

LEAD INDUSTRIES ASSOCIATION

60 EAST 42ND STREET
NEW YORK 17, N. Y.

April 1, 1960

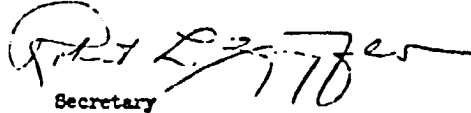
SUBJECT: TERNE-PLATE ROOFING

To Members of the Lead Industries Association:

We are attaching a copy of a new brochure dealing with terne-plate roofing, a lead-alloy coated product which is enjoying a resurgence in popularity. This is another in our series of fliers dealing with lead products for building construction and is being mailed to a list of approximately 14,000 architects and builders.

Additional copies in quantities up to 25 are available free of charge and in larger quantities at \$3.00 per hundred while the supply lasts.

Very truly yours,


Secretary

Att.

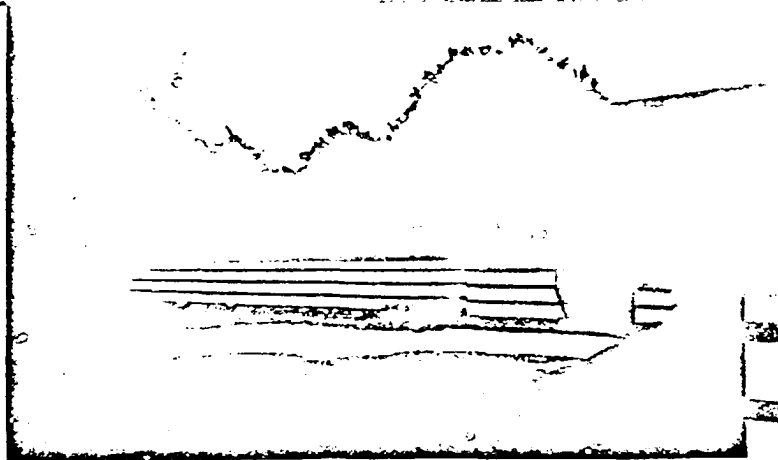
MAILED - 100

This Staten Island residence, by Frank Lloyd Wright, has a Bermuda roof of Terne.

A.I.A. 12-4031

SPECIFICATIONS

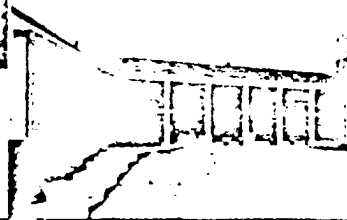
SEAMLESS TERNE FOR ROOFING



Along Pennsylvania's route 40 — the Uniontown Motel. Roofing was done by Henry J. Copper Roofing Company of Uniontown.

A batten seam roof harmonizes with the style of the Philip F. Howerton residence in Charlotte, N. C.

St. Luke's Chapel at Annapolis, Md. makes use of terne in vaulted roof construction. Architects: Rogers, Talliferro and Lamb, Baltimore.



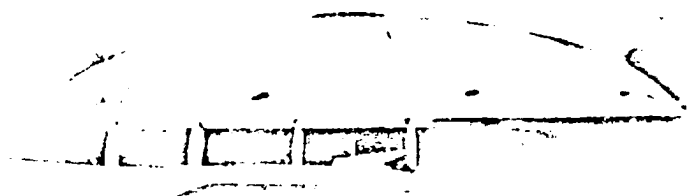
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292 Madison Ave. New York 17, N. Y.

George Tech's Alexander Memorial Arena, designed by Arch Associates, shows seamless terne roofing designed to harmonize with the surrounding campus. The roof, 270 feet in diameter, is set on 32 arched girders.



LOOK AHEAD WITH LEAD



TERNE: *An Architectural Rediscovery*

"...I have furthermore found terne superior to other roofing materials in economy, color adherence, heat-reflection, permanence, workability, and low coefficient of expansion."

— Frank Lloyd Wright

Terne, a two-century-old building material, is making current headlines in architectural and technical journals, and in newspapers. Though it is substantially unchanged from the time of its first popularity in the characteristics which give it such excellent performance, there has been a recent development in terne plate's manufacture which is causing the present focus of attention on it: in place of the time-honored sheets which have been characteristic of terne, it is now being made in 30 feet seamless rolls. In this new form it is easily and economically applied; typical installed costs range from 50 to 75 cents per square foot.

Of unquestioned durability, terne is one of the lightest and strongest roofing materials known. It is thoroughly waterproof and hail-proof and survives windstorms unscathed.

Not the least important of its attributes is terne's ability to accept and hold ordinary exterior paints. Terne will take paint without pretreatment or weathering. The exceptional durability of painted terne surfaces argues for the use of a good grade of exterior paint as the finished coat so that an unmarred appearance can persist throughout its life.

