Section 12 36 53

Laboratory grade solid phenolic panels for durable lab designs

1. Part – General

1.01 Section includes

A. Solid composite work surfaces suitable for use on laboratory grade casework and as shelving, backsplash/curb, wall cladding, drawer fronts, cabinet doors, partitions and other structural components

1.02 Related Sections:

A. Documents affecting work in this section include but is not limited to the General Conditions, Supplementary Conditions and Sections in Division 1 – General Requirements of these specifications:

- Section 064100 – architectural wood cabinets
- Section 06200 – Finished Carpentry
- 10500 - Lockers
- 10670 – Shelving
- 12300 Laboratory Casework and fixtures (12 3100 through to 12 3500)
- 15400 – Sinks field inserted in countertops

1.03 References:

A. SEFA 3-2010 Recommended practices for laboratory work surfaces
B. SEFA 8PH – 2014 Recommended Practices for Lab Grade phenolic casework
C. International Standards:
    - ASTM D3023 & C1378 – Stain Resistance
    - ASTM D696 – Thermal Co-efficient of Expansion
    - ASTM E1428 / JIS Z 2801:2012 (mod) – Bacteria Resistance
    - EN 438-2:12 – Boiling water absorption
    - EN 438-2:16 – Standard Test Method for Resistance to Dry Heat
    - EN 12721 – Standard test method for resistance to wet heat
    - EN 438-2:17 Dimensional stability in elevated temperature (ASTM D648 – Heat distortion)
    - EN 438 – 2:21 – Impact resistance
    - EN 438 -2:25 – Standard Test Method for Resistance to Scratch
    - EN 438 – 2:27 – Light fastness
    - EN ISO 178/ASTM 790-08 – Elasticity and flexural strength
    - EN ISO 1183 – Density
    - ASTM e-84 – Surface burning / flame spread
    - ASTM D785 – Rockwell hardness

- ISO 9001 – quality management systems
- ISO 14001: 2015 – Environmental management system
- ISO 50001:2018 – Energy Management System
- ISO 45001:2018 -0ccupational health and safety management system

1.04 Submittals

1. Submittals for Review in accordance with Section:

A. Shop drawings:

Submit plan, section, elevation and perspective drawings necessary to describe and convey layout, profiles and product components, including edge conditions, joints, fitting and fixture locations, anchorage, accessories and finish colors.

Verify actual measurements by field measurements before fabrication; show-recorded measurements on shop drawings.

Co-ordinate field measurements and fabrication schedule with construction progress to avoid construction delays

B. Product data:

Manufacturer's data sheets on each product used, including preparation instructions/installation instructions and recommendations; storage & handling requirements.

C. Samples

Selection Samples: for each product specified, submit a complete set of color samples representing manufacturer's full range of standard colors

Verification samples: Submit four samples 4"x6" representing each color and thickness of material used

2. Quality Control Submittals

A. Test Reports – independent/certified test reports showing compliance with specified performance characteristics and physical properties

3. Sustainable Design Submittals

A. Low Emitting Materials: provide certification of VOC content

B. EPD: provide independent Environmental Product Declaration

C. FSC – provide chain of custody certification

4. Close out submittals

A. Maintenance Data

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i. Provide maintenance, cleaning and life cycle information

ii. Include recommended cleaning materials and procedures including a list of materials detrimental to FunderMax Max Resistance^2

1.05 Quality Assurance

A. Manufacturer qualifications

i. Primary product furnished by a single manufacturer with a minimum of 10-years (documented) experience in work of this section

ii. Products manufactured in an ISO 9001 certified facility

B. Installer qualifications

i. Minimum 5 years documented experience of work in this section

C. Mockup:

i. Construct countertop mockup, xx wide x full depth

1.06 Delivery, Storage and Handling

A. Delivery

- Use pallets larger than countertops during transportation
- Package materials to prevent damage during shipping and handling

