
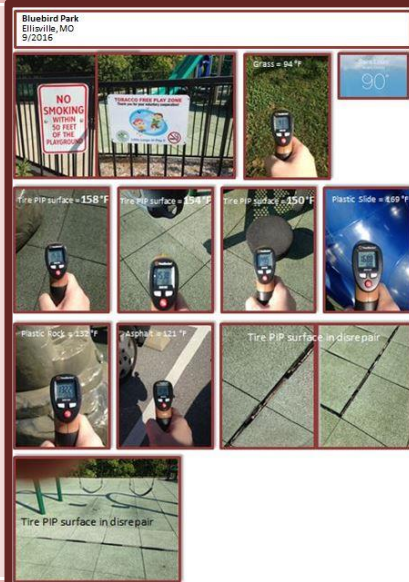





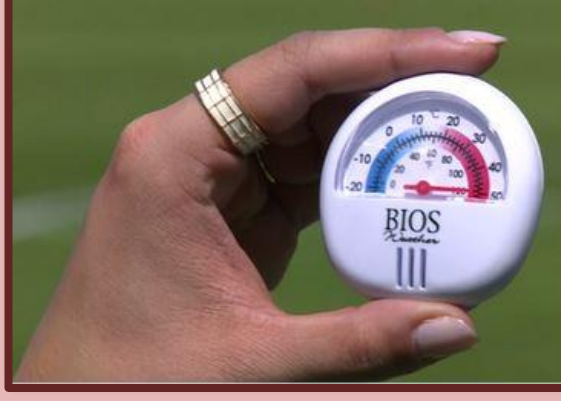





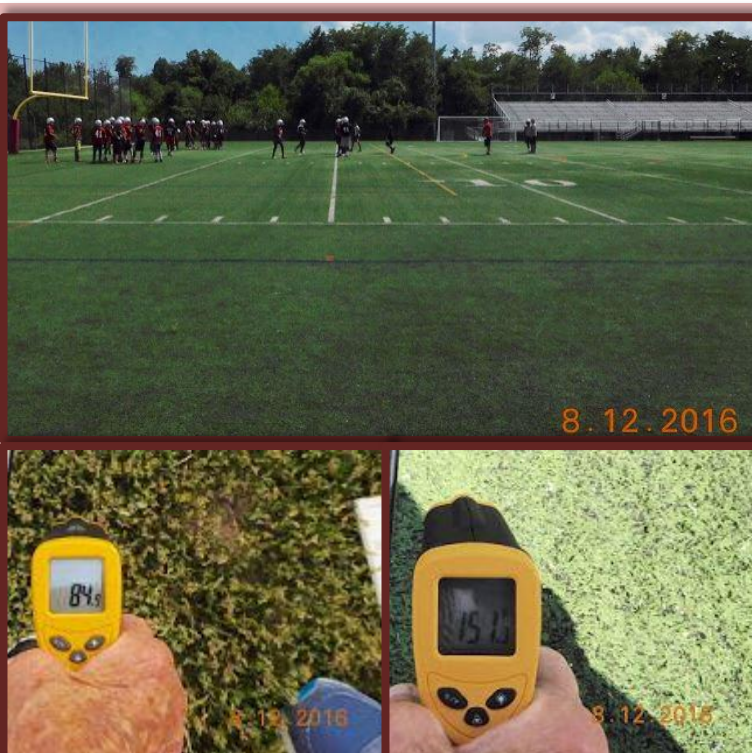


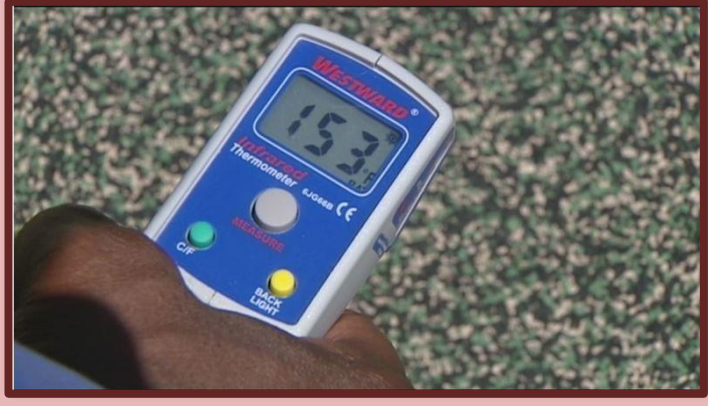



Number	Picture	Date	Time	Synthetic Turf Field/Tire Playground	City	State	ST Brand	Air Temp	Grass Temp	ST/TPG Temp	Children/Athletes Playing at Time ST/PG Temperature Taken?	Notes	Source 1	Source 2	Source 3	Source 4
1		8/17/2015	6:48 PM	Beaverton High	Beaverton	OR	U	78	U	131	Y	<p>"...Monday, the high in Beaverton hit 90 degrees. Beaverton High School freshmen were out learning the rigors of high school football in the climbing heat and noon day sun.</p> <p>While the official temperature may have been only 78 degrees at noon, a heat gun recorded temperatures on the turf at 131 degrees.</p> <p>The young men were working hard, sweating hard and drinking hard over a roughly two hour practice. Coaches were giving the players water and Gatorade breaks at least every 30 minutes.</p> <p>One freshman between gulps of water said he wasn't just hot, his feet felt as though they were on fire. Another player, Trey Singleton, said the gear the players wear adds to the heat.</p> <p>"It gets really hot out here but when you are sweating with the helmet on it definitely tends to get a lot more hot," he said..."</p>	http://www.kptv.com/story/29807462/high-school-athletes-fighting-record-heat-as-they-head-back-to-practice#ixzz3jDC31pXa			
2		9/2016		U Bluebird Park	Ellisville	MO	U	90	94	158	Y					
3		7/7/2010	11:46 AM	Booker T. Washington Playground	Manhattan	NY	U	102	U	172	U	<p>"This photo was taken at the Artificial Turf Field in Manhattan's Booker T. Washington Playground yesterday, showing a 171 degree surface at 11:46 a.m. Geoffrey Croft of the NYC Park Advocates sent the photo along, noting that park surface temperatures are reaching record highs.</p> <p>Croft & Co. tested temps at city parks yesterday and more than a dozen reached 170 degrees or more, which he says is higher than any temp he's taken in the past three years. He added, "Temperatures on black rubber playground safety surfacing were recorded at over 160 degrees." The surfaces are likely to be just as high today, so the NYC Park Advocates have release the following tips:</p> <ul style="list-style-type: none"> Avoid playgrounds with black safety surfacing, unless they have complete shade coverage. Avoid metal surfaces like slides. Avoid artificial turf fields in the sun. Drink lots of liquids. Use spray showers, pools and water features. Seek shade. Participate in non-strenuous activities. 	http://gothamist.com/2010/07/07/park_surface_reaches_171_degrees.php			
4		6/20/2016	4:04 PM	Brandon's Village Playground	Calabasas	CA	U	U	115	130	Y	<p>KNBC News Report: "Heat Dangers of Artificial Turf" "Have you ever seen grass that's so good it almost looks real? I have and I sometimes try to stay away from that. Park visitor Alandra Rojas told us she avoids artificial grass because the chemicals tend to irritate her skin. Dr. Michael Lewis has worked in both urgent and emergency care on days like today. He told us what concerns him the most about artificial turf. "It will absorb the temperature and become very hot and some 50 to 70 degrees higher than the ambient temperature."</p>	https://www.youtube.com/watch?v=AoYCeJzkm8&feature=youtu.be			
5	(No picture available)	6/2002	7:00 AM-7:00 PM	Brigham Young University practice fields	Provo	UT	FieldTurf	U	78-89	117-157	Y	<p>Williams, F.C., Pulley, G.E. (2002). <i>Synthetic Surface Heat Studies</i>. "...Shortly after the Field Turf was installed football camps were started. The coaches noticed the surface of the synthetic turf was very hot. One of the coaches got blisters on the bottom of his feet through his tennis shoes. An investigation was launched to determine the range of the temperatures, the effect water for cooling of the surfaces, and how the temperatures compared to other surfaces...The results of the preliminary study are shocking. The surface temperature of the synthetic turf was 37° F higher than asphalt and 86.5° F hotter than natural turf. Two inches below the synthetic turf surface was 28.5° F hotter than natural turf at the surface. Irrigation of the synthetic turf had a significant result cooling the surface from 174° F to 85° F but after five minutes the temperature rebounded to 120° F. The temperature rebuilt to 164° F after only twenty minutes...The synthetic surface was treated as two areas, the soccer field and the football field and the natural turf was one area...The amount of light (electromagnetic radiation) has a greater impact on temperature of A.T. than air temperature. The hottest surface temperature recorded was 200° F on a 98° F day..." a. Temperature measurements were taken at the surface, above the surface, and below the surface of artificial turf, natural turf, bare soil, asphalt, and concrete. b. Surface temperatures of synthetic turf were 37° F higher than asphalt and 86.5° F hotter than natural turf. c. Two inches below the surface, synthetic turf was 28.5° F hotter than natural turf. d. Although irrigation of synthetic turf resulted in a reduction of close to 90°F, temperatures rose 35° within five minutes and returned to the starting temperature within 20 minutes. e. "The hottest surface temperature recorded was 200° F on a 98° F day. Even in October the surface temperature reached 112.4° F." f. BYU has set a surface temperature guideline which restricts play on synthetic turf fields when surface temperatures are potentially hazardous to athletes. This reduces the playing season and eliminates any continuous play benefit that is typically mentioned in favor of artificial turf.</p>	http://aces.nmsu.edu/programs/turf/documents/brigham-yung-study.pdf			





