Refrigerated Dryers

Phase 5

Phase 5 Overview

Real Work. *Real Thinking.*

Congratulations on reaching Phase 5 of the Department of Real Work (DRW) training program. This phase is intended for certified technicians who are ready to take the next step in their development through a Refrigerated Dryer curriculum.

Most of this curriculum is self-paced, but there are instructor-led, hands-on sessions that will need to be scheduled in your local shop. These sessions should be led by an experienced technician who is skilled in refrigeration work, including brazing, soldering, refrigerant recovery, charging, and system troubleshooting.

In this phase, you'll build upon the knowledge gained in Phases 1–4 as you develop a deeper understanding of refrigerated dryers & refrigeration systems. You will learn how components function, how heat moves through a system, and how to apply that knowledge when troubleshooting equipment in the field.

In addition to technical knowledge, you will develop hands-on skills in brazing, soldering, leak testing, refrigerant recovery, evacuation, charging, and system repair. Success in this phase requires active participation in both the self-paced and instructor-led portions of the curriculum, with a focus on understanding not only what to do, but why it is done and how it affects overall system performance.

At the end of this program, you will be prepared to troubleshoot and repair basic refrigerated dryers, safely handle refrigerants and refrigeration equipment, successfully complete the Phase 5 Final Practical Examination, and obtain your EPA certification.

Learning Block Structure

There'll be 9 Learning Blocks, each following a consistent structure designed to build technical knowledge, critical thinking, and real-world troubleshooting skills.

Success in Phase 5 requires more than completing assignments. Focus on understanding system behavior, thinking through problems methodically & developing the confidence to evaluate + solve real-world issues.

Absorb

Part 1

This is where you absorb the material. Learning resources may include LMS courses, training manuals, Tech Direct articles, videos, and other technical resources. During this stage, focus on understanding the concepts, taking notes, and identifying questions that arise as you work through the material.

Articulate

Part 2

This is where you process and apply what you have learned. Each Learning Block contains technical questions designed to help you explain key concepts, system relationships, and troubleshooting considerations in your own words. Focus on demonstrating why the information is important and how it applies in the field.

Master

Part 3

This is where knowledge becomes application. Mastery consists of scenario-based field evaluations designed to strengthen your troubleshooting process and technical judgment, or instructor-led hands-on skill development activities where you practice and apply the skills learned throughout the curriculum.

Block Progress Tracker

Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8	Block 9
☐	☐	☐	☐	☐	☐	☐	☐	☐
Heat Transfer & System Fundamentals	Components & Control Devices	System Relation & Field Application	Intro to Brazing & Soldering	Dissimilar Metals	Refrigerant	EPA Certification	Final Hands-On Session	Final Phase Test

Block Tracker

Name: _____ **Phase Start Date:** _____

DRW

Refrigerated Dryers — page 2

Phase 5

Review Topics

Refrigeration Fundamentals

- ☐ Heat Transfer
- ☐ Sensible & Latent Heat
- ☐ Refrigeration Cycle
- ☐ BTU Concepts
- ☐ Superheat
- ☐ Subcooling
- ☐ P-T Charts
- ☐ Saturated Temperature

Components & Controls

- ☐ Compressors
- ☐ TXVs
- ☐ Capillary Tubes
- ☐ HPCO / LPCO
- ☐ Fan Cycling Controls
- ☐ Liquid Line Solenoids
- ☐ Glycol Pumps
- ☐ Condensate Drains

Service & Field Application

- ☐ Troubleshooting Methodology
- ☐ Refrigerant Recovery
- ☐ Vacuum Procedures
- ☐ Refrigerant Charging
- ☐ Leak Testing
- ☐ Nitrogen Purging
- ☐ Brazing & Soldering
- ☐ EPA Requirements

Program Expectations:

Technicians are expected to complete all assigned Learning Blocks, participate in instructor-led training sessions, complete hands-on exercise , and demonstrate an understanding of both the technical concepts and practical skills presented throughout the curriculum.

1.

EPA Certification Requirement:

Successful completion of Phase 5 requires obtaining **EPA 608 Certification** Technicians are responsible for completing the required study materials, practice examinations, and certification testing associated with ***Block 7.***

2.

