Overview

Pointek CLS500 is an inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of high temperature and pressure

Benefits

- Patented Active-Shield technology so measurement is unaffected by material buildup in active shield section
- 2-wire loop powered with solid-state switch or 4 to 20/20 to 4 mA output
- Simple push-button calibration and integrated local display
- Full function diagnostics
- HART communications for remote commissioning and inspection

Application

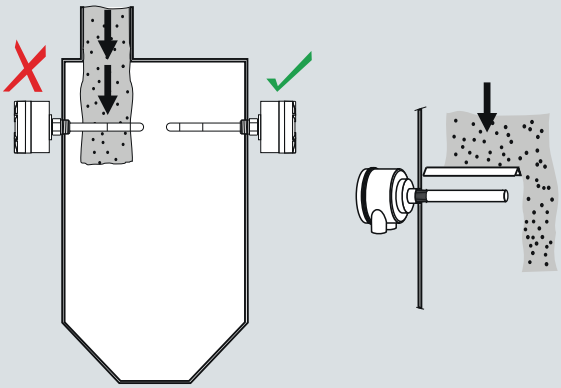
Patented Active-Shield technology ensures that measurement is unaffected by vapours, product deposits, dust and condensation. The unique mechanical probe design coupled with a high performance transmitter gives superior performance in a wide range of level detection applications.

Pointek CLS500's microprocessor-based electronics provide one-point calibration, making setup possible without shutting down your production process.

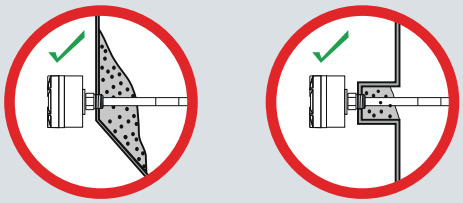
- Key Applications: foam or liquid/foam level, glycol regenerators, high-pressure coalescers, LNG applications

Configuration

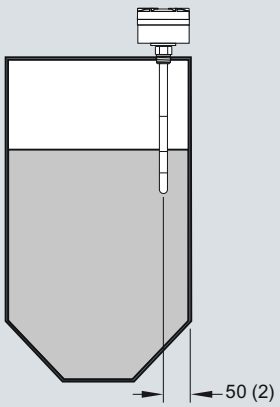
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Install probe at least 50 mm (2") from tank wall.

Pointek CLS500 installation, dimensions in mm (inch)

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Pointek CLS500

Technical specifications

Input	
Measuring range	0 ... 330 pF
Span	Min. 1 pF
Output	
Solid-state switch	
• Output	Galvanically isolated
• Protection	Against reversed polarity (bipolar)
• Max. switching voltage	30 V (DC) 30 V peak (AC)
• Max. load current	82 mA
• Voltage drop	< 1 V, typical at 50 mA
• Time delay (pre or post switching)	1 ... 60 s
Current loop	4 ... 20 mA/20 ... 4 mA
Accuracy (transmitter)	
Temperature stability	0.15 pF (0 pF) or < 0.25 % (typical < 0.1 %) of actual measurement value, whichever is greater over the full temperature range
Non-linearity and repeatability	0.1 % of full scale and actual measurement respectively
Accuracy	Deviation < 0.1 % of measured value
Rated operating conditions[1]	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature (transmitter)	-40 ... +85 °C (-40 ... +185°F)[2]
• Installation category	I
• Pollution degree	4
Medium conditions	
• Relative dielectric constant ε_r	Min. 1.5
• Process temperature	Temperature ratings are pressure dependent. See Pressure/Temperature curves on page 5/67.
- Standard (PFA)	-50 ... +200 °C (-58 ... +392 °F)
- High temperature stainless steel version with enamel insulation and thermal isolator	Contact nacc.smpi@siemens.com
- High temperature stainless steel version with thermal isolator	-60 ... +400 °C (-76 ... +752 °F)
- Cryogenic version	-200 ... +200 °C (-328 ... +392 °F) Contact nacc.smpi@siemens.com for details.
Process pressure	Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/67.
• Standard (PFA)	-1 ... +150 bar g (-14.6 ... +2175 psi g)
• High temperature version (Enamel)[3]	Contact nacc.smpi@siemens.com
• High temperature version (Stainless steel)	-1 ... +35 bar g (-14.6 ... +507.6 psi g)

Design	
Material	
• Wetted parts material - Standard rod	316L stainless steel
• Probe isolation (rod)	PFA, enamel
Probe diameter	
• Standard rod version (PFA)	16 mm (0.63")
• High temperature rod version (Enamel)	Contact nacc.smpi@siemens.com for details.
• High temperature rod version (Stainless steel)	19 mm (0.75")
Probe length	
• Standard rod version (PFA)	Max. 1000 mm (39.4") with 16 mm (0.63") diameter probe
• High temperature rod version (Enamel)	Contact nacc.smpi@siemens.com for details.
• High temperature rod version (Stainless steel)	Max. measuring length 1000 mm (39.4") with 19 mm (0.75") diameter probe
Process connection of probe	
• Threaded mounting	NPT [(Taper), ANSI/ASME B1.20.1] R [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
• Flange mounting	ASME, EN 1092-1
Enclosure	
• Material	Aluminium, epoxy-coated (Stainless steel option available. Contact nacc.smpi@siemens.com)
• Cable inlet	2 x ½" NPT
• Degree of protection	Type 4X/NEMA4X/IP65, IP68
Power supply	Max. 33 V DC
Features	
Measurement current signalling	NAMUR NE 43
Safety	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier
• Diagnostics with fault alarm when:	Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility
• Function rotary switch	Positions 0 ... 9, A ... F
• SMART communication	Conforming to HART Communication Foundation (HCF)

Certificates and approvals	
General Purpose	CE, CSA/FM, C-TICK
Non incendive/Non sparking	CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC T6 to T4 T100 °C
Dust Ignition Proof	CSA/FM Class II and III, Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ia] T6 to T1 T100 °C
Explosion Proof	FM Class 1, Div. 1, Groups A, B, C, D T4 ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, ENV3, ENV5, Bureau Veritas

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate.
See also Pressure/Temperature curves on page 5/67.
2) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F)
3) Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact nacc.smpi@siemens.com

