ACG CONSULTING

Your
Commerial & Industrial
FLAT ROOFING EXPERTS

Andrew H. Akerboom, RRO
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andrew.a@acgconsultant.ca

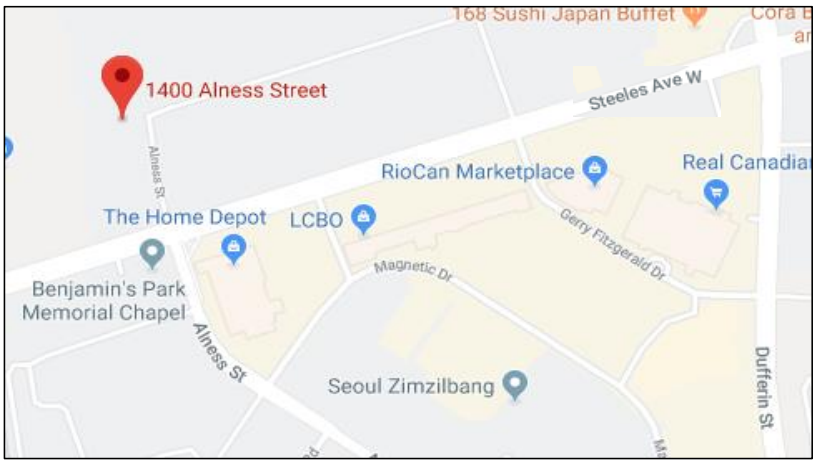
SAMPLE INSPECTION REPORT

PROJECT: **FLAT ROOF INSPECTION**

ROOF SYSTEM: **SAMPLE 4-PLY INSPECTION REPORT**

DATE: **May 17, 2019**

CONSULTANT:	Andrew Akerboom	CELL:	647.408.4992
JOB SITE:	1400 ALNESS ST.	Toronto	Ont.
CUSTOMER:			
ADDRESS:			
CITY:	Toronto		
Contact:			
Ph:			
EMAIL:			



LEGEND	P = PASSED INSPECTION	X = FAILED INSPECTION	N = Not Applicable	Comment in shaded areas

Parapet Flashing	X	Pitch Pans	X	Drains & Scuppers	X	Membrane Blisters	X	Mem Seam Defects	X	Repair Patches	X	
Curb Flashing	X	Equip. Sleepers	X	Ponding	X	Membrane Ridges	X	Mem Deteriorated	X	Debris & Veg.	P	
Penetration Flash.	X	Equip. Platforms	N	Metal Flashing	X	Membrane Splits	X	Membrane Holes	X	Wall Structure	P	

Above: Results of 18 Point Inspection. This Roof Failed -[15]of the 17 Applicable points of failure

INSPECTION NOTES: **Core Existing Roof:** (To be done with on owners consent)

1. Scupper Drains: **a.** Are higher than roof. Water will never drain.

b. Pooling water will start to deteriorate the asphalt membrane after 48 hours.

2. Cones, Pipes & Goose Necks: Membrane is Alligatoring / Dried, Cracked & Splitting

3. Curbs & Parapet membrane flashings:
a. Membrane is Alligatoring / Dried, Cracked & Splitting

4. Field (Flat Areas)**:**
a. Alot of Blueberries noted:
[Blueberries: Asphalt is dried out & Leaving the roof system]
b. This roof has only 40% of waterproof abiltiy left

5. Wall structure: ok, still appears to be strong

6. Roof top Mechanical assemblies (HVAC & Ducts)
a. Many of the units are old & rusted.
b.The seal on Ductwork joints is old & poorly applied

Experience has shown that old HVAC assemblies;
1.) Rust right through in some areas allowing water through to penetrate the building interior.
2.) Internal drains clog & overflow, allowing water to enter the duct work & penetrate the building interior.
3.) Ducts & duct joints are common leak sources
Solution: Insulate(Optional) and wrap all ducts & joints with a PVC membrane.
Recommendation: After new roof is installed preform a water test . Test the entire roof & HVAC assemblies

Estimated Remaining Life Expectancy: [0] Years
This roof is [8] passed it's life expectance