Final Practical Examination:

Upon completion of all Blocks, you'll participate in a practical evaluation covering refrigerant recovery, pressure testing, charging, brazing, soldering, and troubleshooting. You must demonstrate technical knowledge and hands-on competency to successfully complete Phase 5.

3.

Requirements

Phase 5 Completion Reqs.

Real Work, Real Thinking —

Real Competence.

To successfully complete Phase 5, technicians must:

- ☐ **Complete all 9 Learning Blocks**
- ☐ **Complete all Absorb, Articulate & Master assignments**
- ☐ **Participate in all req'd instructor-led training sessions**
- ☐ **Demonstrate proficiency in brazing & soldering**
- ☐ **Pass the EPA 608 Certification Examination**
- ☐ **Successfully complete Phase 5 Final Practical Exam**

Name: _____ **Phase Start Date:** _____

DRW

Heat Transfer & System Fundamentals

Phase 5 BLOCK 1

Phase 5 — Block 1 Overview

Block 1 introduces the refrigeration principles that form the foundation of refrigerated dryer operation and troubleshooting. You'll develop an understanding of how heat moves through a refrigeration system, how refrigerants change state, and how pressure + temperature relationships are used to evaluate system performance. The concepts presented in this block serve as the basis for all subsequent refrigeration diagnostics, service procedures & troubleshooting activities throughout Phase 5.

Block Completion Requirements

For Block 1, complete all requirements listed below. Assigned *Absorb* resources can be accessed through the learning platform. Contact your mentor or supervisor if you need assistance with any topic or requirement.

1. ☐ **Review all *Absorb* resources**
2. ☐ **Complete all Articulate questions**
3. ☐ **Complete the Mastery Evaluation**

Absorb Resources

Refer to the DRW Learning Block online for the complete list of assigned resources for this block. Topics to review include:

AST580 TRAINING MATLS.

- Refrigeration Basics
- Refrigeration Components
- Refrigeration Analysis

SUPPLEMENTAL

- AST580 Prework Manual
- Refrigeration Videos
- Tech Direct Articles
- Manufacturer Resources

LMS REFRIGERATION

- Refrigeration Heat Cycle
- Refrigeration Components
- Refrigerant Analysis

Resources

Key Competencies

By completion of this Learning Block, technicians should demonstrate competency in:

- ☐ Heat Transfer Principles
- ☐ Sensible and Latent Heat
- ☐ BTU Fundamentals
- ☐ Refrigeration Cycle Operation
- ☐ Refrigerant State Changes
- ☐ Evaporator Function
- ☐ Condenser Function
- ☐ Pressure-Temperature Relationships
- ☐ Saturated Temperature
- ☐ P-T Chart Interpretation
- ☐ Superheat Fundamentals
- ☐ Subcooling Fundamentals
- ☐ TXV Operation
- ☐ TXV Sensing Bulb Function
- ☐ Refr. System Performance Evaluation
- ☐ System Heat Flow
- ☐ Glycol Circuit Verification
- ☐ Refrigerated Dryer Troubleshooting

Competencies

Name: _____ **Phase Start Date:** _____

DRW

Components & Control Devices

Phase 5 BLOCK 2

Phase 5 — Block 2 Overview

Learning Block 2 builds upon refrigeration fundamentals by introducing the components, controls, and metering devices that regulate refrigeration system operation. Technicians will learn how refrigerant flow is controlled, how system protection devices safeguard equipment, and how various control strategies influence dryer performance. By understanding the purpose and operation of these components, technicians will be better prepared to diagnose system faults, interpret operating conditions, and make informed troubleshooting decisions in the field.

Block Completion Requirements

For Block 2, complete all requirements listed below. Assigned *Absorb* resources can be accessed through the learning platform. Contact your mentor or supervisor if you need assistance with any topic or requirement.

1. ☐ **Review all *Absorb* resources**
2. ☐ **Complete all *Articulate* questions**
3. ☐ **Complete the *Mastery* Evaluation**

Absorb Resources

Refer to the DRW Learning Block online for the complete list of assigned resources for this block. Topics to review include:

AST580 TRAINING MATLS.

