

Laboratory hoods and cabinets: Training the inexperienced to choose the correct device

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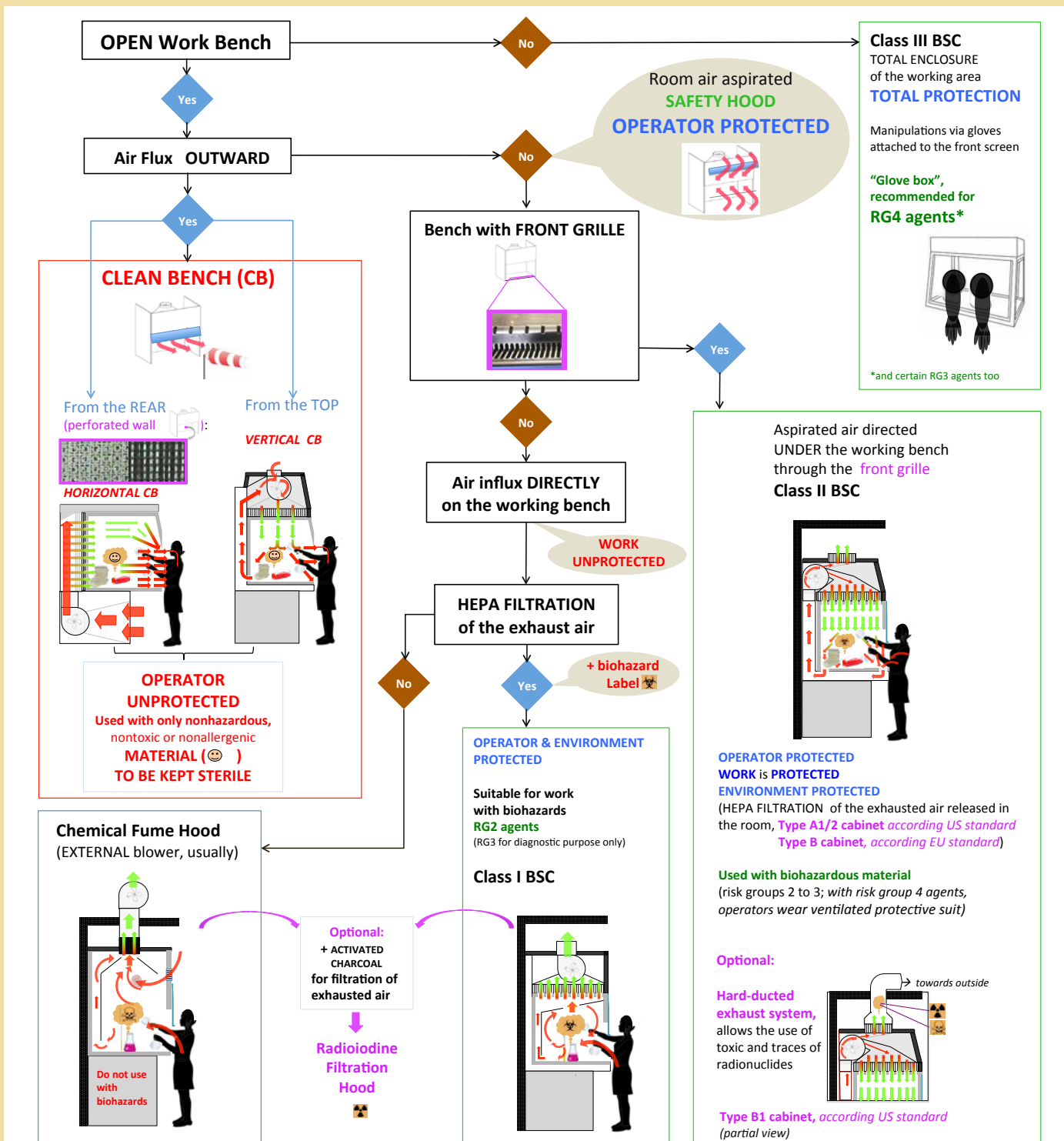
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Introduction:

It can sometimes be confusing to discriminate between biosafety cabinets and other types of ventilated cabinets such as fume hoods and clean benches.


The decision tree found below will help you to identify any hood encountered in most laboratories. For each device, the protection target(s) (i.e. the worker, the work and/or the environment) will be specified regarding the major types of laboratory hazards (i.e. biological, toxicological and radiological), considered alone or combined.



Legend: : blower; : HEPA filter; : potentially contaminated air; : HEPA filtered air

BSC, Biological Safety Cabinet (American standard NSF/ANSI 49-2007, 4 class II types)
= MSC, Microbiological Safety Cabinet (European standard EN 12469: 2000)
RG, Risk Group of biological agents (from 1 to 4)

Summary of hood identification criteria and protection range

HOOD TYPE	Identification criteria			Protection range		
	Air outflow perceptible	Working bench with a front GRILLE	Biohazard Label 	Worker	Work (kept sterile)	Environment
Chemical fume hood	-	-	-	+	-	-
Class I BSC	-	-	+	++	-	+
Class II BSC	-	+	+	+	+	+
Class III BSC	-	IR*	+	++	+	+
Horizontal CB	++	-	-	-	+	-
Vertical CB	+	-	-	-	+	-

*irrelevant in the case of an hermetically closed cabinet

Additional useful information

1) Clean Bench (CB):

Is sometimes referred to as “laminar flow hood” or “laminar flow cabinet” or “laminar flow workstation”. The “laminar part” of those names could lead the user to mistake a clean bench (especially the vertical clean bench) with a class II BSC. To avoid this confusion, keep in mind that a vertical clean bench is devoid of

- front grille on the working bench
- biohazard label (as they are not suitable for working with biohazards)

2) Class II BSC sub-classes in USA

	US standard NSF/ANSI 49-2007			
	A1*	A2*	B1§	B2§
Duct and plenum pressure	negative (EU t. A: positive)	negative	negative	negative
Air inflow velocity (m/s)	0,38	0,5 (EU type A/B: > 0,4)	0,5	0,5
Fate of exhaust HEPA filtered air	Recirculation - into the laboratory (30%) - into the cabinet (70%)		Hard ducted towards outside (70%; 30% recirculated into cabinet)	Hard ducted towards outside (100%, no recirculation)
Work with volatile toxic and radioactive materials	No	No* (Yes, minute amounts if ducted outside through exhaust canopy / thimble)	Yes (but traces of radioactive material only)	Yes
	Type A (no longer produced)	Type B	No EN equivalent	No EN equivalent
EU standard EN 12469:2000				

* could be ducted out the building by a THIMBLE connection (less energy consuming than hard duct)

§ additional blower needed to maintain air flow velocity; more vulnerable to exhaust variation (second blower)

References:

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