

Quality classes:

- By application
- By type of component

The two tables below show the recommended air quality classes. The range of application on the one hand, and the type of components on the other, are the two criteria which should provide guidance for the choice of class.

Table A.1 – Quality classes recommended by types of application

Types of application	Quality classes			ULTRAFILTER SOLUTION
	Solids	Water	Oil	
Air agitation	3	5	3	PE - FDS - MF
Pneumatic conveyance of granules	3	6	3	PE - FDS - MF
Pneumatic conveyance of pulverised particles	2	3	2	PE - HED - MF
Manufacture of photographic films	1	1	1	PE - MSD - AK
Drilling	4	5 to 2	5	PE - ALD
Welding machines	4	6	5	PE - FDS
Packaging and textile machines	4	3	3 to 2	PE - HED - SMF
Foundry machines	4	6	5	PE - FDS
Machine tools	4	3	5	PE - HED
Machinery for brick and glass manufacture	4	6	5	PE - FDS
Shoe-making machinery	4	6	5	PE - FDS
Beverage and food machinery	2	6	1	FF - FDS - AK
Mining machinery	4	5	5	PE - FDS
Cleaning of machinery	4	6	4	PE - FDS - FF
Paint spray gun operations	3	3 to 2	1	PE - ALD - AK
Sandblasting	-	3	3	HED - MF
Civil engineering – buildings and construction work	4	5	5	PE - FDS

Table A.2 – Quality classes recommended by types of components

Types of components	Quality classes			ULTRAFILTER SOLUTION
	Solids	Water	Oil	
Control instrumentation	2	2	3	PE - FF - ALD
Pneumatic gauges	2	3	3	FF - HED - MF
Air bearings	2	2	3	PE - ALD
Fine regulation (of pressure, output)	3	2	3	PE - ALD - MF
General plant networks	4	6	5	PE - FDS
Pneumatic transmission systems:				
– Linear actuators (screw devices)	3	3	5	PE - HED
– Rotary actuators	4	6 to 1	5	PE - HED
– Heavy pneumatic motors	4	6 to 1	5	PE - ALD
– Light pneumatic motors	3	3 to 1	3	PE - MSD - MF
– Industrial portable tools	4	5 to 6	5 to 4	PE - FDS - MF
– Turbines	2	2	3	MF - ALD - MF
– Jet effect sensors	2	2 to 1	2	MF - MSD - AK
– Logic distribution devices to mobile units	4	6	4	PE - FDS
– Static logic units (fluid)	2	2 to 1	2	PE - MSD - AK

Note: The values given above are indicative values only. Several classes may be retained for certain applications. The ambient conditions exert an influence on the choice, with the dewpoint being of particular importance.

Quality classes

ULTRAFILTER, approved under DIN/ISO 9001, have committed themselves to the concept of "quality without compromise". We also work on the basis of the existing ISO/Pneurop standards, extracts from this are set out below.

Table 1
Maximum granulometry and concentration

Class	Granulometry μm (*)	Mass concentration mg/m^3
1	0.1	0.1
2	1	1
3	5	5
4	15	8
5	40	10

(*) Granulometry figures are based on a filtration ratio BN of 20 (**)

(**) The minimum precision of the method of measurement used is 20% of the limit value for the class.

Table 2
Dewpoint under pressure
(max. values)

Class	Dewpoint
1	-70°C
2	-40°C
3	-20°C
4	+ 3°C
5	+ 7°C
6	+10°C

Note: Absolute pressure 1 bar, temperature +20°C, and relative vapour pressure of 0.6. Account must be taken of the fact that, at pressures higher than atmospheric pressure, the relative concentration of pollutants will be higher.

The quality of the air supplied by non-lubricated compressors depends on the quality of the supply air and the design of the compressor.

Table 3
Maximum concentration in oil

Class	Concentration mg/m^3
1	0.01
2	0.1
3	1.0
4	5
5	25

Other equipment for which ULTRAFILTER provides an advanced level of protection, of classes 1/2 - 1/2 - 1/2 on average: (PE - MSD - AK):

- Three-dimensional measuring machines – measuring robots – metrology
- Machines for measuring sealing tightness
- Lasers
- Chromatographs – spectrometers
- Assembly and handling robots
- Ozone generators.

TABLE 1
DIRECTORY OF LIMITING CHARACTERISTICS
 (Units in ppm (mole/mole) unless shown otherwise)
QUALITY VERIFICATION LEVELS (GRADES)¹

Maxima for Gaseous Air									
Limiting Characteristics	A	K	L	D	E	G	J	M	N
Percent O ₂ Balance Predominantly N ₂ (Note 2)	atm/ 19.5- 23.5	atm/ 19.5- 23.5	atm/ 19.5- 23.5	atm/ 19.5- 23.5	atm/ 20-22	atm/ 19.5- 23.5	atm/ 19.5- 23.5	atm/ 19.5- 23.5	atm/ 19.5- 23.5
Water, ppm (v/v) (Note 3)		200	50				1	3	
Dew Point, °F (Note 3)		-33	-54				-104	-92	
Oil (condensed) (mg/m ³ at NTP)				5/ ⁽⁴⁾	5/ ⁽⁴⁾				None*
Carbon Monoxide				10/ ⁽⁵⁾⁽⁶⁾	10	5	1	1	10
Odor			see 5.1.7	see 5.1.7	se 5.1.7	see 5.1.7	see 5.1.7	see 5.1.7	None, see 5.6
Carbon Dioxide				1000/ ⁽⁶⁾	500	500	0.5	1	500
Total Hydrocarbon Content (as methane)		25			25	15	0.5	1	
Nitrogen Dioxide						2.5	0.1	0.5	2.5
Nitric Oxide									
Sulfur Dioxide						2.5	0.1		5
Halogenated Solvents						10	0.1		
Acetylene							0.05		
Nitrous Oxide							0.1		
USP									yes

*Includes water

NOTE 1: The last edition of CGA G-7.1-1973, listed nine quality verification levels of gaseous Air lettered A to J and two quality verification levels of liquid Air lettered A and B. Some of those letter designations have been dropped from this edition (1989) since they no longer represent major volume usage by industry. Four new letter designations, K, L, M, and N have been added to reflect current specifications. To get a listing of quality verification levels dropped, see CGA G-7.1—1973 or contact the Compressed Gas Association.

NOTE 2: The term “atm” (atmospheric) denotes the oxygen content normally present in atmospheric air; the numerical values denote the oxygen limits for synthesized air.

NOTE 3: The water content of compressed air required for any particular quality verification level may vary with the intended use from saturated to very dry. For breathing air used in conjunction with self-contained breathing apparatus in extreme cold where moisture can condense and freeze, causing the breathing apparatus to malfunction, a dew point not to exceed -50°F (63 ppm v/v) or 10 degrees lower than the coldest temperature expected in the area is required. If a specific water limit is required, it should be specified as a limiting concentration in ppm (v/v) or dew point. Dew point is expressed in °F at one atmosphere pressure absolute, 101 kPa abs. (760 mm Hg). To convert to other units, see 7.1.

NOTE 4: Not required for synthesized air whose oxygen and nitrogen components are produced by air liquefaction.

NOTE 5: Not required for synthesized air when nitrogen component was previously analyzed and meets *National Formulary* (NF) specification. [1]¹

NOTE 6: Not required for synthesized air when oxygen component was produced by air liquefaction and meets *United States Pharmacopeia* (USP) specification. [1]

¹NOTE: References in this document are shown by bracketed numbers and are listed in the order of appearance. See Section 8, References.