Production Resumption

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1 Introduction

The goal of this document is to provide studios with workflow-related information to assist with restarting film production activities halted due to Covid-19 orders and health concerns. We list the various categories of work activities typically involved in film production, both on-set and off-set. For each category of work, we describe some key characteristics and workflow-specific considerations that may be relevant to the development of health and safety guidelines for that activity. Finally, we provide checklists of questions to answer that are relevant across film workflows.

This document does not provide or recommend any specific health and safety guidelines for the work activities described. We understand that joint efforts involving industry, labor and the government around health and safety guidelines and working conditions are actively ongoing with advice from medical experts on communicable diseases. Our goal is to provide a map of production-related work activities, along with relevant information about each of those activities, that will assist in the development of those guidelines.

Of necessity, we have made assumptions about what types of workflow information will be helpful to health and safety professionals. Where possible, we also have provided references to industry-specific sources of information that may assist with their work. But our goal is always to provide the relevant context and usage information to assist in their work, not to propose or dictate any specific health and safety requirements or working conditions.

2 Methodology and Organization

Section 3 below sets out key considerations and work characteristics that may be relevant to development of health and safety guidelines. We attempt to describe the considerations as precisely as possible to avoid ambiguity. Section 4 provides lists of editorial, VFX, and post-production work activities and specific considerations and work characteristics relevant to that activity. Section 5 addresses principle photography operations. Section 6 addresses virtual production, pre-visualization, and on-set capture. Appendix A describes general checklists of considerations that may be relevant to multiple categories of work activities. Appendix B provides references to information on equipment cleaning that may be helpful to health and safety guidelines. Appendix C provides some additional technical references on other potential cleansing technologies.

Activities common with other industries such as standard office environments and IT data centers are not addressed. It is assumed that suitable guidelines exist elsewhere.

3 Characteristics of Workplaces and Activities

To help standardize the characterization of various work activities, we have defined categories of descriptive information that we anticipate will be most useful to the development of health and safety guidelines. Specifically, we categorized all work activities according to the following criteria:

- Type of space in which the work occurs
- Typical working distances between personnel in each activity
- Expected levels of interpersonal contact
- Types of equipment used

- Rough characterization of how the equipment is used and expected levels of contact with personnel
- Expected level of sharing of equipment among personnel
- Cleansing methods that may be appropriate for different types of equipment

Where possible, we have relied upon documented sources for categorizations that would be most useful to health and safety experts. Where not available, we have provided rough descriptive information that can be refined as needed for the development of guidelines. All of the categorizations and descriptions apply to typical workflows in place prior to Covid-19 orders and health concerns.

3.1 Working distances

Close	6 feet or less
Near	6 feet to 15 feet
Proximity	> 15 feet

Rational for distances used:

- 6 feet (2 meters): This is the separation distance in public health recommendations.
- 15 feet: Empirical evidence has been published by accredited sources that indicates that cough aerosols can travel at least 12 feet. At the Florida Atlantic University, researchers using mechanically generated aerosols demonstrated transmission up to 12 feet. Research into the time that cough aerosols hang in the air indicates that air flow is also a factor.

Sources:

- Stay 6 Feet Apart. Simulated Cough Reveals That May Not be Enough. Manhar D, Ph.D. April 2020. http://www.fau.edu/newsdesk/articles/mechanical-cough-coronavirus.php
- A Novel Method and Its Application to Measuring Pathogen Decay in Bioaerosols from Patients with Respiratory Disease. Graham R. Johnson et al. (Peer reviewed paper) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4936712/

3.2 Categorization of Spaces

Space	**Example**
Enclosed Interior	A room
Open Interior	A sound stage
Confined Exterior	An alley behind a building
Open Exterior	A football field

Source:

- Common use

3.3 Interpersonal Contact

This categorization addresses how each person comes into contact with others. For this purpose, a group is people working together such as a department, a team or a crew (e.g., camera crew).

Other than the category Ad Hoc Grouping, being a member of a group means that an individual spends most of their time working with others who are members of the same group.

Category	Description
Ad Hoc Groups	Individuals who work in groups where they come together to complete a task
Inter Group	Individuals in a group who have contact with people in other groups
Intra Group	Individuals whose contact with others is largely limited to people in the same group
Mobile	An individual who routinely comes in regular contact with people from different groups
Limited	Individual with limited direct contact with others

Reference:

- Community Mitigation Guidelines to Prevent Pandemic Influenza — United States, 2017, CDC, https://www.cdc.gov/mmwr/volumes/66/rr/rr6601a1.htm.
- Pandemic spread simulation, https://learningsim.itch.io/pandemic-spread-simulation
- Community Flu 2.0, CDC https://www.cdc.gov/flu/pandemic-resources/tools/communityflu.htm
- Simulating the Effect of Quarantine on the Spread of the 1918–19 Flu in Central Canada, Bulletin of Mathematical Biology, Lisa Sattenspiel, Ann Herring, https://link.springer.com/article/10.1006/bulm.2002.0317

3.4 Equipment Use Levels

Level of Use	Notes
Common	Used by two or more people simultaneously (no opportunity for cleansing)
Shared	Used by two or more people in turn (some opportunity for cleansing)
Re-deployed	Used by two or more people at different times (cleansing can occur between uses)
Single User	Used by only one person (e.g., a user's laptop)

Source:

- Common use

3.5 Equipment Contact

Level of Contact	Notes
High Contact	Close to face or in contact with face.
Normal Contact	Touched with bare hands
Low Contact	Typically handled with gloves or Mechanical lifting device or installed in equipment rack.

Frequency of Contact	Notes
High Frequency + Multiple People	Item is touched frequently by multiple people with little or no opportunity for cleansing between contact.
Low Frequency + Multiple People	Item is touched by multiple people with opportunity to cleanse between contact.

Single Person	Item is touched only by one person and can be cleansed before contact. For example, a workstation that is shared between people working different shifts.

Reference:

- How COVID-19 Spreads, CDC https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html

3.6 Equipment Characterization

Equipment	**Example and notes**
Active Ventilation	Computer workstation with fan
Unsealed	Keyboard
Sealed (not necessarily airtight)	Portable SSD drive, sealed other than for connectors
Electrical (non-porous surface)	A light used on-set
Mechanical (non-porous surface)	A light stand
Specialized	A microphone. For equipment in this category please refer to manufacturer or other authoritative sources. (Appendix B includes some references.)

Source:

- Common use

Notes:

- Devices in the categories of Active Ventilation and Unsealed will contain crevasses or inaccessible areas. Devices in the category Sealed will usually have connectors, which are also crevasses.
- These categories do not address equipment with porous surfaces because of the wide range of such surfaces.
- This document does not include furniture because furniture includes a wide range of types of surfaces and cleansing of furniture is covered by public healthcare sources.

3.7 Standard Equipment Bundles

To reduce repetition, this document employs the following terminology to mean the primary piece of equipment and its peripherals. The list of peripherals includes common ones but should not be assumed to be complete.

