Basler & Hofmann

Maintenance handbook for BSL-2 and BSL-3 laboratories
In accordance with ContainO and PEMO

Appendix 1

Safety level 3 laboratories

Excel tables are provided as an Appendix to the maintenance handbook. They show the requirements for the maintenance and inspection journals, and give explanations and examples for consistent further development.

Maintenance and inspection journals are given for all safety-relevant systems, structured according to safety level 2 and 3 laboratories. They may be completed with reference to the SWKI guidelines or in collaboration with the specialist companies.

The Excel tables are weighted towards ventilation systems, as experience has shown that these are the priority for maintenance and inspection journals.

Maintenance and inspection

Name of system / component

Company: _____
Person responsible: _____
Place / date:

Location: _____
Facility: _____
Commissioning

Function

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Checks													
	Reliability													
	Safety measure													
	Disposal													
	Notes													

Key:
T = Daily
W = Weekly
M = Monthly
V = Quarterly
H = Semi-annually
J = Annually
2J= Biennially
Z = As required
A = ……

Maintenance and Inspection Schedule

Year: ____________

Company: ______________________________ Location: ______________________________

Person responsible: ______________________________ Facility: ______________________________

Place / date: Commissioning:

Code	Part	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
carried out by / signed: ……………………………..																																																							
Date: ……………………………..																																																							

Maintenance and inspection

Surfaces surrounding BSL-3 lab areas

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

Integrity is necessary for the surfaces surrounding BSL-3 laboratories, so that they may be fumigated / decontaminated.

Checks

Check surface conditions of epoxy resin on concrete wall / floor for damage
Check door seal (inflatable or rigid) for damage
Check windows (e.g. bulletproof, fire protection class etc.) for damage
Check seals to wall penetrations for damage

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Observe manufacturer's instructions.

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Walls													more detail needed
	Ceiling													in work sheets for
	Floor													individual parts
	Doors													
	Windows													
	Penetrations													

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Maintenance and inspection

Wastewater deactivation plant

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

BSL-3 laboratories should generally be run as dry labs and not as wet labs.
If a wastewater deactivation plant is necessary, it may be desgined as a thermal or chemical installation, depending primarily from the use of the laboratory for microbiology.

Checks

Check storage tank, catch basin and pipework for damage, corrosion and fastening
Check for watertightness
Check insulation for damage
Check drains for corrosion and damage
Check temperature and pressure gauges for damage and accuracy of display

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Wastewater deactivation													more detail needed
	Effluent tanks													in work sheets for
	Water pipes and accessories													individual parts
	Shut-off device													
	Anti-flooding devices													
	Drainage pump													
	Catch basin													
	Decontamination													
	Valve controls													
	HEPA filter													

Key: T = Daily; W = Weekly; M = Monthly; V = Quarterly; H = Semi-annually; J = Annually; 2J= Biennially; Z = As required; A = ……

Maintenance and inspection

Service water network

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

A holding tank should be provided for mains separation between drinking water and service water (BSL-3 laboratory separate from remaining drinking water supply), according to the state of technology. A pressure booster and water heating for service water for lab sinks, eye showers and emergency showers may be needed, depending on use.

Checks

Check holding tank, water pipes and accessories for damage, (external) corrosion and fastening
Check insulation for damage and completeness
Check for watertightness (visual check)
Check sections of pipes for incrustation

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Corrosion	Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Holding tank													more detail needed
	Water heater													in work sheets for
	Pressure booster													individual parts
	Water pipes and accessories													
	Shut-off device													
	Service water pump													
	Eye showers													
	Emergency showers													

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Maintenance and inspection

Compressed air supply

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

A compressed air supply system generally consists of compressors, buffer tanks, pressure monitoring equipment, compressed gas cylinders, automatic switching station, removal station, and where applicable, HEPA filter

Checks

Check for damage
Check oil level
Top up oil
Replace oil
Check functioning of compressor

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Compressors													more detail needed
	Buffer tanks													in work sheets for
	Pressure monitoring													individual parts
	Compressed gas cylinders													
	Automatic swtiching stations													In accordance with
	Removal station													manufacturer's instructions
	Where applicable, HEPA filter													In accordance with Swiss
														Standard

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Maintenance and inspection — *Carbon dioxide supply*

Company: _____ Location: _____
Person responsible: _____ Facility: _____
Place / date: Commissioning:

Function

Carbon dioxide supply systems generally consists of compressed gas cylinders, automatic switching station, gas failsafe device, removal station, non-return valve, and, where applicable, HEPA filter