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6		6/21/2016		Chesterfield U Central Park	Chesterfield	MO	U	95	N/A	175	U	"This is a temp reading on a playground in St. Louis." "95 air temp in St.Louis last week" Brian Winka was contacted to find out which park.	https://www.facebook.com/healthyplayduluth/posts/613830358786546	https://www.yelp.com/biz_photos/chesterfield-central-park-chesterfield?select=ffQ-dP0zYSjIKrRrwwGsg		
7		6/27/2005	10:32 AM	Claude Robillard	Montreal	Canada	U	U	74	90		"Five synthetic soccer fields and their surface temperature derived from Landsat 5" (Temperatures converted from Celsius to Fahrenheit.)	https://drive.google.com/file/d/0B6Nas_2VeYktMmYzYzk4ZmMtNzU1YiO0MTFmLTkyMWYtNGU2ZTM5M2FiNTk0/view?hl=en			
8		9/3/2015		Columbia U University	New York	NY	2007 - FieldTurf	U	U	147	U	147 degrees! Taken 9/3/2015 Columbia University, NYC, newly installed synthetic turf football field. (Information obtained by contacting Ryan Hillert.)	https://www.facebook.com/photo.php?fbid=10205955211987535&set=pa10205955211987535&type=3&theater	http://www.gocolumbialions.com/ViEWArticle.dbml?ACLID=1152266		
9 (No picture available)		6/27/2015	12:27 PM	Commonwealth Stadium	Edmonton	Canada	Grass (1978–2009) FieldTurf Duraspine Pro (2010–2015) GTR Turf/Shaw Sports Turf Powerblade Elite 2.5-5 with Hydrochill system (2015–present)	82	N/A	150	Y	Refs have decided against a cooling break 4 JPN & AUS -air temp 82 but turf temp is 150. Was just on field-it's toasty ☺ "Prior to the start of the Australia vs Japan quarterfinal in Edmonton on 27 June, Fox commentator Kyndra de St. Aubin measured the air temperature at 82 °F (28 °C) and the turf temperature at 150 °F (66 °C). Despite such dangerous conditions, officials decided against taking cooling breaks during the match because the air temperature was under 32 °C (90 °F). As the game wore on, players appeared noticeably exhausted due to the playing conditions."	https://twitter.com/Kyndrasports/status/614877828027416576	https://en.m.wikipedia.org/wiki/2015_FIFA_Women%27s_World_Cup	https://en.wikipedia.org/wiki/Commonwealth_Stadium_(Edmonton)	
10 (No picture available)		6/6/2015	4:00 PM	Commonwealth Stadium	Edmonton	Canada	FieldTurf Duraspine Pro (2010–2015) GTR Turf/Shaw Sports Turf	79	N/A	86, 122	Y	"Stewart-Binks said she laid two thermometers on the Commonwealth turf before Canada's 1-0 win over China on Saturday, and saw the measurement rise from roughly 30 C to over 50 C [86 °F to 122 °F] within five minutes..." Temperatures most likely taken after watering the synthetic turf. Other studies have noted that the effects of watering synthetic turf only last five minutes.	http://www.nalpost.com/sports/soccer/womens-world-cup-offence-is-hot-and-the-fields-are-up/matches/	http://www.fifa.com/womensworldcup/matches/	http://www.washingtonpost.com/news/early-lead/wp/2015/06/06/the-artificial-turf-at-the-womens-world-cup-was-reportedly-120-degrees-at-kick-off/	https://en.wikipedia.org/wiki/Commonwealth_Stadium_(Edmonton)
11		6/6/2015	4:00 PM	Commonwealth Stadium	Edmonton	Canada	Grass (1978–2009) FieldTurf Duraspine Pro (2010–2015) GTR Turf/Shaw Sports Turf Powerblade Elite 2.5-5 with Hydrochill system (2015–present)	79	N/A	120	Y	"...A Fox sideline reporter said turf temperatures had reached 49 degrees in Edmonton for the Canada-China game Saturday. Air temperature was 26 degrees..."	https://www.thestar.com/sports/soccer/2015/06/08/womens-world-cup-heats-up-as-pitch-level-mercury-soars.html	http://www.fifa.com/womensworldcup/matches/	https://www.washingtonpost.com/news/early-lead/wp/2015/06/06/the-artificial-turf-at-the-womens-world-cup-was-reportedly-120-degrees-at-kick-off/	https://en.m.wikipedia.org/wiki/2015_FIFA_Women%27s_World_Cup
12		6/27/2005	10:32 AM	Concordia (Loyola)	Montreal	Canada	U	U	81	93, 95	U	"Five synthetic soccer fields and their surface temperature derived from Landsat 5" (Temperatures converted from Celsius to Fahrenheit.)	https://drive.google.com/file/d/0B6Nas_2VeYktMmYzYzk4ZmMtNzU1YiO0MTFmLTkyMWYtNGU2ZTM5M2FiNTk0/view?hl=en			









