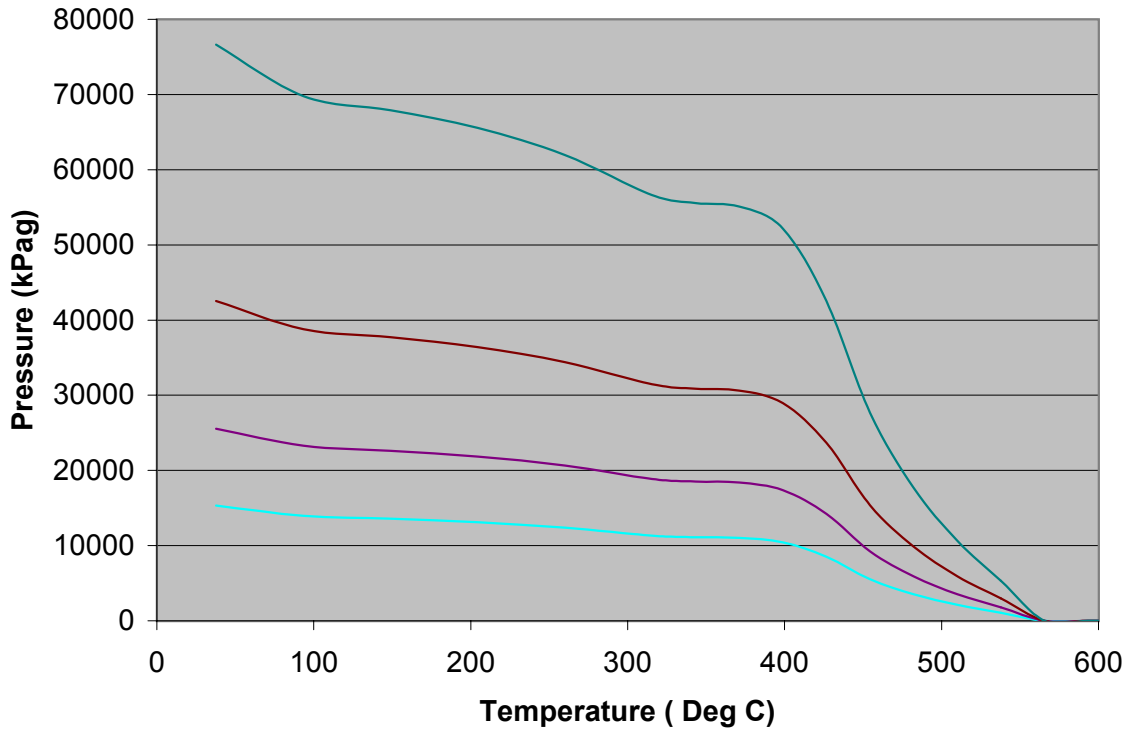


ASTM Materials Specifications and Pressure Temperature Graphs

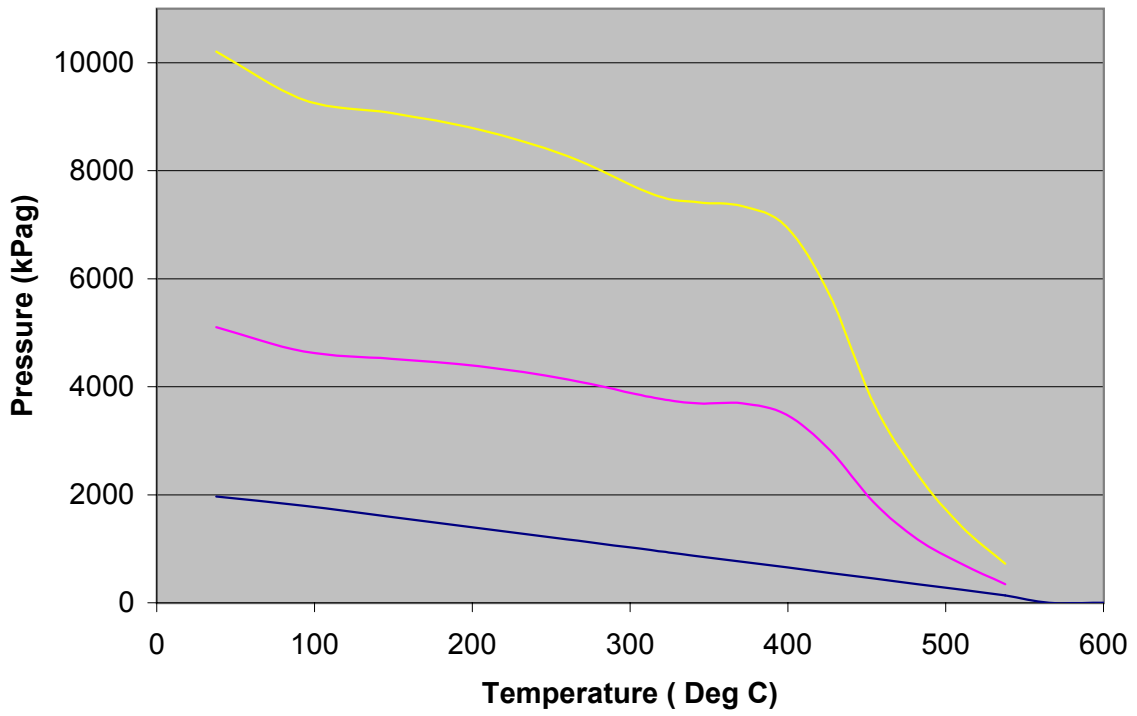
Material Group	Nominal Designation	Pressure - Temperature Rating	Applicable ASTM Specifications		
			Forgings	Castings	Plates
1.1	C - Si	2 - 1.1	A 105	A 216 Gr. WCB	A 515 Gr. 70
	C - Mn - Si		A 350 Gr. LF2		A 516 Gr. 70
	C - Mn - Si - V		A 350 Gr. LF6 Cl. 1		A 537 Cl. 1
1.2	C - Mn - Si	2 - 1.2		A 216 Gr. WCB	
				A 352 Gr. LCC	
	C - Mn - Si - V		A 350 Gr. LF6 Cl. 2		
	2-1/2 Ni			A 352 Gr. LC2	A 203 Gr. B
	3-1/2 Ni			A 352 Gr. LC3	A 203 Gr. E
1.3	C - Si	2 - 1.3		A 352 Gr. LCB	A 515 Gr. 65
	C - Mn - Si				A 516 Gr. 65
	2-1/2 Ni				A 203 Gr. A
	3-1/2 Ni				A 203 Gr. D
1.4	C - Si	2 - 1.4			A 515 Gr. 60
	C - Mn - Si		A 350 Gr. LF1 Cl. 1		A 516 Gr. 60
1.5	C - 1/2Mo	2 - 1.5	A 182 Gr. F1	A 217 Gr. WC1	A 204 Gr. A
				A 352 Gr. LC1	A 204 Gr. B
1.7	C - 1/2Mo	2 - 1.7			A 204 Gr. C
	1/2Cr - 1/2Mo		A 182 Gr. F2		
	Ni - 1/2Cr - 1/2Mo			A 217 Gr. WC4	
	3/4Ni - 3/4Cr - 1Mo			A 217 Gr. WC5	
1.9	1Cr - 1/2Mo	2 - 1.9	A 182 Gr. F12 Cl. 2		
	1-1/4Cr - 1/2Mo			A 217 Gr. WC6	
	1-1/4Cr - 1/2Mo - Si		A 182 Gr. F11 Cl. 2		A 387 Gr. 11 Cl. 2
1.10	2-1/4Cr - 1Mo	2 - 1.10	A 182 Gr. F22 Cl. 3	A 217 Gr. WC9	A 387 Gr. 22 Cl. 2
1.13	5Cr - 1/2Mo	2 - 1.13	A 182 Gr. F5		
			A 182 Gr. F5a	A 217 Gr. C5	
1.14	9Cr - 1Mo	2 - 1.14	A 182 Gr. F9	A 217 Gr. C12	
1.15	9Cr - 1Mo - V	2 - 1.15	A 182 Gr. F91	A 217 Gr. C12A	A 387 Gr. 91 Cl. 2
2.1	18Cr - 8Ni	2 - 2.1	A 182 Gr. F304	A 351 Gr. CF3	A 240 Gr. 304
			A 182 Gr. F304H	A 351 Gr. CF8	A 240 Gr. 304H
2.2	16Cr - 12Ni - 2Mo	2 - 2.2	A 182 Gr. F316	A 351 Gr. CF3M	A 240 Gr. 316
			A 182 Gr. F316H	A 351 Gr. CF8M	A 240 Gr. 316H
	18Cr - 13Ni - 3Mo				A 240 Gr. 317
	19Cr - 10Ni - 3Mo			A 351 Gr. CG8M	
2.3	18Cr - 8Ni	2 - 2.3	A 182 Gr. F304L		A 240 Gr. 304L
	16Cr - 12Ni - 2Mo		A 182 Gr. F316L		A 240 Gr. 316L
2.4	18Cr - 10Ni - Ti	2 - 2.4	A 182 Gr. F321		A 240 Gr. 321
			A 182 Gr. F321H		A 240 Gr. 321H
2.5	18Cr - 10Ni - Cb	2 - 2.5	A 182 Gr. F347	A 351 Gr. CF8C	A 240 Gr. 347
			A 182 Gr. F347H		A 240 Gr. 347H
			A 182 Gr. F348		A 240 Gr. 348
			A 182 Gr. F348H		A 240 Gr. 348H
2.6	25Cr - 12Ni	2 - 2.6		A 351 Gr. CH8	
				A 351 Gr. CH20	
	23Cr - 12Ni				A 240 Gr. 309S

					A 240 Gr. 309H
2.7	25Cr - 20Ni	2 - 2.7	A 182 Gr. F310	A 351 Gr. CK20	A 240 Gr. 310S A 240 Gr. 310H
2.8	20Cr - 18Ni - 6Mo 22Cr - 5Ni - 3Mo - N 25Cr - 7Ni - 4Mo - N 24Cr - 10Ni - 4Mo - V 25Cr - 5Ni - 2Mo - 3Cu 25Cr - 7Ni - 3.5Mo - W - Cb 25Cr - 7Ni - 3.5Mo - N - Cu - W	2 - 2.8	A 182 Gr. F44 A 182 Gr. F51 A 182 Gr. F53 A 182 Gr. F55	A 351 Gr. CK3MCuN A 351 Gr. CE8MN A 351 Gr. CD4MCu A 351 Gr. CD3MWCuN	A 240 Gr. S31254 A 240 Gr. S31803 A 240 Gr. S32750 A 240 Gr. S32760
3.1	35Ni - 35Fe - 20Cr - Cb	2 - 3.1	B 462 Gr. N08020		B 463 Gr. N08020
3.2	99.0Ni	2 - 3.2	B 160 Gr. N02200		B 162 Gr. N02200
3.3	99.0Ni - Low C	2 - 3.3	B 160 Gr. N02201		B 162 Gr. N02201
3.4	67Ni - 30Cu 67Ni - 30Cu - S	2 - 3.4	B 564 Gr. N04400 B 164 Gr. N04405		B 127 Gr. N04400
3.5	72Ni - 15Cr - 8Fe	2 - 3.5	B 564 Gr. N06600		B 168 Gr. N06600
3.6	33Ni - 42Fe - 21Cr	2 - 3.6	B 564 Gr. N08800		B 409 Gr. N08800
3.7	65Ni - 28Mo - 2Fe	2 - 3.7	B 564 Gr. N10665		B 333 Gr. N10665
3.8	54Ni - 16Mo - 15Cr 60Ni - 22Cr - 9Mo - 3.5Cb 62Ni - 28Mo - 5Fe 70Ni - 16Mo - 7Cr - 5Fe 61Ni - 16Mo - 16Cr 42Ni - 21.5Cr - 3Mo - 2.3Cu	2 - 3.8	B 564 Gr. N10276 B 564 Gr. N06625 B 564 Gr. N10001 B 564 Gr. N10003 B 564 Gr. N06455 B 564 Gr. N08825		B 575 Gr. N10276 B 443 Gr. N06625 B 333 Gr. N10001 B 434 Gr. N10003 B 575 Gr. N06455 B 424 Gr. N08825
3.9	47Ni - 22Cr - 9Mo - 18Fe	2 - 3.9	B 572 Gr. N06002		B 435 Gr. N06002
3.10	25Ni - 46Fe - 21Cr - 5Mo	2 - 3.10	B 672 Gr. N08700		B 599 Gr. N08700
3.11	44Fe - 25Ni - 21Cr - Mo	2 - 3.11	B 649 Gr. N08904		B 625 Gr. N08904
3.12	26Ni - 43Fe - 22Cr - 5Mo 47Ni - 22Cr - 20Fe - 7Mo	2 - 3.12	B 621 Gr. N08320 B 581 Gr. N06985		B 620 Gr. N08320 B 582 Gr. N06985

