

Dec. 2007

Alberta News

# GREENHOUSE TIPS

Combat the high cost of heating.

Double Poly\_1



The state/age and repair (maintenance) of your double poly roofing system drastically effects your bottom line

## ENERGY CONSERVATION SERIES - DOUBLE POLY CLADDING

Is a great cladding system when all things are good. If things not good, a nose bleed.

Double layer 6 mil inflated poly when installed and maintained provides a very good overall U value when all things are considered.

We have covered this topic many times in the past, but let's refresh everything.

Double poly cladding systems get their high R values from the fact of the dead air space between the sheets. Dead air is just that dead/still/stiff. Basically we wish to maintain a pillow of dead air. ie : Close of

the intake on your inflation fan and turn the fan off. Generally this roof should maintain its state for at least 10 to 15 minutes. If not, well your roof/walls are leaking badly. No dead air space and the higher heat loss.

### Inflation Pressure / Inflation fans.

Aim for an inflation pressure of about 0.3" static. That's lots. Actually, in most cases, if you work through the numbers and apply a air pressure of 0.5" static, you will develop so much pressure that the poly film at the look exceeds its limits and

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### Energy Conservation

Should be your first step in reducing your energy operation costs.

begins to creep ( plastic deformation ) and starts to thin. That's not good. How do you tell what your pressure is. A have manometer of course, or if you are handy, just a hunk of 1/8" flexible tubing, and a ruler, and a piece of wood and make one. If so inclined contact us and we can forward a drawing to you.

Anyhow. To control the discharge static pressure of the fan, simply use a intake blade damper of sorts.

If you end up with a 2 foot inflated bubble, at say 0.3" static, this tells you that the poly (outer sheet at least ) is on to loose. Aim for no more than say a 10" pillow. The problem with to big of an air space is that they create thermal convection eddies in the air space itself. These eddies will actually reduce the overall thermal qualities and increase heat loss. This is no great problem just get up on the roof remove the insert wires in the

lock and tighten up the poly and bingo you are back in business.

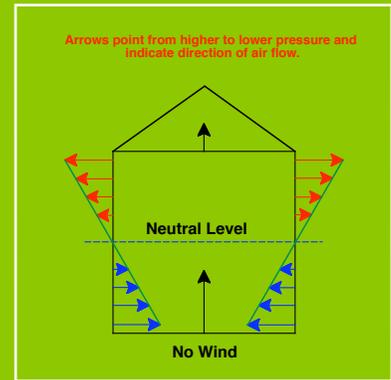
Visually a roof or wall inflated to 0.3" pressure well provide a decent drumming sound when slapped. And won't move around to much when exposed to moderate winds.

Fan size is a question, we get many times a year ! Actually if the poly and the state of installation is good shape, very very little. Most greenhouse suppliers provide fans in the small 100 to 150 CFM range for most applications. These will easily look after the needs of a 30 foot X 144 foot gutter house and have capacity to spare. ( Repeat after me ---- **dead or as close to dead air** , so you don't need much volume of air flow). Just as an example, we have in many many occasions pulled 10 - 15 to 20 bays of roof and have inflated all those roofs with as little as two or three of the fans running. That tells us a



Gee's ...  
now I am not  
running as  
much .

# HEAT LOSS



An inflated double 6 mm poly roof or wall provides excellent thermal properties, but it needs to be installed correctly, maintained as it ages. If left unattended or neglected it is one of those hidden items that can be a costly component on you profit or loss sheets.

**TiD bit of Information**

Bedding plant growers/tomato growers etc. etc. think they have it rough. How about the tree seedling silver culture growers ? Most located way up in Northern Alberta. Start their crops in January. Lots of -40 deg. F or C conditions and they are busy germinating crop. And quite successfully we must say. They indeed face challenges that most can only dream about. Even in the early 1990's they took their structure operational costs seriously.

## Ratty Old Double Poly

Replace or repair.  
It will only cost you dearly on your energy costs if you don't.

few things. We did a good job installing the lock system and we didn't add many holes during installation. And ... the best feature .... this roof will be thermally very good.

On multi bay gutter connected greenhouse projects we like to install all of the inflation fans in a daisy chain fashion. This allows redundancy in the inflation system. If a fan fails to work at least the roof will remain inflated by the sharing of the fans. It is important to consider adding one way air valves on the jumper connections at the poly connections.

If you are not able to inflate the roof and the side walls etc. ? Well, you have a leaker. You simply have some loose or miss installed lock ( it doesn't take much ) or you have significant holes somewhere in the poly or jumper systems. Resist the urge to simply add more fans to maintain inflation. ( **Repeat and Repeat... I need dead air space** ). If not .... I guess you would rather take the simple approach and continue paying those higher than normal energy bills. And it appears that a lot do.

### How to determine how thermally efficient your poly is ?

Very very simply of course. Use this silly little equation.

$$R1/R2=(Ti-Tx)/(Ti-To)$$

Where R1 = 0.62 and R2 is the thermal resistance of the cladding assembly. Ti is the inside air temperature in deg. F. To is the outside air temperature in deg. F and Tx is the inside surface temperature of the cladding system in deg. F.

All that you need to do is to solve for R2.

Example. Say it is -20 deg. F outdoors. The spacial temperature in the greenhouse is 60 deg. F. And with a contact thermometer the surface temperature of the poly is 15 deg. F.

Well, plug these numbers in and you have a resulting ( actual ) resistance value of 1.10. Well folks .... this roof will be a nose bleed ..... it will cost you a fortune to heat. Why .... the R value of double poly in reasonable state is 1.91. Look at the difference in the R values. Why do you have such a low R value on your poly ---- well you have leaks and major ones ( **again Repeat to yourself ... I need dead air space ... or at least as dead as possible** ).

The extra cost to heat ( or more appropriately pay to your favorite Utility Co ) would be :

$(1/1.1)-(1/1.91) * 80 = 30$  extra BTU's per sq. ft of roof area per hour. Heck, at this rate you may just as well be operating under glass.

Not sold. Let's say you actually worked up the energy to go up onto the gutters. You found a bit of lock out and some small tears along the lock line and pulled them out.

Now come in and measure the surface temperature. It now reads 25 deg. F. Wow ... great. Now you have a resulting R factor ( let the drums roll ) of 1.4. Folks don't snicker at this. You now have reduced your roof loss. How much ? Well you have saved yourself 15 BTU's/sq.ft./hr over the area of the roof. Hmm .... if my math is right that small improvement reflected a 50% improvement from when you started. Now assuming you have say 4000 sq. ft. of roof. That 1/2 hour effort spent up on the roof seems insignificant.

In an ideal world. At the above conditions and if your poly was new and not a leaker your assembly should be close to a R value of 1.91, again using the equation, your real target inside surface temperature should be around, ( Solve for Tx), 34 deg. F. So you can see, even though you made major improvements, but there is a way to go.

If you find that there are simply too many small holes to patch etc. etc. you can use this simple little equation as a tool to help you determine .... well its better to replace or live with and pay the utility bill consequences.

### Poly Nipples and Jumpers

If you are jumpering a roof with a roof or a roof to a wall etc. from a common fan it is best to provide a one way air flow nipple at those connection points. Typical examples include: When the wind blows and it flattens the sidewall, all that is happening is all your inflation air is now in the leeward side of the roof. Install a air check valve on the wall and bingo the wall will not deflate. If you need air check valves contact our office we carry both 3" and 4".

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