Pointek CLS500 probe version	Standard	HT Series
Process connection types	**Standard (PFA) (7ML5601, 7ML5602, 7ML5603)**	**High Temperature (Enamel or Stainless steel) (7ML5604)**
Threaded	Available as standard	–
Flange	Available as standard	Available as standard
Process connection materials		
316L stainless steel	Available as standard	Available as standard
Probe insulation		
None	–	HT Stainless: available as standard
PFA	Available as standard	–
Enamel		HT Enamel: available as special order[1]
Length parameters		
Max. rod length	1000 mm (40")	1000 mm (40")
Process condtitions[2]		
Max. process pressure	150 bar g (2175 psi g)	Stainless steel:[3] 35 bar g (507 psi g) Enamel:[3] 345 bar g (5004 psi g)
Max. process temperature	+200 °C (+392 °F)	+400 °C (+752 °F)

1) Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact nacc.smpi@siemens.com
2) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/67. Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/67.
3) Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/67.
– Not available as standard

Pointek CLS500

Selection and Ordering data	Order No.
Pointek CLS500, threaded C)	**7ML5601 -**
Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.	**- A 0**
Electronic transmitter	
No transmitter supplied	**0**
MSP 2002-1 (330 pF)	**1**
Process connection	
¾"	**A**
1"	**B**
1¼"	**C**
1½"	**D**
2"	**E**
Threaded connection and rating	
NPT [(Taper), ANSI/ASME B1.20.1]	**A**
R [(BSPT), EN 10226/PT (JIS-T) JIS B 0203]	**B**
G [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	**D**
Probe insulation/material of process connection	
PFA insulation/316L stainless steel	**1**
Approvals	
General Purpose: CE, CSA/FM, C-TICK	**1**
CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3GD 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4	**2**
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C	**4**
FM Class I, Div. 1, Groups A, B, C, D T4	**6**
Probe/electrode diameter	
16 mm (0.63") rigid rod, minimum insertion length 200 mm (7.9"), maximum insertion length 1000 mm (39.4")[1]	**1**
Thermal isolator/remote version	
Rigid thermal isolator [for process connection temperature over +85 °C (+185 °F)]	**A**
No thermal isolator	**B**

1) Add order code Y01 and Y02 in plain text: "Insertion/active shield length to mm"

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	**Y01**
Active Shield length - minimum length is 50 mm Y02: to mm[1]	**Y02**
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	**Y15**
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	**See page 5/66**
Pointek Specials	**See page 5/77**

1) See dimension drawings on page 5/74 for further explanation of Y02

Selection and Ordering data	Order No.
Pointek CLS500, welded flange C)	**7ML5602 -**
Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.	**- A 0**
Electronic transmitter	
MSP 2002-1 (330 pF)	**1**
Process connection and pressure rating	
Welded flange, 316L stainless steel, raised face	
2" ASME, 150 lb	**A A**
2" ASME, 300 lb	**A B**
3" ASME, 150 lb	**B A**
3" ASME, 300 lb[1]	**B B**
4" ASME, 150 lb[1]	**C A**
4" ASME, 300 lb[1]	**C B**
6" ASME, 150 lb[1]	**D A**
6" ASME, 300 lb[1]	**D B**
Welded flange, 316L stainless steel, Type A flat faced	
DN 50 PN 16	**E C**
DN 50 PN 25	**E D**
DN 80 PN 16	**F C**
DN 80 PN 25	**F D**
DN 100 PN 16[1]	**G C**
DN 125 PN 16[1] (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	**H C**
Probe insulation/material of process connection	
PFA insulation/316L stainless steel	**1**
Approvals	
General Purpose	**1**
CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3G 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4	**2**
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C	**4**
FM Class I, Div. 1, Groups A, B, C, D T4	**6**
Probe/electrode diameter	
16 mm (0.63") rigid rod, min. length 200 mm (7.9"), max. length 1000 mm (39.4")	**1**
Thermal isolator	
Rigid thermal isolator [for process temperature over +85 °C (+185 °F)]	**A**
No thermal isolator	**B**

1) Custom shipping methods required. Contact factory for more details.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	**Y01**
Active Shield length - minimum length is 50 mm.Y02: to mm[1]	**Y02**
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	**Y15**
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	**See page 5/66**
Pointek Specials	**See page 5/77**

1) See dimensional drawings on page 5/74 for further explanation of Y02

Selection and Ordering data		Order No.
Pointek CLS500, single piece flange	C)	7 M L 5 6 0 3 -
Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.		■■■■■ - ■■ A 0
Electronic transmitter		
MSP 2002-1 (330 pF)		1
Process connection and pressure rating		
Single piece flange, 316L stainless steel, raised face		
2" ASME, 150 lb		A A
2" ASME, 300 lb		A B
3" ASME, 150 lb		B A
3" ASME, 300 lb[1]		B B
4" ASME, 150 lb[1]		C A
4" ASME, 300 lb[1]		C B
6" ASME, 150 lb[1]		D A
6" ASME, 300 lb[1]		D B
Single piece flange, 316L stainless steel, Type B1 raised faced		
DN 50 PN 16		E C
DN 50 PN 25		E D
DN 80 PN 16		F C
DN 80 PN 25		F D
DN 100 PN 16[1]		G C
DN 100 PN 25[1]		G D
DN 125 PN 16[1]		H C
Probe insulation/material of process connection		
PFA insulation/316L stainless steel		1
Approvals		
General Purpose: CE, CSA/FM, C-TICK		1
CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3G 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4		2
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C		4
FM Class I, Div. 1, Groups A, B, C, D T4		6
Probe/electrode diameter		
16 mm (0.63") rigid rod, maximum length 1000 mm (39.4") (Y01)		1
Thermal isolator		
Rigid thermal isolator [for process connection temperature over +85 °C (+185 °F)]		A
No thermal isolator		B

[1] Custom shipping methods required. Contact factory for more details

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	**Y01**
Active Shield length - minimum length is 50 mm.Y02: to mm[1]	**Y02**
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	**Y15**
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	**See page 5/66**
Accessories	**See page 5/77**

