



## GENERAL

TUFF-N-NUFF Rock Shield is a non-woven mat consisting of small diameter (approximately 0.050") strands of flexible PVC. The strands are bonded to each other in a controlled, random pattern. TUFF-N-NUFF Rock Shield protects pipe coatings from direct impact during backfilling operations. It also provides long-term protection by keeping hard objects in the backfill away from the pipe coating during operation of the line. TUFF-N-NUFF protects the pipe coating from these abrasive objects as lateral and longitudinal movements occur.

## TO INSTALL

TUFF-N-NUFF is installed in any of **three ways**, depending on pipeline diameter, available equipment, and contractor's choice.

**Method 1** - For pipelines measuring 20" in diameter or less the "cigarette wrap" method is recommended. Unroll TUFF-N-NUFF rolls along the top of the pipe allowing the free edges to hang down. The width of the TUFF-N-NUFF **roll** is matched to the circumference of the pipe and includes a nominal overlap of 4". Secure the free edges in place with monofilament tape or nonmetallic strapping overlapping the ends at the 6 o'clock position of the pipe for maximum protection.

**Method 2** - 72" wide TUFF-N-NUFF **pads** are available from the factory cut to length matching the circumference of the pipe. Pads are wrapped around the circumference of the pipe, with ends overlapped approximately 2" to 4" at the 6 o'clock position. Pads are secured in place with monofilament tape or non-metallic strapping. Pads are placed in this manner along the length of the pipe with an edge overlap of 1" to 2".

**Method 3** - The third method of installing TUFF-N-NUFF is spiral wrapping. TUFF-N-NUFF can be purchased in **roll** form and spiral wrapped around the pipe by hand or with a spiral wrap tape machine.





## PHYSICAL PROPERTY DATA

### Minimum thickness – 11mm TUFF-N-NUFF Rock Shield

Property	Test Method	Typical Results
Impact Strength	ASTM G14 spherical point	241 inch-pounds <sup>1</sup>
Impact Strength	ASTM G14 (-35F)	235 inch-pounds <sup>1</sup>
Compressive Strength	ASTM D1621 (modified <sup>3</sup> )	54 psi @ 50% compression
Impact Resistance	ASTM G13 (modified <sup>4</sup> )	No failure @ 6" rock
Tear Strength	ASTM D624	69.6 lbf/in of thickness
Tensile Strength	ASTM D4595	1,378 psi
Elongation	ASTM D4595	459%
Low Temp Brittleness	ASTM D746	-62°F
Bacteria Resistance	ASTM G22	No growth
Cathodic Protection	Custom	No inhibiting effect
Weight: 6mm or 11mm		0.675 lb/ft <sup>2</sup> or 0.825 lb/ft <sup>2</sup>
Melt Temperature	Custom	300°F

<sup>1</sup> Compare to 27 inch-pounds for unprotected 16- mil thick Fusion Bonded Epoxy coating tested in the same manner

<sup>2</sup> Aged @ 121C for 21 days

<sup>3</sup> Two 3 x 2" x 2" samples stacked together and compressed to 50%

<sup>4</sup> Test modified to include rocks progressing in size from 1 1/2", 3", 4" and 6", 10 drops each. Each drop consisted of releasing 50+ of stone from a height of 6'-0" onto an epoxy coated plate protected by TUFF-N-NUFF. The plate was inspected for coating damage after each drop.

## AVAILABILITY AND SIZE

TUFF-N-NUFF is available in 6mm & 11mm thickness and in rolls or pads up to 72" wide. TUFF-N-NUFF can be produced in any length. Custom size TUFF-N-NUFF rolls and pads are quickly made to order to fit virtually ANY size pipe for NO EXTRA CHARGE.

