						COST			
						Initial Cost		Life Cycle Cost	
cat 1	cat 2	cat 3	cat 4	cat 5	cat 6				
			membrane thickness	membrane attachment method	surface characteristic	cat 6 level score	comment	cat 3 level score	cat 6 level score	comment	cat 3 level score
NON-BITUMINOUS TYPE	Thermoplastic	PVC	45 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	7.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	8.0
				mechanically attached membrane		8	approx $4.00 per sf		8	1.1 multiplier	
				fully adhered membrane		7	approx $4.50 per sf		8	1.1 multiplier	
			60 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		8	approx $4.00 per sf		8	1.1 multiplier	
				fully adhered membrane		6	approx $4.50 per sf		8	1.1 multiplier	
			80 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		7	approx $4.00 per sf		8	1.1 multiplier	
				fully adhered membrane		6	approx $4.50 per sf		8	1.1 multiplier	
		TPO	45 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	6.8	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	2.0
				mechanically attached membrane		8	approx $4.00 per sf		2	results uncertain at this time	
				fully adhered membrane		6	approx $4.50 per sf		2	results uncertain at this time	
			60 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		7	approx $4.00 per sf		2	results uncertain at this time	
				fully adhered membrane		6	approx $4.50 per sf		2	results uncertain at this time	
	Elastomeric	EPDM	45 mil	loose laid membrane	ballast	10	approx $2.50 per sf	9.5	6	1.15 multiplier	6.0
				mechanically attached membrane		10	approx $3.70 per sf		6	1.15 multiplier	
				fully adhered membrane		9	approx $4.00 per sf		6	1.15 multiplier	
			60 mil	loose laid membrane	ballast	10	approx $2.50 per sf		6	1.15 multiplier	
				mechanically attached membrane		9	approx $3.70 per sf		6	1.15 multiplier	
				fully adhered membrane		9	approx $4.00 per sf		6	1.15 multiplier	
BITUMINOUS TYPE	BUR	Asphalt	3 ply	hot, mop applied	flood coat with ballast	5	approx $4.50 per sf	3.2	10	1.1 multiplier	10.0
					coating	3	approx $4.50 per sf		10	1.1 multiplier	
					cap sheet membrane	4	approx $4.50 per sf		10	1.1 multiplier	
			4 ply	hot, mop applied	flood coat with ballast	4	approx $4.50 per sf		10	1.1 multiplier	
					coating	3	approx $4.50 per sf		10	1.1 multiplier	
					cap sheet membrane	3	approx $4.50 per sf		10	1.1 multiplier	
			5 ply	hot, mop applied	flood coat with ballast	3	approx $4.50 per sf		10	1.1 multiplier	
					coating	2	approx $4.50 per sf		10	1.1 multiplier	
					cap sheet membrane	2	approx $4.50 per sf		10	1.1 multiplier	
	Polymer-Modified Bitumen	APP	Single Ply (base sheet plus cap sheet	hot, mop applied base sheet and heat welded, toch applied cap sheet	cap sheet membrane	3	approx $5.25 per sf	2.2	3	1.2 multiplier	3.7
				cold, adhesive applied	cap sheet membrane	2	approx $5.25 per sf		3		
			Double Ply (base sheet plus one intermediate ply sheet plus cap sheet	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	2	approx $5.25 per sf		4		
				cold, adhesive applied	cap sheet membrane	2	approx $5.25 per sf		4		
			Triple Ply (base sheet plus two intermediate ply sheet plus cap sheet - BUR hybrid)	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	2	approx $5.25 per sf		4		
				cold, adhesive applied	cap sheet membrane	2	approx $5.25 per sf		4		
		SBS	Single Ply (base sheet plus cap sheet	hot, mop applied base sheet and heat welded, toch applied cap sheet	cap sheet membrane	3	approx $5.25 per sf	2.3	4		4.0
				cold, adhesive applied	cap sheet membrane	2	approx $5.25 per sf		4		
			Double Ply (base sheet plus one intermediate ply sheet plus cap sheet	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	3	approx $5.25 per sf		4		
				cold, adhesive applied	cap sheet membrane	2	approx $5.25 per sf		4		
			Triple Ply (base sheet plus two intermediate ply sheet plus cap sheet - BUR hybrid)	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	2	approx $5.25 per sf		4		
				cold, adhesive applied	cap sheet membrane	2	approx $5.25 per sf		4	1.2 multiplier	

RANK - Category Level 3

Initial Cost			Life Cycle Cost		
Rank	Type	score	Rank	Type	score
1	EPDM	9.5	1	Asphalt	10.0
2	PVC	7.0	2	PVC	8.0
3	TPO	6.8	3	EPDM	6.0
4	Asphalt	3.2	4	SBS	4.0
5	SBS	2.3	5	APP	3.7
6	APP	2.2	6	TPO	2.0

