

Nolan



INDUSTRIAL FABRICS – SECTION TWO

WOVEN POLYETHYLENE FABRICS



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Nolan Warehouses

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COVERALL

The ToughStuff 'Coverall' ranges are formulated from UV stabilised HDPE yarn, with UV inhibitors incorporated in the PE coating. They are lightweight, durable outdoor fabrics, with high strength to weight ratio.



KEY PRODUCT FEATURES



- ✓ *UV stabilised**
- ✓ *High strength to weight ratio*
- ✓ *Weldable*
- ✓ *Supported by the Nolan Warranty*

**all ranges except Coverall 10 x 10*

CONSUMER GUIDE

What is coated woven polyethylene?

The term "coated" refers to a method of stabilising and waterproofing a woven base fabric, by application of coating compound of similar molecular composition in liquid or molten form.

Polyethylene is a derivative of the petroleum refining process and has an uncomplex molecular structure comprising simply hydrogen and carbon atoms. Low density polyethylene (LDPE) and high density polyethylene (HDPE) are almost identical, except that HDPE is more linear in structure, with less branching of the polymer chains, which results in better tensile properties. HDPE is used for the base yarn of the fabric, and LDPE as the coating

The woven base fabric is usually designated by its yarn count and weight. (e.g 12 x 12 x 1000 denier) The yarn 'count' is literally the number of yarns per inch (25.4 mm) in the warp and weft directions respectively. 'Denier' is a weight per length namely, grams/9,000 metres.

SPECIFICATIONS

PRODUCT	COVERALL 10 X 10	COVERALL 12 X 12	COVERALL 16 X 16
Construction	10 x 10 x 1000D	12 x 12 x 1000D	16 x 16 x 1000D
Total Weight	110gsm	130gsm	210gsm
Roll Width	183cm	200cm	200cm
Roll Length	100 metres	50 metres	50 metres
Tensile Strength (N/50mm) (AS 2001.2.3.1)	554 warp, 466 weft	672 warp, 634 weft	1131 warp, 817 weft
Tear Strength (N) (AS 2001.2.10)	143 warp, 137 weft	170 warp, 119 weft	160 warp, 136 weft
Flex Cracking	100,000 cycles	100,000 cycles	100,000 cycles
Resistance to Water Penetration (AS 2001.2.17)	35kpa	39kpa	55kpa
UV Stabilised	No	Yes	Yes
Applications	Light-weight covers for a host of agricultural and industrial applications, including grain and cotton covers; roofing and walling for greenhouses and animal shelters; dam liners; tarpaulins; cricket pitch and similar sports covers.		

COLOURS AVAILABLE

Coverall 10 x 10				
	Colour Blue	White		
Part #	<i>02COV10x10 110 BLU</i>	<i>02COV10x10 110 WHI</i>		
Coverall 12 x 12				
	Colour Beige	Blue	Charcoal	Silver
Part #	<i>02COV12x12 130 BEI</i>	<i>02COV12x12 130 BLU</i>	<i>02COV12x12 130 CHA</i>	<i>02COV12x12 130 SIL</i>
Coverall 16 x 16				
	Colour Blue	Green	Light Grey	White
Part #	<i>02COV16x16 210 BLU</i>	<i>02COV16x16 210 GRE</i>	<i>02COV16x16 210 LTGRY</i>	<i>02COV16x16 210 WHI</i>

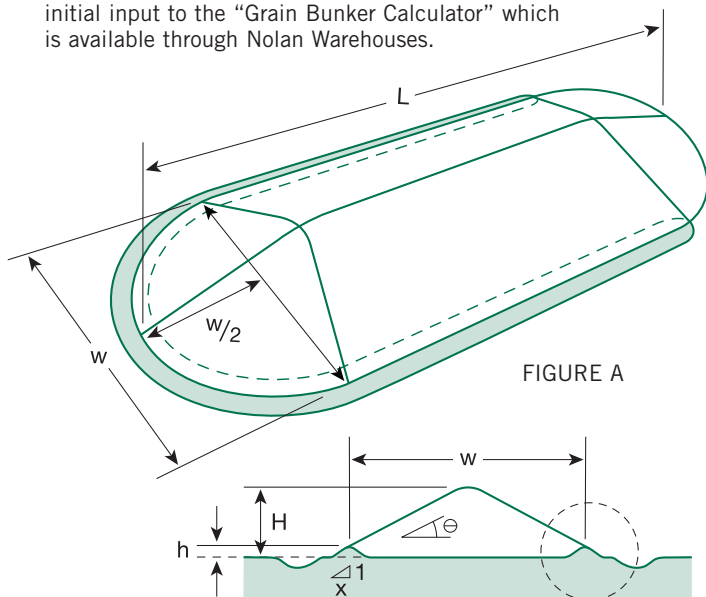
Design of Grain Storage Bunkers

The concept of fabric covered grain storages was originally developed in 2002. The concept is simple, practical, and has been used successfully in field situations around Australia.

Design of the Bunker

A bunker storage consists of a cleared, levelled elevated area bounded on three sides by low retaining walls. The whole area is lined with a plastic groundsheet, and filled with grain, over which a suitable cover sheet is placed and sealed to keep out water, insects and other contaminants.

