

BABBAGE NANOPAMPHLETS

BY RAFAEL LOZANO-HEMMER



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GENERAL IMPORTANT INFORMATION

This short section must be read for proper operation.

BABBAGE NANOPAMPHLETS (2015)

BY RAFAEL LOZANO-HEMMER

Technique

Two million nanopamphlets printed on elemental gold, C-prints or digital frame with slideshow, glass vial, magnet, LED light.

Description

Two million nanopamphlets were printed in elemental gold, higher in purity than 24-karat gold, by Cornell University's NanoScale facility. Each gold leaflet is 150 atoms thick and each letter is 250 nanometers wide. The engraving is an excerpt from *The Ninth Bridgewater Treatise* written in 1837 by English polymath and "the father of the computer" Charles Babbage. In the text, Babbage posits that the atmosphere is a vast repository of everything that has ever been said; that we could potentially "rewind" the movement of every molecule of air to recreate the voices of everyone who has spoken in the past.

During the exhibition at the MUAC Museum in Mexico City, 250,000 copies were released into the Museum's ventilation system so the public could inhale them. Gold is biologically inert so poses no health risk. The remaining pamphlets were suspended in water in a small crystal vial with a magnetic stirrer. Documentary images of the development, such as electron microscope images of the pamphlets, were shown in a nearby display.

Operation

Please refer to [Appendix I - Installation](#) for installation instructions, components placement, and layout diagrams.

1. To turn **ON** the piece, plug in the main power extension. To turn **OFF** the piece, simply unplug the power cord.
2. To turn **ON** the screen (if provided), plug in the main power extension and press the **ON/OFF** button. It will take about 10 seconds before you will see the images. To turn **OFF** the screen, simply press the **ON/OFF** button or shut down through the main menu.

You can also connect a timer to the housing, in order to automatically turn the piece **ON** or **OFF** at a desired time. You can also program an automatic scheduler for the display, but only if the screen is a regular display and not a tablet or another kind of computer.

Maintenance

To clean the acrylic cover, use a clean cotton rag and Novus #1 cleaner (sprayed onto the rag, not directly onto the acrylic.) Using the rag, clean the surface in a circular motion.

To clean and handle the book, ALWAYS use clean fabric gloves. To dust the book, use a clean, dry soft brush. NEVER use compressed air to clean the book, as it might spill liquid onto it.

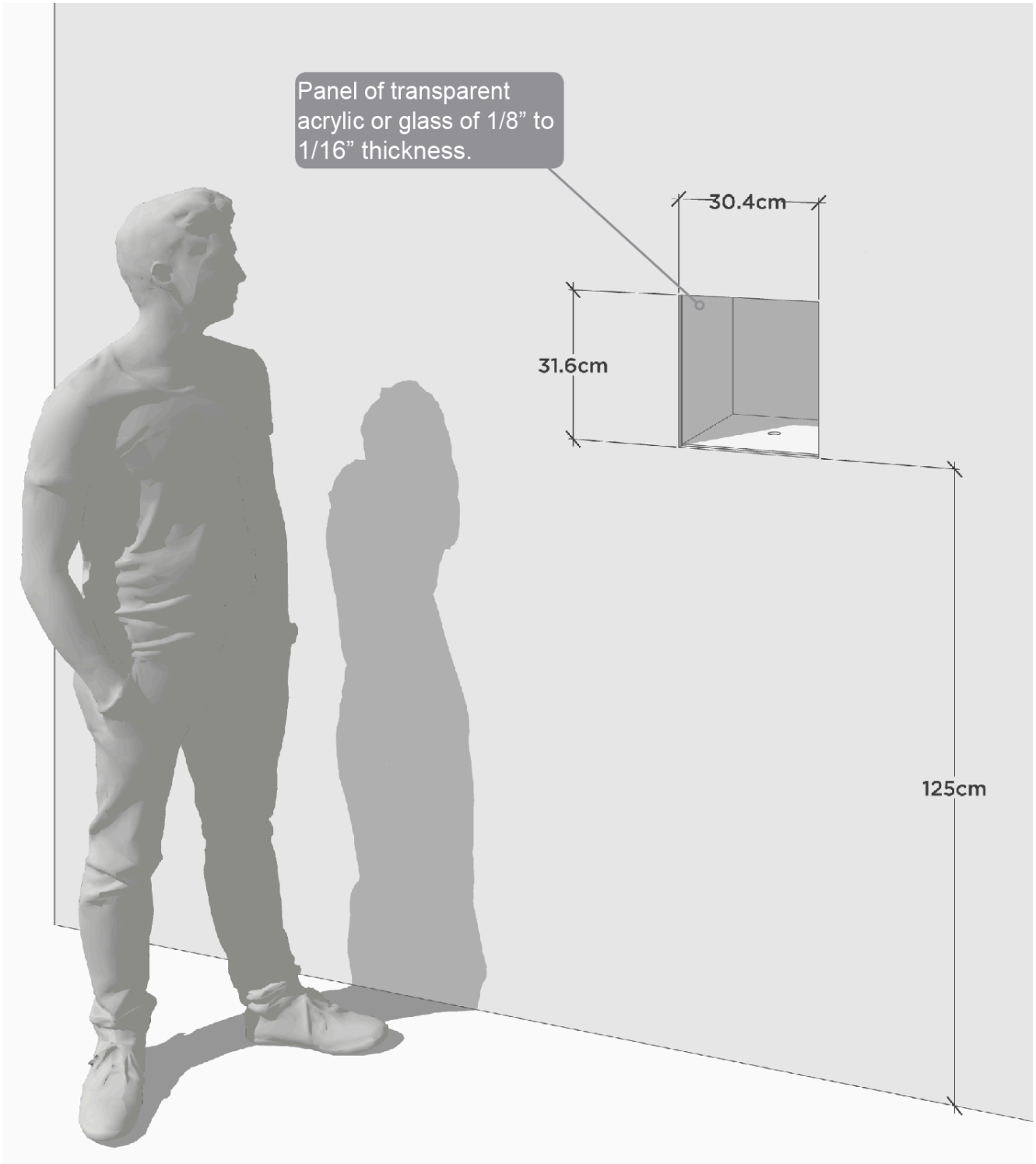
Make sure the book is exposed to the lowest light possible, preferably 50 to 75 lux. Never expose the book to direct daylight, as it will damage the quality and color.

Clean the piece as often as necessary.

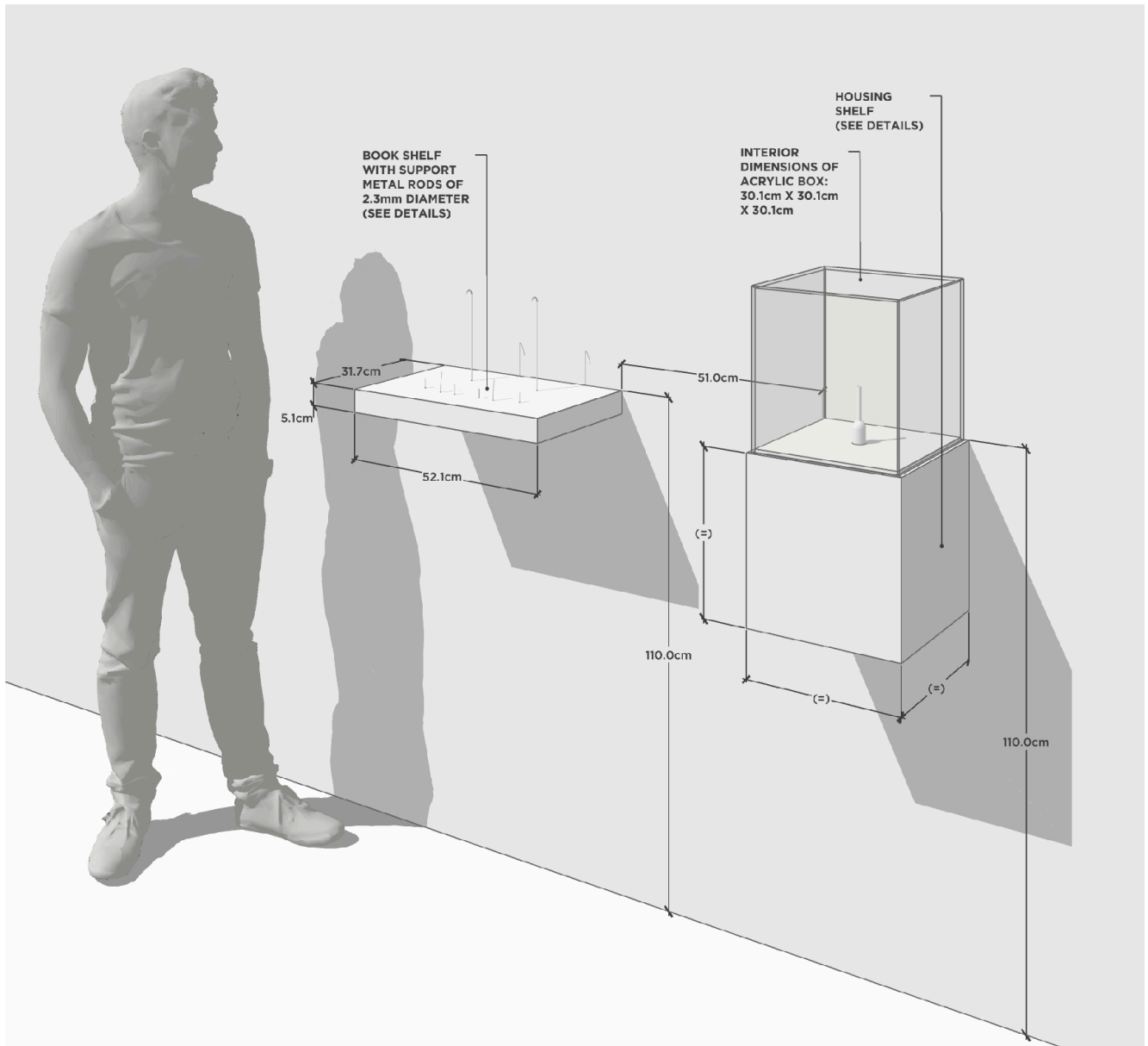
Placement Instructions

The piece can be installed either on a niche or on multiple shelves. The latter is the preferred layout of installation. Ideally, the power supply should be concealed, within the wall or otherwise. Once you have chosen the desired placement, please follow the relevant instructions listed in [Appendix III: Assembly of the Work](#). The following pages show how each version of the work should sit on the wall relative to the floor and its subcomponents.

Niche Version



Multiple Shelves Version



DETAILED TECHNICAL INFORMATION

Preliminary Troubleshooting Steps

The display doesn't show anything.

If this happens, turn off the display and turn it on again. If the problem persists, unplug the power source and plug it in again.

If you are using a tablet or another kind of computer, restart or shutdown the device and turn it on again. Usually it will take up to two minutes before the slideshow replays.

If the problem continues after having followed all the instructions the studio has provided, please [contact us](#) for further technical support.

The LED light is off.

First, ensure that the piece is properly plugged into an electrical power source. If it is indeed plugged in, and the LED light is still not working, then the light is most likely burned out. Proceed to change the light with the custom LED light provided.

The magnet never spins.

First, ensure that the piece is properly plugged into an electrical power source. If the LED light turns ON, inspect all the connections

Troubleshooting Assistance

Prior to contacting the Antimodular Studio with a problem about your artwork, please ensure that you went through the preliminary troubleshooting steps outlined in the previous section.