Some of the oldest historic buildings in this country have terne roofs. The present headquarters of the American Institute of Architects in Washington, D. C., is still using the terne roof which replaced the structure's original roof in approximately 1880. One of the most noted historic buildings in Tennessee is the Hermitage, the home to which Andrew Jackson retired when he left the White House. In 1834, after the house had been destroyed by a fire, started when a spark landed on the

original roof, Jackson wrote his son to have it rebuilt and "have a tin roof put on it". The current roof is terne and has been satisfactory since its installation in 1890.

Andrew Jackson's phrase "tin roof" was the nomenclature used for terne well into the 19th century. To eliminate confusion, the material is universally referred to today as terne. The alloy coating contains 20% tin. The balance of this coating is lead. It is the lead which is responsible for the excellent corrosion resistance of terne, in large part. The tin is present principally to "alloy" the sheet steel so that a continuous level film of coating can be built up on the steel and tightly adhered to it. There is, in fact, a tin-iron substrate formed at the interface and thus a chemical bonding exists from the steel base through to the surface of the alloy coating.

CHARACTERISTICS OF SEAMLESS TERNE ROOFING

TENSILE STRENGTH

The mechanical properties of terne are excellent. Not only is it among the highest tensile strength materials—45,000 psi for standard weight terne—but it will not crack under climatic changes. The combined properties of light weight, high tensile strength, and good heat resistance make it an excellent fire retardant construction material. Even in cases where fire originating under the roof has burned away support timbers, terne roofs have been known to remain suspended over the fire in one piece and have acted as a blanket to prevent sparks from spreading the fire to adjacent structures.

The alloy surface produces an excellent bond with the paint and, in the case of lead pigment paints, forms an exceptionally durable combination.

Painted white or a light color, terne will reflect a major portion of the sun's heat. Reflectivity factors show how important this property can be when light colors are used on the roof to reduce the heat load in air conditioning equipment or to provide comfortable temperatures when air conditioning is not used. White paint for example will reflect about 80 per cent of the solar heat falling on it; yellow, two thirds. For reference, a roof painted black may reflect only five per cent or less.

supporting structure can be made. Thirty gauge terne weighs only 62 lb. per 100 sq. ft. as laid; 28 gauge terne weighs 76 lb.

EXPANSION

The coefficient of expansion of terne is quite low—only wood and slate are better, among common roofing materials, in this respect. Expansion seams in terne roof are not required in runs under 30 feet long as both ends are free to move.

Table I—Thermal Expansion

Material	Lineal Expansion per 100 ft. per 100°F
Wood	0.331
Slate	0.496
TERNE	0.825
Galvanized	0.825
Copper	1.064
Zinc	2.076
Lead	1.908
Aluminum	1.534

COLOR

Color adaptability is a valuable asset of terne roofing. Terne can be painted any color at any time without special treatment of the surface.

WEIGHT

Seamless terne is one of the lightest satisfactory roofing materials. It is, in fact, so much lighter than many other common roofing materials that a significant saving in the cost of the

SPECIFICATIONS

STANDARD SPECS

All roof surfaces of the building shall be covered with copper-bearing terne roofing. This shall be laid on rosin sized paper (tar paper and other qualities containing acids prohibited). No nails shall be driven through the strips. All solder used shall be strictly half-and-half. Rosin only shall be used as a flux for soldering, and all rosin must be removed from seams before painting. No acid flux shall be used.

The seamless terne roofing shall be painted one coat on the underside and two coats on the exposed side. The mill-applied coat is sufficient for the underside. The exposed surface shall have two coats of a long oil base paint, any color. Even though the exposed surface should have a top coat, two coats of exterior paint should be applied. All painting shall be done by hand, well brushed in, as part of the roofing contract.

The roofers shall wear rubber shoes and no unnecessary walking over the roof or using the same for storage of other material will be allowed. All workmanship guaranteed for one year.

When pitch of roof is two and one-half inches or less to the foot, it is to be laid flat lock. Cleats to be one and one-half inches wide and carefully locked over one-half inch edge and nailed to sheathing with two 7/8" roofing nails or stapled with 7/8" diversion point staples to each cleat. The seams are to be thoroughly and smoothly hammered down with a wooden mallet and carefully soldered with large coppers.

When there is sufficient pitch (two and one-half inches or more per foot) the roof is to be laid standing seam, batten seam or Bermuda style.

All valleys and gutters (specify whether 28 gauge or 30 gauge) shall be applied flat lock, of sufficient pitch to prevent any water standing therein.

