

ANNEX D

Recommendations for Personal and Shop Materials, Equipment and Tools

INDIVIDUAL EQUIPMENT and TOOLS

Personal protective clothing and equipment

- ☐ suitable work clothing (to match service conditions for welding process employed, must be fire resistant)
- ☐ leather jacket, cape, sleeves or apron (optional)
- ☐ leather gloves
- ☐ hightop leather safety shoes or boots (steel toed are recommended)
- ☐ welders hat or skullcap
- ☐ spectacles w/side shields (clear lens)
- ☐ burning goggles or face shield (OFC & PAC)
 - ☐ 2 ea. #5 filter plate/lens
 - ☐ 2 ea. #7 filter plate/lens
 - ☐ 4 ea. clear cover plate/lens
- ☐ noise protection (ear plugs)
- ☐ welding helmet
- ☐ welding lenses (to match helmet design)
 - ☐ 2 ea. #1 0 shaded filter plate/lens
 - ☐ 2 ea. #1 2 shaded filter plate/lens
 - ☐ 4 ea. clear cover plate/lens

Personal tools

- ☐ carbon steel wire brush
- ☐ stainless steel wire brush
- ☐ 16 ounce ball peen hammer
- ☐ soap stone

- ☐ center punch
- ☐ metal scribe
- ☐ steel dividers (radius maker, min. 6")
- ☐ handheld calculator
- ☐ measuring devices
 - ☐ steel tape measure (minimum 10')
 - ☐ combination square set
 - ☐ english/metric steel bench rule (min. 12')
- ☐ chipping hammer
- ☐ 10" mill file (half round-bastard cut)
- ☐ cold chisel (size optional)
- ☐ pliers, wrenches and clamps
 - ☐ 12" adjustable wrench
 - ☐ tank wrench (optional)
 - ☐ 10" groove or slip joint pliers
 - ☐ 6" side or diagonal cutting pliers
 - ☐ 6" needle nosed pliers
 - ☐ 10" vice grips 10" vice grip clamp
 - ☐ allen or hex wrench set (to 3/8")
- ☐ screwdrivers
 - ☐ flat head
 - ☐ phillips head
- ☐ oxyfuel friction lighter, flints and tip cleaners
- ☐ flashlight
- ☐ fillet gage

EQUIPMENT and TOOLS

- ☐ first aid kit
- ☐ eye wash station
- ☐ chemical shower
- ☐ fire extinguisher
- ☐ bench vise (medium duty)
- ☐ 4ea. 8" c-clamps
- ☐ grinders (2ea.) and accessories
 - ☐ 4", 4 1/2" or 5" right angle grinder
 - ☐ 7"/9" right angle grinder
 - ☐ 25 ea. grinding wheels (general purpose and aluminum)
- ☐ needle gun or scaler
- ☐ 1set adjustable wrenches
- ☐ 1set alien or hex wrenches (to 3/8")
- ☐ 1set screwdrivers (flat and phillips head)
- ☐ 1set vice grips
- ☐ steel topped layout or work bench (4'x8'x31" recommended)
- ☐ oxyfuel burning table with dross pan and replaceable slats (4'x8'x31" recommended)
- ☐ work area protective screens (as required)
- ☐ ventilation equipment
- ☐ electrode oven
- ☐ guided bend test jig or machine
- ☐ compressed air supply and accessories (minimum delivery 80 psi @ 8 cfm per station)
 - ☐ 1/2" compressed air hose (length optional) compressed air regulator (to match system output)
 - ☐ M/F quick couples and adaptors (to accommodate pneumatic tools or air carbon arc cutting torch)
 - ☐ hose repair kit with crimping tool
- ☐ arc welding/cutting power source(s) and accessories

Note: *Selection of a single multipurpose power source able to meet all welding needs with respect to process, method of metal transfer and materials is limited. Given this limitation, a combination of power sources may be necessary to meet entry level welder training needs.*