[1] See dimensional drawings on page 5/74 for further explanation of Y02

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Pointek CLS500

Selection and Ordering data	Order No.
Pointek CLS500 High temperature C)	**7ML5604 -**
Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.	**A** -
Electronic transmitter	
MSP 2002-1 (330 pF)	**1**
Process connection and pressure rating	
316L stainless steel, raised face[1]	
2" ASME, 150 lb	**A 1**
2" ASME, 300 lb	**A 2**
2" ASME, 600 lb	**A 3**
2" ASME, 900 lb	**A 4**
3" ASME, 150 lb	**B 1**
3" ASME, 300 lb[2]	**B 2**
3" ASME, 600 lb[2]	**B 3**
3" ASME, 900 lb[2]	**B 4**
4" ASME, 150 lb[2]	**C 1**
4" ASME, 300 lb[2]	**C 2**
4" ASME, 600 lb[2]	**C 3**
4" ASME, 900 lb[2]	**C 4**
6" ASME, 150 lb[2]	**D 1**
6" ASME, 300 lb[2]	**D 2**
6" ASME, 600 lb[2]	**D 3**
6" ASME, 900 lb[2]	**D 4**
316L stainless steel, Type B1 raised face[3]	
DN 50 PN 16	**E 1**
DN 50 PN 25	**E 2**
DN 50 PN 40	**E 3**
DN 50 PN 63	**E 4**
DN 80 PN 16	**F 1**
DN 80 PN 25	**F 2**
DN 80 PN 40[2]	**F 3**
DN 80 PN 63[2]	**F 4**
DN 100 PN 16[2]	**G 1**
DN 100 PN 25[2]	**G 2**
DN 100 PN 40[2]	**G 3**
DN 100 PN 63[2]	**G 4**
DN 125 PN 16[2]	**H 1**
DN 125 PN 25[2]	**H 2**
DN 125 PN 40[2]	**H 3**
DN 125 PN 63[2]	**H 4**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	

Selection and Ordering data	Order No.
Pointek CLS500 High temperature C)	**7ML5604 -**
Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.	**A** -
Probe insulation/material of process connection	
NOTE: **Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact** nacc.smpi@siemens.com	
No insulation/316L stainless steel[4] [5]	**1**
Stilling well	
No stilling well	**0**
Approvals	
General Purpose	**A**
CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3G 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4	**B**
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C	**D**
FM Class I, Div. 1, Groups A, B, C, D T4	**F**
Probe/electrode diameter	
Maximum length 1000 mm (39.37")[5]	**A**
Thermal isolator	
Rigid thermal isolator	**1**

1) Welded flange for no insulation option only
2) Custom shipping methods required
3) Contact factory for more details.Flat faced flange for no insulation option only
4) Non-conductive material only, stainless steel non-insulated probe diameter 19 mm (0.75")
5) Add order code Y01 and Y02 in plain text:
"Insertion/active shield length to mm"
Minimum insertion length depends on probe version selected.
See dimensional drawings on page 5/74 for more details.

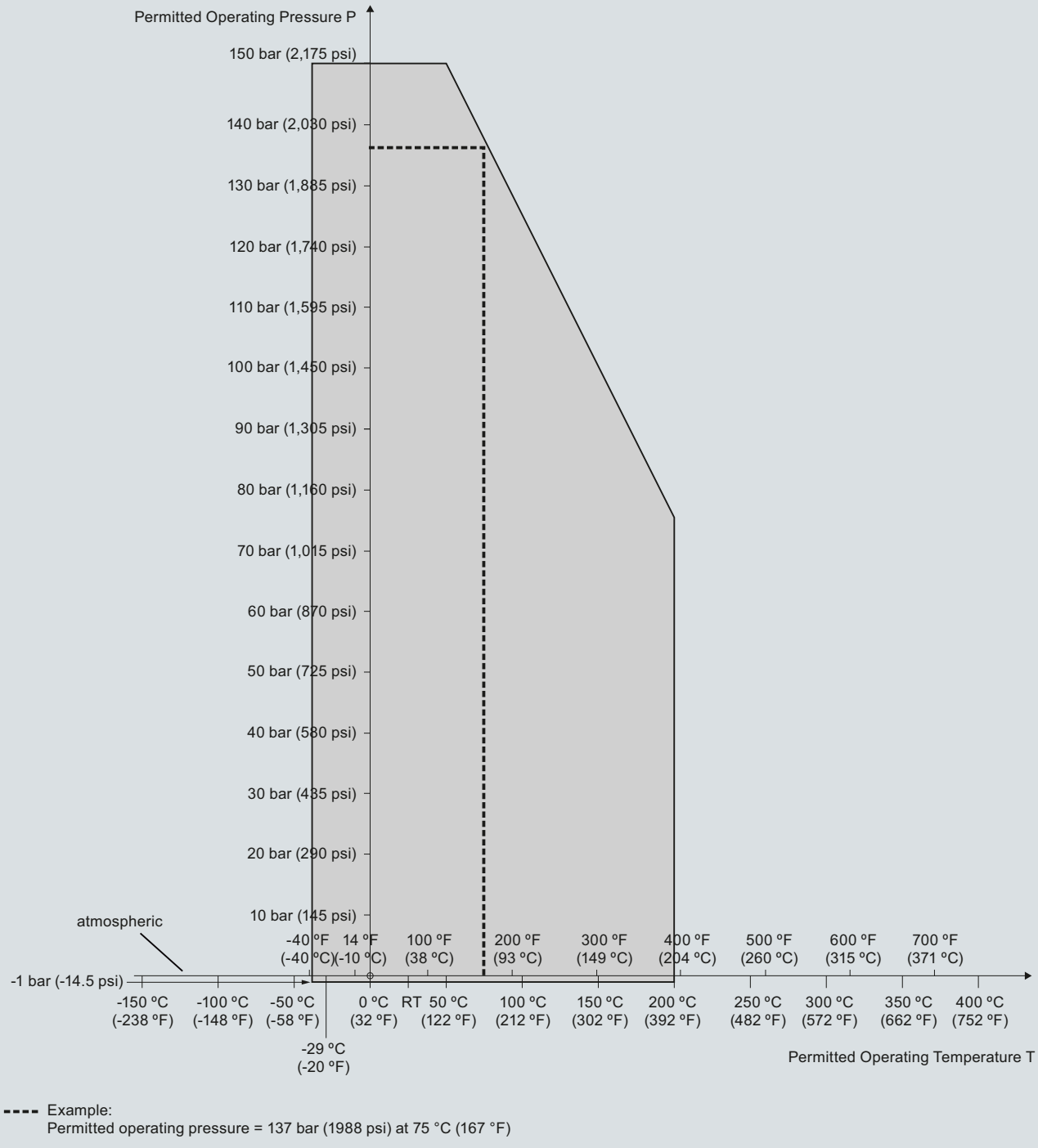
C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	**Y01**
Active Shield length - minimum length is 50 mm.Y02: to mm[1]	**Y02**
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	**Y15**
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	
English	**7ML1998-5GG02**
German	**7ML1998-5GG31**
French	**7ML1998-5GG11**
Dutch	**7ML1998-5GG41**
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Pointek Specials	**See page 5/77**

