

DACUM Research Chart for Electrical/Instrumentation Technician

DACUM Panel

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Beyond Paper

Produced by



1900 Kenny Road
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January 31 – February 1, 2008

DACUM Research Chart for Electrical/Instrumentation Technician

Duties		Tasks					
A	Perform Pre-Work Activities	A-1 Review work orders	A-2 Perform pre-job hazard analysis	A-3 Collect job documentation (e.g., manuals, drawings, history)	A-4 Coordinate repair job with operations	A-5 Obtain parts & tools	
	B	Maintain Instrumentation	B-1 ICR level transmitters	B-2 ICR pressure transmitters	B-3 ICR temperature transmitters	B-4 ICR connectivity transmitters	B-5 ICR flow transmitters
B-13 ICR gas monitors (e.g., TMX, turpentine)			B-14 ICR chlorine dioxide transmitters	B-15 ICR steam flow transmitters	B-16 ICR carbon monoxide transmitters	B-17 ICR dew point transmitters	
B-25 ICR belt scale transmitters			B-26 ICR guided wave radar transmitters	B-27 ICR level switches	B-28 ICR zero speed switches (e.g., proximity, rotary, magnetic)	B-29 ICR LVDT transmitters (e.g., slide, wire, pneumatic)	
B-37 ICR pneumatic current transducers			B-38 ICR current pneumatic transducers	B-39 ICR flow switches	B-40 ICR pressure switches	B-41 IR tubing	
B-48 IMR chemical additive systems (e.g., starch cookers, dye system polymers)			B-49 IMR refractometer	B-50 ICR radio frequency devices (e.g., analogs, discreet, I/O)			
C-1 IMR DC motor brushes			C-2 IMR DC motor ventilation fans	C-3 MR DC motor commutator	C-4 IMR DC motor tachometers	C-5 Monitor DC motor operating temperature & loads	
C-12 Perform AC motor cleaning			C-13 Monitor AC motor operating temperature & loads	C-14 Check AC motor lightning arrestor insulators	C-15 Perform AC motor rotation/phasing checks	C-16 Perform AC motor polarization index test	
C-23 Perform synchronous motor cleaning	C-24 Check synchronous motor lightning arrestor insulators	C-25 Perform synchronous motor rotation checks		C-26 Check synchronous motor bearing oil levels			
C	Maintain Electrical Motors	D-1 Perform voltage checks (e.g., fuses, overloads, control voltage)	D-2 IMR starter compartments	D-3 IMR switches (e.g., push button, selector, limit)	D-4 Verify control interlocks	D-5 Perform current checks	
		D-13 Perform vacuum bottle test	D-14 IMR disconnect switches	D-15 IMR relays (e.g., induction, timing)	D-16 IMR sheet break detector system	D-17 IMR electrical heat tape systems	
D	Maintain Electrical Control Systems	E-1 Adjust hydraulic pump pressure	E-2 Adjust hydraulic pump flow	E-3 Adjust hydraulic system pressure	E-4 Adjust hydraulic subsystem pressure	E-5 ICR hydraulic accumulators	
		E					
E	Maintain Hydraulic Control Systems						

I = Install R = Repair
 C = Calibrate M = Maintain

B-6 ICR pH transmitters	B-7 ICR consistency transmitters (e.g., blade, microwave)	B-8 ICR oxygen transmitters	B-9 ICR opacity transmitters	B-10 ICR mass flow transmitters	B-11 ICR hydrogen sulfide transmitters	B-12 ICR density transmitters
B-18 ICR residual/ORP transmitters	B-19 ICR ultrasonic transmitters	B-20 ICR nuclear transmitters (e.g., level, density)	B-21 ICR differential pressure transmitters	B-22 ICR weir transmitters	B-23 ICR load cell transmitters	B-24 ICR nuclear scale transmitter
B-30 ICR damper drivers	B-31 ICR pneumatic transmitters	B-32 ICR speed transducers	B-33 ICR pneumatic temperature transmitters	B-34 ICR brightness meters	B-35 ICR signal converters	B-36 ICR signal isolators
B-42 ICR temperature switches	B-43 ICR discreet valves (e.g., single acting, double acting)	B-44 ICR control valves (e.g., smart, electronic, servo)	B-45 ICR environmental monitoring systems (e.g., CEMS, dissolved oxygen)		B-46 ICMR fiber length analyzers	B-47 IMR edge marking units
C-6 Perform DC motor cleaning	C-7 Perform DC motor wiring/unwiring	C-8 Perform DC motor bump test	C-9 Set DC motor electrical neutral	C-10 Perform AC motor wiring/unwiring	C-11 Check AC motor insulation integrity (e.g., grounded, shorted, open)	
C-17 Install AC motor capacitors	C-18 MR brakes (e.g., electrical, mechanical)	C-19 Check synchronous motor insulation integrity (e.g., grounded, shorted, open)	C-20 Monitor synchronous motor operating temperature & loads	C-21 IMR synchronous motor slip rings & brushes	C-22 Perform synchronous motor wiring/unwiring	
C-27 Perform synchronous motor polarization index test		C-28 Install synchronous motor capacitors				
D-6 IMR AC drives	D-7 IMR wiring (e.g., termination, identification)	D-8 IMR electrical conduit	D-9 IMR electrical wire trays	D-10 IR indicator lamps	D-11 Identify external power source	D-12 IMR synchronous controls
D-18 IMR ignition equipment (e.g., flame scanners, igniters)						
E-6 Regulate hydraulic cylinder speed	E-7 Regulate hydraulic motor speed	E-8 IMR hydraulic valves (e.g., directional, relief, proportional)		E-9 Repair hydraulic leaks	E-10 Maintain heat exchangers	E-11 MR felt stretch systems