Definition	Equipment Included	Equipment Characterization
Laptop	Laptop computer, mouse, power supply, cables. Not necessarily Single User. **Note**: Any laptop used with other peripherals such as a keyboard or monitor is treated as a workstation.	Active Ventilation, Unsealed, Sealed (e.g., ruggedized laptop)
Workstation	Desktop/deskside computer/workstation, monitors (may be touch), mouse, keyboard, cabling, external USB and similar hubs, speakers other than professional monitors, webcam, microphone other than headset.	Active Ventilation, Unsealed, Sealed, Mechanical, Specialized (e.g., mic)
Projector	Projector, lenses, server, control panel, workstation or laptop primarily used to control projector, cables, power supplies, surfaces of ventilation system in the vicinity of the projector, screen, mounting (including switches for raising/lowering projector and screen), lens handling system.	Active Ventilation, Unsealed, Sealed, Mechanical, Specialized (e.g., the projector itself)
Video monitoring	A monitor used exclusively for viewing content (for example a TV), dedicated playback device, cables, power supplies, converted boxes, stand. On-set and off-set.	Unsealed, Sealed (e.g., outdoor signage monitors)
Audio system	Audio system used when reviewing picture. Speakers, amplifier, small mixer/EQ, dedicated playback device, cables, power supplies, adapters.	Active Ventilation, Unsealed, Sealed, Mechanical, Specialized (e.g., speakers)
Headphones	Used for monitoring audio. Over ear, on-ear and in-ear headphones, cables, audio adapter, power supply	Unsealed, Sealed (e.g., 'sports' in headsets)
2-Way Radio	Communications radio with over the ear, on ear and in ear headphones with mic (often a boom mic or held close to mouth when speaking), cables, power supply, holder for radio.	Unsealed, Sealed (e.g., military spec)

Source:

- Common use

3.8 Categorization of Equipment Cleansing Methods

These categories define cleansing methods that MAY be possible to use to cleanse equipment without causing damage that affects the operation or safety of the equipment.

Method	Notes
Alcohol wipe	Ethyl or isopropyl alcohol. The concentration of alcohol may vary.
Household cleaners	Chemical agent is a product widely available to consumers in the US and is used in accordance with manufacturer's directions.
Contact Manufacturer	Manufacturer specifies cleansing method. References will be provided where possible

Sources:

- Public health guidelines on cleansing items.

Important notes:

1. Cleansing methods apply to the OUTSIDE of equipment and may not apply to cleansing if the enclosure is opened.
2. These are general guidelines. Test the method before use or confirm with the manufacturer.
3. Even if cleansing does not cause damage that affects the operation or safety of the equipment it may cause immediate or long-term cosmetic damage or remove labels and other marking such as on/off marking off power switches.
4. Cleansing some equipment may require it is disconnected from a power source.

Other methods of cleansing are available which are outside of the scope of this document. Information from manufacturers or other authoritative sources may provide information on their use. Examples of these methods are:

- Vapor: Unheated vapor of a chemical agent
- Steam: Steam, possibly superheated and/or with chemical agents
- Boiling water: Possibly with chemical agents
- Heat: Use of dry or moist heat, possibly with chemical agents
- UV light: There are published standards for UV sterilization in some applications.
- Penetrating radiation: Gamma radiation and electron beams are sometimes used for sterilization of food and medical devices.

References:

- Information on the Survivability of the Ebola Virus in Medical Waste, CDC, https://www.cdc.gov/vhf/ebola/clinicians/cleaning/ebola-virus-survivability.html
- 5 latest findings on UV light disinfection in hospitals, Becker's Hospital Review, https://www.beckershospitalreview.com/quality/5-latest-findings-on-uv-light-disinfection-in-hospitals.html
- Guideline for Disinfection and Sterilization in Healthcare Facilities (2008), CDC, https://www.cdc.gov/infectioncontrol/guidelines/disinfection/

(Appendix C contains some additional references regarding UV and penetrating radiation.)

3.9 Clarification of Scope

The following are out of scope of this document:

Out of Scope	Description	In Scope
Standard office environments	Offices, meeting rooms, cubicles, open plan offices, kitchen areas, computers, laptops, computer peripherals, AV systems, video and audio conferencing equipment. Those environments are covered by public healthcare sources	Spaces and equipment used for content creation including review and collaboration.
Telephones	Wired and cordless telephones	Intercoms used in work functions
Personal cell phones and tablets	Phones and tablets used exclusively by one person (typically, continually in their possession)	Tablets used in production, usually by more than one person.
Lighting	Workspace lighting and lighting control systems, work lights (e.g., lights used to illuminate stages during construction). (In screening rooms and similar, lighting controls may be on consoles placed in the seating area or on desks)	Stage and on-set lighting
Furniture	Including desk furniture such as lamps and fans including set dressing	
Items with porous surfaces	Clothing, wall coverings. Suppression or control of light such as Duvetyne, muslin and reflectors	Use of fabrics will be noted but not characterized when the use is important to the work function. Equipment with fabric coverings such as speakers, are classified as Specialized

Out of Scope	Description	In Scope
Access control systems	Locks, badge scanners, RFID. (Some biometric security systems such as retina and iris scanners may be categorized as High Contact)	
Air conditioning	Including thermostats and temperature monitoring	
Fire prevention systems	Monitoring, alarm and suppression systems.	

4 Principle Photography Operations

This section covers principle photography operations conducted on and near the set. The set may be a location or a stage. Multiple groups work on production sets, and in normal circumstances there is no need to isolate any group from others other than for purposes of security or work management. Some groups will have areas with restricted access such as dressing rooms and equipment storage.

Characterizing the interaction between groups is complicated because many groups are working in the same space at the same time even though they may not have direct contact. For example, members of the camera department have little direct interaction with the electrical department, however both groups will be working in the same area of a set at the same time.

This section is primarily organized around departments.

4.1 On-set Functions

4.1.1 Director, Assistant Directors

Metric	Category
Working distance	Close, Near
Equipment Use Level	Common, Shared, Single User
Equipment	Unsealed, Sealed
Equipment contact	Normal Contact
Equipment frequency of contact	Single person. High Frequency + Multiple People.
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior
Interpersonal contact	Mobile

Equipment	Categories
Laptop	Equipment Bundle
2-way radio	Equipment Bundle
Tablet	Unsealed, Sealed
Headphones	Equipment Bundle

Notes:

- Interacting with cast and some members of the crew is important to the director's job
- Interacting with almost everyone on a set is an important part of the AD's job

Other considerations:

- Is it possible to reduce the amount of contact the director and ADs have with crew members?

4.1.2 Camera Department

Metric	**Category**
Working distance	Close, Near
Equipment Use Level	Common, Shared
Equipment contact	High Contact, Normal Contact, Low Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior
Interpersonal contact	Ad Hoc Groups, Intra Group, Inter Group

Equipment	**Categories**
Digital cinema cameras	Active Ventilation, Unsealed
Lenses	Specialized
Recording devices	Active Ventilation, Unsealed, Sealed
Camera equipment (gak)	Electrical, Mechanical
Focus control	Specialized
Dollies and tripods	Specialized
Steadicam rig	Specialized
Video monitoring	Equipment Bundle
Viewfinders	Unsealed
Remote control (typically a tablet)	Unsealed, Sealed
Slate board	Unsealed, Sealed, Mechanical
Cables	Electrical
Light meters	Specialized
Physical media (e.g., data cards)	Specialized

Notes:

- Digital cinema cameras are delicate, expensive and mission critical. Appendix B includes links to guidance for cleaning cameras (in the sense of direct removal) but cleansing guidance may not be available from trustworthy sources.
- Dollies are handled by the grip department.

Other considerations:

- Eyepieces are High Contact equipment; can they be issued to each camera operator and the DoP?

- How are cameras, lenses and other camera department equipment transported? For example, most equipment cases have linings made of porous material.
- Can contact between the camera department and other groups be minimized?
- Can a protocol be established for cleansing recordable media?
- Who handles camera department equipment during transportation?

4.1.3 Sound Department

Metric	Category
Working distance	Close, Near, Proximity
Equipment Use Level	Common, Shared, Single User
Equipment contact	High Contact. Normal Contact.
Equipment frequency of contact	Single User. High Frequency + Multiple People
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior.
Interpersonal contact	Ad Hoc Groups, Mobile

Equipment	Categories
Laptop	Equipment Bundle
Workstation	Equipment Bundle
2-way radio	Equipment Bundle
Tablet	Unsealed, Sealed
Sound mixer	Specialized
Video monitoring	Equipment Bundle
Operator headphones	Equipment Bundle
'Guest' headphones	Equipment Bundle
Audio system	Equipment Bundle
Sound recorder	Specialized
Boom microphones	Specialized
Lavalier microphones	Specialized
Other microphones	Specialized
Wireless audio	Specialized
Dead cat wind shields	Specialized
Physical media (e.g., data cards)	Specialized
Cart	Electrical, Mechanical
Boom	Mechanical
Cables	Electrical

Considerations

- Since microphones can come into close contact with performers, can the manufacturer or an audio equipment specialist advise on a method to cleanse microphones without damaging them?