For more detail see anotated pictures on pages 3 - 8

COMPANY / CONTACT:	TEKNION FORM		
ADDRESS:	1400 ALNESS ST.	Contact:	Mr. TF
CITY:	Markham	Ph:	0
JOB SITE:	1400 ALNESS ST. Dufferin & Steeles	Email:	0
CONSULTANT:	Andrew Akerboom	CELL:	647.408.4992

N

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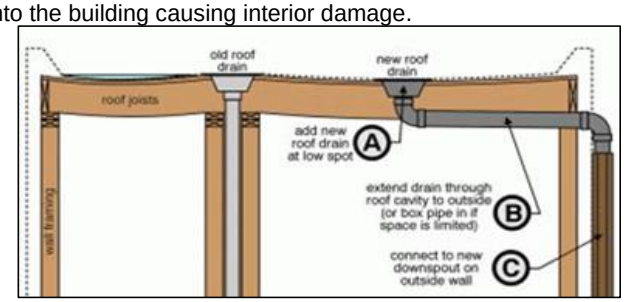
CUSTOMER: **JOB SITE:** 1400 ALNESS ST.

Ponding water collects in large pools on the roof surface. Two reasons: ,

(1) roof drains are blocked or clogged with debris

(2) roof drains are attached to support columns which maintain a consistent height while the rest of the roof system is built on a deck which tends to move and sag or sink

Small cracks and tears will widen until they rupture to allow water into the building causing interior damage.



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In both cases, roof depressions that collect and hold water will tend to grow in size as the added weight of the pooling water will continue to cause exponential sagging of the roof deck. Ponding water has many negative effects on a roof system. The weight can crush insulation rendering it a useless thermal barrier - this will cost you big money since your HVAC system will have to work longer and harder to maintain a comfortable interior temperature. In the winter ponding water will expand as it freezes. This expansion will weaken imperfections in the roof system.

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EPANSION MEMEBRANE FLASHING

Membrane is dry out and split open

Water has & will continue to enter the building causing interior damage.

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PITCH POCKET FLASHING / SEALANT

Sealant is dry out and split open

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Tempoary stop leak cement used during rain

On a dry day (Membrane must be dry);

a) Cement should be removed

b) A perminant patch installed

Cement will break down within;
1. In the summer 2 to 6 months
2. In the winter 1 or 2 freeze-thaw cycles.

When cement breaks down, water will enter the building causing interior damage.

More tempoary stop leak cement used and never patched

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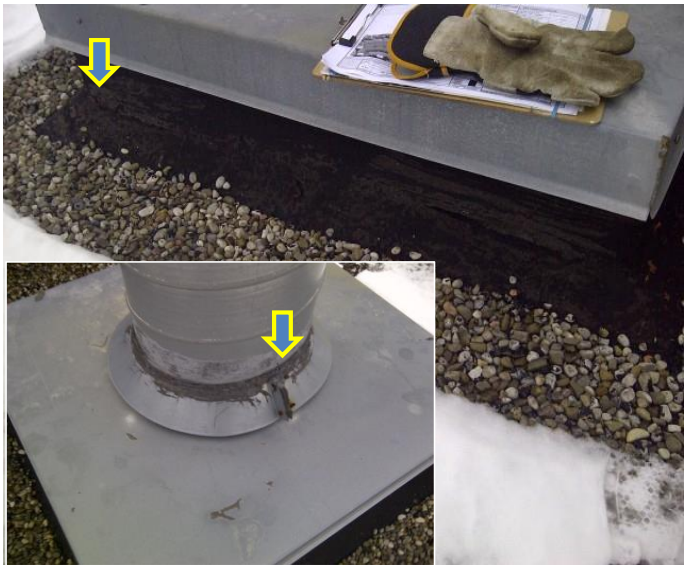

CURB & PIPE FLASHING / MEMBRANE & SEALANT

Flashing is dry out and split open

Water has & will continue to enter the building causing interior damage.