The troubleshooting process will vary depending on the problem. In order to make the process easier, it is recommended that you collect and send the following information to the studio:

- Date and time when the problem first happened;
- Description of the problem;
- Actions taken so far and conclusions;
- Detailed photographs (or videos) displaying the problem;
- Detailed photographs (or videos) of the suspected faulty component;
- Detailed photographs (or videos) of the whole artwork and its surroundings;
- Personnel involved.

Support (Contact Us)

If you would like support for the piece, please feel free to call Lozano-Hemmer's studio in Canada:

Antimodular Research
4462 rue Saint-Denis
Montréal, Québec, Canada
H2J 2L1
Tel 1-514-597-0917
info@antimodular.com
www.antimodular.com

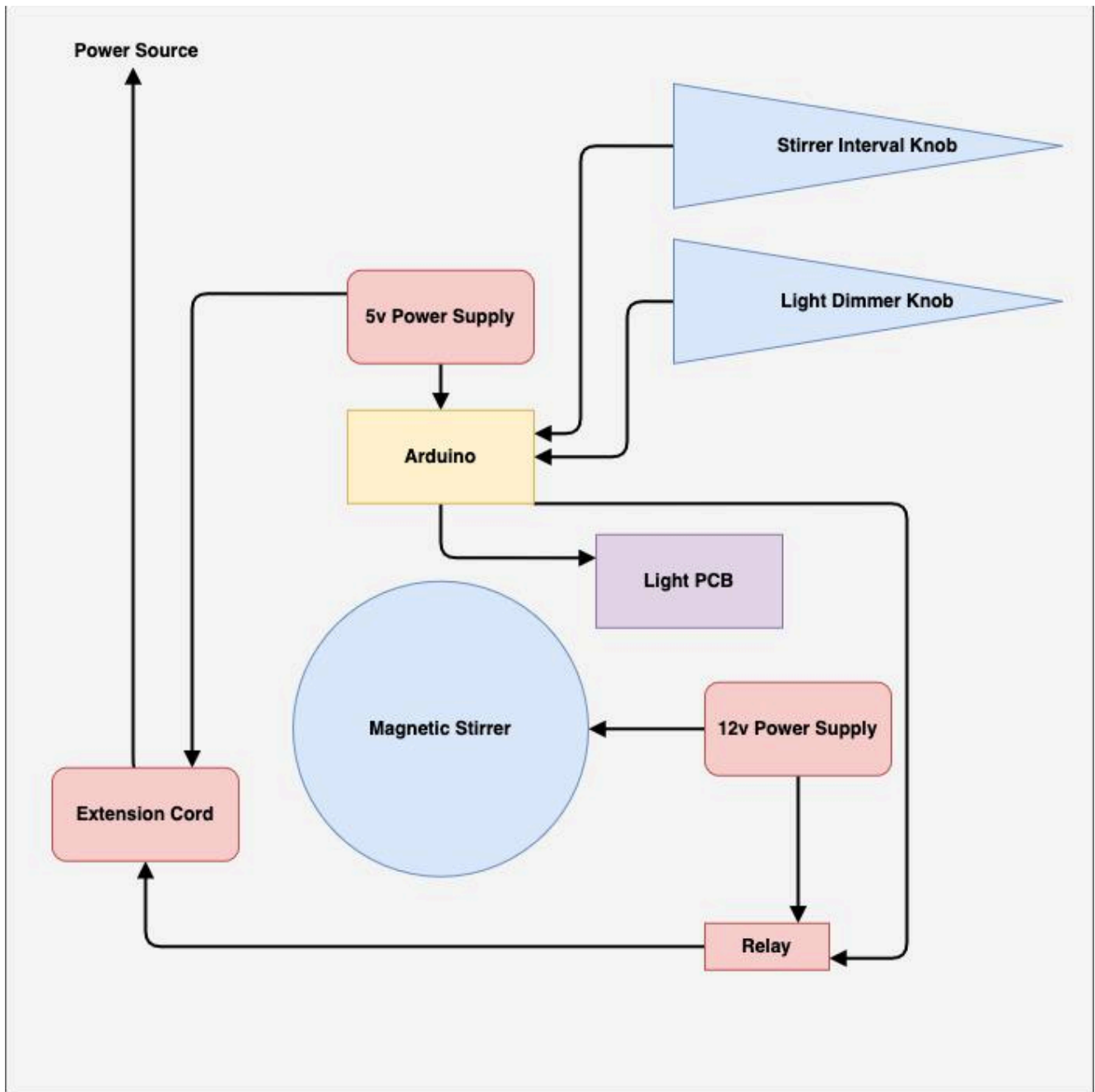
APPENDIX I - INSTALLATION

Description of Components

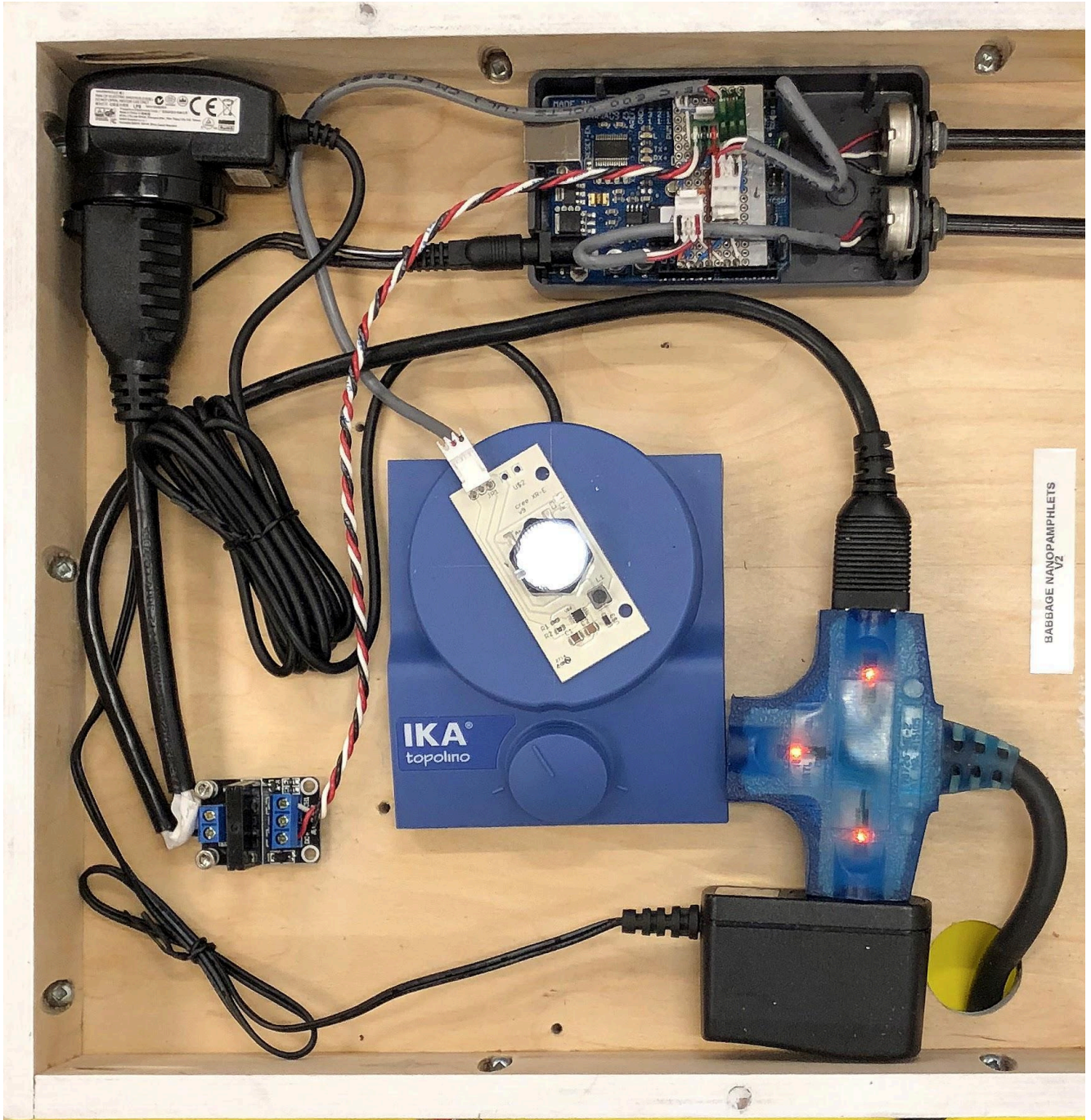
This artwork requires the following components:

Component	Description
IKA Topolino magnetic stirrer	A stirrer that makes the magnet turn inside the vial, in turn making the gold nanopamphlets float.
Arduino UNO	Controls the light dimmer and the stirrer.
LED light	Lights the vial and makes the gold nanopamphlets brighter and thus more visible.
Stirrer interval knob	Controls how often the magnet inside the vial turns. The knob is set to 50% but the intervals should be double-checked with a chronometer when installing the piece. The intervals should be set to 45-50 seconds.
Light dimmer knob	Controls the amount of light reflected into the vial. The knob is set to 60% (a bit above the middle).
Relay	Turns the power supply for the stirrer ON and OFF.
12 VDC power supply	Powers the stirrer.
WAGO connector	Connects the main power line to the extension cord.
Glass vial	Contains a magnet and a solution of Formalin 10%, Neutral Buffered, in which the gold nanopamphlets are suspended.
Magnet	Generates movement to the Formalin solution so that the nanopamphlets are visible. The magnet is inside the vial.
Screen (optional)	Displays documentary images of the development of the nanopamphlets.
Book	<i>The Ninth Bridgewater Treatise: A Fragment</i> by Charles Babbage (First edition, 1937). Displays part of the facsimile which is also printed and shown separately.
Facsimile	Displays the text excerpt from Charles Babbage printed onto the nanopamphlets.