- Air & Refrigerant Flow
- NVC Heat Exchange Diagrams
- **Valves, Switches, Pumps & Metering Devices**

SUPPLEMENTAL

- Refrigeration Videos
- Tech Direct Articles
- Manufacturer Resources
- Control Device Op. & Troubleshooting Resources

DRYERS AT A GLANCE

- Refr. Dryer Op. & Components
- System Configurations

Resources

Key Competencies

By completion of this Learning Block, technicians should demonstrate competency in:

- ☐ Refrigeration Component Identification
- ☐ Refrigeration Component Functions
- ☐ Refrigerant Flow Control
- ☐ Thermostatic Expansion Valve (TXV) Op.
- ☐ Capillary Tube Operation
- ☐ Fixed vs. Modulating Metering Devices
- ☐ Refr. Dryer Diagnostic Methodology
- ☐ Superheat Application & Relevance
- ☐ High Pressure Cutout (HPCO) Operation
- ☐ Low Pressure Cutout (LPCO) Operation
- ☐ System Protection Strategies
- ☐ Fan Cycling Switch Operation
- ☐ Liquid Line Solenoid Operation
- ☐ Glycol Pump Function & Diagnostics
- ☐ Hot Gas Bypass Valve Operation
- ☐ Condensate Drain Systems
- ☐ Refrigeration Control Logic
- ☐ Alarm Recognition & Interpretation
- ☐ Component-Based Troubleshooting

Competencies

Name: _____ **Phase Start Date:** _____

DRW

System Relationships & Field Application

Phase 5 BLOCK 3

Phase 5 — Block 3 Overview

Learning Block 3 focuses on the relationships between pressure, temperature, phase change, and overall refrigeration system performance. Technicians will learn how to interpret P-T charts, evaluate saturated temperature conditions, and understand how refrigeration system readings relate to real-world operation.

Building upon the concepts introduced in Blocks 1 and 2, this Learning Block emphasizes diagnostic thinking and the ability to connect system measurements, component behavior, and field symptoms to accurately troubleshoot refrigerated dryer performance issues.

Block Completion Requirements

For Block 3, complete all requirements listed below. Assigned *Absorb* resources can be accessed through the learning platform. Contact your mentor or supervisor if you need assistance with any topic or requirement.

1. ☐ **Review all *Absorb* resources**
2. ☐ **Complete all Articulate questions**
3. ☐ **Complete the Mastery Evaluation**

Absorb Resources

Refer to the DRW Learning Block online for the complete list of assigned resources for this block. Topics to review include:

AST580 TRAINING MATLS.

- Dryers at a Glance
- Alarm Lists
- DPC Controller Operation
- Refr. Troubleshooting

SUPPLEMENTAL

- Refr. Dryer Alarm Interpretation
- Controller Operation References
- Manufacturer Resources
- Real-World Troubleshooting

SYSTEM PERFORMANCE

- Pressure-Temp. Relationships
- Saturated Temperature Concepts
- Refrigeration System Diagnostics

Resources

Key Competencies

By completion of this Learning Block, technicians should demonstrate competency in:

- ☐ Saturated Temperature Fundamentals
- ☐ Pressure-Temperature Relationships
- ☐ P-T Chart Interpretation
- ☐ Refrigerant Phase Change Analysis
- ☐ Refr. System Performance Evaluation
- ☐ Refrigeration System Diagnostics
- ☐ Alarm Recognition & Interpretation
- ☐ DPC Controller Operation
- ☐ Suction Pressure Evaluation
- ☐ Discharge Pressure Evaluation
- ☐ Superheat Interpretation
- ☐ Subcooling Interpretation
- ☐ Refrigeration Component Interaction
- ☐ Field Symptom Analysis
- ☐ Root Cause Identification
- ☐ High Pressure Condition Diagnostics
- ☐ Refr. Dryer Troubleshooting Methodology
- ☐ Real-World System Evaluation

Competencies

Name: _____ **Phase Start Date:** _____

DRW

Intro to Brazing and Soldering

Phase 5 BLOCK 4

Phase 5 — Block 4 Overview

Block 4 introduces the foundational brazing and soldering techniques used throughout refrigeration system service and repair. You'll develop an understanding of flame control, capillary action, joint preparation, nitrogen purging, and proper material selection. The concepts and skills presented in this block serve as the foundation for safe tubing installation, component replacement, and refrigeration piping procedures throughout Phase 5.

