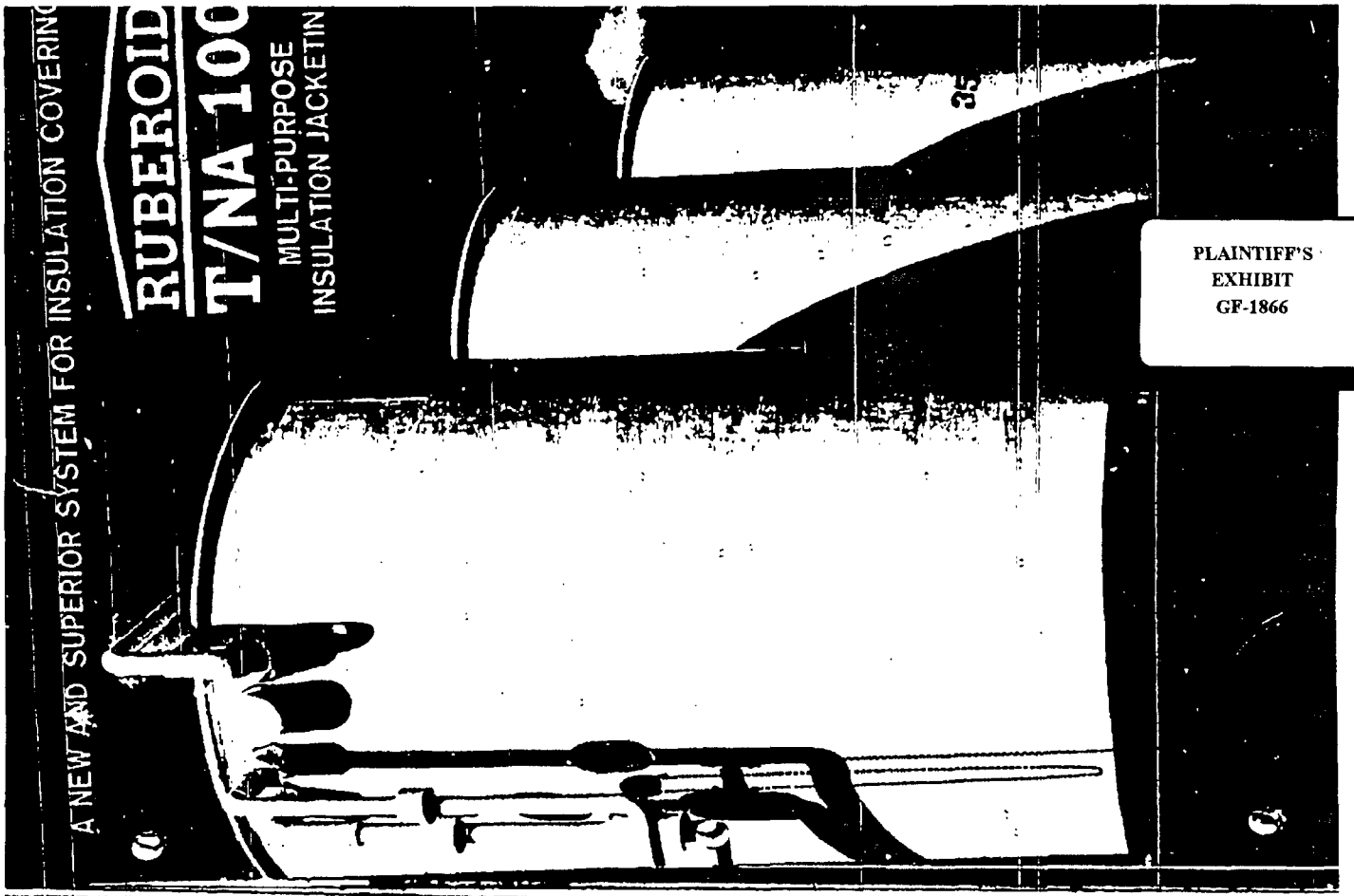



PLAINTIFF'S
EXHIBIT
GF-1866

# ESTIMATING TABLES

## PIPE LINE FELT

| Pipe Size in Inches Nominal | Pipe Size in Inches Outside Diameter | Lap of Felt in Inches | Width of Felt in Inches | Felt in Squares Per Mile | Felt in Squares Per 1000 Ft. |
|---|---|---|---|---|---|
| 2 | 2.375 | 1½" | 4 | 41.6 | 7.9 |
| 2½ | 2.875 | 1½" | 4 | 49.5 | 9.4 |
| 3 | 3.5 | 1½" | 4 | 59.4 | 11.3 |
| 3½ | 4. | 1½" | 4 | 67.3 | 12.8 |
| 4 | 4.5 | 1½" | 4 | 75.2 | 14.2 |
| 4½ | 5. | 1½" | 4 | 83.2 | 15.8 |
| 4½ | 5. | 1½" | 6 | 80.0 | 15.2 |
| 5 | 5.563 | 1½" | 4 | 97.0 | 18.4 |
| 5 | 5.563 | 1½" | 6 | 88.6 | 16.8 |
| 6 | 6.625 | 1½" | 6 | 105.5 | 19.9 |
| 7 | 7.625 | 1½" | 6 | 120.0 | 22.7 |
| 8 | 8.625 | 1½" | 9 | 132.0 | 25.0 |
| 8 | 8.625 | 1¾" | 9 | 135.3 | 25.6 |
| 9 | 9.625 | 1½" | 9 | 147.0 | 27.8 |
| 9 | 9.625 | 1¾" | 9 | 154.5 | 29.3 |
| 10 | 10.75 | 1½" | 9 | 164.0 | 31.1 |
| 10 | 10.75 | 1¾" | 9 | 167.5 | 31.7 |
| 11 | 11.75 | 1½" | 9 | 179.0 | 33.9 |
| 11 | 11.75 | 1¾" | 9 | 183.0 | 34.7 |
| 12 | 12.75 | 1½" | 12 | 190.9 | 36.2 |
| 12 | 12.75 | 1¾" | 12 | 194.6 | 36.9 |
| 13 | 14. | 1½" | 12 | 209.2 | 39.6 |
| 13 | 14. | 1¾" | 12 | 213.4 | 40.4 |
| 14 | 15. | 1¾" | 12 | 228.0 | 43.2 |
