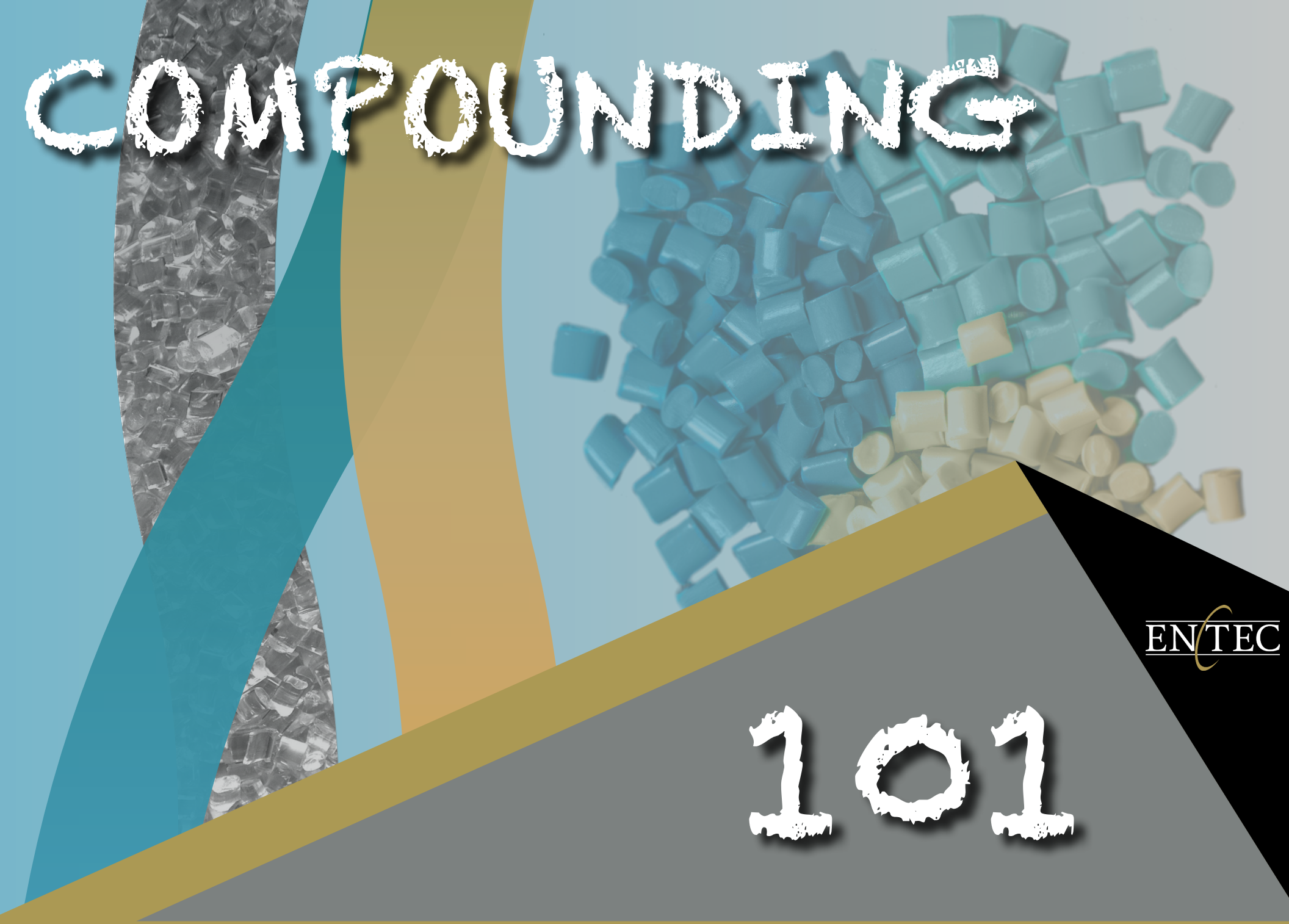
COMPOUNDING



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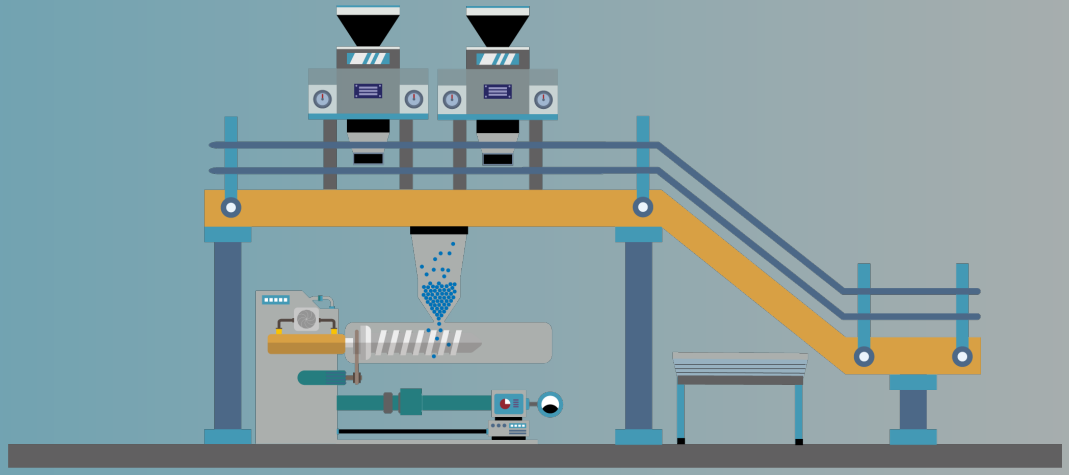
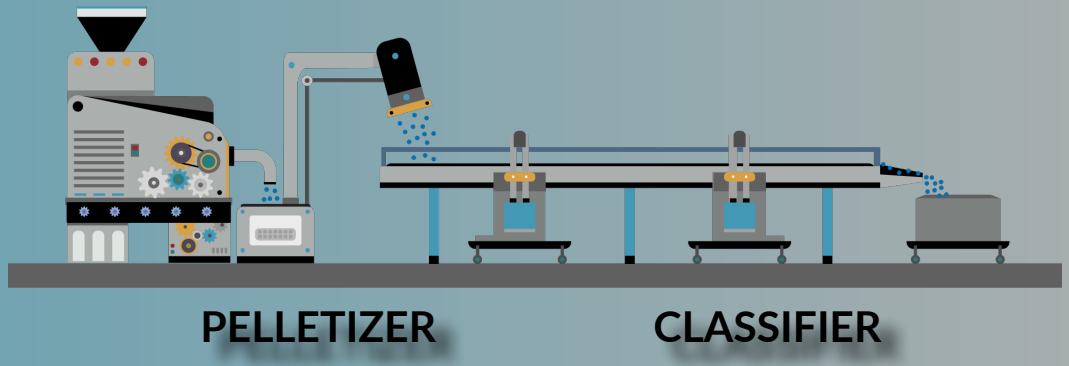
WHAT IS COMPOUNDING?

