

Hepatex CR

Setting the Quality Standard



CLEAN
AIR



POWER
GENERATION



CLEAN
ROOM



INDUSTRIAL

Hepatex CR filters are high-efficiency submicron particulate air filters designed to protect people, equipment and processes from airborne particulate contamination.

Hepatex CR filters are used in situations requiring high or very high levels of air purity. They are primarily designed as intake filters for low turbulence displacement (or laminar) flow clean room ceilings and clean workbenches.

Typical applications can be found in: microelectronics, semiconductor manufacture, medicine, chemistry, pharmacy, microbiology, film and magnetic tape production, compact disc manufacture, laboratories and the food industry.

KEY FACTS

- Initial efficiency from 85 % to 99.999995 % for MPPS: Suited to all types of applications
- Optimised velocity distribution: For stable air flow and longer life
- Guaranteed leak-free: For assured protection
- Mechanically stable: For optimum performance
- Various frame types and sizes: To suit all requirements
- Two face guards and anodized aluminium frame: For rigidity, strength and safety in operation
- Integrated one-piece round, gel or knife edge gasket: To ensure an air-tight seal in all environments
- ULPACATS quality certificates available: For guaranteed safety and performance
- Low pressure drop: Reduced energy consumption and operating costs



Hepatex CR Construction and Design

CONSTRUCTION

A filter medium constructed from various grades of micro glass fibre paper is folded into a pack designed with the optimum pleat height and density for the specific operating conditions. Continuous thread separators coated with adhesive, support the individual pleats and impart great stability to the whole pack.

As standard, the entire pack is sealed into an anodised aluminium frame with a continuous one-piece gasket to ensure a perfect seal between the filter assembly and its housing.

DESIGN

MANN+HUMMEL became one of the first filter manufacturing companies to install an automated filter medium tester.

With this instrument the penetration of each individual medium as a function of particle size and velocity (diagrams 1 and 2) may be determined. This allows the selection of the optimum filter medium for any particular filter type and application from the wide variety of media available on the market.

This instrument is therefore also able to calculate, measure and guarantee all relevant filtration characteristics for individual projects.

Diagram 1 shows that every filter medium has a maximum penetration. The associated particle diameter is known as MPPS (Most Penetrating Particle Size).

The MPPS is a function of the particle and fibre diameters, velocity through the medium, thickness of the medium and the packing density.

The integral and local penetration values of all Hepatex CR filters are –beside the traditional NaCl values– specified for MPPS and thus conform fully to the stipulations of EN 1822.

PRE-FILTRATION

The service life of Hepatex CR filters can be prolonged by efficient prefiltration for which we would recommend the higher grades of the Compaflex FP filters.

TYPICAL MEDIA PENETRATIONS

DIAGRAM 1

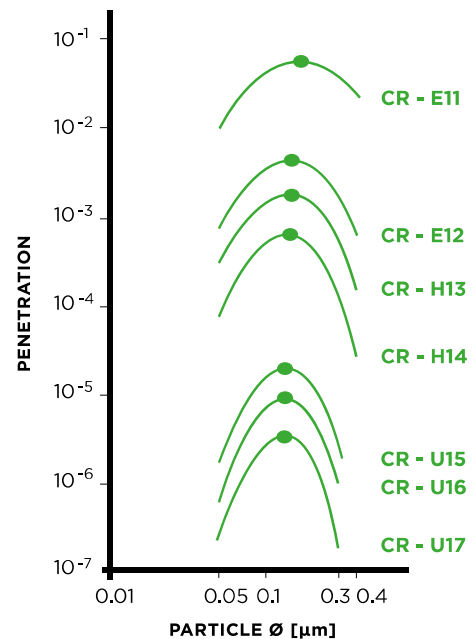
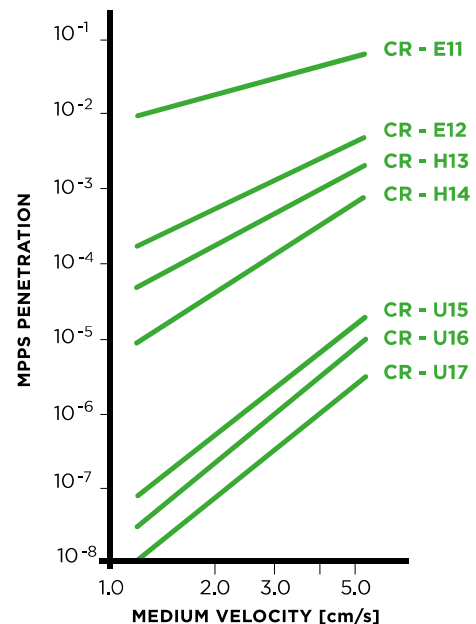