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13		9/2016		U Conway Park	Creve Coeur	MO	U	89	89	126	N					
14		9/2016		U Des Peres Park	Des Peres	MO	U	90	84	148	Y					
15	(No picture available)	8/2006-3/2007	12:56 PM	Ed Fountain Park	Las Vegas	NV	2006 - Artificial Turf	107	100	169	Y	(Temperatures converted from Celsius to Fahrenheit.) "Solar radiation accounted for most of the variation in surface temperature of the green artificial turfgrass...as opposed to air temperature...Three separate experiments were conducted during the period from August to March 2007 in Las Vegas, NV...The highest value recorded was 76.0 °C (169 °F) on the green artificial turfgrass at 12:56. Maximum recorded temperature of green artificial turfgrass was 38.4 °C higher than the irrigated turfgrass and 34.4 °C higher than air temperature...We measured surface temperatures of artificial turfgrass as high as 76 °C, and these values did not represent turfgrass response during the two hottest months of the year (June and July)...Moreover, Williams and Pulley (2006) also measured elevated temperatures on synthetic surfaces and indicated that the Safety Office at Brigham Young University set a safe surface temperature of 50 °C, stating that injury to the skin can occur within 10 minutes of exposure to artificial turfgrass with temperatures ≥50 °C, jeopardizing the safety of those who play on the surface. Based on a 50 °C threshold value, the artificial turfgrass system exceeded this value for 9 hours during a day in late August and for approximately 2 hours during a day in mid October. This would suggest that surface temperatures during summer months (June-August) could preclude the recreational use of artificial turfgrass during the majority of daytime hours. This would clearly offset, to some extent, the benefits achieved with reduced irrigation..." Article: "This was a temperature where if you put your hand down on it, you could only hold it for five seconds or so before it would burn," said Dale Devitt, director of UNLV's Center for Urban Water Conservation, who worked on the study with Mike Young of the Desert Research Institute's Division of Hydrological Sciences. [...] "During the summer months, the artificial turf is not suitable for play during the day," Devitt said.	http://www.syntrf.org/images/Devitt_et_al_2008_art_turf.pdf	http://lasvegassun.com/news/2009/jan/15/fake-grass-has-drawback-it-gets-too-hot-study-says/	http://www.syntheticurfconsulting.com/site/athleticfields/pro_turf_installations.pdf	http://www.syntheticurfconsulting.com/site/athleticfields/index.html
16	(No picture available)	11/1/2013	3:50 PM	Gulf Coast High	Naples	FL	FieldTurf	U	U	U	Y	When asked why Gulf Coast High School in Florida was watering the artificial turf by giant sprinklers, the athletic director replied "All high schools in Collier County have artificial turf, and they all use irrigation systems" and "we need to water it. Absolutely, we need to water it." "It helps bring down the temperature of the field," Arias said just minutes before the irrigation system turned on."	http://www.abc7.com/story/23854847/good-question-why-water-artificial-turf-football-fields#.V9vIjzXDup9	http://archive.naplesnews.com/community/new-football-fields-replacing-grass-with-artificial-turf-to-cost-collier-schools-over-6m-ep-40136865-		
17	(No picture available)	6/24/2016		U Isidoro Beaton Stadium	Belize City	Belize	U (FIFA 2 star)	U	U	U	Y	In June 2016 the artificial turf [in Belize] "got so hot that it melted the glue of the players' boots, which did not have the soles sewed on, and many of the players [...] lost the soles of their boots [and] had to borrow or change to a fresh pair..." The field, which hosted the National Primary School Football Championships "has a black rubber cushion underneath, that absorbs an enormous amount of heat during the day. Looking across the field, you can see the chain link fence on the other side distorted into wiggly lines by the heat haze [and sitting] on the side, the breeze blowing off the field feels like it is coming out of an oven; and for the children playing on the field, it was like playing in a sauna, and many suffered from dehydration and heat exhaustion."	http://amandala.com.bz/news/artificial-turf-puts-pressure-kids-primary-school-football-nationals-belmopan/	http://www.7newsbelize.com/sstory.php?id=35661		
18		6/27/2005	10:32 AM	Jeanne-Mance	Montreal	Canada	U	U	82	90	U	"Five synthetic soccer fields and their surface temperature derived from Landsat 5" (Temperatures converted from Celsius to Fahrenheit.)	https://drive.google.com/file/d/0B6Nas_2VeYktMmYzYzk4ZmMtNzU1YjQ0MTFmLTkyMmYyNGU2ZTM5M2FiNTk0/view?hl=en			

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19		7/14/2015	4:26 PM	Kansas University	Shawnee Missis	KS	U	U	96	147	U		http://videowall.aacuweather.com/detail/videos/latest-weather-news/video/4354482828001/spike-in-heat-across-southern-plains-causes-camp-cancellations-police-issued-			
20		6/21/2016		Lester Park Elementary playground	Duluth	MN	U	77	N/A	128	U	"Just hours before the school board meets tonight to vote on a resolution to work towards removal of the tire mulch I went and took the temperature of it. On a sunny, 77 degree day with a nice cool breeze off of the lake the surface temperature of the mulch was reading 127 degrees!"	https://www.facebook.com/healthyplayduluth/posts/613759245460324			
21		5/26/2010	3:34 PM	Macombs Dam Park	Bronx	NY	Astroturf (AstroPlay?)	U	N/A	152	U	This week, Mayor Michael R. Bloomberg signed a bill that requires the parks and health departments to work together in ensuring a thorough review of materials going into future playing fields. The new law also establishes a nine-member advisory committee, appointed by the mayor and the City Council speaker, which will review the type of material proposed for any playing field and make suggestions for alternate materials...the bill was prompted by problems like the temporary shutdown of the soccer field at Thomas Jefferson Field in East Harlem last year because of elevated lead levels...But Geoffrey Croft, a longtime critic of artificial turf as head of the watchdog group NYC Park Advocates, said the health, safety and environmental concerns raised by the materials — and the 150-degree temperatures they can produce by soaking up sunlight and emitting heat on a warm day — make the new law long overdue. (A photograph that he sent to The Times, shown below, reflects such a reading.)	http://green.blogs.nytimes.com/2010/06/03/city-tightens-rules-on-artificial-turf/	http://www.astroturf.com/sports/recreation/		
22		6/22/2015	5:30 PM	Medway High	Medway	MA	2004 FieldTurf, 2014 - FieldTurf	80	80	140	U	"...FOX25 confirmed unusually high field temperatures, relative to the air, using an infrared thermometer. We also found another huge temperature variance, between real grass and fake. We pointed the thermometer down at the synthetic surface of the field, and temperature was close to 140 degrees. Over on the grass surface, in the sunshine, the temperature was slightly above the 80-degree mark... "People lost track of the fact that children would be playing on this. Children who are very susceptible to toxins, to carcinogens, much more so than adults," said Concord resident Beverly Ridpath. Back in Medway, the town's health director tells FOX25 the health board will take up the field heat issue next month, and, if necessary, could even order the placement of signs around the field advising of the excessive heat."	http://www.fox25boston.com/news/parents-concerned-about-high-temperatures-on-turf-playing-fields/8948385	https://en.wikipedia.org/wiki/List_of_FieldTurf_installations		
23		8/12/2016	3:00 PM	Montgomery Blair High	Silver Spring	MD	2008 - FieldTurf	99	84	151	Y	"...On Friday, Reagan National reported a high of 99 degrees and a low of 93 degrees between noon and 6 pm, with 50 percent humidity. And on the artificial turf? Here is a picture recorded of actual field temperatures. Our not so very sophisticated weather gauge on the left indicated that at a little after 3 pm, the air temperature was 98 degrees, while the temp on the Blair artificial turf field was a sizzling 151 degrees. How would our regular grass fields fare in the heat? A few minutes later, our weather gauges recorded a more modest 84 degrees on the natural grass surrounding the Blair field..."	http://parentscoalitionmc.blogspot.com/search?q=degre	http://www.rockvilleview.com/rmhs-artificial-turf-warranty-expires-today/		
24 (No picture available)		6/27/2010		Montgomery Blair High	Silver Spring	MD	2008 - FieldTurf	98	94	161	U	"...today at the Montgomery Blair High School Artificial Turf (read: ground auto and tire crumb rubber material) temperatures were as follows: Air Temperature: 98 degrees Fahrenheit Grass Temperature in the Sun: 94 degrees Fahrenheit; Asphalt (black) Temperature: 120 degrees Fahrenheit; Asphalt (white) Temperature: 115 degrees Fahrenheit; and, wait for it... Artificial Turf Temperature: 161 degrees Fahrenheit."	http://parentscoalitionmc.blogspot.com/search?q=degre	http://www.rockvilleview.com/rmhs-artificial-turf-warranty-expires-today/		