The bunker dimensions are determined by five variables – the stack height, the tonnage and type of grain, and the height and batters of the retaining walls (FIGURE A). These five variables can be initial input to the “Grain Bunker Calculator” which is available through Nolan Warehouses.



L = Bunker Length h = Bank Height w = Width Between Banks
 H = Stack Height Θ = Angle of Repose
 x = Batter Ratio (i.e. ratio of the retaining bank height to width)

The crucial factor is the stack height, that is, the maximum height to which the grain handling equipment can form a stack of grain. It is the stack height, together with the height of the retaining walls that determines the width of the bunker.

The bunker length, that is the distance from the outermost point of the circular perimeter to the tail of the grain at the open end, is a function of the tonnage to be stored, but is also slightly influenced by the batters of the retaining banks, expressed as a ratio of the bank height to width (refer FIGURE A).

The initial output from the “Grain Bunker Calculator” is the width and overall length of the bunker, which immediately provides an idea of the scale of the project. The computer model also prompts for a selection of fabric for both cover and groundsheet. If a selection is made, the relevant dimensions to the nearest half roll (allowing for joins) and overall weight of both are provided as output, together with the “edge allowance”, that is, the amount of material available to seal the storage outside the boundary of the grain or retaining bank.

The selection of material is dependent on the degree of risk one is prepared to accept. Because of the risk of puncturing or tearing, the use of non-reinforced plastic is not recommended. Both the reinforced, coated polyethylene and coated PVC fabrics have been successfully used for temporary covers on site storage of grain. As a rule of thumb, the heavier the cover, the more security provided. Coverall 16 x16 coated PE is generally used as a liner for the floor and walls, and although it can be used as a short-term tarpaulin cover, the heavier Protex and Toughstuff reinforced PVC fabrics are recommended for the longer term, or where multiple re-use is envisaged.

The “Grain Bunker Calculator” model allows an iterative process of design to be easily accomplished. One needs to take into account, not just whether or not the overall size of the required storage can be accommodated on the site selected, but the resultant weight and size of the groundsheets and tarpaulins. There are obvious

practical difficulties of unfurling and furling large, heavy groundsheets and tarps. Based on field experience, these should have a maximum area of 1500 square metres or weight of 400 kilograms. While these can be joined on site, it is not easy to do so, and it is better to have a number of smaller storages with a single homogeneous cover than one large site with multiple joins.

Construction of a Sited Bunker

The bunker must be sited on a well drained area where the water table is well below the surface. The site must be accessible, and located away from any trees likely to drop limbs on the finished bunker.

Vegetation should be cleared, and the ground levelled. The retaining walls can be constructed of earth, up to one metre high if the soil is readily compacted, or half a metre if not. A minimum batter ratio of 1:1.5 should be adopted. Alternatively, grain bags can be used to form a low height vertical wall.

The semi-circular end shape is designed to accommodate the natural shape of a heaped grain pile and avoids the need to fill corners with grain.

Construction of a proper drain outside the retaining walls is essential. The base should be at least 0.5 metres lower than the base of the retaining wall and have minimum batters of 1:3, and a minimum fall of 0.5%, but preferably 1.0% to 2.0%.

Lining, Filling and Covering the Bunker.

The base is lined with the prefabricated groundsheet before filling the bunker. The liner extends over the earthen banks and is anchored in a trench (FIGURE B). An alternative detail if grain bags are used is shown (FIGURE C).

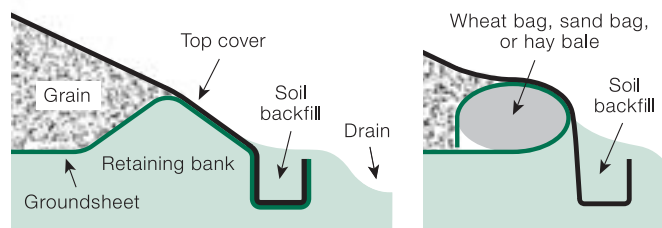


FIGURE B

FIGURE C

Bunkers are simply filled by dumping grain from a truck into an auger (or grain thrower) located midway between the side walls. The auger must be positioned far enough back to prevent the under-carriage being excessively buried by grain during filling. A directional chute attached to the outlet of the auger can be a valuable aid when filling, as it directs the grain further from the outlet, preventing undercarriage burial.

Grain should not be stored at greater than 12% moisture content. As the bunker fills, the auger is moved progressively towards the open end, taking care not to tear or puncture the ground sheet. However, it is prudent to have spare ground sheet material and Tear-aid tape on hand to make repairs. The grain peak should be at its design height and uniform along the full length of the bunker. Hand trimming of the stack before covering is necessary to avoid depressions in the grain mass or along the top of the wall where water may pond on the cover.

The bunker does not have to be completely full before starting to cover the grain. The cover is fitted by hand by a team of men progressively dragging the concertina fabric from the filled end across the top of the stacks. The cover is tensioned over the retaining banks and the end and edges sealed. One of the simplest and more successful practice requires both groundsheet and cover to extend about one metre beyond the base of the wall. These edges are buried in a previously dug trench about 250mm deep at the base of the wall.

Used tyres, sand filled wheat bags or other ballast can be placed on and around the top cover to hold it down and reduce wind flap. Avoid objects with sharp projections that may puncture or abrade the cover.