B. Storage

- Use pallets larger than sheets during transportation
- Deliver and store in manufacturers original protective packaging until ready for installation
- Store panels using protective dividers to avoid damage
- Do not store vertically
- Do not leave protective film on stored or installed panels longer than xxx months
- Store material in an enclosed shelter to provide protection /exposure to the elements

C. Handling

- Remove protective peel once countertop/panel has been installed
- Handle panels individually to prevent damage
- Remove adhesive stickers immediately after installation
- Do not use work surfaces as a workbench, seating or stand on

1.07 Co-ordination and Project conditions

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A. Do not install products under environmental conditions outside of manufacturer's recommended limits
B. Secure field measurements before preparation of shop drawings and fabrication.
C. Furnish anchorage and top connection devices or material as specified

1.08 Warranty

Countertops should hold a warranty for an extended period of 10 years. The warranty to include the specified physical and chemical properties. The manufacturers authorized fabricator, product installer and panel manufacturer must sign the warranty documents and submit a copy to the contractor.

2. Products

2.01 Manufacturer

Contract documents/specification is based on raw material panels manufactured by FunderMax and provided by FunderMax GmbH, located at IZ NOE-Sued Strabe 3, Objekt1`, 2351 Wiener Neudorf, Austria. Approved fabricators that provide products that comply with this specification section, as judged and approved by the architect, may be acquired from the above.

All panel products specified in this section shall be provided by a single manufacturer.

Substitutions: not permitted

2.02 Materials

Max Resistance² is a duromer high pressure, phenolic, laminate (HPL), manufactured under high pressure at high temperature, in accordance with EN 438-4, type CGS. The layers of virgin kraft paper impregnated with phenolic resin coupled with its scientifically developed, double-cured polyurethane acrylic coating, Max Resistance² stands up to the toughest tests – unaffected by solvents, most acids and the harshest chemicals. Easy-to-clean and disinfect and at the same time wear and scratch resistant, this innovative material significantly extends the life cycle of the laboratory work surface. It is suitable for use on laboratory grade countertops, shelving, casework, lockers, wall cladding and fume hood liners. The double-sided material is color matched to the top and bottom surface.

Basis of Design: FunderMax Resistance^2 with a double sided and double-cured polyurethane acrylic surface finish

Basis of Design Product: Subject to compliance with requirements, provide phenolic Max Resist countertops, with double hardened acrylic coating top and bottom as manufactured by FunderMax GmbH, or a comparable product by one of the following:

Max Resistance[2]

- FunderMax GmbH / FunderMax North America LLC
- American Epoxy Scientific LLC
- Counter Reaction

Substitutions: not permitted

2.03 Material Properties

A. Work surfaces – shall be constructed of chemical resistant panels that are double sided and color matched top and bottom.

B. Thickness – As specified on drawings or by Architect

C. Color – As specified on drawings or by Architect

Black Core: 0082 Deep Black; 074 Birch Grey: 0074 Pastel Grey: 0075 Dark Grey: 0077 Charcoal; 2181 Volcano; 0606 Arctic White: 0085 White: 0851 Winter White: 0706 Glacier Blue: 0592 Kiwi Green: 0558 White Punto: 0559 Pastel Grey Punto: 3361 Arctic Punto

Colored Core: 0085 white with 0085 white core; 0074 pastel grey with 0074 pastel grey core; 0077 charcoal with 0077 charcoal core; 2181 volcano with 2181 volcano core

D. Finish – matte non-glare

E. Chemical resistance

Evaluation of chemical resistance based on SEFA 3-2010 Laboratory Work Surfaces standard list of 49 chemicals / concentrations, their required methods of testing (24-hour surface test) and exceed the acceptable results as a means of establishing an acceptable level of performance for all exposed and semi-exposed surfaces.