Wiring Diagrams and Connections

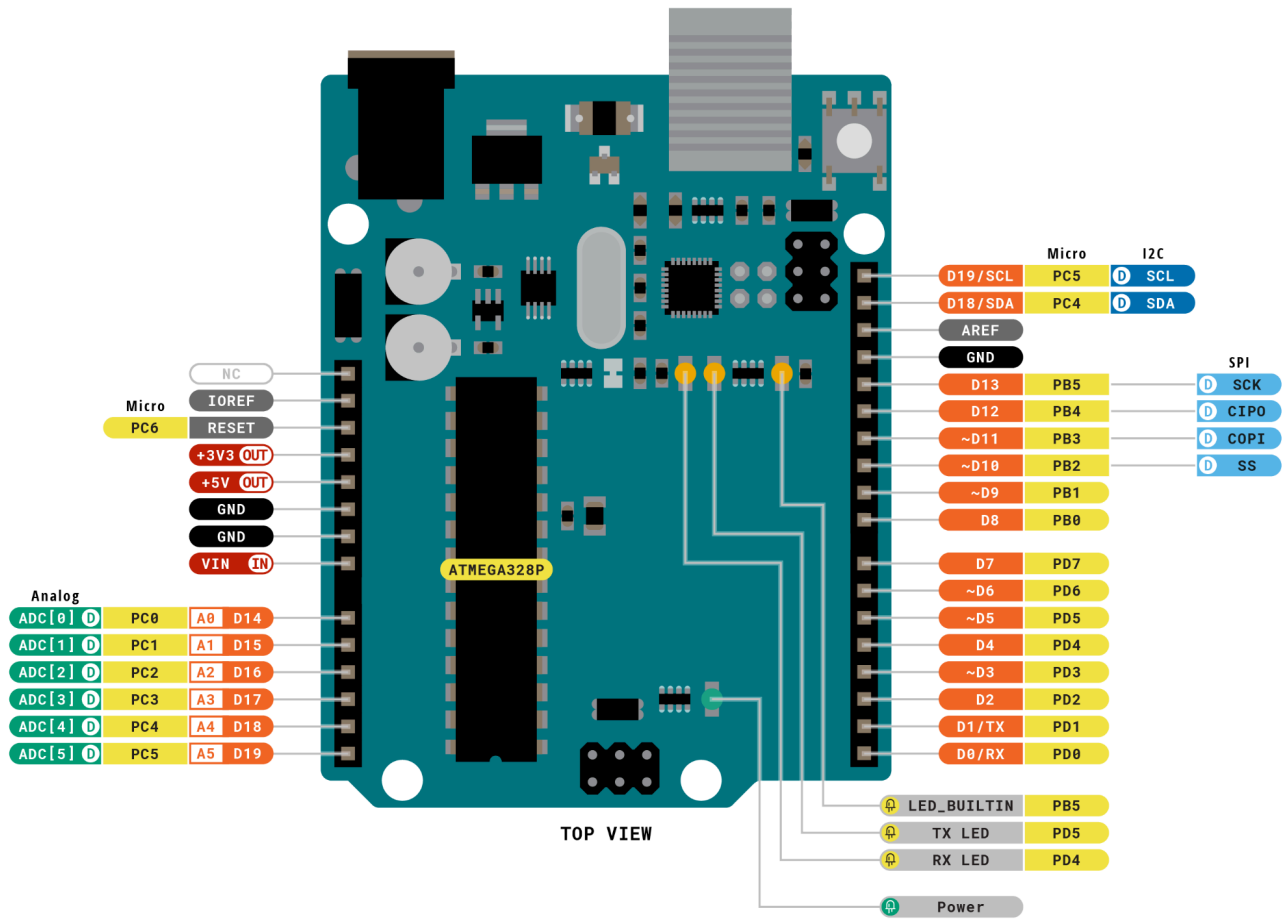


Case



APPENDIX II - TECHNICAL DATA SHEETS

Arduino Uno



Legend:	■ Digital	■ I2C
■ Power	 Analog	■ SPI
■ Ground	■ Main Part	■ Analog



ARDUINO
 ARDUINO UNO REV3
 SKU code: A000066
 Pinout
 Last update: 6 Oct, 2022

Specification	Details
Manufacturer	Arduino
Model	Uno
Power Requirements	5V DC USB-B port or 7-12 V DC Barrel Jack center positive pin.

Formalin, 10%, Neutral Buffered



Formalin, 10%, Neutral Buffered

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 12/09/2015 Version: 1.0

SECTION 1: Identification

1.1. Product identifier

Product form : Mixture
Product name : Formalin, 10%, Neutral Buffered
Product code : F6000
Product group : Blend

1.2. Recommended use and restrictions on use

No additional information available

1.3. Supplier

Produits Chimiques ACP Chemicals Inc.
4601, boul. des Grandes Prairies
Montreal, Quebec H1R 1A5
www.acpchem.com

1.4. Emergency telephone number

Emergency number : (613) 996-6666 (CANUTEC)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-CA)

Skin Irrit. 2 H315

Eye Irrit. 2A H319

Carc. 1A H350

STOT SE 1 H370

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-CA labelling

Hazard pictograms (GHS-CA)



GHS07

GHS08

Signal word (GHS-CA) Hazard statements (GHS-CA) : Danger

Hazard statements (GHS-CA) : Causes skin irritation
Causes serious eye irritation
May cause cancer (Inhalation)
Causes damage to organs (central nervous system, optic nerve)

Precautionary statements (GHS-CA) : Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Do not breathe mist, spray, vapours
Wash hands, forearms and face thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves, eye protection
IF ON SKIN: Wash with plenty of water
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
IF exposed or concerned: Call a POISON CENTER, a doctor
If skin irritation occurs: Get medical advice/attention
If eye irritation persists: Get medical advice/attention
Take off contaminated clothing and wash it before reuse
Store locked up
Dispose of contents/container to Comply with applicable regulations

2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS-CA)

No data available

Formalin, 10%, Neutral Buffered

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification (GHS-CA)
Water	(CAS No) 7732-18-5	89.52	Not classified
Formaldehyde, 37% w/w	(CAS No) 50-00-0	9.33	Flam. Liq. 3, H226 Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Dermal), H312 Acute Tox. 2 (Inhalation:vapour), H330 Skin Corr. 1C, H314 Eye Dam. 1, H318 Carc. 1A, H350 STOT SE 1, H370 Aquatic Acute 2, H401
Sodium Hydroxide	(CAS No) 1310-73-2	0.65	Skin Corr. 1A, H314 Eye Dam. 1, H318
Phosphoric Acid, 85% w/w	(CAS No) 7664-38-2	0.5	Skin Corr. 1B, H314 Eye Dam. 1, H318

Full text of H-statements: see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

- First-aid measures after inhalation : Allow breathing of fresh air. Allow the victim to rest.
- First-aid measures after skin contact : Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical advice/attention.
- First-aid measures after eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
- First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention.

4.2. Most important symptoms and effects (acute and delayed)

- Symptoms/injuries : May cause cancer (Inhalation).
- Symptoms/injuries after inhalation : May cause an allergic skin reaction.
- Symptoms/injuries after skin contact : Causes skin irritation.
- Symptoms/injuries after eye contact : Causes serious eye damage.
- Symptoms/injuries after ingestion : Nausea. Vomiting.
- Symptoms/injuries upon intravenous administration : Not available.
- Potential adverse human health effects and symptoms : Based on available data, the classification criteria are not met.

4.3. Immediate medical attention and special treatment, if necessary

- Treatment : Obtain medical assistance. Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

- Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

5.2. Unsuitable extinguishing media

- Unsuitable extinguishing media : Do not use a heavy water stream. Flammable liquid and vapour.

5.3. Specific hazards arising from the hazardous product

- Fire hazard : Flammable liquid and vapour.
- Explosion hazard : No direct explosion hazard.
- Reactivity : Product is not explosive.

5.3. Special protective equipment and precautions for fire-fighters

- Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.
- Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Evacuate area. Absorb spillage to prevent material damage. Eliminate every possible source of ignition.

Formalin, 10%, Neutral Buffered

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

Personal Precautions, Protective Equipment and Emergency Procedures : Protective gloves. Protective clothing. Chemical goggles or safety glasses.

Prevention Measures for Secondary Accidents : Ventilate area. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

6.2. Methods and materials for containment and cleaning up

For containment : Collect spillage.

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

Other information : Dispose of materials or solid residues at an authorized site.

6.3. Reference to other sections

Sea transport (IMO)

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapour. Avoid breathing mist, vapours, spray. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.

Local and general ventilation : Provide appropriate exhaust ventilation at places of dust forming.

Hygiene measures : Wash exposed skin thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations. Use only non-sparking tools. Take precautionary measures against static discharge.

Storage conditions : Keep container closed when not in use.

Incompatible products : Strong bases. Strong acids. Strong oxidizers.

Incompatible materials : Sources of ignition. Direct sunlight.

Heat and ignition sources : KEEP SUBSTANCE AWAY FROM: ignition sources. heat sources.

Storage area : Keep container in a well-ventilated place. Keep locked up. Store away from heat.

Prohibitions on mixed storage : organic materials.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Sodium Hydroxide (1310-73-2)		
USA - ACGIH	ACGIH Ceiling (mg/m ³)	2 mg/m ³ (Sodium hydroxide; USA; Momentary value; TLV - Adopted Value)
Canada (Quebec)	PLAFOND (mg/m ³)	2 mg/m ³
Canada (Quebec)	Notations and remarks	RP
Alberta	OEL Ceiling (mg/m ³)	2 mg/m ³
British Columbia	OEL Ceiling (mg/m ³)	2 mg/m ³
Manitoba	OEL Ceiling (mg/m ³)	2 mg/m ³
New Brunswick	OEL Ceiling (mg/m ³)	2 mg/m ³
New Foundland & Labrador	OEL Ceiling (mg/m ³)	2 mg/m ³
Nova Scotia	OEL Ceiling (mg/m ³)	2 mg/m ³
Nunavut	OEL Ceiling (mg/m ³)	2 mg/m ³
Northwest Territories	OEL Ceiling (mg/m ³)	2 mg/m ³
Ontario	OEL Ceiling (mg/m ³)	2 mg/m ³
Prince Edward Island	OEL Ceiling (mg/m ³)	2 mg/m ³
Québec	PLAFOND (mg/m ³)	2 mg/m ³
Québec	Notations and remarks	RP
Saskatchewan	OEL Ceiling (mg/m ³)	2 mg/m ³
Yukon	OEL Ceiling (mg/m ³)	2 mg/m ³
Phosphoric Acid, 85% w/w (7664-38-2)		
Canada (Quebec)	PLAFOND (mg/m ³)	1 mg/m ³
Alberta	OEL Ceiling (mg/m ³)	3 mg/m ³
Alberta	OEL TWA (mg/m ³)	1 mg/m ³
British Columbia	OEL Ceiling (mg/m ³)	3 mg/m ³
British Columbia	OEL TWA (mg/m ³)	1 mg/m ³
Manitoba	OEL Ceiling (mg/m ³)	3 mg/m ³
Manitoba	OEL TWA (mg/m ³)	1 mg/m ³

Formalin, 10%, Neutral Buffered

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

Phosphoric Acid, 85% w/w (7664-38-2)		
New Brunswick	OEL Ceiling (mg/m ³)	3 mg/m ³
New Brunswick	OEL TWA (mg/m ³)	1 mg/m ³
New Foundland & Labrador	OEL Ceiling (mg/m ³)	3 mg/m ³
New Foundland & Labrador	OEL TWA (mg/m ³)	1 mg/m ³
Nova Scotia	OEL Ceiling (mg/m ³)	3 mg/m ³
Nova Scotia	OEL TWA (mg/m ³)	1 mg/m ³
Nunavut	OEL Ceiling (mg/m ³)	3 mg/m ³
Nunavut	OEL TWA (mg/m ³)	1 mg/m ³
Northwest Territories	OEL Ceiling (mg/m ³)	3 mg/m ³
Northwest Territories	OEL TWA (mg/m ³)	1 mg/m ³
Ontario	OEL Ceiling (mg/m ³)	3 mg/m ³
Ontario	OEL TWA (mg/m ³)	1 mg/m ³
Prince Edward Island	OEL Ceiling (mg/m ³)	3 mg/m ³
Prince Edward Island	OEL TWA (mg/m ³)	1 mg/m ³
Québec	PLAFOND (mg/m ³)	1 mg/m ³
Saskatchewan	OEL Ceiling (mg/m ³)	3 mg/m ³
Saskatchewan	OEL TWA (mg/m ³)	1 mg/m ³
Yukon	OEL Ceiling (mg/m ³)	3 mg/m ³
Yukon	OEL TWA (mg/m ³)	1 mg/m ³
Formaldehyde, 37% w/w (50-00-0)		
USA - ACGIH	ACGIH Ceiling (mg/m ³)	0.37 mg/m ³
Alberta	OEL Ceiling (mg/m ³)	1.3 mg/m ³
Alberta	OEL Ceiling (ppm)	1 ppm
Alberta	OEL TWA (mg/m ³)	0.9 mg/m ³
Alberta	OEL TWA (ppm)	0.75 ppm
Alberta	Notations and remarks	A2
British Columbia	OEL Ceiling (ppm)	1 ppm
British Columbia	OEL TWA (ppm)	0.3 ppm
Manitoba	OEL Ceiling (mg/m ³)	<= mg/m ³
Manitoba	OEL Ceiling (ppm)	1 ppm
Manitoba	OEL TWA (ppm)	0.3 ppm
New Brunswick	OEL Ceiling (ppm)	1 ppm
New Brunswick	OEL TWA (ppm)	0.3 ppm
New Foundland & Labrador	OEL Ceiling (ppm)	1 ppm
New Foundland & Labrador	OEL TWA (ppm)	0.3 ppm
Nova Scotia	OEL Ceiling (ppm)	1 ppm
Nova Scotia	OEL TWA (ppm)	0.3 ppm
Nunavut	OEL Ceiling (ppm)	1 ppm
Nunavut	OEL TWA (ppm)	0.3 ppm
Northwest Territories	OEL Ceiling (ppm)	1 ppm
Northwest Territories	OEL TWA (ppm)	0.3 ppm
Ontario	OEL STEL (ppm)	1 ppm
Prince Edward Island	OEL TWA (ppm)	0.1 ppm
Saskatchewan	OEL TWA (ppm)	0.3 ppm
Yukon	OEL Ceiling (ppm)	0.3 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls : Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Provide adequate general and local exhaust ventilation.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment : Avoid all unnecessary exposure.

