DACUM Research Chart for Pipefitter

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Duties	Tasks				
A Plan Scope of Work	A-1 Assess technical work document	A-2 Confirm job materials	A-3 Verify tooling requirements	A-4 Certify employee qualification	A.5 Request support services
B Sketch Pipe Layout	B-1 Establish critical measurements	B-2 Analyze critical measurements	B-3 Develop transferrable template drawing	B-4 Target existing details	B-5 Establish pipe assembly template
C Fabricate Braze Joints	C-1 Determine braze classi-fication (e.g., P3A, P3B)	C-2 Maintain cleanliness of pipe system components	C-3 Cut pipe square/straight (eg, blue line, FMED)	C-4* Deburr pipe ends inside/outside	C-5 Prep pipe for brazing
	C-13 Verify tube/pipe assembly	C-14 Install FMEDs for shipping	C-15**** Install ID tag		
D Fabricate Weld (SIB) Joints	D-1# Maintain cleanliness of pipe systems/ components	D-2## Cut pipe square/straight	D-3* Deburr pipe ends inside/outside	D-4 Prep pipe for joint design (e.g., fitting, component	D-5 ** Check diametrical clear-ance (e.g., socket, insert ring)
E Fabricate Mechanical Joints	E-1# Maintain cleanliness of pipe systems/ components	drawings prior to installation	E-3* Deburr pipe ends inside/outside	E-4. Prep pipe mechanical joints	E-5 Apply reference line
	E-13****Install ID tag				
F Execute Bend Process	F-1 Anneal pipe for bending (e.g., aluminum, copper)	F-2 Setup bending machine (e.g., mandrel, size, radius)	F-3 Manufacture bend detail	F-4 Perform visual QA pipe inspection	F-5 Validate tube assembly with template drawing
G Install Pipe Assembly	G-1 Verify system cleanliness	G-2 Verify TWD drawings prior to installation	G-3 Install support hangers	G-4 Tie in fabricated details (e.g., weld, braze)	G-5 Verify TWD drawings post installation
H Test Piping System	H-1 Conduct pretest brief	H-2 Inspect testing components	H-3 Establish scope of test (e.g., pressure, time)	H-4 Establish test boundaries	H-5 Setup hydro static pump (e.g., gauge relief valve)
	H-13 Submit job documentation				

A-6 Coordinate pre-job brief	A-7 Mitigate safety risks					
B-6 Confirm pipe assembly template	B-7 Deliver template to fabricator					
C-6** Check diametrical clearance (e.g., sock-et, insert ring)	C-7*** Install scribe lines	C-8 Prep fittings for brazing	C-9 Apply flux on components	C-10 Complete braze process	C-11 Clean braze joint	C-12 Inspect braze joint
D-6*** Install scribe lines	D-7 Verify back-out for socket weld	D-8 Inspect tube assembly prior to welding	D-9 Weld pipe per application	D-10 Inspect tube assembly post welding	D-11### Install FMEDs for shipping	D-12****.Install ID tag
E-6 Connect compression fittings	E-7 Assemble mechanical detail	E-8 Tighten mechanical joints	E-9 Crimp/lock pipe fitting	E-10 Verify (no)go gauge	E-11 Approve detail accuracy	E-12### Install FMEDs for shipping
F-6 Re-establish cleanliness of the pipe after bending	F-7### Install FMEDs for shipping	F-8**** Install ID tag				
G-6 Validate installation completion	G-7 Notify installation completion					
H-6 Flush piping system (e.g., hot water, oil,)	H-7 Perform hydrostatic test	H-8 Inspect joints for leaks	H-9 Restore piping system	H-10 Perform operational test	H-11 Perform QA inspection	H-12 Notify customer of completed job

General Knowledge and Skills

Asbestos handling
Basic chemistry
Basic fall protection
Basic metal knowledge
Basic reading skills
Basic rigging skills
Communication skills
Critical thinking skills
Gasket preparation
HAZMAT handling
High school graduate or GED
Mechanical ability
Mechanical flanges
Organization skills
Reading shipboard blueprints
Thread pipe
Time management skills
Valve orientation
Valve packing and seals
Writing skills

Acronyms

CAD	Computer-Aided Drafting
FMED	Foreign Material Exclusion Device
GED	General Education Diploma
HAZMAT	Hazardous Materials
ID	Identification Tag
QA	Quality Assurance
SIB	Socket, Insert, and Butt Welds
SS	Stainless Steel
TWD	Technical Work Document

Related Certifications

Back flow
Brazing
Fire watch
Freeze seal
Gas free confined space
Lok ring
Tack weld/welding

Ongoing State Water board Certifications for Utilities

Various In-House Certifications

Worker Behaviors

Able to set priorities
Adaptable
Common sense
Creative thinker
Desire to learn
Detail oriented
Flexible
Follows rules
Goal oriented
Good listener
Good work ethics
Honest
Humble
Initiative
Integrity
Positive attitude
Problem solver
Professional
Punctual
Respect
Safety conscious
Sense of humor
Tactful
Team player

Future Trends and Concerns

Alternative fuels
Applicants without experience
Change in materials
Elimination of methods, brazing, welding (due to mechanical joints)
Generation gap not getting pipefitters who stay; they leave and go into design
Hard to fill positions
Hard to find tradesman
Injuries-safety
Lack of training
Less face-to-face time (cell phones and tablets to communicate)
Management by commodities (underground cable, telephone, mechanical, and electrical)
Still welding joints on ships due to heat
Technology taking work away from pipefitters, such as
availability of pre-bent pipe thereby eliminating that knowledge from the field

Tools and Equipment

¼" OD tubing bender
¼" Pneumatic air die grinder
6-foot folding ruler
8" x 12" square
16" x 24" square
Angle finder
Angle grinder
Auto/Ford wrench
Ballpeen hammer
Band saw
Bending machine
Brazing torch
CAD Program XYZ
Carpenter ruler
C-clamp
Center punch
Chop saw
Combination square
Come along
Dividers
Drift pin
Drill and hole saw
E1-10-hex wrench
Feeler gauges
Framing square
Gasket punch/cutter
Hacksaw
Half round files
J bevel prep gauge
Micrometers
Miracle point
Non- metallic wrench
Open end wrench
Pipe scribe
Pipe threader
Pipe wrap
Pipe wrench
Plumb bob
Pneumatic cut machine
Prep gauge
Rat tail file
Ratchet cutter/tubing
Rawhide mallet
Reciprocating saw
Rotary hammer
Screw driver
Straight edge
Torpedo level
Vibro etcher
Vise
Vise Grip
Wire brush
Work bench

Supplies and Materials

Aluminum pipe
Anti-seize
Brazing flux
Calculator
Carbon steel pipe
Cast iron pipe
Copper nickel pipe (90/10, 70/30)
Copper pipe
Cress pipe (SS 304, 308, 311, 316, 321, 347, 348)
Duct tape
Ductile iron guard pipe
Emory cloth
Fastening hardware
Fill metals
Fittings
Galvanized pipe
Gasket material/O–rings
Glasses
GRP-fiberglass reinforced pipe
Leather gloves
Liquid graphite
Markers
Molycote (O-ring grease)
Monel pipe
Nickel copper pipe
Nickel pipe
Notepad
Pens
PVC glue
PVC pipe
Respirator dust mask
Safety shoes
Solder
Steel pipe
Tape cutting/grinding wheels
Teflon tape (gas and mechanical)
Titanium pipe
Transite (asbestos) pipe
Valves
Welding gloves
White/orange tape


PIPE FITTER