- If dead cat windshields are used in the close proximity of performers, can they be assigned to individual performers?

4.1.4 Video Assist, DIT

Metric	Category
Working distance	Close, Near
Equipment Use Level	Common, Shared, Single User
Equipment contact	Normal Contact.
Equipment frequency of contact	Single User. High Frequency + Multiple People
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior.
Interpersonal contact	Ad Hoc Groups, Mobile

Equipment	Categories
Laptop	Equipment Bundle
Workstation	Equipment Bundle
2-way radio	Equipment Bundle
Tablet	Unsealed, Sealed
Video monitoring	Equipment Bundle
Headphones	Equipment Bundle
Video recorder	Active Ventilation, Unsealed
Physical media (e.g., data cards)	Specialized
Data card readers	Unsealed
Cart	Electrical, Mechanical

Notes:

- These groups often work in tents or under canopies that reduce ambient lighting to facilitate viewing video monitors. This may be the case even if the shoot is taking place on a stage.
- The function of video assist is to provide playback of takes for immediate review.
- One of the DIT's responsibilities is 'look' management which includes playing back camera footage for the DoP's review.
- DIT and video assist carts invariably have power distribution and often have battery backup.

Other considerations:

- Can video assist or the DIT cart be placed at a distance from the video monitors used for review?
- Can additional monitors be used to reduce or eliminate the need for cast and crew to gather to review footage?

4.1.5 Script Supervisor

Metric	Category

Working distance	Close, Near
Equipment Use Level	Single User
Equipment contact	Normal Contact
Equipment frequency of contact	Single User. High Frequency + Multiple People
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior
Interpersonal contact	Mobile

Equipment	**Categories**
Laptop	Equipment Bundle
Workstation	Equipment Bundle
2-way Radio	Equipment Bundle
Tablet	Unsealed, Sealed
Video monitoring	Equipment Bundle
Headphones	Equipment Bundle
Video recorder	Active Ventilation, Unsealed
Video adapter (e.g., multi-viewer)	Unsealed, Sealed
Physical media (e.g., data cards)	Specialized

Other considerations:

- Is it possible to limit the contact the script supervisor has with other crew members?

4.1.6 Stunt Department, Effects Department

Metric	**Category**
Working distance	Close, Near, Proximity
Equipment Use Level	Common, Shared, Re-deployed
Equipment contact	High Contact, Normal Contact, Low Contact
Equipment frequency of contact	Single User. High Frequency + Multiple People
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior
Interpersonal contact	Ad Hoc Groups, Inter Group, Mobile

Equipment	**Categories**
Laptop	Equipment Bundle
Workstation	Equipment Bundle
2-way radio	Equipment Bundle
Tablet	Unsealed, Sealed
Headphones	Equipment Bundle
Video adapter (e.g., multi-viewer)	Unsealed, Sealed
Stunt equipment and rigging	See note

Note:

- The work of the stunt department is shaped entirely by the nature of the stunts required for the scene and there is a high degree of variability which prevents characterization of stunt work. Stunt departments work with an enormous range of equipment that cannot be covered here and are best addressed on a case by case basis.

Other considerations:

- Can practical stunts and FX be replaced with digital ones?

4.1.7 Electrical and Grip

Metric	**Category**
Working distance	Close, Near, Proximity
Equipment Use Level	Common, Shared, Re-deployed
Equipment contact	Normal Contact, Low Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior
Interpersonal contact	Intra Group, Inter Group, Mobile

Equipment	**Categories**
Laptop	Equipment Bundle
2-way radio	Equipment Bundle
Tablet	Unsealed, Sealed
Generators	Specialized
Lighting board	Specialized
Distribution panels	Specialized
Lights	Electrical, Specialized
Light stands, etc.	Mechanical
Light modifiers (e.g., reflectors, scrims)	Mechanical, Specialized
Camera dolly	Specialized
Cabling	Electrical
Carts	Mechanical

Notes:

- Light modifiers are often made from porous material.

4.1.8 Construction Department, Greensman

Metric	**Category**
Working distance	Close, Near, Proximity
Equipment Use Level	Common, Shared, Re-deployed, Single User
Equipment contact	Normal Contact, Low Contact
Equipment frequency of contact	High Frequency + Multiple People

Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior
Interpersonal contact	Intra Group, Inter Group, Mobile

Equipment	**Categories**
Laptop	Equipment Bundle
2-way radio	Equipment Bundle
Tablet	Unsealed, Sealed
Measurement devices	Sealed, Unsealed, Mechanical
Tools	Electrical, Mechanical
Carts	Mechanical

Notes:

- During set construction, the working space may be very confined.

Other considerations:

- Can physical sets be replaced by or supplemented by virtual sets?

4.1.9 Props Department, Set Decorator

Metric	**Category**
Working distance	Close, Near, Proximity
Equipment Use Level	Common, Shared, Re-deployed, Single User
Equipment contact	Normal Contact, High Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior
Interpersonal contact	Intra Group, Inter Group, Mobile

Equipment	**Categories**
Laptop	Equipment Bundle
2-way radio	Equipment Bundle
Tablet	Unsealed, Sealed
Measurement devices	Sealed, Unsealed, Mechanical
Props	See note
Carts	Mechanical

Notes:

- The props department and the set decorator handle a wide range of types of objects which should be assessed on a case by case basis.
- Performers' contact with props may be in the High Contact category.

- Cleansing props cannot be generalized. They can be made from a wide variety of materials including both porous and non-porous. They can be constructed with varying degrees of fragility.

Other considerations:

- Can the material used to make props be chosen to make cleansing easier or more effective?
- Who handles props off of the set, for example during transportation?

4.1.10 Costume Department

The costume department is responsible for the design, fitting, hire, purchase, manufacture, continuity and care of all costumes.

Metric	**Category**
Working distance	Close
Equipment Use Level	Common, Shared, Single User
Equipment Contact	High Contact, Normal Contact, Low Contact
Equipment Frequency of Contact	High Frequency + Multiple People
Space	Enclosed Interior
Interpersonal contact	Ad Hoc Groups, Inter Group, Intra Group

Equipment	**Categories**
Laptops	Unsealed
Cameras (still)	Specialized
Sewing machines	Electrical
Irons and steaming devices	Electrical
Drapery tools	Mechanical
Clothing racks	Mechanical
Cases for transportation	Specialized

Notes:

- Members of the costume department will come into close contact with performers including background performers.
- Costumes can be made from a wide variety of types of material, both cloth and other materials such as plastic and metal.
- Cleansing costumes cannot be generalized. Under normal circumstances costumes are cleaned for reasons of hygiene, appearance, or longevity. Some costumes can be washed, others dry cleaned and some will be too fragile to clean.

Other considerations:

- Can the material used in a costume be chosen to make cleansing easier or more effective?
- Who handles costumes during transportation?

4.1.11 Hair and Makeup

Metric	Category
Working distance	Close
Equipment Use Level	Common, Shared, Single User
Equipment contact	High Contact, Normal Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed Interior
Interpersonal contact	Ad Hoc Groups, Inter Group, Intra Group

Equipment	Categories
Laptops	Unsealed
Cameras (still)	Specialized
Styling devices	Electrical
Supplies	See note
Capes, etc.	See note

Notes:

- Hair and make-up products are outside of the scope of this document.
- Capes and similar ways of protecting clothing are porous materials and out of scope of this document.
- Almost without exception, the interaction with performers is High Contact.

