



## CASE STUDY - RETAIL STORE LIGHTING

### N' Sew On - Goderich

#### Summary:

N' Sew On is a small custom embroidery and fabric item gifts retail store located in Goderich Ontario. Gift items are sewn and embroidered at 6 workstation areas in the retail store so that customers can have items personalised while they shop.

Existing fluorescent 2 X 4 suspended ceiling "troffer" type fixtures were replaced with Miser Lighting induction lamps of various wattages. The 20W halogen incandescent lamps in the wire-type track lights were replaced with 3W LED direct replacement lamps. A dual tube, 80W, fluorescent fixture in the fabric-cutting area was replaced with a 40W self-ballasted Miser Induction lamp in a pendant fixture.

Total lighting load was reduced from 1,150W to 717W - **more than a 37% energy savings!**

Average light levels were improved from 365.8 to 595.5 Lux - **more than 55% brighter!**

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## Case Study - Retail Store Lighting

### N' Sew On - Goderich

#### Background:

The “N’ Sew On” retail store is located close to the central square in downtown Goderich, Ontario. The location is a small custom embroidery and fabric item gifts store. Gift items are sewn and embroidered at 6 workstation areas in the retail store so that customers can have items personalised while they shop. The store also produces larger orders of custom embroidered items such as sports team shirts and jackets, caps, canvas tote bags, aprons and other items.

The premises consists of a 50.2 square meters [540 sq. ft] retail area with a large glass window at the front, flanked by a glass door. There are two smaller areas; one for storage [where the existing fluorescent lighting was not changed] and one of approximately 8.9 square meters [96 sq. ft.] with a wall-to-wall table for fabric cutting.

#### Initial Lighting Configuration:

The store area was originally lit by means of five 2 X 4 suspended ceiling “troffer” type fixtures each using four 40W, T12, fluorescent tubes with dual “coil and core” type ballasts. In addition, there was a suspended wire type track lighting system using eight 20W, MR16, halogen incandescent lamps for spotlighting merchandise on shelves and display boards.

The lighting load in the retail store area was 800 watts for the 5 fluorescent troffers and 160 watts for the track lights. When ballast overhead is included, the total lighting load in the retail area was 1,060 watts.

The fabric cutting area was lit with a poorly placed, ceiling mounted, dual T12 fluorescent tube fixture with a “core and coil” type ballast nominally consuming 80 watts. The actual power consumption was 90 watts of power with the ballast overhead included.

The total electrical load of the old fluorescent lighting in the retail area and the fabric cutting area was 1,150 Watts.

The type of work being done relies on fine vision for dealing with small stitching. Colour rendering is an important issue when matching the colours of corporate logos. The owner, Kevin Soehner, and the staff of the store, had complained that the lighting was poor and uneven - especially in the far corners of the store (see photo below).



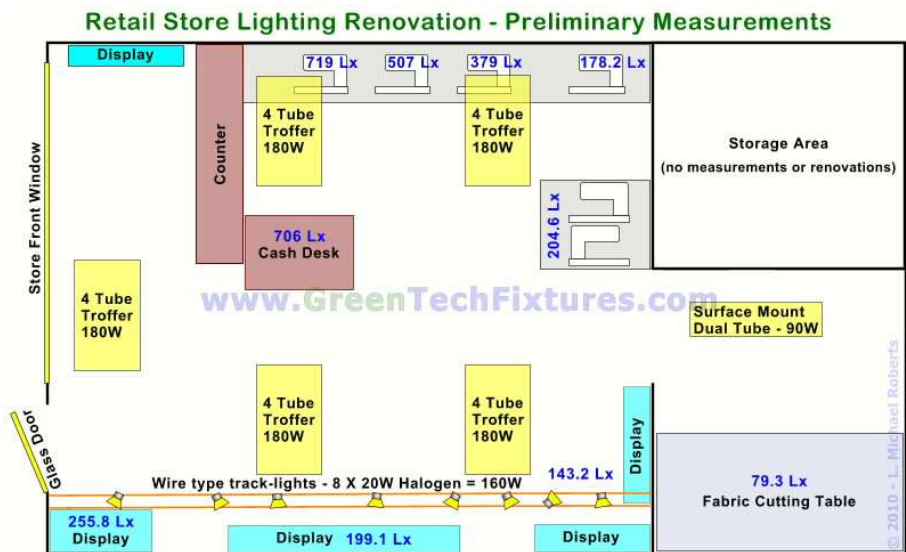
N' Sew On - Retail store lit with existing fluorescent troffer lights [before the lighting renovations]

The photo on the previous page shows a view of the store from the front door showing the suspended ceiling fluorescent troffer lights and track lights. Looking at the wall on the left side of the store, one can see the uneven light distribution. The far left corner of the store, where three sewing machines were located, was particularly dim.

Detailed light level measurements (see diagram at right) at each workstation and display area in the retail store were taken before the lighting renovations began (measurements in Lux are shown in blue). The readings were taken at night so as to eliminate the effects of daylight entering through the glass storefront and glass entry door.