Block Completion Requirements

Access *Absorb* resources through DRW platform & contact a mentor/supervisor for topic assistance. This Mastery is instructor-led + must be completed with a Senior/Master Technician with extensive refrigeration systems experience.

1. ☐ Review all *Absorb* resources
2. ☐ Complete all *Articulate* questions
3. ☐ Complete the **Instructor-led** *Mastery*

Absorb Resources

Refer to the DRW Learning Block online for the complete list of assigned resources for this block. Topics to review include:

REFR. SERVICE SKILLS

- Brazing Fundamentals
- Soldering Fundamentals
- Capillary Action
- Joint Prep & Materials Selection

SUPPLEMENTAL

- Assigned Videos
- Brazing Demonstrations
- Nitrogen Purging
- Flame Control & Torch Op.

AST580 TRAINING MATLS.

- Westchester Braze Training PowerPoint

Resources

Key Competencies

By completion of this Learning Block, technicians should demonstrate competency in:

- ☐ Flame Safety & PPE Requirements
- ☐ Torch Operation & Flame Types
- ☐ Capillary Action Principles
- ☐ Copper Tubing Preparation
- ☐ Brazing + Soldering Fundamentals
- ☐ Filler Metals & Flux Selection
- ☐ Copper-to-Copper Connections
- ☐ Dissimilar Metal Connections
- ☐ Nitrogen Purging Practices
- ☐ Component Protection Techniques
- ☐ Overheating Prevention
- ☐ Joint Quality & Safe Piping Practices

Competencies

Mastery

Instructor-Led Skills Session
Copper Brazing and Soldering

*Complete **Assessment Tasks** with an instructor, then return to DRW platform to document:*

- **Safety** — Review flame safety, PPE requirements, and firewatch responsibilities.
- **Preparation** — Clean + prepare copper tubing + fittings for brazing and soldering.
- **Materials** — Identify the purpose and proper use of flux, solder, and brazing rods.
- **Torches** — Demonstrate torch operation and identify common flame types.
- **Practice** — Complete 4 brazing + soldering exercises using copper tubing + fittings.
- **Development** — Discuss best practices for cont. safe practice + skill improvement.

Name: _____ **Phase Start Date:** _____

DRW

Brazing and Soldering of Dissimilar Metals

Phase 5 BLOCK 5

Phase 5 — Block 5 Overview

Block 5 builds upon brazing + soldering fundamentals by focusing on dissimilar metal connections commonly found in refrigeration systems. You'll develop an understanding of proper material selection, component protection, overheating prevention, and nitrogen purging techniques. The concepts and skills presented in this block support safe refrigeration piping repairs, component replacement, and field service procedures throughout Phase 5.

Block Completion Requirements

Access *Absorb* resources through DRW platform & contact a mentor/supervisor for topic assistance. This Mastery is instructor-led + must be completed with a Senior/Master Technician with extensive refrigeration systems experience.

1. ☐ Review all *Absorb* resources
2. ☐ Complete all *Articulate* questions
3. ☐ Complete the **Instructor-led** *Mastery*

Absorb Resources

Refer to the DRW Learning Block online for the complete list of assigned resources for this block. Topics to review include:

ASSIGNED VIDEOS

- Brazing with Dissimilar Metals

TECH DIRECT ARTICLES

- Brazing Techniques w/Copper Tube
- Proper Brazing Procedure

REFR. SERVICE SKILLS

- Dissimilar Metal Brazing

Resources

Key Competencies

By completion of this Learning Block, technicians should demonstrate competency in:

- ☐ Dissimilar Metal Brazing
- ☐ Material Selection & Compatibility
- ☐ Brazing Rod Selection
- ☐ Flux Selection & Application
- ☐ Copper-to-Copper Connections
- ☐ Dissimilar Metal Connections
- ☐ Nitrogen Purging Practices
- ☐ Component Protection Techniques
- ☐ Overheating Prevention
- ☐ Joint Inspection & Quality Verification
- ☐ Brazing vs. Soldering Applications
- ☐ Safe Refrigeration Piping Practices

Competencies

Mastery

Instructor-Led Skills Session
Brazing and Soldering of Dissimilar Metals

*Complete **Assessment Tasks** with an instructor, then return to DRW platform to document:*

- **Safety** — Review flame safety, PPE, firewatch duties + safe handling of brazing equip.
- **Preparation** — Clean + prep tubing + fittings for soldering + brazing applications.
- **Materials** — Identify proper solder, brazing rods, fluxes + fillers for copper-to-copper & dissimilar metal joints.
- **Nitrogen Purging** — Demonstrate proper nitrogen purge setup + explain its purpose during brazing.
- **Practice** — Complete (3) soldering and brazing exercises involving dissimilar metal connections.
- **Development** — Discuss overheating prevention, component protection & skill development.