| 14 | 15. | 1" | 12 | 232.5 | 44.0 |
| – | 16. | 1¾" | 12 | 243.3 | 46.1 |
| – | 16. | 1" | 12 | 247.8 | 46.9 |
| – | 18. | 1¾" | 12 | 272.0 | 51.5 |
| – | 18. | 1" | 12 | 278.3 | 52.7 |
| – | 20. | 1" | 18 | 301.0 | 57.0 |
| – | 22. | 1" | 18 | 331.0 | 62.7 |
| – | 24. | 1" | 18 | 361.0 | 68.4 |
| – | 26. | 1" | 18 | 390.1 | 73.9 |
| – | 28. | 1" | 18 | 420.0 | 79.6 |
| – | 30. | 1" | 18 | 445.0 | 84.3 |

## ROCK SHIELD

| Size Pipe | Length of Rock Shield | Pieces Recommended | Width of Rock Shield | Sq. Ft. Per Ft. of Pipe | Squares Per Mile |
|---|---|---|---|---|---|
| 4" | 8' | 1 | 17" | 1.42 | 75 |
| 6" | 8' | 1 | 24" | 2.00 | 106 |
| 8" | 8' | 1 | 30" | 2.50 | 132 |
| 10" | 8' | 1 | 38" | 3.17 | 167 |
| 12" | 8' | 1 | 44" | 3.67 | 194 |
| 14" | 8' | 1 | 48" | 4.00 | 211 |
| 16" | 8' | 2* | 29" | 4.83 | 255 |
| 18" | 8' | 2* | 32" | 5.33 | 282 |
| 20" | 8' | 2* | 36" | 5.83 | 308 |
| 22" | 8' | 2* | 38" | 6.33 | 334 |
| 24" | 8' | 2* | 41" | 6.83 | 361 |
| 25" | 8' | 2* | 44" | 7.33 | 387 |
| 28" | 8' | 2* | 48" | 8.00 | 422 |
| 30" | 8' | 2* | 50" | 8.33 | 440 |
| 32" | 8'8" | 1 | 60" | 8.66 | 458 |
| 34" | 9'4" | 1 | 60" | 9.30 | 492 |
| 36" | 10'2" | 1 | 60" | 9.75 | 515 |

*See Estimating Table below for 1-pc. Cigarette Wrap.

