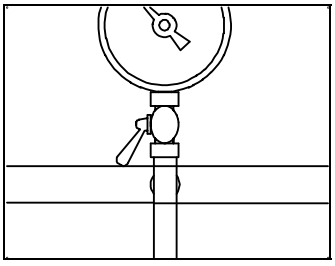
adding pressure gauges

You may find it strange that special consideration needs to be made in this pack for such a simple thing as a pressure gauge. When inserting pressure gauges to a drawing, they need to look as though they are sitting over the existing pipework, like this...



Pressure gauge as it should look in the line

However, when you insert the pressure gauge it will look like this...

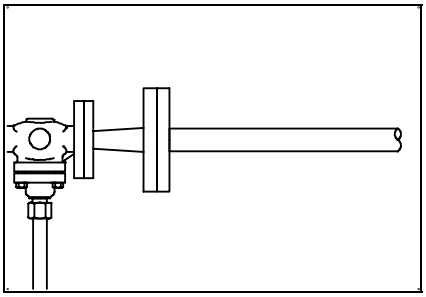


Pressure gauge as it will look after insertion

As you can see, to make the drawing look right, the pipe 'behind' the pressure gauge needs to be removed. To do this you will probably have guessed that the ***Trim*** command needs to be used.

☞ Follow the instructions below to see how to do this:

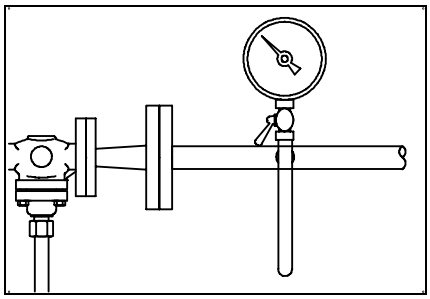
1. Use the Flanged Smart Pipe to add a 40mm/1½" flange and pipe with cut-section to the expander, like this...



40mm/1½" cut-section pipe added

2. Click ***Pipeline Ancillaries, Pressures Gauges + Temp. Gauges*** Select ***Press Gauge Lo +U #***
3. Insert the pressure gauge on the pipe (you don't need to use ***Endpoint*** or ***Midpoint***).
4. Size it to ***15mm/½"***

Tip!
To be accurate, you could snap the gauge to the ***Endpoint*** on the flange and then move the gauge, with ***Ortho Mode on***, to the desired location.



The gauge should look like this at the moment

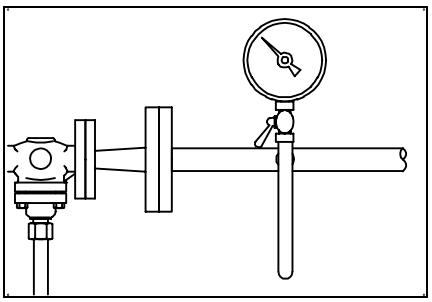
5. Select the ***Trim*** command.
6. Click on any parts of the pressure gauge that have pipework 'behind' it and press Return.

⇒ The entities you pick will turn dotted. You may notice that picking what appears to be one line actually picks an entire shape. This is because the lines have been grouped so that colour can be added in other Windows applications.

7. Select the two lines of the pipe where they should be 'behind' the pressure gauge.

Tip!
If you are confused about which lines to pick, you can pick all lines in the general area and let AutoCAD LT sort things out!

Tip!
You may need to ***Explode*** (ungroup) a drawing inserted from the library in order to ***Trim*** it. Click ***Modify, Explode*** and select the drawing.

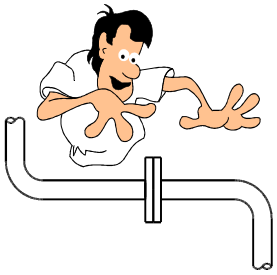


The drawing should look like this after trimming out the pipe 'behind' the pressure gauge

⇒ As you can see, the drawing looks much more realistic once the lines have been trimmed out. These small touches do not take long to do and will help create a professional overall look to your drawing.

☞ ***Save*** the drawing (overwriting the **Pack2_Tutorial2.DWG** file).

section 5
more about smart pipe



In this section we will look at the various Smart Pipe facilities available to allow the easy addition of pipework of varying sizes to your drawing.

We have already looked at some of the Screwed Smart Pipe options in the previous sections. In this section we will look at the way in which we can add pipes with bends and how we can add capillary pipe.

using automatic bend smart pipe

☞ With the drawing we created in the last section on-screen, follow the instructions below to experiment with the various CASSIO LT Smart Pipe options:

1. Click ***Smart Pipe, Flanged...***

⇒ You will see an icon menu containing all of the available Flanged Smart Pipe options.

2. Select the ***Right - Left Up*** icon and size it to ***32mm/1¼"***

⇒ You will see a single flange on the crosshair.

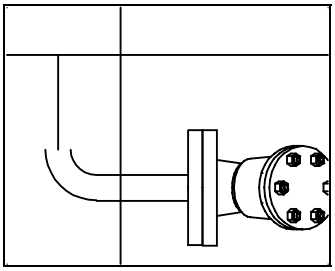
3. Click on the ***Endpoint*** Object Snap button.
4. Attach the flange to the left (inlet) of the strainer.

⇒ You will now see that the flange has been scaled correctly (the strainer is also sized to 32mm/1¼") and that by dragging the mouse to the left you will see a line being drawn.

5. Drag the mouse to the left and click the **left mouse button** - this is where the bend will occur.

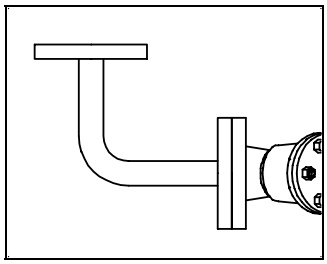
⇒ See the next page…

Tip!
You can switch to ***Screwed Smart Pipe*** without exiting this menu by clicking on the ***Screwed version...*** icon. There is a ***Flanged version...*** icon in the ***Screwed Smart Pipe*** section to get back.



The drawing should look like this at the moment. You will see another line being dragged from the bend.

5. Drag the mouse up and click the **left mouse button.**

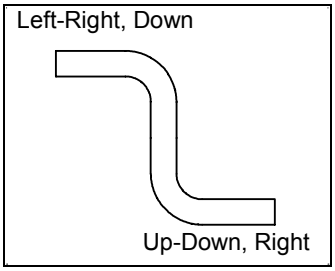


You will see that the pipework has been completed and that a 32mm/1¼" flange has been added ready for the next product to be attached.

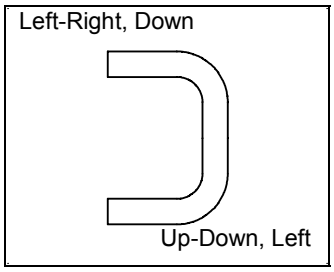
As you can see, the pipework is added to the drawing in the same way as it is shown in the Smart Pipe icon menu - from right to left, a bend and then up.

☞ Practice some of the other Screwed and Flanged Smart Pipe options on this drawing. You will notice that there are vertical, horizontal and bend versions, some of which have cut-sections on one end.

⇒ You can create multiple bends in the pipework by attaching differing styles of Screwed Smart Pipe together using ***Midpoint.*** For example:



On this occasion ***Left - Right, Down*** and ***Up - Down, Right*** pipework have been connected together. The end-caps are removed automatically.



On this occasion ***Left - Right, Down*** and ***Up - Down, Left*** pipework have been connected together. The end-caps are removed automatically.

Tip!
If you add the second Smart Pipe directly after adding the first, try clicking the **right mouse button** instead of ***Midpoint***

You will find adding pipework a very quick and easy task by utilising the various Smart Pipe options.

Remember, the quickest way to gain access to the various ***Pipeline Tools*** is by clicking the relevant toolbar button.

using capillary smart pipe

Capillary Smart Pipe works in much the same way as the Screwed and Flanged Smart Pipe options. The main difference is that Capillary Smart Pipe does not have to be sized - it comes as one standard size.

☞ With the drawing we created in the last section on-screen, follow the instructions below to experiment with Capillary Smart Pipe:

1. Click ***Smart Pipe, Capillary...***

⇒ You will see the various Capillary Smart Pipe options showing expansion loops for self-acting controls and sensor pipe for pressure reducing valves.

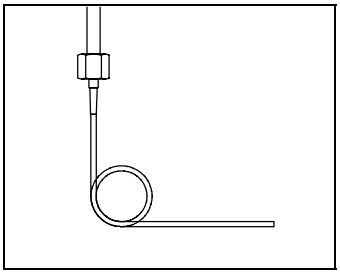
2. Select ***Up - Down, Right***
3. Start the pipe at the ***Endpoint*** of the actuator on the self-acting valve. You will probably need to ***Zoom*** in to make sure you select the correct point.
4. Drag the mouse down and click the **left mouse button** where you want the expansion loop to start.

⇒ The loop will be drawn and you can then specify where you want the pipe to finish.