Hand protection : Wear protective gloves.

Formalin, 10%, Neutral Buffered

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

Eye protection	: Chemical goggles or safety glasses.
Skin and body protection	: Wear suitable protective clothing.
Respiratory protection	: Wear appropriate mask.
Other information	: Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: No data available
Colour	: Colourless.
Odour	: characteristic.
Odour threshold	: No data available
pH	: 5 - 8
pH solution	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Relative evaporation rate (ether=1)	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: Non flammable
Vapour pressure	: No data available
Vapour pressure at 50 °C	: No data available
Relative vapour density at 20 °C	: No data available
Relative density	: No data available
Relative density of saturated gas/air mixture	: No data available
Density	: No data available
Relative gas density	: No data available
Solubility	: Soluble in water.
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, kinematic (calculated value) (40 °C)	: No data available
Explosive properties	: No data available.
Oxidising properties	: No data available.
Explosive limits	: No data available
Lower explosive limit (LEL)	: No data available
Upper explosive limit (UEL)	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

Reactivity in case of fire	: Product is not explosive.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: Refer to section 10.1 on Reactivity.
Conditions to avoid	: Direct sunlight. Extremely high or low temperatures.
Incompatible materials	: Strong acids. Strong bases. Strong oxidizers.
Hazardous decomposition products	: Phosphorus oxides. Carbon monoxide. Carbon dioxide.

SECTION 11: Toxicological information

Likely routes of exposure	: Skin and eye contact. Inhalation.
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11.1. Information on toxicological effects

Acute toxicity (oral)	: Oral: Not classified.
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Not classified

11/12/2015

EN (English)

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Formalin, 10%, Neutral Buffered

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

Formalin, 10%, Neutral Buffered	
LD50 oral rat	> 5000 mg/kg
Water (7732-18-5)	
LD50 oral rat	≥ 90000 mg/kg
Formaldehyde, 37% w/w (50-00-0)	
LD50 oral rat	500 mg/kg
LC50 inhalation rat (Vapours - mg/l/4h)	0.578 mg/l/4h
Skin corrosion/irritation	: Causes skin irritation. pH: 5 - 8
Serious eye damage/irritation	: Causes serious eye irritation. pH: 5 - 8
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: May cause cancer (Inhalation).
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: Causes damage to organs (central nervous system, optic nerve).
Specific target organ toxicity (repeated exposure)	: Not classified
Aspiration hazard	: Not classified
Potential adverse human health effects and symptoms	: Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - water : Harmful to aquatic life.

Sodium Hydroxide (1310-73-2)	
LC50 fish 1	45.4 mg/l (LC50; Other, 96 h; Salmo gairdneri; Static system; Fresh water; Experimental value)
Phosphoric Acid, 85% w/w (7664-38-2)	
LC50 fish 1	138 mg/l (LC50)
Formaldehyde, 37% w/w (50-00-0)	
LC50 fish 1	41 mg/l (LC50; 96 h)
EC50 Daphnia 1	14.7 mg/l (EC50; 24 h)
EC50 Daphnia 2	2 mg/l

12.2. Persistence and degradability

Formalin, 10%, Neutral Buffered	
Persistence and degradability	Not established.
Water (7732-18-5)	
Persistence and degradability	Not established.
Sodium Hydroxide (1310-73-2)	
Persistence and degradability	Biodegradability: not applicable. No (test) data on mobility of the substance available.
Biochemical oxygen demand (BOD)	Not applicable
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable
Phosphoric Acid, 85% w/w (7664-38-2)	
Persistence and degradability	Biodegradability: not applicable. No (test) data on mobility of the components available.
Biochemical oxygen demand (BOD)	Not applicable
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable

Formalin, 10%, Neutral Buffered

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

Formaldehyde, 37% w/w (50-00-0)	
Persistence and degradability	Readily biodegradable in water. Biodegradability in soil: no data available. No (test) data on mobility of the components available. Photodegradation in the air.
Biochemical oxygen demand (BOD)	0.64 g O ₂ /g substance
Chemical oxygen demand (COD)	1.06 g O ₂ /g substance
ThOD	1.068 g O ₂ /g substance
BOD (% of ThOD)	0.60 (5 days; Literature study)
12.3. Bioaccumulative potential	
Formalin, 10%, Neutral Buffered	
Bioaccumulative potential	Not established.
Water (7732-18-5)	
Bioaccumulative potential	Not established.
Sodium Hydroxide (1310-73-2)	
Bioaccumulative potential	No bioaccumulation data available.
Phosphoric Acid, 85% w/w (7664-38-2)	
Bioaccumulative potential	Not bioaccumulative.
Formaldehyde, 37% w/w (50-00-0)	
Log Pow	-0.78 - 0.0
Bioaccumulative potential	Bioaccumulation: not applicable.
12.4. Mobility in soil	
Formaldehyde, 37% w/w (50-00-0)	
Log Pow	-0.78 - 0.0
Ecology - soil	Toxic to flora.
12.5. Other adverse effects	
Other information	: Avoid release to the environment.
SECTION 13: Disposal considerations	
13.1. Disposal methods	
Regional legislation (waste)	: Disposal must be done according to official regulations.
Waste treatment methods	: Dispose of contents/container in accordance with licensed collector's sorting instructions.
Waste disposal recommendations	: Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to comply with local, state and federal regulations.
Ecology - waste materials	: Avoid release to the environment.
SECTION 14: Transport information	
14.1. Basic shipping description	
In accordance with TDG	
TDG	
Not regulated for transport	
DOT	
Not regulated for transport	
14.3. Air and sea transport	
IMDG	
No additional information available	
IATA	
No additional information available	
SECTION 15: Regulatory information	
National/international regulations	
No additional information available	
SECTION 16: Other information	
SDS Major/Minor	: None
Date of issue	: 09/12/2015
Indication of changes:	

Formalin, 10%, Neutral Buffered

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

Other information : None.

Full text of H-statements:

H226	Flammable liquid and vapour
H302	Harmful if swallowed
H312	Harmful in contact with skin
H314	Causes severe skin burns and eye damage
H315	Causes skin irritation
H318	Causes serious eye damage
H319	Causes serious eye irritation
H330	Fatal if inhaled
H350	May cause cancer
H370	Causes damage to organs
H401	Toxic to aquatic life

SDS Canada ACP

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

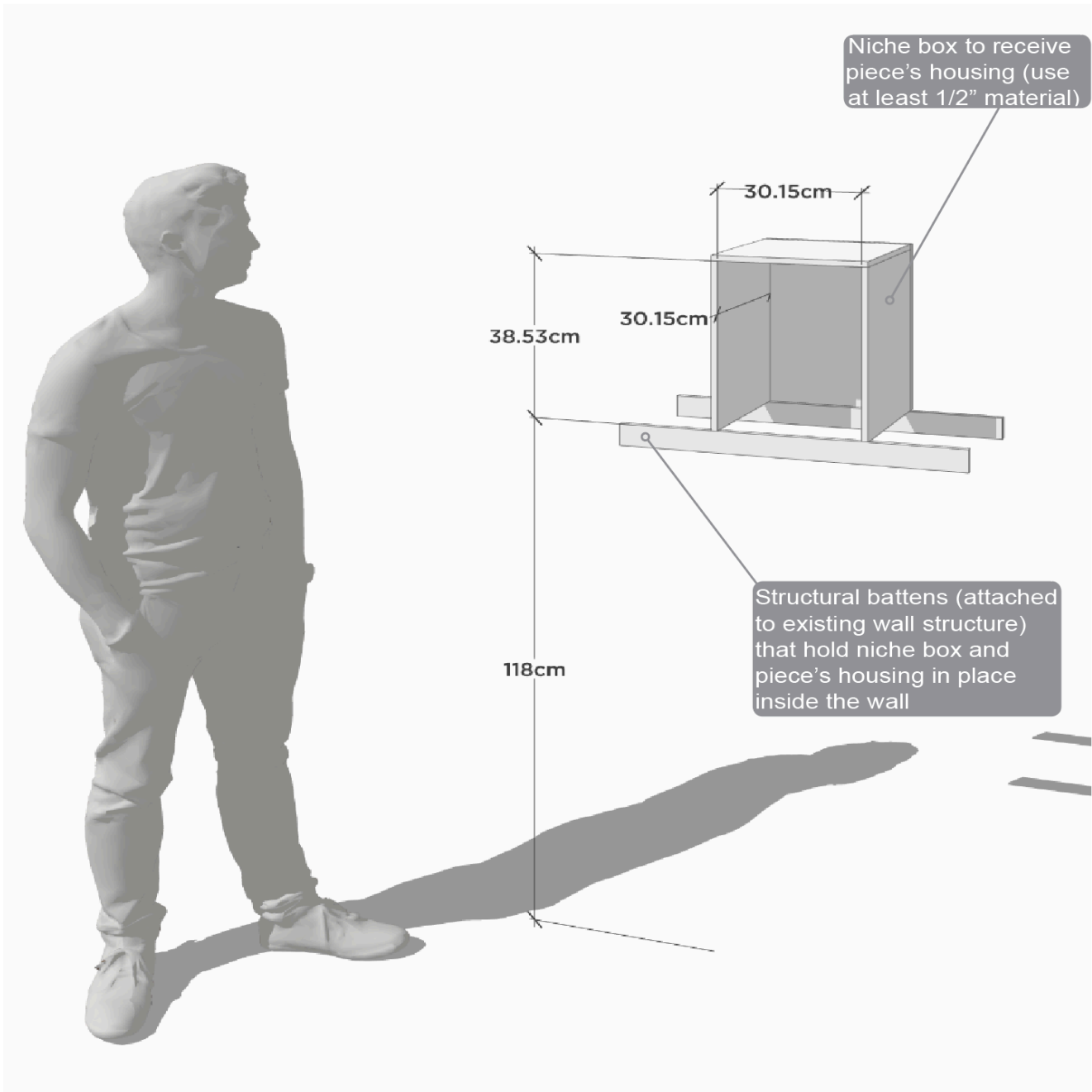
APPENDIX III - ASSEMBLY OF THE WORK

The following are general installation instructions. For specific measurements and details for both the “Niche” and “Multiple Shelves” version of the installation please read those specific sections.