PERFORMANCE

cat 1	cat 2	cat 3	cat 4 membrane thickness	cat 5 membrane attachment method	cat 6 surface characteristic	Historical cat 6 level score	Historical comment	Historical cat 3 level score	Traffic resistance cat 6 level score	Traffic resistance comment	Traffic resistance cat 3 level score	Puncture resistance cat 6 level score	Puncture resistance comment	Puncture resistance cat 3 level score	Chemical resistance cat 6 level score	Chemical resistance comment	Chemical resistance cat 3 level score	Fatigue resistance cat 6 level score	Fatigue resistance comment	Fatigue resistance cat 3 level score
NON-BITUMINOUS TYPE	Thermoplastic	PVC	45 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	6.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	5.3	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	5.3	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	6.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	5.3
				mechanically attached membrane		6	20 years		5	fair		5	fair		6	good		5	good	
				fully adhered membrane		6	20 years		5	fair		5	fair		6	good		5	good	
			60 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		6	20 years		5	fair		5	fair		6	good		5	good	
				fully adhered membrane		6	20 years		5	fair		5	fair		6			5	good	
			80 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		6	20 years		6	fair		6	fair		6	good		6	good	
				fully adhered membrane		6	20 years		6	fair		6	fair		6	good		6	good	
		TPO	45 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	2.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	3.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	5.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	5.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	5.0
				mechanically attached membrane		2	15 year history, TPO roofing use started in early 1990's with limited succes, formulations improved in late 1990's.		3	poor, must use walk pads		5	fair		5	fair		5	good	
				fully adhered membrane		2	15 year history, TPO roofing use started in early 1990's with limited succes, formulations improved in late 1990's.		3	poor, must use walk pads		5	fair		5	fair		5	good	
			60 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		2	15 year history, TPO roofing use started in early 1990's with limited succes, formulations improved in late 1990's.		3	poor, must use walk pads		5	fair		5	fair		5	good	
				fully adhered membrane		2	15 year history, TPO roofing use started in early 1990's with limited succes, formulations improved in late 1990's.		3	poor, must use walk pads		5	fair		5	fair		5	good	
	Elastomeric	EPDM	45 mil	loose laid membrane	ballast	9	40 year history	8.3	3	fair, consider roof pavers	2.7	6	consider using roof pavers	5.7	3	EPDM is susceptible to degradation when exposed to oils (including kitchen venting)	2.3	6	good but needs to be reinforced and perimeter mechanically fastened to reduce shrinkage problems	6.5
				mechanically attached membrane		8	40 year history		2	poor, must use walk pads		5	good puncture resistnace		2	EPDM is susceptible to degradation when exposed to oils (including kitchen venting)		6	good, but needs to be reinforced	
				fully adhered membrane		8	40 year history		2	poor, must use walk pads		5	good puncture resistnace		2	EPDM is susceptible to degradation when exposed to oils (including kitchen venting)		6	good, but needs to be reinforced	
			60 mil	loose laid membrane	ballast	9	40 year history		4	fair, consider roof pavers		6	consider using roof pavers		3	EPDM is susceptible to degradation when exposed to oils (including kitchen venting)		7	good but needs to be reinforced and perimeter mechanically fastened to reduce shrinkage problems	
				mechanically attached membrane		8	40 year history		2	poor, must use walk pads		6	good puncture resistnace		2	EPDM is susceptible to degradation when exposed to oils (including kitchen venting)		7	good, but needs to be reinforced	
				fully adhered membrane		8	40 year history		3	poor, must use walk pads		6	good puncture resistnace		2	EPDM is susceptible to degradation when exposed to oils (including kitchen venting)		7	good, but needs to be reinforced	
BITUMINOUS TYPE	BUR	Asphalt	3 ply	hot, mop applied	flood coat with ballast	10	Over 80 year history - one of the oldest long standing track record of success	10.0	8	good	8.3	9	very good	9.7	6	good	6.7	2	poor	2.3
					coating	10	Over 80 year history - one of the oldest long standing track record of success		8	good		9	very good		6	good		2	poor	
					cap sheet membrane	10	Over 80 year history - one of the oldest long standing track record of success		9	very good with cap sheet		9	very good		6	good		2	poor	
			4 ply	hot, mop applied	flood coat with ballast	10	Over 80 year history - one of the oldest long standing track record of success		8	good		10	excellent, redundancy in waterproofing system is inherent		7	good		2	poor	
