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Aerospace — Fluid systems and components — Pressure and temperature classifications

Aéronautique et espace — Systèmes de fluides et éléments constitutifs — Classification des températures et des pressions

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Foreword

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ISO 6771 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 10, *Aerospace fluid systems and components*.

This third edition cancels and replaces the second edition (ISO 6771:1987), which has been technically revised. This third edition adds imperial unit equivalents, and the nominal temperatures and pressures for all classes have been revised.

Introduction

Aerospace fluid systems and components are generally designed and marked for a specific fluid pressure class and temperature type.

Aerospace — Fluid systems and components — Pressure and temperature classifications

1 Scope

This International Standard specifies the pressure classes and temperature types for the basic systems and component systems that are commonly used in aerospace fluid systems. Classes and types in the lower ranges represent systems in common use. Those in the higher ranges represent systems that are in less common use or that are used in developmental systems.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
basic system
temperature types and pressure classes of the aircraft fluid systems, usually specified in the aircraft specification, with which the vehicle is designed to be operated

NOTE 1 The basic system consists of several subsystems.

NOTE 2 The temperature type and pressure classes are tested and certified as an integral part of vehicle performance.

2.2
component system
system whose temperature types and pressure classes are usually defined in the product specification

NOTE 1 The components are tested and qualified individually under each subsystem.

NOTE 2 The harmonization of temperature and pressure tolerances is accomplished in the component systems so that one product can be used in both systems, metric or imperial, and attain the same degree of performance of the subsystem.

3 Classification

3.1 Basic system

3.1.1 General

The pressure classes and temperature types for the basic systems are as specified in Tables 1 and 2. No tolerance is permitted in the basic systems.

3.1.2 Pressure classes

Nominal system pressure classes for the basic systems shall be as specified in Table 1. The old pressure classes designated in Table 1 are the existing systems commonly used in the United States and Europe. The equivalent pressures as shown are mathematically converted from the basic systems for comparison only and should not be used in the basic systems.

Table 1 — Nominal system pressure classes for the basic systems

Pressure classes	Metric system			Imperial system		
	Old pressure classes	Pressure values		Old pressure classes	Pressure values	
		kPa (bar) [a] basic	psi equivalent [b]		psi basic	kPa equivalent [c]
A	A	4 000 (40)	580	600	600	4 137
B	B	10 500 (105)	1 522	1 500	1 500	10 342
H [d]	—	14 000 (140) [d]	2 031	2 000	2 000	13 790
C	C	16 000 (160)	2 321	—	2 500 [d]	17 237
D	D	21 000 (210)	3 046	3 000	3 000	20 684
E	E	28 000 (280)	4 061	4 000	4 000	27 579
J [d]	—	35 000 (350) [d]	5 076	5 000	5 000	34 474
F	F	40 000 (400)	5 802	—	6 000 [d]	41 368
G	G	50 000 (500)	7 252	—	7 000 [d]	48 263
K [d]	—	55 000 (550) [d]	7 977	8 000	8 000	55 158

[a] 1 bar = 100 kPa.

[b] 1 kPa (kilopascal) = 0,145 038 1 psi (pound-force per square inch).

[c] 1 psi (pound-force per square inch) = 6,894 74 kPa (kilopascal).

[d] Additional pressure classes for future application.

3.1.3 Temperature types

Types of system operating temperature for the basic systems shall be as specified in Table 2. The old temperature types as shown in Table 2 are the existing systems commonly used by the United States and Europe. Some new temperature types are added in this revision for future application. The tolerances are not allowed in the basic systems.

Table 2 — Types of system operating temperature for basic systems

Temperature type	Metric system		Imperial system	
	Old temperature type	Temperature range °C	Old temperature type	Temperature range °F
07	I	–55 to 71	I	–65 to 160
09	—	–55 to 95	—	–65 to 200
13	II	–55 to 135	II	–65 to 275
20	III	–55 to 200	—	–65 to 400
23	—	–55 to 235	III	–65 to 460
32	IV	–55 to 320	—	–65 to 600
40	V	–55 to 400	—	–65 to 750
42	—	–55 to 425	—	–65 to 800
45	—	–55 to 450	—	–65 to 840
55	—	–55 to 550	—	–65 to 1 020
65	VI	–55 to 650	—	–65 to 1 200
73	—	–55 to 730	—	–65 to 1 350
76	—	–55 to 760	—	–65 to 1 400

NOTE Formula used in temperature conversion:
X °F = 32 + 9/5 Y °C or Y °C = 5/9 (X °F –32).