5. Drag the mouse to the right and click the **left mouse button.**

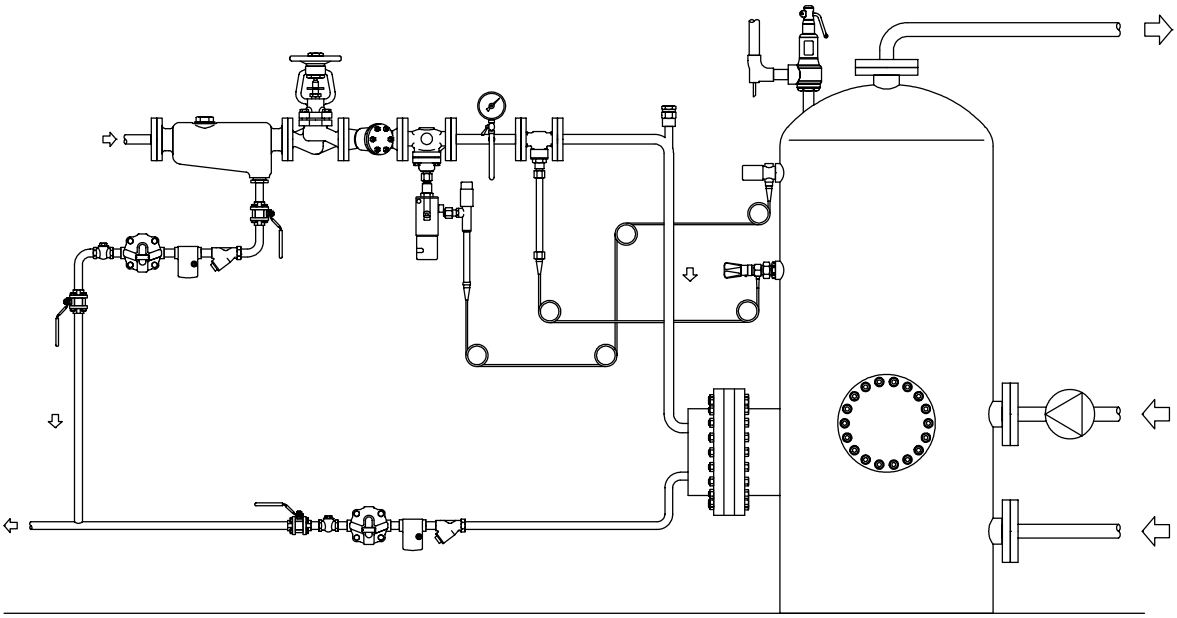
Tip!
You can ***Zoom*** during a Smart Pipe or most other commands by selecting ***Zoom*** from the ***View*** pull-down menu, or by selecting one of the zoom toolbar buttons.

Tip!
You could ***Trim*** out the lines that go 'behind' the pipe to make the drawing look more realistic..



The pipe and loop should look something like this

⇒ An appropriate actuator could be added at this stage, but if the pipe needs to travel to a location above the actuator, further Smart Pipe could be added. See the example on the next page to see what's possible.



using trap set wizard

One of the newer and most useful/time saving features of CASSIO is the Trap Set Wizard. This feature incorporates Smart Pipe and lets you create any number of different styles of trap set extremely quickly. The wizard prompts you to choose the products you wish to include and adds them automatically! You can select from most of the steam traps and ancillary products (screwed or flanged) in the CASSIO library.

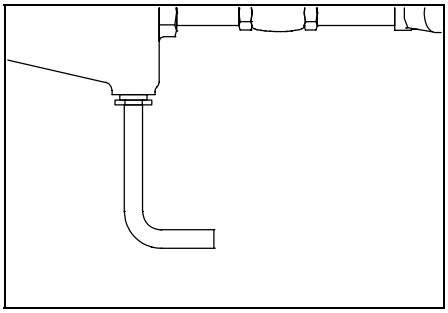
☞ ***Open*** the drawing you created in Exercise 1 of this manual - **Pack2_Exercise1.DWG**
☞ Follow the instructions below to add a trap set to each of the separators in the drawing:

1. Click ***CASSIO, Trap Set Wizard, Screwed...***

⇒ You will be presented with a menu showing various styles of screwed Smart Pipe that you can start the trap set with. The obvious choice for adding a trap set to a separator would be either 'Up - Down, Left...' or 'Up - Down, Right...'

2. Select ***Up - Down, Right...***
3. Use the Smart Pipe in the usual way - connect it to the drain outlet of the screwed separator using ***Endpoint***.
4. Draw the pipe down and to the right, like this (next page)...

Tip!
It's good practice to make sure the trap set will fit into the current view before starting, though you can ***Pan*** during the wizard.



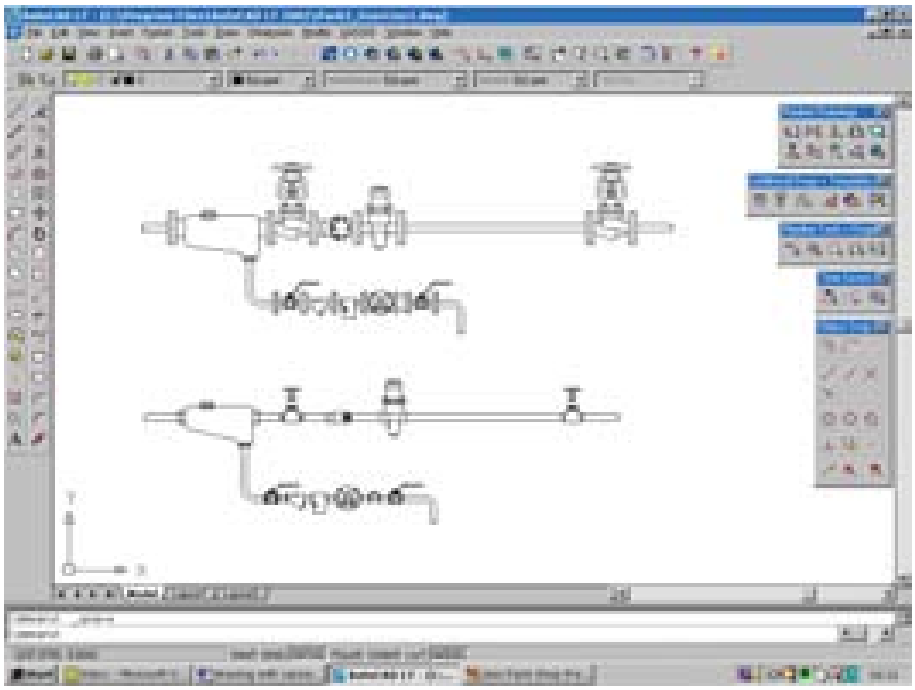
Remember to click the **left mouse button** where you want the bend, and where you want the pipe to finish.

⇒ You will now be presented with a menu from which you can choose the first product to add - an isolation valve. You can skip the insertion of a product by clicking on the 'None' icon.

5. Simply click on a product of your choice - the product will be fitted into the set and you will be asked to add the next, and so-on.
6. The final step is to add a finishing section of Smart Pipe. Again, this Smart Pipe is used in the same way as all other types of Smart Pipe.

⇒ As you can see, using Trap Set Wizard is very simple because you let CASSIO do all the hard work!

☞ Experiment with the flanged version of the Trap Set Wizard on the flanged pressure reducing set on your drawing - it works in exactly the same way, except there is no pipe added between products.



exercise 2

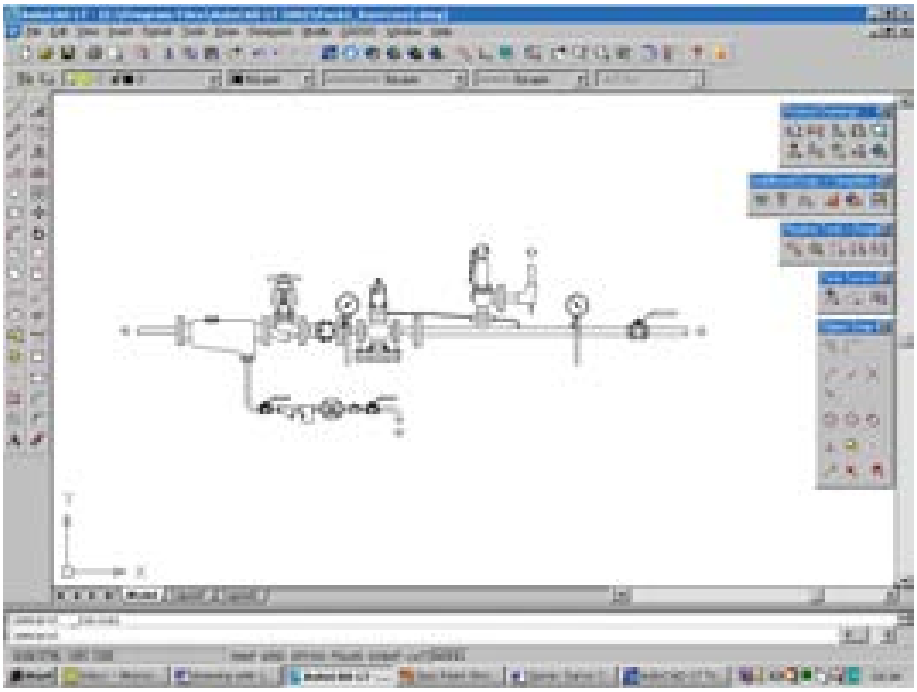
During this second exercise you will produce the drawing shown below. While producing the drawing you should incorporate most of the features of CASSIO we have covered so far in this manual.

If you have forgotten how something is done you can always look back to the previous sections where you should find the answer.

- ☞ Use a drawing area with a 'width' of **4200** and a 'length' of **2970**
- ☞ Copy the drawing, as shown below. The drawing is of a standard 25mm/1" DP17 pressure reducing valve station.
- ☞ Upstream pipework is 40mm/1½" while downstream pipework is 50mm/2". Full details of the products and sizes can be found in the accompanying table.
- ☞ Remember to follow the instructions when sizing reducers.
- ☞ ***Save*** the drawing, giving it the filename **Pack2_Exercise2.DWG**

Tip!
Pipe elbows and swept drain fittings can be found in the ***Pipeline Fittings, Screwed*** section of CASSIO.

Tip!
You may need to ***Explode*** (ungroup) a drawing inserted from the library in order to ***Trim*** it. Click ***Modify, Explode*** and select the 'untrimmable' drawing.



Size	Product type	CASSIO image
40mm/1½"	***Separators***	***S3 L***
40mm/1½"	***Bellows Sealed Stop Valve***	***BSA1* L***
40mm/1½"	***Strainer***	***FIG3* L Fl CAP Hor***
25mm/1"	***Pressure Reducing Valve***	***DP17* L Fl ext***
50mm/2"	***Ball Valve***	***M10S L Sc***
50mm/2"	***Safety Valve***	***SV60 L Closed Bonnet***
15mm/½"	***Pressure Gauge***	***Press Gauge Hi + U #***
15mm/½"	***Pressure Gauge***	***Press Gauge Lo + U #***
15mm/½"	***FT14 Trap Set*** *(including your choice of ancillaries)*	*(various)*

section 6
finishing a drawing

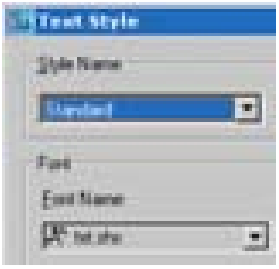
In this section we will look at how we can put the final touches to a drawing we have created. This includes adding information text, using border templates and printing the finished drawing.

adding text

Invariably, when creating drawings, of any kind, you will need to add text in order to explain certain aspects of the drawing. In CASSIO drawings, you may need to label steam and condensate pipes, or add item numbers and legends.