## Estimating Table for 1-Pc. Cigarette Wrap

| | | | | | |
|---|---|---|---|---|---|
| 16" | 54" | 1 | 60" | 4.50 | 238 |
| 18" | 61" | 1 | 60" | 5.00 | 254 |
| 20" | 67" | 1 | 60" | 5.50 | 290 |
| 22" | 73" | 1 | 60" | 6.00 | 319 |
| 24" | 80" | 1 | 60" | 6.00 | 343 |
| 26" | 86" | 1 | 60" | 7.00 | 370 |
| 28" | 92" | 1 | 60" | 7.50 | 396 |
| 30" | 98" | 1 | 60" | 8.00 | 423 |
| 32" | 104" | 1 | 60" | 8.39 | 443 |
| 34" | 110" | 1 | 60" | 8.90 | 470 |
| 36" | 117" | 1 | 60" | 9.43 | 498 |

STRAPPING, STRAPPING TOOLS AND SEALS AVAILABLE UPON REQUEST.

gaf



# RUBEROID T/NA 100® A NEW AND SIMPLIFIED SOLUTION TO INSULATION JACKETING PROBLEMS

**□ SUPERIOR IN APPEARANCE □ SUPERIOR WHEREVER ATMOSPHERIC CONDITIONS PRESENT SEVERE MAINTENANCE PROBLEMS □ SUPERIOR BECAUSE IT REQUIRES NO SPECIALIZED INSTALLATION**

Ruberoid T NA 100 is a new and revolutionary material that represents a major break-through in the field of insulation jacketing. T NA 100 is the first and only flexible jacketing to be virtually fireproof and provide unparalleled resistance to outdoor weathering. Its unusual flexibility and workability simplifies the application process and offers a significant saving in installation costs. The versatility of T/NA 100 makes it as effective for covering large tank units as for protecting extended pipelines. Ruberoid T/NA 100 combines asbestos fibre, an inorganic material of established durability and flame resistance, with "Tedlar,"* a new PVF film of unique characteristics recently developed in the laboratories of DuPont. The asbestos fibre is formed into a tough asbestos felt, using an elastomeric binder. "Tedlar" is permanently laminated to the asbestos felt with an elastomeric adhesive. Ruberoid T/NA 100 sets a new standard of durability and maintenance ease. It represents a giant step forward in insulation materials development.

* DuPont's Registered Trademark

## FEATURES:

**FLEXIBLE:** Tough and flexible over wide temperature range, from minus 50° F to over 200° F.

**FLAME-RESISTANT:** Virtually incombustible. T NA 100 has been tested and labeled by Underwriters' Laboratories with a Flame Spread Rating of 25 (Incombustible).

**WEATHER-RESISTANT:** Exposed surface is "Tedlar" and is essentially unaffected by ultra-violet light. Will not craze or erode on exposure; will not corrode in industrial atmospheres.

**CHEMICAL AND SOLVENT RESISTANT:** Retains its form and strength even when exposed to strong acids and bases. Unaffected at ordinary temperatures by many classes of common solvent, including hydrocarbons and chlorinated solvents. T NA 100 is impermeable to greases and oils, is unaffected in strength and appearance by soil bacteria.

**DESIGNED FOR MULTI-PURPOSE USE:** Flexibility of material permits its use over large areas as well as narrow-diameter pipelines.