1) See dimensional drawings on page 5/74 for further explanation of Y02

Characteristic curves

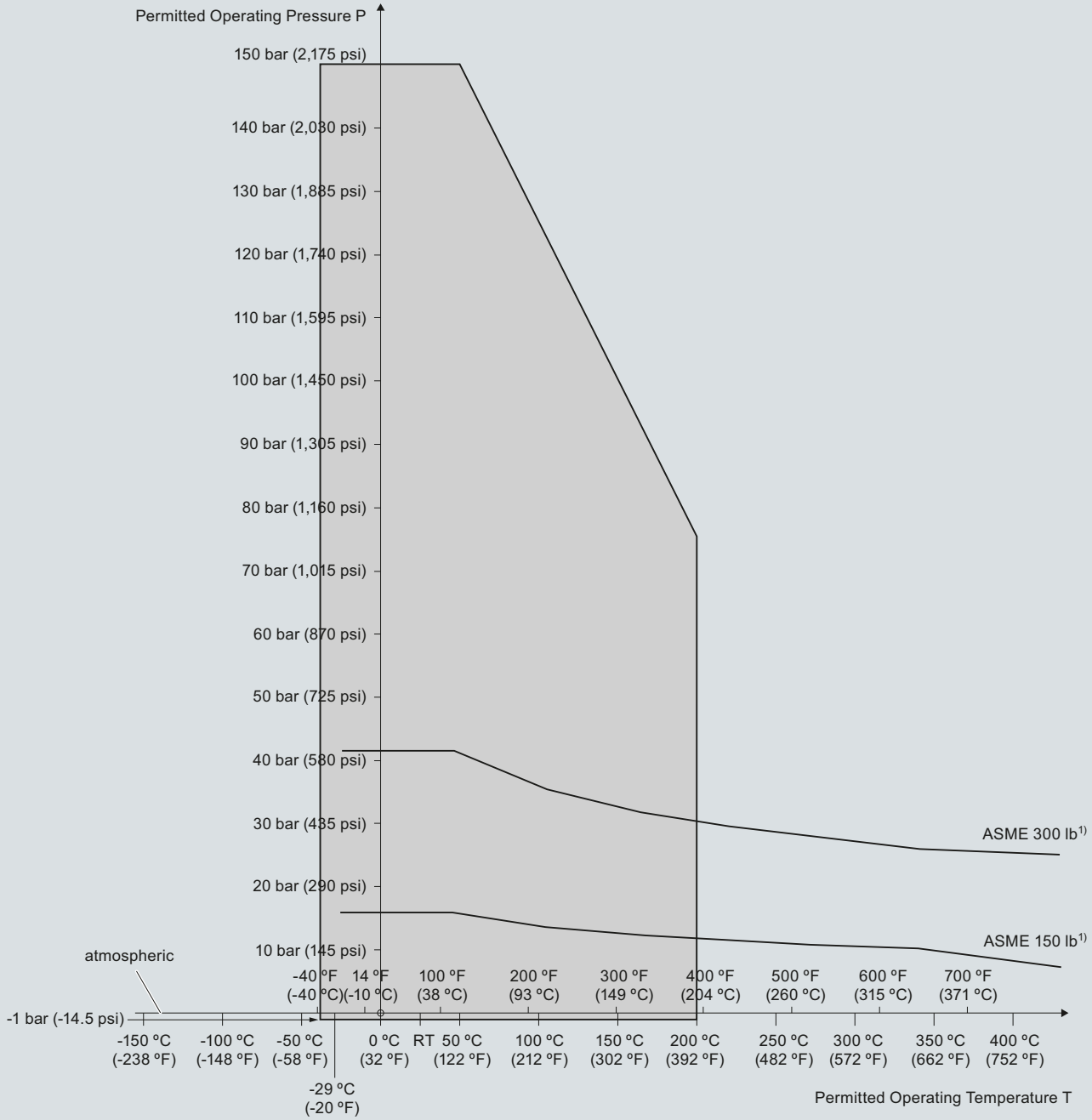
Pressure/Temperature Curve
CLS500 Rod Probes
Threaded Process Connections
(7ML5601)



Pointek CLS500 Process Pressure/Temperature derating curves (7ML5601)