☞ With the drawing you created in Exercise 2 on-screen, follow the instructions below to experiment with the various text options:

⇒ Before entering any text, we will first set the text style/font.



1. Click ***Format, Text Style...***

⇒ You will see a dialogue box appear showing the default text style (STANDARD) and its associated font (txt.shx). A preview of the font is also shown at the lower-right corner of the dialogue box. This font can be used, though for this example we will change the font to 'Arial'. In order to do this, do the following...

2. Click on the 'New' button to create a new text style.
3. In the resulting dialogue box, type **ARIAL** and click O.K.
4. Next, from the 'Font Name' drop-down box, select the 'Arial' font (it is at the top of the list).

⇒ An example of the Arial font will be displayed in the 'Preview' section.

5. To accept the new font, click 'Close' and then 'Yes' to save the changes.
6. We will only insert a single line of text, so click ***Draw, Text, Single Line Text***

⇒ At this point you can select a start point for the text or justify the text to the left, right, middle etc., examples of which are shown below (the 'x' marks the justification point):

DText Command
No button
Draw, Single Line Text
DTEXT
DT

⇒ Left justification is the default, so...

7. Select a start point for the text - we are going to label the inlet pipework.
8. Enter a height of **25** and a rotation angle of **0**
9. Type the text **STEAM IN** and press Return twice.
10. Use the ***Move*** command to re-position the text if you need to.
11. Go back to step 6 and add the text **STEAM OUT** and **CONDENSATE OUT** in the appropriate places.

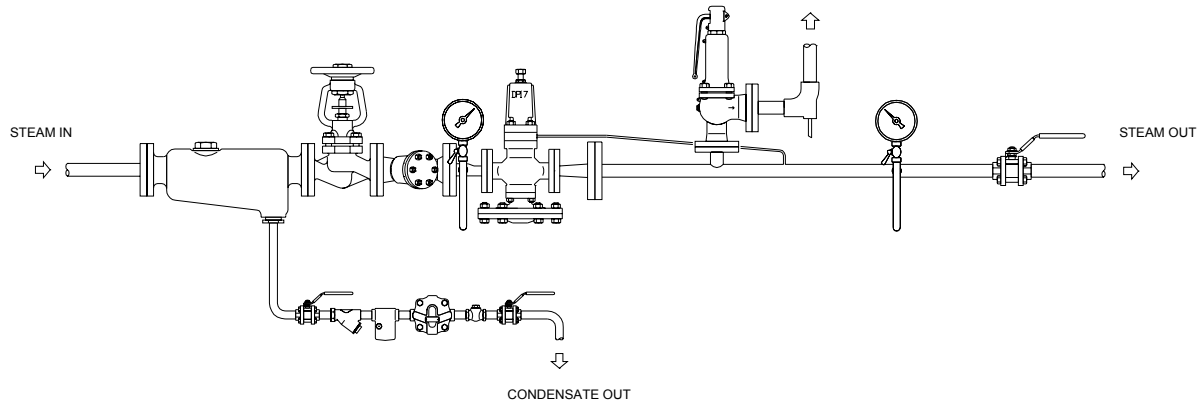
MText Command

Draw, Paragraph Text…
MTEXT
MT

⇒ There is another way of adding text to a drawing, called ***Paragraph Text***. As its name suggests, with this feature you can add paragraphs of text to your drawing, via AutoCAD LT's text editor. From within this text editor you can 'spell check', justify the text, find and replace text, and even import text from a text file you created in a separate text editor.

⇒ For more information about this command, refer to your AutoCAD LT 'User's Guide' or do a search on 'Text' in the help system.

The drawing should look something like this.



DDEdit Command

Modify, Object, Text, Edit...
DDEDIT
ED

⇒ If you need to modify the text in the future, use the ***Modify, Object, Text, Edit…*** tool. On selecting the required text, you will be presented with a dialogue box in which you can change single characters or the entire line.

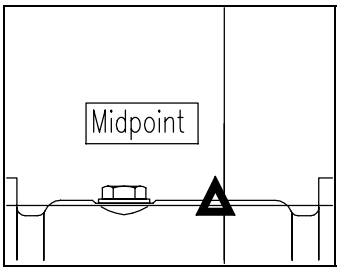
adding item numbers

On creating a drawing as we have in the previous sections, it is sometimes necessary to create a parts list. One way of doing this is to label each product with a number and then produce a legend giving details about each product.

You can add your own item numbers to the drawing, or use the ***Auto Item Number*** facility of CASSIO found in the ***Nuts, Bolts, Arrows etc.*** section.

☞ To insert an ***Auto Item Number***, try the following:

1. Open the ***Nuts, Bolts, Arrows etc.*** section of the ***CASSIO*** menu.
2. Select the ***Auto Item Number***
3. Select the ***Midpoint*** Object Snap Mode.
4. Position the crosshair on the top of the separator, as shown.



Position the crosshair like this (then click **left mouse button**).

⇒ You will see that the item number will attach itself to the middle point of the selected line on the top of the separator, and a dialogue box will appear. You can then enter a number (or letter), not exceeding two characters, for this product.

⇒ The characters are standard AutoCAD text and so can be modified at a later date by using the ***Edit Text*** facility

using templates

The final addition to the drawing can be a border template. The border will carry information about the drawing, for example title, customer name and date.

CASSIO contains pre-drawn templates. These templates are designed to make adding a border a quick and easy task as all relevant information can be inserted without the need to use the DText command. The templates/borders are drawn in *paper space* which contains a *viewport* through to *model space* (which contains your drawing). This means that to fit your drawing into the border template you simply adjust the zoom percentage through to model space rather than attempt to fit the border around the drawing.

☞ Try inserting a CASSIO template into the drawing you currently have on-screen by doing the following:

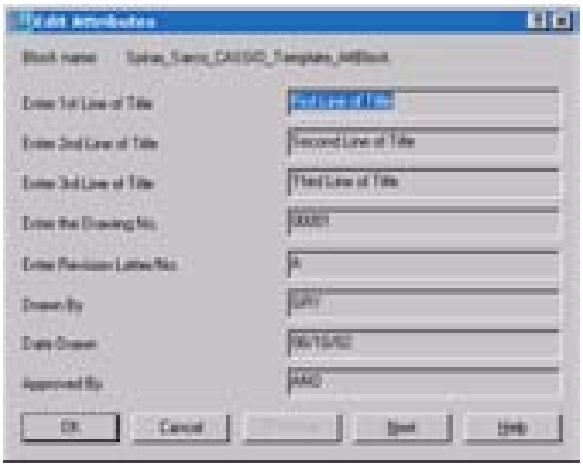
1. Click ***CASSIO, Templates, Use Spirax Sarco Template*** and click O.K.

⇒ The template will be inserted into a new *layout tab*, called *Spirax_Sarco_CASSIO_Template*. You will notice this at the bottom of the drawings area.

Tip!
You can enter the details later if you like – use the ***CASSIO, Templates, Edit Text in Template*** tool.

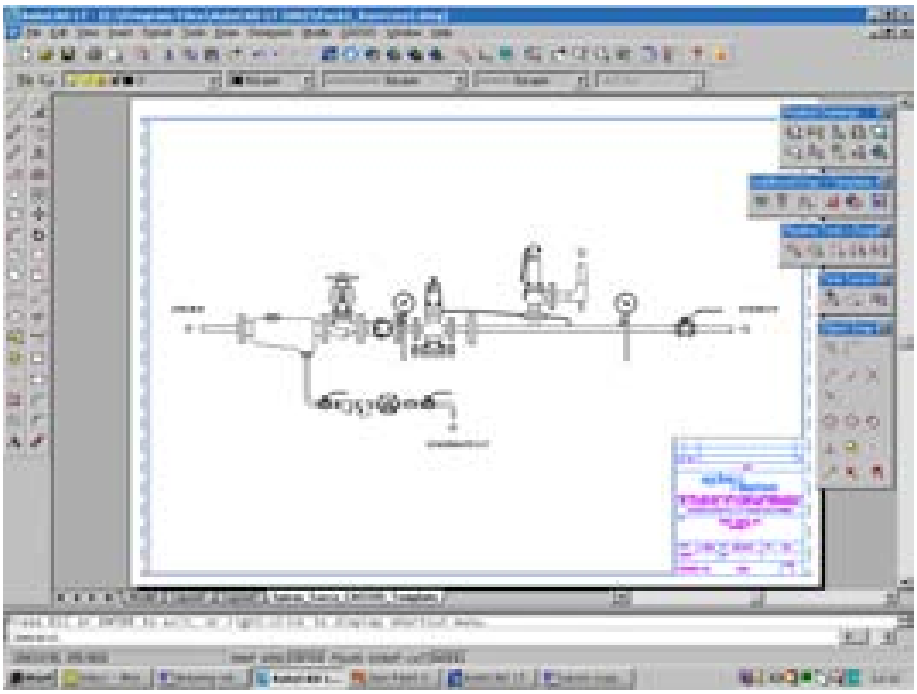
⇒ You will now be prompted to enter the details of the drawing into a dialogue box.

2. Enter any details you wish to include. When you have finished, click O.K.



⇒ Following this, you will see a help screen reminding you to use the ZOOM and PAN commands to position your drawing accurately within the template. You will see that the drawing has already been positioned within the template. The whole area within the template is your view through to model space (your drawing).

3. If any parts of the drawing are cut off, use ***Zoom*** and ***Pan*** to position the drawing more accurately within the border.