4.2 Near-set operations

4.2.1 Near-set Dailies

Near-set dailies are a combination of work functions covered in Section 4, Off-set Operations

Please refer to the following sections:

- 4.2.1 Managing Physical Media
- 4.3.1 Edit Bays
- 4.3.2 Editorial Review
- 4.5.1 Small Color Correction Suites
- 4.5.2 Screening Rooms

4.2.2 Aerial Photography, UAV (Drone) Photography

Metric	Category
Working distance	Close
Equipment Use Level	Common, Shared, Re-deployed, Single User
Equipment contact	High Contact, Normal Contact, Low Contact
Equipment frequency of contact	High Frequency + Multiple People, Single person.
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior

Interpersonal contact	Ad Hoc Groups, Intra Group, Inter Group

Equipment	**Categories**
Camera, lenses, recording devices and gak	Refer to section 5.1.2, Camera Department
Video monitoring	Equipment Bundle
Wireless video link	Specialized
Remote control	Unsealed, Sealed
Camera gimbals	Specialized
Physical media (e.g., data cards)	Specialized

Notes:

- Aircraft, including UAVs, are outside of the scope of this document.

4.2.3 Location Manager

Metric	**Category**
Working distance	Close, Near
Equipment Use Level	Common, Shared, Single User
Equipment	Active Ventilation, Unsealed, Sealed
Equipment contact	Normal Contact, High Contact
Equipment frequency of contact	Single User. High Frequency + Multiple People
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior
Interpersonal contact	Ad Hoc Groups, Mobile

Equipment	**Categories**
Laptop	Equipment Bundle
Workstation	Equipment Bundle
Tablet	Unsealed, Sealed
2-way radio	Equipment Bundle
Optical devices	Specialized
Camera	Specialized

Notes:

- Physical supplies, maps, drawings, etc. are out of scope.

Considerations

- Can locations initially be scouted remotely, for example using VR technology, Google street view or accurate CG models of buildings and cities?

4.2.4 Art Department

Metric	Category
Working distance	Close, Near
Equipment Use Level	Common, Shared, Re-deployed, Single User
Equipment contact	Normal Contact
Equipment frequency of contact	Single User. High Frequency + Multiple People
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior
Interpersonal contact	Ad Hoc Groups, Intra Group, Inter Group, Mobile

Equipment	Categories
Laptop	Equipment Bundle
Workstation	Equipment Bundle
Tablet	Unsealed, Sealed
2-way radio	Equipment Bundle
Camera	Specialized

Notes:

- Physical supplies, sketches, drawings, drawing tables etc. are out of scope.

4.3 Other Departments

Functions that are not covered by this document include:

- Craft Services and Catering
- Transportation
- Physical Security

These departments make extensive use of 2-way radios.

5 Virtual Production, Pre-Viz, Geometry and Performance Capture

Virtual production, pre-viz (pre-visualization) and on-set capture using work functions from principal photography and VFX combined with Specialized techniques.

Pre-viz and virtual production create content using VFX techniques such as modeling and animation, photography, motion capture and real-time rendering. While both use real-time techniques, pre-viz is often created near-set, often before production and integrates with editorial, while virtual production is inherently treated as a production function that is virtual, requiring key talent to execute.

This section does not address the workflows and systems of virtual production that are common to principal photography and VFX.

5.1 Motion and Facial Capture

Motion (mocap) and facial capture are techniques for producing a spatial and temporal plot of a performers body or facial features.

- Facial capture uses a rig with small cameras either attached to the performers head or set up as an array to capture a performer's action outside of the production context.
- Optical Mocap uses targets (such as small white spheres or infrared LEDs) attached to a bodysuit worn by the performer and requires a large array of cameras surrounding the "capture volume."
- Inertial Mocap uses devices attached directly to a bodysuit worn by the performer to capture data in any production context.

Metric	**Category**
Working distance	Close
Equipment Use Level	Common, Shared, Re-deployed, Single User
Equipment contact level	High Contact, Normal Contact.
Equipment frequency of contact	High Frequency + Multiple People, Single User
Space	Enclosed Interior, Open Interior, Open Exterior
Interpersonal contact	Ad Hoc Groups, Intra Group

Equipment	**Categories**
Workstations	Equipment Bundle
Volumetric cameras	Specialized
Facial capture rigs	Specialized
Mocap body suits	See notes
Tablets and virtual camera rigs	Unsealed, Sealed, Specialized
Lighting	Unsealed, Electrical, Specialized
Wireless video links	Specialized
Video monitoring	Equipment Bundle
VR headsets	Specialized. See notes
Physical media (e.g., data cards)	Specialized

Notes:

- Bodysuits have porous surfaces and are outside the current scope of this document.
- Head mounted camera rigs can have porous surfaces.
- VR headsets have porous surfaces.

5.2 Spatial Scanning

Spatial scanning is the use of a system such as LIDAR to capture a digital model of the set. LIDAR captures the geometry of objects in a space by bouncing encoded low energy laser light off the objects.

Metric	**Category**

Working distance	Close, Proximity
Equipment Use Level	Common, Shared
Equipment contact level	High Contact, Normal Contact.
Equipment frequency of contact	High Frequency + Multiple People, Single User
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior
Interpersonal contact	Ad Hoc Groups, Intra Group

Equipment	**Categories**
Workstations	Equipment Bundle
Laptop	Equipment Bundle
Scanning system	Specialized
Video monitoring	Specialized
Physical media (e.g., data cards)	Specialized
2-way Radio	Equipment Bundle

Notes:

- Spatial scanning will often take place on an empty set, for example before call time or during a meal break.
- The scanning system may be fixed or may be attached to a UAV or remote-controlled vehicle.

5.3 Performer Scanning and Volumetric Video Capture

Performer scanning is the creation of a CG model of a performer. In many cases this is static. Volumetric video capture is the creation of a CG model of a performance by one or more performers. Both use an array of cameras enclosing the performers. The data from the cameras is then processed into animated CG models.

One difference between this and mocap is that performers are in costume and do not wear body suits.

Metric	**Category**
Working distance	Close
Equipment Use Level	Common, Shared, Re-deployed, Single User
Equipment contact level	High Contact, Normal Contact.
Equipment frequency of contact	High Frequency + Multiple People,
Space	Enclosed Interior, Open Interior, Confined Exterior, Open Exterior
Interpersonal contact	Ad Hoc Groups, Intra Group

Equipment	Categories
Workstations	Equipment Bundle
Real time rendering systems	Equipment Bundle. See notes
Volumetric cameras	Specialized
Tablets and virtual camera rigs	Unsealed, Sealed, Specialized
Lighting	Unsealed, Electrical, Specialized
Wireless video links	Specialized
Video monitoring	Equipment Bundle
VR headsets	Specialized. See notes
Physical media (e.g., data cards)	Specialized

Notes:

- Performer scanning usually takes place in a small enclosed green screen space with the performer surrounded.
- VR headsets have porous surfaces.

5.4 Real-Time Rendering

Real-time rendering systems produce video output that combines live input from cameras with real-time computer-generated images. Computer generated characters can be animated in real-time using motion capture.

These systems high end workstations with power graphics subsystems.

5.5 VR and Virtual Cameras

In the context of this document, virtual reality (VR) is the use of virtual reality technology in conjunction with a binocular real-time rendering system. A virtual camera is a device that is tracked in space that outputs a real-time render of a virtual scene to a video monitor or tablet. These devices may be attached to a rig that allows the user to hold it as they would a handheld camera.

What is seen on the screen of the virtual camera and the VR headset is an augmented reality view of the action on the stage combined with computer imagery generated in real time.