Name: _____ **Phase Start Date:** _____

DRW

Refrigerant

Phase 5 BLOCK 6

Phase 5 — Block 6 Overview

Block 6 introduces the refrigerant service procedures used to safely recover, test, evacuate, and charge refrigeration systems. You'll develop an understanding of refrigerant types, A2L safety, leak detection, pressure testing, and the proper use of recovery machines, vacuum pumps, gauges, and charging equipment. The concepts and skills presented in this block support safe refrigeration service, system repairs, and field diagnostics throughout Phase 5.

Block Completion Requirements

Access *Absorb* resources through DRW platform & contact a mentor/supervisor for topic assistance. This Mastery is instructor-led + must be completed with a Senior/Master Technician with extensive refrigeration systems experience.

1. ☐ Review all *Absorb* resources
2. ☐ Complete all *Articulate* questions
3. ☐ Complete the **Instructor-led** *Mastery*

Absorb Resources

Refer to the DRW Learning Block online for the complete list of assigned resources for this block. Topics to review include:

REFR. SERVICE SKILLS

- Refrigerant Recovery
- Leak Detection & Pressure Testing
- Vacuum & Evacuation Procedures
- Refrigerant Charging

LMS REFRIGERATION

- A2L Safety
- Refrigerant Fundamentals
- Refrigerant Service Procedures

SUPPLEMENTAL

- Service Equipment Training
- Tech Direct Articles
- Manufacturer Resources

Resources

Key Competencies

By completion of this Learning Block, technicians should demonstrate competency in:

- ☐ Refrigerant Types & Applications
- ☐ A2L Safety Fundamentals
- ☐ Refrigerant Recovery Procedures
- ☐ Recovery Machine Operation
- ☐ Manifold Gauge Operation
- ☐ Pressure Testing with Nitrogen
- ☐ Leak Detection Techniques
- ☐ Vacuum Pump Operation
- ☐ System Evacuation Procedures
- ☐ Refrigerant Charging Procedures
- ☐ Refrigerant Scale Usage
- ☐ Refr. Documentation & Best Practices

Competencies

Mastery

Instructor-Led Skills Session

Refrigerant: Recovery, Pressure Testing, Vacuum & Charging

*Complete **Assessment Tasks** with an instructor, then return to DRW platform to document:*

- Refrigerant Fundamentals – Discuss refrigerant types, industry transitions, A2L refrigerants + key safety considerations.
- Recovery Procedures – Demonstrate refrigerant recovery, equipment operation, and proper documentation.
- Pressure Testing & Leak Detection – Show proper use of nitrogen regulators, tanks, valves + leak detection procedures.
- Vacuum Procedures – Show proper vacuum pump setup, evacuation procedures + explain purpose of system evacuation.
- Charging Procedures – Demonstrate proper refrigerant charging techniques using scales and charging equipment.
- Safety & Best Practices – Discuss equipment monitoring, unattended operation, and safe refrigerant handling.
- Hands-On Practice – Perform recovery, pressure testing, evacuation, and charging procedures under instructor guidance.

Name: _____ **Phase Start Date:** _____

DRW

EPA Certification

Phase 5 BLOCK 7

Phase 5 — Block 7 Overview

Block 7 prepares technicians to earn their EPA 608 Certification by building an understanding of refrigerant regulations, safe refrigerant handling practices, and certification requirements. Through guided learning resources, practice exams, and final certification, the Technician will develop the knowledge required to safely service refrigeration systems while remaining compliant with EPA regulations. Once the exam is successfully completesd, be sure to upload your certification to the DRW platform.

Block Completion Requirements

Access all Absorb resources through the DRW platform and complete each of the four EPA 608 Practice Tests before proceeding to the final certification exam. After successfully passing the EPA 608 Certification Exam, return to the DRW platform and upload a copy of your EPA Certification Card for Supervisor verification and documentation.