Tip!
You can start a new drawing with a template. Click ***New***, then ***'Start with Template'***. Select the ***Spirax Sarco CASSIO Template***. The template will be added and you can fit your drawing into it.

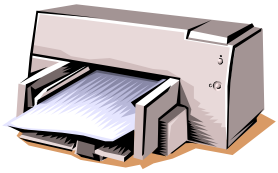
⇒ You will see that the information has been arranged in the border automatically for you. As you can see, this feature can save a lot of time and also makes sure that each time the border is inserted it retains the same overall look.

⇒ You can modify your drawing in either the *layout view* (within the border) or in the *model space view* (the view in which you created the drawing). Any changes made in the *model space view* will be reflected in the *layout view* and vice-versa.

☞ Toggle between the two views yourself by using the tabs at the bottom of the drawing area.

⇒ If you run into trouble while in the *layout view*, you can reposition your drawing by clicking ***CASSIO, Templates, Fit Model to Template***. The viewport through to model space will be zoomed sufficiently so that the whole drawing fits into the template boundary. However, you may need to make small adjustments after using the tool – you will be reminded by a help screen as to how to do this.

⇒ Don't ***Explode*** the border. The templates store drawing details as *attributes*. These attributes will be lost if the template is *exploded*. Click ***CASSIO, Templates, Edit Text in Template*** and click on any part of the border to display the dialogue box and modify the drawing details.



printing a drawing

The templates provided are sized to A4, though you can print to any size of paper by adjusting the *Plot Scale*. If you choose *Scale to Fit* the drawing and template will be printed to fill whatever paper is in the printer tray.

☞ Use the guidelines below to print your drawing with a template:

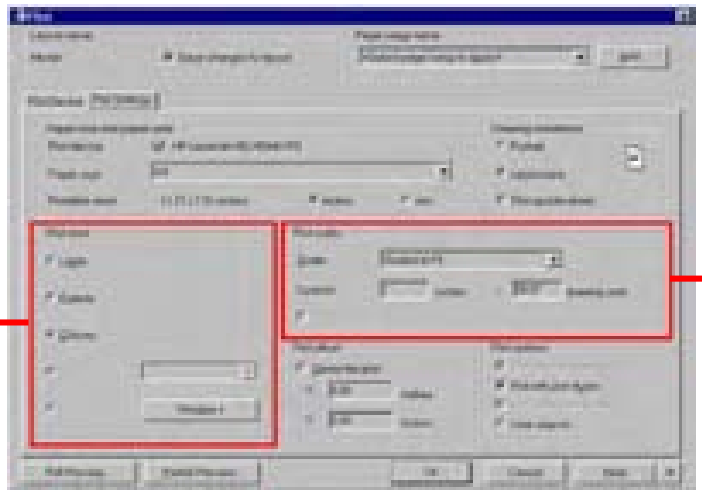
Plot Command

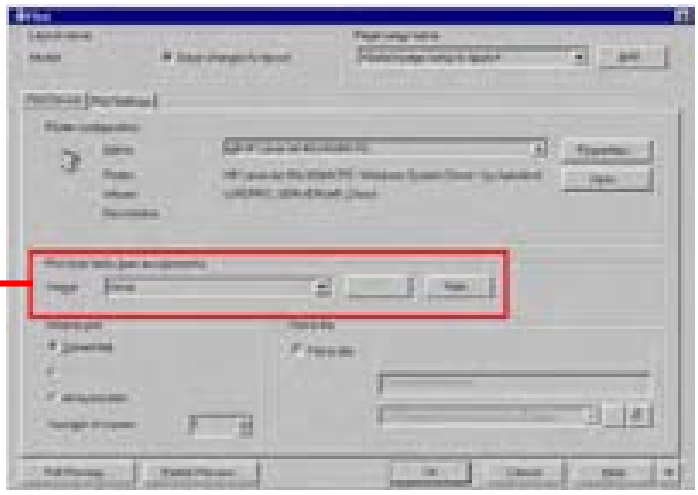
File, Plot…
PLOT

1. Click ***File, Plot…***

⇒ When the Print/Plot dialogue box appears, you may wish to check the following:

- ✓ Your preferred printer is displayed in the device list.
- ✓ The *Plot Style Table* is set to *CASSIO Template*.
- ✓ The correct *Plot Scale* is set (1:1 if you are printing to A4).
- ✓ The *Plot area* is set to *Extents* or *Display*.





⇒ Refer to the first training pack in this series, the CASSIO help system or the AutoCAD LT documentation if you require more detailed information on printing.

section 7
application drawings

The ***Locally Stored Application Drawing Library*** section of the menu contains a library of system/application drawings already drawn using CASSIO. This library has been built up over time and can be a huge time saving feature, as you may find that the drawing you wish to create is already in the library.

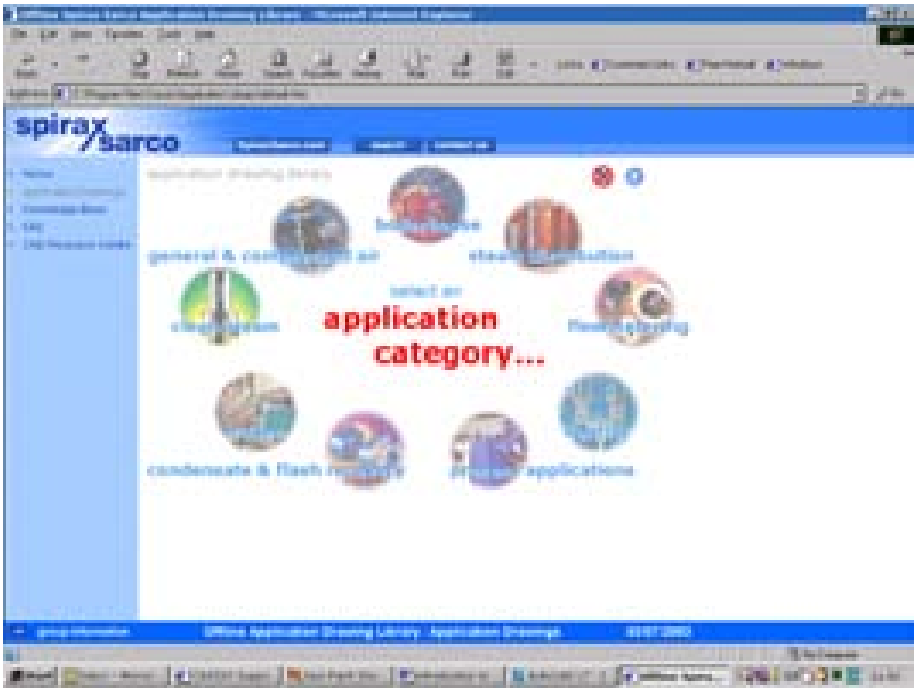
finding a drawing

☞ Viewing the application drawings is slightly different from viewing the product drawings. Do the following to find out how to use the application drawing library:

1. Start a ***New*** drawing, ***2970*** wide by ***2100*** length.
2. Click ***CASSIO, Locally Stored Application Drawing Library***.

⇒ Your web browser will be started and you will see following menu.

⇒ Note: you are not connected to the internet at this time – the pages you are viewing are stored locally (either on your hard disk or on the CASSIO CD, depending on your installation).



⇒ As you will see, there are a number of different categories. Moving the mouse cursor over one of the icons will display the sub-categories for that application area in the middle of the menu ring. You can then click on one of these sub-categories to view the drawings in that section.

3. Move the mouse cursor over the ***Process Applications*** category and select the ***Heat Exchangers*** sub-category to view the related drawings.

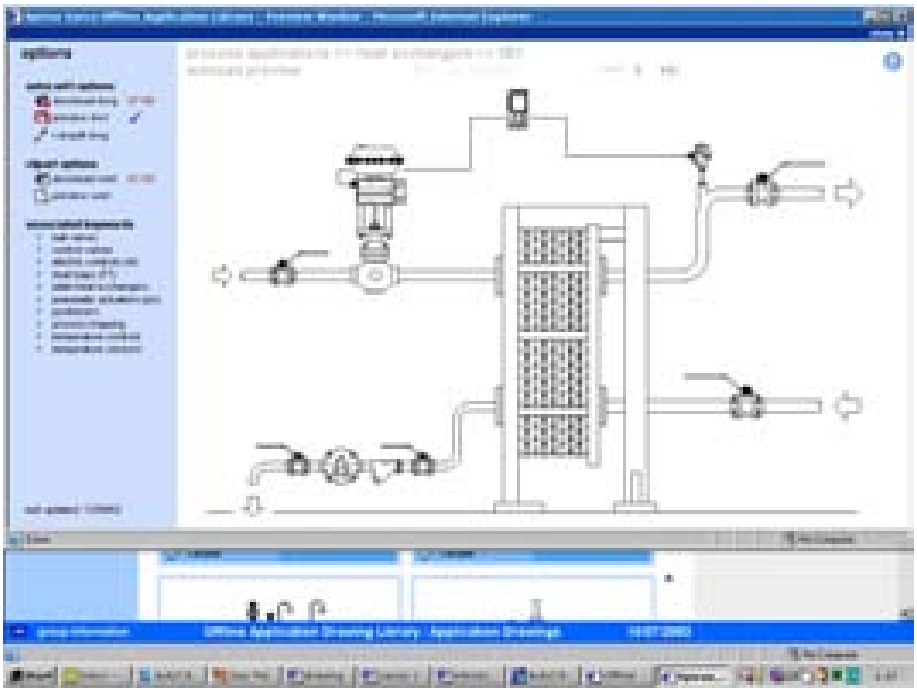
⇒ As you can see, all of the drawings in this category are now dis played on-screen. Beneath each drawing are a number of options. As an AutoCAD/CASSIO user you will be interested in the *AutoCAD Options*. These are described below:

This icon/option...	Allows you to do this...	How do I use it..?
download	Download the AutoCAD (DWG) file to your hard disk or network drive.	**Right-click** on the text or icon and select ***Save Target As…*** from the resulting menu. Then choose a location for the drawing on your computer's hard disk, or a network drive.
preview	Preview the AutoCAD file (in DWF format) in *Volo View Express*. This preview allows you to pan and zoom in the drawing.	**Left-click** on the text or icon.
i-drop	Drag-and-drop the AutoCAD (DWG) file directly into your current drawing area.	**Left-click** and drag into AutoCAD window.