**RESISTANT TO PUNCTURE AND ABRASION:** Tough "Tedlar" surface is designed to take wear and tear.

**EASY TO REPAIR:** Damage can be readily repaired by patching with T/NA 100 Finishing Tape.

**WHITE COLOR:** Natural color is an attractive bright white.

## MATERIAL SPECIFICATIONS:

| | |
|---|---|
| Width of Roll | 35.5 in. |
| Length | 166.7 lin. ft. |
| Area (Gross) | 500.0 sq. ft. |
| Approx. Shipping Weight | 67.0 lbs. |

Note: Butt Strap Stock available in rolls, 4 inches wide x 166.7 lineal feet.

For Full Details Write:
INDUSTRIAL PRODUCTS DIVISION
**The RUBEROID Co.**
733 Third Avenue, New York, N.Y. 10017

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## SUBSTANTIAL SAVINGS IN INSTALLATION

Flexible T NA 100 wraps easily into position and may be secured with an ordinary staple gun. Joints are easily sealed with T NA 100 Finishing Tape or lap adhesives.



# RUBEROID T/NA 100®
MULTI-PURPOSE INSULATION JACKETING

## T/NA 100 FIELD APPLICATION SPECIFICATION

### 1. SCOPE

1.1 This Specification covers field application of T NA 100 Insulation Jacketing on rigid insulating materials such as Calcium Silicate, Cellular Glass and Glass Fiber. Urethane and Polystyrene Foam.

### 2. MATERIALS

2.1 T NA 100 Insulation Jacketing
T NA 100 Finishing Tape, 2" wide
Metal Bands
Lap Adhesive (a) Solvent type—Foster 82 x 32
(b) Emulsion type—Foster 82 x 29
Flashing Compound—Foster Foamseal 30-45
Mastic Finish—Foster Sealfas Mastic, White 31-99
Coating Finish—Foster Velect Vinyl White 57 15
Glass Cloth—Foster Mast A-Fab Glass Cloth

### 3. PIPE-INSULATION APPLICATION

3.1 Pipe insulation shall be applied in standard approved manner with precautions taken to eliminate projections of bands or wires above the surface of the insulation On lines operating above 600 F. insulation shall be applied in double layer with all joints staggered.

### 4. PIPE-JACKETING APPLICATION

4.1 The T NA 100 Jacketing shall be cut into sheets appropriate to the insulation size with an allowance for a 2" minimum lap joint. Each sheet of jacketing shall be applied snugly to the insulation with an overlap of the adjacent sheet a minimum of 2". On horizontal lines the lap shall be installed so that water runs over the lap joint rather than into it. On vertical lines the overlap should be outside the sheet below it.

4.2 METHOD A—Apply a uniform band of the selected lap adhesive a minimum of 2" wide to the asbestos face of the jacketing at the rate of 450 to 500 lineal feet per gallon. Position jacketing into place on the insulation and press laps together firmly to assure good contact and check for tight seal

4.3 METHOD B—Apply 2" T NA 100 Finishing Tape to all laps. Rub tape firmly after application to insure good contact

4.4 METHOD C—(For hot lines only) Secure jacketing with aluminum bands, on 6" centers.

### 5. FITTINGS-INSULATION APPLICATION

5.1 Fittings and elbows shall be insulated with molded or fabricated insulation snugly fitted to the surface of the fitting. Thickness shall be at least equal to the adjacent pipe insulation.

### 6. FITTINGS – FINISH

6.1 All fittings shall be protected by an application by spray or trowel of Foster Sealfas Mastic, White applied to the insulation surface at the rate of 2 to 3 gallons per hundred square feet Imbed into the mastic coat a layer of Mast-A fab Glass Cloth overlapping all seams a minimum of 2" and continuing onto the surface of the adjacent straight run piping a minimum of 2". Apply a finish coat of Sealfas Mastic to the entire cloth surface at the rate of 4 to 5 gallons per hundred square feet Apply T/NA Jacketing to overlap the fitting finish and to assure a neat edge appearance.

6.2 Where desired T NA 100 Jacketing and Finishing Tape may be specified by the field in place of Mastic.

6.3 Where a glossy finish is required on fittings allow the Sealfas Mastic application to become thoroughly dry then apply two brush coats of Foster Velect Vinyl White to the mastic surface at the rate of 150 sq. ft. per gallon per coat.

