

EFFE

# ROOFING *Systems*





# HI-TUFF ROOFING SYSTEMS

## High Performance Roofing for Industrial, Commercial and Institutional Buildings

*Famous Players Tenplex  
Mississauga, Ontario*

*Roofed With Grey Hi-Tuff*

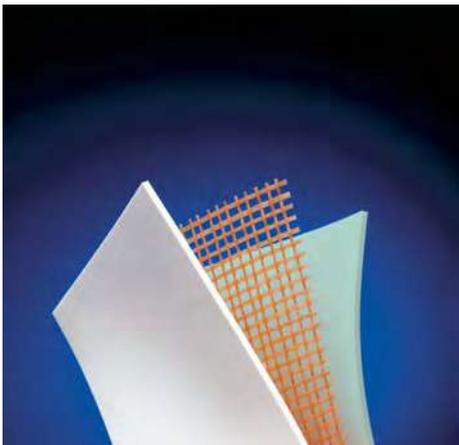
### PRODUCT DESCRIPTION

Hi-Tuff roofing systems are based on the Hi-Tuff TPO membrane; a copolymer of polypropylene and ethylene propylene rubber that has been formed into a membrane sheet and internally reinforced with a heavy duty polyester scrim. A 'second generation' single ply product, Hi-Tuff marries the advantages of previous generation materials while eliminating their limitations. The result is a roofing membrane that is faster and easier to install yet offers outstanding resistance to weathering, temperature extremes, ultraviolet exposure and a wide variety of industrial chemicals.



*Standard Hi-Tuff colours*

HI-TUFF FLEECE is a special purpose membrane consisting of the standard Hi-Tuff membrane (in 1.1 mm or 1.5 mm thicknesses) laminated to a non-woven polyester fleece matting. The fleece acts as a cushion against rough surfaces and provides a mechanical means for securing the membrane with adhesive.



*Standard Hi-Tuff is internally reinforced with a polyester scrim*

### APPLICATIONS

Hi-Tuff is a thermofusible membrane manufactured in different roll widths. The membrane is welded together with a hot air gun to form a uniform membrane across the roof.

Hi-Tuff may be installed in a number of different methods, including "loose laid and ballasted" applications such as Lexcan's standard Design B and C assemblies. It truly stands out in mechanically fastened or fully adhered systems, where its heavy duty scrim reinforcement and super strong, heat-welded seams offer the superior protection needed for a fully exposed application. Featuring an attractive, contour hugging surface in a truly light-weight assembly, Hi-Tuff is the preferred choice for many commercial and industrial roofing applications.

### MEMBRANE ALTERNATIVES

**COLOURS:** Standard Hi-Tuff colours are white, grey and tan. Custom colours are available on special order, subject to minimum quantities and cost surcharges.

**THICKNESSES:** Hi-Tuff membrane is available in four different thicknesses: 1.1 mm (45 mil), 1.5 mm (60 mil), 1.8 mm (72 mil) and 2.0 mm (80 mil). The thinner membranes are acceptable for most applications, however thicker membranes should be considered in areas of exposed roofs (Designs A, E or F) that may be subject to heavy foot traffic, frequent roof top unit maintenance or vandalism. Heavy duty Hi-Tuff walkways may also be used in these areas.

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*Front Cover Photos:  
St. James Industrial Park, Winnipeg, Manitoba  
Orillia Retirement Centre, Orillia, Ontario  
CP Airport, Vancouver, British Columbia*

*Ikea Superstore  
Coquitlam, BC*

*Fabricated with custom colours  
to emulate a seashore*



# Consider the Advantages of a Hi-Tuff roof...

## FOR THE OWNER

**Long-Term Performance** - Hi-Tuff outperforms competing roofing systems in just about every physical category. Cold temperature flexibility, seam strength, tear and puncture resistance and resistance to UV degradation are just some of the characteristics that make Hi-Tuff stand out as your best roofing choice for long term performance.

**Hi-Tuff Roofs save Energy** - Hi-Tuff roofs are ENERGY STAR® listed. Compared to traditional dark coloured roofs, a light coloured Hi-Tuff roof can yield significant reductions in air conditioning costs in the summer time.

**Help reduce Global Warming** - Even in more temperate climates, light coloured, heat reflective roofs can help reduce the "urban heat island effect" that occurs during the summer in major cities - a major contributor to global warming\*.