Metric	Category
Working distance	Close, normal
Equipment Use Level	Common, Shared, Re-deployed, Single User
Equipment contact level	High Contact, Normal Contact.
Equipment frequency of contact	High Frequency + Multiple People, Single User
Space	Enclosed Interior, Open Interior
Interpersonal contact	Ad Hoc Groups, Intra Group

Equipment	Categories
Workstations	Equipment Bundle
VR headsets	Specialized
Virtual camera rig	Sealed, Unsealed, Specialized
Wireless video links	Specialized
Video monitoring	Equipment Bundle
Physical media (e.g., data cards)	Specialized

5.6 Virtual Production Stages

Virtual production stages are conventional stages adapted for virtual production through the extensive use of green screens and Specialized lighting equipment.

6 Editorial, VFX and Post-Production

This section covers post-production, VFX, editorial and other production operations that are not on-set or near set.

"Equipment Bundle" means the equipment is categorized in the Standard Equipment Bundles subsection of section 3.

6.1 Common Functions

6.1.1 Managing Physical Media

Metric	Category
Working distance	Close, Near
Equipment use level	Shared, Re-deployed
Equipment contact level	Normal Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed Interior
Interpersonal contact	Inter-group

Equipment	Category
Workstations	Equipment Bundle
Laptop	Equipment Bundle
Portable media	Sealed, Unsealed, Active Ventilation

Considerations:

- Can physical media be eliminated by electronic transfer of files?
- Can Unsealed and Active Ventilation media be eliminated?
- Can shipped media be quarantined upon reception?

6.1.2 Server Rooms

Metric	Category
Working distance	Close, Near

Equipment use level	Common, Shared
Equipment contact level	Normal Contact.
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed Interior
Interpersonal contact	Intra Group

Equipment	**Category**
Workstations	Equipment Bundle
Laptops	Equipment Bundles
Servers	Active Ventilation
Storage	Active Ventilation
Tape machines (video and data)	Active Ventilation, Unsealed
Network switches and routers	Active Ventilation
Racks	Mechanical
Environmental monitoring and control • Air conditioning • Water, temperature, airflow monitoring • Fire prevention and suppression	Unsealed, Electrical, Sealed, Mechanical

Other considerations:

- Does server room air conditioning pose a unique challenge?
- Are High Contact access controls used?

6.2 Editorial Department

Editorial departments consist of a group of people, including editors and assistant editors, who work collectively or individually on productions. An editorial department may be devoted to a single production, for example a motion picture, or may work on multiple projects such as conformance edits of content prior to distribution.

6.2.1 Edit Bays

Metric	**Category**
Working distance	Close
Equipment use level	Common, Shared
Equipment contact level	Normal Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed Interior
Interpersonal contact	Intra Group

Equipment	Categories
Workstations	Equipment Bundle
Laptop	Equipment Bundle
Audio system	Equipment Bundle

Considerations:

- Can editorial staff continue to work remotely from their workstations (possibly within the same building)?
- Can equipment be moved away from workspaces to limit contact?
- Can editorial and other related media be sent electronically to the editorial storage system rather than through the use of physical media?

6.2.2 Editorial Review

Metric	Category
Working distance	Close
Equipment use level	Common, Shared
Equipment contact level	Normal Contact, Low Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed Interior
Interpersonal contact	Inter-group, Ad Hoc Groups

Equipment	Categories
Workstations	Equipment Bundle
Laptops	Equipment Bundle
Projectors	Equipment Bundle
Audio system	Equipment Bundle
Intercom and speaker phones	Unsealed

Considerations:

- Can editorial review be conducted remotely?
- Can a review room be made available separate from editorial work areas?

6.3 VFX

The physical contact between members of the VFX department and other groups can be minimized without significant disruption using remote approval and digital data transfer.

A VFX organization is often organized as departments around a function, e.g., modeling, lighting, rendering.

6.3.1 Artist Work Areas

Metric	Category
Working distance	Close
Equipment use level	Shared, Re-deployed, Single User
Equipment contact level	Normal Contact
Equipment frequency of contact	Single person
Space	Enclosed Interior
Interpersonal contact	Intra Group

Equipment	Categories
Workstations	Equipment Bundle
Audio system	Equipment Bundle
Desk lights, desk fan	Electrical

Other considerations:

- Can open plan work areas be replaced with single person offices or reduced in density?
- Can artists work remotely from their workstation, such is in other offices in the same building?
- Can equipment be moved away from user workspaces to limit contact?
- Can equipment (keyboard, mouse) be moved with individuals to reduce Shared contact?

6.3.2 Collaboration & Review, Screening Rooms

Metric	Category
Working distance	Close
Equipment use level	Common, Shared
Equipment contact level	Normal Contact, Low Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed Interior
Interpersonal contact	Inter-group, Ad Hoc Groups

Equipment	Categories
Workstations	Equipment Bundle
Projector	Equipment Bundle
Audio system	Equipment Bundle
Console lights	Electrical
Intercom and speaker phones	Unsealed
Webcam	Unsealed

Considerations:

- Can reviews be conducted remotely either from a different room or a different location? Can a live video be used to maintain the normal interaction during review?
- Can reviews be recorded to reduce the number of people in the review room?

- Can a review room be made available separate from work areas?
- Can a screening room be used that has significantly more capacity than the number of people taking part in the review?

6.4 Picture Post-Production

Post-Production can include a lot of collaboration between teams and the movement of multiple variants of content, sometimes with very large files that can take many hours to copy. The streaming of content to remote users, especially for final color, can be prohibitive, so users still need to be resident with the media. Fortunately, many post teams are small (less than 10 per department) and those departments can be segregated to minimize interactions. Some members of the team can continue to work remotely to minimize engagement, although the creative as noted may need to be within a professional environment to get performant access to the media.

Post-Production creative spaces can be small with many members of a team and the client together for long mixing, grading or editing sessions, making the wearing of masks and gloves uncomfortable. The rooms hosting these sessions can range from small (12’ x 12’ rooms) to larger screening theaters. Equipment is often shared between users and moved between rooms and the equipment is expensive and hard to cleanse.

6.4.1 Individual Work Areas, Small Color Correction Suites

Color correction suites with projectors should be classified as large color correction suites.

Metric	**Category**
Working distance	Close
Equipment use level	Shared
Equipment contact level	Normal Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed
Interpersonal contact	Ad Hoc Groups, Intra Group

Equipment	**Categories**
Workstations	Equipment Bundle
Audio system	Equipment Bundle
Video monitor	Equipment Bundle
Scopes	Specialized
Color Grading Panel	Active Ventilation, Unsealed

Note:

- A scope is a device used to monitor video waveforms. It has a screen and controls and is either built into a console or is a free-standing device.

Considerations:

- Can creators/clients work in different rooms of a facility with fiber channel connecting suites and remote video conferencing?
- Can suitable remotely viewing be set up?
- Can creators reduce shared equipment by users having labeled keyboards and mice that follow them between projects?
- Can the movement of equipment be minimized between sessions?
- Can embedded equipment (i.e., monitors, scopes, jog controls, mixing boards, etc.) be covered or cleansed between each session?
- How many tasks can continue to be done remotely?

6.4.2 Large Color Correction Suites, Screening Rooms, Review & Collaboration

Metric	**Category**
Working distance	Close, Near
Equipment use level	Common, Shared, Re-deployed
Equipment contact level	Normal Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed
Interpersonal contact	Ad Hoc Groups, Inter Group, Intra Group

Equipment	**Categories**
Workstations	Equipment Bundle
Projector	Equipment Bundle
Audio system	Equipment Bundle
Color correction panel	Active Ventilation, Unsealed
Scope	Specialized
Video monitoring	Equipment Bundle
Console lighting	Electrical
Intercom and speaker phones	Unsealed
Webcam	Unsealed

Other considerations:

- Can a screening room be used that has significantly more capacity than the number of people taking part in the review? Can seats be blocked out in the screening room to ensure social distancing?
- Do all attendees need to be in the same screening room?
- Can screenings be done remotely either from a different room or a different location? Can a live video be used to maintain the normal interaction during review?
- Can all consumer screenings be done online securely instead of in screening rooms?