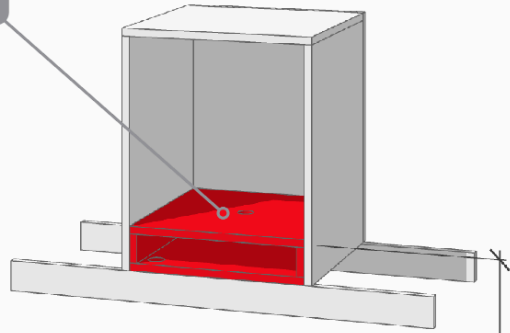
1. Place the housing inside the podium and connect the power cable to the WAGO connectors coming from the extension power cord. Make sure the 12VDC power supply is connected as well.
2. Once the housing is plugged in to the electricity, place the vial with the nanopamphlets on top of the magnetic stirrer and with a chronometer double check that the stirrer interval time is set between 45-50 seconds.
3. Remove the vial from the stirrer and put it aside, in a safe place.
4. Before closing the housing, make sure there are no gaps between the podium and the housing. If there are gaps wider than 1 mm, fill them in with strands of white foam board and glue them in place. Use modeling paste to make the surface even, if needed.
5. Close the housing and follow the labels underneath the cover, to make sure you are placing the top cover in the right direction.
6. If you must clean the housing cover, use water and a clean cotton rag. If the stains do not go away or the paint becomes uneven from the cleaning, apply a thin coat of paint to the entire surface of the housing where the vial will be placed. To do this, use a foam paint roller and apply a thin coat of paint until stains are no longer visible. Please refer to Paint for Housing.
7. Clean the acrylic box with the Novus #1 cleaner provided. Avoid using any other cleaning products as they might damage the acrylic, and NEVER use alcohol-based products for this purpose as they will crack the material. Make sure to wear clean nitrile gloves to avoid leaving fingerprints on the material. Use a clean cotton rag and spray a generous amount of Novus #1 cleaner on top of the rag. Proceed to clean the acrylic in a circular motion.
8. Clean the vial with a clean cotton rag to remove any fingerprints left behind. You can use the Novus #1 cleaner provided to clean the acrylic box. Wear clean gloves while cleaning.
9. Place the vial on top of the housing. Then, carefully place the acrylic box on top of the housing.
10. Install the display metal frame at 150 cm distance from the floor to the center of the frame. Install the display inside it, close the frame, plug in the display, and turn it on.
11. To install the book, follow the template provided in the Book Support Layout section. While handling the book, please use clean fabric gloves at all times.

The metal rods that suspend the book are made out of stainless steel (1.8 mm.) Please follow the diagrams to ensure that they are the right measurements.
12. Drill a hole using a drill bit one size smaller than the metal rods. Insert the metal rods into each hole, while making sure the rods go all the way down into the wood, or as much as necessary. Once inserted, the metal rods should be tight and stable.
13. Place the book open at pages 110-111. Use white fabric gloves when handling the book.

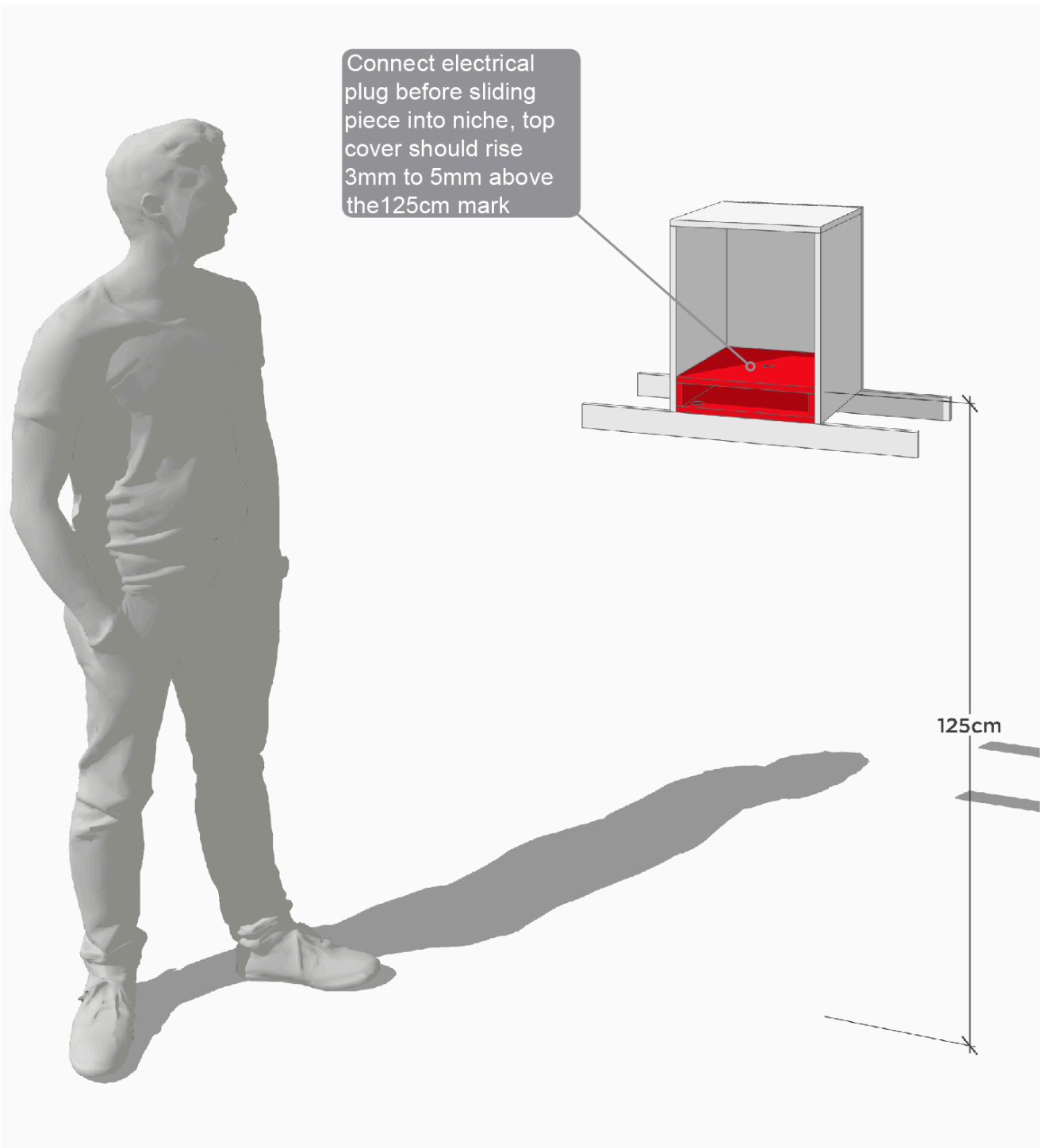
Niche Version

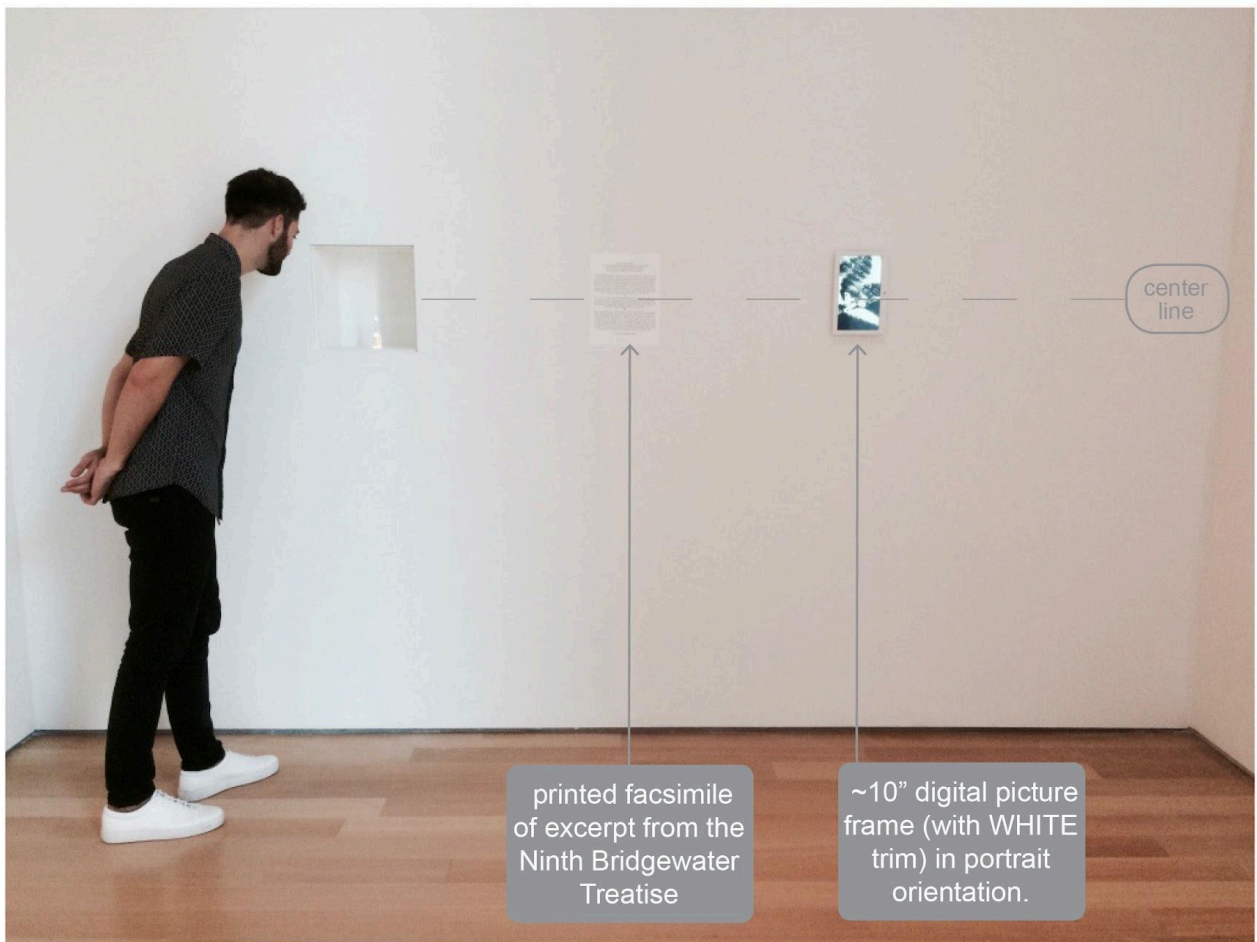
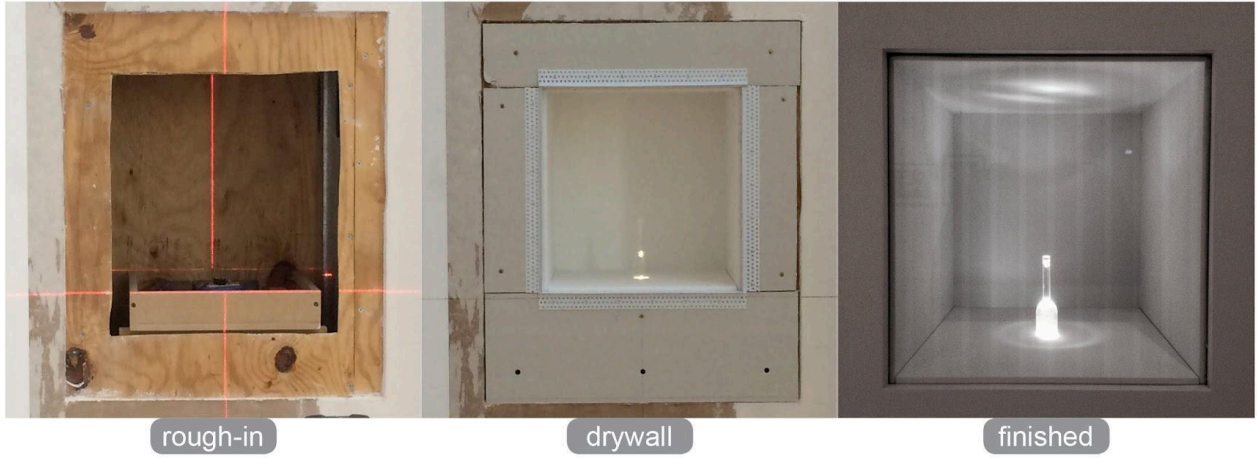