Checks

Check installation for damage, dirt, corrosion
Check oil level
Top up oil
Replace oil
Check functioning of compressed gas cylinders

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Compressed gas cylinders													more detail needed
	Automatic switching station													in work sheets for
	Gas failsafe device													individual parts
	Removal station													
	Non-return valve													In accordance with
	Where applicable, HEPA filter													manufacturer's instructions
														In accordance with Swiss
														Standard

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Maintenance and inspection

Liquid nitrogen supply

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

Liquid nitrogen supply systems generally consist of the following components: Tank installation with filling level and pressure monitoring, pipes, shut-off valve and an oxygen deficiency warning system in the lab area.
The filling station is situated outside containment

Checks

Check tank installation for damage, dirt, corrosion
Check functioning of filling level monitoring
Check functioning of pressure monitoring
Check pipes and check functioning of insulation
Check functioning of oxygen deficiency warning system

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Corrosion	Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Tank installation													more detail needed
	Filling level monitoring													in work sheets for
	Pipes													individual parts
	Oxygen deficiency warning system													
	Filling station													In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

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Maintenance and inspection

Fire extinguishing system

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

National legislation on fire safety requires fire extinguishers to be provided. Sprinkler systems should be avoided if possible because of contamination through extinguishing water. In some cases, coordination with the fire service responsible is necessary. Should the fire service require sprinkler or spraymist systems in addition to fire extinguishers, a wastewater deactivation plant should be planned for the extinguishing water.

Checks

Check sprinkler for coatings
Check sprinkler settings
Check pressure vessels for tightness
Check functioning of shut-off device and safety equipment
Check pressure relief and shut-off valves in the expansion line

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Corrosion	Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Fire extinguishers													In accordance with
	Sprinkler systems													manufacturer's instructions
	Spraymist systems													

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Maintenance and inspection *Steam generator*

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

A separate steam generator may be needed for autoclaves, if they do not have their own electric steam generation. The steam quality must be coordinated with water treatment. Heat extraction between untreated and pure steam generation may be used for autoclaves to save energy.

Checks

Check steam generator for dirt, damage and corrosion
Check functioning of solenoid valve
Check functioning of heating rods
Check functioning of water supply, and check water level
Check functioning of control valve

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Untreated steam generator													more detail needed
	Pure steam generator													in work sheets for
	Heat exchanger													individual parts
	Stainless steel pipes													
	Condensation line													In accordance with
	Burner													manufacturer's instructions
	Burner fan													In accordance with Swiss

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Maintenance and inspection

Air-conditioning system (AC) Supply air

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

Conditioning of external air, temperature regulation of supply air to room conditions, regulating humidity of supply air to room conditions, filtering supply air
Supply air systems possibly with redundancy (if user requires); air-conditioning systems (heating, cooling, humidifying, dehumidifying); heat recovery; silencing; supply air filter (2-level); pressure monitoring for filters and ducts; cooling pipes; volume flow controller for supply air.
Users of BSL-3 laboratories may require a redundant second supply air system.

Checks

Check underpressure in lab area
Check condensate tray and droplet separator for dirt, corrosion and functioning
Check directed air current into laboratory
Check fan for dirt, damage and corrosion
Clean fan parts and drains that are in contact with air to preserve function

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
L01	Device / monobloc housing													more detail needed
L11	Coarse dust filter													in work sheets for
L12	Fine dust filter													individual parts
L21	PWW fan heater													
L24	Air cooler													In accordance with
L33	Heat recovery grid system													manufacturer's instructions
L42	Radial fan													In accordance with Swiss
L44	Motor													Standard
L45	Belt drive													
L46	Fan/motor bearings													
L47	Frequency converter													
L57	Steam humidifier													
L74	Volume flow controller													
L81	Air duct system													
L82	Air intake opening													
L83	Weatherproofing													
L84	Air outlet													
L88	Fire damper													
L92	Electrical controls													
L93	Measurement/control peripherals													
L94	Switchgear combination													

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Maintenance and inspection

Air-conditioning system (AC) Exhaust air

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

Exhaust air systems for BSL-3 laboratories should be designed with redundancy. The exhaust air system should include heat recovery; silencing; exhaust air filter to protect heat recovery; pressure monitoring for filters and ducts; cooling pipes; volume flow controller for exhaust air

Checks

Check heat exchanger for dirt, damage and corrosion

Check air filters for inadmissible dirt and damage (leakage); replace the air filter in question if filter stage was last replaced less than 6 months ago; otherwise replace the entire filter stage