Flashings: Seamless terne roofing (specify gauge and coating weight) to be turned up not less than six inches at chimneys and fire wall and to be cap-flashed four inches, cap-flashings to extend into brick work one inch and to be firmly wedged in with wedges not over fifteen inches apart. Fill openings in brick work with Portland cement.

BERMUDA ROOF*

Use seamless terne roofing. Specify gauge and coating weight. Paint one side and dry well before applying to roof with painted side down. This shop coat may be applied at the mill.

Specify ridge treatment to be either flat seam or standing seam.) To form Bermuda seams, make a vertical bend along the longer dimension of the sheets or rolls 1/2" higher than the batten. Place first course in position with painted side down. Do not nail through the strips. Use cleats made of the same material. Nail cleats every 8" along the face of the batten. Bend the cleat 1/4" over the top of the upturned edge. Bend the 1/2" which projects above the batten to a horizontal position (right angle bend).

Place the next course in position against the face of the succeeding batten. Bottom edge of this course must extend 1" beyond the lower batten. Bend 1/2" around the edge of the first course and mallet tightly against the face of the batten. Stagger cross seams to avoid extra thickness in malleting against the battens.

* For applications of 2 1/2" per foot max pitch. Specify if wanted in 10, or heavier weight 1X. The coating is the same in each gauge; the difference is in the thickness of the Copper Bearing Steel base strip before roofing. Formulated in 10, or 1X, or 10 to 15, or 15 to 20, or 20 to 25, or 25 to 30, or 30 to 35, or 35 to 40, or 40 to 45, or 45 to 50, or 50 to 55, or 55 to 60, or 60 to 65, or 65 to 70, or 70 to 75, or 75 to 80, or 80 to 85, or 85 to 90, or 90 to 95, or 95 to 100, or 100 to 105, or 105 to 110, or 110 to 115, or 115 to 120, or 120 to 125, or 125 to 130, or 130 to 135, or 135 to 140, or 140 to 145, or 145 to 150, or 150 to 155, or 155 to 160, or 160 to 165, or 165 to 170, or 170 to 175, or 175 to 180, or 180 to 185, or 185 to 190, or 190 to 195, or 195 to 200, or 200 to 205, or 205 to 210, or 210 to 215, or 215 to 220, or 220 to 225, or 225 to 230, or 230 to 235, or 235 to 240, or 240 to 245, or 245 to 250, or 250 to 255, or 255 to 260, or 260 to 265, or 265 to 270, or 270 to 275, or 275 to 280, or 280 to 285, or 285 to 290, or 290 to 295, or 295 to 300, or 300 to 305, or 305 to 310, or 310 to 315, or 315 to 320, or 320 to 325, or 325 to 330, or 330 to 335, or 335 to 340, or 340 to 345, or 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to 3950, or 3950 to 3955, or 3955 to 3960, or 3960 to 3965, or 3965 to 3970, or 3970 to 3975, or 3975 to 3980, or 3980 to 3985, or 3985 to 3990, or 3990 to 3995, or 3995 to 4000, or 4000 to 4005, or 4005 to 4010, or 4010 to 4015, or 4015 to 4020, or 4020 to 4025, or 4025 to 4030, or 4030 to 4035, or 4035 to 4040, or 4040 to 4045, or 4045 to 4050, or 4050 to 4055, or 4055 to 4060, or 4060 to 4065, or 4065 to 4070, or 4070 to 4075, or 4075 to 4080, or 4080 to 4085, or 4085 to 4090, or 4090 to 4095, or 4095 to 4100, or 4100 to 4105, or 4105 to 4110, or 4110 to 4115, or 4115 to 4120, or 4120 to 4125, or 4125 to 4130, or 4130 to 4135, or 4135 to 4140, or 4140 to 4145, or 4145 to 4150, or 4150 to 4155, or 4155 to 4160, or 4160 to 4165, or 4165 to 4170, or 4170 to 4175, or 4175 to 4180, or 4180 to 4185, or 4185 to 4190, or 4190 to 4195, or 4195 to 4200, or 4200 to 4205, or 4205 to 4210, or 4210 to 4215, or 4215 to 4220, or 4220 to 4225, or 4225 to 4230, or 4230 to 4235, or 4235 to 4240, or 4240 to 4245, or 4245 to 4250, or 4250 to 4255, or 4255 to 4260, or 4260 to 4265, or 4265 to 4270, or 4270 to 4275, or 4275 to 4280, or 4280 to 4285, or 4285 to 4290, or 4290 to 4295, or 4295 to 4300, or 4300 to 4305, or 4305 to 4310, or 4310 to 4315, or 4315 to 4320, or 4320 to 4325, or 4325 to 4330, or 4330 to 4335, or 4335 to 4340, or 4340 to 4345, or 4345 to 4350, or 4350 to 4355, or 4355 to 4360, or 4360 to 4365, or 4365 to 4370, or 4370 to 4375, or 4375 to 4380, or 4380 to 4385, or 4385 to 4390, or 4390 to 4395, or 4395 to 4400, or 4400 to 4405, or 4405 to 4410, or 4410 to 4415, or 4415 to 4420, or 4420 to 4425, or 4425 to 4430, or 4430 to 4435, or 44