**Government Grants/Tax Incentives** - In some jurisdictions, governments provide grants or tax incentives for owners who install white, heat reflective roofs. Consult with your local building authority.

**Economical** - Hi-Tuff can be economically installed in a variety of design configurations in either new or re-roof applications. In some cases the membrane can be installed over top of an existing roof to avoid the high costs of tearing-off and disposing of the existing roof.

**Rooftop advertising** - Using different coloured membranes, your logo can be incorporated right into your roof! Ideal for low rise buildings in downtown cores or on airport flight lines.

**Odor-Free Installation** - Roofing with Hi-Tuff means roofing without asphalt and its noxious fumes.

\* For more information on the urban heat island effect and how a white Hi-Tuff roof can help, consult with your Lexcan representative.

## FOR THE ROOFER

**Fast, Efficient Installation** - With pre-assembled fasteners and seam welding speeds averaging 12 to 16 feet per minute, a mechanically fastened Hi-Tuff roof goes on fast. You are more competitive because you can complete the roof much faster than conventional systems - saving both you and your customer money.

**Reliable Heat-Welded Seams** - Featuring an unusually wide seaming temperature range, Hi-Tuff offers superior weld reliability even in the most difficult job site environments.

**Easy to Repair** - Should mechanical

*Toronto Star Building  
Vaughan, Ontario*

*Attractive Rooftop Advertising!*



damage occur, it can be easily found and quickly repaired. Aging has virtually no effect on the membrane's 'weldability' so it can be as easily repaired five years from now as the day it was put on.

**Complete Line of Flashing Accessories** - From pipe boots to corners, Hi-Tuff pre-fabricated flashings make the most troublesome details easier than ever.

**Clean Installation** - Based on a highly inert and homogenous polymer, Hi-Tuff is lead free and does not release chlorine gas during welding or combustion. Only the most minimum amount of adhesives and sealants are required to complete the system.

**The Backing of Lexcan** - The world's premier supplier of single ply roofing systems, with over 40 years of experience in applications ranging from the most northern industrial building in the world to the deserts of north Africa.

**Hi-Tuff is ideal for re-roofing applications where, in many cases, the membrane may be installed over the top of the existing roof. This can result in substantial savings on the cost of removing and disposing of the original membrane.**

## FOR THE SPECIFIER

**Lightweight** - Most Hi-Tuff roofs weigh less than 1 lb / ft<sup>2</sup> (4.9 kg / m<sup>2</sup>), including insulation. This can often yield considerable savings in a building's construction through reduced requirements for structural steel and footings.

**Plasticizer Free** - Unlike other thermoplastic membranes, Hi-Tuff contains no plasticizers that will leach out causing premature aging and embrittlement.

**Resistant to Physical Abuse** - The 1.1 mm thick Hi-Tuff membrane is one of the most puncture and tear resistant roofing membranes on the market. Three levels of thicker membranes are available to address the most demanding applications.

**Chemical Resistant** - Hi-Tuff is able to withstand prolonged exposure to numerous industrial wastes and chemicals. It is an ideal roofing membrane for roofs subject to high levels of airborne pollutants or vent stack effluents. Contact Lexcan to verify the resistance of the membrane to a particular chemical before proceeding with an installation.

**And most Important: Peace of Mind.** Knowing that you have chosen for your customer the most durable, long-lasting roof available.



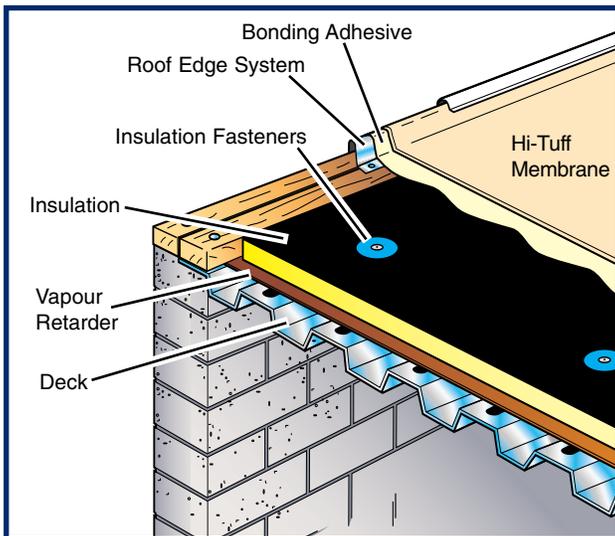
*A full range of accessory products are available to ensure a complete job.*