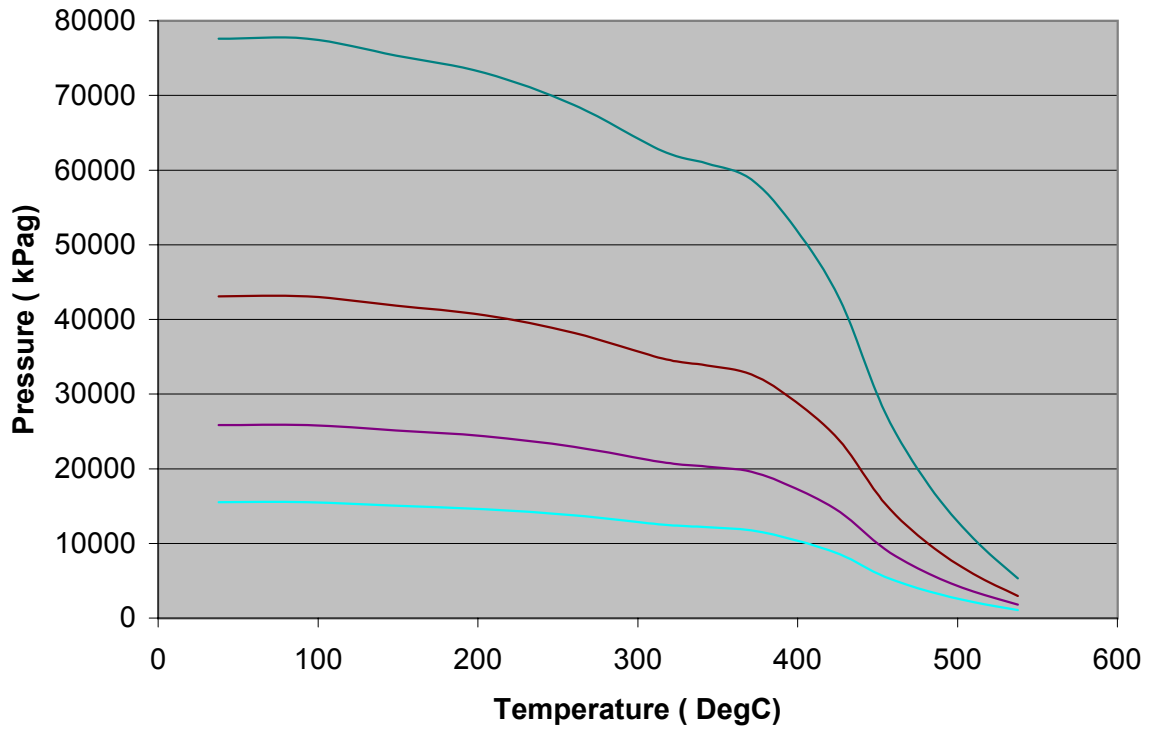
Material Group 1.1



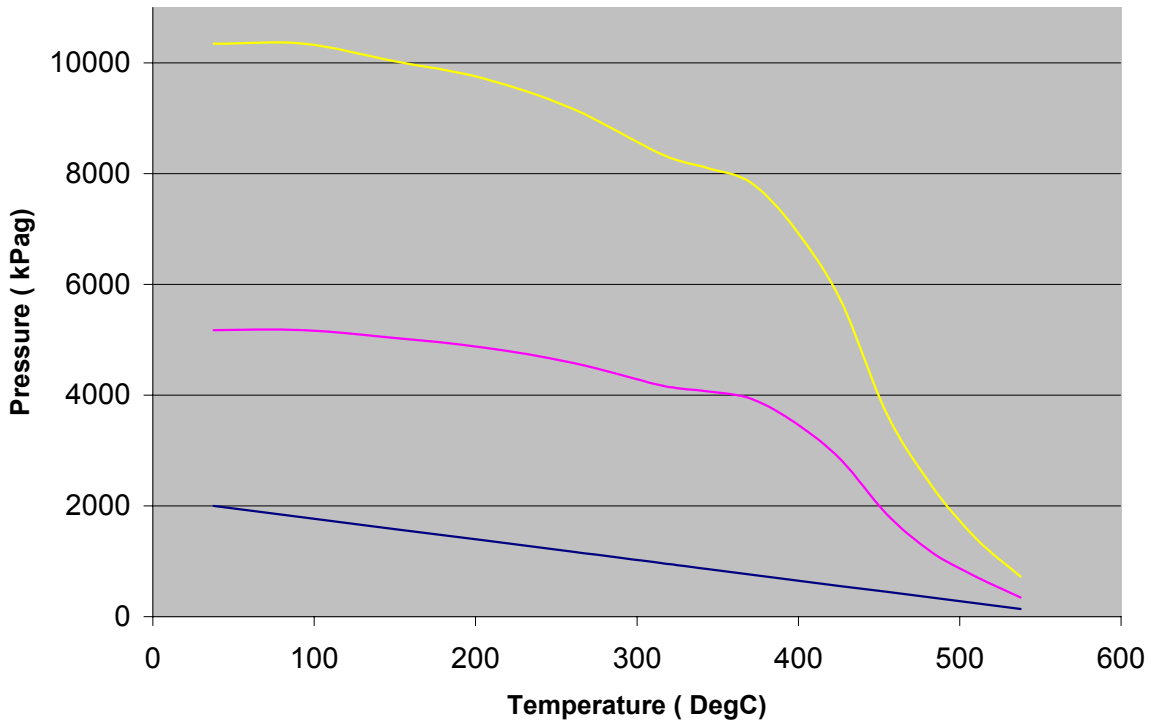
Material Group 1.1



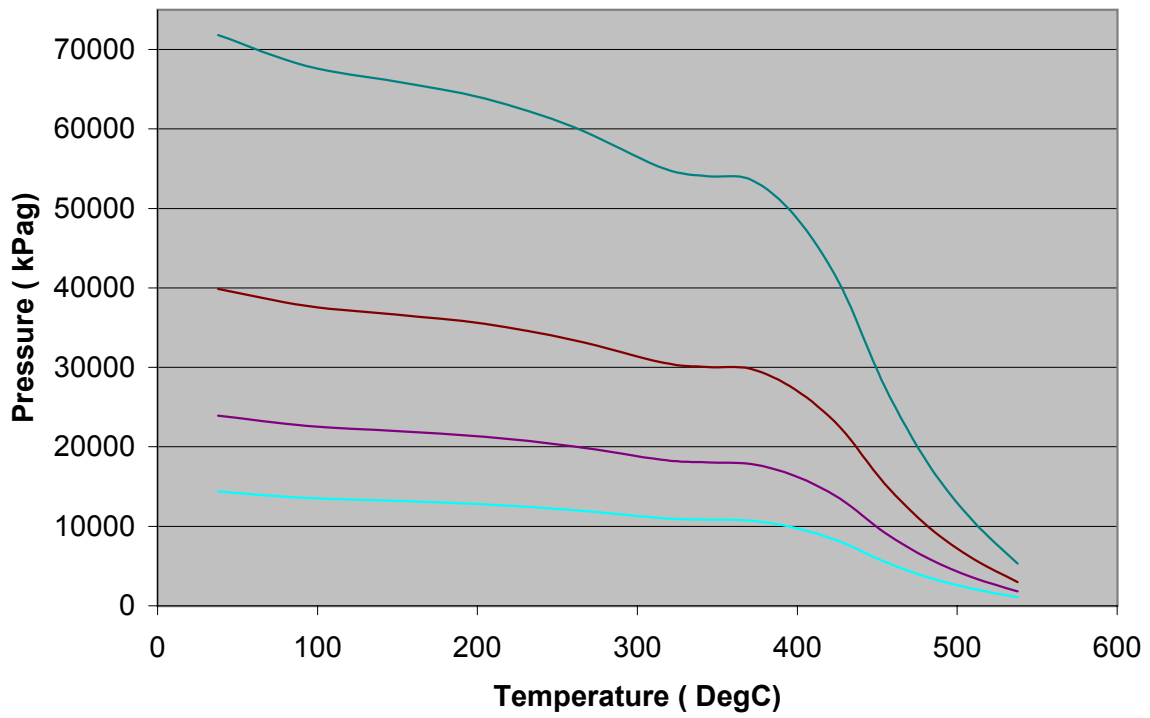
Material Group 1.2



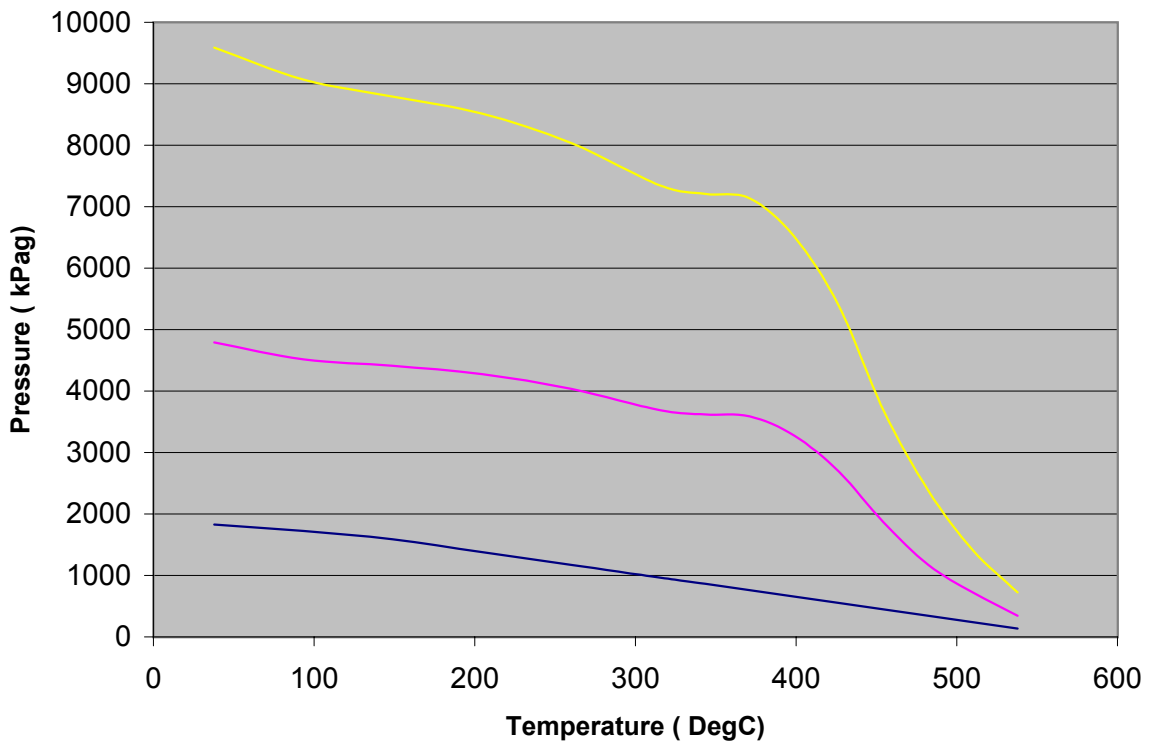
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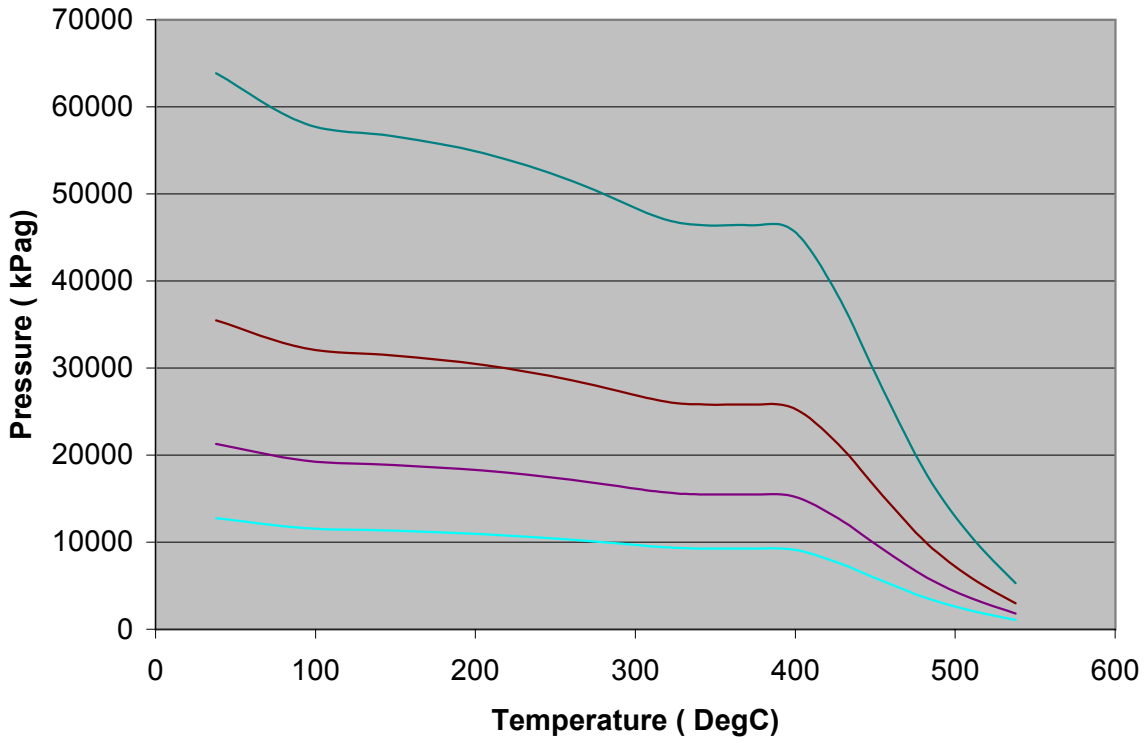
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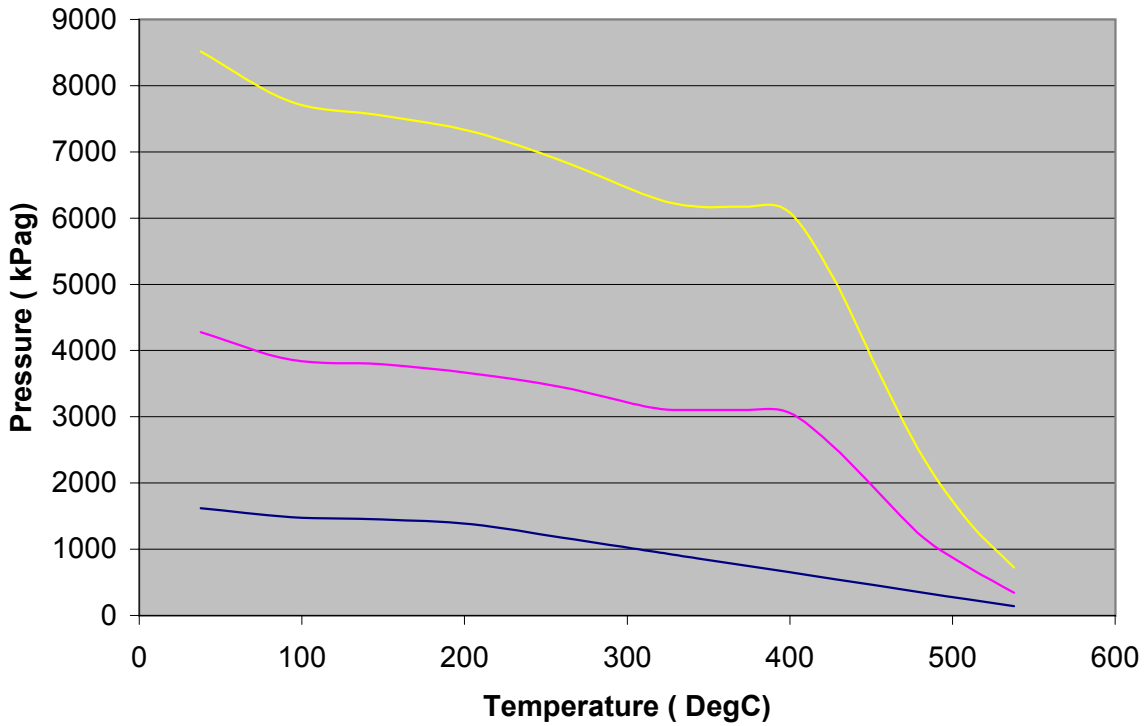
Material Group 1.3