					coating	10	Over 80 year history - one of the oldest long standing track record of success		8	good		10	excellent, redundancy in waterproofing system is inherent		7	good		2	poor	
					cap sheet membrane	10	Over 80 year history - one of the oldest long standing track record of success		9	very good with cap sheet		10	excellent, redundancy in waterproofing system is inherent		7	good		2	poor	
			5 ply	hot, mop applied	flood coat with ballast	10	Over 80 year history - one of the oldest long standing track record of success		8	good		10	excellent, redundancy in waterproofing system is inherent		7	good		3	poor	
					caoting	10	Over 80 year history - one of the oldest long standing track record of success		8	good		10	excellent, redundancy in waterproofing system is inherent		7	good		3	poor	
					cap sheet membrane	10	Over 80 year history - one of the oldest long standing track record of success		9	very good with cap sheet		10	excellent, redundancy in waterproofing system is inherent		7	good		3	poor	
	Polymer-Modified Bitumen	APP	Single Ply (base sheet plus cap sheet	hot, mop appliec base sheet and heat welded, toch applied cap sheet	cap sheet membrane	3	15 years	3.8	9	very good, especially with granular cap sheet membrane	9.7	7	good, especially with granular cap sheet membrane	7.7	6	good	6.3	9	very good, the APP is a high rubber content and can handle movements. Consider polyester scrim sheets to allow movement	9.7
				cold, adhesive applied	cap sheet membrane	4			9	very good, especially with granular cap sheet membrane		7	good, especially with granular cap sheet membrane		6	good		9	very good, the APP is a high rubber content and can handle movements. Consider polyester scrim sheets to allow movement	
			Double Ply (base sheet plus one intermediate ply sheet plus cap sheet	hot, mop appliec base/intermediat e sheets and heat welded, toch applied cap sheet	cap sheet membrane	4			10	excellent, especially with granular cap sheet membrane		8	very good, especially with grnaular cap sheet membrane		6	good		10	excellent, the APP is a high rubber content and can handle movements. Consider polyester scrim sheets to allow movement	
				cold, adhesive applied	cap sheet membrane	4			10	excellent, especially with granular cap sheet membrane		8	very good, especially with grnaular cap sheet membrane		6	good		10	excellent, the APP is a high rubber content and can handle movements. Consider polyester scrim sheets to allow movement	
			Triple Ply (base sheet plus two intermediate ply sheet plus cap sheet - BUR hybrid)	hot, mop appliec base/intermediat e sheets and heat welded, toch applied cap sheet	cap sheet membrane	4			10	excellent, especially with granular cap sheet membrane		8	very good, especially with grnaular cap sheet membrane		7	good		10	excellent, the APP is a high rubber content and can handle movements. Consider polyester scrim sheets to allow movement	
				cold, adhesive applied	cap sheet membrane	4			10	excellent, especially with granular cap sheet membrane		8	very good, especially with grnaular cap sheet membrane		7	good		10	excellent, the APP is a high rubber content and can handle movements. Consider polyester scrim sheets to allow movement	
		SBS	Single Ply (base sheet plus cap sheet	hot, mop appliec base sheet and heat welded, toch applied cap sheet	cap sheet membrane	4		4.0	9	very good, especially with granular cap sheet membrane	10.0	6	good, especially with granular cap sheet membrane	6.0	4	fair	4.0	2	Can be poor since the there is no minimum percentage of polymer	2.5
				cold, adhesive applied	cap sheet membrane	4			9	very good, especially with granular cap sheet membrane		6	good, especially with granular cap sheet membrane		4	fair		2	Can be poor since the there is no minimum percentage of polymer	
			Double Ply (base sheet plus one intermediate ply sheet plus cap sheet	hot, mop appliec base/intermediat e sheets and heat welded, toch applied cap sheet	cap sheet membrane	4			10	excellent, especially with granular cap sheet membrane		6	very good, especially with granular cap sheet membrane		4	fair		2	Can be poor since the there is no minimum percentage of polymer	
				cold, adhesive applied	cap sheet membrane	4			10	excellent, especially with granular cap sheet membrane		6	very good, especially with granular cap sheet membrane		4	fair		2	Can be poor since the there is no minimum percentage of polymer	
			Triple Ply (base sheet plus two intermediate ply sheet plus cap sheet - BUR hybrid)	hot, mop appliec base/intermediat e sheets and heat welded, toch applied cap sheet	cap sheet membrane	4			10	excellent, especially with granular cap sheet membrane		6	very good, especially with granular cap sheet membrane		4	fair		3	Can be poor since the there is no minimum percentage of polymer	
				cold, adhesive applied	cap sheet membrane	4	15 years		10	excellent, especially with granular cap sheet membrane		6	very good, especially with granular cap sheet membrane		4	fair		3	Can be poor since the there is no minimum percentage of polymer	

