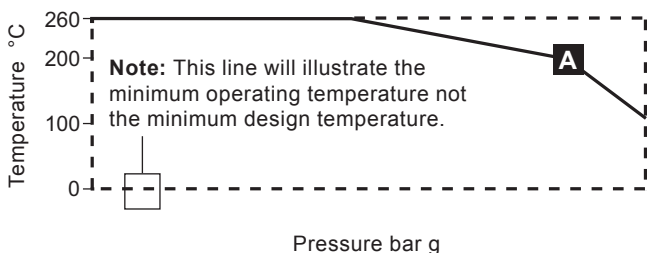


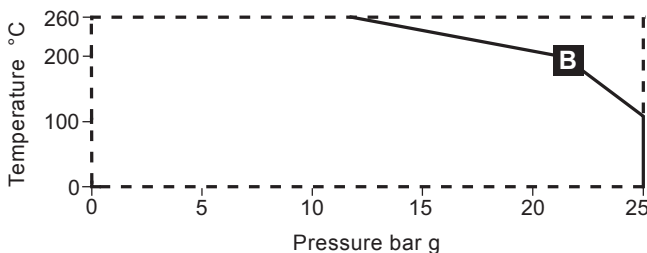
## Pressure / Temperature Limits for Control Valves

**Control valve** Technical Information sheets (TIs) for products in pressurised systems contain a 'Pressure / temperature limits' diagram. This diagram indicates the envelope of the product(s) at the full range of pressures and temperatures. The construction of the 'Pressure / temperature limits' diagram is shown below.

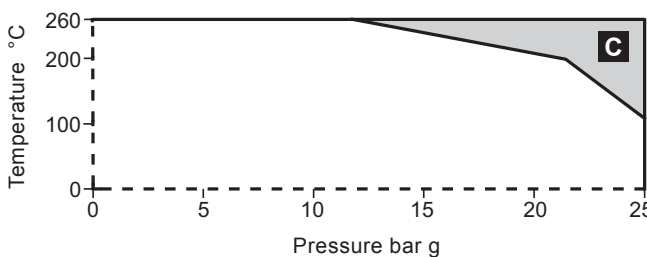
**Note:** A table 'Definition of technical terms used for control valves' and a typical example (no specific product) is displayed overleaf.



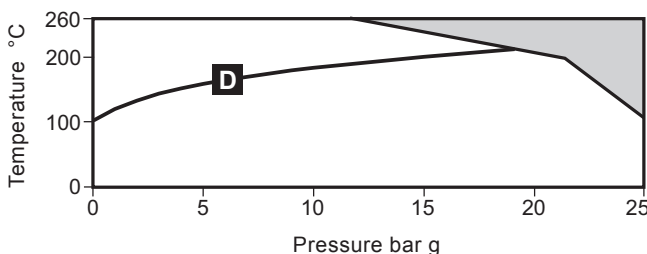
**A** Is the maximum design temperature the body of the product can be raised to permanently, at a given pressure.



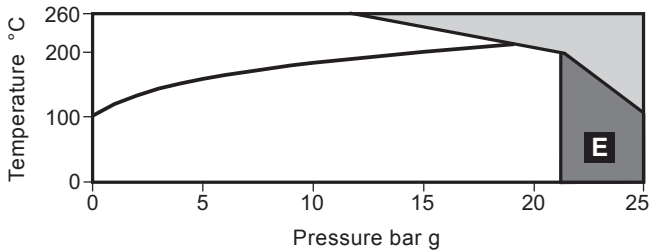
**B** Is the maximum design pressure that the combined body and end connections of the product can withstand at a given temperature. It is a function of the PN rating and body design / material.




**C** Is a prohibited area and the product **must not** be used in this region and will be worded:  
 The product **must not** be used in this region.

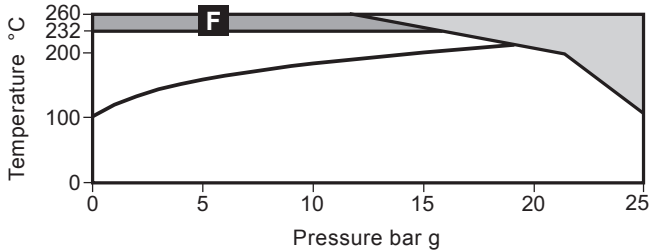


**D** The steam saturation curve is added (where relevant) to enable users to easily find the specific operating points, e.g. 10 bar g saturated steam @ 185 °C, 10 bar g steam with 20 °C superheat or 10 bar g / 250 °C steam.