⇒ You can also click on the drawing itself. This will also open the preview window. If you do not have AutoCAD, the preview window will display a clipart (*.wmf) file of the drawing, which you can import directly into any Windows application.

preview

3. Click on the ***Preview DWG*** icon below the first drawing (or simply click on the drawing itself).



⇒ A preview of the drawing will be displayed, together with the available options. This preview is interactive, so you can *zoom* and *pan* around the drawing to see specific areas 'up close'. **Right-click** on the drawing to access these tools.

⇒ You will also notice that there are *Associated Keywords* (or phrases) in a list to the left of the preview that identify the drawing. For instance, if you executed a search on the phrase *plate heat exchangers*, this drawing (and a number of others) would be returned.

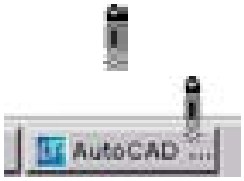
Tip!
You can search for drawings via keywords. Click ***Search*** and enter a word or phrase, or pick a phrase from the drop-down box.

inserting a drawing

☞ Now that you have found a drawing, do the following to find out how to insert it into AutoCAD LT:

i-drop

4. Whether in the preview window or the main window showing the thumbnail images, move the cursor over the i-drop icon and **left-click** and hold.

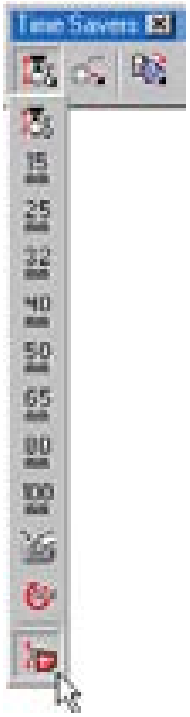


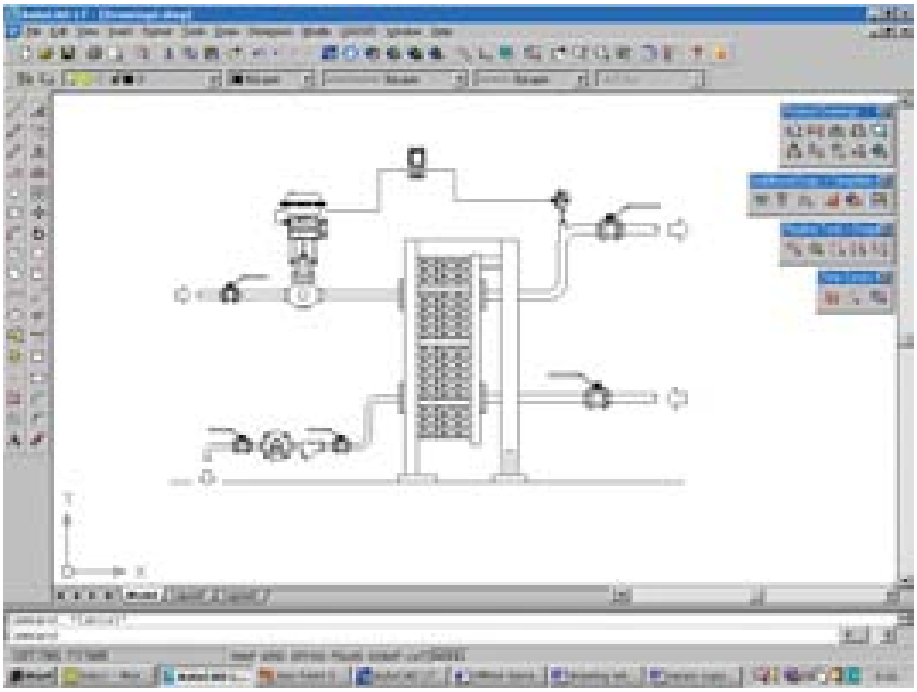
⇒ The dropper icon will be shown as 'full' when the drawing is picked up.

5. Drag the icon/cursor onto to the AutoCAD LT item on the Windows taskbar and hold for a moment. The AutoCAD LT window will then maximise so that you can drop the DWG file into your drawing.

⇒ If you access the library via the CASSIO menu item or toolbar button, you can simply drop the drawing into AutoCAD LT and it will be sized correctly. If not, you will be prompted for a *scale factor*. At this point you can either press RETURN three times or click the ***Size Application Drawing*** button on the ***Smart Scaling*** toolbar.

☞ The screen should now look something like this:





⇒ You could easily add a CASSIO template to this drawing now and make it look like you've spent hours producing the drawing!

☞ Play around with the application drawing library for yourself to familiarise yourself with the various categories and to practice I-dropping drawings.

⇒ You may notice an icon at the top-right of many pages in the application drawing library. This icon gives you instant access to the online/web based version of the page you are currently viewing. This is useful as there may be newer/updated drawings available online, as these libraries are updated more regularly.

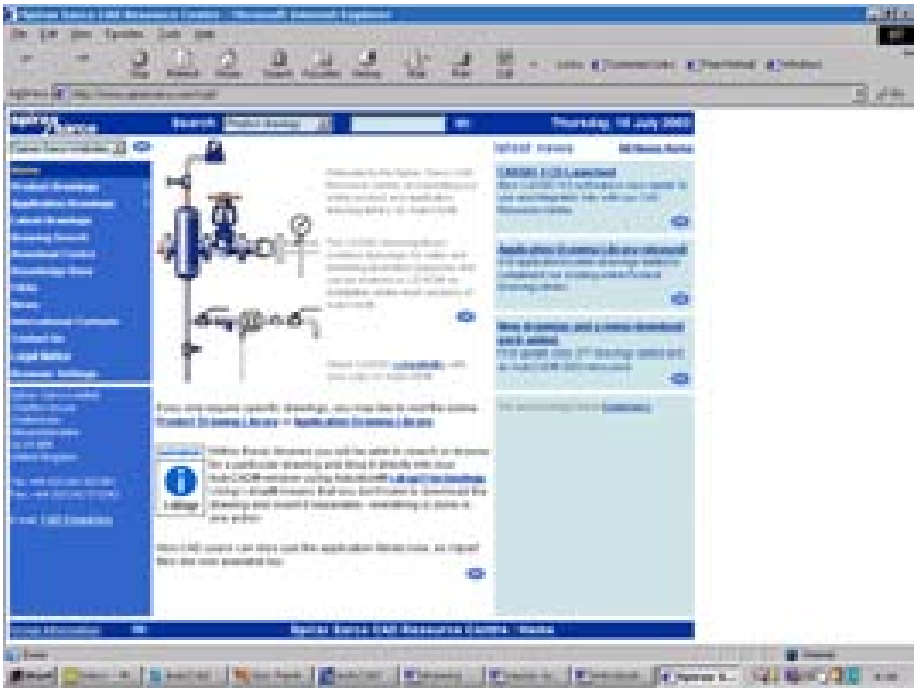
⇒ More information about the online libraries can be found in the next section…

section 8
utilising the online libraries

This section looks at the Spirax Sarco online *CAD Resource Centre* and how to use its libraries in conjunction with CASSIO.

why use the online libraries?

The Spirax Sarco *CAD Resource Centre* was launched in 2002 to act as a central location for our sales and marketing product and application drawing libraries. The drawings can be easily downloaded or dropped directly into AutoCAD.



At the time of going to press, the drawing content of the online libraries and CASSIO was exactly the same. Naturally, it is anticipated that the drawings will be updated and added as necessary

to account for product changes and additions.

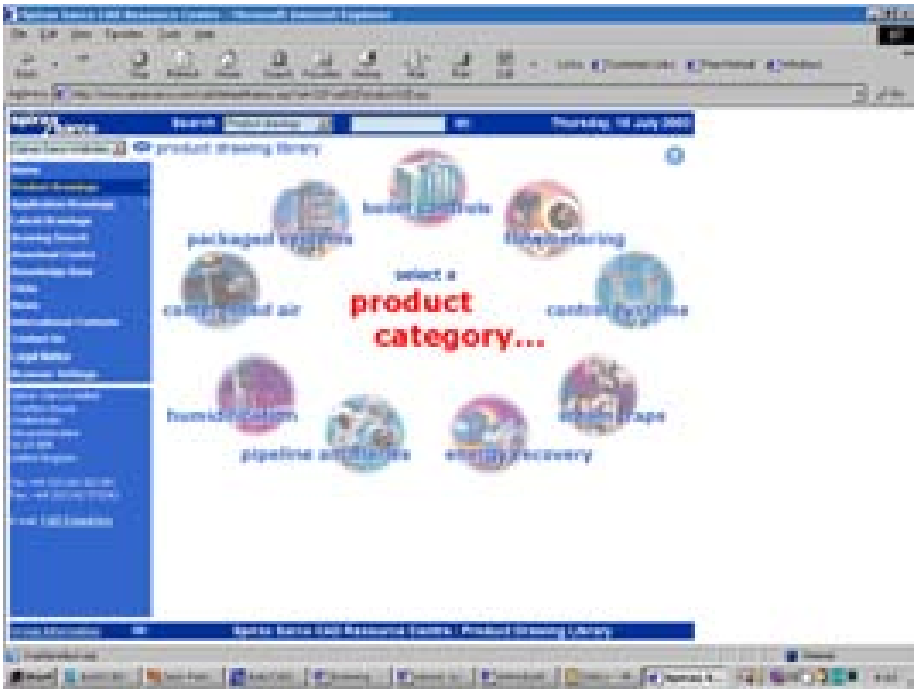
This is the point at which the online libraries become so vital. In the past, updates were only available every 18 months-2 years. Because the *CAD Resource Centre* is hosted on our website, it is available twenty-four hours a day, seven days a week to anyone in the world who has access to the World Wide Web. This means that as soon as a new product is released, a CASSIO drawing will be made available to everyone instantly, regardless of where they are in the world.