Before the lighting renovations, the light levels varied from a low of 199.1 Lux to a high of 706 Lux - with an average lighting value of 365.8 Lux in the retail store area. The average was computed by adding the readings from all areas and then dividing by 9 [(719 + 507 + 379 + 178.2 + 204.6 + 143.2 + 199.1 + 255.8 + 706 = 3291.9)/9 = 365.8 Lux] As can be noted from the readings in the diagram above, the work areas varied widely in light levels.

The light level in the fabric cutting area was 79.3 Lux as measured in the center of the wall-to-wall cutting table (this figure was not included in the average calculation).



## Retail Lighting Renovation Design:

GreenTech installed six, 18 inch, laser-cut, Low-Bay type fixtures with prismatic diffusers. The prismatic diffusers allow for some light to project onto the ceiling to eliminate the "cave effect". The existing troffer fixtures were disconnected but were left in place to save the cost and mess involved in removing them. Four of the GreenTech fixtures were equipped with 120W lamps. The two fixtures at the front of the store, where there was an abundance of natural light entering through the window and door, were equipped with 80W lamps - all the induction lamps were 4100K type.

The placement of the fixtures was generally symmetrical with the exception of one of the fixtures at the front of the store. This was placed closer to the storefront window as the store has a hinged display wall which is moved to an approximately 45 degree angle when the store is closed. The placement of this fixture, and wiring it to a separate circuit, allows it to remain on at night to light the merchandise displayed in the front window.

The 20W MR16 halogen lamps in the track lighting were removed and replaced with 3W, LED, MR16 lamps to light the display areas. No changes to the track lighting were required to accommodate these lamps as they are a plug-in direct replacement.

The 80W dual-tube fluorescent fixture in the fabric cutting area was removed and replaced with a 40W, self-ballasted, 5000K GreenTech induction lamp in a pendant fixture mounted over the center of the wall-to-wall table at a height of 1 metre. A 5,000K lamp was chosen for this location to provide colour rendering closer to daylight when assembling fabrics for production.

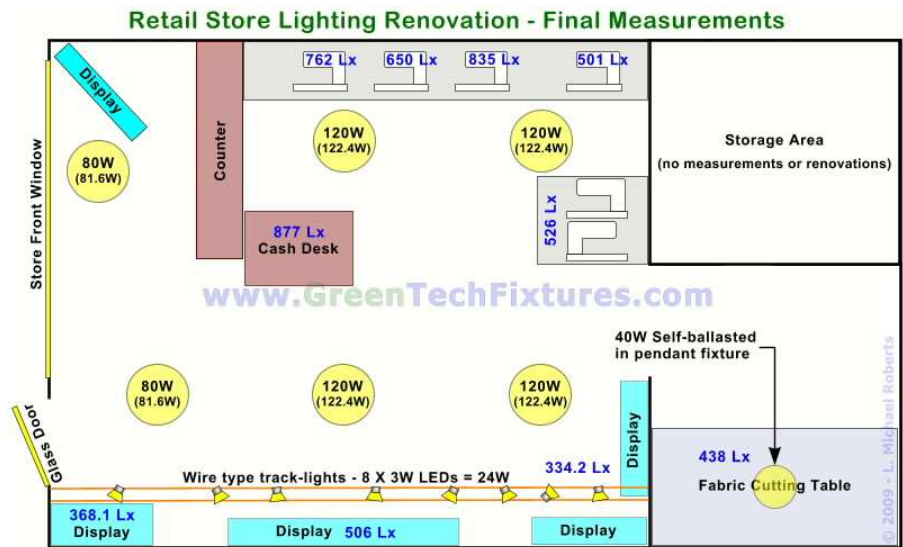
## Final Lighting Configuration:

Detailed measurements were taken after the new lights were installed - again at night so as to eliminate the effects of daylight from the glass storefront.

After the lighting renovation (see diagram below - readings in Lux shown in blue), the light levels varied from a low of 368.1 Lux to 877 Lux - with an average lighting value of 595.5 Lux - an increase of over 55%. The average was computed by adding the readings from all areas (except fabric cutting) and then dividing by 9 [(762 + 650 + 835 + 501 + 526 + 334.2 + 506 + 368.1 + 877 = 5359.3)/9 = 595.5 Lux] As can be noted from the diagram and seen in the photos below, the work areas are now more uniformly lit and all are close to, or above, the Ontario Government recommended 500 Lux for fine work.

The light level in the fabric cutting area was measured at 438 Lux in the center of the wall-to-wall cutting table.

The total electrical load of the new Miser induction and LED lighting installed in the premises (including the ballast overhead) is 717 Watts - an energy saving reduction of 433 watts.



### Summary:

The new GreenTech induction and LED lamps and fixtures provide much smoother, glare free lighting at higher light levels, with improved colour rendering and significant energy savings.

Electrical load was reduced from 1,150 W to 717 W - **more than a 37% energy savings!**

Average light levels were improved from 365.8 to 595.5 Lux - **more than 55% brighter!**



Left: N' Sew On - Retail store lit with GreenTech Induction and LED lights after lighting renovations (looking from the front door - the sixth fixture is not visible due to its placement for lighting the store window).

Right: N' Sew On - Retail store lit with GreenTech Induction and LED lights after lighting renovations (looking from the back towards the front door - the folding display wall at the front right is in the "store closed" position).



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