- ☐ shielded metal arc (minimum rating - AC/DC - constant current (CC) 300 amp @ 60%)
 - ☐ 25' 2/0 electrode cable
 - ☐ 25' 2/0 workpiece cable
 - ☐ 2/0 cable lugs and connects (to suit)
 - ☐ ground clamp (amp capacity to suit)
 - ☐ electrode holder (to 3/16" capacity)
- ☐ gas tungsten arc (minimum rating AC/DC - constant current (CC) 300 amp @ 60%)
 - ☐ high frequency control
 - ☐ gas purge control (optional)
 - ☐ remote control (optional)
 - ☐ water circulation and control (optional)
 - ☐ torch (25', amps and cooling to suit) accessory kit (to suit)
 - ☐ part repair/replacement kit (to suit)
 - ☐ flow meter(s) (argon, helium service)

- ☐ air carbon arc
(minimum rating - AC/DC - constant current (CC) 300 amp 4 60%)
 - ☐ 25' 2/0 electrode cable
 - ☐ 25' 2/0 workpiece cable
 - ☐ 2/0 cable lugs and connects (to suit)
 - ☐ ground clamp (amp capacity to suit)
 - ☐ torch (light - medium duty)
- ☐ gas metal arc (spray and short circuit)
(minimum rating - DC - constant voltage (CV or CP) 300 amp @ 100%)
 - ☐ 25' 2/0 electrode cable
 - ☐ 25' 2/0 workpiece cable
 - ☐ 2/0 cable lugs and connects (to suit)
 - ☐ ground clamp (amp capacity to suit)
 - ☐ wire feeder (to suit power supply and wire diameter)
 - ☐ gun (15', amp and cooling to suit)
 - ☐ consumable parts kit (.030 - .045)
 - ☐ parts repair/replacement kit (to suit)
 - ☐ flow meter(s) (CO₂ or mixtures Arg/Oxy, Arg/CO₂)
- ☐ flux cored arc
(minimum rating - DC - constant voltage (CV or CP) 300 amp @ 100%)
 - ☐ 25' 2/0 electrode cable
 - ☐ 25' 2/0 workpiece cable
 - ☐ 2/0 cable lugs and connects (to suit)
 - ☐ ground clamp (amp capacity to suit)
 - ☐ wire feeder (to suit power supply and wire diameter)
 - ☐ self-shielded gun (15', amp and cooling to suit)
 - ☐ gas shielded gun (15', amp and cooling to suit)
 - ☐ consumable parts kit (? - 1/16")
 - ☐ parts repair/replacement kit (to suit)
 - ☐ flow meter(s) (CO₂ or mixtures Arg/CO₂)
- ☐ plasma arc
(minimum rating DC - constant current (CC) 300 amp @ 60%)
 - ☐ torch (25', low volt, air primary and secondary)
 - ☐ consumable parts kit (to suit)
 - ☐ part repair/replacement kit (to suit)
 - ☐ air regulator (to suit)
- ☐ oxyfuel gas cutting
 - ☐ manual oxyfuel gas cutting torch and accessories
 - ☐ cutting torch (manual or combination assembly)
 - ☐ oxygen regulator (to suit system)
 - ☐ fuel gas regulator (to suit system)
 - ☐ 25' oxyfuel gas hose
 - ☐ 4 ea. (per unit) 00 - 3/0 cutting tips
 - ☐ 4 ea. (per unit) 2/0 gouging tips
 - ☐ 1 ea. (per unit) heating tip (optional)
 - ☐ consumable parts kit
 - ☐ part repair/replacement kit (to suit)
 - ☐ cylinder cart
 - ☐ tank wrench
 - ☐ friction lighter, flints and tip cleaner
- ☐ machine oxyfuel gas
 - ☐ cutting machine torch assembly (to suit)
 - ☐ drive unit (track burner)
 - ☐ rails or track
 - ☐ oxygen regulator (to suit supply)
 - ☐ fuel gas regulator (to suit supply)
 - ☐ 25' oxyfuel gas hose
 - ☐ 2 ea. (per unit) 00 - 2/0 cutting tips
 - ☐ consumable parts kit
 - ☐ part repair/replacement kit (to suit)
 - ☐ tank wrench
 - ☐ friction lighter, flints and tip cleaner
- ☐ Oxyfuel gas supply
 - ☐ oxygen supply (capacity to suit)
 - ☐ fuel gas supply (capacity and type to suit)