Pointek CLS500

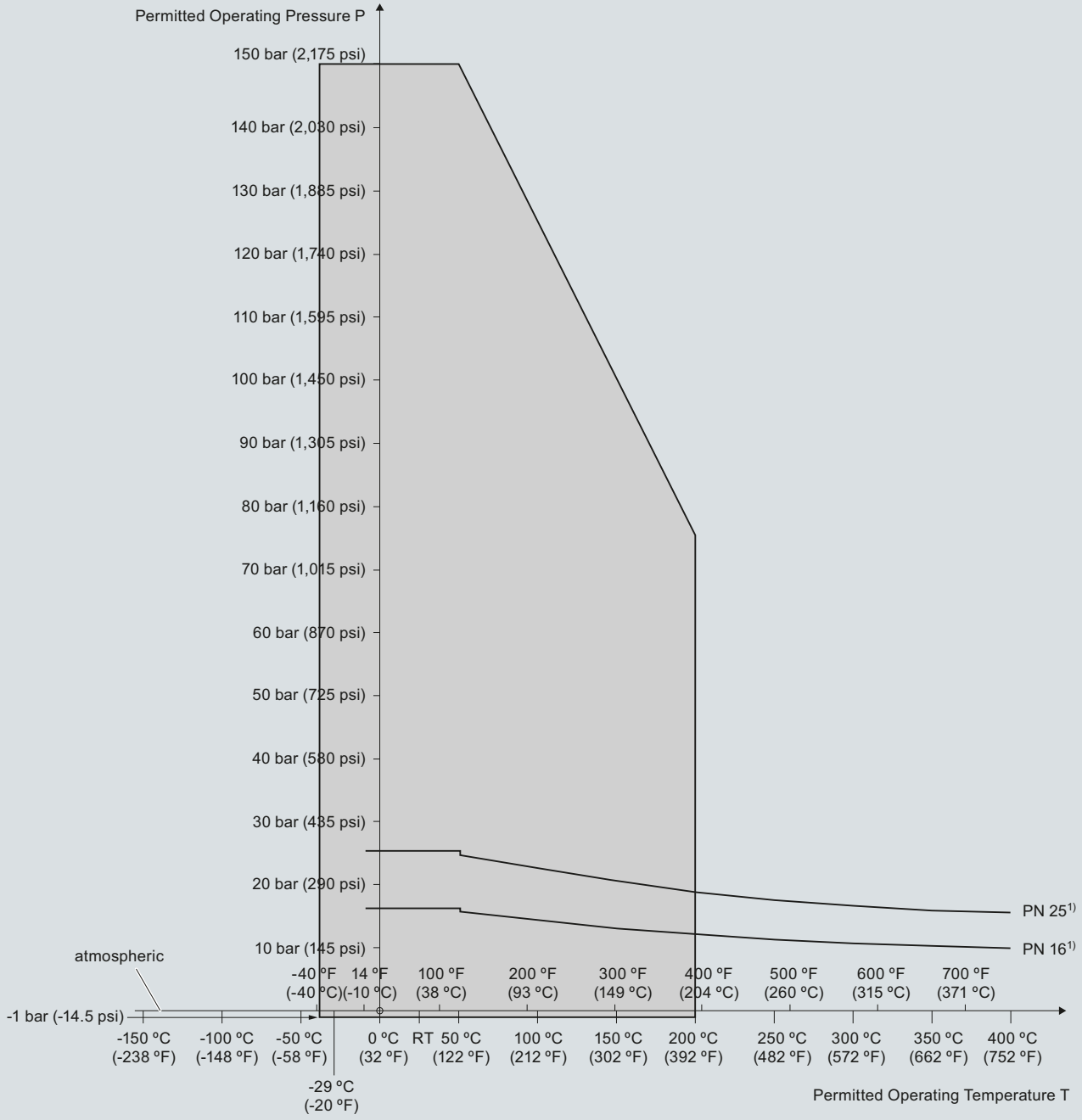
Pressure/Temperature Curve
CLS500 Rod Probes
ASME Flanged Process Connections
(7ML5602 and 7ML5603)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5602 and 7ML5603)

Pressure/Temperature curve
CLS500 Rod Probes
EN Flanged process connections
(7ML5602 and 7ML5603)

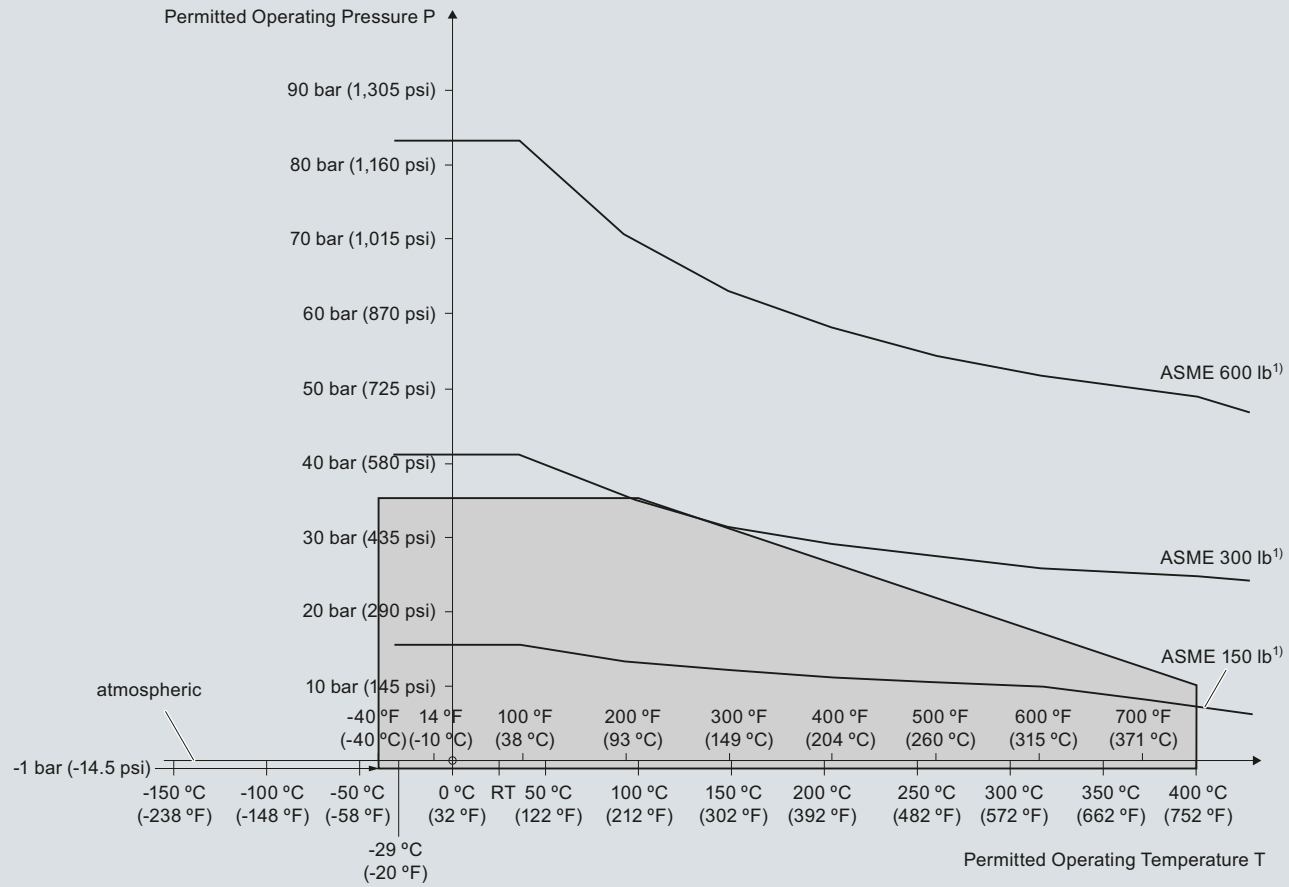


1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5602 and 7ML5603)