# Hi-Tuff Roofs may be installed in several different ways

## Summary Guide of Alternative Installation Methods

System	Primary Features	Restrictions
<b>Design A</b> Adhesive Adhered Roof System	<ul style="list-style-type: none"> <li>• Ideal for high slope jobs or roofs on high buildings.</li> <li>• Attractive, roof hugging finish.</li> </ul>	Insulation must be compatible with adhesive. Deck must accept appropriate fasteners.
<b>Design B</b> Ballasted Roof System	<ul style="list-style-type: none"> <li>• Economical.</li> <li>• Fast Installation.</li> <li>• Non exposed membrane.</li> </ul>	Deck must be able to support at least 5 kg (10 lbs) / ft <sup>2</sup> dead load. Maximum roof slope is 2:12.
<b>Design C</b> Protected Membrane Roof System	<ul style="list-style-type: none"> <li>• Economical.</li> <li>• Fast Installation.</li> <li>• Protected Membrane</li> </ul>	Deck must be able to support at least 5 kg (10 lbs) / ft <sup>2</sup> dead load. Maximum roof slope is 2:12.
<b>Design E</b> Mechanically Fastened Roof System	<ul style="list-style-type: none"> <li>• Economical.</li> <li>• Fast installation.</li> <li>• Ideal for re-covers.</li> </ul>	Deck must accept appropriate fasteners. Higher sloped roofs require job specific design.
<b>Design F</b> Vented Roof System	<ul style="list-style-type: none"> <li>• Economical.</li> <li>• Fast installation.</li> <li>• Ideal for structural concrete decks and certain re-cover applications.</li> </ul>	Each job requires Lexcan's prior approval.
<b>Re-Cover over an Existing Roof</b>	<ul style="list-style-type: none"> <li>• Eliminates high cost and environmental problems of dumping old roof.</li> </ul>	Refer to Lexcan's Technical Bulletin on Re-Cover roofs.
<b>Metal Roof Retrofit</b>	<ul style="list-style-type: none"> <li>• Extends life &amp; performance of standing seam metal roofs.</li> </ul>	Metal roof must be well attached and cannot be too corroded.

## DESIGN A - ADHESIVE ADHERED



The adhesive adhered system is the most versatile of Lexcan's roofing assemblies. Able to be used on any flat or sloped surface, it is ideal for barrel, saw-tooth or irregularly shaped roofs where corners and direction changes prevail. It is also the system of choice for high-rise buildings or buildings exposed to unusually extreme winds.

In the fully adhered assembly, the Hi-Tuff membrane is bonded to an acceptable insulation or other substrate with Hi-Tuff bonding adhesive; a synthetic rubber based contact cement. Membrane seams are heat-welded to complete the watertight membrane from the parapet to the drain.

For a more environmentally friendly alternative, Lexcan has special water based bonding adhesives available that may be used with the Hi-Tuff Fleece membrane. Consult Lexcan for more information on this system.



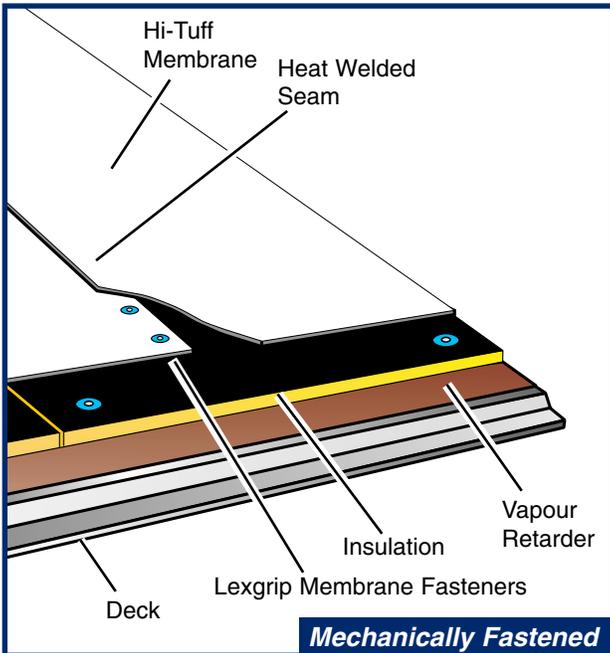
*Thunder Bay Hospital  
Thunder Bay, ON*