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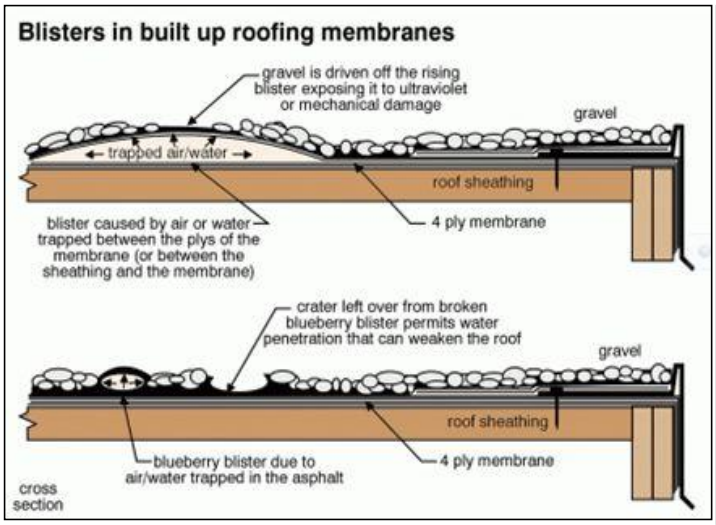
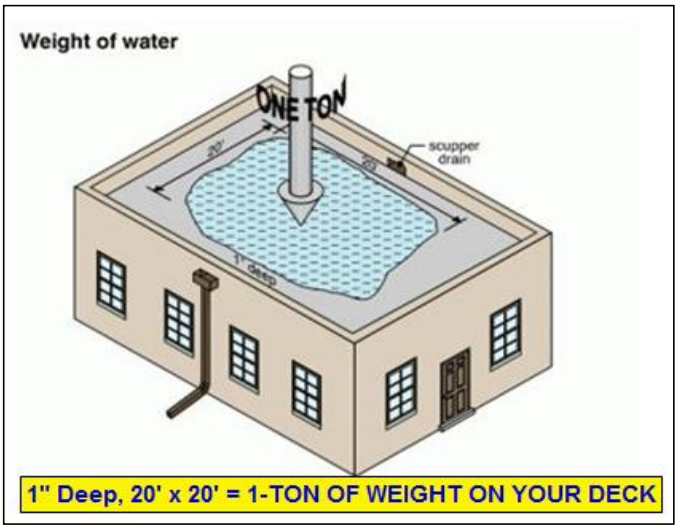
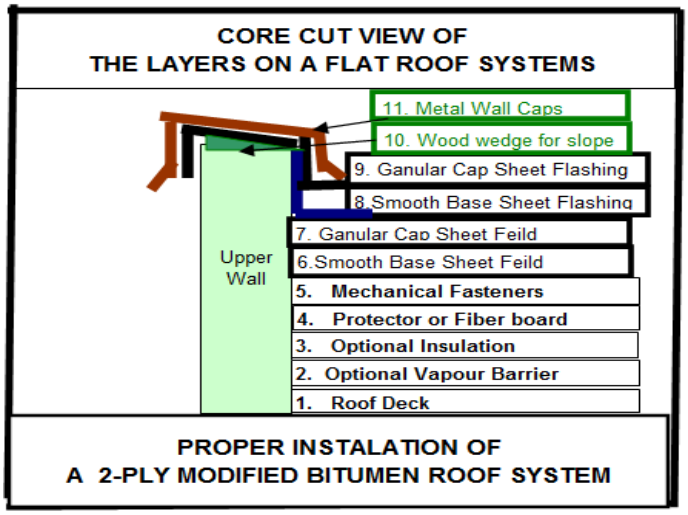
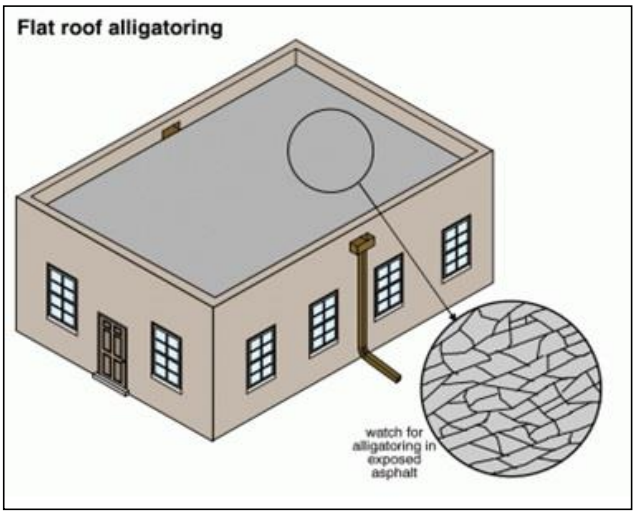
Common Faults that develop as Traditional Built Up Roofs (i.e. TAR & GRAVEL & MODIFIED BITUMEN) age:





MOST COMMON PROBLEMS WITH AGING FLAT ROOFS





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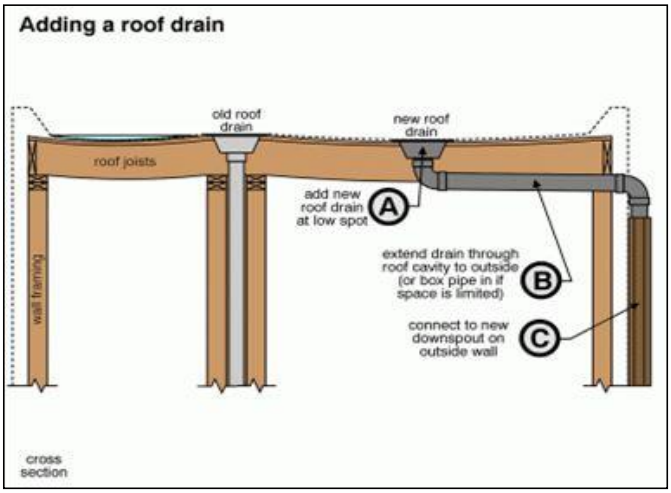

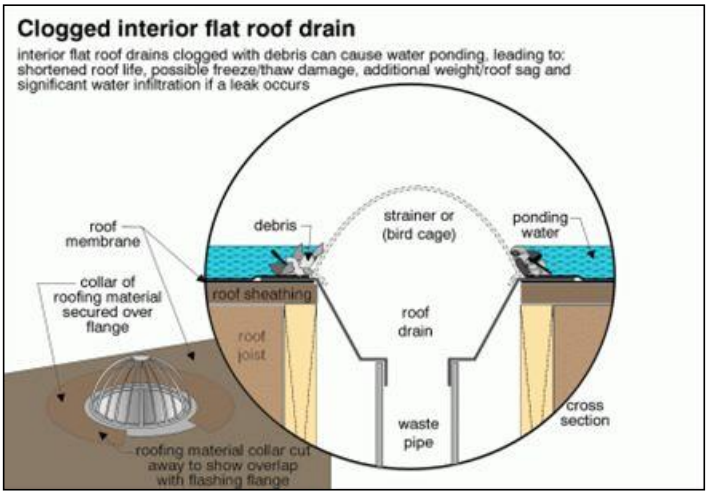

MOST COMMON PROBLEMS WITH AGING FLAT ROOFS

AFD FLATROOFING INC.

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Common Faults that develop as Traditional Built Up Roofs
(i.e. TAR & GRAVEL & MODIFIED BITUMEN) age:

Alligatoring: a result of the drying out and shrinking of the asphalt surface resulting in a “mud-cracking” pattern. The pattern is most pronounced in areas of exposed asphalt. It is caused by the heat and UV rays of the sun beating down. If left untreated, the alligatoring condition can develop into membrane splits. As the surface continues to shrink and dry out, cracks will develop and may stress-crack the membrane in cold weather. These crack channels will allow water to penetrate the roof and possibly damage the building interior.

Bare felts: areas lacking in surface asphalt, mineral, granule, or aggregate due to wind and water erosion. Weathering causes the roofs surfacing materials to oxidize and wear away after a period of time. Loss of UV protection results in accelerated deterioration of asphalt (the roof’s water repellent) and felts (the membrane’s strength). Heat and UV rays dry out unprotected asphalt which then leave the bare felts exposed to the elements. The exposed membrane will then absorb moisture and degrade through freeze/thaw or wet/dry cycles, causing premature failure which will allow water to penetrate the roof and possibly damage the building interior.

Blisters: soft spongy pockets or swellings in the roof membrane. They occur between layers of felt or between the roof membrane and substrate. Air or moisture vapour entrapped within a blister expands exponentially as the roof and outside air temperatures rise. This results in sufficient pressure to push the felts upwards and split open. Blisters may be ruptured by roof traffic, expanding frozen water, or hail (especially during colder weather). Some blisters may become so large as to affect drainage and cause pounding water. Seams may split apart, resulting in leakage. A ruptured blister will immediately allow water to penetrate the roof and possibly damage the building interior.