6.4.3 Client Areas

Client areas include reception areas, guest offices, conference rooms and refreshment areas. To the extent that these spaces are standard office environments, they are outside of the scope of this document.

Where a conference room is used for review and collaboration, it is covered in the previous subsection.

Other considerations:

- In reception area/elevators can attendee arrival times be staggered, attendees asked to wait outside, and seating areas distanced 6-15 feet away from each other?

6.5 Sound Post-Production

This section covers sound post-production, the creation of the final audio tracks, as well as the creation of elements that are mixed together in that process.

The audio systems used in sound post-production are larger and more complex that the audio systems used elsewhere. Differences include:

- Speakers may be on sitting on mixing consoles, mounted on stands, at attached to the wall and ceiling.
- Amplifiers, sometimes one per speaker, that are mounted in a rack away from the user area in closets or dedicated rooms

Some of the rooms used are full-size theaters.

6.5.1 Individual Work Areas, Small Mixing, Editing Rooms

Metric	**Category**
Working distance	Close, Near
Equipment use level	Common, Shared, Re-deployed
Equipment contact level	Normal Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed
Interpersonal contact	Ad Hoc Groups, Inter Group, Intra Group

Equipment	**Categories**
Workstations	Equipment Bundle
Projector	Equipment Bundle
Audio system	Equipment Bundle
Audio mixing panel	Active Ventilation, Unsealed
Video monitoring	Equipment Bundle
Console lights	Electrical
Intercom and speaker phones	Unsealed
Webcam	Unsealed

Considerations:

- Can creators/clients work in different rooms of a facility and maintain synchronization with connecting suites and remote video conferencing?
- Can mixers/editors reduce shared equipment by users having labeled keyboards and mice that follow them between projects?
- Can the movement of equipment be minimized between sessions?
- Can embedded equipment (i.e., monitors, jog controls, mixing boards etc.) be covered or cleansed between each session?
- How many tasks can continue to be done remotely?

6.5.2 Mixing Stages

Metric	**Category**
Working distance	Close, Near, Proximity
Equipment use level	Common, Shared, Re-deployed
Equipment contact level	Normal Contact
Equipment frequency of contact	High Frequency + Multiple People, Low Frequency + Multiple People
Space	Enclosed
Interpersonal contact	Ad Hoc Groups, Inter Group, Intra Group

Equipment	**Categories**
Workstations	Equipment Bundle
Projector	Equipment Bundle
Audio system	Equipment Bundle
Audio Mixing Panel	Active Ventilation, Unsealed
Video Monitors	Equipment Bundle
Desk/console Lights	Electrical
Intercom and speaker phones	Unsealed
Webcam	Unsealed

Notes:

- Mixing panels for sound mixing are large, often 48 or more faders.

Considerations:

- Can creators/clients work in different rooms of a facility and participate using video conferencing?
- Can mixers/editors reduce shared equipment by users having labeled keyboards and mice that follow them between projects?
- Can the movement of equipment be minimized between sessions?

- Can embedded equipment (i.e., monitors, jog controls, mixing boards, etc.) be covered or cleansed between each session?
- How many tasks can continue to be done remotely?

6.5.3 Recording Studios, Scoring Stages, Foley, ADR, Looping/Walla

In the context of this document, we use the term "recording studio" to mean the functions that record music and dialog. A scoring stage is used when a large number of performers are present.

Metric	Category
Working distance	Close, Near, Proximity
Equipment use level	Common, Shared, Re-deployed, Single User
Equipment contact level	High Contact, Normal Contact, Single User
Equipment frequency of contact	High Frequency + Multiple People, Low Frequency + Multiple People, Single User.
Space	Enclosed
Interpersonal contact	Ad Hoc Groups, Intra Group

Equipment	Categories
Workstations	Equipment Bundle
Projector	Equipment Bundle
Audio system	Equipment Bundle
Audio Mixing Panel	Active Ventilation, Unsealed
Video Monitors	Equipment Bundle
Desk/console Lights	Electrical
Intercom and speaker phones	Unsealed
Webcam	Unsealed
Studio microphones	Specialized
Pop screens and dead cat windshields	Specialized
Foley	Unsealed, Mechanical, Specialized

Notes:

- Foley uses physical objects of a wide variety of types including hardwoods, shoes and vegetables.

Considerations:

- Can performers be recorded remotely?
- Can performers be isolated from each other and from studio personnel using screens? (Screens are commonly used to provide sound isolation between performers. For example, when recording a band, screens will be placed around the drummer to prevent the drums spilling into other mics.)
- Can creators/clients work in different interconnected rooms of a facility?
- Can mixers/editors reduce shared equipment by users having labeled keyboards and mice that follow them between projects?

- Can the movement of equipment be minimized between sessions?
- Can embedded equipment (i.e., monitors, jog controls, mixing boards, etc.) be covered or cleansed between each session?
- Since microphones can come into close contact with performers, can the manufacturer or an audio equipment specialist advise on a method to cleanse microphones without damaging them?
- Can pop screens and dead cat windshields be assigned to individual performers?

6.6 Mastering

Mastering is the process of creating versions of the content for delivery to consumers. It includes both theatrical and home masters.

In addition to the functions presented in this section, the mastering process includes:

Function	**See Section**
Edit bays	6.2.1 Edit Bays
Editorial review	6.2.2 Editorial Review
Dialog recording	6.5.3 Recording Studios…

6.6.1 Individual Work Areas

Metric	**Category**
Working distance	Close, Near
Equipment use level	Shared, Re-deployed
Equipment contact level	Normal Contact
Equipment frequency of contact	Low Frequency + Multiple People, Single User
Space	Enclosed
Interpersonal contact	Ad Hoc Groups, Inter Group, Intra Group

Equipment	**Categories**
Workstations	Equipment Bundle
Video monitoring	Equipment Bundle
Webcam	Unsealed

6.6.2 Video QC

• **Metric**	**Category**
Working distance	Close
Equipment use level	Common, Shared
Equipment contact level	Normal Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed
Interpersonal contact	Ad Hoc Groups, Intra Group

Equipment	Categories
Workstations	Equipment Bundle
Audio system	Equipment Bundle
Video monitor	Equipment Bundle

Note:

- Video QC normally happens in a QC room, not a theater.

Considerations:

- Do all attendees need to be in the room? Can QC be done remotely either from a different room or a different location?

6.6.3 Theatrical QC

Metric	Category
Working distance	Close, Near
Equipment use level	Common, Shared, Re-deployed
Equipment contact level	Normal Contact
Equipment frequency of contact	High Frequency + Multiple People
Space	Enclosed
Interpersonal contact	Ad Hoc Groups, Inter Group, Intra Group

Equipment	Categories
Workstations	Equipment Bundle
Projector	Equipment Bundle
Audio system	Equipment Bundle
Video monitoring	Equipment Bundle
Console lighting	Electrical
Intercom and speaker phones	Unsealed

Notes:

- Theatrical QC normally happens in a theater.

Other considerations:

- Can theatre be used that has significantly more capacity than the number of people taking part in the review to facilitate social distancing?

Appendix A General Considerations

Some considerations apply to more than one working environment, and these are listed here:

- Can the use of shared equipment be reduced by supplying workers with equipment for their sole use, e.g., lights, microphones, keyboards and mice?
- Can working distances be increased by using larger open work areas or rearranging office layouts?
- Can protocols be employed to reduce number of people in confined spaces at once? For example, the back of a truck.
- Can workflows be modified or tasks assigned differently to situations where multiple people are touching equipment without the opportunity to cleanse it?
- Can physical barriers, such as screens, be used to reduce the likelihood of airborne transmission either from person to person or from person to surfaces?
- Can equipment that cannot be cleaned be treated as either disposable or Single User?
- Can equipment be protected with disposable or wipeable covers?
- Can equivalent devices be used that are better for cleaning or resistant to contamination, e.g., washable keyboards, waterproof laptops or screens designed for medical environments?
- What operations can be performed with the worker wearing PPE such as gloves and masks?
- Have correct cleansing procedures been documented and conveyed to workers?
- Will the correct supplies be available at the point of use?
- Does it help to use a labeling protocol that records when equipment was last cleaned?
- Can the use of paper be replaced with electronic documents?
- Can the need for Ad Hoc Groups be reduced?
- Is it useful to track contacts between groups or individuals to aid the remediation in the event of widespread transmission?
- In a situation, such as a set, where multiple groups are engaged, can specific spaces be allocated for the exclusive use of a group?