240,000 sq. ft. Hi-Tuff Roof



*Hi-Tuff adhered to substrate with bonding adhesive.*

# to accommodate almost any type of roofing situation

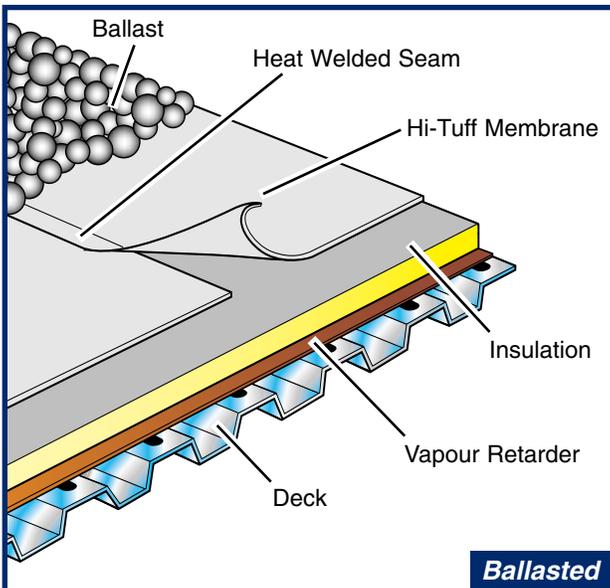


## MECHANICALLY FASTENED

The mechanically fastened roof system (MFRS) takes advantage of the Hi-Tuff membranes super strong tear resistance and heat welded seams to provide a secure, light-weight roof. Economical to install, the mechanically fastened roof system is as popular and reliable in re-roofing as it is for new construction.

In the MFRS, the Hi-Tuff membrane is secured to the structural deck with special membrane fasteners evenly spaced down the side of each membrane sheet. The number and pattern of fasteners required depends upon several factors including local wind conditions, building construction and the height of the roof. Adjacent sheets are positioned to overlap the fasteners and then heat-welded to form a watertight seal that is as strong as the membrane itself.

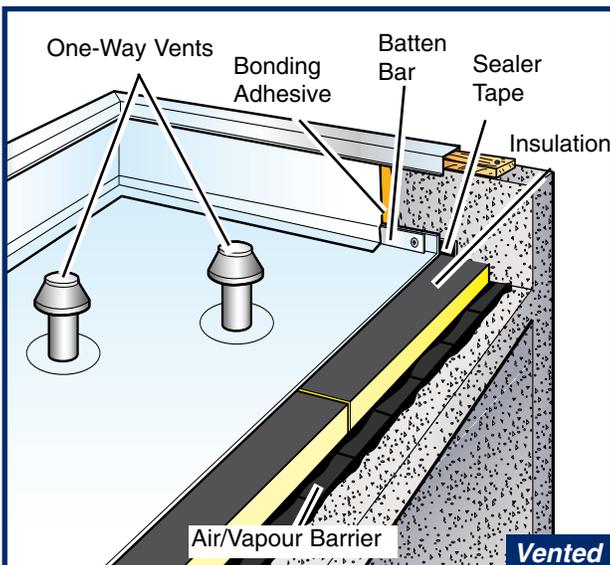
Lexcan has a variety of special corrosion resistant fasteners for securing the Hi-Tuff membrane to steel, concrete, lightweight concrete and wood decks. Lexgrip™ fasteners surpass Factory Mutual requirements for wind and corrosion resistance.



## DESIGN B & C BALLASTED

Hi-Tuff membranes may be used in ballasted roofing applications where membrane protection is desired. In a conventional ballasted design, the membrane is loose laid over top of an acceptable insulation or substrate. Round washed river stone ballast or approved pavers are then placed on the membrane to hold it in place.

Hi-Tuff may also be used in inverted systems where the membrane is positioned below the insulation. In this design, extruded polystyrene insulation is positioned above the membrane and held in place by a filter (or ballast reducer) fabric and washed river stone or another acceptable ballast. This design offers additional protection for the membrane and is often used on concrete roof decks.