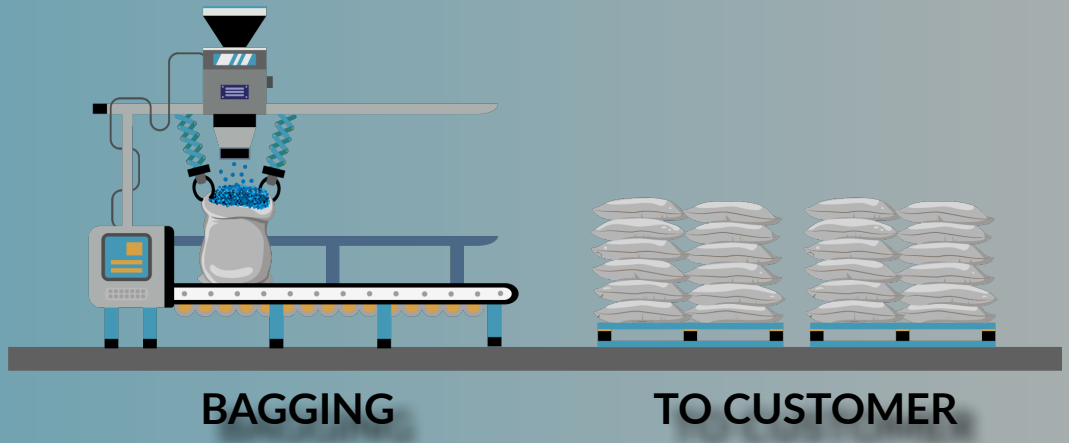
Compounding is a melt blending process where a thermoplastic resin is combined with additives and reinforcements such as anti-oxidants, UV stabilizers, impact modifiers, colorants, flame retardants, glass fibers or minerals. Compounding changes many of the physical, mechanical, electrical or other properties of the thermoplastic material, which is now called a compound or a thermoplastic composite.

THE COMPOUNDING PROCESS

Compounding starts with a specific formulation for the compound that is being produced. The various ingredients may be pre-blended or they may be fed separately into the extruder. The resin and additives are mixed and homogenized together in the melt state inside of the extruder barrel. The molten plastic is then forced through a die plate that has a number of holes that are about 1/8” in diameter. These strands are cooled by being pulled through a water bath and then head into a pelletizer where they are chopped into cylindrical pellets. From here the pellets head to a classifier where any small pellets, longs or fines are separated. After this step the pellets head into packaging in bags, boxes or bulk transport. Depending on the base resin, the compound may need to be dried prior to packaging.







WHY WE COMPOUND

Additives are added to the base resin to improve properties such as strength, stiffness, color or other characteristics. The specific types of additives, colorants or reinforcements used are determined based on the desired final properties of the compound or the expected end use application. Certain additives may not be compatible based on the end use application or end use environment. For example, certain types of antioxidants are subject to color change (pinking or yellowing) when exposed to certain environmental conditions and therefore would not be used in those types of applications. UV stabilizers may not be part of the formulation if the end use requirement does not include UV exposure.

For applications requiring high strength or stiffness, glass fiber reinforcement would be added. If high stiffness is critical ether carbon fiber or long glass fiber reinforcement could be added. While minerals such as wollastonite, talc or mica do not offer the strength and stiffness of glass fibers, they can provide some mechanical property benefits as well as have lower warpage than glass fiber reinforced compounds.

Other applications may require special characteristics such as flammability resistance, tribological performance or electrical or thermal conductivity. For these types of compounds there are various halogenated and non-halogenated flame retardant additives that can make the compound self extinguishing; PTFE, silicone, siloxane and other modifiers that help with friction and wear; and carbon, ceramic or polymeric based modifiers to make compounds more conductive.

APPLICATIONS FOR COMPOUNDS

Thermoplastic compounds are used in virtually every market, industry and application. The uses of thermoplastic compounds is only limited by our imaginations and our creativity in developing compounds to meet the end-use requirements.