Ridges: linear buckling felt lines protruding upward through the surface layers of asphalt and aggregate. Ridges are formed by either thermal changes expanding and contracting the roofing felts or by gaps in the underlying insulation that allow vapour to migrate upwards through the roof system. Over a period of time ridges will grow and erode until they are stripped of their protective asphalt. These exposed ridges, through repeated weather cycling, will eventually crack and split to allow water into the roof system and building causing interior damage.

Blueberries: The result of dried out asphalt. They appear on the roof as small blue or black balls, resembling blue berries. *When* the top pour of *asphalt erodes to this stage, the roof system has lost at least 40% of its waterproofing ability.*

Perimeter Flashing Deterioration: expansion and contraction movement of the metal edge causes a sawing action that cuts into the perimeter flashing. Moisture can then enter the roofing system and building. Moisture will damage the insulation and R-value. It will also allow water to enter the building causing interior damage.

Splits: membrane splits are usually caused by building movement, ridges, and expansion and contraction. Weak or inflexible membranes reach a point where they cannot accommodate further movement. At this time the roof splits open. The open split allows water to enter the roofing system, saturating the insulation, and leak into the building causing interior damage.

Pitch Pockets: metal protrusions that penetrate the roof system to allow conduits to run from the roof top into the building. Movement from the protrusion can break the waterproofing compound, creating cracks. Over time, the release of solvents from the compound can cause the material to shrink, leaving gaps. Water can enter through a defective pitch pan and find its way into the interior of the building causing interior damage. Moisture can also penetrate into the roof system leading to premature failure.

Ponding: ponding or pooling water occurs as rain or snow melt water collects in large pools on the surface of a roof system. These pools begin to form for two reasons: (1) roof drains are blocked or clogged with debris, (2) roof drains are attached to support columns which maintain a consistent height while the rest of the roof system is built on a deck which tends to move and sag or sink under the weight of the roof system, mechanical units and pools of water. In both cases, roof depressions that collect and hold water will tend to grow in size as the added weight of the pooling water will continue to cause exponential sagging of the roof deck. Ponding water has many negative effects on a roof system. The weight can crush insulation rendering it a useless thermal barrier - this will cost you big money since your HVAC system will have to work longer and harder to maintain a comfortable interior temperature. In the winter ponding water will expand as it freezes. This expansion will weaken imperfections in the roof system. Small cracks and tears will widen until they rupture to allow water into the building causing interior damage.

Ponding water also accelerates the aging of a roof. The natural waterproofing oils in the asphalt will separate from the membrane if the system remains submerged under water for periods longer than 48 hours. And finally, a negatively sagged deck becomes a structural concern. The deck’s tolerances will onl accept a limited amount of weight before it becomes a candidate for a roof collapse. Did you know that;

A Pool Of Water [1” deep], [20’ long] x [20’ wide] = 1-TON of extra weight on your roof. 1-Ton per inch!!

The roofing felts are not waterproof. They are 100% wood fibre compound and left unprotected, will absorb water. Over time, they ultimately rot, exposing the next layer of asphalt. This layer is installed at one third the rate of the initial top pour and its oxidation rate is much greater. When it breaks down the next layer of roofing felt is exposed and the cycle continues.

Conclusion: Many building owners could prevent premature & costly replacement of their roofs. If properly maintained, roof systems can last 25-35% longer than average.

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CONCLUSIONS:

This roof is 28 years old. 8 years past it's life expectancy
Investing any additional money into this roof system would be a very poor investment ,
as it would be very expensive and short lived.

Short Lived because;

1. Adhering repair patches to an existing dry & brittle membrane will not hold for long as the dry & brittle membrane will crack and break away taking the repair patches with it.
2. As the existing membrane is so dry & brittle, installing repairs would be disruptive to the system & may (usually does) cause the membrane to crack & split open in new areas.

Often for every one repair done, two other new splits occur.