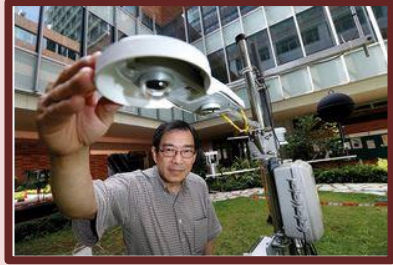
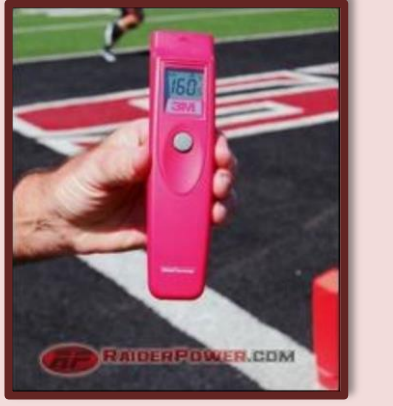

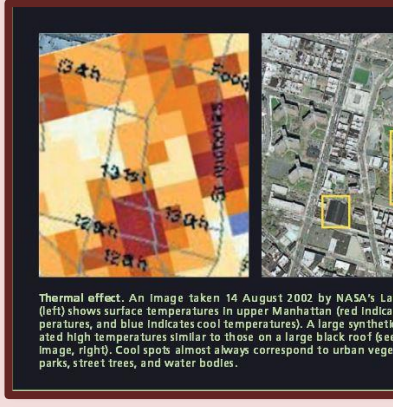
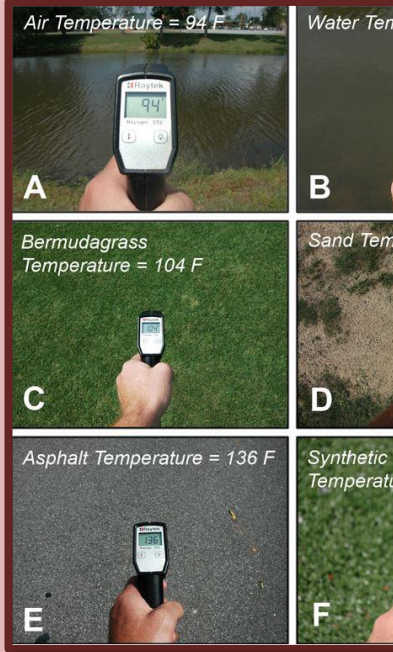
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25		8/16/2009	2:30 PM	Montgomery Blair High	Silver Spring	MD	2008 - FieldTurf	93	U	167	U	"...This measured temperature of 167.3 degrees was taken today, August 16, at the AT field at Montgomery Blair High School, Montgomery County Maryland at 2:30 PM EST. The air temperature in the full sun was 93 degrees Fahrenheit..."	http://parentscoalitionmc.blogspot.com/search?q=degrees	http://www.rockvilleview.com/rmhs-s-artificial-turf-warranty-expires-today/		
26		8/15/2009		Montgomery Blair High	Silver Spring	MD	2008 - FieldTurf	U	91	134	U	"...Photo on left shows the temperature at the Artificial Turf: 134 degrees Fahrenheit. Photo to the right shows the temperature at the natural sod turf: 91 degrees Fahrenheit..."	http://parentscoalitionmc.blogspot.com/search?q=degrees	http://www.rockvilleview.com/rmhs-s-artificial-turf-warranty-expires-today/		
27 (No picture available)		8/13/2009	2:00 PM	Montgomery Blair High	Silver Spring	MD	2008 - FieldTurf	96	U	152	U	"On Monday, August 10, 2009, at 2 PM the artificial turf football field at Montgomery Blair High School registered over 152 degrees Fahrenheit. The high temperature for Monday was 96 degrees. MCPS football practices start on August 15th. MCPS does not have a policy in place for determining when it is too hot for students to practice on artificial turf fields. The Washington Post reports on this issue in "Heat-Related Illness a Chief Concern as Football Practice Opens"..."	http://parentscoalitionmc.blogspot.com/search?q=degrees	http://www.rockvilleview.com/rmhs-s-artificial-turf-warranty-expires-today/		
28 (No picture available)		N/A	N/A	Montgomery County Schools	N/A	MD	2008 - FieldTurf	N/A	N/A	N/A	N/A	Montgomery Magazine on why MoCo doesn't win football state titles anymore. Blamed in part on: not enough artificial turf fields. Former AD thinks with so few kids trying out the future may hold two high schools fielding one team. Says he'd rather have Bermuda turf but AT is better than existing fields and the only downside is the heat. See p. 46.	#(%22issue_id%22:323504,%22page">http://mydigitalpublication.com/publication/?i=323504	http://www.rockvilleview.com/rmhs-s-artificial-turf-warranty-expires-today/		
29		7/18/2013	11:47 PM	Mount Auburn Playground	Cincinnati	OH	U	U	U	153	U	Metal bars were only 110 degrees! "The heat-sensor gun showed metal bars were at a blistering 110 degrees and the rubber surface was 153 degrees."	http://www.wlwt.com/article/sun-heat-make-playground-equipment-dangerous-for-kids/3533460			
30 (No picture available)		6/26/2015	3:22 PM	N/A	N/A	N/A	N/A	U	U	U	N/A	"...Others in last summer's Women's World Soccer Cup described the condition of their feet due to the heat from AT, in vivid detail: 'I have plenty of blisters on my toes,' United States forward Alex Morgan said with a resigned smile on Thursday. That's not a good thing for any player, let alone a star on the mend from knee and ankle ailments. '[Synthetic] Turf achiness takes a little longer to recover from,' Morgan said. Michelle Heyman of Australia was even more blunt: 'You wouldn't want to see the bottom of our feet after a game,' she told one Australian newspaper. 'They just turn white. The skin is all ripped off; it's pretty disgusting. It's like walking on hot coals with your skin ripping and slowly cracking, constantly.' Sweden's Nilla Fischer told Yahoo Sports the blisters were such a constant concern during the group stage that some of her teammates started taping up every single toe before going out onto the field..."	http://sports.yahoo.com/news/there-s-nothing-fake-about-issues-with-artificial-turf-at-women-s-world-cup-200746963.html			
31 (No picture available)		2/11/2009		N/A	N/A	N/A	N/A	N/A	U	N/A	N/A	"Artificial fields cannot be played on all the time due to temperature build-up on warm-sunny days. Artificial field surface temperatures have been documented as high as 199°F on a sunny day with an air temperature of 98°F (7). Researchers at Brigham Young University reported that the surface temperature of a synthetic football field on campus averaged 117°F, with a daily high of 157°F (8). On an adjacent natural grass field the surface temperature averaged 78°F, with a daily high of 89°F. Researchers at Penn State University studied the effect of using irrigation to reduce surface temperatures of synthetic fields and discovered that temperature could be decreased with irrigation, but the effects were short-lived (20 minutes) (9). Because of these high temperatures, an artificial field will remain largely unusable during warm days. Additionally, practicing on an artificial field could increase the incidence of heat stroke, muscle cramping, and overall athlete fatigue. Coaches holding practices on synthetic fields will need to monitor athlete health more closely and will need to limit the duration of practices on these surfaces to reduce the risk of athlete injury."				
32 (No picture available)		2014	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	"Release of Polycyclic Aromatic Hydrocarbons and Heavy Metals from Rubber Crumb in Synthetic Turf Fields: Preliminary Hazard Assessment for Athletes." 2014 Journal of Environmental and Analytical Toxicology: On 80° or higher sunny days "[...] fields can heat to 140° F they can release very high levels of carcinogenic PAHs [...] and [...] although synthetic turf offers various advantages over natural grass, the quantity of toxic substances it releases when heated does not make it safe for public health."	http://www.omicsonline.org/open-access/release-of-polycyclic-aromatic-hydrocarbons-and-heavy-metals-from-rubber-crumb-in-synthetic-turf-			







