

JOB TASK ANALYSIS



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THERMOPLASTIC SYSTEMS INSTALLER



NATIONAL ROOFING CONTRACTORS ASSOCIATION





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National Roofing Contractors Association
10255 W. Higgins Road, Suite 600
Rosemont, IL 60018-5607
(847) 299-9070
Fax: (847) 299-1183
Website: www.nrca.net Email: nrca@nrca.net

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Job Task Analysis for ProCertified® Thermoplastic Systems Installer Certification

Introduction

This document presents an in-depth Job Task Analysis for professionals who install thermoplastic single-ply roof membrane systems and waterproofing membrane systems. A committee of subject matter experts who have extensive experience with installing these types of membrane systems participated in developing this JTA to create the NRCA ProCertified Thermoplastic Systems Installer certification. This document also adopts applicable knowledge, skills and abilities referenced in The NRCA Roofing Manual.

Purpose and Scope

This JTA defines the general body of knowledge, skills and abilities typically performed by professional installers of thermoplastic membrane systems, including the four common thermoplastic sheet membrane subcategories: polyvinyl chloride (PVC); PVC alloys; thermoplastic polyolefin (TPO); and ketone ethylene ester (KEE) single-ply membrane systems and waterproofing membrane systems (collectively, thermoplastic membrane systems).

A JTA is a foundational document for developing all certification programs. It helps define the requirements for the assessment and credentialing of system installers. Further, it helps establish the requirements for recognizing or accrediting related training and educational programs and in developing curricula. The tasks listed in this document—or modified versions thereof—may be used by states or organizations that wish to develop requirements for education or training to qualify existing or new industry installers. This JTA is intended to be all-inclusive of the knowledge, skills, abilities and attitudes expected for any qualified installer of thermoplastic single-ply roof membrane systems and waterproofing membrane systems.

Limits and Exceptions

In general, the job tasks listed in this document are grouped into common themes, or domains, which include project safety; general work practices and communications; system materials; tools and equipment; preparation; sheet layout; membrane attachment; membrane seaming; membrane flashing; and housekeeping. Note the listed general workplace safety and general work practices and communication tasks are common to most system installations.

It is important to recognize this JTA includes specific knowledge, skills and abilities for mechanically attaching, adhering and ballasting thermoplastic single-ply membranes. Although there are many shared and common tasks, the specific knowledge, skills and abilities for installing rigid board thermal insulation are not included in this document.

This JTA also includes specific knowledge, skills and abilities for installing single-ply sheet membrane flashings. Single-ply sheet membrane flashing designs may include a variety of accessory products to help assure performance. Many of these accessories are fabricated using other materials,



including different metals, polymer membrane-coated metals, plastics and other materials. NRCA recognizes these accessories are integral components of successful membrane system design that manufacturers may require to be integrated into the system installation to meet the systems' performance requirements. However, the skill sets required for fabricators and installers of metal or polymer-clad metal components are significantly different from those of sheet membrane installers and, therefore, are not included in this JTA. They are included in other ProCertification JTA documents.

NRCA ProCertified Thermoplastic Systems Installer certification is not a license to practice nor does it supersede any licensing requirements or manufacturer's installation instructions. It is assumed NRCA ProCertified® Thermoplastic Systems Installers will comply with all applicable federal, state and local laws and regulations. The tasks listed in this JTA will not all be relevant to every installation. Rather, they are meant as a comprehensive list of all tasks that could apply depending on the scope and complexity of any given installation. It also should be noted the tasks under each subsection are not necessarily listed in a prioritized order within a topic area.