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F	Maintain Pneumatic Control Systems	F-1 MR air compressors	F-2 IMR air dryer system	F-3 Adjust pneumatic pressure	F-4 Adjust pneumatic subsystem pressure	F-5 IMR pneumatic separators
G	Maintain PLCs/DCSs	G-1 IMR PLC/DCS power supply	G-2 Replace processor back-up battery	G-3 IMC stand alone controllers	G-4 Edit PLC/DCS software program	G-5 Search PLC/DCS software program
H	Maintain Power Distribution Systems	H-1 IMR breaker panels	H-2 IMR distribution disconnect panels	H-3 Rack in/out sub breakers (e.g., ZEP, DEZEP)	H-4 Set up temporary power feeds	H-5 Set up generator feeds
I	Maintain Facility Equipment	I-1 IMR lighting (e.g., indoor, outdoor, emergency)	I-2 IMR HVAC systems (e.g., steam heaters, air handlers, air conditioning)		I-3 IMR electrical devices (e.g., switches, receptacles)	I-4 IMR gates (e.g., turnstile, security)
J	Perform Post Work Activities	J-1 Perform DEZEP	J-2 Notify operations of job status	J-3 Perform housekeeping	J-4 Finalize work history (e.g., follow-up, shift change)	
K	Continue Professional Development	K-1 Participate in vendor training	K-2 Participate in daily safety training meetings	K-3 Provide employee mentoring	K-4 Participate in advanced journeyman training (e.g., online, internet, intranet)	

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Acronyms

AC	Alternating Current
CCST	Certified Control Systems Technician
CEMS	Continuous Emissions Monitoring System
DC	Direct Current
DCS	Distributive Control System
DEZEP	Unlock Zero Energy Potential
HVAC	Heating, Ventilation, Air Conditioning (equipment)
ISA	Instrumentation System Automation (organization)
LVDT	Low Voltage Differential Transformer
MSDS	Material Safety Data Sheet
NEC	National Electrical Code
NFPA	National Fire Protection Association
ORP	Oxygen Reduction Potential
OSHA	Occupational Safety Health Administration
pH	Potential Hydrogen
PLC	Programmable Logic Controller
PPE	Personal Protective Equipment
ZEP	Zero Energy Potential

F-6 ICR pneumatic lubricators	F-7 Regulate/ repair pneumatic cylinders	F-8 Regulate/ repair pneumatic motors	F-9 IMR pneumatic valves (e.g., directional, proportional, pilot)	F-10 Repair air leaks	F-11 IMR pneumatic vibrators	F-12 IMR felt guide systems
G-6 Replace peripheral devices (e.g., mouse, keyboard, screen)	G-7 IMR PLC hardware (e.g., input, output, processor)	G-8 IMR DLS hardware (e.g., input, output, processor)	G-9 Force PLC/DCS inputs/outputs	G-10 Perform loop tuning		
H-6 IM switchgear back-up battery power	H-7 Perform preventative maintenance on distribution transformers (e.g., clean, oil test, cooling fans)		H-8 Transfer alternate power sources (e.g., tie breakers, double throw disconnects)			
I-5 MR roll-up doors	I-6 IMR fire systems	I-7 IMR paging systems	I-8 MR dock locks/levelers	I-9 MR elevators (e.g., people, freight)	I-10 MR cranes (e.g., overhead, stacker)	I-11 IMR video equipment
J-5 Process job documentation (e.g., manual, drawings, history)		J-6 Return unused parts	J-7 Replenish parts inventory			
K-5 Participate in code & regulation training	K-6 Obtain CCST certification from ISA					

General Knowledge and Skills

Problem solving skills
Electrical knowledge/skills
Mechanical knowledge/skills
Software programming knowledge/skills
Ladder logic knowledge
Instrumentation knowledge
Schematics
Communication skills (written, verbal, listening)
Job hazards
Basic chemical knowledge
Deductive reasoning skills
Plant policies and procedures

Worker Behaviors

Patient
Self motivated
Multi-tasked
Problem solver
Positive work ethic
Detail oriented
Willingness to learn
Team player
Energetic
Respectful
Able to accept constructive criticism

Alert/aware
Confident
Stress tolerant
Good communicator
Willingness to get dirty
Creative

Tools, Equipment, Supplies and Materials

Digital volt meter
Ammeter
Phase rotation checker
General hand tools
Current source
Pressure calibrator
Flow calibrator
Hart communicator
pH meter
Conductivity tester
Manometer
Bench power supply
Transmitter test stand
Megger
Hi-pot
Eductor
Nitrogen accumulator charge kit
Gas generator
Pipe threader
Benders (conduit and tubing)
Laptop/internet
Documentation (drawings, manuals)
Software (Microsoft Office, P-I, AMS, PLC software, DCS software)

Frequency generator
Decade box
Squeeze box
Dead weight tester
Temperature calibrators
Laminator
Power tools
Label maker (wire, tape, plastic)
Test gasses (hydrogen sulfide, oxygen, etc.)
Soldering iron
Fish tape
Lifts (scissor, aerial, boom)
Ladders
PPE
High voltage tools
Fork truck
Temperature bath
Oscilloscope
MSDS
Infrared temperature sensor
Infrared temperature camera

Future Trends and Concerns

Job security
Changing technology
Lack of training on new equipment
Need for continuing education (current employees)
Opportunities for advancement
Lack of performance incentives
Future job requirements
Rising health care costs
Development of new products
Lack of company community outreach
Global competition in paper market
Declining employee morale
Growth of E&I department