RANK - Category Level 3

Historical Rank	Historical Type	Historical score	Traffic resistance Rank	Traffic resistance Type	Traffic resistance score	Puncture resistance Rank	Puncture resistance Type	Puncture resistance score	Chemical resistance Rank	Chemical resistance Type	Chemical resistance score	Fatigue resistance Rank	Fatigue resistance Type	Fatigue resistance score
1	Asphalt	10.0	1	SBS	10.0	1	Asphalt	9.7	1	Asphalt	6.7	1	APP	9.7
2	EPDM	8.3	2	APP	9.7	2	APP	7.7	2	APP	6.3	2	EPDM	6.5
3	PVC	6.0	3	Asphalt	8.3	3	SBS	6.0	3	PVC	6.0	3	PVC	5.3
4	SBS	4.0	4	PVC	5.3	4	EPDM	5.7	4	TPO	5.0	4	TPO	5.0
5	APP	3.8	5	TPO	3.0	5	PVC	5.3	5	SBS	4.0	5	SBS	2.5
6	TPO	2.0	6	EPDM	2.7	6	TPO	5.0	6	EPDM	2.3	6	Asphalt	2.3

cat 1	cat 2	cat 3	cat 4	cat 5	cat 6	LIFE			
						Expected Life		Warranty	
			membrane thickness	membrane attachment method	surface characteristic	cat 6 level score	comment	cat 3 level score	cat 6 level score	comment	cat 3 level score
NON-BITUMINOUS TYPE	Thermoplastic	PVC	45 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	7.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	5.0
				mechanically attached membrane		6	15 years		4		
				fully adhered membrane		6	15 years		4		
			60 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		7	18 years		5		
				fully adhered membrane		7	18 years		5		
			80 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		8	20 years		6		
				fully adhered membrane		8	20 years		6		
		TPO	45 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	4.5	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	3.5
				mechanically attached membrane		4	10 years		3		
				fully adhered membrane		4	10 years		3		
			60 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		5	12 years		4		
				fully adhered membrane		5	12 years		4		
	Elastomeric	EPDM	45 mil	loose laid membrane	ballast	4	10 years	3.5	4		3.7
				mechanically attached membrane		2	8 years		3		
				fully adhered membrane		2	8 years		3		
			60 mil	loose laid membrane	ballast	5	12 years		4		
				mechanically attached membrane		4	10 years		4		
				fully adhered membrane		4	10 years		4		
BITUMINOUS TYPE	BUR	Asphalt	3 ply	hot, mop applied	flood coat with ballast	8	18 years plus	9.2	7		8.0
					coating	8	18 years plus		7		
					cap sheet membrane	9	18 years plus		7		
			4 ply	hot, mop applied	flood coat with ballast	9	20 years plus		8		
					coating	9	20 years plus		8		
					cap sheet membrane	10	20 years plus		8		
			5 ply	hot, mop applied	flood coat with ballast	10	25 years plus		9		
					caoting	10	25 years plus		9		
					cap sheet membrane	10	25 years plus		9		
	Polymer-Modified Bitumen	APP	Single Ply (base sheet plus cap sheet	hot, mop applied base sheet and heat welded, toch applied cap sheet	cap sheet membrane	9	20 years	9.0	8		8.3
				cold, adhesive applied	cap sheet membrane	9	20 years		8		
			Double Ply (base sheet plus one intermediate ply sheet plus cap sheet	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	9	20 years		8		
				cold, adhesive applied	cap sheet membrane	9	20 years		8		
			Triple Ply (base sheet plus two intermediate ply sheet plus cap sheet - BUR hybrid)	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	9	20 years		9		
				cold, adhesive applied	cap sheet membrane	9	20 years		9		
		SBS	Single Ply (base sheet plus cap sheet	hot, mop applied base sheet and heat welded, toch applied cap sheet	cap sheet membrane	8	18 years	8.8	7		8.5
				cold, adhesive applied	cap sheet membrane	8	18 years		7		
			Double Ply (base sheet plus one intermediate ply sheet plus cap sheet	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	9	20 years		8		
				cold, adhesive applied	cap sheet membrane	8	20 years		8		
			Triple Ply (base sheet plus two intermediate ply sheet plus cap sheet - BUR hybrid)	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	9	20 years		9		
				cold, adhesive applied	cap sheet membrane	9	20 years		9		

RANK - Category Level 3

Expected Life			Warranty		
Rank	Type	score	Rank	Type	score
1	Asphalt	9.2	1	SBS	8.5
2	APP	9.0	2	APP	8.3
3	SBS	8.8	3	Asphalt	8.0
4	PVC	7.0	4	PVC	5.0
5	TPO	4.5	5	EPDM	3.7
6	EPDM	3.5	6	TPO	3.5

						MAINTENANCE								
						Ability to find problems			Ability to fix problems			Maintenance of Surface		
cat 1	cat 2	cat 3	cat 4	cat 5	cat 6	cat 6 level score	comment	cat 3 level score	cat 6 level score	comment	cat 3 level score	cat 6 level score	comment	cat 3 level score
			membrane thickness	membrane attachment method	surface characteristic									
NON-BITUMINOUS TYPE	Thermoplastic	PVC	45 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	8.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	8.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	8.0
				mechanically attached membrane		8	20 years		8	1.1 multiplier		8	1.1 multiplier	
				fully adhered membrane		8	20 years		8	1.1 multiplier		8	1.1 multiplier	
			60 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		8	20 years		8	1.1 multiplier		8	1.1 multiplier	
				fully adhered membrane		8	20 years		8	1.1 multiplier		8	1.1 multiplier	
			80 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		8	20 years		8	1.1 multiplier		8	1.1 multiplier	
				fully adhered membrane		8	20 years		8	1.1 multiplier		8	1.1 multiplier	
		TPO	45 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	2.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	2.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	2.0
				mechanically attached membrane		2	results uncertain at this time		2	results uncertain at this time		2	results uncertain at this time	
				fully adhered membrane		2	results uncertain at this time		2	results uncertain at this time		2	results uncertain at this time	
			60 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		2	results uncertain at this time		2	results uncertain at this time		2	results uncertain at this time	
				fully adhered membrane		2	results uncertain at this time		2	results uncertain at this time		2	results uncertain at this time	
	Elastomeric	EPDM	45 mil	loose laid membrane	ballast	6	18 years	5.7	6	1.15 multiplier	6.0	6	1.15 multiplier	6.0
				mechanically attached membrane		5	15 years		6	1.15 multiplier		6	1.15 multiplier	
				fully adhered membrane		6	16 years		6	1.15 multiplier		6	1.15 multiplier	
			60 mil	loose laid membrane	ballast	6	18 years		6	1.15 multiplier		6	1.15 multiplier	
				mechanically attached membrane		5	15 years		6	1.15 multiplier		6	1.15 multiplier	
				fully adhered membrane		6	16 years		6	1.15 multiplier		6	1.15 multiplier	
BITUMINOUS TYPE	BUR	Asphalt	3 ply	hot, mop applied	flood coat with ballast	9	15 years	9.7	10	1.1 multiplier	10.0	10	1.1 multiplier	10.0
					coating	9			10			10		
					cap sheet membrane	9			10			10		
			4 ply	hot, mop applied	flood coat with ballast	10	20 years		10			10		
					coating	10			10			10		
					cap sheet membrane	10			10			10		
			5 ply	hot, mop applied	flood coat with ballast	10			10			10		
					coating	10			10			10		
					cap sheet membrane	10	25 years		10			10		
	Polymer-Modified Bitumen	APP	Single Ply (base sheet plus cap sheet	hot, mop applied base sheet and heat welded, toch applied cap sheet	cap sheet membrane	5	15 years	5.8	4	1.2 multiplier	4.0	4	1.2 multiplier	4.0
				cold, adhesive applied	cap sheet membrane	5			4			4		
			Double Ply (base sheet plus one intermediate ply sheet plus cap sheet	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	6			4			4		
				cold, adhesive applied	cap sheet membrane	6			4			4		
			Triple Ply (base sheet plus two intermediate ply sheet plus cap sheet - BUR hybrid)	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	7			4			4		
				cold, adhesive applied	cap sheet membrane	6			4			4		
		SBS	Single Ply (base sheet plus cap sheet	hot, mop applied base sheet and heat welded, toch applied cap sheet	cap sheet membrane	5		6.3	5		5.0	5		5.0
				cold, adhesive applied	cap sheet membrane	5			5			5		
			Double Ply (base sheet plus one intermediate ply sheet plus cap sheet	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	6			5			5		
				cold, adhesive applied	cap sheet membrane	6			5			5		
			Triple Ply (base sheet plus two intermediate ply sheet plus cap sheet - BUR hybrid)	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	7			5			5		
				cold, adhesive applied	cap sheet membrane	6	15 years		5	1.2 multiplier		5	1.2 multiplier	