RECOMMENTATIONS:

Replace the existing roof system.
Attached is a systems comparative chart comparing 6 of most popular systems.
Pricing is bases on a specific roof & 2017 costs. You will see the relative difference between systems.
For budgeting purposes add about 10-15% to the numbers on the chart.
If you have any questions or would like additional information reguarding any of the systems and /or insulation, please just ask me. *(I don't charge for education toward well informed decisions)*

ADDITIONAL SERVICES AVAILABLE:

Services at additional costs that vary bases on requirements;

1. Writing tender specifcations.
2. Manage the tender process.
3. Supervise /Spot Check Quality & Inspect Installation or Repair Projects

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ROOF SYSTEMS OPTIONS

Total Square Feet of roof Field):	30,393		Pipes:	21	AS AT: 23-Feb-17
Total Square Feet of roof Detail):	1,976		Curbs:	5	DRAINS: 11
ROOF DECK:	STEEL	BUILDING HEIGHT:	2-STORY	STRAIGHT DROP TO GARBAGE:	YES

EXISTING ROOF MAKE UP: [Pea Gravel]+[1/4" Flood Coat]+[1/4" 4-Ply felt /Asphalt] + [1" Fiberboard]

TOTAL SQUARE FEET OF ROOF (Field + Flashing): 32,369 SF

NOTE: Below Prices are based on stated roof details & 2017 Materials & Labour costs

ROOF SYSTEM OPTIONS		R-VALUE (add R-9)	Roof Cost	Cost / SF	20 year Warranty Cost	Cost with Warranty	Cost/FT2 (with warranty)	Expected LIFE (Yrs)	Your True Cost. /Yr.
OPTION-1:	TAR & GRAVEL+Modified Flashings: RIP/ 4Ply-BUR Felt:	*R-9*	$ 259,087	$ 8.00	N/A	$ 259,087	$ 8.00	18	$ 14,394
OPTION-2:	TAR & GRAVEL+Modified Flashings: RIP/ 5Ply-BUR 4-Glass & 1-Felt:	*R-9*	$ 277,058	$ 8.56	$ 11,329	$ 288,396	$ 8.91	25	$ 11,082
OPTION-3:	*2-Ply Modified Bitumen :* RIP/ Mop-Base & Torch Cap:	*R-9*	$ 258,382	$ 7.98	$ 11,329	$ 269,719	$ 8.33	25	$ 10,335
OPTION-4:	2-Ply Modified Bitumen: RETROFIT/ MF-Base & Torch Cap:	***R-21****	$ 226,681	$ 7.00	N/A	$ 226,688	$ 7.00	20	$ 11,334
OPTION-5:	60Mill PVC Roof System RETROFIT/ MF-PVC:	***R-21****	$ 235,970	$ 7.29	$ 8,092	$ 244,070	$ 7.54	35	$ 6,742
OPTION-6:	60Mill TPO Roof System RETROFIT/ MF-TPO:	***R-21****	$ 220,285	$ 6.81	$ 8,092	$ 228,384	$ 7.06	25	$ 8,811

** Typical existing 4Ply BUR System has [R-13[+[R-9] in Retorofit= R-21.*

QUALITY CONSIDERATIONS CHART

SYSTEM SCORE BOARD		Modified Bitumen	BUR Felt	BUR Glass	PVC	TPO	EPDM
WARRANTY (A lot of Fine Print)		Poor	N/A	Fine Print	Very Good	Fair	Fair
Most Economical (Lowest Cost /Year.)	RANKING FROM 1 to 6:	4	6	3	1	2	7
Sustainability (Longest life)	RANKING FROM 1 to 6:	3	5	4	1	2	6
Reflective (Reduces energy costs)	RANKING FROM 1 to 6:	ABSORBS	ABSORBS	ABSORBS	1 -REFLECTS	2-REFLECTS	ABSORB
Deteriorates with Ponding (48-72 hrs)		YES	YES	YES	NO	NO	NO
Easy to Repair		Takes 2-Trips	Takes 2-Trips	Takes 2-Trips	Only 1-Trip	Only 1-Trip	Takes 2-Trips
Heat or Torch Welded (Open flame or Hot air.)		OpenFlame	OpenFlame	OpenFlame	Hot Air	Hot Air	Glue
Common Aging Faults: Alligatoring, Bare felts, Blisters, Ridges, Splits, & Ponding		YES	YES	YES	NO	NO	YES
Supports a fire (Will feed a fire)		YES	YES	YES	NO	YES	YES