Number	Picture	Date	Time	Synthetic Turf Field/Tire Playground	City	State	ST Brand	Air Temp	Grass Temp	ST/TPG Temp	Children/Athletes Playing at Time ST/PG Temperature Taken?	Notes	Source 1	Source 2	Source 3	Source 4
33	(No picture available)	11/2013	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	This eight-page STC guidance on avoiding heat issues on ST, p. 4 recommends Schedule activity during the cooler parts of the day (early morning or evening), limit the duration and intensity of activity early in the season and in hot weather, keep athletes well-hydrated and periodically rested to avoid becoming overheated. Install irrigation (cites owners re: may clean fields - either it does or it doesn't). Long disclaimer p. 7.	http://c.ymcdn.com/sites/www.syntheticurf.org/resource/resmgr/files/stc_guidelines_for_min_risk.p			
34	(No picture available)	1967-2014	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Fatalities: Heat Stroke. (Data: football players only.) pp. 29-30 pdf pp. 33-34 of 40 1967-1982 48 deaths 1983-1998 22 deaths 1999-2014 43 deaths Synthetic turf field installation at public schools began around 1999. Is there a link between heat stroke death and synthetic turf fields? It should be studied. The NCCSIR report below contains a table with football player heat stroke deaths. Speaking with NCCSIR, they note the table shows middle school, high school and college players. The data is only what is reported to them and what they can scour from the Internet. NCCSIR also notes that they are certain there are more that are unreported. Unfortunately, they do not have data on what kind of field these players were on and they cannot release other player information. A few case studies are listed on p. 21 (pdf p. 25 of 40).	http://www.kshb.com/news/state/kansas/kansas-high-school-football-player-luke-schemm-is-11th-to-die-after-game-related-injuries-since-july	http://www.vype.com/northwestprepreport/2015/08/18/too-hot-to-practice-heat-deaths-and-illness-threaten-game/	https://nccsir.unc.edu/files/2013/10/Annual-Fatalities-2014-Fatalities-Final.pdf	
35	(No picture available)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	"...The hot temperatures create additional concern for exposing players to dangerous toxins. As well explained by a well cited petition to the Consumer Product Safety Commission for rulemaking: "When tires are shredded and pulverized, their surface area increases exponentially, as does the particulate and gas yield from the tire material. Since tires are made of very harmful materials, including 24 gases found to be harmful to humans, carbon black, (a carcinogen which makes up 30% of tires), latex, benzothiazoles, phthalates, lead, mercury, cadmium, zinc and many other known toxins, when the fields heat up, they become increasingly dynamic. Of primary concern is the interaction of particles and gases, 'because when particles adsorb onto the surface of gases, they become 10-20 times more toxic than the materials themselves.' The fields yield continuously, but become more dynamic and more toxic as they heat up..."	http://www.regulations.gov/contentStreamer?documentId=ATSDR-2016-0002-0045&attachmentNumber=1&disposition=attachment&contentType=pdf	https://www.regulations.gov/contentStreamer?documentId=ATSDR-2016-0002-0045&attachmentNumber=1&disposition=attachment&contentType=pdf		
36		U	U	Newport Central Catholic High/Dixie Heights High		KY	Sprinturf	U	92	130	Y	"...WBAL TV and WLWT TV comparing natural turf fields and artificial turf fields at schools -- 92 degrees F on natural turf; 130 degrees F on artificial turf..." From video: "Anything above 104, you have to terminate your practice." Dixie certified athletic trainer Jay Bauers had to call practice early. That 130 degrees surface temperature helped create a heat index of 107 degrees in air temperature and that's 4 feet above the surface..."	http://parentscoalitionmc.blogspot.com/search?q=degrees	http://www.cincinnati.com/story/news/local/northern-kv/2015/05/19/football-field-give-player-infection/27608513/		
37		8/13/2007	U	NYC	New York City	NY	U	N/A	U	N/A	Y	Scientists at Columbia University who analyzed satellite thermal images of New York City the past two summers concluded that synthetic turf fields were up to 60 degrees hotter than grass fields. Stuart Gaffin, an associate research scientist at the Center for Climate Systems Research at Columbia University, said the synthetic fields get almost as hot as a tar rooftop.	http://www.nytimes.com/2007/08/13/nyregion/13citywide.html?_r=1	http://blogs.reuters.com/environment/2008/04/04/turf-battles-and-plant-physics/	http://www.drluzc.audio.com/uploads/2/6/2/6/26264188/synthetic_turf.pdf	
38	(No picture available)	7/5/2008	U	NYC Parks - Greenbelt Recreation Center, Flushing Meadows-Corona Park, 3 others	New York City	NY	FieldTurf and AstroPlay	80	U	145-162	Y	"...My feet are burning! I had to dump cold water on my shoes just to walk around," Yannick Pena, 9, complained to his mom on a recent visit to Macombs Dam Park in the Bronx, where The News found the turf hit temperatures of 145 to 160 degrees on an 80-degree day..." My feet always blister coming out here. The bottoms of my shoes feel like melted rubber, it gets so hot," said Luis Coronell, 33, who regularly takes his 10-year-old nephew, Andres, to play on turf field because there are no real ones in the neighborhood. 'You bring the kids out here, but you can't do anything because the turf gets too hot,' Coronell said. 'This turf is a killer.'"	http://www.nydailynews.com/new-york-parks-fake-grass-reach-scorching-162-degrees-article-1.347132	http://www.nytimes.com/2003/10/26/nyregion/neighborhood-report-new-york-parks-cows-can-t-eat-it-but-ball-fields-are-getting.html?_r=0		
39		6/27/2005	10:32 AM	Parc Beaubien	Montreal	Canada	U	U	N/A	92	U	"Five synthetic soccer fields and their surface temperature derived from Landsat 5" (Temperatures converted from Celsius to Fahrenheit.)	https://drive.google.com/file/d/0B6Nas_2VeYktMmYzYzk4ZmM1NzU1Yj00MTFmLTkyMWYtNGU2ZTM5M2FiNTk0/view?hl=en			
40		8/26/2014	11:23 AM	Park	Roswell	GA	U	U	(See Notes)	165	U	"Synthetic turf temperature on 8/26. Natural grass about 60-65 degrees less." Mark Holder was contacted to find out location of temperature reading.	https://twitter.com/Mh20dawgs/status/504333261062295552			