3.2 Component system

3.2.1 Pressure classes

Nominal system pressure classes for the component systems shall be as specified in Table 3. The tolerance values as shown are to be used for conversion from one system to another. To qualify for both systems, the higher pressure shall be used.

Table 3 — Nominal system pressure classes for the component systems

Pressure classes	Metric system			Imperial system		
	Nominal pressure kPa (bar) [a, b]	Harmonize tolerance kPa	upper value/ lower value kPa	Nominal pressure psi [c]	Harmonize tolerance psi	upper value/ lower value psi
A	4 000 (40)	+137	4 137 4 000	600	–20	600 580
B	10 500 (105)	–158	10 500 10 342	1 500	+23	1 523 1 500
H [d]	14 000 (140)	–211	14 000 13 789	2 000	+31	2 031 2 000
C	16 000 (160)	+1 237	17 237 16 000	2 500	–179	2 500 2 321
D	21 000 (210)	–316	21 000 20 684	3 000	+46	3 046 3 000
E	28 000 (280)	–421	28 000 27 579	4 000	+61	4 061 4 000
J [d]	35 000 (350)	–526	35 000 34 474	5 000	+76	5 076 5 000
F	40 000 (400)	+1 368	41 368 40 000	6 000 [a]	–198	6 000 5 802
G	50 000 (500)	–1 737	50 000 48 263	7 000 [a]	+252	7 252 7 000
K [d]	55 000 (550)	+158	55 158 55 000	8 000	–23	8 000 7 977

[a] 1 bar = 100 kPa.

[b] 1 kPa (kilopascal) = 0,145 038 1 psi (pound-force per square inch).

[c] 1 psi (pound-force per square inch) = 6,894 74 kPa (kilopascal).

[d] Additional pressure classes for future application.

3.2.2 Temperature types

The old temperature types as used in Table 4 are from the existing systems commonly used in the United States and Europe. The new temperature types are additional temperatures added in this revision for future broader application. To qualify for both systems, the higher temperature range shall be used.

Table 4 — Types of system operating temperature for component systems

Temperature type	Metric System				Imperial System			
	Old temperature type	Temperature range °C	Lower temperature Field of tolerance	Upper temperature Field of tolerance	Old temperature type	Temperature range °F	Lower temperature Field of tolerance	Upper temperature Field of tolerance
07	I	–55 to 71	–55 –54	71 70	I	–65 to 160	–67 –65	160 158
09	—	–55 to 95	–55 –54	95 93	—	–65 to 200	–67 –65	203 200
13	II	–55 to 135	–55 –54	135 135	II	–65 to 275	–67 –65	275 275
20	III	–55 to 200	–55 –54	204 200	—	–65 to 400	–67 –65	400 392
23	—	–55 to 235	–55 –54	238 235	III	–65 to 460	–67 –65	460 455
32	IV	–55 to 320	–55 –54	320 316	—	–65 to 600	–67 –65	608 600
40	V	–55 to 400	–55 –54	400 399	—	–65 to 750	–67 –65	752 750
42	—	–55 to 425	–55 –54	427 425	—	–65 to 800	–67 –65	800 797
45	—	–55 to 450	–55 –54	450 449	—	–65 to 840	–67 –65	842 840
55	—	–55 to 550	–55 –54	550 549	—	–65 to 1 020	–67 –65	1 022 1 020
65	VI	–55 to 650	–55 –54	650 649	—	–65 to 1 200	–67 –65	1 202 1 200
73	—	–55 to 730	–55 –54	732 730	—	–65 to 1 350	–67 –65	1 350 1 346
76	—	–55 to 760	–55 –54	760 760	—	–65 to 1 400	–67 –65	1 400 1 400

NOTE Formula used in temperature conversion:
X °F = 32 + 9/5 Y °C or Y °C = 5/9 (X °F –32).