RANK - Category Level 3

Ability to find problems			Ability to fix problems			Maintenance of Surface		
Rank	Type	score	Rank	Type	score	Rank	Type	score
1	Asphalt	9.7	1	Asphalt	10.0	1	Asphalt	10.0
2	PVC	8.0	2	PVC	8.0	2	PVC	8.0
3	SBS	6.3	3	EPDM	6.0	3	EPDM	6.0
4	APP	5.8	4	SBS	5.0	4	SBS	5.0
5	EPDM	5.7	5	APP	4.0	5	APP	4.0
6	TPO	2.0	6	TPO	2.0	6	TPO	2.0

cat 1	cat 2	cat 3	cat 4 membrane thickness	cat 5 membrane attachment method	cat 6 surface characteristic	ENVIRONMENTAL — Installation impact: cat 6 level score	comment	cat 3 level score	Sustainabile material: cat 6 level score	comment	cat 3 level score	Sustainable characteristic: cat 6 level score	comment	cat 3 level score
NON-BITUMINOUS TYPE	Thermoplastic	PVC	45 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	9.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	3.4	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	9.0
				mechanically attached membrane		9	no odor		4	not sustainable due to toxicity of manufacturing process		9	light colors offer good light reflectance and reduced heat island	
				fully adhered membrane		9	very slight adhesive odor		4	not sustainable due to toxicity of manufacturing process		9	light colors offer good light reflectance and reduced heat island	
			60 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		0	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		9	no odor		4	not sustainable due to toxicity of manufacturing process		9	heat island reduction, light reflectance high	
				fully adhered membrane		9	very slight adhesive odor		4	not sustainable due to toxicity of manufacturing process		9	heat island reduction, light reflectance high	
			80 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		9	no odor		4	not sustainable due to toxicity of manufacturing process		9	heat island reduction, light reflectance high	
				fully adhered membrane		9	very slight adhesive odor		4	not sustainable due to toxicity of manufacturing process		9	heat island reduction, light reflectance high	
		TPO	45 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	9.5	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	10.0	-	not recommended, ballast may cause membrane degradation by leaching plasticizers	10.0
				mechanically attached membrane		10	no odor		10	common selection when sustainable design is primary factor		10	heat island reduction, light reflectance high	
				fully adhered membrane		9	very slight adhesive odor		10	common selection when sustainable design is primary factor		10	heat island reduction, light reflectance high	
			60 mil	loose laid membrane	ballast	-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers		-	not recommended, ballast may cause membrane degradation by leaching plasticizers	
				mechanically attached membrane		10	no odor		10	common selection when sustainable design is primary factor		10	heat island reduction, light reflectance high	
				fully adhered membrane		9	very slight adhesive odor		10	common selection when sustainable design is primary factor		10	heat island reduction, light reflectance high	
	Elastomeric	EPDM	45 mil	loose laid membrane	ballast	7	slight adhesive odor	6.3	3	petroleum based	3.0	5	ballast color will improve the light reflectance	3.7
				mechanically attached membrane		7	slight adhesive odor		3	petroleum based		3	most common membrance is black and does not reduce heat island or offer light reflectance	
				fully adhered membrane		5	significant adhesive odor		3	petroleum based		3	most common membrance is black and does not reduce heat island or offer light reflectance	
			60 mil	loose laid membrane	ballast	7	slight adhesive odor		3	petroleum based		5	ballast color will improve the light reflectance	
				mechanically attached membrane		7	slight adhesive odor		3	petroleum based		3	most common membrance is black and does not reduce heat island or offer light reflectance	
				fully adhered membrane		5	significant adhesive odor		3	petroleum based		3	most common membrance is black and does not reduce heat island or offer light reflectance	
BITUMINOUS TYPE	BUR	Asphalt	3 ply	hot, mop applied	flood coat with ballast	2	strong asphalt and pitch odor	2.0	2	petroleum based	2.0	2	ballast color will improve the light reflectance	1.6
					coating	3	strong asphalt and pitch odor		2	petroleum based		2	energy intensive, contributes to air pollution	
					cap sheet membrane	3	strong asphalt and pitch odor		2	petroleum based		2	energy intensive, contributes to air pollution	
			4 ply	hot, mop applied	flood coat with ballast	1	strong asphalt and pitch odor		2	petroleum based		2	ballast color will improve the light reflectance	
					coating	2	strong asphalt and pitch odor		2	petroleum based		1	energy intensive, contributes to air pollution	
					cap sheet membrane	2	strong asphalt and pitch odor		2	petroleum based		1	energy intensive, contributes to air pollution	
			5 ply	hot, mop applied	flood coat with ballast	1	strong asphalt and pitch odor		2	petroleum based		2	ballast color will improve the light reflectance	
					coating	2	strong asphalt and pitch odor		2	petroleum based		1	energy intensive, contributes to air pollution	
					cap sheet membrane	2	strong asphalt and pitch odor		2	petroleum based		1	energy intensive, contributes to air pollution	
	Polymer-Modified Bitumen	APP	Single Ply (base sheet plus cap sheet	hot, mop applied base sheet and heat welded, toch applied cap sheet	cap sheet membrane	2	strong asphalt odor	2.3	2		2.2	3	energy intensive, contributes to air pollution	3.2
				cold, adhesive applied	cap sheet membrane	3	strong adhesive odor		3			4	less energy intensive than hot mopped, contributes to air pollution	
			Double Ply (base sheet plus one intermediate ply sheet plus cap sheet	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	2	strong asphalt odor		2			3	energy intensive, contributes to air pollution	
				cold, adhesive applied	cap sheet membrane	3	strong adhesive odor		3			4	less energy intensive, contributes to air pollution	
			Triple Ply (base sheet plus two intermediate ply sheet plus cap sheet - BUR hybrid)	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	1	strong asphalt odor		1			2	energy intensive, contributes to air pollution	
				cold, adhesive applied	cap sheet membrane	3	strong adhesive odor		2			3	less energy intensive, contributes to air pollution	
		SBS	Single Ply (base sheet plus cap sheet	hot, mop applied base sheet and heat welded, toch applied cap sheet	cap sheet membrane	2	strong asphalt odor	2.5	2		1.8	3		3.0
				cold, adhesive applied	cap sheet membrane	3	strong adhesive odor		2			4		
			Double Ply (base sheet plus one intermediate ply sheet plus cap sheet	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	2	strong asphalt odor		2			3		
				cold, adhesive applied	cap sheet membrane	3	strong adhesive odor		2			3		
			Triple Ply (base sheet plus two intermediate ply sheet plus cap sheet - BUR hybrid)	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	2	strong asphalt odor		1			3		
				cold, adhesive applied	cap sheet membrane	3	strong adhesive odor		2			3		

RANK - Category Level 3

Installation impact: Rank	Type	score	Sustainabile material: Rank	Type	score	Sustainable characteristic: Rank	Type	score
1	TPO	9.5	1	TPO	10.0	1	TPO	10.0
2	PVC	9.0	2	PVC	3.4	2	PVC	9.0
3	EPDM	6.3	3	EPDM	3.0	3	EPDM	3.7
4	SBS	2.5	4	APP	2.2	4	APP	3.2
5	APP	2.3	5	Asphalt	2.0	5	SBS	3.0
6	Asphalt	2.0	6	SBS	1.8	6	Asphalt	1.6

		IMPORTANCE FACTOR														
		COST		PERFORMANCE					LIFE		MAINTENANCE			ENVIRONMENTAL		
		Initial Cost	Life Cycle Cost	Historical	Traffic resistance	Puncture resistance	Chemical resistance	Fatigue resistance	Expected Life	Warranty	Ability to find problems	Ability to fix problems	Maintenance of Surface	Installation impact	Sustainabile material	Sustainable characteristic
Hospital Building	detail	3.0	10.0	6.0	10.0	10.0	6.0	7.0	6.0	9.0	8.0	10.0	6.0	9.0	4.0	4.0
	average	6.5				7.8			7.5			8.0			5.7	
Ambulatory Surgery Center	detail	4.0	8.0	5.0	8.0	8.0	6.0	6.0	6.0	6.0	8.0	8.0	6.0	7.0	4.0	4.0
	average	6.0				6.6			6.0			7.3			5.0	
Ambulatory Care Center	detail	4.0	8.0	5.0	8.0	7.0	6.0	6.0	6.0	6.0	6.0	8.0	6.0	7.0	4.0	4.0
	average	6.0				6.4			6.0			6.7			5.0	
Medical Office Building	detail	10.0	1.0	3.0	4.0	4.0	3.0	5.0	2.0	4.0	4.0	5.0	3.0	5.0	2.0	2.0
	average	5.5				3.8			3.0			4.0			3.0	
Nursing School	detail	10.0	1.0	3.0	4.0	4.0	2.0	5.0	2.0	4.0	4.0	5.0	3.0	5.0	2.0	2.0
	average	5.5				3.6			3.0			4.0			3.0	