The chemical resistance performance should be as follows:

CHEMICAL/REAGENT	TEST METHOD	RATING
ACETATE, AMYL	A	0
ACETATE, ETHYL	A	0
ACETIC ACID - 98%	B	0
ACETONE	A	0
ALCOHOL, ETHYL	A	0
ALCOHOL, METHYL	A	0
ALOCHOL, BUTYL	A	0
AMMONIUM HYDROXIDE, 28%	B	0
BENZENE	A	0

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CARBON TETRACHLORIDE	A	0
CHLOROFORM	A	1
CHROMIC ACID - 60%	B	0
CRESOL	A	1
DICHLORACETIC ACID	A	2
DICHROMATE ACID 5%	B	1
DIMETHYLFORMAMIDE	A	0
DIOXANE	A	0
ETHYL ETHER	A	0
FORMALDEHYDE, 37%	A	0
FORMIC ACID - 90%	B	1
FURFURAL	A	1
GASOLINE	A	0
HYDROCHLORIC ACID 37%	B	0
HYDROFLUORIC ACID, 48%	B	1
HYDROGEN PEROXIDE, 30%	B	2
IODINE, TINCTURE OF	B	1
METHYL ETHYL KETONE	A	0
METHYLENE CHLORIDE	A	0
MONOCHLOROBENZENE	A	0
NAPTHALENE	A	0
NITRIC ACID 20%	B	0
NITRIC ACID 30%	B	0
NITRIC ACID 70%	B	0
PHENOL, 90% (WT)	A	1
PHOSPHORIC ACID 85%	B	0
SILVER NITRATE, SATURATED	B	0
SODIUM HYDROXIDE FLAKE	B	0
SODIUM HYDROXIDE, 10% (WT)	B	0
SODIUM HYDROXIDE, 20% (WT)	B	0
SODIUM HYDROXIDE, 40% (WT)	B	0
SODIUM SULFIDE SATURATED	B	0
SULFURIC ACID, 33%	B	0
SULFURIC ACID, 77%	B	0
SULFURIC ACID, 77% & NITRIC ACID, 70% EQUAL PARTS	B	2
SULFURIC ACID, 96%	B	1
TOLUENE	A	0
TRICHOLOROETHYLENE	A	0
XYLENE	A	0
ZINC CHLORIDE, SATURATED	B	0

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F. Physical Properties

1) Density DIN 52350 / ISO 1183: $\geq$ 1,35g/cm^3 / $\geq$ 84lbs/ft^3
2) Modulus of elasticity EN ISO 178: $\geq$ 9000MPa / $\geq$ 1,305,340 psi
3) Flexural Strength EN ISO 178: $\geq$ 80 MPa / $\geq$ 11,603 psi
4) Tensile Strength EN ISO 527-2: $\geq$ 60 MPa / $\geq$ 8,702 psi
5) Resistance to Scratching EN 438-2 point 25: 4-6 N (6N = 1.35lbf)
6) Resistance to Impact EN 438-2 point 21: $\geq$8mm /$\geq$ 1/3”
7) Resistance to stress Abrasion EN 438-2 point 10: $\geq$ 450 U (rotations)
8) Dimensional stability measured at elevated temperatures with moisture change EN 438-2, point 17: $\leq$ 0.10% length : $\leq$ 0.21% width
9) Resistance to boiling water EN 438-2, point 12: 0.5% (CGS/CGF) 1.5 (BCS)
10) Co-efficiency of thermal expansion DIN 52328: 20 x 10^{-6}
11) Resistance to dry heat EN 438-2, point 16: 4
12) Resistance to staining EN 438-2, point 26 (group 1-2): 5 no visible changes, no blisters or cracks
13) Light fastness EN 438-2 point 27: 4 or 5
14) Non porous and non-microporous surface and edges
15) Surface will not support bacteria growth
16) Will not support oxidation of material surface
17) Both sides decorative and chemical resistant
18) Double hardened acrylic surface finish
19) Min thickness of the acrylic finish: $\geq$ 0,1mm / 0.004”
20) Environmental standards: FSC / PEFC certification ; Environmental Product Declaration (EPD) ; Manufacturer recycles waste and cutoffs to produce green electricity
21) Fire Rating –
    a. Flame Spread Index: 25
    b. Smoke Developed Index: 130