Pointek CLS500

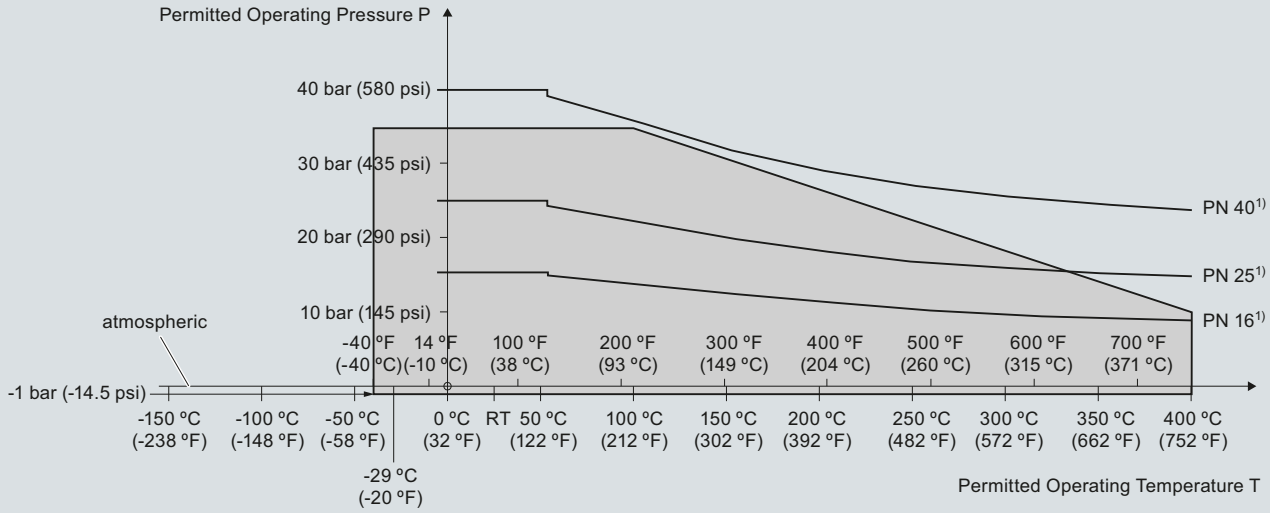
Pressure/Temperature Curve
CLS500 HighTemperature (no insulation)
ASME Flanged Process Connections
(7ML5604)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

Pressure/Temperature Curve
CLS500 HighTemperature (no insulation)
EN Flanged Process Connections
(7ML5604)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

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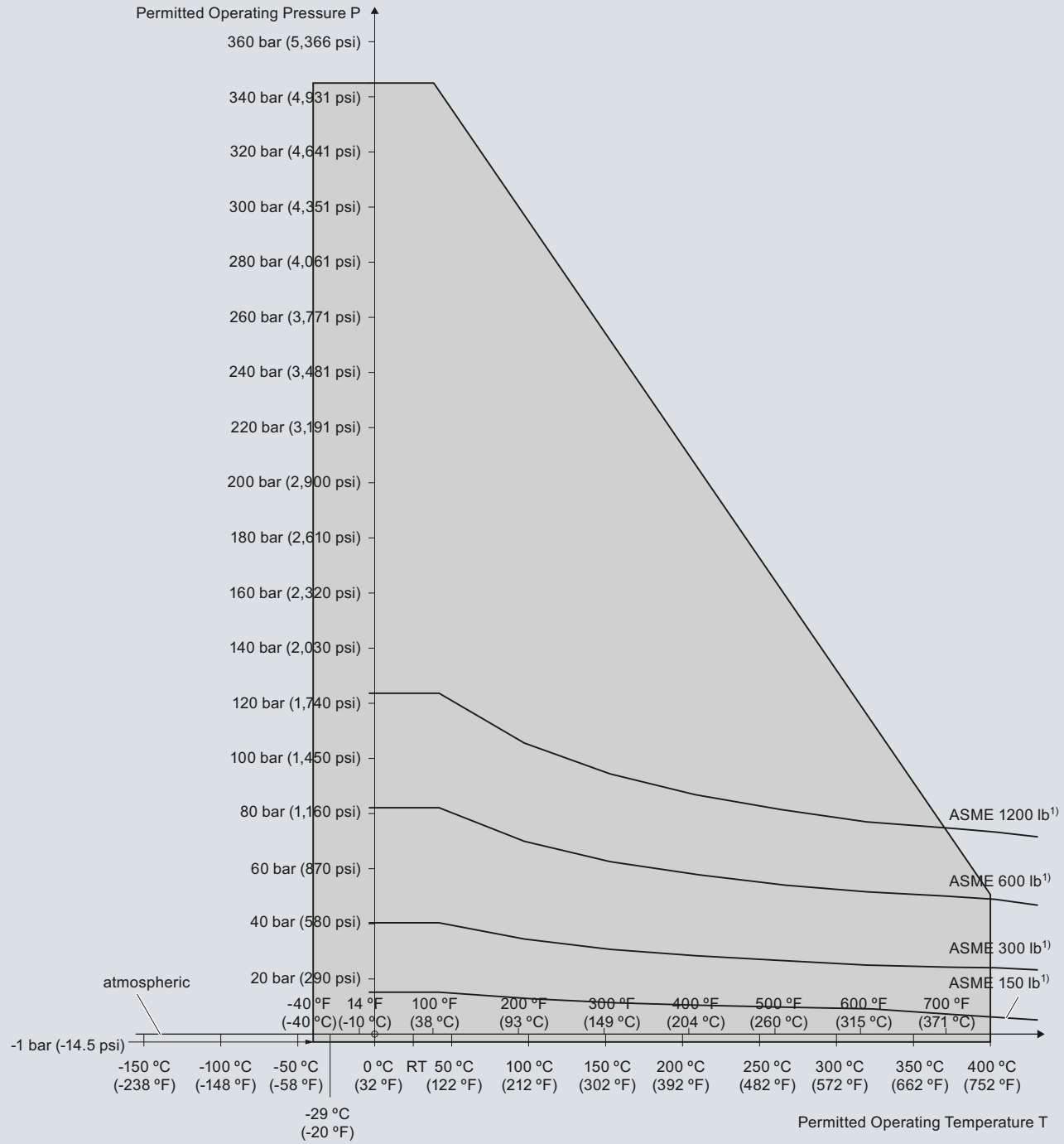
Pointek CLS500