Appendix B References on Equipment Cleaning

This section provides references on cleaning or cleansing that are specific to a type of equipment. Unfortunately, few manufacturers have provided specific recommendations to address Covid-19.

This section uses the word **cleaning** is used to describe normal cleaning in the sense of the removal of dirt and dust, cleaning monitor screens and cleaning for basic hygiene. The word **cleansing** is used only where the referenced source states that the cleaning method is designed to address Covid-19 prevention.

B.1 Computer Equipment

While computer equipment is not generally in scope for this document, references are included here because many of the more Specialized types of equipment share some characteristics with computer equipment, for which comparatively more references are available.

CDC, “Cleaning and Disinfecting Your Facility,” 2020, https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html

- General document that includes a short note on cleansing of electronics, including a recommendation for the use of wipeable covers.

Dell, “Guidance for Keeping Your Dell Technologies Equipment Clean,” April, 2020, https://www.dell.com/support/article/en-us/sln308919/guidance-for-keeping-your-dell-technologies-equipment-clean

- Guidance for cleaning and disinfecting of PCs, monitors, keyboards and mice, including the use of isopropyl alcohol. Includes cautions on the use of some solvents and liquids and a note on the lack of test data for the use of UV-C.

Wacom, “How to clean your Wacom product,” https://www.wacom.com/en-us/support?guideTitle=How-to-clean-your-Wacom-product&guideId=150-995

- Cleaning instructions, including the use of isopropyl alcohol.

Logitech, “Keeping Your Logitech Mice Clean,” 2015, https://blog.logitech.com/2015/05/29/keeping-your-logitech-mice-clean/

- General cleaning instructions for optical mice including exterior surfaces, lens, and mouse wheel. Includes cautions on the use of rubbing alcohol and powering it off before cleaning.

Logitech, “Clean the Logitech MX Ergo trackball,” 2019, https://support.logi.com/hc/en-001/articles/360023356753

- General cleaning instructions for removing and cleaning trackball from mouse, including the use of isopropyl alcohol and anti-bacterial wipes. Includes cautions on possible discoloration when alcohol is used.

B.2 Cameras

RED, “Camera System Maintenance,” http://docs.red.com/955-0156/EPICSCARLETOperationGuide/en-us/Content/10_Maintenance/1_Intro_Maintenance.htm

- General cleaning instructions for camera components including exterior surfaces, screens and sensor. Cautions on use of solvents. Not updated for Covid-19.

ARRI, “ARRI Camera Sensor Glass Cleaning,” March, 2015, https://www.arri.com/resource/blob/178014/503ef0d04c9e4c0841709a21775ac051/arri-camera-sensor-cover-glass-cleaning-instructions-data.pdf

- Instructions for cleaning sensor cover glass: contactless, wet and dry.

Sony, “PMW-F55 Operating Instructions,” 2013, https://pro.sony/ue_US/support-resources/pmw-f55/manual

- General manual that includes a short note on dry or damp cleaning of unit.

Sony, “VENICE, Operating Instructions,” 2017, https://pro.sony/ue_US/support-resources/venice/manual

- General manual that includes instructions on cleaning the air filter and a short note on dry or damp cleaning of unit.

B.3 Microphones

Shure, "How Should I Clean My Microphone," March 2020, https://service.shure.com/s/article/how-should-i-clean-my-microphone

- General instructions for cleaning dynamic and condenser microphones. Dynamic section covers removing and cleaning the grille and windscreen using water and mild detergent. Cautions against reattaching the grille before it is completely dry. Condenser section cautions against getting water near condenser element. Includes warning that instructions not advice for protecting against Covid-19.

Shure, "How to Clean Shure Microphones," May 2013, https://www.youtube.com/watch?v=1j6CVlFG1Vk

- General instructions for removing grille from dynamic microphone and cleaning with toothbrush, water, and mild detergent.

Sennheiser, "MKE 1 – Care and Cleaning Instructions," September 2019, https://assets.sennheiser.com/global-downloads/file/10428/540099_BB_A03_MKE1_INT_EN.pdf

- General instructions for cleaning lavalier microphone including frequency response caps, microphone capsules, and cable, including make-up removal and the use of isopropyl alcohol. Cautions against using a brush on the capsule or alcohol on the cable.

DPA Microphones, "5 simple steps to wash your DPA microphone," 2018, https://www.dpamicrophones.com/mic-university/5-simple-steps-to-wash-your-dpa-microphone

- General instructions for lavalier microphones, includes using demineralized water, removing the grid, and drying.

Sennheiser, "MKH 416 Instruction Manual," January 2019, https://assets.sennheiser.com/global-downloads/file/5806/MKH_416_0119_EN.pdf

- General document that includes a short note on cleaning a shotgun microphone, including a warning to keep away from all liquids and to only use a soft, dry cloth.

Shure, "Keeping Your Microphone Clean," 2013, https://www.shure.eu/musicians/discover/educational/keeping-your-microphone-clean

- General instructions for cleaning grills and foam windscreens. Recommends warm soapy water and leaving to dry overnight. Indicates that some users report employing a product called Microphome.

Stedman, "Proscreen FAQ," https://www.stedmanusa.com/faqs

- General FAQ for pop filter. The first answer includes a short note for cleaning with detergent and water. Antibacterial detergent can improve effectiveness of cleaning.

B.4 Recording Equipment

Atomos, "Shogun Inferno User Manual," October 2018, http://downloads.atomos.com/shogun-inferno/Shogun_Inferno_User_Manual.pdf

- General user manual with cautions against exposing to liquid or scratching the screen.

B.5 Studio Monitors

Dynaudio, "How to Clean Your Speakers – Video Guide," February 2017, https://www.dynaudio.com/dynaudio-academy/2017/february/ask-the-expert-how-to-clean-your-speakers

- Instructional video for cleaning speakers along with bookmarks and transcript. Including the woofer cone, tweeter, rubber surround, and cabinet. Recommends moist/dry microfiber cloth for most parts, but cautions against touching tweeters.

Dynaudio, "How to Clean Your Speakers in 27 seconds," November 2017, https://www.youtube.com/watch?v=RrxPmcdb13k

- Extremely brief instructional video summarizing the video above. Cautions strongly against touching tweeter.

Mackie, "HR624 MK2 High Resolution Active Studio Monitor Owner's Manual," July 2014, https://mackie.com/sites/default/files/PRODUCT%20RESOURCES/MANUALS/Owners_Manuals/HR624mk2_OM.pdf

- General instructions that include a short warning to clean only with dry non-scratch cloth to protect finish.

B.6 Sound Mixing Desks

Hirogari Music, "Tutorial: How to Clean An Audio Mixer," May 2018, https://www.youtube.com/watch?v=T1r1YyKTA1Y

- Instructional video for cleaning a large sound mixer. Recommends mild detergent for the caps, and goo remover from the face.

Teri Hogan, "Zen and the Art of Mixing Console Cleaning & Maintenance," August 2019, https://www.prosoundweb.com/zen-the-art-of-mixing-console-cleaning-maintenance/2/

- Extremely detailed Instructions on cleaning a mixing console including the faders, internals, and face.

B.7 Headphones

Sennheiser, "Momentum Wireless Around-Ear Headphones M3AEBTXL Instruction Manual," January 2020, https://assets.sennheiser.com/global-downloads/file/13911/Manual_M3AEBTXL_0120_EN.pdf

- User manual with section of care and maintenance of headphones, including maintaining the leather and replacing the ear pads. Cautions against using any solvents, liquids, or cleaning agents.