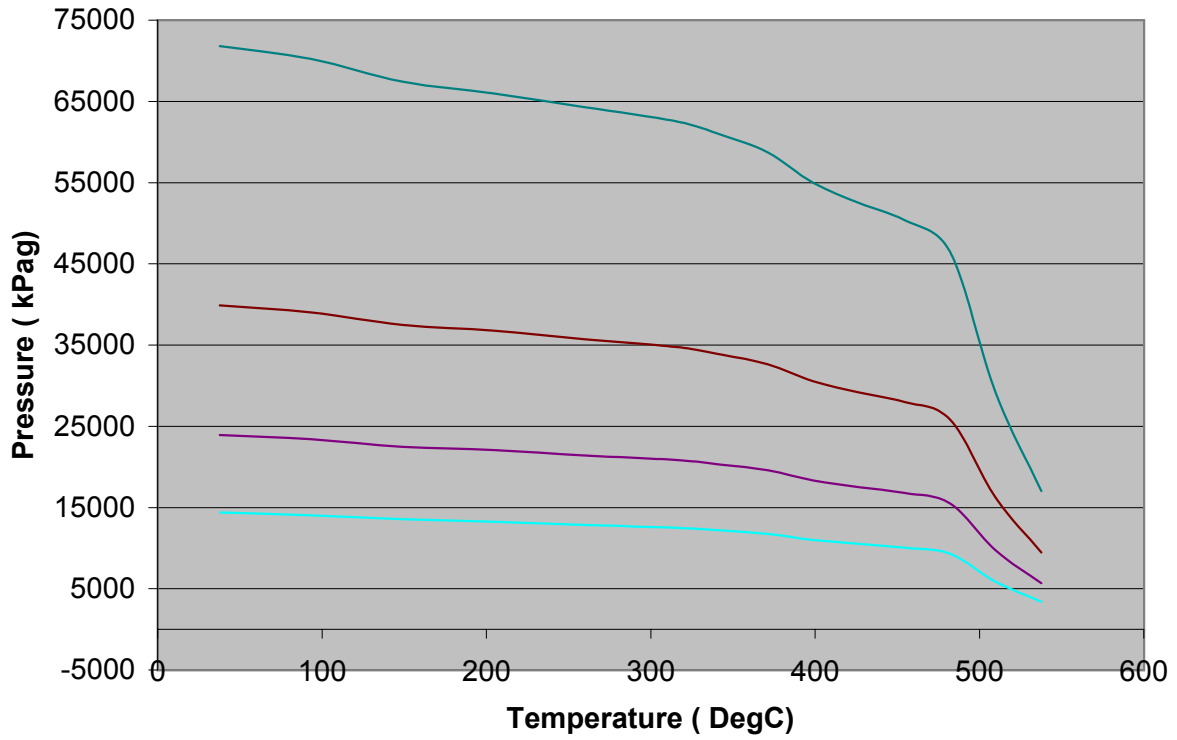
Material Group 1.4



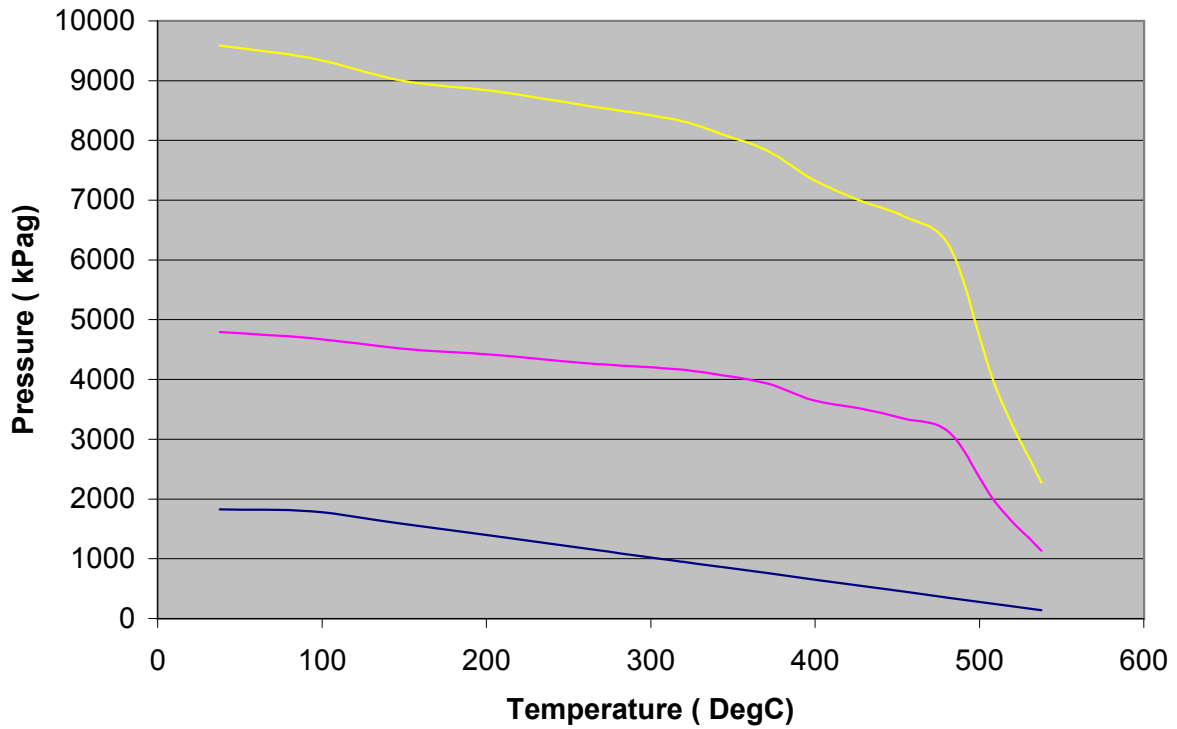
Material Group 1.4



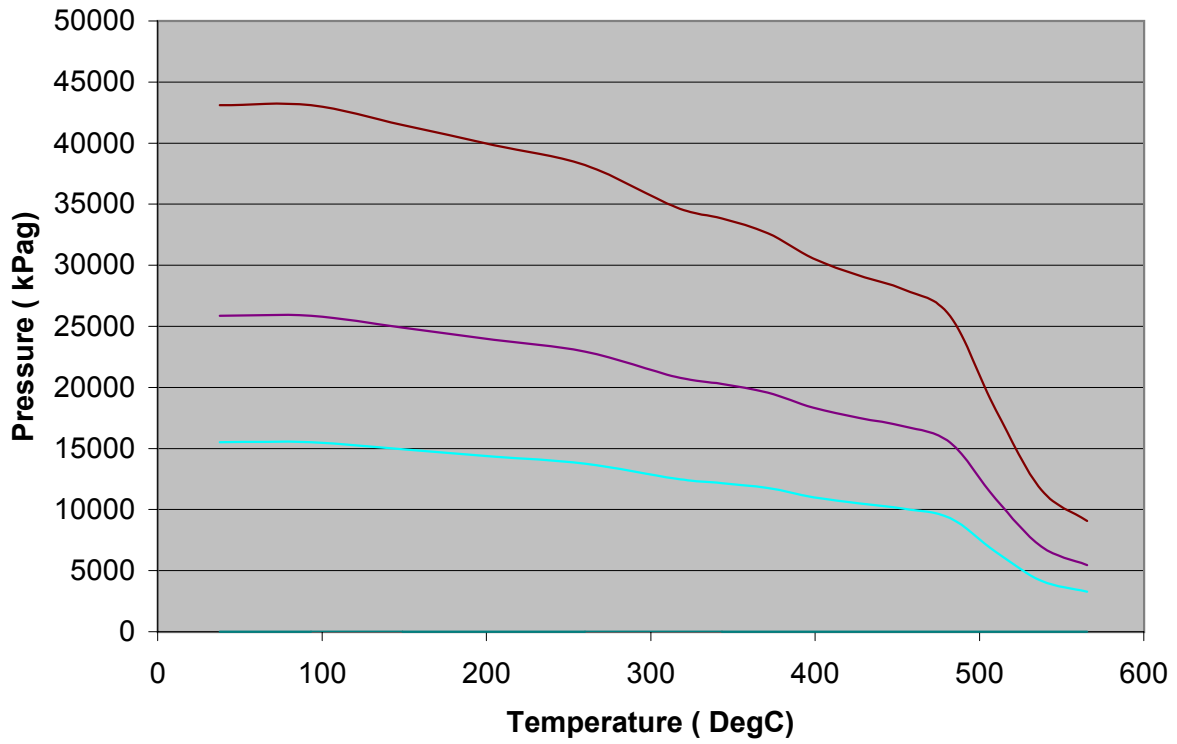
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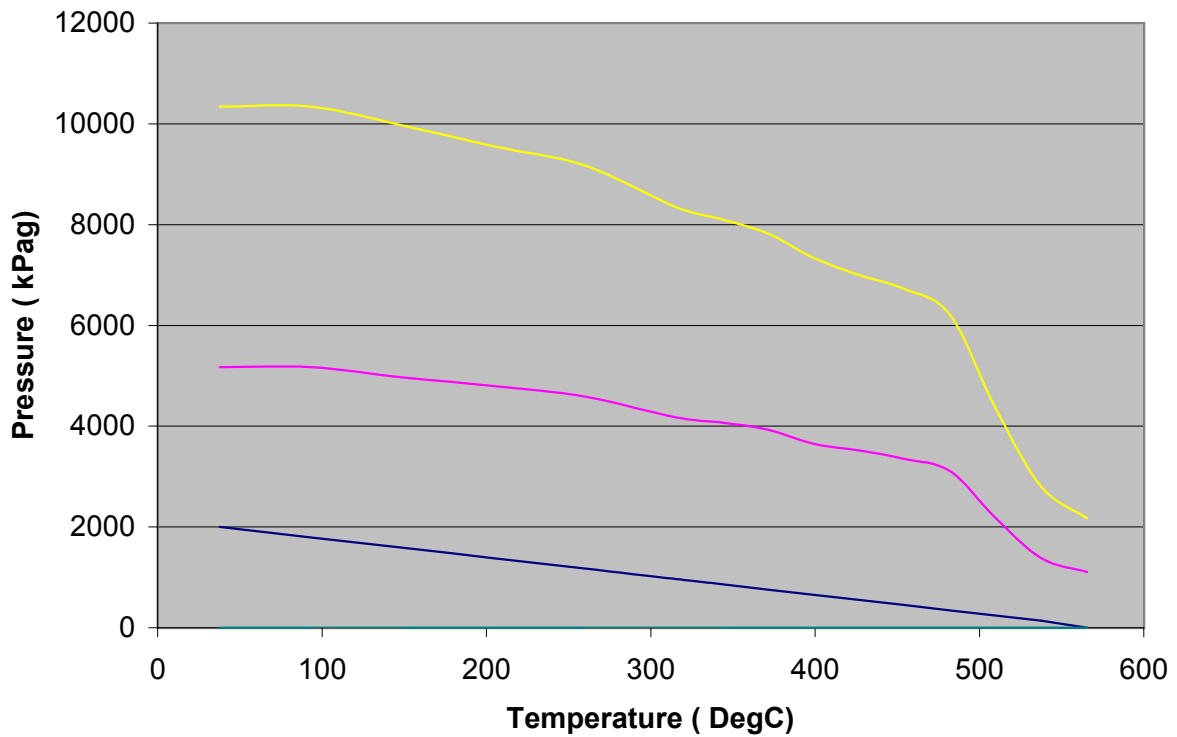
Material Group 1.5



