NORTH CAROLINA DEPARTMENT OF LABOR	No. 22-5
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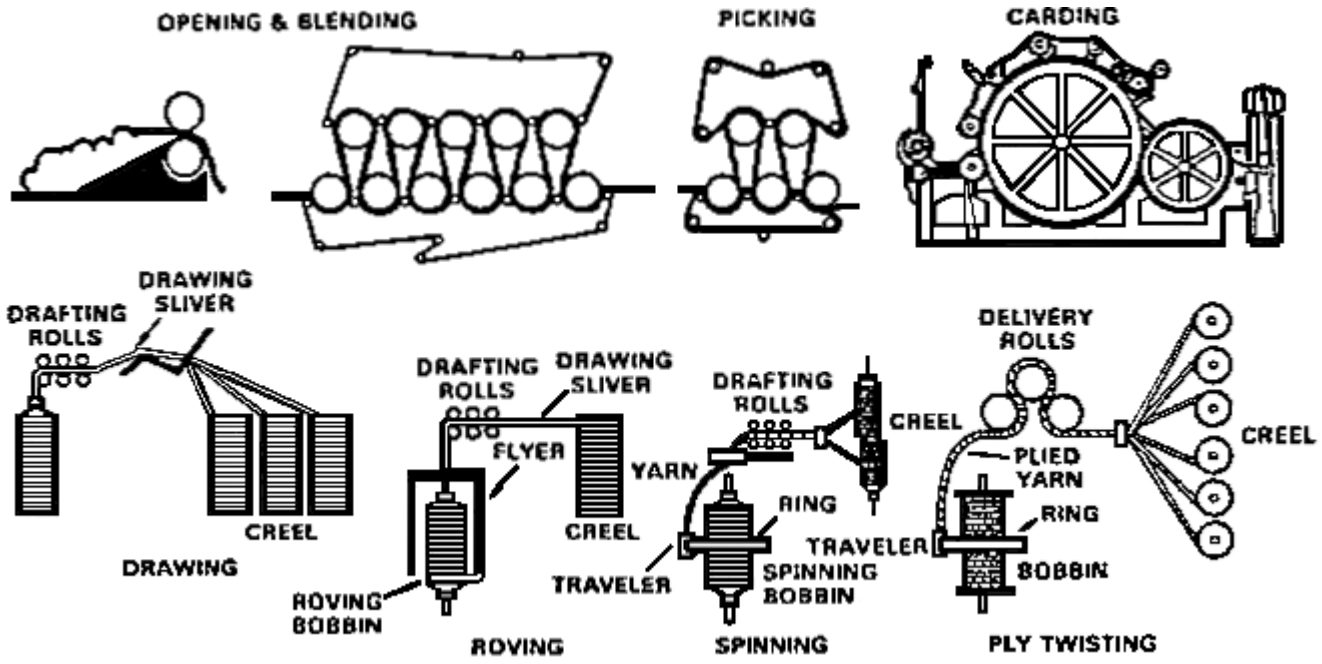
Industry: **Textile Mill Products**	Sub-Group: **Yarn and Thread Mills**
SIC: **2281, 2282 and 2284**	NAICS: **313111, 313112, 313113 and 313312**

PROCESS DESCRIPTION: Yarns composed of textile fibers include varieties such as single yarn, plied yarn, cabled yarn, cord, thread and fancy yarn. Spun yarns are usually manufactured by the cotton, woolen or worsted system. The cotton system consists of sorting and blending fibers in the 1) opening process, which further cleans the fibers and forms them into a lap; 2) carding, which refines and straightens the fibers and forms the web; 3) combing, using the card sliver for the manufacture of high-quality yarns of outstanding evenness; 4) drawing, which combines several slivers into one sliver; 5) roving, which attenuates the sliver and imparts a slight twist to the strand; and 6) spinning, which inserts the desired amount of twist. The yarn may then be further twisted (combined with other yarns) and rewound for subsequent processes.

PROCESS FLOW:



Hazards Analysis

Major Hazards			Other Hazards		
Location	**Item**	**Hazard**	**Location**	**Item**	**Hazard**
Picking, roving, spinning, winding, twisting	Noise Cotton dust	Hearing loss Byssinosis	Throughout	Flyings, lint Housekeeping	Fire hazard Slips, trips and falls
Opening, picking, carding, combing	Points of operation such as lickerins, doffers, beaters, feeders and cylinders Noise Cotton dust	Amputations and crushed limbs Hearing loss Byssinosis	Shipping and receiving	Forklifts Material handling and hoists	Carbon monoxide and accidents Back strains
Throughout	Mechanical power transmission apparatus	Amputations and crushed limbs			
Carbonization	Sulfuric acid	Skin irritation and inhalation			
Warehouse	Bales of fiber	Fall potential (400 to 800 lb. bales)			
Opening room	Removing metal bands on bales	Eye and face lacerations			
Wastehouse	Cotton dust	Byssinosis			

Key OSHNC Standards

Reference	29 CFR 1910 - General Industry Standards
ANSI-B30.6	Overhead underhung hoists
NCGS 95-129	General duty clause - ergonomics
Subpart D	Walking and working surfaces
Subpart E	Exit Routes, Emergency Action Plans, and Fire Prevention Plans

Subpart I	Personal protective
Subpart O	Machinery and machine guarding – where 1910.262 does not apply
Subpart S	Electrical
1910.95	Occupational noise exposure
1910.141	Sanitation
1910.147	Control of hazardous energy (lockout/tagout)
1910.176	Material handling – general requirements
1910.178	Powered industrial trucks
1910.262	Textile machinery
1910.1000	Air contaminants
1910.1043	Cotton dust
1910.1200	Hazard communication

Inspection Analysis

The inspection should begin in the receiving area and warehouse. Checking powered industrial trucks, walking-working surfaces and stacking. The opening, blending and picking processes must be closely checked for properly guarded machinery (power transmission apparatus, points of operation and rotating parts) and existence of cotton dust. All wiring, motors and other electrical apparatus subjected to flyings or fibers must comply with Subpart S – Electrical. Drawing frames, slubbers, roving frames, cotton combers, spinning, winding and twisting frames must be checked for interlocked gear housings (or an alternative) and the floor checked for slipping or tripping hazards next to the rotating flyers on the fly frames (slumbers, roving frames, speeders and intermediates). The shipping departments' materials handling apparatus must be checked.

Other Pertinent Comments: The picker is the primary accident-causing machine within the textile industry. The majority of the accidents associated with the picker result from either unguarded beaters and manipulation of the interlock or the removal of chokes by methods other than the one prescribed. The card, whether cotton, wool or worsted, is the second accident-causing machine with the greatest single cause of its accidents resulting from the operator reaching into a moving machine to remove fly and chokes.

The carbonization process used in the manufacture of woolen yarns involves passing the yarn through a sulfuric acid bath and applying heat which combines with the acid to burn out vegetable matter before a final rinse is used to remove the acid and carbonized matter. An acid mist may be generated if proper controls are not utilized.