NRCA ProCertified Thermoplastic Systems Installer Examination Specifications

DOMAIN	DESCRIPTION	PERCENTAGE
1	Project safety	13%
2	General work practices and communications	7%
3	System materials	10%
4	Tools and equipment	6%
5	Materials installation	27%
6	Membrane seaming	22%
7	Flashings and accessories installation	11%
8	Job site housekeeping	4%
	Total:	100%



Job Description	Given instructions for installing a specific thermoplastic single-ply roof or waterproofing membrane system, a ProCertified Thermoplastic Systems Installer must be able to:	
DOMAIN 1	PROJECT SAFETY	13%
<i>General workplace safety</i>		
1.1	Comply with all employer's safety instructions, policies and rules	
1.2	Participate actively in discussions with supervisors (e.g., foreman, superintendent or safety director) about specific hazards likely to be found on a job site and their controls before the start of each day's work	
1.3	Ask supervisors to explain unclear safety instructions	
1.4	Notify supervisors and other crew members immediately of any unsafe work conditions discovered during construction and implement corrective actions, if feasible, to ensure safety of others.	
1.5	Recognize the specific safety regulations published by the Occupational Safety and Health Administration (OSHA) or other organizations with jurisdiction that may apply to a given job site	
<i>Specific workplace safety</i>		
1.6	Confirm fall-protection systems are set up during all construction phases	
1.7	Use and maintain fall-protection system(s) following manufacturer's and employer's policies and instructions	
1.8	Identify safety equipment and devices required to meet project requirements	
1.9	Locate safety data sheets for all materials being used on the job	
1.10	Review and implement the information provided in SDSs	
1.11	Select and wear required personal protective equipment when hazards are present	
1.12	Maintain PPE following manufacturer's instructions and employer's policies and procedures	
1.13	Determine safe and efficient roof access locations	
1.14	Select, set up and use ladders following manufacturer's and employer's instructions and policies before each day's use	
1.15	Lift, move and set materials without injuring yourself or others	
1.16	Use hand and power tools only after receiving training	
1.17	Inspect all hand and power tools and equipment for damage prior to use	
1.18	Tag and remove damaged tools or equipment from job sites and report them to supervisors and other crew members following employer's policies and instructions	
1.19	Identify work processes that could generate static electricity hazards	
DOMAIN 2	GENERAL WORK PRACTICES AND COMMUNICATIONS	7%
2.1	Define basic roofing terminology	
2.2	Perform basic roof calculations and measurements	
2.3	Accurately follow all instructions given for a projects' specification	
2.4	Ask questions to review and clarify instructions	
2.5	Review work goals, tasks and objectives with supervisor to start each day	
2.6	Remain flexible when work conditions unexpectedly change	
2.7	Participate in and contribute to problem-solving discussions	



2.8	Collaborate with other team members	
2.9	Share work experience and knowledge with others	
2.10	Arrive at job sites on time	
2.11	Express ideas about ways to improve work processes	
2.12	Respect everyone	
2.13	Actively seek feedback on one's performance	
2.14	Notify supervisors when resources are running low	
2.15	Perform all tasks with pride by achieving the high-quality standards specified for the project.	
2.16	Take personal responsibility for and report mistakes	
2.17	Continuously seek and actively participate in education and training opportunities that enhance and grow a professional career	
DOMAIN 3	SYSTEM MATERIALS	10%
3.1	Explain the function(s) of all membrane system components	
3.2	Explain the differences among types of thermoplastic membranes	
3.3	Identify and select the correct materials required for a given installation	
3.4	Identify incompatible materials and substrates	
3.5	Select and apply sealants to cut edges of reinforced membranes according to manufacturer's requirements	
3.6	Describe the effects different weather conditions may have on thermoplastic membrane installations	
3.7	Recognize and react to defective or damaged materials following employer's policies and manufacturer's recommendations	
3.8	Mix adhesives or sealants thoroughly following product manufacturer's instructions	
3.9	Use, handle and store adhesives and primers according to manufacturer's safety data sheet guidelines	
DOMAIN 4	TOOLS AND EQUIPMENT	6%
4.1	Select the required tools and equipment for a given task	
4.2	Inspect tool and equipment condition before every use	
4.3	Use tools and equipment only for their intended purposes	
4.4	Only operate powered tools and equipment that you have been trained to use and follow manufacturer's instructions	
4.5	Maintain tools and equipment per manufacturer's instructions	
4.6	Select electrical extension cords to match the power requirement of a tool	
4.7	Confirm an adequate Ground Fault Circuit Interrupter-protected power source for each tool before use	
4.8	Clean tools and equipment after each use	
DOMAIN 5	MATERIALS INSTALLATION	27%
<i>General preparation</i>		
5.1	Set up and inspect all safety-related equipment and devices	
5.2	Determine the installation sequence for all required system components	
5.3	Stage and position all required materials, tools and equipment	
5.4	Inspect all materials and accessories for damage; replace as necessary	