## DESIGN F - VENTED ROOF ASSEMBLY

The Vented Roof System (VRS) features a highly economical installation with proven wind resistance. Vented Roofs offer a clean, neat appearance with most of the advantages of adhered or mechanically fastened assemblies.

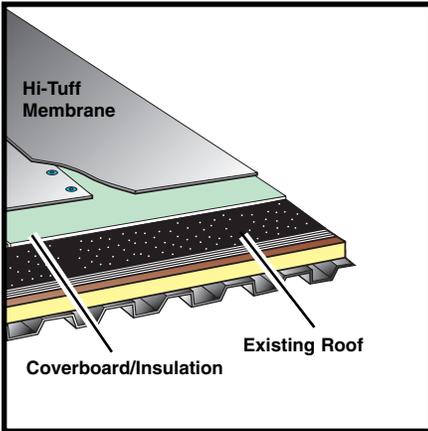
The VRS harnesses the power of the wind itself to hold the membrane in place. Fasteners, adhesives or ballast are not required! Simply put, the harder the wind blows across the roof, the harder the membrane is pulled down to the substrate.

The vented system is an ideal system for structural concrete decks that can be made air tight. Once this is achieved, the membrane is simply air sealed to the perimeter of the roof and laid loose across the field. Specially designed one-way vents are strategically located around the perimeter to permit any excess air from underneath the membrane to vent outside.

Note: Vented roofs are restricted to certain types of buildings. All VRS projects must be approved in advance by Lexcan.

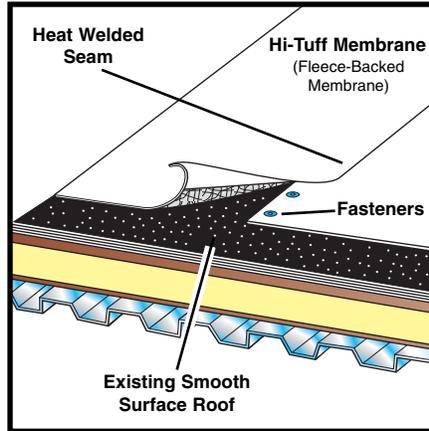
# Re-Covering over an Existing Roof\*

Hi-Tuff roofing systems are ideal for re-covering over an existing roof. Re-covering (leaving the existing roof system in place) not only yields substantial savings on the cost of removing and disposing of the original membrane, it helps reduce the burden on our landfill sites. Lexcan has several re-covering options available:



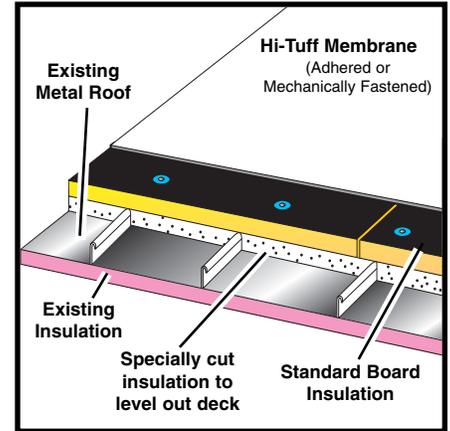
## RE-COVERING WITH A THERMAL INSULATION UPGRADE

Recovering with Hi-Tuff presents almost as many options as new construction in that the Hi-Tuff membrane may be mechanically fastened, ballasted with stone or fully adhered. When using standard Hi-Tuff membrane, an acceptable coverboard or insulation layer must be installed between the existing roof and the new membrane.



## RE-COVERING DIRECTLY OVER A SMOOTH SURFACED ROOF WITH MECHANICALLY FASTENED HI-TUFF FLEECE MEMBRANE

Even though a thermal insulation upgrade is not included, the use of a white, heat reflective membrane can reduce interior temperatures and air conditioning costs in the summer.



## METAL ROOF RETROFIT

Metal roofs that leak or are starting to corrode can be brought back to life with Hi-Tuff metal roof retrofit systems. Hi-Tuff roof membranes can either be mechanically fastened to the structural purlins (our MRR-MF system) or adhered to mechanically fastened insulation (MRR-FA system). In both cases, specially cut insulation is used to fill the voids between the metal seams and present a smooth surface for the Hi-Tuff membrane.