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41		5/24/2016	7:48 AM	Pine Trails Park	Westglades	MS	U	86	113	163	U	"50° temp swing from #SyntheticTurf to #NaturalGrass on typical #SoFlo morning. #SafetyFirst #GrassCanTakeMore"	https://mobile.twitter.com/NPappas23/status/735120384647794688				
42		7/5/2015	2:22 PM	Providence Park	Portland	OR	FieldTurf Revolution	U	N/A	166	N (See Notes)	"A reminder of why the game was moved to 8PM today, this was just taken. #RCTID" Game was a home game.	https://twitter.com/TimbersFC/status/617805706306039809	http://www.oregonlive.com/timbers/index.ssf/2015/01/portland_timbers_announce_2015.html	https://en.wikipedia.org/wiki/Providence_Park		
43		8/13/2015	4:00 PM	Ratliff Park	Lubbock	TX	U	91	U	151	U	"...In 91-degree temperatures at 4 p.m., benches at Higginbotham were approximately 120 degrees and certain areas of the jungle gym were about 122 degrees. The equipment was heated, but areas surrounding the gym equipment proved to be hotter than some of the surfaces themselves. A turf-like area near the jungle gym was 151 degrees, while the sand surrounding all equipment was 144 degrees. The cement walkway leading to the park was about 128 degrees. At Ratliff Park, a light-green plastic slide was approximately 144 degrees, and the AstroTurf installed at the site was about 141 degrees...The weather does not even have to be hot in order for the equipment to heat up and cause burns, according to the CPSC. Even in mild weather, as long as the equipment or surfacing is in direct sunlight for an extended period of time, there is a risk of suffering a thermal burn injury..."	http://lubbockonline.com/local-news/2015-08-13/too-hot-handle-slide-heat-not-what-it-was-can-still-be-harmful#				
44 (No picture available)		8/7/2008		U Riverside Park	Manhattan	NY	U	86	U	161	Y	"...In the shade it's 86 degrees. But out in the center of the soccer field where kids are playing soccer, the sun is directly overhead. Holding his thermometer waist-high, he gets a reading of 160.6 degrees Fahrenheit. Croft is surprised. 'It's way higher than I thought it would be,' he says. As the coaches call a water break, which they do every 15 minutes or so, a group of 8- and 9-year-olds stands dripping in sweat. 'It's hot,' says 8-year-old Michael-Luca Natt. 'Very hot.' Nearby, two more day-campers, Max Rana and Billy Hurwitz, say it can be hard to keep playing when it's so hot on the field...The New York City Health Department hired consultants to assess potential health risks associated with crumb-rubber turf fields...Since crumb-rubber turf absorbs and retains heat, the NYC Health Department report says heat is the primary health concern associated with playing on the fields. It says people can suffer dehydration, heatstroke and thermal burns at field temperatures above 115 degrees... But Columbia University researcher Gaffin says he's skeptical. He says even without any black rubber added, the plastic blades of grass in synthetic turf trap a lot of heat. 'They're spongy and lightweight — and that means the solar energy that's absorbed quickly gets converted to high temperatures,' he says. 'Without the natural system of evaporation that living grasses have, everything's working in one direction to turn sunlit turf fields into heat islands', he says."	http://www.npr.org/templates/story/story.php?storyId=93364750				
45 (No picture available)		7/2016		U High	Rockwood School District - Lafayette	Wildwood	MO	FieldTurf	84	98	125	Y	Very young children around age 6 playing soccer. Grass fields are in poor shape, maintained by school staff only. Licensed agronomist notes that grass field temperatures would be even lower if grass was in good condition.				
46		7/2016		U High	Rockwood School District - Lafayette	Wildwood	MO	FieldTurf	91	106	137	N	Grass fields are in poor shape, maintained by school staff only. Licensed agronomist notes that grass field temperatures would be even lower if grass was in good condition.				




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47		7/2016	U High	Rockwood School District - Lafayette	Wildwood	MO	FieldTurf	93	105	128	N	Grass fields are in poor shape, maintained by school staff only. Licensed agronomist notes that grass field temperatures would be even lower if grass was in good condition.				
48	 	7/2016	U Marquette High	Rockwood School District - Marquette High	Chesterfield	MO	FieldTurf	97	111	140	Y	High school children playing at Rockwood School District - Lafayette High (nearby location with same FieldTurf synthetic turf; same school district). Grass fields are in poor shape, maintained by school staff only. Licensed agronomist notes that grass field temperatures would be even lower if grass was in good condition.				
49	 	8/2016	U Marquette High	Rockwood School District - Marquette High	Chesterfield	MO	FieldTurf	82	100	120	N	Grass fields are in poor shape, maintained by school staff only. Licensed agronomist notes that grass field temperatures would be even lower if grass was in good condition.				
50	 	9/2016	U Marquette High	Rockwood School District - Marquette High	Chesterfield	MO	FieldTurf	79	97	136	Y	Grass fields are in poor shape, maintained by school staff only. Licensed agronomist notes that grass field temperatures would be even lower if grass was in good condition.				
51	 	9/2016	U Marquette High	Rockwood School District - Marquette High	Chesterfield	MO	FieldTurf	79	98	114	N	Grass fields are in poor shape, maintained by school staff only. Licensed agronomist notes that grass field temperatures would be even lower if grass was in good condition.				

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52		9/2016		Rockwood School District - Marquette High	Chesterfield	MO	FieldTurf	87	92	122	N	Grass fields are in poor shape, maintained by school staff only. Licensed agronomist notes that grass field temperatures would be even lower if grass was in good condition.				
53		9/2016		Saint Louis Premium Outlets playground	Chesterfield	MO	U	93	U	139	Y	Most of the playground that day was in the sun even though there is a shade cover above the entire playground. Shade cover was not enough to block the sun.	http://www.urbanreviewstl.com/2013/11/two-new-outlet-malls-in-chesterfield-valley-prestige-vs-premium/			
54		8/8/2016	1:50 PM	San Elizario High	San Elizario	TX	U	100	U	160	U	"Still don't believe me..... 100 degrees outside. 160 at turf level."	https://twitter.com/SEHSAthTrainin/status/762752930927644673			
55				Silver Terrace U synthetic turf field	San Francisco	CA	FieldTurf	U	82	161	U		https://sites.google.com/site/sfparks/heatandburns.jpg	https://sites.google.com/site/sfparks/synturf-letter		
56		6/27/2005	10:32 AM	Stade McGill	Montreal	Canada	U	U	78	94	U	"Five synthetic soccer fields and their surface temperature derived from Landsat 5" (Temperatures converted from Celsius to Fahrenheit.)	https://drive.google.com/file/d/0B6Nas_2VeYktMmYzYzk4ZmMtNzU1YjO0MTFmLTkyMWYtNGU2ZTM5M2FiNTk0/view?hl=en			
57		8/23/2014	5:22 PM	Stanley H. Durwood Soccer Stadium	Kansas City	MO	2009 - Mondoturf	U	U	159	Y	The New York Times reported that "[players recall that AT makes] ...a match in the midday summer sun something like playing on a simmering frying pan. Morgan has told stories of playing on turf so hot — as high as 160 degrees — that she needed to be in constant motion to keep from searing the soles of her feet right through her cleats. 'Your feet will burn right off'"	http://www.sportingnews.com/soccer/news/alex-morgan-nwsl-portland-thorns-hot-turf-field-uswnt/10fmsrguepk1n103zt64djlj	http://www.nytimes.com/2015/06/24/sports/a-memento-players-carry-with-them-like-it-or-not.html?_r=2		