DIAGRAM 2



Hepatex CR

Quality Policy

At MANN+HUMMEL we are committed to the design and production of filter equipment which is fit for its stated purpose, is of the highest quality, consistent in its performance and offers safety and reliability at the optimum price and product availability. This is achieved by operating and maintaining a comprehensive quality control system based on ISO 9001.

MANN+HUMMEL concentrates on the quality assurance of the: Filter medium, production process and finished filter element.

Hepatex CR filters are manufactured and tested in accordance with an established and audited procedure. During these processes, and depending on the requirements, a distinction is made between the different quality levels as explained below.



QUALITY LEVEL A

- Statistical control of filtration and other data at finished products and materials
- 100% visual inspection of the finished product before packing



QUALITY LEVEL B

100% leak test of the finished filters to EN 1822-4 ("oil thread test", fig.1)



QUALITY LEVEL C

Batch test certificate to DIN EN 10204-2004-2.2



QUALITY LEVEL D

With ULPACATS (ULPA filter Computer Aided Test System), MANN+HUMMEL created new dimensions to quality assurance and test techniques: the filter is placed in a computer controlled test rig and runs at its rated air flow. It is challenged by an aerosol, and the upstream and downstream concentrations of that aerosol are measured by parallel traversing laser particle counters covering the entire surface of the filter.

The results are analysed at the MPPS for the particular filter, giving the integrated overall efficiency and the local penetrations in accordance with EN 1822. Should the local penetration be greater than an approved maximum, then the leaks are repaired on an associated rig where the actual leak locations are identified by the computer so that the smallest possible repair is carried out. The filter is then retested. All test readings are fully documented with an inspection certificate acc. to DIN EN 10204:2004-3.1 and the individual measuring protocols for the filter.

The ULPACATS test is a further guarantee of quality where particularly high levels of air purity are necessary (e.g. micro- electronic industry), avoids risks and ensures problem-free qualification and commissioning of the Clean Rooms.

Quality Levels by Efficiency

	E10	E11	E12	H13	H14	U15	U16	U17
Level A	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Level B	N/A	N/A	N/A	Standard	Standard	Standard	Standard	Standard
Level C	N/A	N/A	N/A	Standard	Standard	N/A	N/A	N/A
Level D	N/A	N/A	N/A	Optional	Optional	Standard	Standard	Standard

Hepatex CR

Technical Data

Hepatex CR	Unit	AS-H13	AL-H13	AS-H14	AL-H14	AS-U15	AL-U15	AS-U16	AL-U16
Nominal Air Flow ^{(1) (2)}	m/s	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Pressure Drop at Nominal Flow ⁽²⁾	Pa	115	90	120	85	170	100	190	110
Recommended Final Pressure Drop ⁽³⁾	Pa	240	150	240	150	340	180	380	200
Filter Surface Area per m ² Face Area ⁽¹⁾	m ² /m ²	24	38	24	38	24	38	24	38
Filter Efficiencies									
EN 1822 Integral Value (typ. for CR) ⁽⁴⁾	%	99.98	99.98	99.998	99.998	99.9998	99.9998	99.99997	99.99997
with MPPS-DEHS-aerosol (min.) ⁽⁴⁾	%	≥ 99.95	≥ 99.95	≥ 99.995	≥ 99.995	≥ 99.9995	≥ 99.9995	≥ 99.99995	≥ 99.99995
EN 1822, MPPS-DEHS, Local Value ⁽⁴⁾	%	≥ 99.75	≥ 99.75	≥ 99.975	≥ 99.975	≥ 99.9975	≥ 99.9975	≥ 99.99975	≥ 99.99975
Filter Class to EN1822	-	H13	H13	H14	H14	U15	U15	U16	U16

1) External filter dimensions. 2) Tolerance: ± 10%. 3) Maximum final pressure drop ≤ 600 Pa. 4) DEHS = DieEthylHexylSebacat MPPS = Most Penetrating Particle Size.