Connect electrical plug before sliding piece into niche, top cover should rise 3mm to 5mm above the 125cm mark

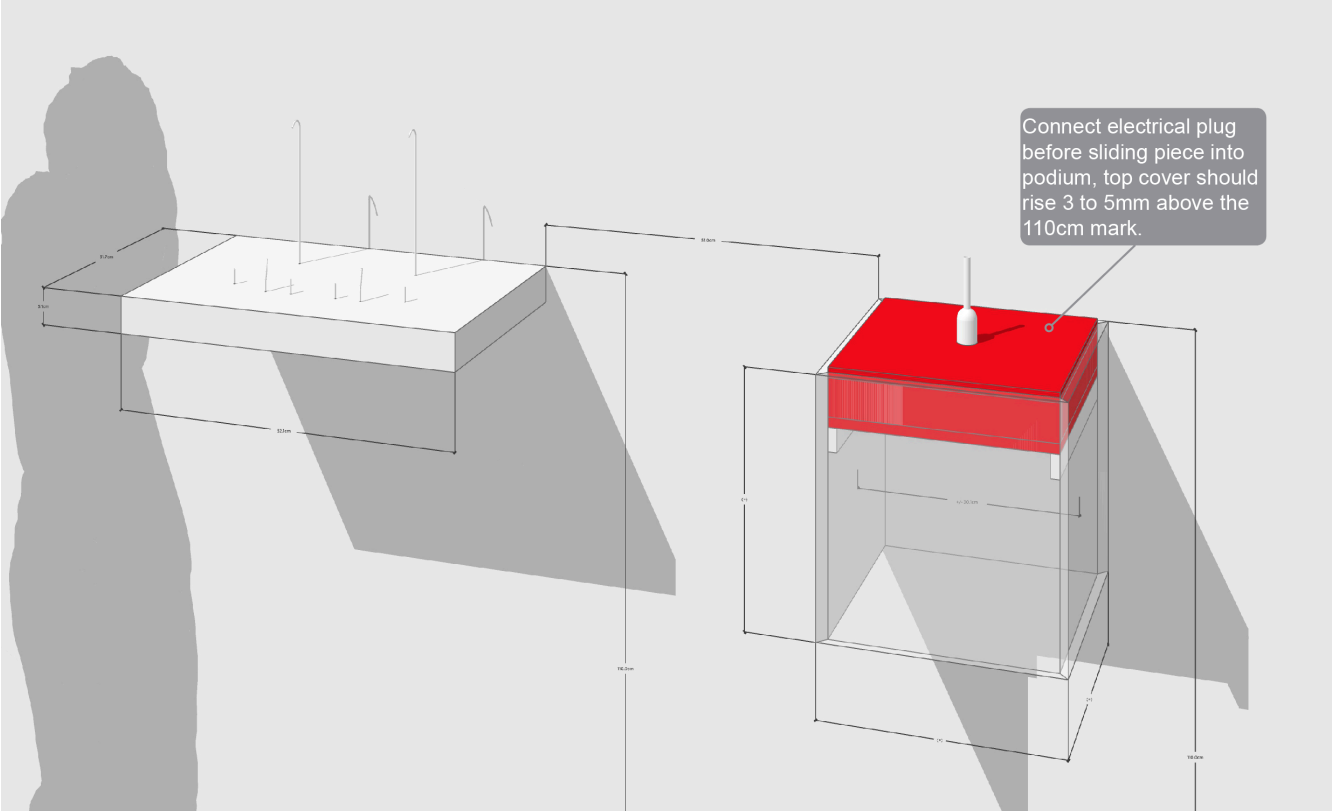
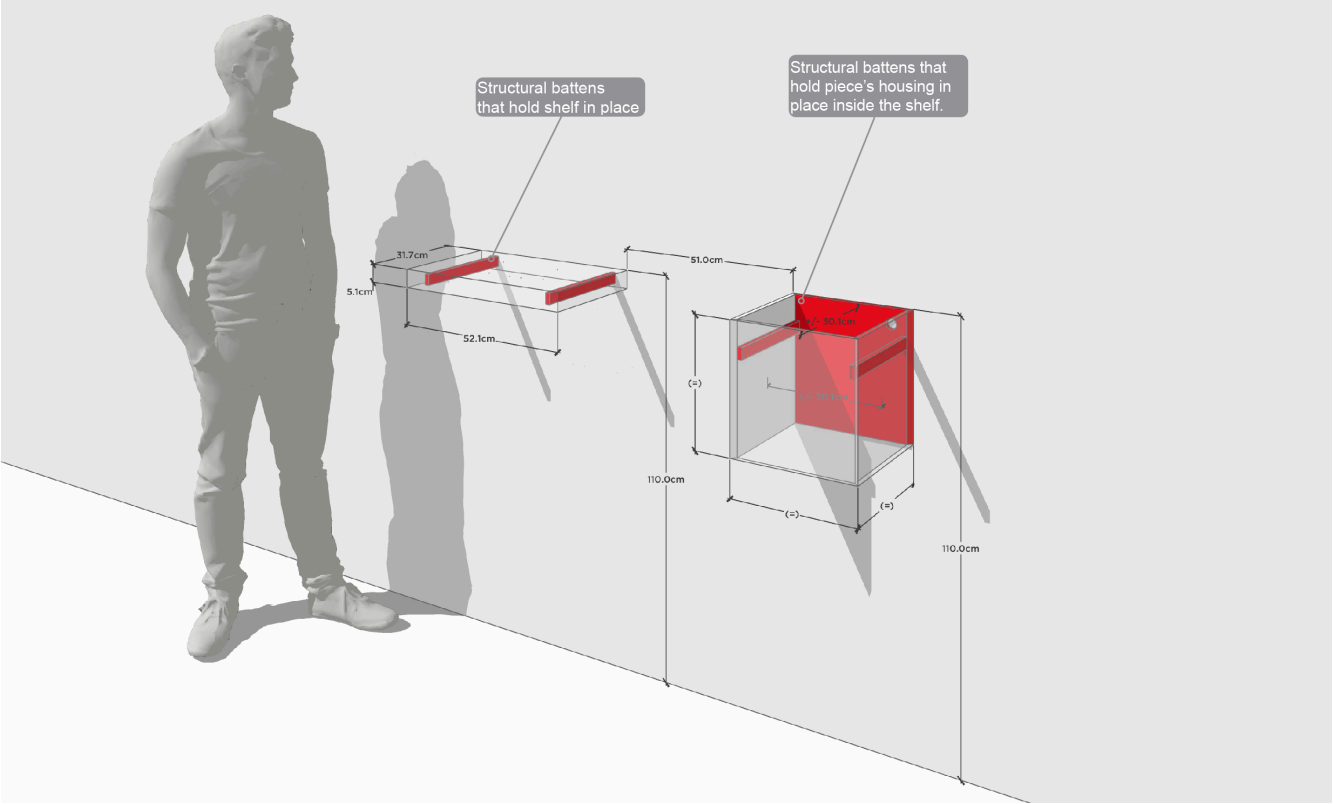


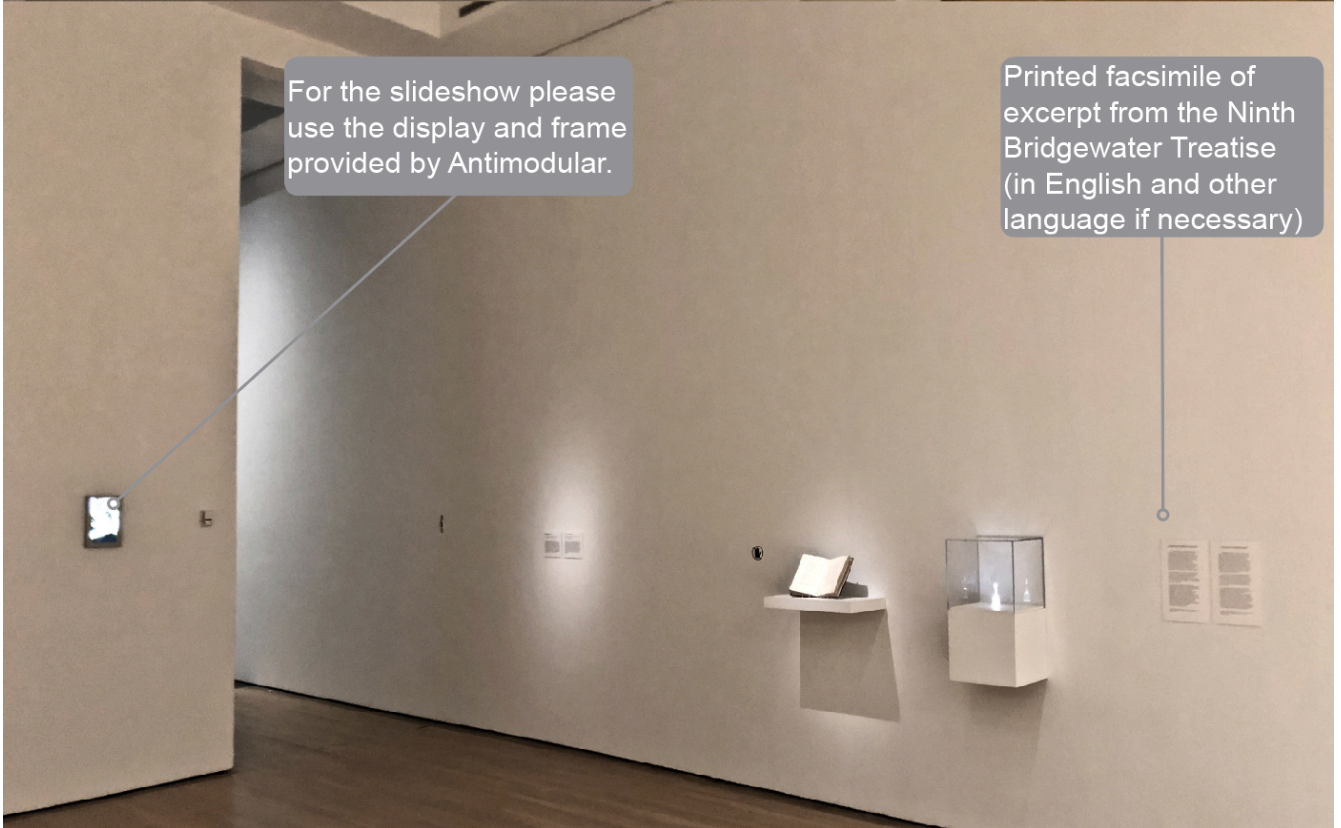
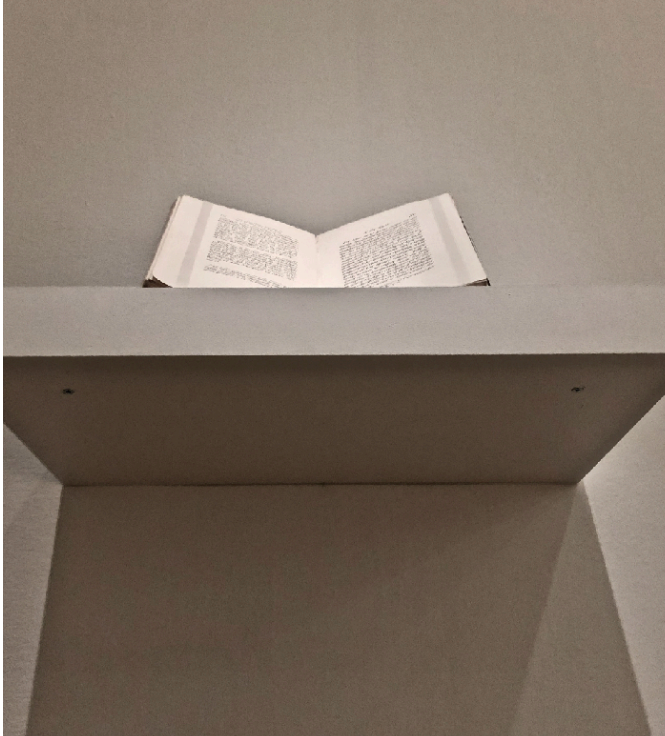
125cm