	IMPORTANCE BY BUILDING TYPE		
	Rank	Category	Sub category
Hospital Building	1	Performance	Traffic Resistance
	2	Performance	Puncture Resistance
	3	Maintenance	Ability to fix problems
	4	Cost	Life Cycle Cost
	5	Life	Warranty
	6	Environmental	Installation impact
	7	Maintenance	Ability to find problems
Ambulatory Surgery Center	1	Maintenance	Ability to fix problems
	2	Performance	Traffic Resistance
	3	Performance	Puncture Resistance
	4	Maintenance	Ability to find problems
	5	Cost	Life Cycle Cost
Ambulatory Care Center	1	Maintenance	Ability to fix problems
	2	Performance	Traffic Resistance
	3	Cost	Life Cycle Cost
Medical Office Building	1	Cost	Initial Cost
Nursing School	1	Cost	Initial Cost

						TOTALS														
						COST		PERFORMANCE					LIFE		MAINTENANCE			ENVIRONMENTAL		
			membrane thickness	membrane attachment method	surface characteristic	Initial Cost	Life Cycle Cost	Historical	Traffic resistance	Puncture resistance	Chemical resistance	Fatigue resistance	Expected Life	Warranty	Ability to find problems	Ability to fix problems	Maintenance of Surface	Installation impact	Sustainabile material	Sustainable characteristic
NON-BITUMINOUS TYPE	Thermoplastic	PVC		loose laid membrane	ballast	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			45 mil	mechanically attached membrane		8.0	8.0	6.0	5.0	5.0	6.0	5.0	6.0	4.0	8.0	8.0	8.0	9.0	4.0	9.0
				fully adhered membrane		7.0	8.0	6.0	5.0	5.0	6.0	5.0	6.0	4.0	8.0	8.0	8.0	9.0	4.0	9.0
				loose laid membrane	ballast	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-
			60 mil	mechanically attached membrane		8.0	8.0	6.0	5.0	5.0	6.0	5.0	7.0	5.0	8.0	8.0	8.0	9.0	4.0	9.0
				fully adhered membrane		6.0	8.0	6.0	5.0	5.0	6.0	5.0	7.0	5.0	8.0	8.0	8.0	9.0	4.0	9.0
				loose laid membrane	ballast	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			80 mil	mechanically attached membrane		7.0	8.0	6.0	6.0	6.0	6.0	6.0	8.0	6.0	8.0	8.0	8.0	9.0	4.0	9.0
				fully adhered membrane		6.0	8.0	6.0	6.0	6.0	6.0	6.0	8.0	6.0	8.0	8.0	8.0	9.0	4.0	9.0
		TPO		loose laid membrane	ballast	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			45 mil	mechanically attached membrane		8.0	2.0	2.0	3.0	5.0	5.0	5.0	4.0	3.0	2.0	2.0	2.0	10.0	10.0	10.0
				fully adhered membrane		6.0	2.0	2.0	3.0	5.0	5.0	5.0	4.0	3.0	2.0	2.0	2.0	9.0	10.0	10.0
				loose laid membrane	ballast	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			60 mil	mechanically attached membrane		7.0	2.0	2.0	3.0	5.0	5.0	5.0	5.0	4.0	2.0	2.0	2.0	10.0	10.0	10.0
				fully adhered membrane		6.0	2.0	2.0	3.0	5.0	5.0	5.0	5.0	4.0	2.0	2.0	2.0	9.0	10.0	10.0
	Elastomeric	EPDM		loose laid membrane	ballast	10.0	6.0	9.0	3.0	6.0	3.0	6.0	4.0	4.0	6.0	6.0	6.0	7.0	3.0	5.0
			45 mil	mechanically attached membrane		10.0	6.0	8.0	2.0	5.0	2.0	6.0	2.0	3.0	5.0	6.0	6.0	7.0	3.0	3.0
				fully adhered membrane		9.0	6.0	8.0	2.0	5.0	2.0	6.0	2.0	3.0	6.0	6.0	6.0	5.0	3.0	3.0
				loose laid membrane	ballast	10.0	6.0	9.0	4.0	6.0	3.0	7.0	5.0	4.0	6.0	6.0	6.0	7.0	3.0	5.0