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58		(two summers, 10 consecutive days)		Stanley Ho Sports complex in Sandy U Bay	Hong Kong	China	(Pitch 2) 2014 Polytan/STI - Poligras Mono 2035	66.2	U	129	U	A Hong Kong study found heat indices nearly double ambient air temperature. On a 66.2 °F day "[...Synthetic turf] surface temperature...can shoot up to a sizzling 70 °C [or 129.2 °F, twice the ambient temperature], whilst natural turf peaks no higher than 38 °C [71.6 °F]. In addition "the air temperature 50 cm above ground was higher than temperatures at 150 cm, meaning small children were at greater risk." He found that "Natural grass pitches serve important ecosystem purposes and help mitigate the urban heat island effect - the increase in temperatures in urban areas compared with suburban areas due to urbanisation. Water evaporation from natural turf produced a cooling effect," [and he] criticised the policy of replacing natural turf with artificial grass, noting that the trend in cities such as Singapore and Japan was to convert more hard ground into grass. "It is very disappointing that, whilst every developed country is working to reduce the urban heat island effect, the government here is doing things to intensify it."	https://www.pitchcare.com/magazine/concerns-over-heat-stress-on-3g-surfaces.html	http://www.ihp.hk/index.php?option=com_content&view=article&id=300&Itemid=279	http://events.fih.ch/media/813156/pitches-at-2015-06-01.pdf		
59 (No picture available)		6/7/2015	1:00 PM	(Lansdowne Stadium)	Ottawa	Canada	1984-2000 AstroTurf	77	N/A	131	Y	"In Ottawa, where she covered two matches Sunday, the temperature reportedly reached 55 C [131 °F] at field level, compared to air tallies that topped out at 25 C [77 °F]."	nailpost.com/sports/soccer/womens-womensworldcup/matches/	m.womensworldcup/matches/	ia.org/wiki/TD_Placement_Stadium		
60 (No picture available)		6/7/2015	1:00 PM	TD Place Stadium (Lansdowne Stadium)	Ottawa	Canada	1908-1983 grass 1984-2000 AstroTurf 2001-present FieldTurf	64	N/A	129	Y	"...Fox Sports, on its game broadcast, reported temperatures at turf level had reached 54 degrees Celsius during the early afternoon Norway-Thailand match Sunday in Ottawa and 43 degrees for the Germany-Ivory Coast match that followed. FIFA listed the air temperature at 18 and 25 degrees, respectively, for the Ottawa doubleheader..."	https://www.thestar.com/sports/soccer/2015/06/08/womens-world-cup-heats-up-as-pitch-level-mercury-	http://www.fifa.com/womensworldcup/matches/	https://en.wikipedia.org/wiki/TD_Placement_Stadium		
61 (No picture available)		6/7/2015	4:00 PM	TD Place Stadium (Lansdowne Stadium)	Ottawa	Canada	1908-1983 grass 1984-2000 AstroTurf 2001-present FieldTurf	77	N/A	109	Y	"...Fox Sports, on its game broadcast, reported temperatures at turf level had reached 54 degrees Celsius during the early afternoon Norway-Thailand match Sunday in Ottawa and 43 degrees for the Germany-Ivory Coast match that followed. FIFA listed the air temperature at 18 and 25 degrees, respectively, for the Ottawa doubleheader..."	https://www.thestar.com/sports/soccer/2015/06/08/womens-world-cup-heats-up-as-pitch-level-mercury-	http://www.fifa.com/womensworldcup/matches/	https://en.wikipedia.org/wiki/TD_Placement_Stadium		
62		8/8/2010		Texas Tech Jones U AT&T Stadium	Lubbock	TX	FieldTurf	95	98	155-160	Y	"...Could it get any hotter?" assistant coach Tommy Mainord said during the two-hour Sunday workout that began at 3:45 p.m. CDT...So while the air temperature was around 95 degrees, according to the National Weather Service, the temperature off the turf reached as high as 160 degrees on the black parts of the synthetic grass. Hearing rumors that the new red end zone and green turf on practice field would be cooler, we tried both with each still reading around 155 degrees...the increasing temperatures is becoming a concern to many individuals. For example, when we measured the temperature reading off of a patch of regular grass in the same direct sunlight just outside the stadium, the temperature reading was around 98 degrees — 57 degrees less than the green synthetic turf reading..."	http://www.scout.com/college/texas-tech/story/990531-beating-the-heat?s=188				
63		7/21/2016	6:09 PM	The Country Club golf course	Ontario	Canada	U	U	92	148	U	"The difference b/w live turf(left) and artificial turf(right) in temperature."	https://twitter.com/CountryClubTurf/status/756294997629018112				
64		8/14/2002	U U		Manhattan	NY	U	U	U	U	Y	Columbia University who analyzed satellite thermal images of New York City the past two summers concluded that synthetic turf fields were up to 60 degrees hotter than grass fields. They attributed the difference to the pigments used in making the turf, as well as the turf's reliance on filaments that increase the surface area that soaks up heat. More important, the turf lacked grass's ability to vaporize water and cool the air. Stuart Gaffin, an associate research scientist at the Center for Climate Systems Research at Columbia University, said the synthetic fields get almost as hot as a tar rooftop. 'I've been telling everybody that turf is among the hottest surfaces in the city,' said Dr. Gaffin, who is publishing the study later this year. "With the scale we are talking about here, I think they are going to be hazardous places to be during heat waves in the city..."	http://www.drluzc.audio.com/uploads/2/6/2/6/26264188/synthetic_turf.pdf	http://www.nytimes.com/2007/08/13/nyregion/13citywide.html?_r=0			
65		U	U U		U	SC	U	94	104	165	U		http://turf.uark.edu/turfhelp/archives/021109.html				

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66		6/21/2016	5:16 PM	U	Denver	CO	U	95	N/A	169	N	"On a Denver area artificial field this afternoon 169 F=76.2 C Stay cool on natural grass" (Air temperature obtained by contacting Ross Kurcab.)	https://twitter.com/NaturalGrassMan/status/745410056926093318/video/1?utm_source=fb&utm_medium=fb&utm_campaign=idwacher&utm_content=745445775652491264			
67		7/29/2015	11:32 AM	U	Columbus	OH	U	U	99	159	U	"For all you guessers out there, here are the answers! It's a hot one out there, remember to stay hydrated!"	https://twitter.com/GroundsCrews/status/626460238523166720	https://en.wikipedia.org/wiki/Mapfre_Stadium		
68		9/7/2016	10:02 AM	U	Arlington	VA	U	85	U	127	U	"Current ArlingtonVA air & artificial field turf temperatures. Monitor heat for #DMV PM school activities/athletics."	https://twitter.com/RyanMiller_AB/status/773567216109424640			
69		9/1/2015	10:08 AM	U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	This post is from an athletic trainer. Even she knows that Synthetic Turf is dangerous! "Turf temperatures can get up to 50 degrees hotter than grass, so keep these tips in mind during practices this week!"	https://twitter.com/lplourdeATC/status/638760292718125057			
70		7/18/2015	12:18 PM	U	U	U	U	U	U	176	U	"Temperature down on the field turf at #LSU camp"	https://twitter.com/ScarboroughMike/status/622485577531682816			
71		6/22/2016	3:50 PM	U	U	AZ	U	U	U	181	U	"Crazy! @phxdonald says this artificial turf is 180 degrees. #BeOn12"	https://twitter.com/12News/status/745750738907828224	https://twitter.com/phxdonald/status/745731098076807168		
72	(No picture available)	10/2014, 3/2015	N/A	U	U	U	U	U	U	U	U	Petrass, L.A. et. al (2014). <i>Comparison of surface temperatures of different synthetic turf systems and natural grass: Have advances in synthetic turf technology made a difference.</i> "...This article compared surface temperatures of typical third-generation synthetic turf with a cool climate product and also compared the synthetic turf products to natural grass to determine whether synthetic turf reacts differently to environmental factors and hence may increase heat-related health risks for participants." Although surface temperatures were lower for the cool climate field, compared to other synthetic turf, "...both synthetic fields were considerably warmer than natural grass at the same venue (by 12.46 °C [54 °F] at the metropolitan venue and 22.15 °C [72 °F] at the regional venue)..."	http://pip.sagepub.com/content/22/9/1/10			