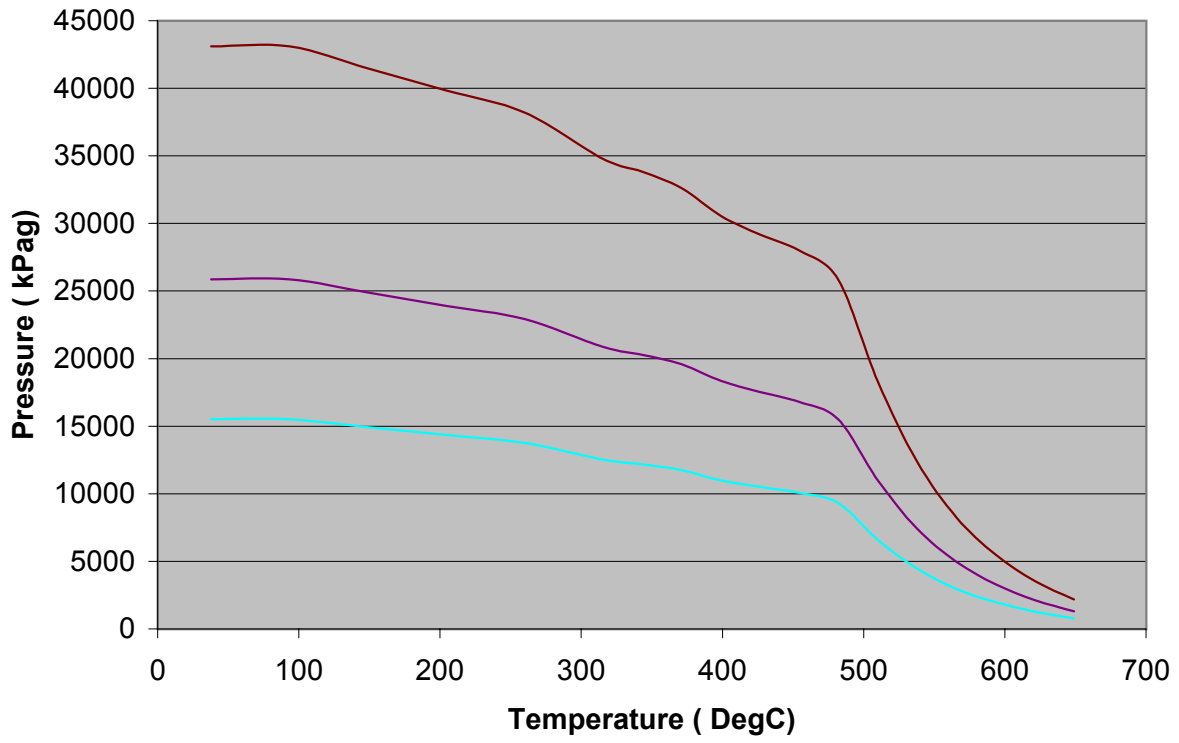
Material Group 1.7



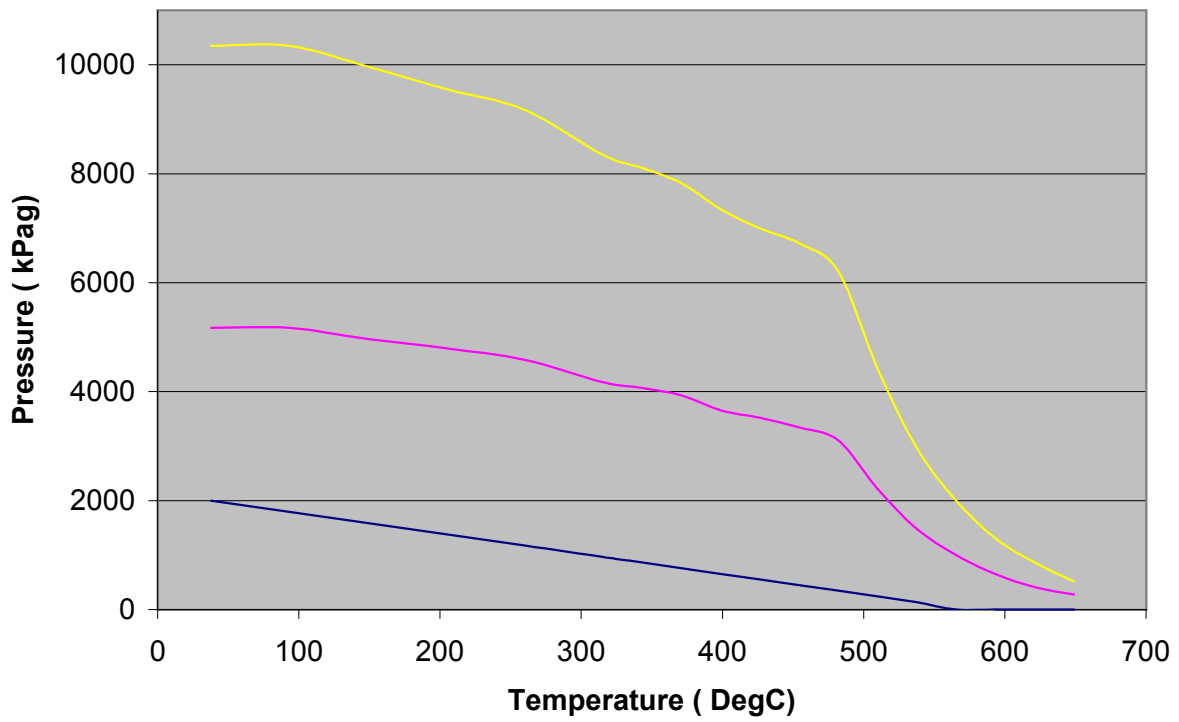
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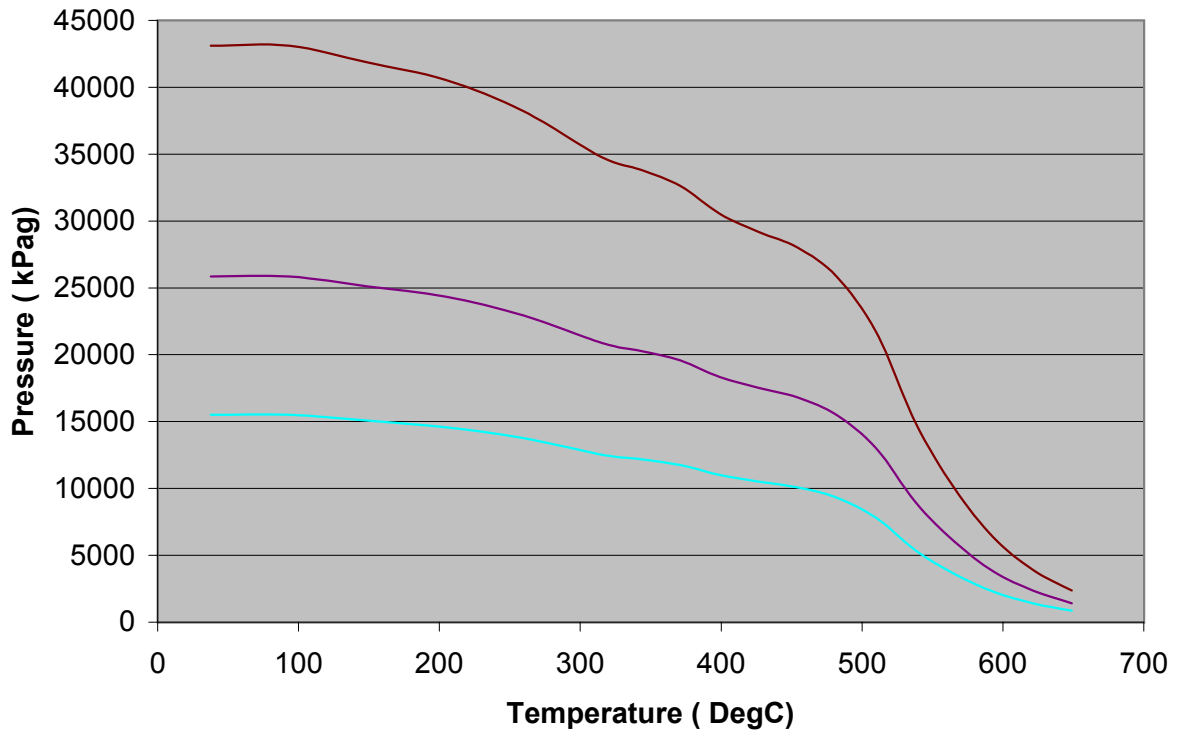
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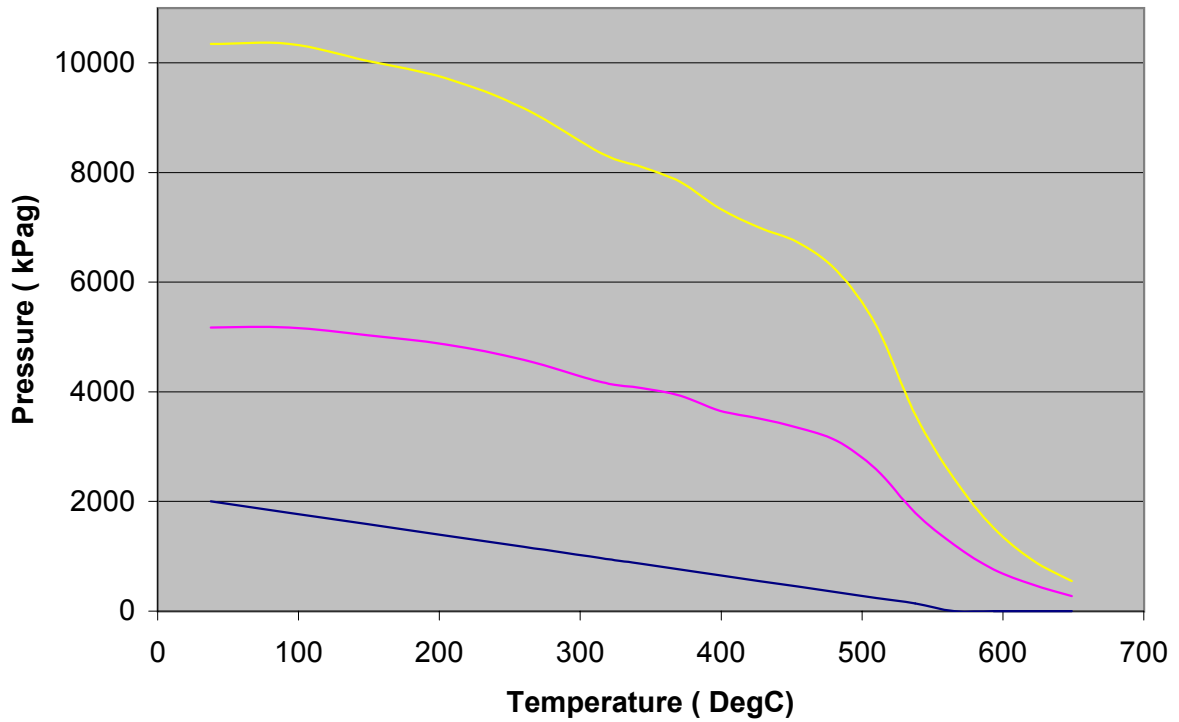
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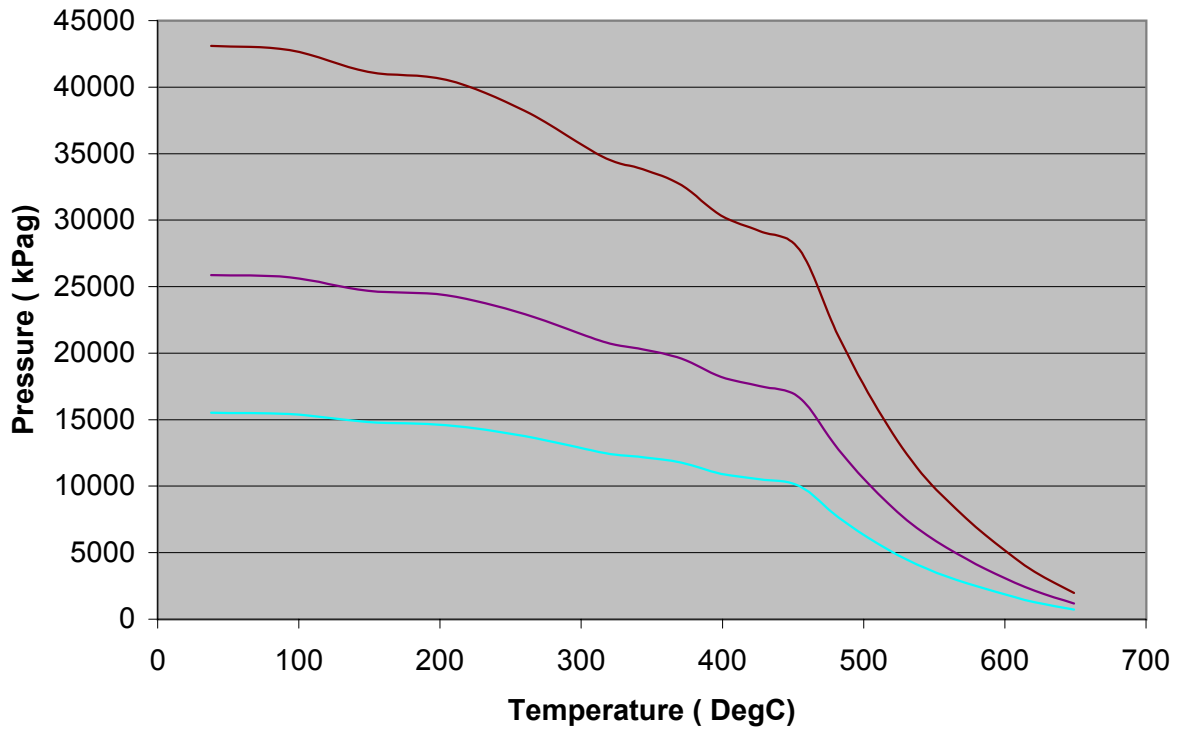
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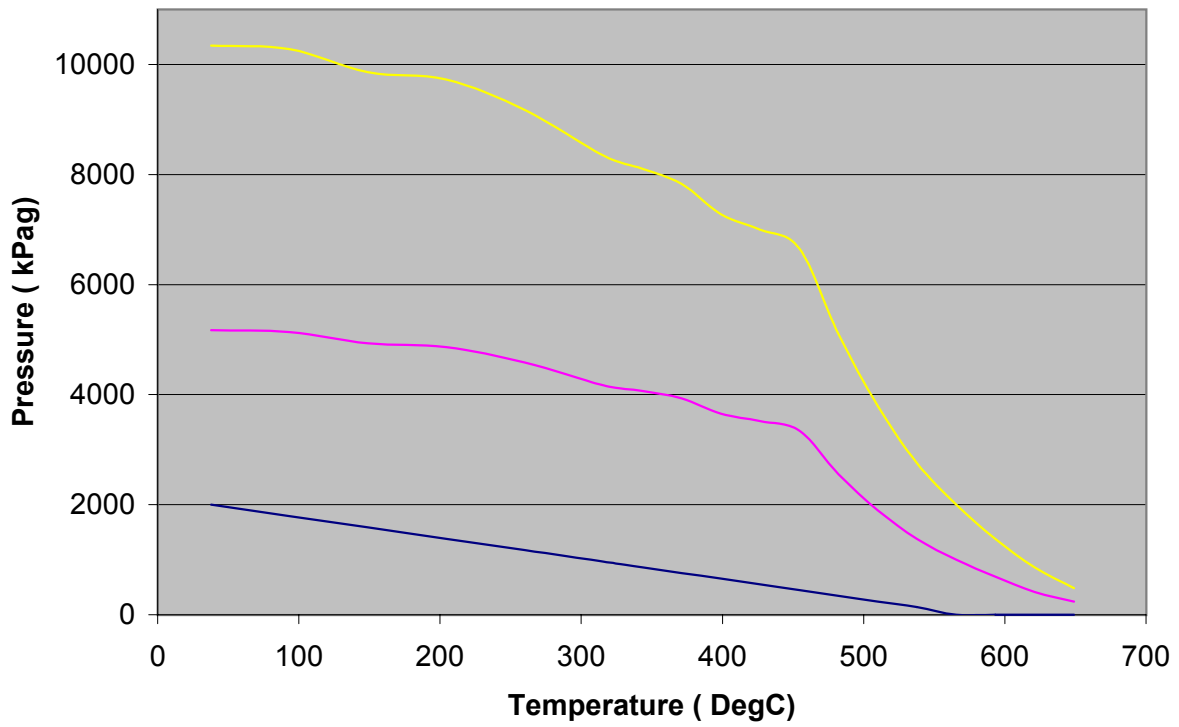