<i>Substrate preparation</i>	
5.5	Visually inspect substrate to ensure it is reasonably smooth, clean, frost-free and dry before installing materials
5.6	Notify supervisor and other crew members immediately of any deteriorated substrate conditions discovered during construction and implement corrective actions, if feasible, to ensure safety of others
5.7	Repair substrate defects as instructed by supervisor
5.8	Ensure wood nailers, curbs, drains and other penetrations are secured in place
<i>Sheet layout</i>	
5.9	Follow a sheet layout plan
5.10	Identify roll size(s) and coverage area
5.11	Determine roll installation sequencing
5.12	Determine direction(s) to unroll membranes
5.13	Move, set and align rolls into sequenced locations
5.14	Unroll and allow membranes to relax as specified
5.15	Unroll adjoining sheets to ensure water flows over side laps and not against them
5.16	Unroll membranes and maintain specified sidelap dimension
5.17	Cut membranes without damaging underlying membranes
5.18	Unroll and cut membranes around penetrations and maintain specified sidelap dimension
5.19	Unroll and cut membranes around penetrations and provide specified membrane extensions up all vertical surfaces
5.20	Set and align membrane end laps at specified dimensions
5.21	Stagger membrane roll end laps when necessary
5.22	Fold excess membrane into inside corners following manufacturer's recommendations
5.23	Apply temporary ballast to maintain sheet alignment
5.24	Install temporary night seals at all vulnerable membrane edges following manufacturer's recommendations at the end of each day's work
<i>Membrane attachment—loose-laid ballasted systems</i>	
5.25	Review and identify the ballast type(s), locations, loading, application rates and sequence with supervisor
5.26	Attach field membrane at all perimeter, penetration and slope change locations
5.27	Install membrane protection layers following manufacturer's requirements
5.28	Safely operate and use special equipment to spread ballast at the specified rate of coverage
5.29	Set and install paver pedestal systems
5.30	Safely cut and install concrete pavers
<i>Membrane attachment—mechanically attached systems</i>	
5.31	Select the specified fastener types and lengths, plates or bars and tools and equipment requirements
5.32	Inspect the underside of substrates and/or structural decks for the presence of utility piping or conduits; mark substrate surface to ensure fasteners avoid contact with them



5.33	Install all fasteners, plates and bars following the specified distances, patterns or grid instructions in the sheet or insulation layout plan
5.34	Ensure fasteners, plates and bars when placed in membrane side laps are at specified locations within the seam
5.35	Drive all fasteners straight, true and to specified depths without overdriving or underdriving
5.36	Immediately remove, relocate and replace any faulty fastening attempts
5.37	Safely operate and use heat-induction welding equipment
5.38	Adjust heat-induction welding equipment to accommodate ambient weather conditions and roof slope
5.39	Weld membrane to coated heat-induction fastener plates fully without overheating
5.40	Frequently clean and maintain contact surface of heat-induction welding equipment
Membrane attachment—adhered systems	
5.41	Select the primers, adhesives, materials, tools and equipment required for the specified application method
5.42	Set, align, cut and place membranes in position and in manageable sizes before applying or activating adhesives (dry set)
5.43	Fold back dry-set membranes and secure with temporary ballast to hold in place and avoid movement and to facilitate adhesive application or removal of release films
5.44	Apply required primers to substrate surfaces following manufacturer’s recommended rate of coverage
5.45	Apply membrane adhesives to substrate and/or membrane surfaces following manufacturer’s recommended rate of coverage
5.46	Apply hot bitumen adhesives following manufacturer’s guidelines, instructions and specified temperature
5.47	Continuously remove release film from the folded-back side of self-adhering membranes without tearing the film (this task does not apply to factory-applied sidelap adhesive release films—see <i>Membrane Seaming</i> domain)
5.48	Fold in and set membrane in place within the manufacturer’s recommended adhesive set or drying times and without creases, wrinkles, voids, bubbles or blisters
5.49	Immediately broom membrane surface to smooth any creases, wrinkles, voids, bubbles or blisters
5.50	Immediately roll entire membrane surface with a roller of specified size and/or weight to help ensure full contact between membrane and adhesives
DOMAIN 6	MEMBRANE SEAMING 22%
6.1	Select, inspect and set up all tools, materials and equipment required to meet manufacturer’s seaming instructions and specifications
6.2	Ensure all membrane seams remain clean, dry and free of dust, dirt or other contaminants
6.3	Trim corners of underlying membrane corner at T-joints as directed by manufacturer
6.4	Operate and use handheld hot-air welding equipment, including making adjustments that achieve appropriate welding temperatures for site conditions and result in seams welded according to manufacturer’s specifications