FABRICATION EQUIPMENT (optional)

- ☐ shear 1/4" capacity
- ☐ ironworker
- ☐ pedestal grinder
- ☐ band saw
- ☐ drill press
- ☐ crane (A-frame)
- ☐ cage, cylinder storage
- ☐ tool room, secure storage

MATERIALS

- ☐ drawings or sketches
- ☐ base metal
 - ☐ 3/8" plain carbon steel plate
 - ☐ 10 - 18 gage plain carbon steel sheet (gage size optional)
 - ☐ 10 - 18 gage stainless steel sheet (gage size optional)
 - ☐ 10 - 18 gage aluminum sheet (gage size optional)
 - ☐ useable pieces for all types material (thickness optional)
- ☐ SMAW filler metal
 - ☐ 100# 3/32" E7018
 - ☐ 100# 1/8" E7018
 - ☐ 100# 5/32" E7018
 - ☐ 100# 1/8" E6010
 - ☐ 100# 5/32" E6010
 - ☐ 100# 1/8" E6011
 - ☐ 100# 5/32" 6011
- ☐ GMAW filler metal and shielding gas
 - ☐ 14# spool (per unit) .030 E70-SX
 - ☐ 14# spool (per unit) .035 E70-SX
 - ☐ 14# spool (per unit) .045 E70-SX
 - ☐ 75% argon + 25% C02 (capacity to suit) or C02 (capacity to suit)
 - ☐ argon + 2-5% O2 (capacity to suit)
 - ☐ Anti-spatter spray or gel
- ☐ FCAW filler metal and shielding gas
 - ☐ 14# spool (per unit) .035 E71T-1
 - ☐ 14# spool (per unit) .045 E71T-1
 - ☐ 14# spool (per unit) .035 E71 T-11
 - ☐ 14# spool (per unit) .045 E71 T-11
 - ☐ C02 (capacity to suit) or 75% argon + 25% C02 (capacity to suit)
- ☐ GTAW electrodes, filler metal, and shielding gas
 - ☐ 4 pkg.. at 10 pc. ea. 1/1 6" EWTh-2
 - ☐ 4 pkg.. at 10 pc. ea. 3/32" EWTh-2
 - ☐ 4 pkg.. at 10 pc. ea. 1/8" EWTh-2
 - ☐ 4 pkg.. at 10 pc. ea. 1/1 6" EWCe-2
 - ☐ 4 pkg.. at 10 pc. ea. 3/32" EWCe-2
 - ☐ 4 pkg.. at 10 pc. ea. 1/8" EWCe-2
 - ☐ 4 pkg.. at 10 pc. ea. 1/1 6" EWP
 - ☐ 4 pkg.. at 10 pc. ea. 3/32" EWP
 - ☐ 4 pkg.. at 10 pc. ea. 1/8" EWP
 - ☐ 4 pkg.. at 10 pc. ea. 1/1 6" EWZr
 - ☐ 4 pkg.. at 10 pc. ea. 3/32" EWZr
 - ☐ 4 pkg.. at 10 pc. ea. 1/8" EWZr
 - ☐ 40# 1/16" ER70-S2 (carbon steel rod)
 - ☐ 40# 3/32" ER70-S2 (carbon steel rod)
 - ☐ 40# 1/16" ER4043 (aluminum rod)
 - ☐ 40# 3/32" ER4043 (aluminum rod)
 - ☐ 40# 1/16" ER3XX (stainless rod)
 - ☐ 40# 3/32" ER3XX (stainless rod)
 - ☐ 100% argon (capacity to suit)
- ☐ CAC-A electrodes
 - ☐ 4 boxes 1/8" DC copper clad, pointed
 - ☐ 4 boxes 5/32" DC copper clad, pointed
 - ☐ 4 boxes 1/4" DC copper clad, pointed
 - ☐ 4 boxes 3/8" DC copper clad, flat