			60 mil	mechanically attached membrane		9.0	6.0	8.0	2.0	6.0	2.0	7.0	4.0	4.0	5.0	6.0	6.0	7.0	3.0	3.0
				fully adhered membrane		9.0	6.0	8.0	3.0	6.0	2.0	7.0	4.0	4.0	6.0	6.0	6.0	5.0	3.0	3.0
BITUMINOUS TYPE	BUR	Asphalt	3 ply	hot, mop applied	flood coat with ballast	5.0	10.0	10.0	8.0	9.0	6.0	2.0	8.0	7.0	9.0	10.0	10.0	2.0	2.0	2.0
					coating	3.0	10.0	10.0	8.0	9.0	6.0	2.0	8.0	7.0	9.0	10.0	10.0	3.0	2.0	2.0
					cap sheet membrane	4.0	10.0	10.0	9.0	9.0	6.0	2.0	9.0	7.0	9.0	10.0	10.0	3.0	2.0	2.0
			4 ply	hot, mop applied	flood coat with ballast	4.0	10.0	10.0	8.0	10.0	7.0	2.0	9.0	8.0	10.0	10.0	10.0	1.0	2.0	2.0
					coating	3.0	10.0	10.0	8.0	10.0	7.0	2.0	9.0	8.0	10.0	10.0	10.0	2.0	2.0	1.0
					cap sheet membrane	3.0	10.0	10.0	9.0	10.0	7.0	2.0	10.0	8.0	10.0	10.0	10.0	2.0	2.0	1.0
			5 ply	hot, mop applied	flood coat with ballast	3.0	10.0	10.0	8.0	10.0	7.0	3.0	10.0	9.0	10.0	10.0	10.0	1.0	2.0	2.0
					coating	2.0	10.0	10.0	8.0	10.0	7.0	3.0	10.0	9.0	10.0	10.0	10.0	2.0	2.0	1.0
					cap sheet membrane	2.0	10.0	10.0	9.0	10.0	7.0	3.0	10.0	9.0	10.0	10.0	10.0	2.0	2.0	1.0
	Polymer-Modified Bitumen	APP	Single Ply (base sheet plus cap sheet	hot, mop applied base sheet and heat welded, toch applied cap sheet	cap sheet membrane	3.0	3.0	3.0	9.0	7.0	6.0	9.0	9.0	8.0	5.0	4.0	4.0	2.0	2.0	3.0
				cold, adhesive applied	cap sheet membrane	2.0	3.0	4.0	9.0	7.0	6.0	9.0	9.0	8.0	5.0	4.0	4.0	3.0	3.0	4.0
			Double Ply (base sheet plus one intermediate ply sheet plus cap sheet	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	2.0	4.0	4.0	10.0	8.0	6.0	10.0	9.0	8.0	6.0	4.0	4.0	2.0	2.0	3.0
				cold, adhesive applied	cap sheet membrane	2.0	4.0	4.0	10.0	8.0	6.0	10.0	9.0	8.0	6.0	4.0	4.0	3.0	3.0	4.0
			Triple Ply (base sheet plus two intermediate ply sheet plus cap sheet - BUR hybrid)	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	2.0	4.0	4.0	10.0	8.0	7.0	10.0	9.0	9.0	7.0	4.0	4.0	1.0	1.0	2.0
				cold, adhesive applied	cap sheet membrane	2.0	4.0	4.0	10.0	8.0	7.0	10.0	9.0	9.0	6.0	4.0	4.0	3.0	2.0	3.0
		SBS	Single Ply (base sheet plus cap sheet	hot, mop applied base sheet and heat welded, toch applied cap sheet	cap sheet membrane	3.0	4.0	4.0	9.0	6.0	4.0	2.0	8.0	7.0	5.0	5.0	5.0	2.0	2.0	3.0
				cold, adhesive applied	cap sheet membrane	2.0	4.0	4.0	9.0	6.0	4.0	2.0	8.0	7.0	5.0	5.0	5.0	3.0	2.0	4.0
			Double Ply (base sheet plus one intermediate ply sheet plus cap sheet	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	3.0	4.0	4.0	10.0	6.0	4.0	2.0	9.0	8.0	6.0	5.0	5.0	2.0	2.0	3.0
				cold, adhesive applied	cap sheet membrane	2.0	4.0	4.0	10.0	6.0	4.0	2.0	8.0	8.0	6.0	5.0	5.0	3.0	2.0	3.0
			Triple Ply (base sheet plus two intermediate ply sheet plus cap sheet - BUR hybrid)	hot, mop applied base/intermediate sheets and heat welded, toch applied cap sheet	cap sheet membrane	2.0	4.0	4.0	10.0	6.0	4.0	3.0	9.0	9.0	7.0	5.0	5.0	2.0	1.0	3.0
				cold, adhesive applied	cap sheet membrane	2.0	4.0	4.0	10.0	6.0	4.0	3.0	9.0	9.0	6.0	5.0	5.0	3.0	2.0	3.0

