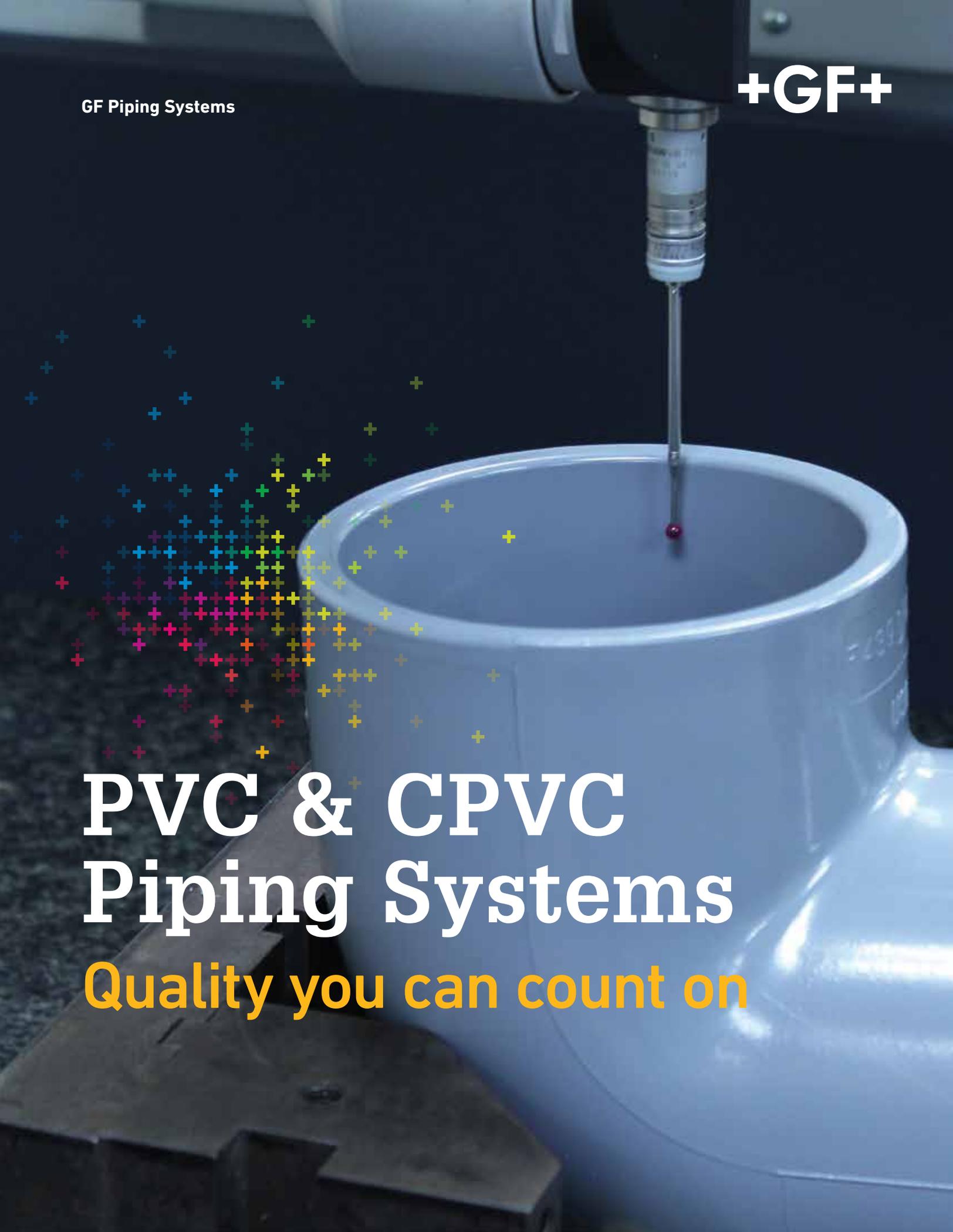


GF Piping Systems

+GF+



# PVC & CPVC Piping Systems

Quality you can count on



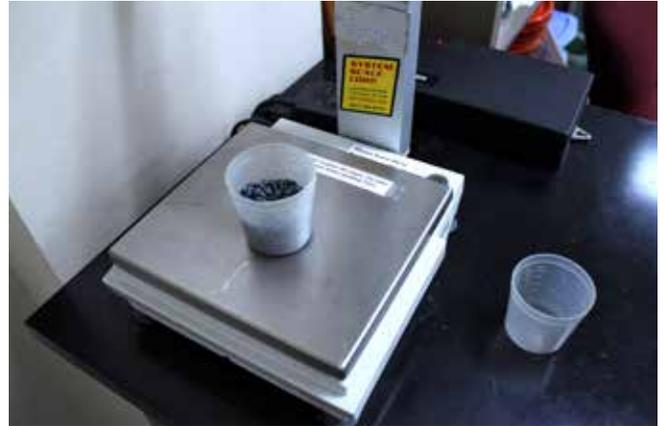
**These are just some of the steps we take to ensure GF delivers only the highest quality products.**