2.04 Quality Control

A. Panels shall be of material specifically designed for laboratory work surfaces. Fabricated work surfaces / countertops shall comply with all current codes and regulations. Tops and shelves shall have a uniform thickness of max +/- 0.03” and a flatness of maximum 0.04” for a 3 foot span.
B. Panels to be UL Greenguard and FSC certified and labeled for quality consistency
C. Environmental Product Declaration (EPD) provided by the manufacturer
D. SEFA 3 – 2010 independent (SEFA approved) test certificate to be provided meeting conditions outlined above.

2.05 Fabrication

Fabricate panels as per shop drawings

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A. Drip grooves (1/8”) set back ½” from face on the underside at all exposed edges unless otherwise noted on Laboratory Furnishings drawings

B. Edge treatment
    - All exposed edges to be sanded to a smooth finish
    - Standard chamfered edge (1/8”)
    - Standard ¼” radius edge
    - As indicated on drawings
    - Corners – exposed corners eased slightly for safety

C. Curb/Back splash
    - Supplied loose for field installation
    - Same material as the work surface/countertop
    - 4” high unless otherwise indicated on the drawing
    - Bonded to the top of the work surface to form a square joint

D. Joints
    - Tight fitting butt joints (recommended) – adhered with reactive adhesive/resin adhesive or mechanical fasteners positioned to be concealed after installation
    - Standard butt joints – a 1/16th seam using a two-part epoxy adhesive/grout
    - Fix work surface panels with blind fastenings into the back or underside of the panel. Use #10, type A sheet metal screws sized to stop at least 1/8” short of the finished face. Pre-drill panel with an 11/64” diameter high-speed drill bit aligned with 7/32” clearance hole in the supporting structure. Or Max Compact panels can be bonded to wood materials using a high-quality PVA glue

E. Sink cutouts –
    - Drop in – shall be routed to form openings with 3/8” minimum depth supporting flanges and such that the rim of the sink, when installed is at the same level as the work surface top. Epoxy sinks shall be set in a bed of two-part epoxy adhesive/grout. Stainless steel and polypropylene sinks shall be set in a bed of silicone sealant.
    - Under Mount – routed to form smooth edged openings with the top edge radius. The bottom edge of the sink opening shall be finished smooth with the edge broken to prevent sharpness. Corners of sink cutouts shall be radius not less than 1/8”. All undermount sinks shall be supported by brackets blind fixed to the underside of the work surface and/or cabinet.

F. Allowable tolerances
    - Square: +/- 1/64” per running foot
    - Location of cutouts / drilled openings: +/- 1/16” of design dimension
    - Size of cutouts / drilled openings: +/- 1/16”

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3. Execution

3.01 Examination

- Do not begin installation of work surfaces/countertops until cabinets have been installed
- Confirm that surfaces to receive tops are plumb, level with a maximum deflection of ¼" in 20'

3.02 Preparation

- Prepare surface as per methods recommended by manufacturer

3.03 Installation

- Install in accordance with approved shop drawings and manufacturer's instructions
- Adhere to adjacent surfaces in accordance with manufacturer's recommendations
- Fasten tops to supporting construction with adhesive appropriate for use with adjoining construction and as recommended by the manufacturer
- Form field joints using manufacturer's recommended adhesive. Joints to be inconspicuous and nonporous
- Install (laboratory shelving / pegboards/ reagent racks using fasteners and adhesive appropriate for use with adjoining construction and as recommended by the manufacturer

A. Adhesive options
    - For installation of materials in permanent location bond joints with a high chemical resistant sealant with color similar to base material

3.04 Protection

Following installation, the General Contractor shall ensure the work surfaces/countertops are protected from damage. The tops shall be kept free from paint, plaster, cement scratches or any other destructive forces.

<ENDS>