Batten Seam—continued

below, showing finished seam and progressive steps in forming and attaching with cleats. Construction of batten seams at ridge and hip and ends of battens are shown in diagram.

- Do not drive nails through strips. Use cleats, space at intervals of 8".
- Stagger the cleats along battens.
- Stagger all flat lock soldered seams to avoid extra thickness.
- All work must be painted with two coats of a long oil base paint immediately.

STANDING SEAM

Use seamless terne roofing. (Specify gauge and coating weight.) Paint one side and dry well before applying to roof with shop painted side down. This coat may be applied at the mill. Before beginning the first course, be governed by proper application at ridge, gutter, valley, drip edge, end or side wall, etc.

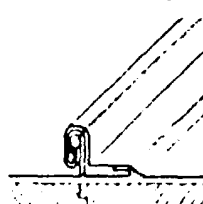
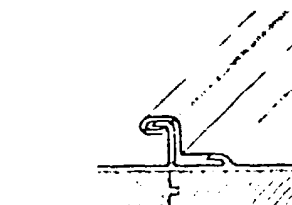
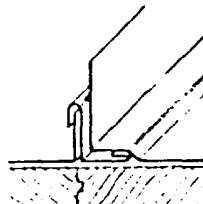
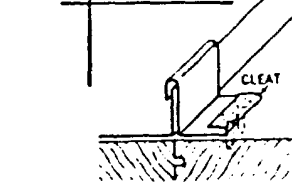
Specify ridge treatment to be either flat seam, standing seam, or seamless with continuous cross seams.

To form standing seams, make vertical bend along the longer dimensions of sheets or rolls, on one side $1\frac{1}{2}$ " high and on the other side $\frac{1}{4}$ " upturned edge. Bend the cleat $\frac{1}{4}$ " over top of the upturned edge and bend the other end of cleat over staple or nail head. Place next joint in position with the $1\frac{1}{2}$ " flanged edge adjoining the one attached to the roof. Bend $\frac{1}{4}$ " of the $1\frac{1}{2}$ " flange edge over $1\frac{1}{4}$ " cleated edge, forming a single lock standing seam $1\frac{1}{4}$ " high; continue by turning over $\frac{1}{4}$ " of the standing seam, thereby forming a double locked standing seam $1\frac{1}{2}$ " high. Press the seam tightly together in each operation. Stagger cross seams to avoid extra thickness in pressed standing seams.

All cross seams to be single locked soldered joints excepting expansion joints which must be placed above the high water line of gutters, valleys, walls, etc. Cross seams to be

made according to the flow; that is, the higher strips must always overlap the lower adjoining strips.

All work must be painted immediately after application.

STANDING SEAM**FLAT LOCKED SEAM**

Use seamless terne roofing. Specify gauge and coating weight. For roofing or at end walls, side walls, gutters, drip edges, valleys, flashings, etc., use $14\frac{1}{2}$ ", 20", 24" or 28" wide seamless rolls (specify preference). Paint one side and dry well before applying to roof with painted side down. The shop applied coat is sufficient for the under side. Do not nail through the strips. Attach strips to roof with cleats made of the same material. Place cleats at 8" intervals.

Notch corners of the strips and turn $\frac{1}{2}$ " edges, top and one end turned up and bottom and one end turned under, to form $\frac{1}{2}$ " flat seam.

Before beginning the first course, be governed by proper application at ridge, drip edge, end or side wall, gutters, valleys, etc.

Nail cleats to sheathing board. Bend one end of cleat over nail heads and hook the other end of the cleat into the $\frac{1}{2}$ " edge formed on strip. Lay strips according to the flow, i.e., placing the strip higher on the roof over the upper edge of the lower adjoining strip. Sufficient pitch must be provided for proper drainage to prevent any water from standing thereon.

Stagger all joints. Seams to be malletted down to form flat overlapping surface. Carefully mallet the seams to avoid buckling. Sock the seams well with half and half solder, using rosin as a flux. Remove all excess rosin before painting. Never use acid flux.

All work must be painted with two coats of a long oil base paint immediately after application.

For more detailed information or answers to specific queries, write to:

Architectural Department

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