\* Note: Re-covering over an existing roof may not be a viable option for some roofs. In some cases a full tear-off of the existing roof will be necessary. Lexcan recommends that a qualified roofing expert be consulted before deciding on a re-cover application. Lexcan has special installation requirements for recover roofs. Contractors must follow these guidelines.



*Sears Warehouse, Montréal, QC  
Sectional Re-Roofs with White Hi-Tuff*



*Mechanically Fastening  
Hi-Tuff TPO Membrane*



*Corner fabrication with a hot-air hand welder.*

# The Quality Assured Hi-Tuff Roof... from manufacturing through to post-installation inspection

## MANUFACTURING

Hi-Tuff is manufactured on state-of-the-art equipment, overseen by a computer operated QC system. Each roll of membrane is inspected and certified to meet the high standards described below before being approved for shipment.

## Hi-Tuff Engineering Specifications

PHYSICAL PROPERTIES	TEST METHOD	PROPERTY AFTER AGING <sup>1</sup>		
		HI-TUFF 1.1 mm & 1.5 mm	HI-TUFF 1.8 mm & 2.0 mm	HI-TUFF FLEECE 110 & 115
Thickness Tolerance	ASTM D-751	± 10%	± 10%	
Thickness over Scrim	ASTM D-4637 Optical	1.1 mm: 0.381 mm (0.015") 1.5 mm: 0.508 mm (0.020")	0.635 mm (0.025")	
Elongation at Fabric Break, %	ASTM D-751	25% typical	25% typical	25% typical
Breaking Strength	ASTM D-751, Grab Method	1.0 kN (225 lbf) min. 1.5 kN (340 lbf) typical	1.3 kN (300 lbf) min. 1.8 kN (400 lbf) typ.	1.0 kN (225 lbf) min. 1.8 kN (400 lbf) typ.
Tearing Strength	ASTM D-751 (B Tongue Tear)	245 N (55 lbf) min. 578 N (130 lbf) typical	245 N (55 lbf) min. 578 N (130 lbf) typ.	245 N (55 lbf) min. 578 N (130 lbf) typ.
Puncture Resistance	FTM 101 C, Mtd. 2031	1.1 mm: 1.11 kN (250 lbf) min. 1.5 mm: 1.33 kN (300 lbf) typ.	1.33 kN (300 lbf) min. 1.78 kN (400 lbf) typ.	1.10 mm: 1.11 kN (250 lbf) min. 1.15 mm: 1.78 kN (400 lbf) min.
Linear Dimensional Change	ASTM D-1204 (6 hrs @ 70°C)	± 0.5 % max. - 0.2% typical	± 0.5 % max. - 0.2% typical	± 1 % max. - 0.2% typical
Brittleness Point	ASTM D-2137	- 40°C min. - 46°C typical	- 40°C min. - 46°C typical	- 40°C min. - 46°C typical
Ozone Resistance	ASTM D-1149 (168 hrs @ 100pphm)	No Cracks	No Cracks	No Cracks
Water Absorption	ASTM D-471 (7 days @ 70°C)	+ 4.0% max. + 2.0% typical	+ 4.0% max. + 2.0% typical	+ 4.0% max. + 2.0% typical
Water Vapour Permeance	ASTM E-96	0.10 Perms max. 0.05 Perms typical	0.10 Perms max. 0.05 Perms typical	0.10 Perms max. 0.05 Perms typical
Accelerated Weathering Xenon-Arc, 17,640 kJ / m <sup>2</sup> total radiant, 10 X Magnification	ASTM G-155 (0.70 W / m <sup>2</sup> ) (80°C B.P.T.)	No Cracks No loss of breaking or or tearing strength	No Cracks No loss of breaking or or tearing strength	No Cracks No loss of breaking or or tearing strength
Solar Reflectance, % 65% req'd for ENERGY STAR®	albedo x 100 Spectrum Reflectometer	White: 75 min., 87 typical Tan: 65 min., 70 typical	White: 75 min., 87 typical Tan: 65 min., 70 typical	White: 75 min., 87 typical Tan: 65 min., 70 typical
Resistance to Microbial Growth	ASTM D-3274 S. Florida, 2 yrs.	9 - 10 typical	9 - 10 typical	9 - 10 typical
Field Seam Strength	ASTM D-1876	4.4 kN/m (25 lbf/in.) min. 10.5 kN/m (60 lbf/in.) typical	7.0 kN/m (40 lbf/in.) min. 10.5 kN/m (60 lbf/in.) typical	7.0 kN/m (40 lbf/in.) min. 10.5 kN/m (60 lbf/in.) typical
Emittance, IR (LEEDS)	ASTM E-408	0.92 typical	0.92 typical	0.92 typical

<sup>1</sup> Aging conditions are 28 days at 116°C (240°F) equivalent to 400 days at 80°C (176°F) for breaking strength, elongation, tearing strength, ozone and puncture resistance.