**E** Sometimes end connections or internal components may restrict the operating envelope of the product below the standard rating. **Care must** therefore be taken in selecting **appropriate end connections**. In this case the product should not be used in area 'e' and will be worded:

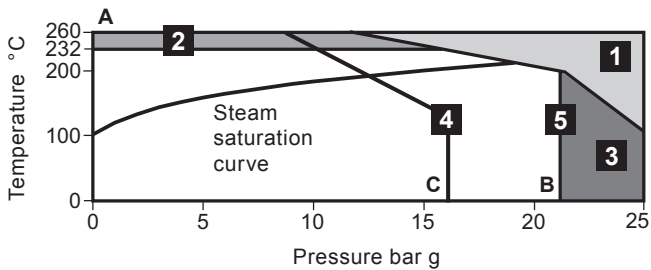
 The product **should not** be used in this region because...(the actual reason will depend on the product being described).






**F** If a product should not be used above a certain temperature, or an ancillary product is required to operate above a certain limit then it will be tinted and worded appropriately. e.g.:

 High temperature bolting required for use in this region (the actual reason will depend on the product being described).

**An example of a finished diagram:**



- 1**  The product **must not** be used in this region.
- 2**  High temperature bolting is required for use in this region.
- 3**  The product should not be used in this region or beyond its operating range as damage to the internals may occur.
- 4** **A - C** Flanged end connections EN 1092 PN16.
- 5** **A - B** Flanged end connections EN 1092 PN25 or ANSI B 16.5 Class 300.

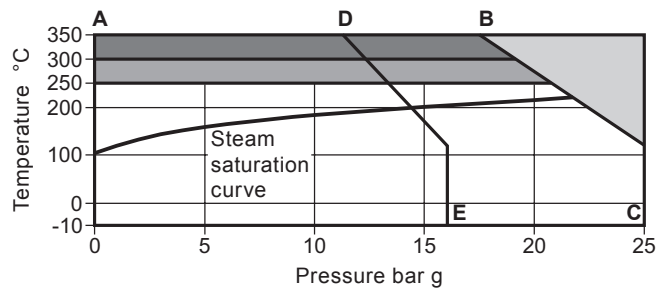
## Definition of technical terms used for control valves

<b>Body</b>	This is a combination of the product body and end connections and is the term used to describe the pressure containing envelope of the product.
<b>Nominal pressure (PN)</b>	The PN is the nominal working pressure / temperature (which is dependant on materials, design and working temperatures/pressures) that can be tolerated by the body of the product.
<b>Maximum design pressure</b>	This is the maximum allowable pressure that the body of the product can withstand at a given temperature.
<b>Maximum operating pressure</b>	This is provided by the manufacturer when it is less than the maximum design pressure. For example the maximum design pressure may be reduced to the pressure limitation of the lowest rated option chosen.
<b>Maximum differential pressure</b>	This is dependant upon the chosen actuator up to the maximum design pressure of the product.
<b>Maximum design temperature</b>	This is the maximum allowable temperature to which the body of the product can be raised permanently, at a given pressure.
<b>Maximum operating temperature</b>	This is the maximum temperature for correct operation of the product. This is determined by the lowest rated option chosen.
<b>Minimum design temperature</b>	This is the minimum documented temperature the body of the product can withstand.
<b>Minimum operating temperature</b>	This is the minimum temperature for correct operation of the product.
<b>Designed for a maximum cold hydraulic test pressure of ___ bar g or psi g</b>	This is a cold hydraulic test applied to the body as supplied. <b>Note:</b> When Spirax Sarco have tested the product in an alternative form than that supplied, a lower pressure will be given (see Typical pressure/temperature limits diagram below).

A standard layout for the Pressure / temperature limits information is shown opposite.

For further layouts, depending on space available in the TI or IMI, are shown on pages 4 and 5.

## Pressure / temperature limits



- The product **must not** be used in this region.
- High temperature packing is required for use in this region.
- The product should not be used in this region or beyond its operating range as damage to the internals may occur.