Multiple Shelves Version



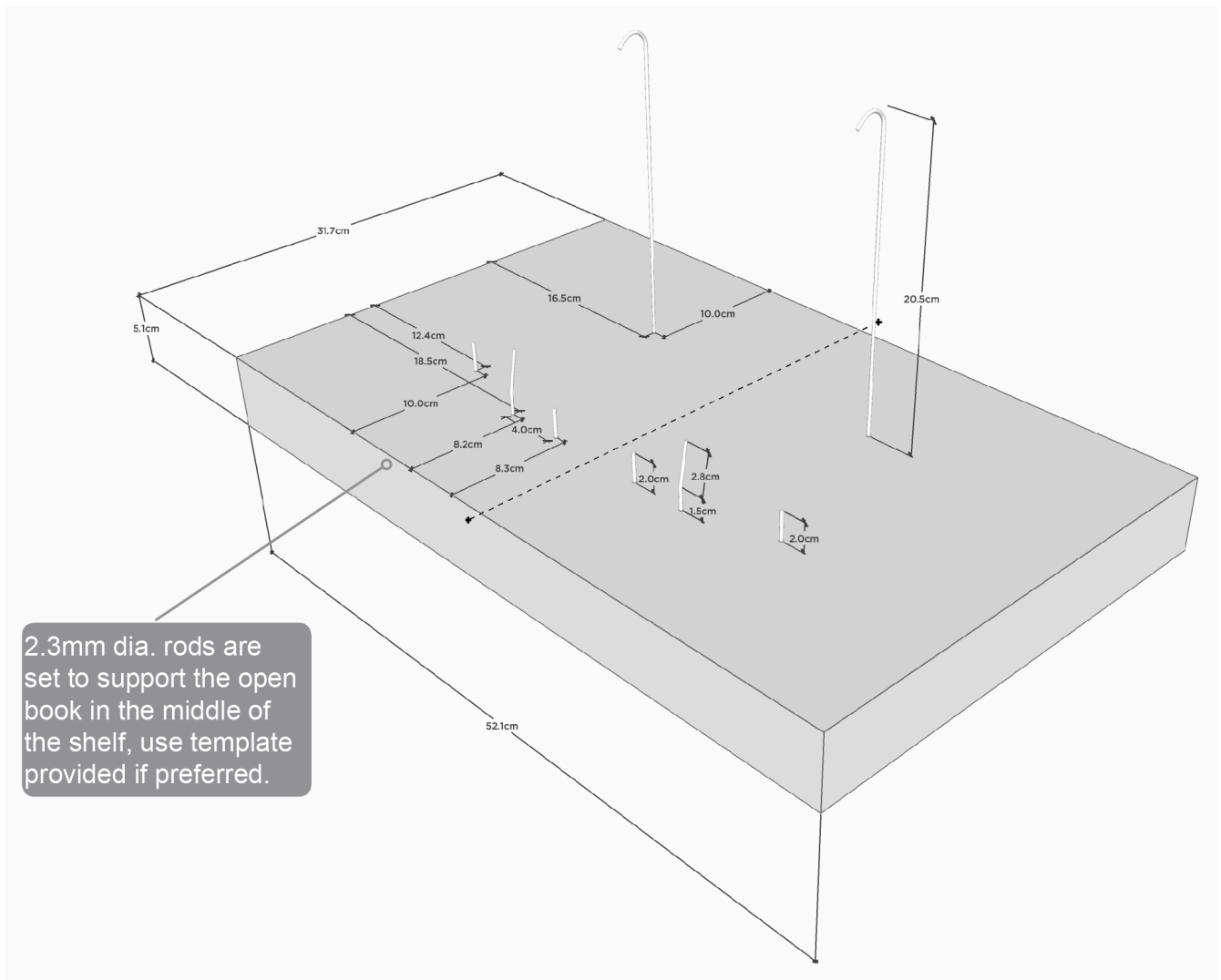


For the slideshow please use the display and frame provided by Antimodular.

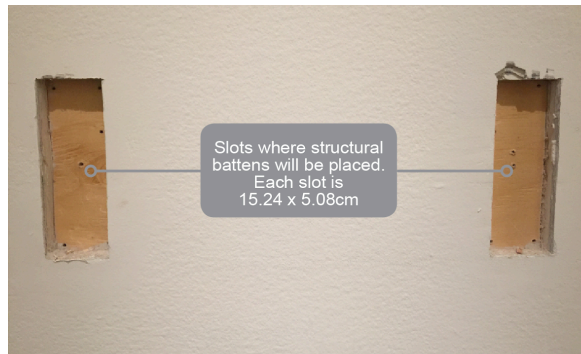
Printed facsimile of excerpt from the Ninth Bridgewater Treatise (in English and other language if necessary)

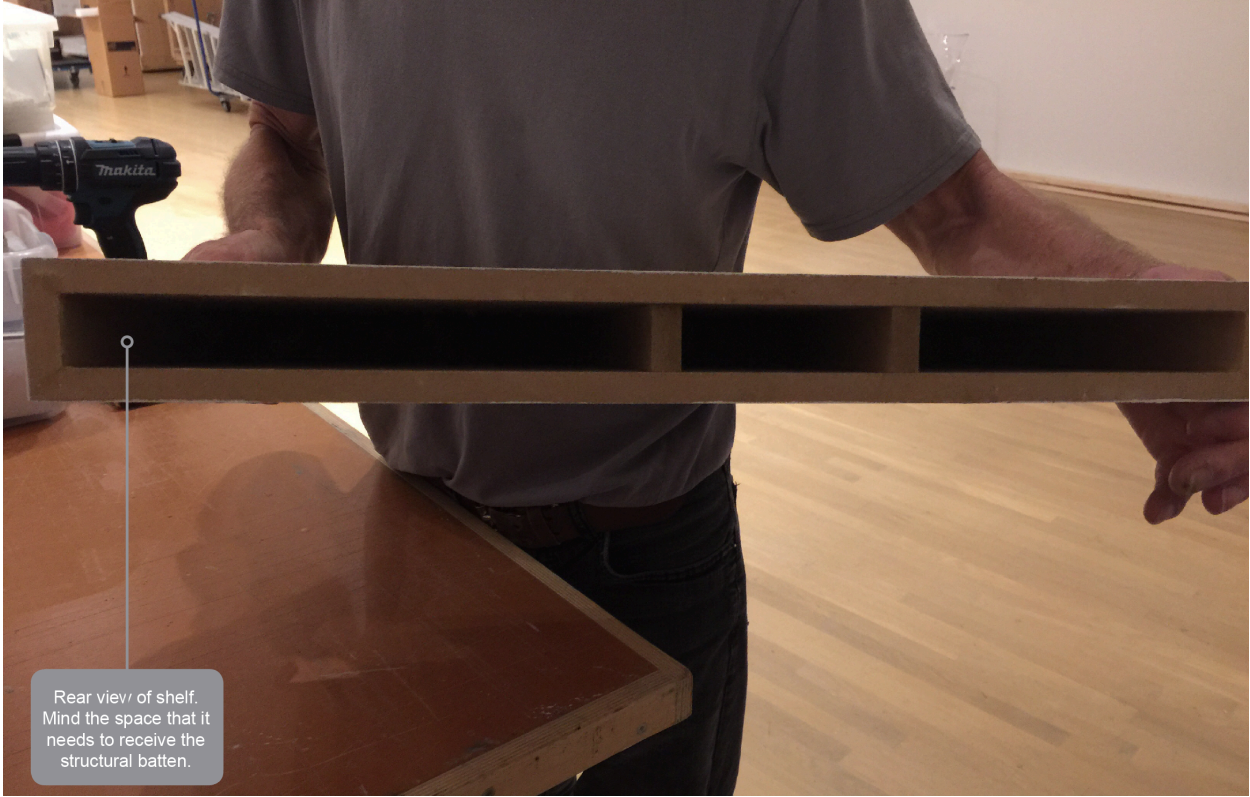
Book Support

The following is the required placement and dimensions for exhibiting the green-cover book. The metal rods are made out of 1.8 mm-thick stainless steel. The top of the rods are covered with a clear rubber hose that fits tightly onto the rod to protect the book from directly touching the metal.

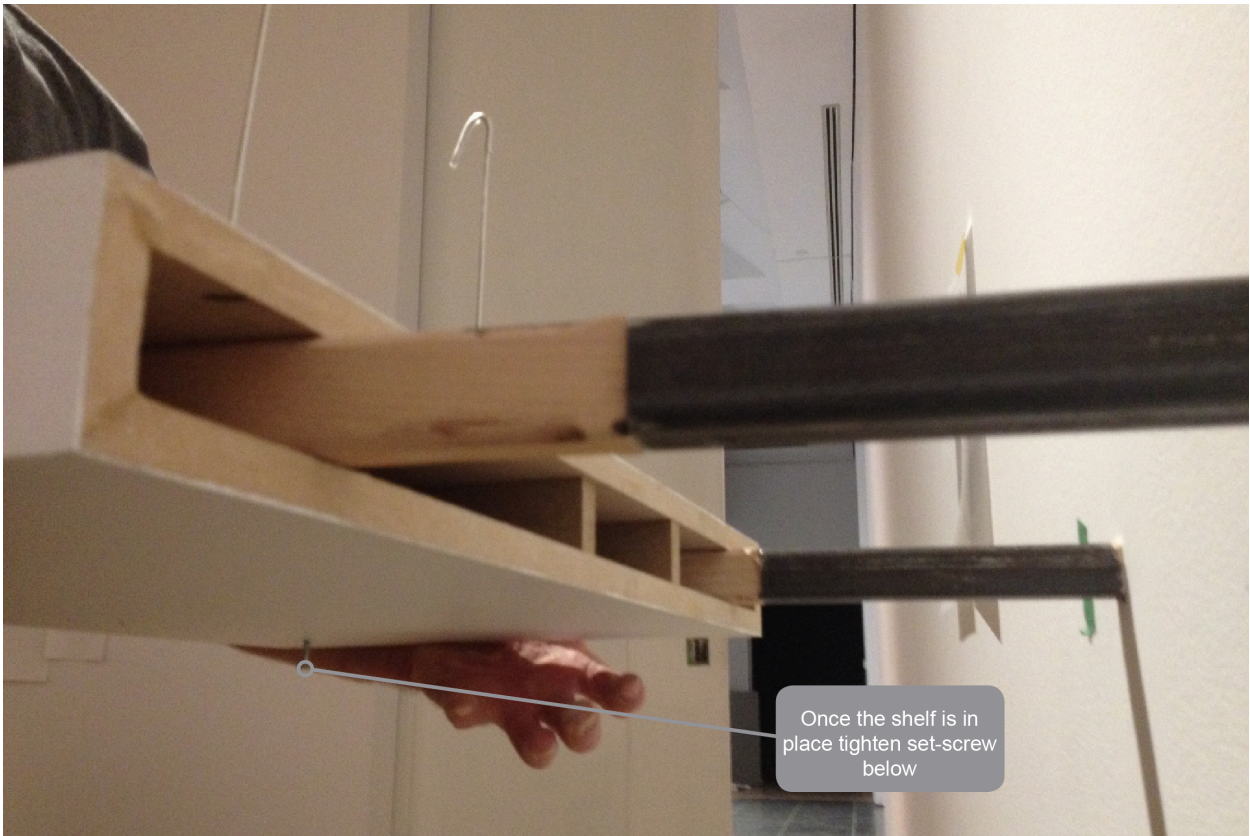


Structural Battens Installation for Bookshelf:





