ROAD & HIGHWAY CONSTRUCTION GUIDE

Nonwoven Geotextiles for Pavement Systems

Introduction

Proper subgrade preparation is critical for long-lasting road construction. Our nonwoven geotextiles provide essential separation, filtration, and stabilization functions in pavement systems.

Product Specifications

ROAD CONSTRUCTION SERIES

Light Traffic Applications (150-200 GSM):

- Rural roads, parking lots, residential streets
- CBR values: 2-5
- Grab Tensile: 400-600 N

Medium Traffic Applications (250-300 GSM):

- Secondary highways, urban roads
- CBR values: 1-3
- Grab Tensile: 700-1000 N

Heavy Traffic Applications (350-400 GSM):

- Primary highways, industrial roads
- CBR values: <2
- Grab Tensile: 1200-1800 N

Material: Needle-punched polyester staple fibers **Permittivity:** 0.5-2.0 sec^{-1} **AOS (Apparent Opening Size):** 70-120 microns

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Functions in Road Construction

SEPARATION

Prevents mixing of subgrade soil with aggregate base

- Maintains aggregate layer integrity
- Preserves load-bearing capacity
- Extends pavement life by 2-3x

FILTRATION

Allows water flow while retaining soil particles

- Prevents clogging of drainage systems
- Maintains hydraulic conductivity
- Reduces hydrostatic pressure

STABILIZATION

Provides temporary platform during construction

- Enables construction equipment trafficking
- Reduces aggregate requirements
- Improves construction efficiency

Design Applications

SUBGRADE STABILIZATION

When to Use:

- CBR < 3%
- Wet/saturated conditions
- Soft clay subgrades
- Spring thaw conditions

Benefits:

- Reduces aggregate thickness by 25-50%
- Enables construction on weak soils
- Provides temporary stability

PAVEMENT REHABILITATION

Applications:

- Overlay projects
- Full-depth reclamation
- Crack reflection control

Installation:

- Place directly on milled surface

- Use tack coat for adhesion
- Overlap seams minimum 150mm

RAILROAD CONSTRUCTION

Ballast Separation:

- Prevents ballast penetration into subgrade
- Maintains track geometry
- Reduces maintenance requirements

Installation Guidelines

SITE PREPARATION

1. **Subgrade Preparation:**
   - Remove organic materials
   - Achieve specified grade and cross-slope
   - Compact to 95% standard Proctor density
2. **Surface Conditions:**
   - Maximum particle size: 75mm
   - No sharp protrusions >50mm
   - Smooth, well-drained surface

FABRIC INSTALLATION

1. **Unrolling:**
   - Deploy fabric in direction of traffic
   - Maintain proper alignment
   - Avoid stretching during placement
2. **Seaming:**
   - Overlap adjacent rolls 300mm minimum
   - Sew seams for permanent installations
   - Pin overlap every 1m for temporary roads
3. **Anchoring:**
   - Secure leading edge in 150mm deep trench
   - Backfill trench and compact
   - Weight fabric during aggregate placement

AGGREGATE PLACEMENT

1. **Initial Lift:**
   - Maximum 200mm thickness
   - Use end-dump trucks when possible
   - Avoid sharp turning on fabric
2. **Compaction:**
   - Begin with vibratory roller
   - Progress to pneumatic tire roller
   - Achieve specified density per project specs

AASHTO M288 Compliance

Our road construction geotextiles meet AASHTO M288 requirements:

Class 1 (Survivability):

- Grab Tensile ≥ 1400 N
- Puncture Resistance ≥ 500 N
- Permittivity ≥ 0.5 sec^{-1}

Class 2 (Survivability):

- Grab Tensile ≥ 1100 N
- Puncture Resistance ≥ 400 N
- Permittivity ≥ 0.2 sec^{-1}

Case Studies

PROJECT 1: NH-48 Highway Widening

- **Location:** Gujarat, India
- **Challenge:** Weak clay subgrade (CBR 1.5%)
- **Solution:** 300 GSM nonwoven geotextile
- **Result:** 40% reduction in aggregate requirement, successful construction

PROJECT 2: Industrial Road Construction

- **Location:** Pune Industrial Area
- **Challenge:** High water table, poor drainage
- **Solution:** 350 GSM geotextile with geocomposite drainage

- **Result:** Stable platform, reduced maintenance costs

PROJECT 3: Rural Road Improvement

- **Location:** Rajasthan Village Roads
- **Challenge:** Limited budget, local materials
- **Solution:** 200 GSM geotextile with local aggregates
- **Result:** Cost-effective solution, 5+ year performance

Quality Assurance Testing

Standard Tests:

- Grab Tensile Strength (ASTM D4632)
- Puncture Resistance (ASTM D4833)
- Permittivity (ASTM D4491)
- Apparent Opening Size (ASTM D4751)

Acceptance Criteria:

- All properties ≥ 95% of specified minimum
- Continuous quality monitoring
- Third-party verification available

Economic Benefits

Cost Savings:

- Reduced aggregate requirements: 25-50%
- Faster construction: 20-30% time savings
- Extended pavement life: 2-3x increase
- Lower maintenance costs: 40-60% reduction

ROI Analysis:

- Typical payback period: 2-3 years
- NPV improvement: 15-25%
- Reduced lifecycle costs

Technical Support Services

- Free site assessment and design review

- Installation training and supervision
- Quality control testing
- Performance monitoring programs
- Warranty and technical backup

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Building better roads with proven geotextile technology