

iFixit's Samsung Galaxy Fold teardown reveals how the phone is dying

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- These plastic bezels and their “light adhesive” are all that hold the display on to the Galaxy Fold.
- So what happens at the fold point? Uh, the plastic bezels stop, so you can stick things under the display.
- In some folding configurations, the display lifts away from the body somewhat, providing ample room for pocket lint and other detritus.
- It's no wonder then that dirt sometimes gets behind the display. Here, The Verge's review unit is a bit bumpier than normal.
- A few folds later and the dirt behind the display can damage the display, as seen here on The Verge's review unit.
- YouTuber Michael Fisher also had something enter the phone and cause a bump in the display.
- Fisher had to send the phone back to Samsung before any damage could take place.

It might be delayed for at least a month, but Samsung's futuristic Galaxy Fold has hit the iFixit Teardown table. How exactly did iFixit get its hands on a phone that has never

been for sale and has had all its review units recalled? It's probably best not to think too much about it. What matters is that we get to see the insides!

Between this teardown and an earlier blog post, iFixit has been building a compelling theory for why the Fold has been dying an early death for some reviewers. The problem, simply, is ingress. While most other smartphones are resistant to the ingress of just about everything, to the point of being water resistant, the Galaxy Fold is full of holes.

Samsung Galaxy Fold

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Traditional slab-style smartphones have their displays bonded to a Gorilla Glass panel, which is then glued onto the front of the phone for a water-proof seal. That doesn't work for a foldable display that needs to bend and move, so the Galaxy Fold has a plastic display that rests on top of the phone and is held on only with a thin, plastic bezel that is glued along the edge. These bezels aren't flexible enough to cover the folding area of the phone, though, so they just *don't*. The plastic bezel stops before the hinge, so the display edge is just exposed to the world, opening a hole into the device.

You can actually stick stuff *under* the display at this point, and if the wrong bit of anything gets stuck under the display, it can push into the back of the display and damage it. To make matters worse, when folded, the flexible display is designed to lift away from the rigid phone body somewhat, providing an ample ingress space for pocket lint and other detritus. If dirt gets behind the display when folded, and then you unfold it, the hinge mechanism can push the dirt into the back of the display, damaging it. The hinge is also an ingress point into the phone. Large gaps along the left and right of the spine allow bits of dirt to enter the phone, but

considering this is on the back of the phone, it's probably not as much of a threat to the display as the hole in the front.

So far we've seen three Galaxy Folds with lumps under the display. In the initial reports, the Verge's review unit famously had a bit of *something* go behind the display and destroy it. Then Swiss site Blick had something that "looked and felt like a grain of sand" appear under the display, but eventually it disappeared. YouTuber Michael Fisher has been the third victim, saying, "A little grain of something found its way beneath my Galaxy Fold display." Fisher had to return his phone before it could be determined if the display would have died.

OLED displays are extremely fragile—much more fragile than LCDs—and can't survive when exposed to oxygen or moisture. A thin "encapsulation" layer is the only thing protecting the OLED display from the outside world, and if anything damages this layer, like say, a bit of pocket lint, the display is toast.

The second problem with the Galaxy Fold was from people removing the plastic screen protector, which was enough to damage the fragile OLED display. iFixit notes that this screen protector looks very similar to the one pre-installed on devices like the Galaxy S10 and asks if users aren't supposed to remove it, "Why not extend this layer under the bezels to hide it from peel-happy folks like us?" The only explanation we can come up with is that the display protector was a last-second solution slapped onto the devices after they were manufactured. After being told not to remove this layer, iFixit *still removed* this layer (some temptations are too strong to resist), and sure enough, this tiny bit of stress was enough to kill the display.

- This hinge is one of the more complicated smartphone

parts in recent memory.

- All the bits to iFixit's (now dead) Galaxy Fold.

As for the non-display parts of the phone, the hinge for the Galaxy Fold is an ultra complicated work of art. There are so many folding and moving parts that the hinge is just mesmerizing once the exterior cladding is removed. We can't embed it here, but iFixit has a video of the naked hinge working, and it's a must see.

Inside you'll find *two* batteries, one on the left and right side of the phone, and after that iFixit notes that you're down to "pretty standard-looking Galaxy smartphone parts."

Every phone on the iFixit bench gets a repairability score, and the Galaxy Fold gets a meager "2." The site cites the loads of glue used on the backs and batteries as making a repair harder than it needs to be and says the hinge, lack of ingress protection, and fragile display will make repairs more likely in the future.

With the Galaxy Fold being delayed at least a month for reworking, we'll have to keep an eye on any changes between this first version and what is eventually released. Will Samsung do something about all the ingress points? Will the screen protector be extended under the bezel so it can't be pulled off? For now, the last official word from Samsung was that it is still investigating what it will do with the Fold and has promised an update in "the coming weeks."

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