Check differential pressure; if necessary replace filter stage

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Corrosion	Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
L01	Device / monobloc housing													more detail needed
L11	Coarse dust filter													in work sheets for
L33	Heat recovery grid system													individual parts
L42	Radial fan													
L44	Motor													In accordance with
L45	Belt drive													manufacturer's instructions
L46	Fan/motor bearings													In accordance with Swiss
L47	Frequency converter													Standard
L74	Volume flow controller													
L81	Air duct system													
L83	Weatherproofing													
L84	Air outlet													
L88	Fire damper													
L92	Electrical controls													
L93	Measurement/control peripherals													
L94	Switchgear combination													

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Maintenance and inspection

AC system: HEPA filter ffor exhaust air system

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

BSL-3 laboratories should have at least a separate particulate filterbox (HEPA) for the exhaust air side.HEPA filter class may be H13 or H14 or higher, depending on work done in lab.Prefilters should be provided to protect the HEPA filter and extend its operating life. There should be pressure monitoring for the filters.Gastight or airtight flaps with fumigation ports or filter replacements / filter testing devices should be provided.

Checks

Check prefilter and HEPA filter for inadmissible dirt and damage (leakage)
Replace the air filter in question if permissible differential pressure has been reached, or if filter stage was last replaced less than 6 months ago. Then replace the entire filter stage
Before replacing filter, decontaminate by fumigation or replace filter through BIBO

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Corrosion	Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
L01	Device / monobloc housing													more detail needed
L11	Coarse dust filter													in work sheets for
L12	Fine dust filter													individual parts
L13	HEPA filter													
	Gastight flaps													In accordance with
	BIBO filter exchange													manufacturer's instructions
	Filter scanning device													In accordance with Swiss
L81	Air duct system													Standard

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Maintenance and inspection

Refrigeration for air coolers in AC system

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

Cold water generation with a recooling plant (and possibly split units) should be provided for temperature control in the laboratory; possibly also with redundancy if user requires.

Checks

Check piston, screw and turbo compressors for external dirt, damage and corrosion
Check fastening and running noise
Measure suction pressure
Measure suction gas temperature before compressor
Measure final compression pressure

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
K01	Alarm system													more detail needed
K02	Energy meter													in work sheets for
K12	Piping / fittings													individual parts
K21	Expansion devices													
K24	Pressure expansion tank													In accordance with
K41	Frequency converter													manufacturer's instructions
K45	Wet rotor pump													In accordance with Swiss
K67	Dry heat exchanger													Standard
K92	Compressor piston													

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Maintenance and inspection

Emergency power supply, UPS / battery system

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

An emergency power supply should be provided for the safe operation of a BSL-3 laboratory. Additionally, a UPS / battery system should be planned. Users should be consulted in advance about which installations they require to be linked to the emergency power supply and which to the battery system.

Checks

Check functioning of emergency power supply, check for damage, and check environmental conditions

Check accumulator and charging device for dirt, damage, corrosion and functioning, and check environmental conditions

Clean

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Emergency power supply													more detail needed
	Accumulator													in work sheets for
	Charging device													individual parts
	Cables, pipes, rails													
	Electrical protective measures													In accordance with
														manufacturer's instructions

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Maintenance and inspection *Power supply*

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

The power supply for BSL-3 laboratories should include at least the following components: general power supply; standby power supply; safety power supply (user-specific); where applicable, generator or accumulators

Checks

Check generator for functioning, dirt, damage and corrosion
Clean
Lubricate bearings
Check state of slip rings, carbon brushes and brush holders
Check switchgears for dirt, damage and corrosion

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Generator													more detail needed
	Accumulators													in work sheets for
	Low-voltage switchgear													individual parts
	Reactive current compensation system													
	Electrical subdistributors													In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

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Maintenance and inspection

Lighting / emergency lighting / safety lighting

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

Central battery for safety lighting
Individual or group batteries for safety lighting
Uninterruptible power supply (UPS)
Normal use (e.g. management, active components)

Checks

Check work safety installation for completeness, damage and if necessary for functioning (e.g. voltmeter, actuating rods, replacement fuses, earthing components, warning signs)
Check functioning of room lighting and safety lighting
Check that electrical connections including connections of busbars are mechanically

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Central battery													more detail needed
	UPS													in work sheets for
	Emergency lighting													individual parts
	Safety lighting													
														In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