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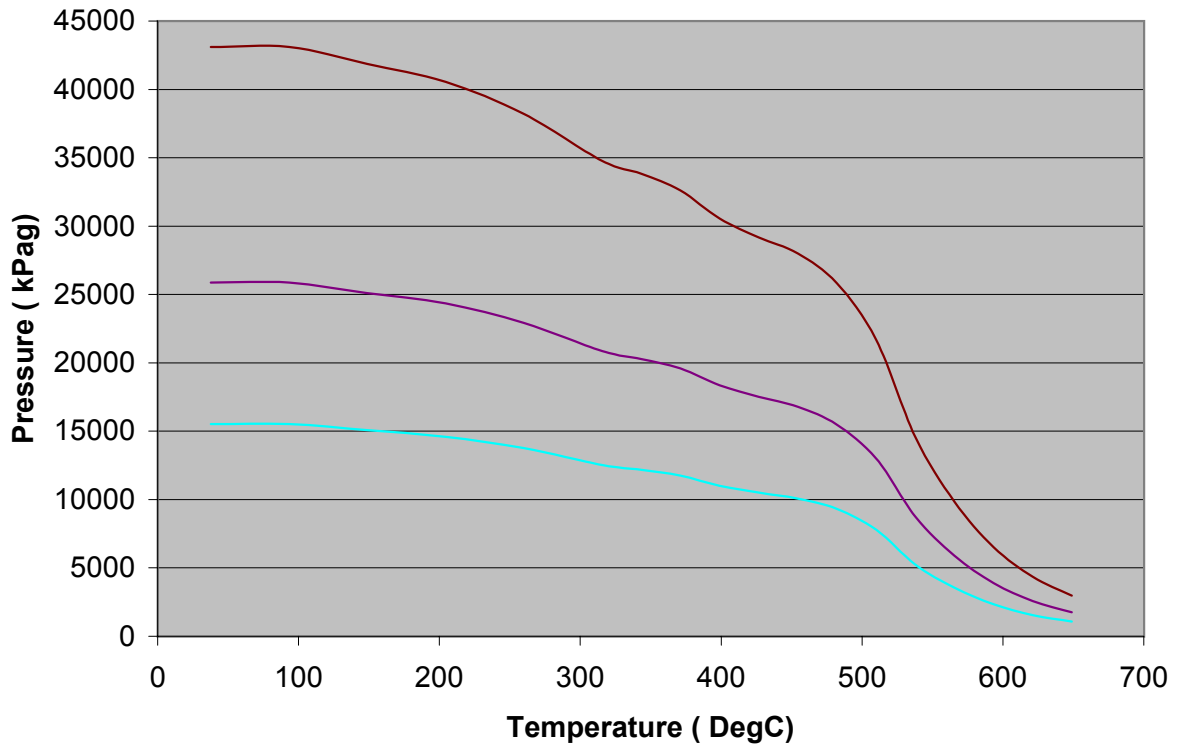
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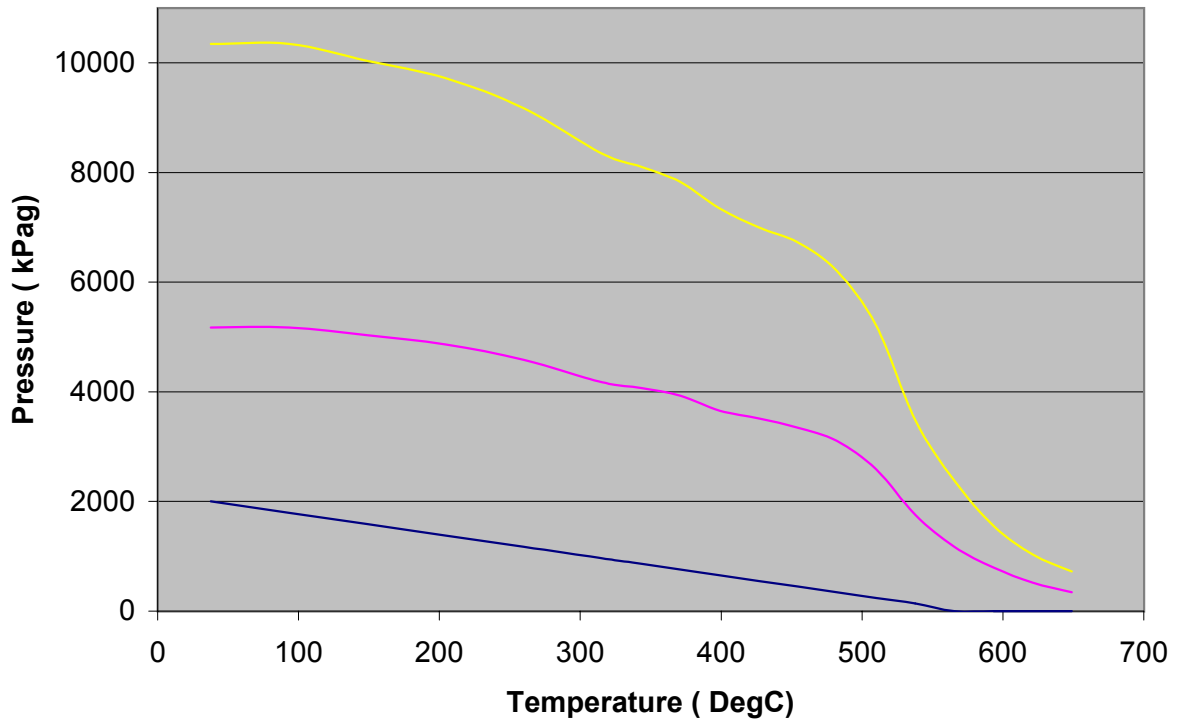
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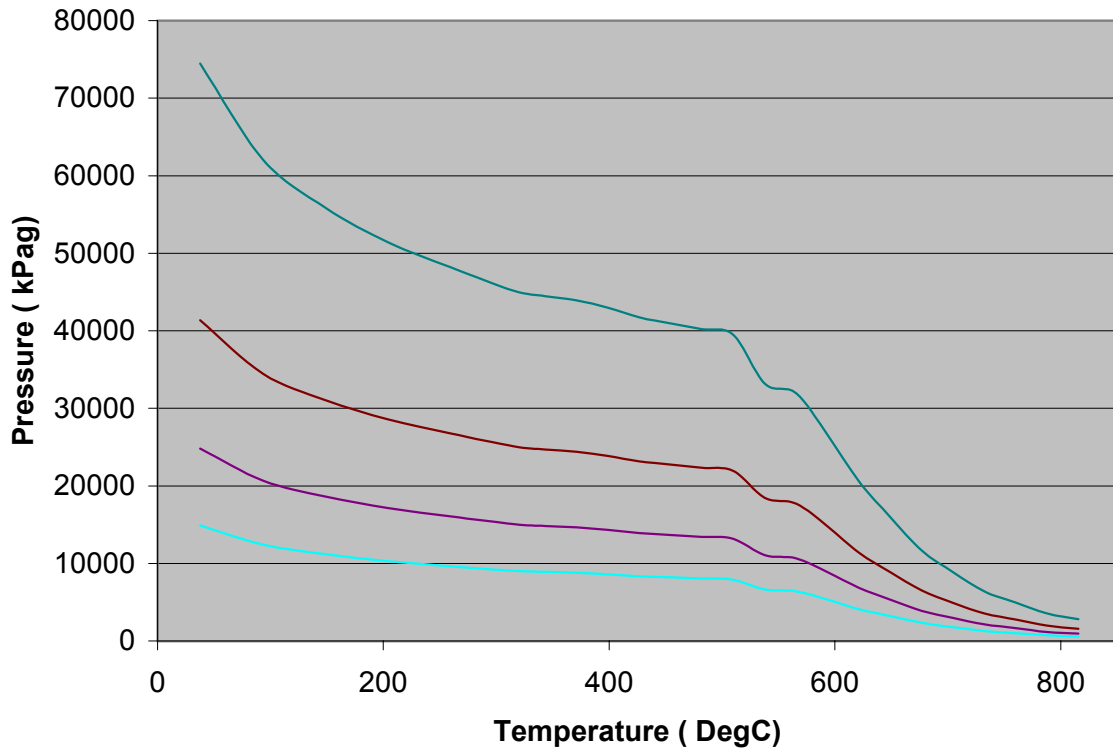
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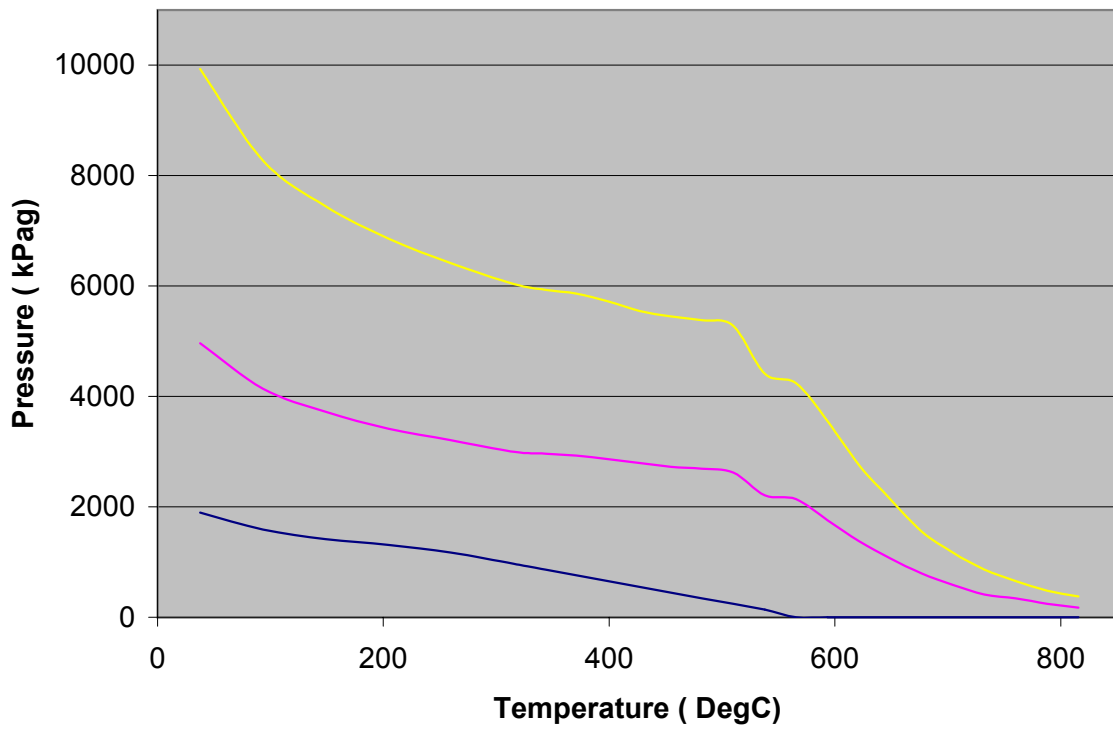
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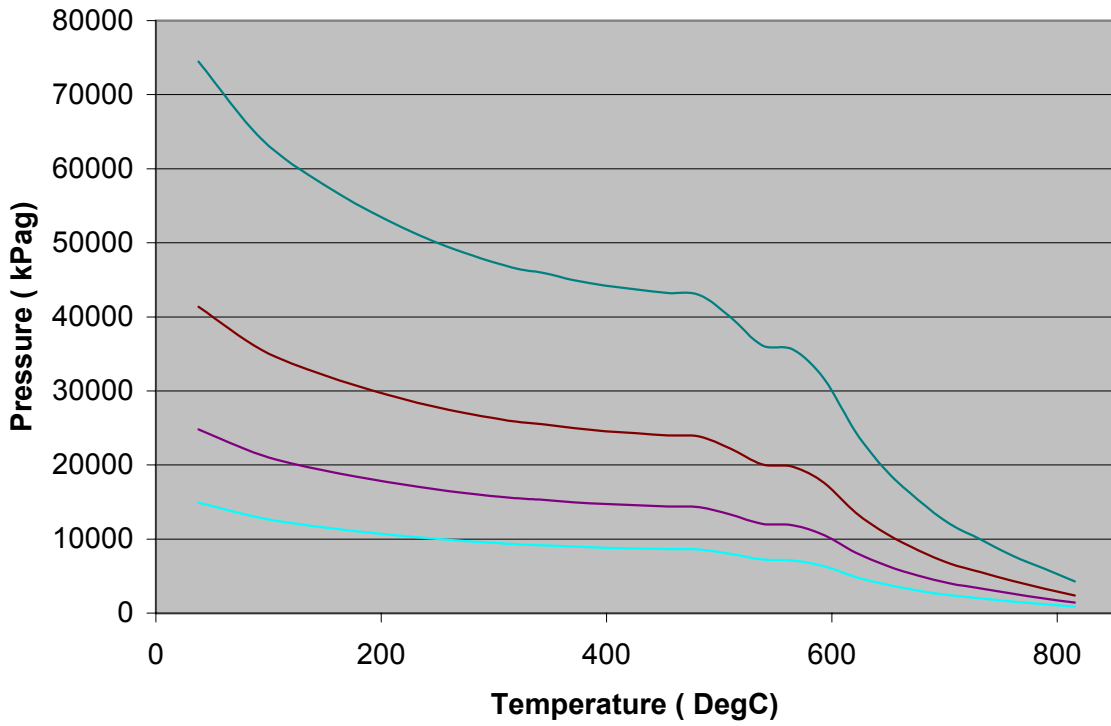
Material Group 2.1