**A-B-C** Flanged PN25.

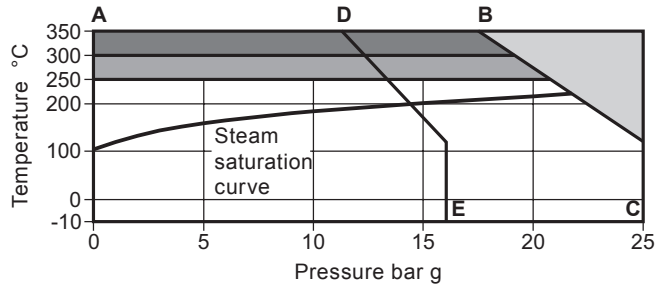
**A-D-E** Flanged PN16.

**Note:** As standard the XYZ series two port control valves are supplied with PTFE stem seal and metal-to-metal seats.

Body design conditions		PN25
Maximum design pressure		25 bar g @ 120 °C
Maximum design temperature		350 °C @ 17.5 bar g
Minimum design temperature		-20 °C
Maximum operating temperature	As standard	250 °C @ 22 bar g
	With high temperature packing	300 °C @ 20 bar g
	With high temperature bolting and packing	350 °C @ 18 bar g
Minimum operating temperature		-10 °C
<b>Note:</b> For lower operating temperatures consult Spirax Sarco.		
Maximum differential pressure		See relevant actuator TI
Designed for a maximum cold hydraulic test pressure of 37.5 bar g		
<b>Note:</b> As supplied the test pressure must not exceed 25 bar g		

If the chart is on a full single page, this layout is used

**Pressure / temperature limits**



- The product **must not** be used in this region.
- High temperature packing is required for use in this region.
- The product should not be used in this region or beyond its operating range as damage to the internals may occur.

**A-B-C** Flanged PN25.

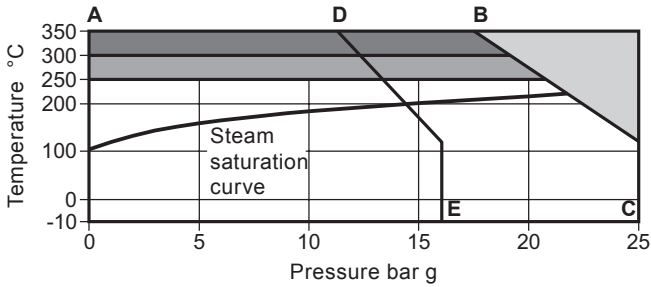
**A-D-E** Flanged PN16.

**Note:** As standard the XYZ series two port control valves are supplied with PTFE stem seal and metal-to-metal seats.

Body design conditions	PN25
Maximum design pressure	25 bar g @ 120 °C
Maximum design temperature	350 °C @ 17.5 bar g
Minimum design temperature	-20 °C
	As standard
	250 °C @ 22 bar g
Maximum operating temperature	With high temperature packing
	300 °C @ 20 bar g
	With high temperature bolting and packing
	350 °C @ 18 bar g
Minimum operating temperature	-10 °C
<b>Note:</b> For lower operating temperatures consult Spirax Sarco.	
Maximum differential pressure	See relevant actuator TI
Designed for a maximum cold hydraulic test pressure of:	37.5 bar g
<b>Note:</b> As supplied the test pressure must not exceed 25 bar g	

If the chart is on a single page, with limited space, this layout is used

### Pressure / temperature limits



- The product **must not** be used in this region.
- High temperature packing is required for use in this region.
- The product should not be used in this region or beyond its operating range as damage to the internals may occur.
- A-B-C** Flanged PN25.
- A-D-E** Flanged PN16.

**Note:** As standard the XYZ series two port control valves are supplied with PTFE stem seal and metal-to-metal seats.

Body design conditions		PN25
Maximum design pressure		25 bar g @ 120 °C
Maximum design temperature		350 °C @ 17.5 bar g
Minimum design temperature		-20 °C
Maximum operating temperature	As standard	250 °C @ 22 bar g
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Minimum operating temperature		-10 °C
<b>Note:</b> For lower operating temperatures consult Spirax Sarco.		
Maximum differential pressure		See relevant actuator TI
Designed for a maximum cold hydraulic test pressure of		37.5 bar g
<b>Note:</b> As supplied the test pressure must not exceed 25 bar g		