To make linking to the online libraries easy, the CASSIO menu contains links that navigate directly to the areas of the *CAD Resource Centre* you are most likely to need instant access to. Once you have found the drawing you require, inserting it is easy. You have already done this in the last section!

browsing for a drawing

You can gain instant access to the online libraries with the click of a button. Do the following to go to the online product drawing library menu ring:

1. Click ***CASSIO, Online Product Drawing Library, Browse Product Drawing Library (Online)***
2. Your web browser will be started and you will be taken to the *Product Drawing Library* on the *CAD Resource Centre*.



⇒ You will notice that these categories are the same as the categories in the *Product Drawings* section of the CASSIO menu. You can browse the different categories much the same as you do in CASSIO. The *Product Drawings* item on the left of the screen cascades down as in CASSIO, which is always available.

3. Click ***Pipeline Ancillaries, Separators*** to view the separator drawings in the online version.

Tip!
The user interface for the online libraries may be subject to change. You can obtain the best and most up-to-date assistance by visiting the online ***Knowledge Base***.

Tip!
If a drawing is new, and only available in the online version of the library, the drawing will be tagged with the new icon.

⇒ If there have been no updates to this section, the array of thumbnails will be identical to the one in the CASSIO library. As with the *locally stored application library* that we looked at in the last section, these drawings can also be previewed and/or downloaded.

inserting a drawing

To insert drawings from the online libraries you follow the same procedure as when inserting drawings from the *locally stored application drawing library*.

4. Move the cursor over the i-drop icon and **left-click** and hold.

⇒ The dropper icon will be shown as 'full' when the drawing is picked up.

5. Drag the icon/cursor onto to the AutoCAD LT item on the Windows taskbar and hold for a moment. The AutoCAD LT window will then maximise so that you can drop the DWG file into your drawing. You must drop the drawing (release the mouse button) over the actual drawing area within AutoCAD LT.

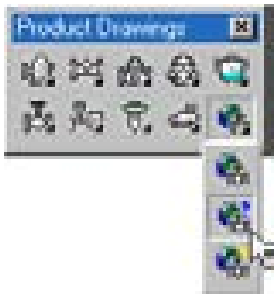
⇒ If you access the library via the CASSIO menu item or toolbar button, you can simply drop the drawing into AutoCAD LT. The *Smart Scaling* menu will be displayed for you to select your desired size from. If not, you will be prompted for a *scale factor*. At this point you can either press RETURN three times (this sizes the product to 15mm/½"), or select a size from the ***Smart Scaling*** toolbar

☞ Play around with the product drawing library for yourself to practice i-dropping drawings.

searching for a drawing

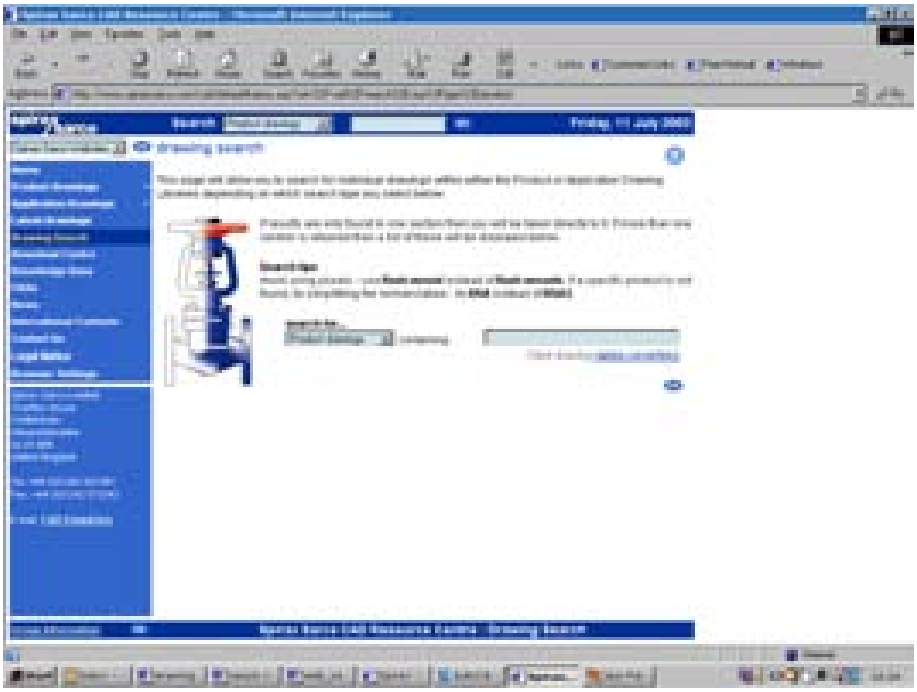
You can find a specific drawing, or type of drawing by using the *Drawing Search* facility. Drawings are searched for by title for product drawings and by keywords/phrases for application drawings.

We will try a search for a product drawing, so do the following:

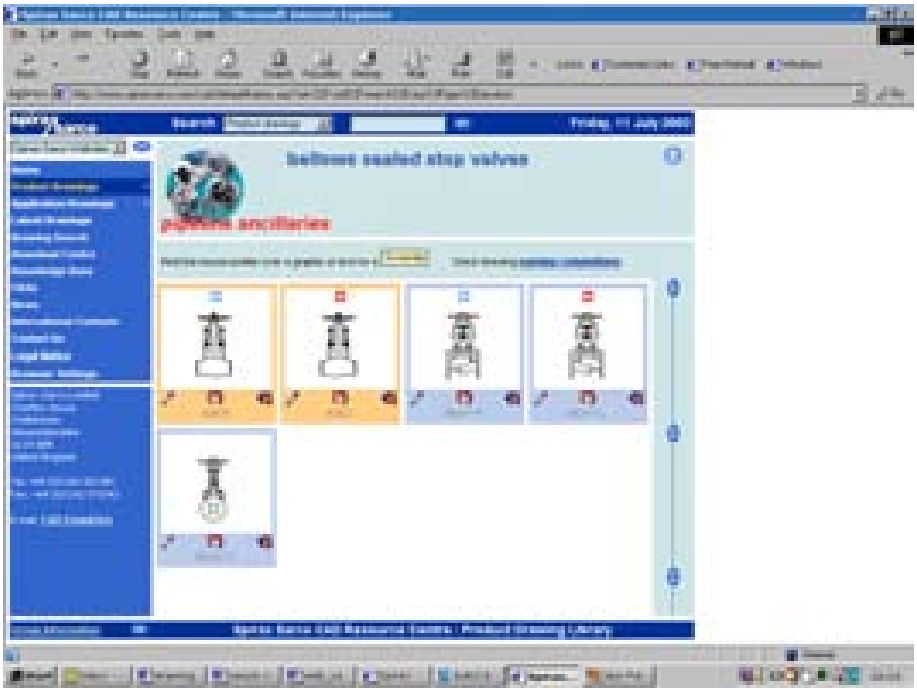


1. Within AutoCAD LT, click ***CASSIO, Online Product Drawing Library, Search for a Product Drawing (Online)***

⇒ Your web browser will be started and you will be taken to the *Product Drawing Search Page* on the *CAD Resource Centre*.



2. Let's say, for instance, that we were looking for an A3S stop valve. Type **A3S** into the search form and press Return or 'Go search'.

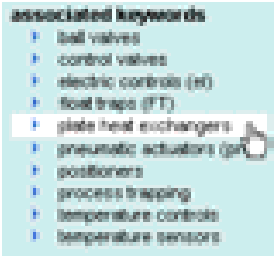


⇒ You will be taken directly to the page where the drawings are stored and the drawings themselves will be highlighted in gold. You can then drop any of the drawings into AutoCAD using the i-drop icon (described on page 49).

⇒ If there is more than one match in two or more sections, the section names containing the products that match will be displayed. Clicking on the title will take you to that section and to the specific drawing in that section that matches the search criteria.

Tip!
You can get quick access to the search form – it is displayed at the top of every page on the *CAD Resource Centre*.

⇒ If you search on application drawings you can enter a search word or phrase, or select one from the drop-down box. This box contains all of the keywords and phrases used in the application drawing library, so you are guaranteed some results.



⇒ When you find an application drawing and view it in the preview window, you will notice that there are *Associated Keywords* in a list. This text will act as a link to other drawings in the library that are associated with the specific keyword or phrase. This can be useful when searching for a certain type of drawing or application. For instance, you could do a search on *plate heat exchangers* to find all of the drawings containing this piece of equipment.

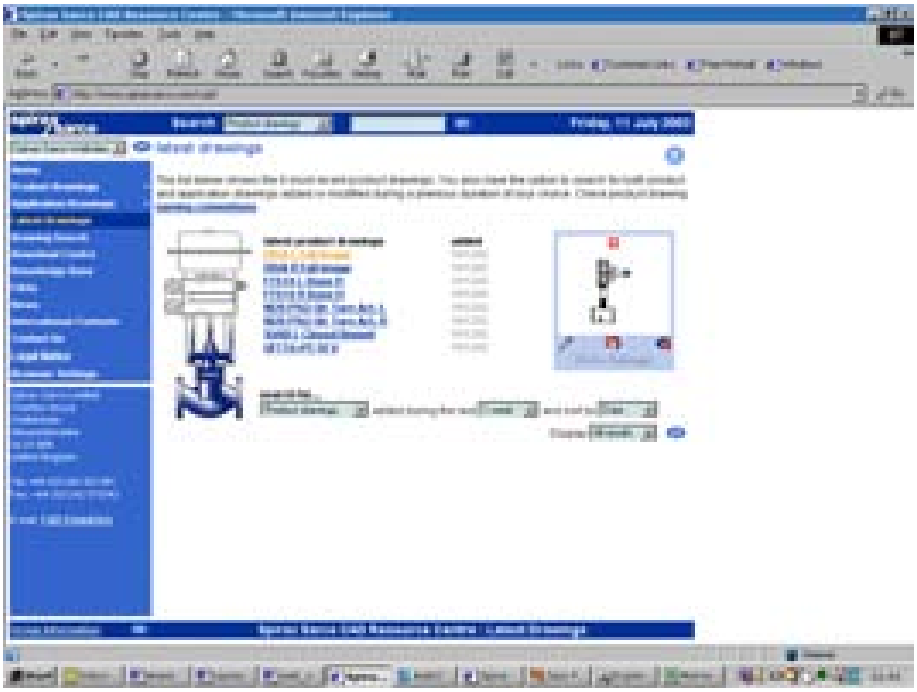
checking for latest drawings

You can check for new or updated drawings online by using the *Latest Drawings* page. Any drawings added or updated online will be tagged with the new icon as they will not be available within the CASSIO libraries. These drawings can be picked out and displayed so you can see at a glance any product drawings that have been added or updated within a timespan of your choice.