6.5	Correctly use seam rollers to eliminate buckles, ridges, bubbles or voids and ensure seams are welded according to manufacturer's specifications
6.6	Operate and use robotic hot-air welding equipment, including making adjustments that achieve appropriate welding speed and temperatures for membrane type and site conditions and result in seams welded according to manufacturer's specifications
6.7	Closely inspect hot-air welded seams for cold-weld areas, voids or gaps using a recommended seam probing tool—without scratching or scoring membranes—and immediately repair deficiencies with handheld hot-air welding equipment
6.8	Hot-air weld T-joint cover patches where required by manufacturer
6.9	Determine required locations for self-adhering seam cover strips and apply where required by manufacturer
6.10	Determine required locations for seam sealants and apply where required by manufacturer
6.11	Continuously remove release film from membrane side laps that use factory-applied seam adhesives without tearing and immediately roll seams to eliminate buckles, ridges, bubbles or voids
DOMAIN 7	FLASHINGS AND ACCESSORIES INSTALLATION 11%
7.1	Identify all components of a specific flashing detail
7.2	Explain the function(s) of all flashing detail components
7.3	Stage and position all required flashing materials, tools and equipment
7.4	Determine the installation sequence for all required flashing accessories
7.5	Recognize inadequate distances between roof drains, curbs, parapet walls and other penetrations
7.6	Install membrane base flashings on all vertical walls and curbs
7.7	Install membrane flashings at raised perimeter edges
7.8	Install membrane flashings with all embedded metal details
7.9	Install membrane flashings with all membrane-coated edge metal details
7.10	Install membrane flashings at all sheet metal and plumbing vent stacks
7.11	Install membrane flashings and associated penetration pockets
7.12	Install membrane flashings at all roof drains
7.13	Install membrane base flashings at all through-wall and overflow scuppers
7.14	Install all types of membrane base flashing fasteners at correct spacings
7.15	Install all types of sealants and caulks used in flashing detail applications
DOMAIN 8	JOB SITE HOUSEKEEPING 4%
8.1	Maintain a high level of cleanliness of substrates, membrane seams and surfaces
8.2	Continuously remove all kinds of construction waste and debris from all rooftop surfaces, curbs, HVAC equipment, skylights or other surfaces during and after daily work
8.3	Immediately clean spills of adhesives, solvents or chemicals from membrane surfaces
8.4	Maintain roof drainage systems clear of any materials or debris that may block drainage
8.5	Wear and maintain clean footwear on all membrane surfaces



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8.6	Ensure sharp-edged materials, fasteners, tools and equipment do not cut, puncture or scrape finished membrane surfaces
8.7	Ensure every completed roofing project is left clean and free of scrap, waste materials or other debris
8.8	Protect all finished membrane surfaces from damage, dirt and other construction debris throughout a project's duration
8.9	Immediately mark and repair any physical damage that may occur to newly installed membranes following manufacturer's guidelines