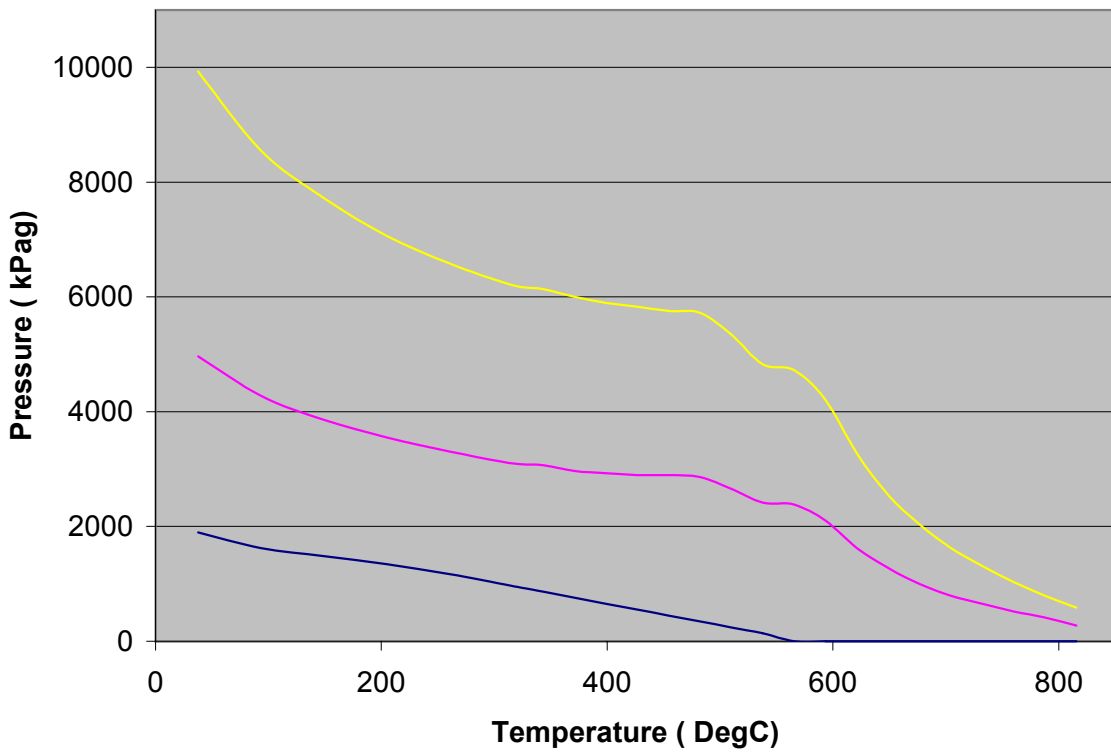
Material Group 2.1



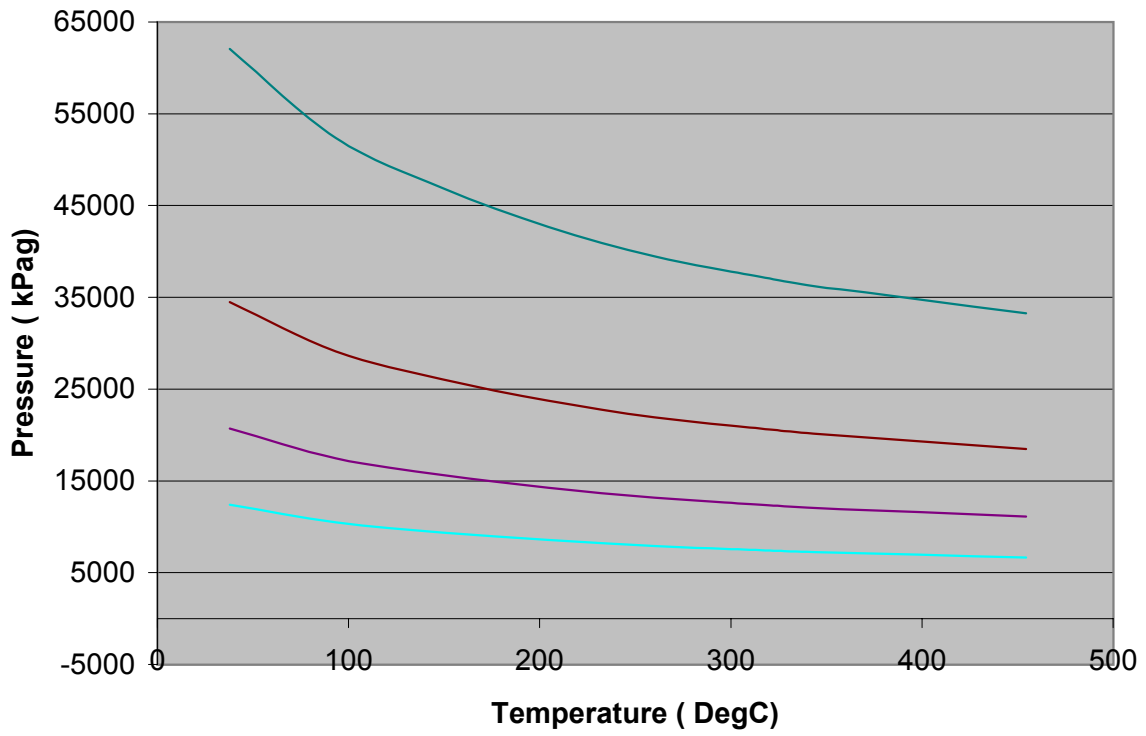
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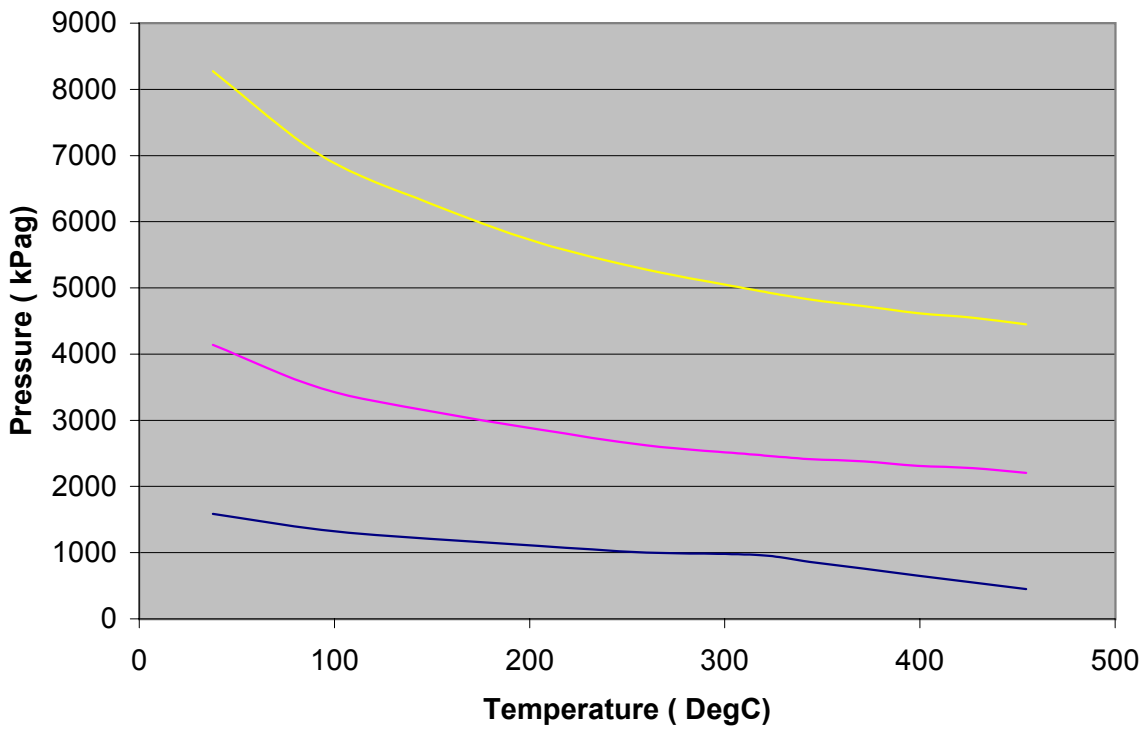
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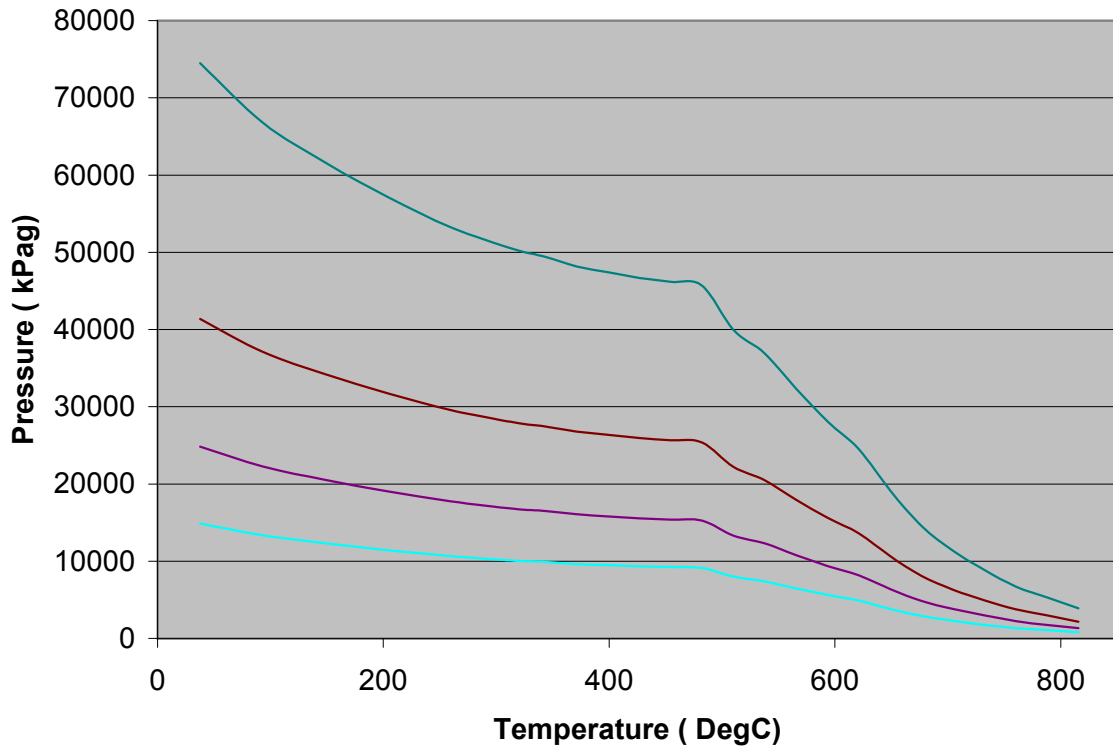
Material Group 2.3