☞ We will run a check on product drawings that have been added, so do the following:

1. Within AutoCAD LT, click ***CASSIO, Online Product Drawing Library, Check Latest Product Drawings (Online)***

⇒ Your web browser will be started and you will be taken to the *Latest Drawings Page* on the *CAD Resource Centre*.

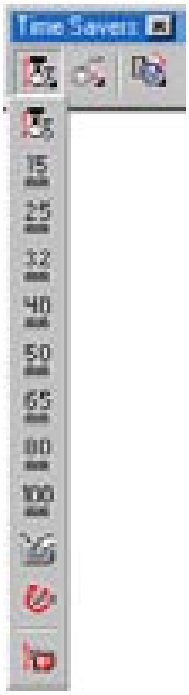


⇒ This page displays the eight most recently added product drawings in a list. You can click on one of the titles to view the thumbnail and choose a download or viewing option.

⇒ Alternatively, you can check for drawings added within a timespan of your choice and sort the results in date, name or section order.

i-drop

⇒ As before, whenever you see the i-drop icon, you can drop the drawing into AutoCAD (as described on page 49).



the smart scaling toolbar

The *Smart Scaling* toolbar can be used in a variety of ways to help size products and application drawings inserted, or existing in your drawing. The *Smart Scaling* menu will appear after every product is inserted from the CASSIO library. The same menu will also appear if you insert a product drawing from the *CAD Resource Centre* after accessing it via one of the online library options.

The *Smart Scaling* toolbar comes in useful if you do not close your web browser and subsequently pick another product to insert. On these occasions the *Smart Scaling* menu will not appear, so select an insertion point as normal, then use the *Smart Scaling* toolbar to select a product size.

The same is true if you insert an application drawing – if the drawing is not sized automatically, and AutoCAD prompts you for a scale factor, simply click the *Size Application Drawing* button.

Another use for the *Smart Scaling* toolbar is for re-sizing product drawings that have already been inserted in your drawing. For instance, you may wish to re-size a product from 25mm (1") to 32mm (1¼").

☞ To do this, follow the example below:

Scale Command

Modify, Scale
SCALE
SC

1. Issue the ***Scale*** command and select the product.
2. Specify a base point (the inlet of the product?).
3. Type **R** (for Reference).
4. Click the 25mm button on the *Smart Scaling* toolbar.
5. Click the 32mm button on the *Smart Scaling* toolbar.

The product will be 'scaled-up' using the correct smart scaling conventions so consistency will be retained through the drawing. You can use the same procedure to re-size *Smart Pipe* as well.

section 9 customising and exporting

This section looks at some of the additional features of CASSIO and how CASSIO drawings can be copied and used in other Windows applications.

These features are not vital in the production of drawings, but are features that may enable you to get the best out of CASSIO.

customising templates

The CASSIO template can be customised to suit specific countries and/or languages and saved to the menu for use with other drawings. For instance, if you are producing a drawing in Portugal, you do not want a Charlton House address on the template.

The template that is included in CASSIO covers the UK and has English text. However, customising a template for use in a different country is very simple, can be done in a few minutes and only needs to be done once.

There are two stages you need to complete in order to customise a template.

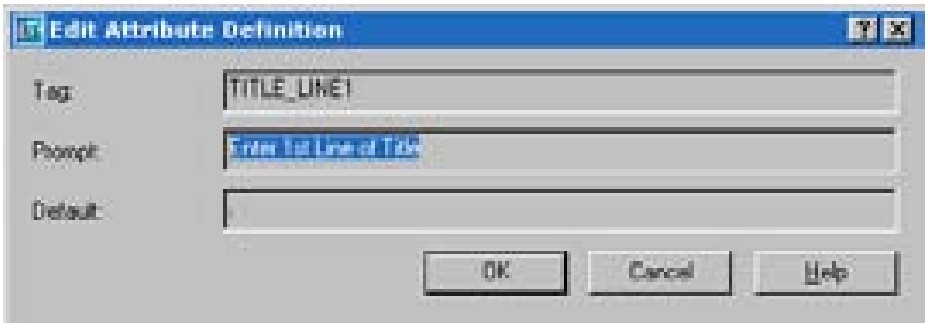
☞ Try customising a template by doing the following:

1. Create a ***New*** drawing (no specific drawing size is required).
2. Click ***CASSIO, Templates, 1.Prepare Template for Customisation***

⇒ The default Spirax Sarco template will be opened and you will be prompted by a help screen to edit the text in the template to suit your requirements. Maybe you need to add a different contact address, or change the language of the titles and prompts?

3. Click the **right mouse button** to clear the help screen. When the pop-up menu appears, select ***Edit Text…***
4. Click on the text you wish to change and enter your preferred text in the resulting dialogue box (address for instance).

⇒ You will notice that some dialogue boxes contain the prompts that you are given when you insert the border. For example, *'Enter 1st Line of Title'* could be changed to the equivalent in Portuguese. The Default section should be kept as a single dot. This is what will be displayed in the border if you wish to leave a section blank when the border is inserted.



Modify the 'Prompt' item to suit. Don't change the 'Tag' or 'Default' items.

⇒ When you have finished making your changes, you need to save the template to the CASSIO menu so that you can use it again in future. To save your customised template:

5. Click ***CASSIO, Templates, 2. Save Customised Template***

⇒ A menu will appear on the screen listing various countries. You can save the template to any of these icons - if you have created a Portuguese template, save it to the Portugal icon and so-on.

6. Select the icon you wish to save the customised template under - it will remain in this location for later.

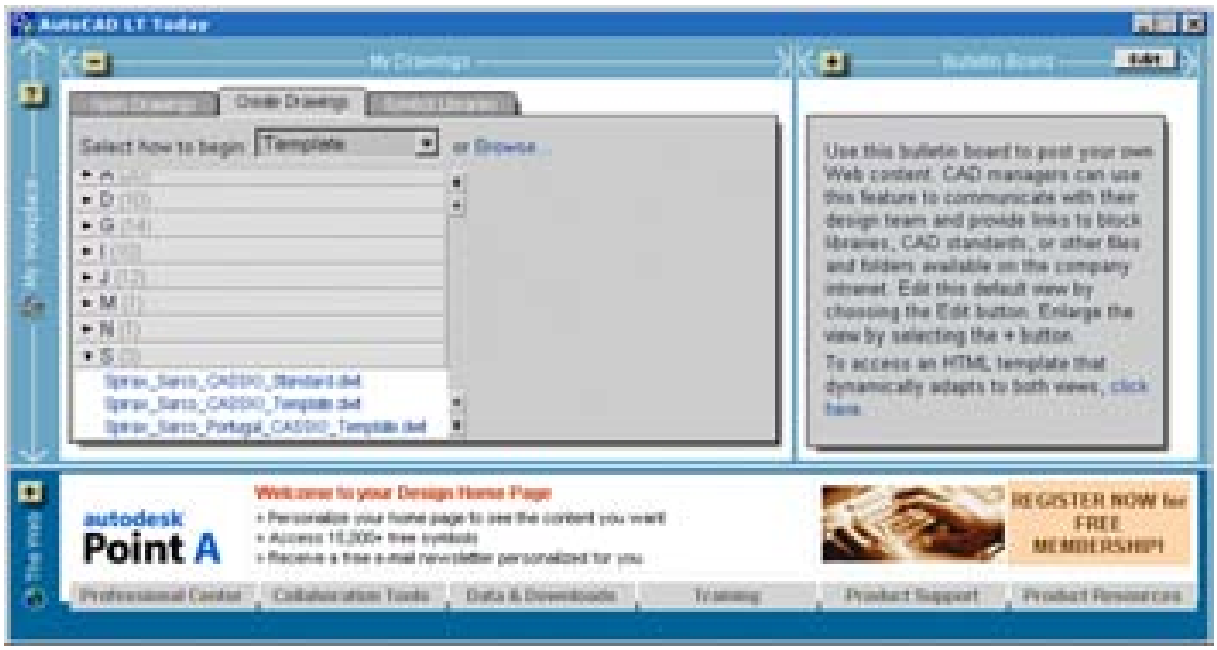
⇒ A final help screen will inform you that the process is complete.

7. Click the **right mouse button** to clear the screen. You can either use the template now or start a new drawing. Make your selection from the pop-up menu.

☞ To see if the process has worked, or to use the new template, click ***CASSIO, Templates, 3. Use Customised Template***. Select the country name you saved your template to and the new template should appear. Any text or prompts you have changed should appear when you insert the template.

⇒ If the text has not changed or you wish to change it again, simply create another ***New*** drawing and run through the process again. The old template will be overwritten automatically if you specify the same country name.

⇒ **Note:** You can also use your customised templates when you create a ***New*** drawing. If you choose the *Begin drawing with a template* option, you will find the Spirax Sarco templates under 'S'.



using cassio drawings in other windows applications

The first section of this manual states that CASSIO can be used to create drawings for a wide range of printed and electronic media. For example, CASSIO drawings are used in literature for quotation and training purposes, and form the basis for the application drawings in our sales brochures.

In order to do this, the drawings you create often need to be exported into other software applications. Microsoft Word, PowerPoint and Excel are widely used to create documents as are many other office type software applications. Illustration touches and colour can be added to CASSIO drawings in software like Macromedia Freehand and Adobe Illustrator.