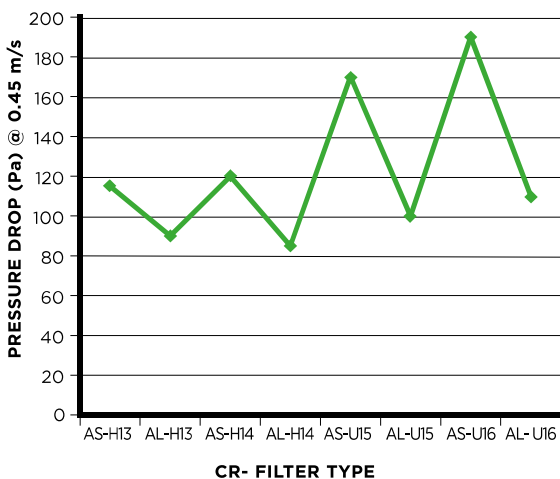
Hepatex CR filters offer significantly higher efficiencies and are designed for a wide range of different “Clean” applications. CR filters are suitable for highest Clean Room requirements up to class 1 as per ISO 16 644-1 and for class A sterile pharmaceutical zones.

Hepatex CR filters of the CR-AL product line achieve a reduction in pressure loss of about 30 % with the same filtration performance. They offer an alternative solution with lower operating costs, significantly reducing energy consumption. Type CR-D and CR-V feature same performance data as the CR-A.

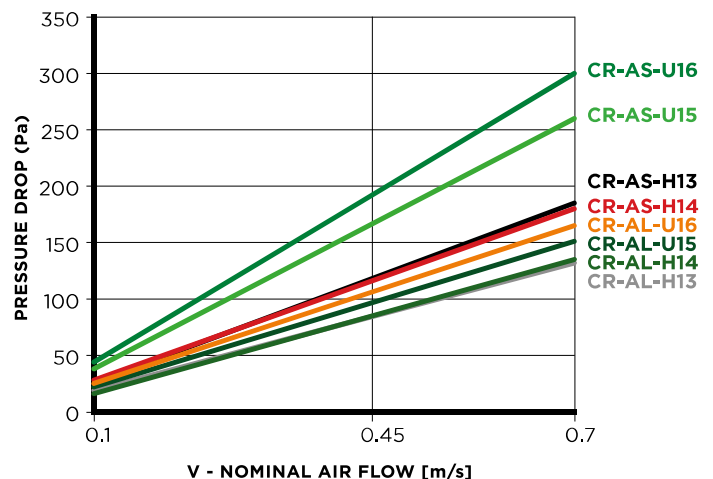
Specifications

Filter Frame	
Type A/D/V	Anodized, extruded aluminium with mitred corners
Type AS/DS/V5	Normal pressure drops
Type AL/DL/VL	Very low pressure drops
Filter Medium	Water repellent micro-glass-fibre paper, pleated in a regular V-pattern
Face Guards	On both sides of the pleat pack, expanded sheet steel, powder coated in white (RAL 9010)
Sealing Compound	Fire-resistant, white two-component polyurethane
Gasket	EPDM foam, circular cross section with a closed surface
Max. Operating Temp.	70 °C (up to 120 °C available on request)
Fire Classification	K2/F2 to DIN 53438