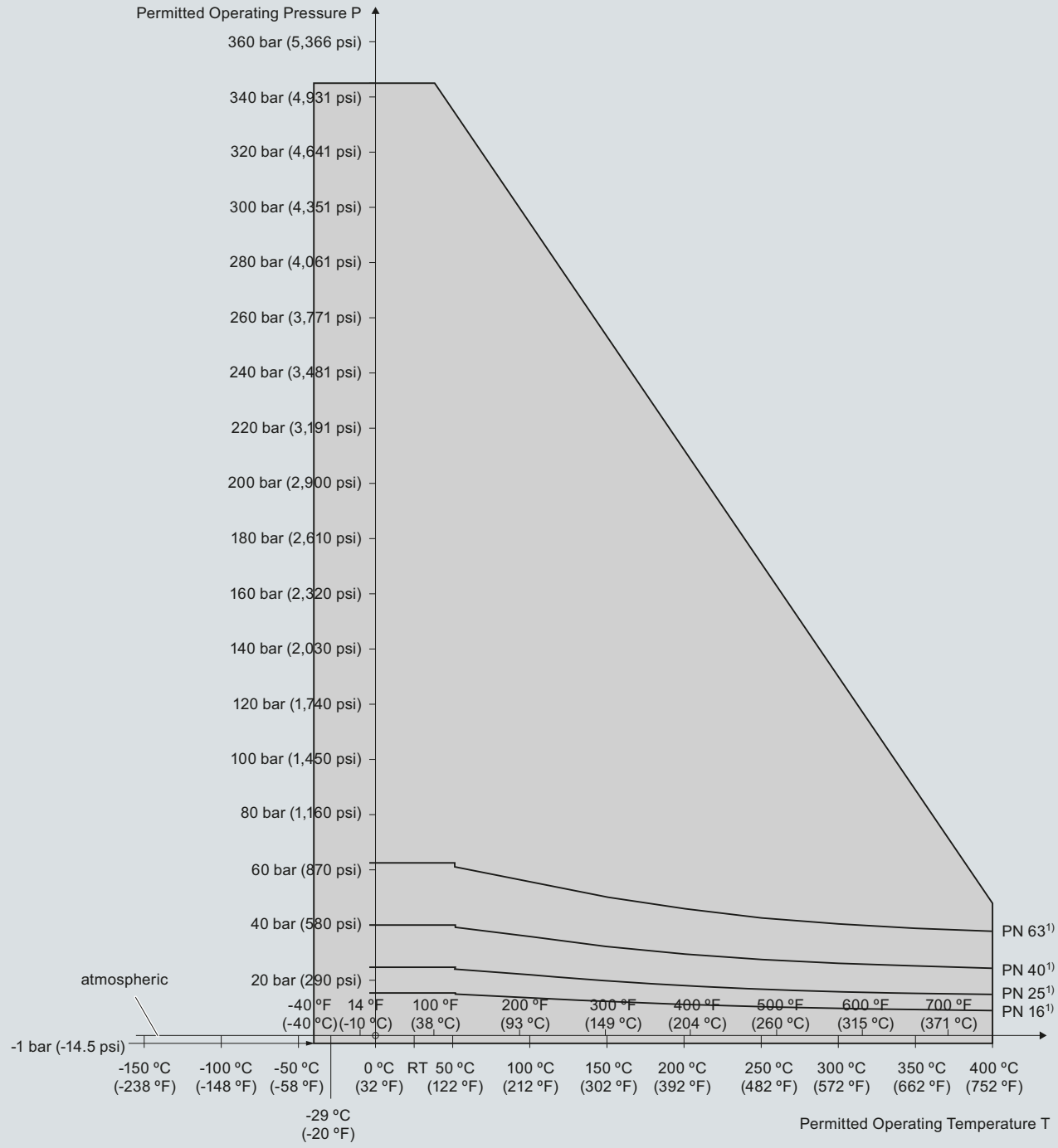
Pressure/Temperature Curve
CLS500 HighTemperature Enamel Rod Probes
ASME Flanged Process Connections (7ML5604)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

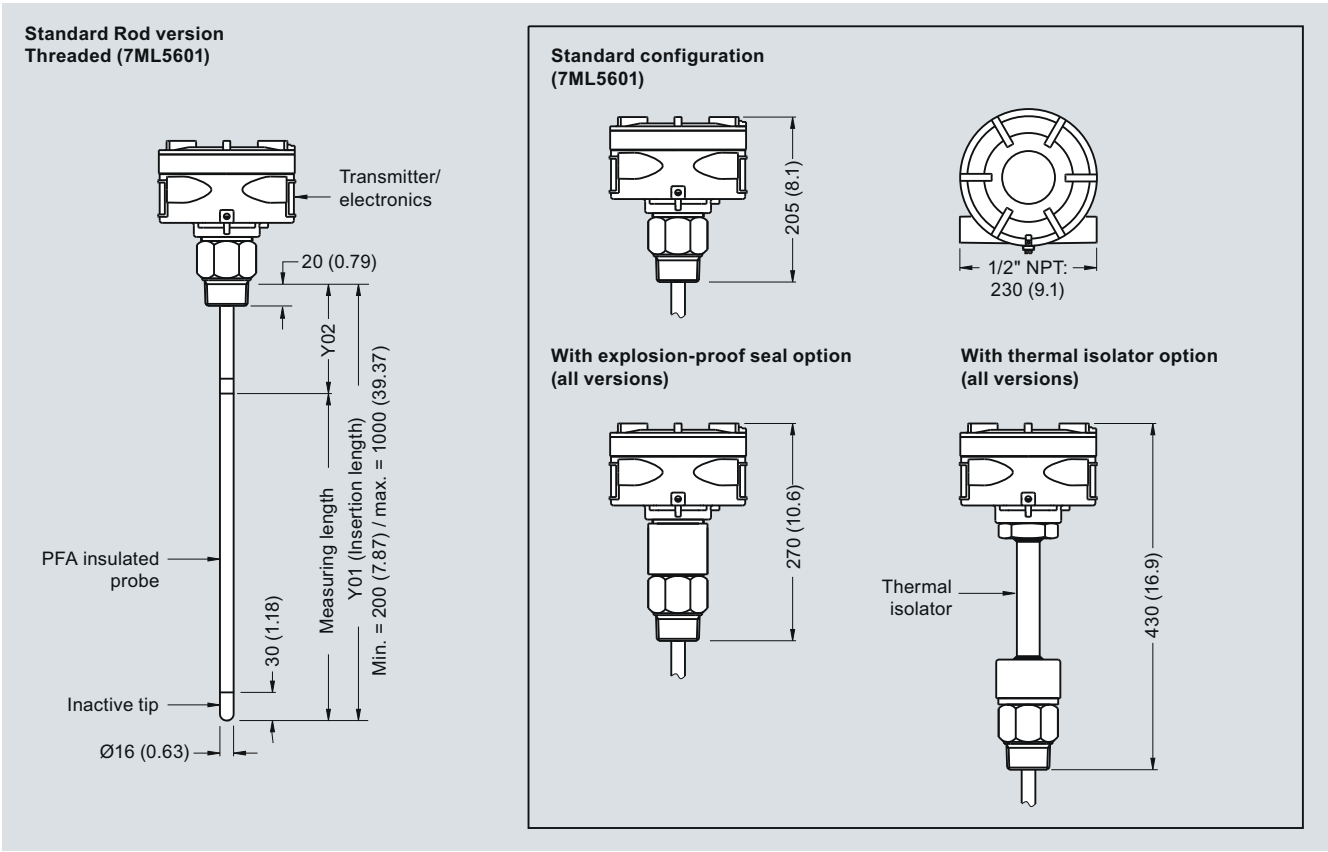
Pressure/Temperature Curve
CLS500 High Temperature Enamel Rod Probes
EN Flanged Process Connections (7ML5604)