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73	(No picture available)	5/2014	U U	U	U	U	U	U	U	U	U	Reasor, E.H. (2014). <i>Synthetic Turf Surface Temperature Reduction and Performance Characteristics as Affected by Calcined Clay Modified Infill</i> . a. Surface temperatures of artificial turf were between 31° C (88° F) and 57° C (135° F). b. Although irrigation reduced surface temperatures of artificial turf, increases of 74 to 102% of the pre-irrigation temperature were observed within 30 minutes after irrigation. c. Surface temperatures returned to pre-irrigation temperature on all of the treatments between 60 and 120 minutes after irrigation. Therefore, the cooling effect of irrigation will not last the entire length of an athletic competition.	http://trace.tennessee.edu/utk_gradthes/2750/	http://trace.tennessee.edu/cgi/viewcontent.cgi?article=3940&context=utk_gradthes		
74	(No picture available)	2014	U U	U	U	U	U	U	U	U	U	Thoms, A. W. et al. (2014). <i>Models for Predicting Surface Temperatures on Synthetic Turf Playing Surfaces</i> . <i>Procedia Engineering</i> , 72, 895 --- 900. a. Artificial turf surface temperatures ranged from --- 9.8 to 86.4° C (14 to 188° F) to when ambient air temperatures ranged from --- 0.4 to 37.1° C (31 to 99° F). b. Absorption of solar radiation results in increased temperatures on artificial turf surfaces, and high rates of solar radiation are absorbed with minimal light reflectance. Therefore, air temperature in conjunction with solar radiation explained most of the variation in artificial turf surface temperatures.	http://www.sciencedirect.com/science/article/pii/S1877705814006699			
75	(No picture available)	2012	U U	U	U	U	U	U	U	U	U	Penn State's Center for Sports Surface Research (2012). <i>Synthetic Turf Heat Evaluation --- Progress Report</i> . January 2012. a. This study measured surface temperatures of artificial turf fields between 140.2 and 173.4° F when air temperatures were between 73 and 79° F. b. Looking at various color options for infill and temperature, no product significantly reduced surface temperatures. Small reductions in temperature are insignificant when surface temperatures still exceed 150° F. This study concluded that "[w]hile marketing materials may claim lower surface temperatures, no scientific reports exist that substantiate such claims." c. Research has not found a good solution for excessive heat levels of turf.	http://plantsciences.psu.edu/research/centers/ssrc/documents/heat-progress-report.pdf			
76	(No picture available)	2011	U U	U	U	U	U	U	U	U	U	Serensits, T. J. et al. (2011). <i>Human health issues on synthetic turf in the USA</i> . <i>Proceedings of the Institution of Mechanical Engineers, Part P: Journal of Sports Engineering and Technology</i> , 225 (3), 139 --- 146. a. High surface temperatures found on artificial turf fields can contribute to physiological stress and cause "serious heat --- related illnesses" including heat stress, heat stroke, and burns. b. The "New York City Department of Health and Mental Hygiene recognizes excessive surface temperatures as the most important health concern associated with infilled synthetic turf." c. Irrigation of excessively hot artificial turf surfaces only provides cooling benefits for about 20 minutes, with a rebound to within 10 degrees of the pre --- irrigation temperature within 3 hours. d. The use of white crumb rubber as the infill does not resolve the heat issue.				
77	(No picture available)	2008	U U	U	U	U	U	U	U	U	U	Sciaccia, T (2008). <i>The Thermal Physics of Artificial Turf</i> . a. A study comparing temperatures on artificial turf temperatures with air temperature found that artificial turf ranged from 58 to 75° hotter than measured air temperature.	http://www.synturf.org/sciaccacheatstudy.html			
78	(No picture available)	2008	U U	U	U	U	U	U	U	U	U	SportsTurf Managers Association (STMA) (2008). <i>A Guide to Synthetic and Natural Turfgrass for Sports Fields: Selection, Construction and Maintenance Considerations</i> . 2nd edition. a. Artificial turf gets dramatically hotter than surrounding land uses including asphalt with surface temperatures as much as 95 to 140° F hotter than natural grass fields whereas the temperature of natural grass rarely rises above 85° F, regardless of air temperature.	http://www.stma.org/sites/stma/files/STMA_Synthetic_Guide_2nd_Edition.pdf			
79	(No picture available)	1994	U U	U	U	U	U	U	U	U	U	Beard, J. B., & Green, R. L. (1994). <i>The role of turf grasses in environmental protection and their benefits to humans</i> . <i>Journal of Environmental Quality</i> , 23(3), 452 --- 460. a. Synthetic surfaces can be up to 39° C (102° F) hotter than natural turf. Natural turf grass provides a natural cooling affect and helps to dissipate heat from neighboring developed areas.	http://www.wateruseefficiency/landscapereordnance/pubcomments/lurgen%2			
80		6/22/2015	2:07 PM	University of Arizona	Tucson	AZ	U	100	100	170	U	"More turf temps. 100° air temp: Natural, shade 81°; Natural, sun 100°; synthetic, shade 97°, synthetic, sun 170°"	https://mobile.twitter.com/niceturf/status/613091019312082944			
81		7/13/2010		University of Florida	Gainesville	FL	FieldTurf	94	103	160	U	"Comparing Surface Temperatures of Natural and Synthetic Turfgrass Systems." "This video was shot on the UF campus on 7/13/10 to demonstrate the difference in surface temperature between a synthetic and natural turf system. In addition, there are photos showing the temperatures of asphalt and concrete on the same day. Ambient air temperature was around 94 degrees." Jason K. Kruse, Ph.D., University of Florida	https://www.youtube.com/watch?v=yxDSm18KUow	http://www.fieldturf.com/en/artificial-turf/artificial-turf-news/practice-fields-to-get-upgrade-by-opener		
82	(No picture available)	6/10/2016	12:30 PM	University of North Carolina	Charlotte	NC	U	82	96	164	U	"Temperatures at 12:30 Air - 82 Grass field - 96 Asphalt - 130 Synthetic turf 164"	https://twitter.com/Tar_Heels_Turf/status/74130847			

Number	Picture	Date	Time	Synthetic Turf Field/Tire Playground	City	State	ST Brand	Air Temp	Grass Temp	ST/TPG Temp	Children/Athletes Playing at Time ST/PG Temperature Taken?	Notes	Source 1	Source 2	Source 3	Source 4
83		9/5/2016	12:30 PM	Virginia Polytechnic Institute and State University (Virginia Tech)	Blacksburg	VA	2015 - Artificial Turf	U	U	145	U	"145 degrees on the turf at 12:30 pm"	https://twitter.com/VT_groundscrow/status/772834684531277824/photo/1?utm_source=fb&utm_medium=fb&utm_campaign=kaufmans828&utm_content=772980998518767620	https://vtnews.vt.edu/articles/2014/12/122314-dsa-recsportsturf.html		
84		6/27/2005	10:32 AM	Westmount Park (grass fields)	Montreal	Canada	N/A	U	78, 79	N/A	Y	"Five synthetic soccer fields and their surface temperature derived from Landsat 5" (Temperatures converted from Celsius to Fahrenheit.)	https://drive.google.com/file/d/0B6Nas_2VeYktMmYzYzk4ZmMTNzU1YjO0MTFmLTkyMWYtNGU2ZTM5M2FiNTk0/view?hl=en			
85	(No picture available)	7/22/2014	Early afternoon	Whiteside Park	Tulsa	OK	U	U	U	170	Y	"...FOX23 used a thermometer to see how hot it was. In the early afternoon, the mulch was 136 degrees and the rubberized surface was 170 degrees..."	http://www.fox23.com/news/local/hot-can-cause-playground-dangers-			
86		8/30/2011	3:00 PM	Wylie High School, Bulldog Stadium	Wylie	TX	Mondo Turf	104	95, 119	181, 185, 202	Y	"...About 3 p.m. Tuesday, Sandifer used a handheld infrared thermometer to detect temperatures of 119 degrees on the natural grass near his office, 156 degrees in the asphalt parking lot at WHS and as high as 185 degrees on the Mondo-brand football field turf in Bulldog Stadium. Sandifer said he's seen it as high as 202 degrees on a spot of concentrated rubber pellets used in turf installation near the surface of the running track that surrounds the football field. The readings came as the National Weather Service reported a high of 104 degrees Tuesday in Abilene..."	http://www.reporternews.com/sports/high-school/football/wylie-highs-fiery-artificial-field-turf-adds-to-heat-ep-387459525-349810111.html			