

A brief technical overview of processes and protocols for composite manufacturing from plastic waste (LDPE, HDPE, etc.) reinforced with fibers (cardboard, agricultural waste, textile, woodchips, etc.)

The processes for creating a composite sheet or tile, which is the base material from which both domestic (notebooks, wallets, clipboards, coasters, lampshades, etc.) and building (ceiling tiles, roofing tiles, piping, etc.) products are manufactured are essentially identical: they both require equipment that exerts heat and pressure.

	
Banana fiber layered between plastic	Composite sheet after heating & pressing

	
Multiple composite sheets pressed together and cut to size	Notebook: final product

For domestic products, a simple, commercially available laminating, tee-shirt or sublimation heatpress is adequate. The press can be manually operated – which we do not recommend – or pneumatically powered, which is what we use whenever possible. The single difference between the heatpresses we use and the ones that are most commonly available is that both the top and bottom platens of our preferred presses contain heating elements, so the base material (combination of plastic and fiber) is heated from above and below. Additional equipment may include a shredder/grinder (depending on the quality of the plastic and/or fiber) and a heat sealer (to seal the edges of certain products, i.e. wallets and bags.)

Building material requires equipment that produces sheets or tiles much like those used for domestic products, however, because the structural properties of those tiles must be significantly enhanced compared to the domestic tiles, the machinery – which produces higher pressure and heat – is more robust. These machines are custom made to our specifications and require a complex infrastructure to support their operation. We are not considering this for the purposes of this project.

We recommend the DK20SP heatpress for the Tijuana project. It is manufactured in the US by GEO Knight & Co. in Massachusetts, and they have a distribution network in Mexico. We have installed slightly smaller versions of this press at USD and the Kumeyaay reservation in Viejas.

	<p>120 Volts/1800 Watts/15 Amps</p> <p>40.6 cm x 50.8 cm dual-heated platens</p> <p>100 kg</p> <p>\$2550 - DK20SP \$875 - DKP-1620BHT (bottom heated platen and control) \$295 – DKA Universal Stand</p> <p>https://heatpress.com/products/digital-knight-air-operated-swingler</p>
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We will also need to purchase an appropriate air compressor with these minimum requirements: 7gal, 1cfm, 100psi, 1/4" line. Cost is approximately \$250, and this will draw an extra amount of electricity which must be accounted for. This California Air Tools compressor is an example of what's needed. <http://bitly.ws/9snB>. We should be able to source something similar in Mexico.

Room requirements are minimal. 25m² with window ventilation can easily accommodate a Prep Station, Cooling Station and Heatpress Work Station.