Key: T = Daily; W = Weekly; M = Monthly; V = Quarterly; H = Semi-annually; J = Annually; 2J = Biennially; Z = As required; A = ……

Maintenance and inspection *Telephone system*

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

A telephone system in BSL-3 containment should include the following components: handsets, switchboard and junction boxes

Checks

Check functioning of handsets, check speech intelligibility
Check functioning of loudspeakers
Check cables for damage and perfect functioning in junction boxes

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Handsets													more detail needed
	Switchboard													in work sheets for
	Junction boxes													individual parts
														In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

Key: T = Daily; W = Weekly; M = Monthly; V = Quarterly; H = Semi-annually; J = Annually; 2J = Biennially; Z = As required; A = ……

Maintenance and inspection

Door intercom and door opening systems

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

A door intercom and door opening system in BSL-3 containment should include the following components: loudspeaker, scanners, coder and card reader

Checks

See also telephone system, access control system

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Loudspeaker													more detail needed
	Scanner													in work sheets for
	Coder													individual parts
	Card reader													
														In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

Key: T = Daily; W = Weekly; M = Monthly; V = Quarterly; H = Semi-annually; J = Annually; 2J = Biennially; Z = As required; A = ……

Maintenance and inspection

Electroacoustic alarm system

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

An electroacoustic alarm system in BSL-3 containment should include the following components: electroacoustic alarm, movement sensors (including those for access control, intruder detection and CCTV)

Checks

Check alarm switchboard for dirt, damage and corrosion
Check UPS for dirt, damage and corrosion
Check loudspeakers and connection boxes for damage
Check all loudspeakers for acoustic function, lack of distortion and speech intelligibility
Check functioning of amplifiers

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Alarm system													more detail needed
	Movement sensors													in work sheets for
														individual parts
														In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

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Maintenance and inspection

Hazard alert and alarm systems

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

A hazard alert and alarm system in BSL-3 containment should include the following components: alarm systems for fire, attack, break-in, manned guarding systems, access control systems, and surveillance systems

Checks

See below
Fire alarm system
Intruder detection system
Access control system

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Corrosion	Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
														more detail needed
														in work sheets for
														individual parts
														In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

Key: T = Daily; W = Weekly; M = Monthly; V = Quarterly; H = Semi-annually; J = Annually; 2J = Biennially; Z = As required; A = ……

Maintenance and inspection

Fire alarm system

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

New laboratory buildings should be equipped with a fire alarm system throughout. It should include a PA system for all lab areas, so that instructions can be given in the event of an evacuation.

Checks

Check switch and display elements for dirt, damage and corrosion
Check functioning of trigger and display elements in the fire alarm system
Check message transfer settings in the fire alarm system

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Corrosion	Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Switch elements													more detail needed
	Trigger elements													in work sheets for
	Display elements													individual parts
	Smoke and fire detectors													
														In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

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Maintenance and inspection

Intruder detection system

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

An intruder detection system in BSL-3 containment should include the following components: surveillance of external doors; surveillance of ground-floor and first-floor windows; surveillance of entrances to lab area and special areas

Checks

Check loudspeaker system
Check functioning of amplifier
Check functioning of peripherals
Check functioning of loudspeaker circuits
Check speech intelligibility

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Loudspeaker													more detail needed
	Amplifier													in work sheets for
	Movement sensors													individual parts
														In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

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Maintenance and inspection

Access control system

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

Measures should generally be taken to counter hazards caused by third parties, e.g. vandalism, sabotage or theft. Building security systems (intrusion and hold-up detection systems), intercoms, CCTV, and access control systems cover these requirements.

Checks

Check functioning of control panel, check for dirt, damage, corrosion and environmental conditions
Check functioning of card reader
Check functioning of electrical door openers
Check card reader for dirt, damage, corrosion and environmental conditions

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Scanners													more detail needed
	Coder													in work sheets for
	Card reader													individual parts
														In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

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Maintenance and inspection *CCTV*

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

A CCTV system in BSL-3 containment should include the following components: External CCTV; internal CCTV; movement sensors (including those for access control and intruder detection systems)

Checks

Check video cable for damage and perfect functioning in connection boxes with pivot frames

Measure parameters and record all connections from the camera boxes and all other peripheral connection points to central engineering room

Check movement sensors for each line for dirt, damage and fastening

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Cameras													more detail needed
	Movement sensors													in work sheets for
	Video cable													individual parts
														In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

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Maintenance and inspection — *Class II safety cabinet*