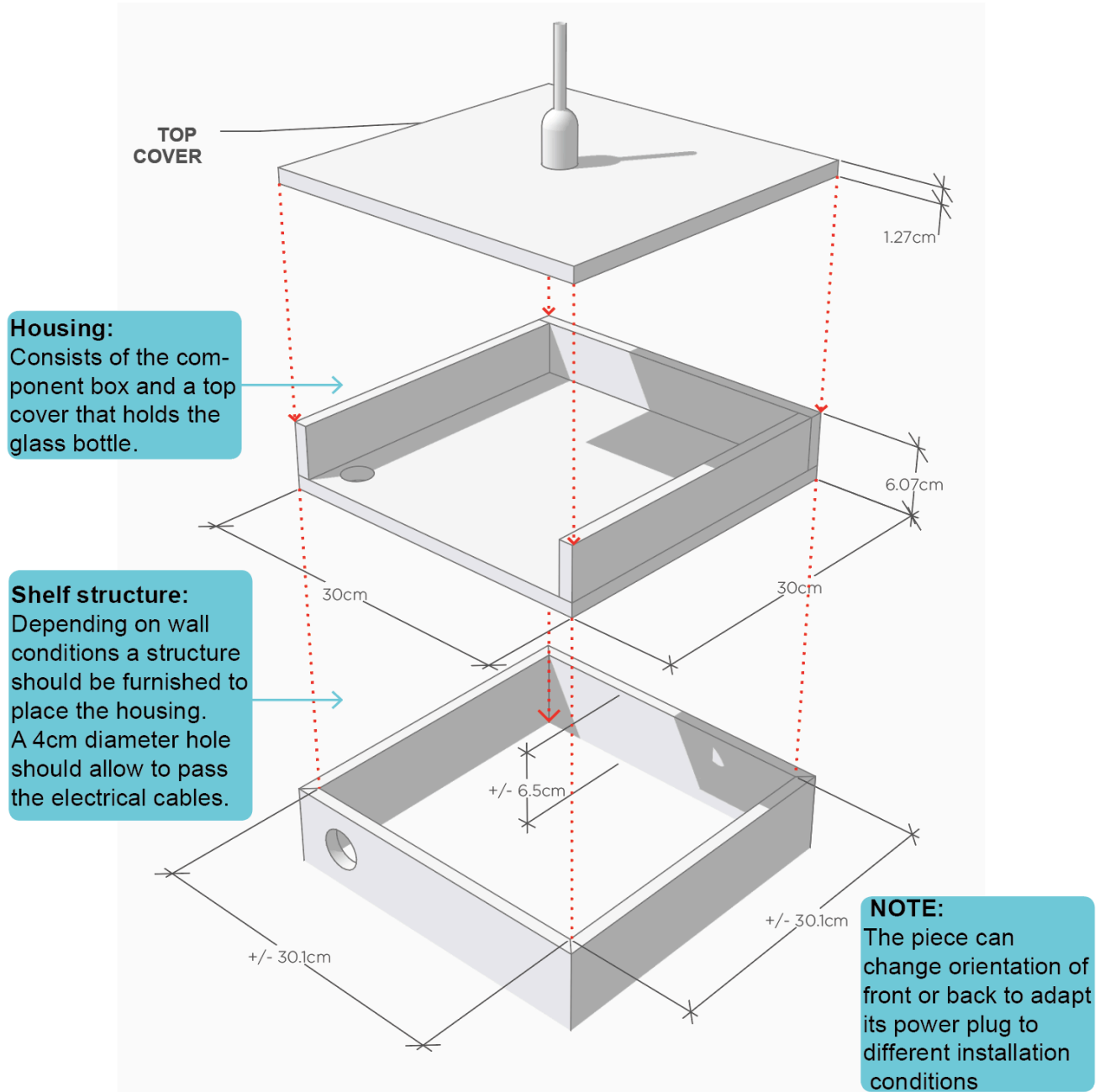
Rear view of shelf.
Mind the space that it
needs to receive the
structural batten.



Once the shelf is in
place tighten set-screw
below

Housing Shelf

The housing is made with 1/2-inch Russian Plywood and/or MDF and should slide into a shelf structure measuring 30.1 cm by 30.1 cm. A lower support, such as a batten, should be installed inside the shelf structure (at about 6.5 cm deep) to hold the top cover slightly above the shelf structure level (1 cm).



APPENDIX IV - REPAIRS AND OTHER MANIPULATIONS

Repainting the Housing

The top cover of the housing comes with three coats of paint. If an extra coat of paint is needed, use a foam paint roller to softly apply the paint onto the cover. We recommend using the following white tone (or at least the closest match possible):

Sherwin Williams
ProMar 200 Zero VOC Interior Latex Paint
Product Number: B30W02650
Sales Number: 6503-92517
Sheen: Flat
Base: High Reflective White

If the multi-shelf or niche has been re-fabricated on site, make sure you to use the same paint that the museum/gallery is using.

Removing Scratches



If you have any scratches, follow these steps. Start by using sandpaper #200, sand the scratch in a perpendicular motion. Clean the dust off.

Take a clean cotton rag and use Novus #3 cream to rub the sanded area. Use a very small amount and rub it in the same perpendicular motion that the sanding was done. Apply some pressure while doing this. Clean the residue off.

Take another clean cotton rag and use Novus #2 cream. Use a very small amount and rub the affected area in a circular motion. Apply enough pressure while doing this. Clean off the residue.

Use another clean cotton rag and spray the Novus #1 cleaner onto the rag. Proceed to clean the acrylic in circular motion. By now, no marks or scratches should be visible; the surface should be completely smooth and polished.

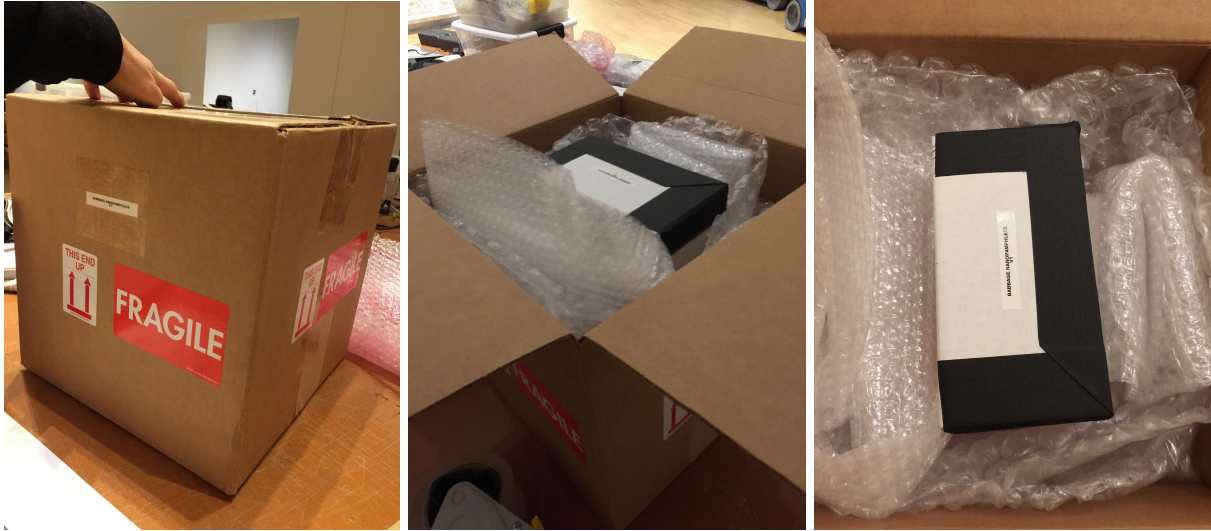
If the scratches are still visible, repeat the steps above until all of the scratches have disappeared.

APPENDIX V - UN-PACKING

The piece is shipped in two separate boxes; the first box contains the housing and the vials, and the second box contains the display, the display's metal frame, and the book.

A. Housing

To unpack the housing, open the cardboard box. Inside, you will find a smaller box containing the vials. Take this small box out, put it aside.



Carefully remove everything else from the box until you reach the red fabric, which wraps and protects the housing. Open the fabric, take the two flaps, and pull them up at the same time as shown in the following photos. This will help you carefully lift the housing out of the box.



Take the housing out of the box and carefully place it on a clean and flat surface.

B. Vials

Place the two vials on top of the wooden base inside the small cardboard box. Make sure the bottles are tightly secured in place. Fill the box with foam packing peanuts and seal it.

Put the box of vials in the middle of the other box with the housing and bubble wrap, making sure there is enough bubble wrap to secure all the components in place, so that they will not move during shipping.



Place a final layer of bubble wrap on top of everything and seal the box.

C. Display, Metal Frame, Book

Wrap the metal frame and book individually in bubble wrap. The display should be packed in its respective box.

When wrapping or handling the book, make sure to wear clean fabric gloves.

Place one or two layers of bubble wrap on the bottom of the designated box.

Place all the items inside the box. Then fill the rest of the box with more bubble wrap, making sure there is enough bubble wrap to secure all the components in place, so that they will not move during shipping.

APPENDIX IV - TEXT

Please provide the following text excerpt (written by Babbage) to the museum or gallery to be printed and translated, if required.

AN EXCERPT FROM "ON THE PERMANENT IMPRESSION OF OUR WORDS AND ACTIONS ON THE GLOBE WE INHABIT" IN *THE NINTH BRIDGEWATER TREATISE*

The pulsations of the air, once set in motion by the human voice, cease not to exist with the sounds to which they gave rise. Strong and audible as they may be in the immediate neighbourhood of the speaker, and at the immediate moment of utterance, their quickly attenuated force soon becomes inaudible to human ears. The motions they have impressed on the particles of one portion of our atmosphere, are communicated to constantly increasing numbers, but the total quantity of motion measured in the same direction receives no addition. Each atom loses as much as it gives, and regains again from other atoms a portion of those motions which they in turn give up.



The waves of air thus raised, perambulate the earth and ocean's surface, and in less than twenty hours every atom of its atmosphere takes up the altered movement due to that infinitesimal portion of the primitive motion which has been conveyed to it through countless channels, and which must continue to influence its path throughout its future existence.



Thus considered, what a strange chaos is this wide atmosphere we breathe! Every atom, impressed with good and with ill, retains at once the motions which philosophers and sages have imparted to it, mixed and combined in ten thousand ways with all that is worthless and base. The air itself is one vast library, on whose pages are for ever written all that man has ever said or woman whispered. There, in their mutable but unerring characters, mixed with the earliest, as well as with the latest sighs of mortality, stand for ever recorded, vows unredeemed, promises unfulfilled, perpetuating in the united movements of each particle, the testimony of man's changeful will.

CHARLES BABPAGE, 1837