Tip!
The ***Smart Export*** tools are not accessible from pull-down menu's. They must be picked from the CASSIO 'Time Savers' toolbar.

CASSIO comes with three different export tools for you to use. They are called ***Smart Export*** tools because although they use standard AutoCAD LT commands, each tool sets specific AutoCAD LT variables in order to generate a high quality output. It is recommended to use these tools if you wish to transfer one of your drawings to another software application.

Note: The drawings will be exported in vector format, so will not lose detail when scaled in the target application. However, if the target application is a raster editing tool, Paint Shop Pro for example, the drawing will be imported as a raster image.

the smart copy to clipboard tool

The most common, and quickest way of transferring a CASSIO drawing to another Windows application is via the Windows Clipboard. A drawing, or part of a drawing can be copied to the Clipboard and pasted directly into the appropriate application.

☞ Follow the instructions below to copy a CASSIO drawing to the Clipboard and paste it into another Windows application:

1. Create a ***New*** drawing.
2. Insert an A3S stop valve of any size.
3. Click the ***Smart Copy to Clipboard*** toolbar button.
4. Select the stop valve and press Return.

⇒ The drawing has now been copied to the Windows Clipboard and

will remain here until something else is copied to the Clipboard or the computer is restarted.

5. Open Microsoft Word.
6. Create a ***New*** document.
7. Click ***Edit, Paste***

⇒ You should see the stop valve appear on the screen. You can re-size the drawing by clicking on it once and dragging one of the corner handles that appear. You will notice that however large or small the drawing is sized, the same level of detail is retained.

⇒ See the next page for tips on using drawings in Office applications.

the smart dxf export tool

The second, and possibly most accurate way of transferring drawings across applications is by saving the drawing as a Drawing Interchange File (*.dxf).

This method is mainly used for transferring drawings between CAD packages, but should also be used within other applications, if supported. The only drawback with *.dxf files is that their file size can become quite large on complex drawings.

☞ To find out how a *.dxf file can be created, try the following:

1. Revert to AutoCAD LT.
2. With the stop valve on-screen, click the ***Smart DXF Export*** toolbar button.

⇒ You will be asked to specify a name and location for the DXF file. Depending on the target application, you may also need to specify an older version of DXF file. If in doubt, change the *Files of type* drop-down box to *AutoCAD R12/LT2 DXF.*

⇒ By default all entities in the drawing will be selected. If you wish to select specific entities, you should click *Tools, Options* while in the DXF Export dialogue box. You will be presented with another dialogue box from which you should click on the *DXF Options* tab and then check the *Select Objects* box. You can then pick the parts of the drawing you want to export.

3. Open the folder where you wish to save the file.
4. Name the file **A3STEST** and click ***Save***.
5. Revert to Microsoft Word.
6. Click ***Insert, Picture...***

7. Change the list of files to *AutoCAD Format 2-D (*.dxf)* and find the A3STEST.DXF file.
8. Insert the file into the Word document.

⇒ See the next page for tips on using drawings in Office applications.

the smart wmf export tool

The third of transferring drawings across applications is by saving the drawing as a Windows Meta File (*.wmf).

This file format was introduced by Microsoft as a preferred method of transferring vector images between Microsoft Office applications, but also works quite well from AutoCAD LT.

☞ To find out how a *.wmf file can be created, try the following:

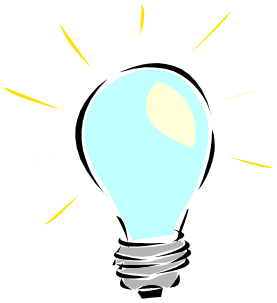
1. Revert to AutoCAD LT.
2. With the stop valve on-screen, click the ***Smart WMF Export*** toolbar button.

⇒ You will be asked to specify a name and location for the WMF file.

⇒ Unlike the *Smart DXF Export* tool, this method will by default ask you to select objects.

9. Open the folder where you wish to save the file.
10. Name the file **A3STEST** and click ***Save***.
11. Revert to Microsoft Word.
12. Click ***Insert, Picture...***
13. Change the list of files to *Windows Metafile (*.wmf)* and find the A3STEST.WMF file.
14. Insert the file into the Word document.

⇒ See below for tips on using drawings in Office applications.

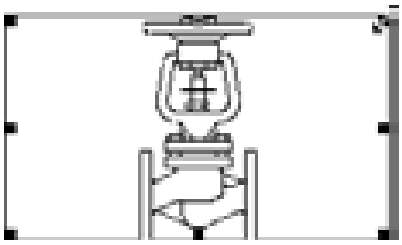


tips

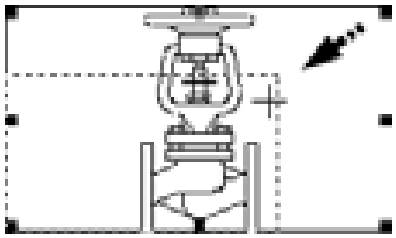
CASSIO drawings can be used in a wide variety of different software applications. Giving in-depth instructions on how to manipulate the drawings in every different application is obviously something that we can't go into here! However, here are a few general tips that you may find useful.

sizing the drawing

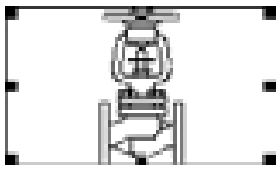
After importing the drawing from CASSIO, you will inevitably need to re-size it to fit into your document. The drawings will be exported in vector format, so will not lose detail when scaled in the target application. To re-size the drawing, click on one of the corner sizing handles and drag inwards or outwards depending on your sizing requirement. Re-sizing with the corner handles ensures that the same aspect ratio is retained while sizing. Resizing with one of the middle handles will 'squash' the drawing.



Move mouse cursor over corner sizing handle…



Click and drag to re-size drawing…



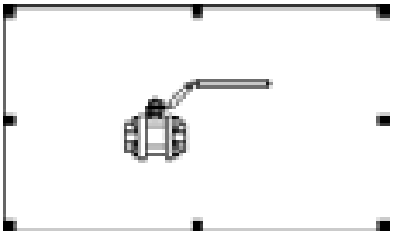
Drawing re-sized.

⇒ **Note:** Some software applications may require that you hold down SHIFT while re-sizing to retain the correct aspect ratio.

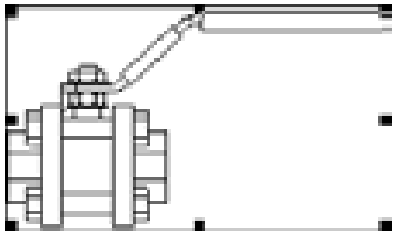
zoom extents before smart copy

If you know you are going export the entire drawing it is a good idea to issue the ***Zoom, Extents*** command before clicking one of the *Smart Export* buttons. If you then select the objects by typing *All* at the command line you will not see as much 'excess space' around the drawing when it is imported into the target application.

⇒ These graphics show how a drawing could look while selected in Microsoft Word…



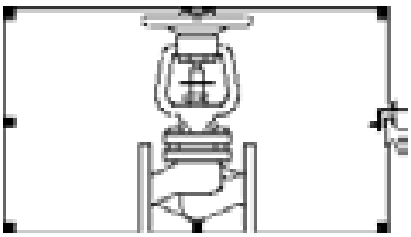
Zoom, Extents not issued before *Smart Export*…



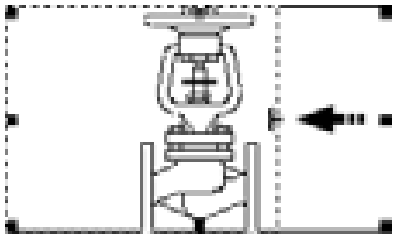
Zoom, Extents issued before *Smart Export*…

cropping the drawing

Sometimes you may need to *crop* (remove excess space from around) a drawing you import from CASSIO, even if you do issue a *Zoom, Extents* before using *Smart Export*. In Microsoft Office applications you can right-click on the drawing and click ***Show Picture Toolbar***. Click the ***Crop*** button from the picture toolbar, then click and drag on one of the sizing handles to reduce the excess space.



Click *Crop*, then move cursor over a sizing handle…



Click and drag to remove excess space from around drawing…

⇒ See how the drawing itself is not 'squashed' – only the excess space around the drawing is removed/hidden from view.

changing the line colour

If you import drawings into Microsoft PowerPoint to include in presentation material, you may need to change the line colour – if you have a black background, you don't want black lines! When you have imported the CASSIO drawing into PowerPoint (using any of the *Smart Export* tools), you should right-click on the drawing and click ***Show Picture Toolbar***. Click the ***Recolor Picture*** button from the picture toolbar, then select a new colour for the lines from the drop-down box.

Before recolor…

After recolor…

⇒ **Note:** You can 'fill' the product drawings with colour if you have Macromedia Freehand or Adobe Illustrator as most product drawings in the library are drawn using our *EasyColour* structure. *EasyColour* product drawings are made up of *closed polylines*, which can be selected and filled with any colour. Use the ***Smart DXF Export*** tool to transfer your drawing into one of these vector-based drawing packages, colour the drawing, then copy/paste your coloured drawing into Word or PowerPoint.

⇒ See the help files for your vector-based drawing package to learn more about filling objects with colour.

congratulations!

You have now completed the second training manual in this series!

Feel free to run through the manual, or any of the individual sections, again if you would like more practice. Only by practising with AutoCAD LT and CASSIO will you gain a better understanding of how the two packages work and improve on the skills you have learnt already.

If you have understood what has been covered in this manual, you will have all the knowledge you need in order to produce your own 'CASSIO style' drawings. With this knowledge you will find that using the CASSIO library can be both simple and rewarding.

cassio users club

If you require technical information on AutoCAD LT or CASSIO, you can contact us on...

e-mail: GarySmith@SpiraxSarco.com

web: http://www.spiraxsarco.com/cad

fax: +44 (0)1242 573342

telephone: +44 (0)1242 521361

address:

Gary Smith
Spirax-Sarco Limited
Charlton House
Cheltenham
Gloucestershire
GL53 8ER
UK