CR- FILTER SELECTION DIAGRAM



DP, V - DIAGRAM

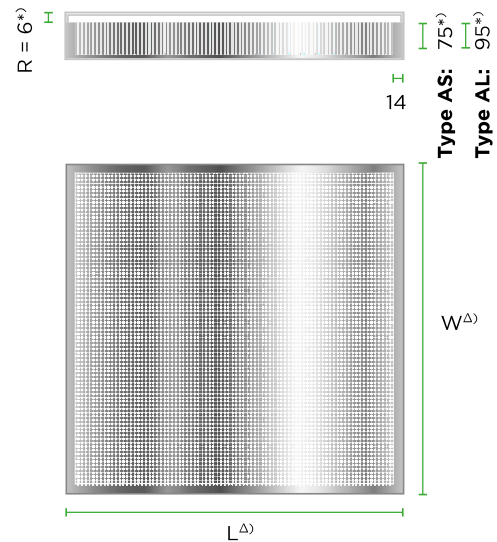


Hepatex CR

Dimensions and Order Code

Dimensions (mm)		Air ow Rate (m ³ /h) at 0.45 m/s	Weight (kg) with frame	
Length	Width		AS / DS / VS	AL / DL / VL
305*	305	140	1.8	2.2
457	305	210	2.5	3.0
610*	305	280	3.0	3.7
762	305	360	3.7	4.6
915	305	430	4.4	5.4
1,220	305	600	5.7	7.0
1,525	305	750	6.9	8.5
457*	457	320	3.2	4.0
557*	557	500	3.9	4.8
610*	610	600	5.1	6.3
762	610	750	6.1	7.5
915*	610	905	7.2	8.8
1,220*	610	1,205	9.3	11.4
1,525	610	1,510	11.3	14.0
1,830	610	1,810	13.4	16.6
762	762	940	7.9	9.7
915	762	1,130	9.1	11.2
1,220	762	1,510	11.5	14.2
1,525	762	1,880	14.7	18.2
915	915	1,355	10.6	13.2
1,220	915	1,810	13.4	16.7
1,525	915	2,260	16.9	21.0

DIMENSIONAL SKETCH (mm)



Δ) Dimension L and W

*) Seal compression from 1.5 to max. 2.0 mm



SPECIAL VERSIONS

The following special versions can be supplied on request:

- Different aluminium frame types, see next page
- Aluminium frames with single or noface guard
- Custom dimensions L x W
- Different filtration efficiencies and pressure drops
- CRM hooded filter module: Any CR filter can be combined and sealed to the CRM hood with integrated spigot for individual air supply connection.

ORDER CODE AND EXAMPLE

This information is only required when ordering non standard versions.

CR	-	AL	-	U16	-	610 x 610	-	(D)
CR Filter Range		Frame Type (first letter): A: Standard aluminium D, V: Special aluminium (Details on next page)		Filter Efficiency: Filter class to EN 1822		Cross-sectional dimensions: Length x Width in mm		Face Guard: B: Both sides (= standard for profiles A, D and V) D: One sided, on gasket side G: One sided, opposite to gasket side O: No face guard
		Filter Design (second letter): S: Standard pressure drop L: Low pressure drop E: Minimum Pressure Drop						

Hepatex CR

Available Aluminium Frames

DIMENSIONAL SKETCH (in mm)	FRAME TYPE	APPLICATION
	AS	Standard frame for all CR-AS filters. Designed for normal pressure drops. With elastomer gasket.
	AL	Standard frame for all CR-AL filters, Designed for reduced pressure drops. With elastomer gasket.
	AE	Standard frame for all CR-AE filters. Designed to achieve minimum pressure drops. With elastomer gasket.
	DS	Special frame CR-DS, with a gel-seal filled groove, suitable to frame systems with knife edge. Normal pressure drops. CR-DS has the same performance data as the CR-AS.
	DL	Special frame CR-DL, with a gel-seal filled groove, suitable to frame systems with knife edge. Reduced pressure drops. CR-DL has the same performance data as the CR-AL.
	VS	Special frame CR-VS, is available with a single or two-sided flatgasket to accept installations using Filtrasept. Normal pressure drops. CR-VS has the same performance data as the CR-AS.
	VL	Special frame CR-VL, is available with a single or two-sided flat gasket to accept installations using Filtrasept. Reduced pressure drops. CR-VL has the same performance data as the CR-AL.