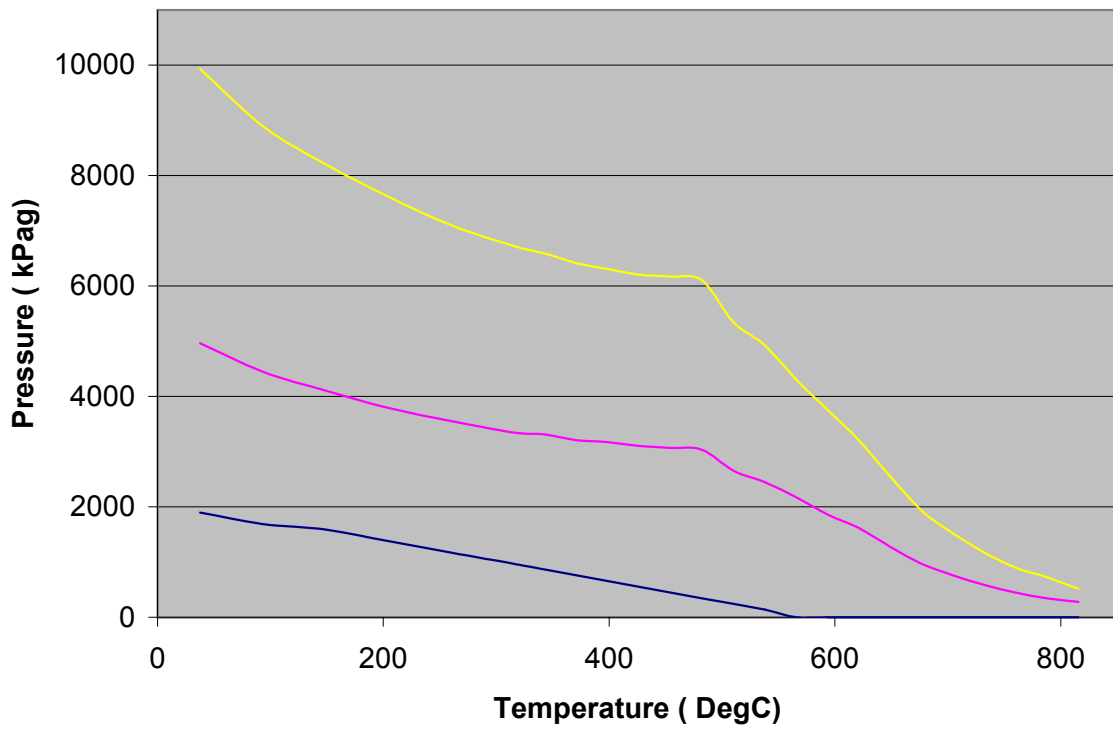
Material Group 2.3



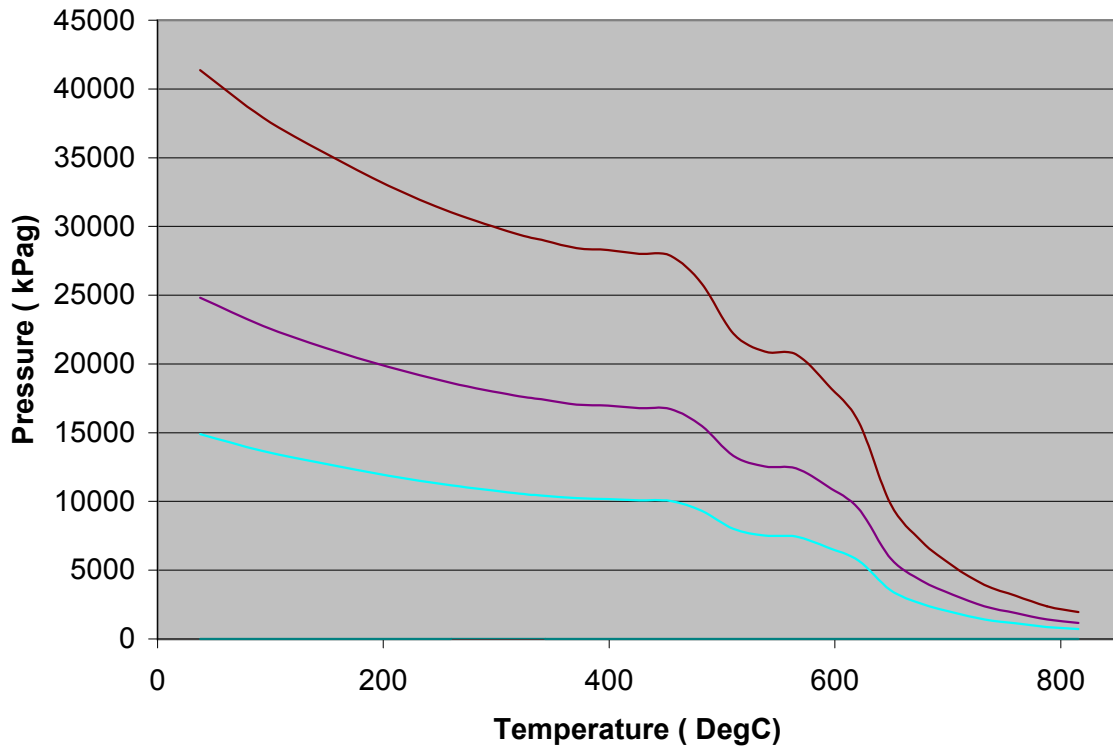
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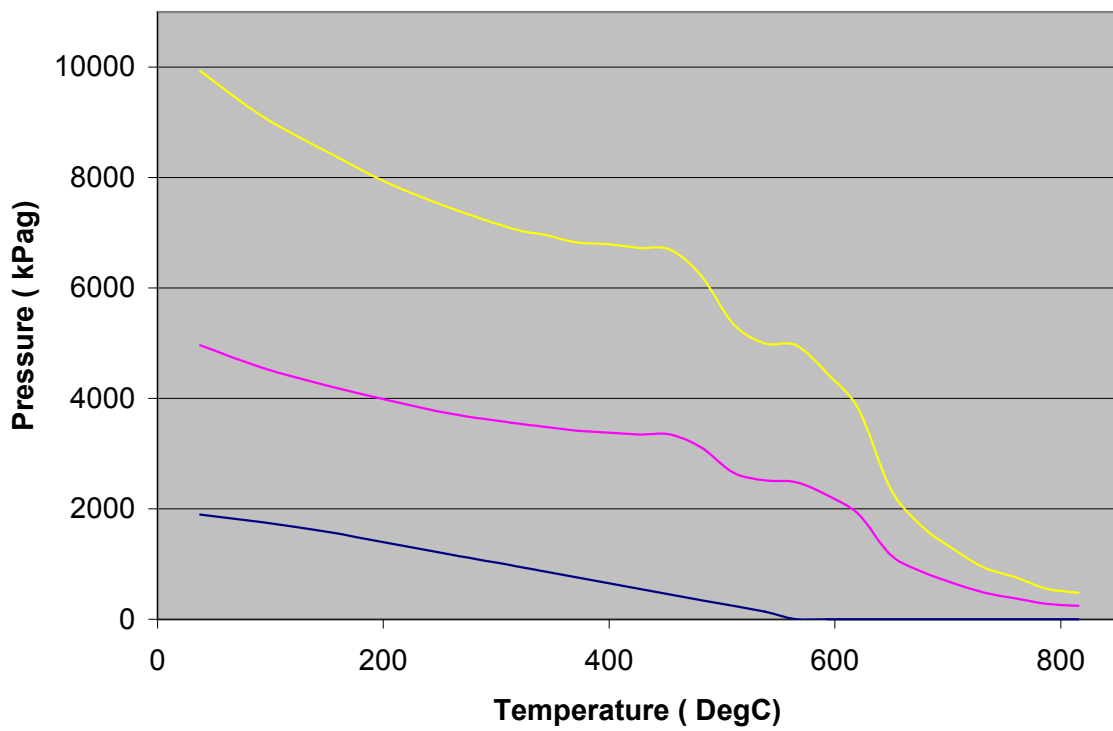
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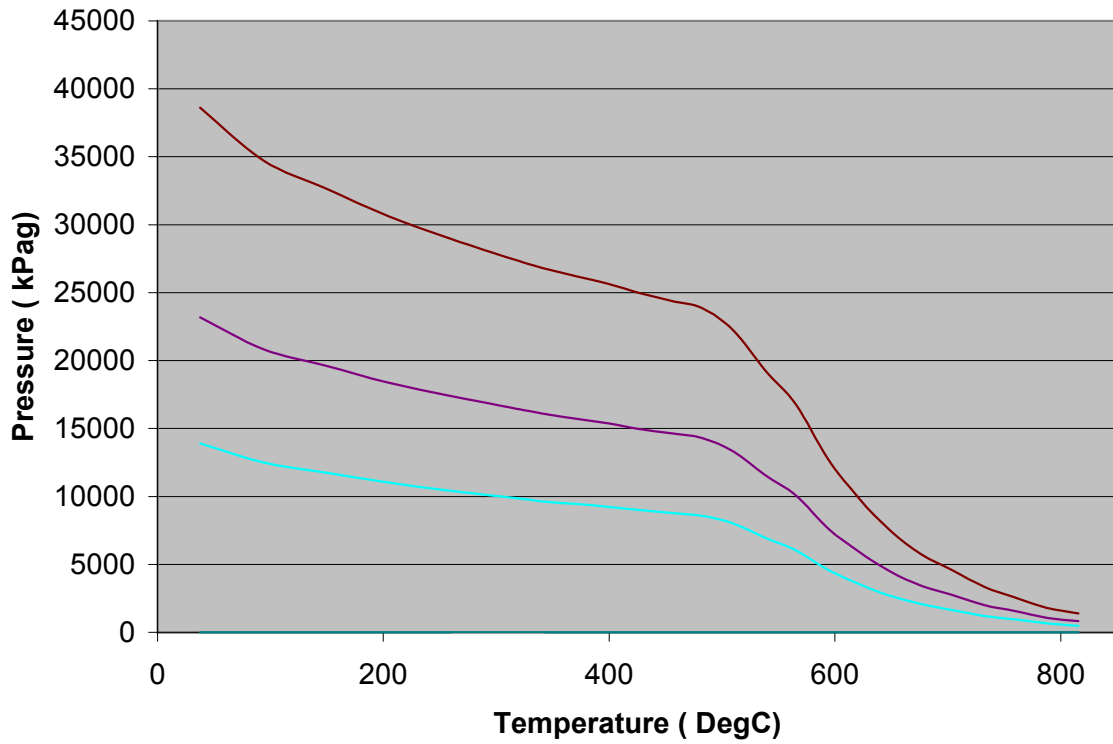
Material Group 2.5