	RANK														
	COST		PERFORMANCE					LIFE		MAINTENANCE			ENVIRONMENTAL		
Rank	Initial Cost	Life Cycle Cost	Historical	Traffic resistance	Puncture resistance	Chemical resistance	Fatigue resistance	Expected Life	Warranty	Ability to find problems	Ability to fix problems	Maintenance of Surface	Installation impact	Sustainabile material	characteristic
1	EPDM	Asphalt	Asphalt	SBS	Asphalt	Asphalt	APP	Asphalt	SBS	Asphalt	Asphalt	Asphalt	TPO	TPO	TPO
2	PVC	PVC	EPDM	APP	APP	APP	EPDM	APP	APP	PVC	PVC	PVC	PVC	PVC	PVC
3	TPO	EPDM	PVC	Asphalt	SBS	PVC	PVC	SBS	Asphalt	SBS	EPDM	EPDM	EPDM	EPDM	EPDM
4	Asphalt	SBS	SBS	PVC	EPDM	TPO	TPO	PVC	PVC	APP	SBS	SBS	SBS	APP	APP
5	SBS	APP	APP	TPO	PVC	SBS	SBS	TPO	EPDM	EPDM	APP	APP	APP	Asphalt	SBS
6	APP	TPO	TPO	EPDM	TPO	EPDM	Asphalt	EPDM	TPO	TPO	TPO	TPO	Asphalt	SBS	Asphalt