1) The curve denotes the minimum allowable flange class for the shaded area below.

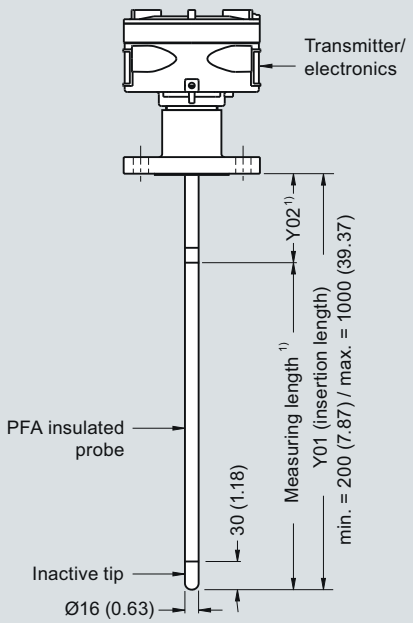
Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

Dimensional drawings

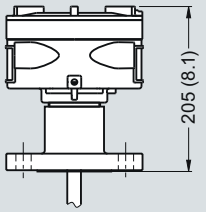


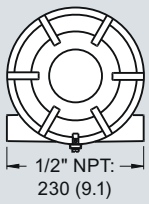
Pointek CLS500 - Threaded Process Connections, dimensions in mm (inch)

Standard Rod version
Welded Flange (7ML5602)
Single Piece Flange (7ML5603)

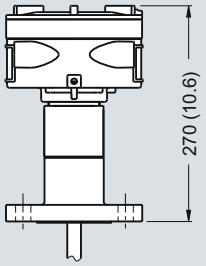


Standard configuration
(7ML5602, 7ML5603)

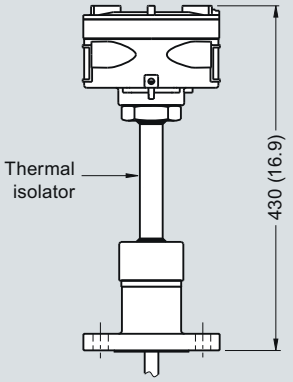




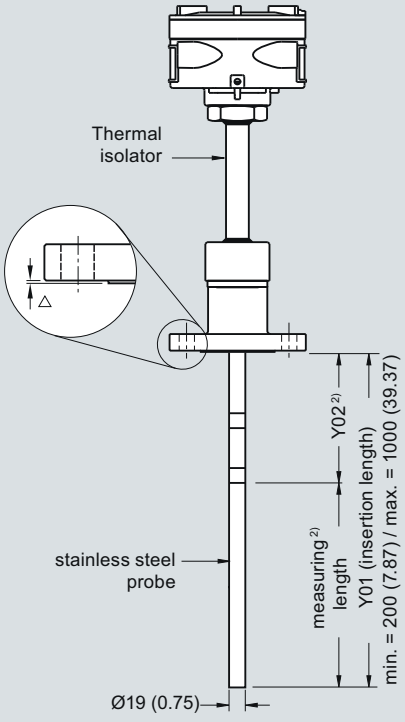
With explosion-proof seal option
(all versions)



With thermal isolator option
(all versions)



High temperature rod version
Welded Flange (7ML5604), Stainless steel rod 3)



Flange Facing (raised face)	
Flange Class	**Facing thickness**
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/25/40/64	2 (0.08)

Notes:

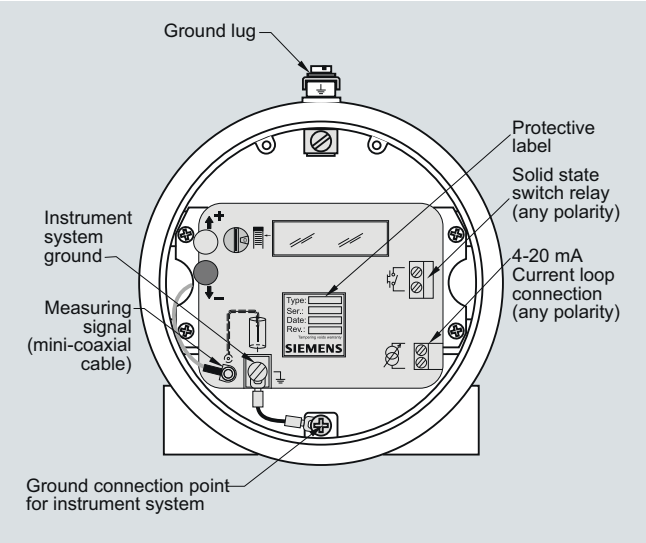
1) Min. Y02 (active shield length) = 50 (1.96)
2) Min. Y02 (active shield length) = 105 (4.13)
3) Non conductive materials only

Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

Pointek CLS500 - Flanged Process Connections, dimensions in mm (inch)

Pointek CLS500

Schematics



Pointek CLS500 connections

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