### Raw Material Qualification Steps

## Why use GF PVC and CPVC piping systems?

GF Piping Systems has always been known for providing the highest quality products. And that is no different when it comes to the manufacturing of our vinyl products, PVC and CPVC. While other manufacturers may consider these materials “commodities,” we consider them highly engineered fluid delivery systems that must satisfy demanding applications and are no different from the many other thermoplastic piping systems we manufacture. The same rigorous attention to detail, material qualification, raw material testing, and in-process quality assurance are essential steps that we apply to maintain these same consistently high standards of quality you’ve come to expect from GF.

It starts with the right choice of raw materials, choosing the best suppliers, and verifying that each and every shipment received meets our high standards. We insist on strict quality control throughout the entire manufacturing process to make sure our products not only meet or exceed our stringent specifications but also look good, provide trouble-free installation and provide years of service. Finally, we take extra care in packaging and protecting the products before they leave our plants. You can expect the product to arrive at the jobsite in the same excellent condition as when it left our plant.



1 Before any raw material can be processed, batches are checked for density and moisture content. Then they are separated by batch number to ensure there is no possibility of unintended blending of raw materials. In addition, raw material is compared to control samples. Inconsistent pellet size, pellet geometry, and contamination are cause for material rejection.



2 Once preliminary checks are complete, the resin is checked with a Brabender or torque rheometer that simulates the way the material will behave when processed through molding machines and extruders. If raw material is out of specification, it will be rejected at this time.



3 Next, the resin is heated and pressed to flatten the material to under 1/10 of an inch with several tons of pressure. This is used to check for correct color using a color platen.



4 It is then analyzed using the color spectrometer. If the material's color is out of tolerance and does not meet specification, the material is rejected.



5 After color check, the melt flow indexer is used to measure the viscosity of the material and how it will behave in the molding and extrusion processes. If the material passes this final step, it can then be released to production.

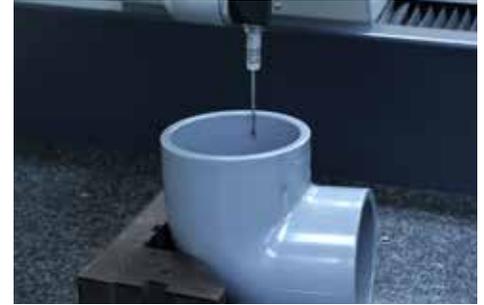
## In-Process Manufacturing Steps



6 Each batch of raw material is retained for five years. This provides traceability in case of a post-manufacturing material issue. Markings on a fitting or pipe allow tracability back to each batch of raw material used in production.



7 Samples of finished product are also retained on a regular basis. As with the raw material, if a problem is suspected, it can be compared to the retained sample to help confirm visual and dimensional conformance. Traceability is an integral part of the quality process.



8 A coordinate measurement machine (CMM) is an extremely precise measuring device that is used to qualify dimensional tolerances on finished products. In many cases, the GF specification is tighter than ASTM specifications. When making solvent cemented joints, a proper fit-up between pipe and fitting is important to ensure leak-proof connection. Too big of a gap can result in weak joints and possible premature failure.



9 Fittings are routinely pressure-tested to failure. This process helps us understand safety factors and ensures the fitting meets or exceeds ASTM standards.



10 In addition to pressure tests, fittings are also crushed under extreme pressures. ASTM requires a 25% compression in order to pass. A GF fitting will usually meet a 75% or better compression without fracture. Fittings that pass this test are considered ductile and will not fail catastrophically.



11 Although some fittings may look similar, they don't all behave the same. At GF, we often analyze and compare competitors' fittings to ours. Here is an example of a competitor's fitting during the crush test resulting in a catastrophic failure.

## Packaging and Handling



12 All manufacturing processes are constantly monitored, recorded and analyzed to make sure products are produced to the most exacting specifications. In most cases, the GF internal tolerance and safety factor requirement specifications are tighter than industry standard and ASTM tolerances.



13 All of these efforts to produce the highest quality part would be lost unless we ensure they are delivered to our customers in the same high quality condition they were produced. Unlike other manufacturers, GF wraps every lift of PVC and CPVC Schedule 80 pipe in UV resistant plastic and encloses pipe ends so it arrives clean and free of scratches.

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