1. ☐ Review all *Absorb* resources
2. ☐ *Articulate:* Take and pass all linked EPA Practice Exams
3. ☐ Pass EPA 608 Certification Exam and upload your certification card

Absorb Resources

Refer to the DRW Learning Block online for the complete list of assigned resources for this block. Topics to review include:

ASSIGNED VIDEOS

- EPA 608 Core Prep
- EPA 608 Core Questions
- EPA 608 Type I Prep
- EPA 608 Type I Practice Test
- EPA 608 Type II Prep
- EPA 608 Type II Practice Test

LMS REFRIGERATION

- EPA 608 Core Certification Prep

EPA STUDY MATERIAL

- EPA 608 Study Book
  (available via Local Supply House)

Resources

Key Competencies

By completion of this Learning Block, technicians should demonstrate competency in:

- ☐ EPA Refrigerant Regulations
- ☐ Ozone Depletion & Envir. Responsibility
- ☐ Refrigerant Safety & Handling
- ☐ Recovery Requirements
- ☐ Leak Prevention & Compliance
- ☐ Refrigerant Cylinders & Identification
- ☐ EPA Type I Certification Topics
- ☐ EPA Type II Certification Topics
- ☐ EPA Certification Exam Readiness

Competencies

Mastery

EPA 608 Certification

*Complete the **EPA 608 Certification** process by successfully passing the certification exam through an EPA-approved testing organization.*

- Register for and complete the EPA 608 Certification Exam.
- Retain a copy of your EPA Certification Card.
- Return to the DRW platform.
- Upload your EPA Certification Card for Supervisor verification and documentation.

Name: _____ **Phase Start Date:** _____

DRW

Brazing in Tight Spaces

Phase 5 BLOCK 8

Phase 5 — Block 8 Overview

Block 8 reinforces brazing and soldering fundamentals by applying them in confined and restricted work areas commonly encountered during refrigeration service. Technicians will strengthen safe work practices, improve tool proficiency, and develop confidence performing component replacement procedures using proper refrigerant recovery, nitrogen purging, and brazing techniques.

Block Completion Requirements

Access Absorb resources through the DRW platform and continue practicing brazing and soldering techniques in tight spaces. This Mastery is instructor-led and must be completed with a Senior or Master Technician experienced in refrigeration systems.

1. ☐ Review all *Absorb* resources
2. ☐ Complete all *Articulate* questions
3. ☐ Complete the **Instructor-led** *Mastery*

Absorb Resources

Refer to the DRW Learning Block online for the complete list of assigned resources for this block. Topics to review include:

ASSIGNED VIDEOS

- Brazing & Soldering Review
- Refrigeration Practice Review

HANDS-ON PRACTICE

- Brazing and soldering in tight spaces

SAFETY DISCUSSION

- Safe brazing practices in confined or restricted work areas

Resources

Key Competencies

By completion of this Learning Block, technicians should demonstrate competency in:

- ☐ Refrigerant Recovery Procedures
- ☐ Safe Use of Refrigeration Service Tools
- ☐ Manifold Gauge Operation
- ☐ Vacuum Pump & Refr. Scale Setup
- ☐ Nitrogen Purging Techniques
- ☐ Component Removal & Replacement
- ☐ Brazing in Tight Spaces
- ☐ Safe Work Practices in Confined Areas
- ☐ Refr. System Repair Confidence

Competencies

Mastery

Instructor-Led Skills Session
Brazing in Tight Spaces

*Complete **Assessment Tasks** with an instructor, then return to DRW platform to document:*

- **Recovery** — Demonstrate proper refrigerant recovery procedures and safe refrigerant handling practices.
- **Service Equipment** — Demonstrate proper setup and operation of manifold gauges, vacuum pumps, refrigeration scales, recovery equipment, and related service tools.
- **Nitrogen Purging** — Demonstrate proper nitrogen purging techniques during component replacement.
- **Component Replacement** — Recover refrigerant, remove a component (such as a filter drier), and braze a replacement component into the system.
- **Brazing** — Demonstrate proper brazing and soldering techniques in tight or restricted work areas.
- **Practice** — Complete the component replacement exercise at least two times using real-world or training equipment.

Name: _____ **Phase Start Date:** _____

DRW