Audio-Technica, "Air Dynamic Headphones ATH-AD2000X Instructions," November 2014, https://eu.audio-technica.com/resources/Hi%20Fidelity/ATH-AD2000X%20User%20Manual%20(EN).pdf

- General instructions that include a small note on cleaning. Recommends a soft cloth. Cautions against using alcohol, thinner or other solvents.

Bose, "Cleaning Your Headphones," https://www.bose.com/en_us/support/article/cleaning-your-headphones-qc20-apple.html

- Instructions for cleaning in-ear headphones and headsets, including ear tips, earbuds, and the mesh screen. Includes use of hydrogen peroxide on mesh, mild detergent with ear tips, and a dry cloth with ear buds.

B.8 Portable Hard Drives and RAIDs

Western Digital, "My Cloud Pro Series User Manual," August 2016, https://shop.westerndigital.com/tools/documentRequestHandler?docPath=/content/dam/doc-library/en_us/assets/public/wd/product/nas/my_cloud/pro_pr_4100/user-manual-unencrypted-drives-my-cloud-pro-series-pr4100.pdf

- User manual that includes brief note on cleaning. Recommends only a damp cloth. Cautions against liquid or aerosol cleaners.

B.9 Color Correction Panels

Tangent, "Element User Manual v 1.17 rev 1," February 2012, https://www.tangentwave.co.uk/download/element-user-manual/

- User manual that includes a small section on removing and cleaning the trackballs. Advises soft damp cloth for the ball and a damp cotton bud for the housing.

B.10 Set Lighting

ARRI, "L5 User Manual," November 2018, https://www.arri.com/resource/blob/31162/7aec274265c90d533cad5ae8b36ee85b/l5-0002357-arri-l-series-l5-user-manual-en-nov2018-l03301-data.pdf

- User manual with brief instructions for cleaning, including electric contacts and surface with soft cloth wetted with mild detergent. Cautions against solvents or strong detergents or rubbing the surface. Isopropyl Alcohol advised for electric contacts.

ARRI, "M8 Short Instructions," 2013, https://www.arri.com/resource/blob/31408/ebd9f1ea23f725e9c4c55487833edb24/arri-m-series-m8-manual-de-en-sep2013-data.pdf

- User manual with brief instructions for cleaning reflector and glass with customary glass cleaning agent and soft cloth. Cautions to keep the electrical connections clean and to replace corroded contacts. Also recommends visual inspection before use and annual inspections by electricians.

ARRI, "ARRILITE 750 User Manual," February 2015, https://www.arri.com/resource/blob/31430/920b1e8e918b0baef738e8ec59e749e1/arri-arrilite-750-plus-manual-de-en-oct2015-data.pdf

- User manual with brief instructions for cleaning reflector and glass with customary glass cleaning agent and soft cloth. Cautions to keep the electrical connections clean and to replace corroded contacts. Also recommends visual inspection before use and annual inspections by electricians.

ARRI, "Electronic Ballast, EB MAX 12/18, Operating Instructions," March 2018, https://www.arri.com/resource/blob/31450/31161def81341893d4f84a8c4ccac845/arri-eb-max-12-18-manual-de-en-mar2018-data.pdf

- User manual with brief not in section 2.8 that unit should only be cleaned with dry/moist cloth while powered off and unplugged. Cautions against immersing in water.

Appendix C Technical References

C.1 Ultraviolet Light

Ultraviolet light, in particular short-wavelength UV-C light, has seen some use in the disinfection of N95 masks and surfaces in medical environments.

C. Jhinadatha et al., "Disinfecting personal protective equipment with pulsed xenon ultraviolet as a risk mitigation strategy for health care workers," Am. J. of Infection Control, 43(4), April 2015, https://www.ncbi.nlm.nih.gov/pubmed/25726129

- Journal article evaluating the effectiveness of pulsed Xenon UV against an Ebola-like virus on gowns and other PPE before the worker takes them off.

J. Lowe et al. (Nebraska Medicine), "N95 Filtering Facepiece Respirator Ultraviolet Germicidal Irradiation (UVGI) Process for Decontamination and Reuse," April 2020, https://www.nebraskamed.com/sites/default/files/documents/covid-19/n-95-decon-process.pdf

- White paper documenting an operational practice for the UV-C decontamination of N95 masks for limited reuse.

B. Heimbuch et al., "A pandemic influenza preparedness study: Use of energetic methods to decontaminate filtering facepiece respirators contaminated with H1N1 aerosols and droplets," Am. J. of Infection Control, 39(1), February 2011, https://www.ajicjournal.org/article/S0196-6553(10)00814-X/fulltext

- Journal article evaluating the effectiveness of UV-C with that of warm moist heat and microwave-generated steam.

D. Mills et al., "Ultraviolet germicidal irradiation of influenza-contaminated N95 filtering facepiece respirators." Am. J. of Infection Control, 46(7), July 2018, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7115285/

- Journal article evaluating effectiveness of UV in the presence of soiling from artificial saliva and skin oil.

Chun-Chieh Tseng & Chih-Shan Li, "Inactivation of Viruses on Surfaces by Ultraviolet Germicidal Irradiation," J. Occup. and Env. Hyg., 4(6), June 2017, https://www.tandfonline.com/doi/pdf/10.1080/15459620701329012

- Journal article evaluating the effects of UV different classes of viruses at various levels of UVC exposure.

G. Byrns et al., "The uses and limitations of a hand-held germicidal ultraviolet wand for surface disinfection," J. Occup. and Environ. Hyg., 14(10), October 2017, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7157946/

- Journal article evaluating the effects of exposure time, angle and humidity on the use of a hand-held UV-C wand.

C.2 Penetrating Radiation

Forms of penetrating radiation, such as gamma rays, X-rays or electron beams, are sometimes used for sterilization of items like food and medical devices where more conventional methods would be either ineffective or damaging. They generally require a dedicated facility.

Finkiel (Tuttnauer), “Sterilization by Gamma Irradiation,” December 2016, https://tuttnauer.com/blog/sterilization-by-gamma-irradiation

- Introduction to gamma radiation and its applications in sterilization.

F. Feldmann et al., “Gamma Irradiation as an Effective Method for Inactivation of Emerging Viral Pathogens,” Am. J. Trop. Med and Hyg., 100(5), May 2019,

- Journal article evaluating the effect of gamma irradiation on viruses, including SARS-CoV.

M. Darnell et al., “Inactivation of the coronavirus that induces severe acute respiratory syndrome, SARS-CoV,” J. Virol. Methods, 121(1), October 2004, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7112912/

- Journal article evaluating the effect of UV-A, UV-C and gamma radiation on SARS-CoV.

Chou, J.W. et al., “Unintended consequences of the potential phase-out of gamma irradiation,” F1000Res, March 2018.

- Online journal article, including a table providing a comparison of alternatives to gamma irradiation for medical device sterilization, including electron beams, X-rays, and microwaves.

International Atomic Energy Agency, "Trends in Radiation Sterilization of Health Care Products," 2008, https://www-pub.iaea.org/MTCD/publications/PDF/Pub1313_web.pdf

- Paper outlining the types of gamma radiation systems being used commercially.

E. Cramer et al., "Disposable N95 Masks Pass Qualitative Fit-Test but Have Decreased Filtration Efficiency after Cobalt-60 Gamma Irradiation," March 2018. https://www.medrxiv.org/content/10.1101/2020.03.28.20043471v1.full.pdf

- Journal article preprint from MIT evaluating physical damage to masks from gamma radiation.

Sterigenics, "Technologies Considerations," September 2018, https://sterigenics.com/wp-content/uploads/2018/09/Technologies-Considerations.pdf.

- White paper including a table comparing methods, including gamma radiation, electron beams and X-rays.