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

EN 12 469 certified; ISO 14644-1; depending on type, fixed connection to duct network or discharge into laboratory; locking / control through AC system; locking sliding window with UV light; type with HEPA filter

Checks

Check fan for dirt, damage and corrosion,
Check differential pressure in HEPA filter; replace filter if necessary, observing safety guidelines
Check locking of sliding windows under UV light
Check and measure air flow through sliding window into safety cabinet

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Body of safety cabinet													more detail needed
	HEPA filter													in work sheets for
	Fan													individual parts
	UV lighting													
														In accordance with
														manufacturer's instructions

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Maintenance and inspection

Class III safety cabinet

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

EN 12 469 certified, ISO 14644-1
Locking / control through AC system should be observed for Class III safety cabinets
Possible combination with Class II safety cabinet advantageous

Checks

Check protective gloves for damage and seal
Check differential pressure in HEPA filter; replace filter if necessary, observing safety guidelines
Check connections for supply and exhaust air to the AC system

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Corrosion	Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	HEPA filter													more detail needed
	HEPA Filter													in work sheets for
	Ventilator													individual parts
	Protective gloves													
														In accordance with
														manufacturer's instructions

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Maintenance and inspection *Pass-through locks*

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: _____ Commissioning: _____

Function

Attention should be paid to the following for pass-through locks: controls, gastight doors, body (material + seal), any UV tubes, automatic fumigation device

Checks

Check door locking
Check connection for fumigation device
Check UV tube lock with door opening

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Corrosion	Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Door lock													more detail needed
	Body of lock													in work sheets for
	any UV tube													individual parts
	Controls													
	Gastight doors													In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

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Maintenance and inspection *Dunk tanks*

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

Attention should be paid to the following fo dunk tanks: Locking of dunk tank doors; intercom system where applicable; drain for disinfectant

Checks

Check locking of flaps
Check intercom system
Check disinfectant drain and clean where applicable

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Door lock													more detail needed
	Body of lock													in work sheets for
														individual parts
														In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

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Maintenance and inspection — *Pass-through autoclaves*

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

Attention should be paid to the following for pass-through autoclaves for BSL-3 applications: Steam or electric steriliser; sterilisation of condensate; gastight installation (bioseal); door lock; filter for steam and exhaust air (type); temperature range up to 134 °C (prions); volumes for sterilisation

Checks

Check sterilisation using bioindicator
Check drainage of condensate water
Check door locking
Check filter for steam and exhaust air (type)
Check temperature range to be used

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Body of autoclave													more detail needed
	Steam steriliser													in work sheets for
	Door lock													individual parts
														In accordance with
														manufacturer's instructions

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Maintenance and inspection *Fumigation devices*

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

Generally, separate devices coordinated with the particular ventilation systems.

Devices are not considered individually. Please refer to the instructions for use and the declaration of conformity supplied with the equipment.

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Corrosion	Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
Checks														In accordance with
														manufacturer's instructions
Reliability														
Safety measure														
Disposal														
Notes														

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Maintenance and inspection

Material airlocks for large equipment

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

Attention should be paid to the following for material airlocks: Controls / locking, gastight doors, connections, body (material + seal)

Checks

Check door locking
Check connection for fumigation device
Check intercom system

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Door lock													more detail needed
	Body of lock													in work sheets for
														individual parts
	Controls													
	Gastight doors													In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

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Maintenance and inspection

Building automation

Company: _____ Location: _____

Person responsible: _____ Facility: _____

Place / date: Commissioning:

Function

Building control technology should have, at least, interfaces to fire alarm and access control systems, measurement and control technology, and AC systems.
For BSL-3 facilties, it is also advisable for information to be relayed to central building control, doorman or safety control centre.

Checks

Check control cabinets, control panels and controls for correct and appropriate installation, and check environmental conditions
Check for dirt, damage and corrosion
Check protective covers for completeness and fastening
Clean

Reliability

Safety can be ensured only if the supplier's instructions are observed.

Safety measure

Disposal

Disposal must be carried out in a correct and environmentally sound way. Please consult supplier for advice on correct and environmentally sound disposal.

Notes

Maintenance / inspection plan

Code	Individual part	Task: Check: State	Check: Corrosion	Check: Tightness	Functioning	Clean	Lubricate	Replace	Vent	Empty	Adjust	Special instructions	Official regulations	Part no. / Note
	Master computer													more detail needed
	Control cabinet													in work sheets for
	Manual operating control													individual parts
														In accordance with
														manufacturer's instructions
														In accordance with Swiss
														Standard

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