



# Scrapers & Fabricating Debris

Tempered glass quality issues - a Window Cleaning Network bulletin

7/21/17 © By Gary Mauer - gmauer@window-cleaning.net

Images: Dan Fields and Gary Mauer

Research: [www.scratched-glass.net](http://www.scratched-glass.net) [www.thefieldsco.com](http://www.thefieldsco.com) [www.iwca.org](http://www.iwca.org) [www.window-cleaning.net](http://www.window-cleaning.net)

**Window cleaners throughout the world use metal scrapers; their markets require efficient, effective, safe cleaning methods.**

**Scrapers do not scratch uncoated glass**, and have long been the world's standard and most practical method for removal of material such as paint, adhesives, or stickers from uncoated glass, not only during construction cleaning, but throughout the useful life of a window.

**Less desirable alternatives** are typically expensive, labor intensive, and may harm seals or surrounding surfaces. Inefficient methods may create ergonomic hazards for workers. Hazardous chemicals pose health and environmental concerns.

**Poor quality tempered glass** often gets scratched. Microscopic surface defects known as fabricating debris defects may be broken or dislodged and trapped by a scraper during window cleaning and cause scratches.

**Millions of dollars have been lost** due to poor quality tempered glass. Many professional window cleaners now refuse to do post construction window cleaning. Many will no longer work without proper liability waivers.

**Fabricating debris defects** are created in contaminated tempering furnaces. Abrasive microscopic debris such as glass fines entering a furnace can stick to furnace rollers and contaminate the roller side (bottom surface).

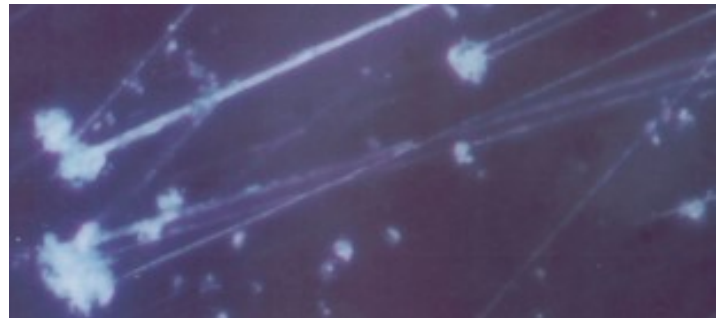
**Defects are a known quality control issue** that can be minimized when tempering fabricators adhere to recommended operating and maintenance procedures for washers, furnaces, air knives, and other equipment.

**Invisible to the naked eye.** Window cleaners should never assume liability for detecting microscopic defects

**Fabricating debris scratches** are typically lighter than scratches caused by common abrasives such as sandpaper. Often they are hard to see without the aid of direct sunlight. Solitary scratches caused by solitary defects are of little concern; numerous scratches caused by excessive defects are a major concern.

**Scratches can grow much wider.** Fine scratches that are invisible to the naked eye when created - when a cleaner is looking for visible damage - may become visible hours later.

**There is no reliable field test** to confirm the absence of these defects. Quality control testing is best done at the production level by the fabricator.



**A heat treated glass scratch liability waiver**, reviewed by legal counsel, should be part of every contract. Waivers typically state that the client agrees to scraper use on all uncoated glass and will not hold the window cleaner liable for any scratches in heat treated glass. Waiver should say "heat treated" rather than "tempered".

**Even if initially protected**, poor quality tempered glass presents maintenance issues, requiring the client's vigilance for the life of the window, so the common scraper is never needed, or alternatives are always used.

**Clients who need efficient, safe, practical cleaning** should agree to sign a liability waiver; builders should insist on quality heat treated glass from suppliers. Every effort should be made by fabricators, window suppliers and builders to assure only quality tempered glass.

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## Tempered Glass Quality Resources

### Quality test for uncoated tempered glass surfaces

Glass Performance Days 2015

[www.scratched-glass.net/pdfs/Mauer2015.pdf](http://www.scratched-glass.net/pdfs/Mauer2015.pdf)

A simple surface quality test for tempering facilities. During tempered glass production, samples are scraped, to simulate cleaning. Glass is checked with a shop microscope, and records kept. Intended to predict performance of tempered glass during cleaning and promote the early detection and resolution of bottom surface defects.

### Maximizing Ceramic Furnace Roll Performance

Glass Processing days 1999

[glassfiles.cc.tut.fi/articles/maximizing-ceramic-furnace-roll](http://glassfiles.cc.tut.fi/articles/maximizing-ceramic-furnace-roll)

US Glass Magazine 1999

[www.iwca.org/resource/resmgr/files/usg\\_1999\\_reprint.pdf](http://www.iwca.org/resource/resmgr/files/usg_1999_reprint.pdf)

Well written, easy to follow explanation of "process variables" that affect tempered glass surfaces - what can go wrong, and what can be done about it. (Only quality issues were studied - there were no scrapers involved.)

Operating practices, cleanliness of the factory, furnace and glass are essential. "Defects in tempered glass can usually be identified, isolated, and resolved through the use of optical microscopy, scanning electron microscopy, and energy dispersive spectroscopy."

### The Fields Company - Dan Fields

[www.thefieldsco.com](http://www.thefieldsco.com)

Articles and information on tempered glass quality and construction window cleaning. Sample scratched glass waivers.

