Summary Table of Polyester Manufacturing, Process & Potential Chemical Use

Manufacturer	Key Process	Possible Chemical Use	Function of Chemicals
Raw chemical	-	-	-
Polymerization	Polymerization	Raw chemical	Raw materials for polymerization of polyester pallets / chips
Spinner	Extrusion	Additives	Control fiber properties for easy handling 1. Delustering agents: Control the luster of the fiber 2. Stabilizers: Stabilize polyester at high temperature 3. Colorants and pigments: Color the fibers 4. Other finishing: Provide specific features or functions at fiber level for the final product
	Pre-treatment	Spinning oil, lubricants or other chemical agents	Applied to reduce static electricity, minimize fiber breakage, and improve processing speed and yarn quality
	Spinning	Typically, no chemicals are added other than pre-treatment steps	-
	Yarn dyeing	Pre-treatment agents (e.g. detergents etc.)	Applied to prepare for the yarn dyeing process whenever necessary. For example, 1. Detergents: Cleaning and removal of impurities
		Dyes, pigments, or other colorants	Dyestuff and colorants to color the yarn
		Auxiliary agents and additives	Applied to improve or control dyeing quality, e.g. dye carrier, color fixation, color evening, maintaining optimal pH etc.
	Yarn finishing	Pre-treatment agents (e.g. detergents etc.)	Applied to prepare for the yarn finishing process whenever necessary. Mainly to remove

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			any impurities before finishing.
		Finishing	Applied to provide specific functions and features to the yarn. For example, 1. Anti-static: Provide anti-static functions for the final product 2. Anti-microbial: Provide odor control or microbial functions for the final product 3. Other finishings: Provide specific features or functions for the final product
Fabric Mill	Pre-treatment	Sizing agents, lubricants or other chemical agents	Applied to reduce friction, adding a protective layer to reduce breakage during weaving and knitting
	Knitting and weaving	Typically, no chemicals are added other than pre-treatment steps	-
	Fabric dyeing and printing	Pre-treatment agents (e.g. de-sizing, scouring agents, detergents etc.)	Applied to prepare for the fabric dyeing process whenever necessary. For examples 1. De-sizing agents: Remove the sizing agents to allow for subsequent wet processing 2. Scouring agents: Remove natural waxes, and other impurities to improve absorbency 3. Detergents: Aid removing impurities
		Dyes, pigments, or other colorants	Dyestuff and colorants to color the fabric
		Auxiliary agents and additives	Applied to improve or control dyeing quality. For example, 1. Color fixing agents: Improve color fastness and reduce color bleeding 2. Leveling agents: Ensure uniform color distribution

Manufacturer	Key Process	Possible Chemical Use	Function of Chemicals
			3. Dye carrier: Facilitate dyeing for polyester, allow dyeing at lower temperature 4. pH regulator: Maintain optimal pH value of dye bath and / or dyed fabrics 5. Washing: After treatment, remove unfixed dyes and impurities
		Printing paste / ink, solvents & other auxiliary agents	Printing agents apply to fabric for specific artwork 1. Printing paste / ink: Colorants for printing process 2. Hardener / curing agents: Facilitate curing or drying of printing paste or ink 3. Solvents: Dilute printing paste / ink, use as cleaning agents.
	Fabric finishing	Pre-treatment agents (e.g. de-sizing, detergents etc.)	Applied to prepare for the fabric finishing process whenever necessary. Mainly to remove any sizing agents and impurities before finishing.
		Finishing agents	Applied to provide specific functions and features to the fabric. For example, 1. Anti-static: Provide anti-static functions 2. Anti-microbial: Provide odor control or microbial functions 3. Water-repellent: Provide water-repellent function 4. Softener: Provide desired hand feel and reduce stiffness 5. Wicking agents: Provide wicking properties to the fabric 6. Other finishings: Provide specific features or functions

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Garment Factory	Cut & sew	Typically, no chemicals are added other than pre-treatment steps	-
	Embroidery & Applique	Typically, no chemicals are added other than pre-treatment steps	-
	Printing	Printing paste / ink, solvents & other auxiliary agents	Printing agents apply to products for specific artwork 1. Printing paste / ink: Colorants for printing process 2. Hardener / curing agents: Facilitate curing or drying of printing paste or ink 3. Solvents: Dilute printing paste / ink, use as cleaning agents.
	Garment dyeing	Pre-treatment agents	Applied to prepare for the garment dyeing process whenever necessary. For examples 1. De-sizing agents: Remove the sizing agents to allow for subsequent wet processing 2. Scouring agents: Remove natural waxes, and other impurities to improve absorbency 3. Detergents: Aid removing impurities
		Dyes, pigments, or other colorants	Dyestuff and colorants to color the fabric
		Auxiliary agents and additives	Applied to improve or control dyeing quality. For example, 1. Color fixing agents: Improve color fastness and reduce color bleeding 2. Leveling agents: Ensure uniform color distribution 3. Dye carrier: Facilitate dyeing for

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			polyester, allow dyeing at lower temperature 1. pH regulator: Maintain optimal pH value of dye bath and / or dyed fabrics 2. Washing: After treatment, remove unfixed dyes and impurities
	Garment finishing	Finishing agents	Applied to provide specific functions and features to the garment. For example, 1. Anti-static: Provide anti-static functions for the final product 2. Anti-microbial: Provide odor control or microbial functions for the final product 3. Other finishings: Provide specific features or functions for the final product
Collector, Sorter & Recycler	Sorting &	Typically, no chemicals are added	-
	Mechanical recycling	Typically, no chemicals are added for mechanical recycling process	-
	Chemical recycling*	Reagents and solvents	Depolymerize and purify polyester materials during recycling
		Catalyst or other chemicals	Facilitate the depolymerization and re-polymerization at optimal condition
	*Chemicals used in chemical recycling depend on the recycling methodology.		

The information provided is non-exhaustive and intended for general guidance only. Actual chemical usage and processes may vary significantly depending on specific manufacturing conditions, raw materials, equipment, and technological choices. Users should perform an in-depth assessment to determine appropriate chemicals and practices tailored to their unique process.