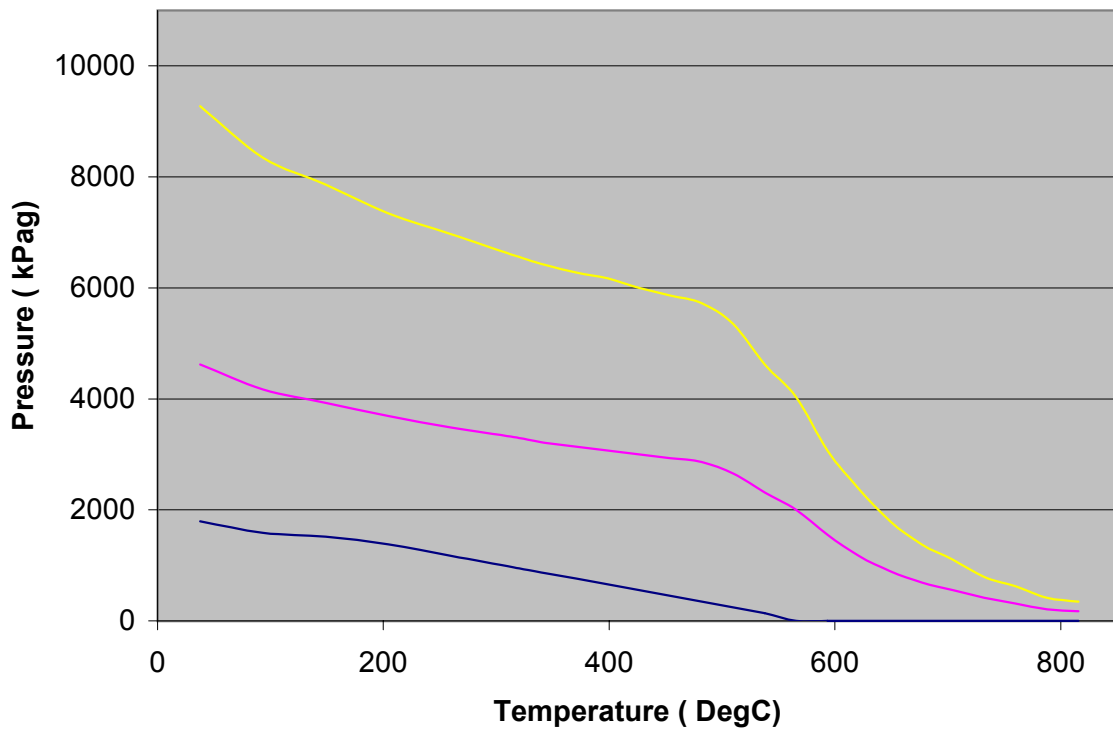
Material Group 2.5



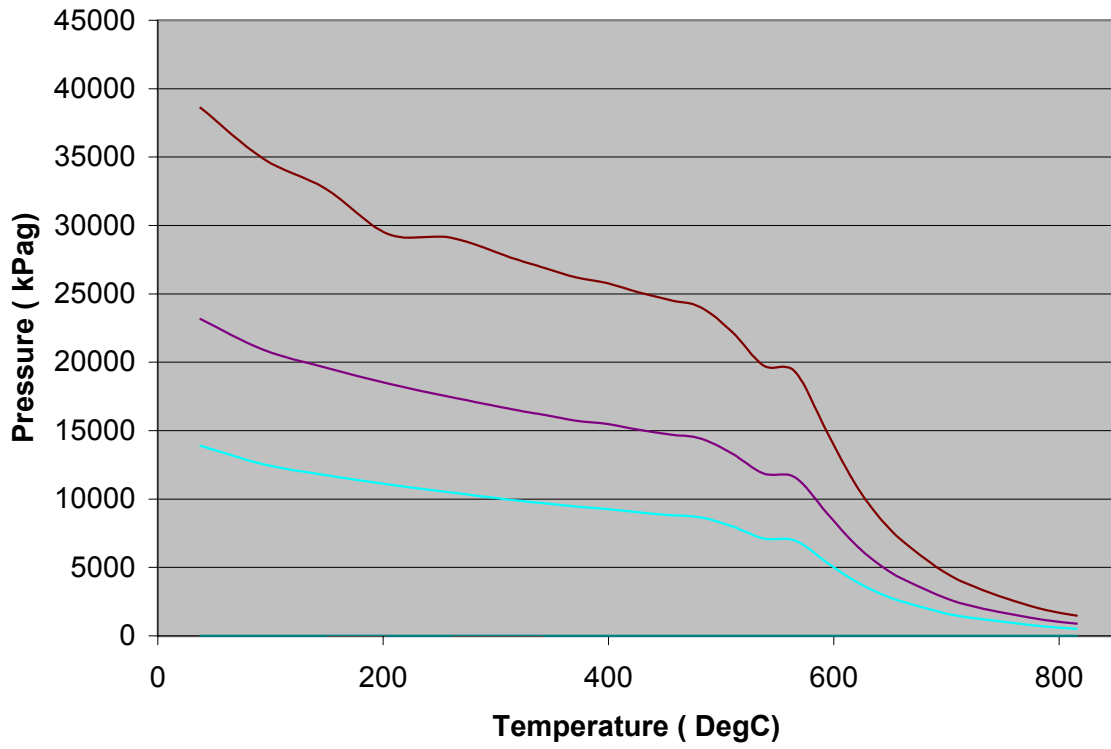
Material Group 2.6



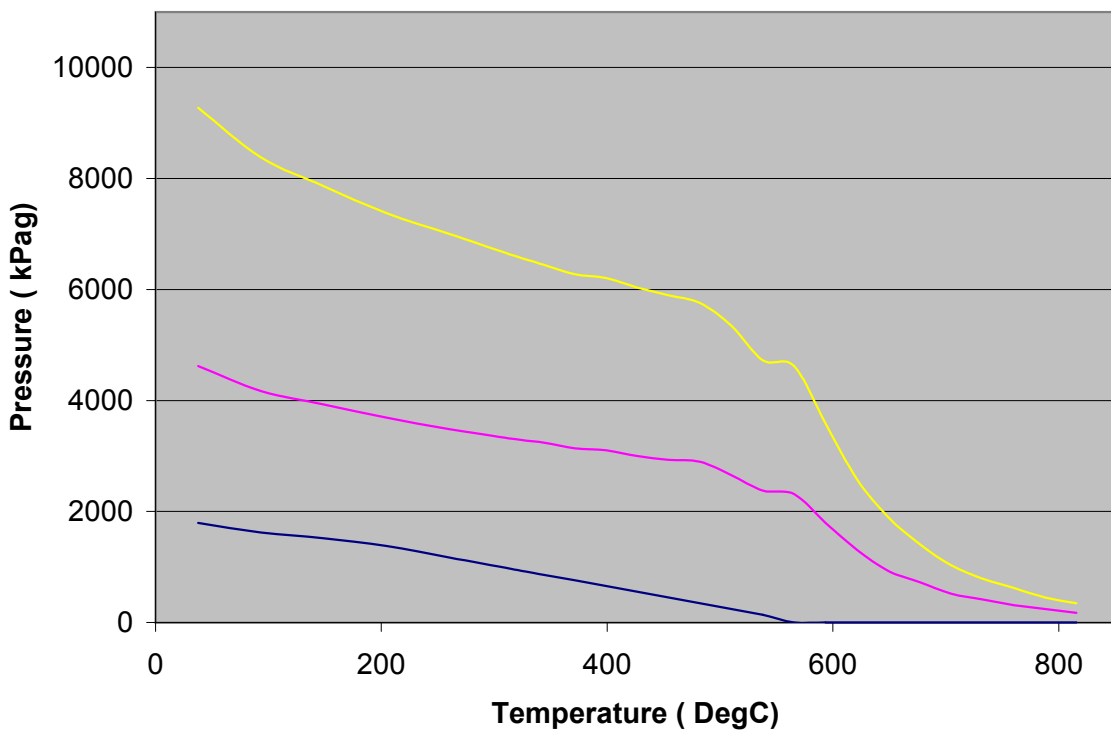
Material Group 2.6



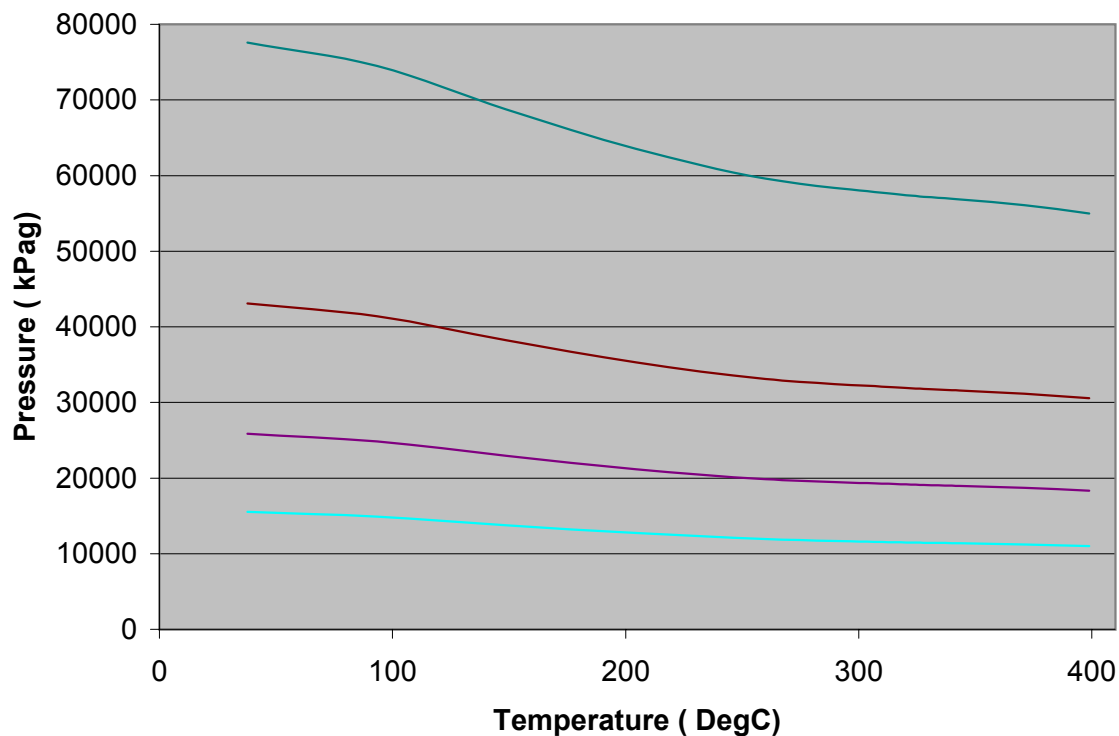
Material Group 2.7



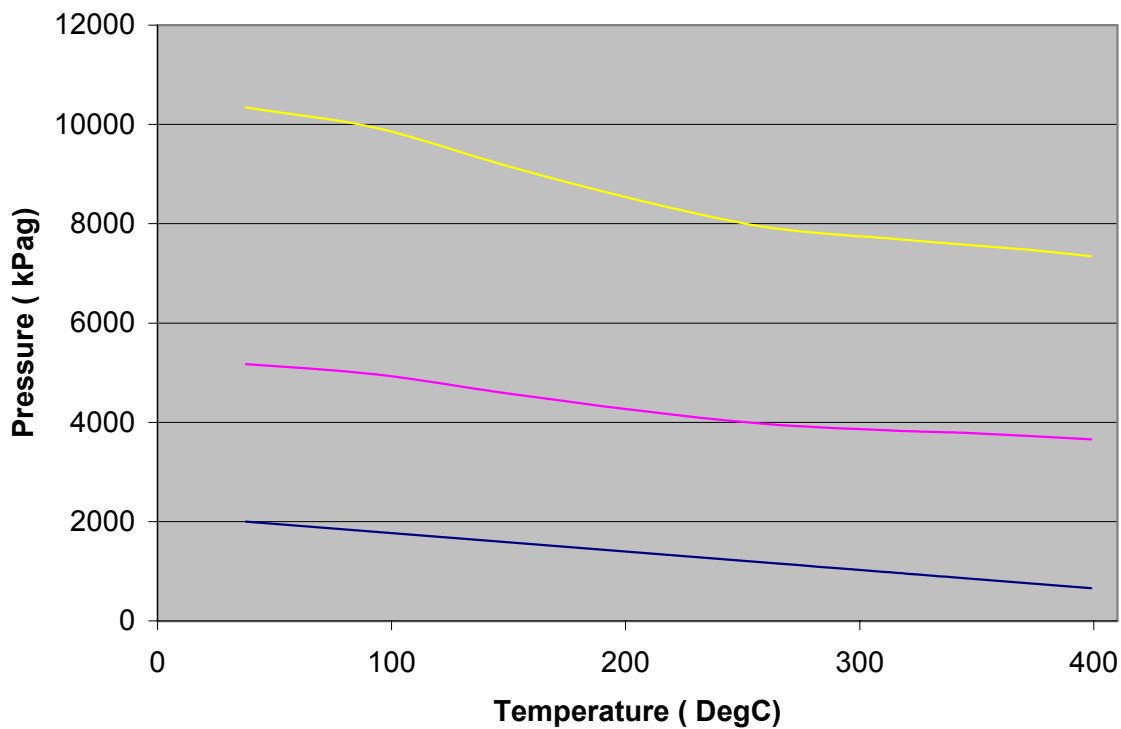
Material Group 2.7



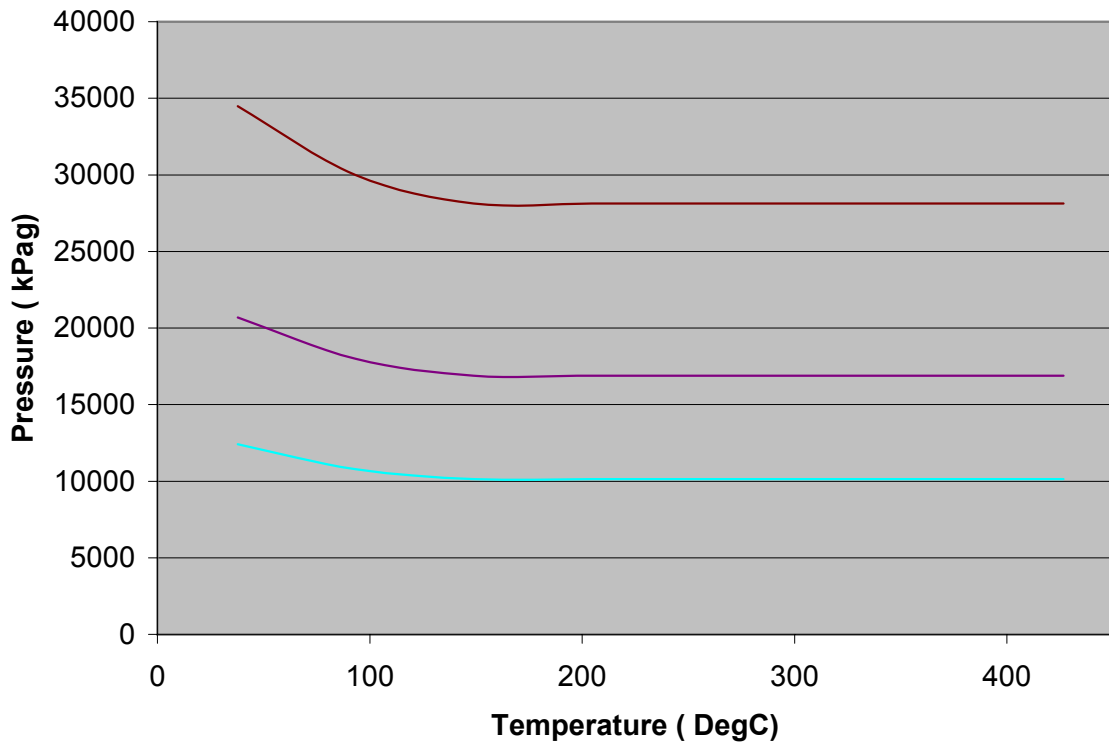
Material Group 2.8



Material Group 2.8



Material Group 3.1



Material Group 3.1