## APPROVALS & COMPLIANCES

Hi-Tuff roofing systems have been tested and approved by Factory Mutual Research Corp. and Underwriters' Laboratories Inc. For current approvals and listings, consult their respective directories or contact Lexcan.

Hi-Tuff meets and exceeds ASTM Standard D6878-03 for TPO Membranes.

White Hi-Tuff membrane is ENERGY STAR® certified.

## INSTALLATION

Hi-Tuff is installed by professional roofing contractors trained and approved by Lexcan. Refresher seminars are regularly held to update contractors on the latest techniques and developments.

## WARRANTY

Superior installation quality and long term performance is guaranteed with comprehensive 'material only' and watertight warranty packages. Projects are normally inspected both during and after completion by a Lexcan technical representative to provide the best assurance of a quality installation.

## TECHNICAL ASSISTANCE

Lexcan has comprehensive design recommendations, sample specifications, detail drawings and product data bulletins available to assist the roof designer. These may be found in our technical catalogue (available from our head office below or through our local distributor) or downloaded from our web site at [www.lexcan.com](http://www.lexcan.com). In addition, Lexcan sales and technical representatives would be pleased to assist designers in everything from system selection to job site support.



Back Cover Photos:

Victoria Park Community Centre, Ingersoll, Ontario  
Fraser Tolmie Apartments, Victoria, British Columbia  
Home Depot, Barrie, Ontario  
Wal-Mart, Saint John, New Brunswick

# HI-TUFF ROOFING Systems

From stringent production control through to full job site support, the Hi-Tuff roof is quality assured from start to finish. For the ultimate in high performance, long-term protection, make your next roof a Hi-Tuff roof. Call or write Lexcan today to find out how Hi-Tuff can be your roofing solution



## PROJECTS

Hi-Tuff roofs have been employed on just about every type of commercial, institutional or industrial building. Applications include schools, hospitals, defense installations, retail stores, manufacturing plants, distribution warehouses, government facilities, restaurants, hotels, theatres - the list goes on and on. The following is a partial list of major companies or institutions with Hi-Tuff roofs:

- General Motors
- Wal-Mart Inc.
- Case Canada
- Sun-X Properties
- Suncor
- B.C. Rail
- The Home Depot
- Abbott Laboratories
- Siemens Corp.
- Sears Canada
- The Bay
- Coca-Cola
- Cara Foods
- McCains Foods
- Lamb-Weston
- Eagle Hardware
- Revy Home Improvement Centres
- Canadian Pacific
- Outback Steakhouse
- Tim Horton's
- Proctor & Gamble
- IBM
- International Paper
- Canadian Embassy in India
- National Grocers
- Orangeville Hospital

## So How do I go about getting a Hi-Tuff roof?

Give us a call and we'll put you in touch with the appropriate roofing professionals in your area.

### LEXCAN LIMITED

52 Bramwin Court,  
Brampton, Ontario, Canada L6T 5G2  
Tel: (905) 792-8300  
Fax: (905) 792-8305  
Toll Free: 1-877-792-8308

### Office & Distributor Locations:

- St. Johns, NFLD
- Montreal, PQ
- Thunder Bay, ON
- Calgary, AB
- Halifax, NS
- Toronto, ON
- Winnipeg, MAN
- Vancouver, BC
- Moncton, NB
- Ingersoll, ON

### Check us out on the web

[www.lexcan.com](http://www.lexcan.com)  
email: [info@lexcan.com](mailto:info@lexcan.com)

### Other Lexcan Products:

For complete single source supply of your entire roof, ask your Lexcan representative about these other quality roofing products:

- PERMATE™ Vapour Retarders
- LEXGRIP™ Insulation Fasteners
- ISOLEX™ Isocyanurate Insulation
- FLASH-TITE™ Flashings