### 7. FLASHING

7.1 At all protrusions and points where pipe hangers may protrude through jacketing, it is imperative that the flashing compound be applied to completely seal the opening to stop moisture penetration. Prior to application wipe all surfaces clean and apply sufficient flashing compound to extend over all intersecting surfaces to complete the seal If a white finish is required at this point allow 8 hours drying of the flashing compound and apply a heavy flush coat of Sealfas Mastic, White.

### 8. PIPE HANGERS

8.1 Pipe hangers must not damage jacketing finish.

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INDUSTRIAL PRODUCTS DIVISION
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RUBEROID

# T/NA 100®
MULTI-PURPOSE INSULATION JACKETING

## Product Data Sheet
### SUMMARY OF PROPERTIES

| 1. PHYSICAL | TYPICAL VALUE | TEST METHOD |
|---|---|---|
| Tensile Strength—M.D.—lbs./in. | 42 | A.S.T.M. Method D-828 |
| Mullen Burst Strength—psi | 88 | A.S.T.M. Method D-744 |
| Elmendorf Tear Strength—C.M.D.—gms. | 448 | A.S.T.M. Method D-689 |
| Moisture Vapor Transmission—Perms | 0.86 | A.S.T.M. Method E-96 |
| Reflectivity | 72.3% | Hunter Gardner Multipurpose Reflectometer |

| 2. THERMAL | TYPICAL VALUE | TEST METHOD |
|---|---|---|
| Underwriters' Rating—Tedlar Exposed | | Underwriters' Labs. Test U.L. 723 |
| Spread of Flame | 25 | |
| Fuel Contributed | 0 | |
| Smoke Contributed | 45 | |
| Discoloration Temperature | | |
| 225°F. | Slight Discoloration | 20 Days—Oven |
| 300°F. | Trace Discoloration | 20 Days—Oven |
| Flexibility After Heat Aging | | |
| 200°F. | Slightly Less Flexible | 20 Days—Oven |
| 176°F. | No Change | 20 Days—Oven |

### 3. CHEMICAL

T/NA 100 has excellent resistance to a variety of chemicals. The laminate was unaffected after two weeks' immersion at room temperature in the following chemicals:

| | |
|---|---|
| 10% Hydrochloric Acid | Methanol |
| Conc. Ammonium Hydroxide | Varsol #1 |
| 10% Nitric Acid | Carbon Tetrachloride |
| 10% Sulfuric Acid | Gasoline |
| 10% Sodium Hydroxide | Perchlorethylene |

T/NA 100 was unaffected after 1 year immersion in water.

### 4. WEATHERABILITY

T/NA 100 has a predicted weathering life of 10 years. The following weathering data is available:

| | TIME | CONDITION |
|---|---|---|
| Clear "Tedlar" | 10 yrs.—Florida @ 45° South | Still Flexible and Strong |
| White "Tedlar" | 7 yrs.—Florida @ 45° South | No appreciable change |
| T/NA 100 | 3 yrs.—Florida @ 45° South | Unchanged |
| T/NA 100 | 3,000 hrs.—Weatherometer | Unchanged |

NOTE: "Tedlar" Film is laminated to the asbestos felt with an elastomeric adhesive. Initial peel bond strength between film and asbestos felt averages 800 gms. per inch of width. The bond strength, after 2 years in Florida at 45° South, is unchanged. Accelerated Weatherometer testing (3,000 hours) likewise shows no change in peel bond strength.

The data in this bulletin is based on information we believe to be reliable. It is offered in good faith but without guarantee, as conditions and the use of our products are beyond our control.

### 5. MATERIAL SPECIFICATIONS

352835

| | | | |
|---|---|---|---|
| Width of roll | 35.5 in. | Area (Gross) | 1,000 sq. ft. |
| Length | 166.7 lin. ft. | Approx. Shipping Wt. | 67.0 lbs. |

The RUBEROID Co. • INDUSTRIAL PRODUCTS DIVISION • 733 Third Avenue, New York, N. Y. 10017

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