

NEXT ASSY: FINAL ASSY:

GENERAL NOTES:

- A. ALL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL CODES AND ORDINANCES.
- B. THE CONTRACTOR SHALL READ ALL OF THE GENERAL NOTES, SPECIFICATIONS AND PLANS AND SHALL BE RESPONSIBLE TO THEIR TRUE MEANING AND INTENT AND SHALL BE RESPONSIBLE FOR COMPLYING WITH EACH, WHEREVER TWO OR MORE SPECIFICATIONS OR PLANS AND SPECIFICATIONS MAY CONFLICT, THE MORE STRINGENT SPECIFICATION SHALL TAKE PRECEDENCE.
- C. IT IS INTENDED THAT THESE PLANS AND SPECIFICATIONS REQUIRE ALL LABOR AND MATERIAL NECESSARY AND PROPER FOR THE WORK CONTEMPLATED AND THAT THIS WORK BE COMPLETED IN ACCORDANCE WITH THESE TRUE INTENT AND PURPOSE. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER IMMEDIATELY REGARDING ANY DISCREPANCIES OR AMBIGUITIES THAT MAY EXIST IN THE PLANS AND/OR SPECIFICATIONS PRIOR TO SUBMITTING BID. THE CONSTRUCTION MANAGER AND THE ENGINEER'S INTERPRETATION THEREOF SHALL BE CONCLUSIVE.
- D. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY FIELD CHANGES MADE WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE CONSTRUCTION MANAGER.
- E. CONTRACTOR SHALL INSTALL ALL PIPING AND DUCTWORK SYSTEMS TO BEST SUIT FIELD CONDITIONS, AND COORDINATE WITH THE INSTALLATION WORK OF OTHER TRADES. THE DRAWINGS ARE DIAGNOMATIC BUT MAY BE SCALED TO DETERMINE THE APPROXIMATE LOCATION OF PIPING AND DUCTWORK. NOTIFY THE CONSTRUCTION MANAGER OF ANY DEVIATIONS FROM THESE DRAWINGS PRIOR TO FABRICATION AND/OR INSTALLATION.
- F. LOCATIONS AND DIMENSIONS OF EQUIPMENT, PIPING, AND THEIR SUPPORTS ARE SHOWN DIAGNOMATICALLY BUT MAY BE SCALED TO DETERMINE THE APPROXIMATE LOCATION OF PIPING OR DUCTWORK. ACTUAL DIMENSIONS AND LOCATIONS ARE DEPENDENT ON MATERIAL SUPPLIED BY CONTRACTORS. CONTRACTORS SHALL PROVIDE OR DETERMINE DIMENSIONS AND PROVIDE LAYOUT DRAWINGS FOR COORDINATION WITH OTHER TRADES IN ACCORDANCE WITH THE SPECIFICATIONS.
- G. DEAD LEGS OVER 6" LONG IN PIPING ARE PROHIBITED.
- H. ACCESS AROUND CABLE TRAYS SHALL BE MAINTAINED AS FOLLOWS: 24" ON EITHER SIDE, 12" ABOVE. OTHER SYSTEMS SHALL NOT BE MOUNTED TO CHANNEL SUPPORT TRAPPEZE FOR THE CABLE TRAY OR TO CABLE TRAY. SEE ELECTRICAL DRAWINGS FOR CABLE TRAY LOCATIONS.
- I. CLEAN ALL DUCTWORK IN THE SHOP PRIOR TO SHIPPING. ALL DUCTWORK SHALL BE TRANSPORTED TO THE SITE IN COVERED VANS TO ELIMINATE CONTAMINATION OR SHALL BE SEALED PRIOR TO SHIPMENT AND SHALL BE PROTECTED FROM CONTAMINATION AT THE SITE. AFTER FABRICATION, AND DURING AND AFTER INSTALLATION, SEAL SECTIONS OF OPEN DUCTWORK WITH PLASTIC SHEETING TO PREVENT THE INTRUSION OF DIRT AND DEBRIS.
- J. CONTRACTOR SHALL REMOVE RUBBISH WASTE MATERIALS ON DAILY BASIS AND PROTECT AREAS FROM DAMAGE WHICH MAY OCCUR DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE WHICH MAY OCCUR.
- K. PROVIDE VALVED DRAIN SYSTEM AT THE LOW POINTS IN EACH LIQUID PIPING SYSTEM AND A MANUAL AIR VENT IN EACH PIPING SECTION THAT CAN TRAP AIR.
- L. ALL VALVES AND OTHER PIPING SYSTEM SPECIALTIES SHALL BE LINE SIZE UNLESS OTHERWISE NOTED.
- M. ALL PIPING IS TO BE FLUSHED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS.
- N. UNIONS, BUSHINGS, TRANSITIONS AND/OR REDUCING INSERTS, ETC. NOT SHOWN ON DRAWINGS BUT REQUIRED FOR INSTALLATION, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
- O. CONTRACTOR IS RESPONSIBLE FOR FIELD ROUTING DRAIN PIPING FROM EQUIPMENT, ETC. TO THE APPROPRIATE WASTE WATER SYSTEM.
- P. WATER PIPE CONNECTIONS TO AIR HEATING AND COOLING COILS SHALL BE MADE SO THERE WILL BE COUNTER FLOW BETWEEN WATER AND AIR.
- Q. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF CEILING DIFFUSERS, REGISTERS, AND GRILLES.
- R. ALL PIPES AND DUCTS PENETRATING FIRE SEPARATIONS SHALL HAVE AN FM APPROVED FIRE RATED ASSEMBLY.
- S. ALL PIPES AND DUCTS PENETRATING FIRE SEPARATIONS SHALL HAVE UL APPROVED FIRE RATED ASSEMBLY.
- T. ALL WORK SHOWN ANYWHERE ON THE DRAWINGS IS INCLUDED, SHOULD AN ITEM (SUCH AS A VALVE) BE SHOWN ON A DETAIL OR SCHEMATIC BUT NOT ON A PLAN VIEW OR VICE VERSA, IT MUST BE PROVIDED AS THOUGH IT WERE SHOWN IN ALL PLACES ON THE DRAWINGS.
- U. THE CONTRACTOR SHALL PROVIDE REDLINE DRAWINGS IN FULL COMPLIANCE WITH SPECIFICATIONS.
- V. PROVIDE ACCESS DOORS FOR ALL ITEMS CONCEALED WITHIN BUILDING STRUCTURE WHICH REQUIRE SERVICE, INCLUDING FIRE DAMPERS AND DUCT SMOKE DETECTORS.
- W. KEEP DUCTS A MINIMUM OF 12" ABOVE CEILINGS EXCEPT FOR BRANCH DUCTS TO SERVE DIFFUSERS.
- X. DELETED.
- Y. ALL EQUIPMENT, PIPING AND DUCTWORK SHALL BE PERMANENTLY IDENTIFIED AND LABELED AS REQUIRED IN THE SPECIFICATIONS.
- Z. COORDINATE ANY BELOW SLAB WORK OR PENETRATIONS THRU CONCRETE WITH STRUCTURAL MEMBERS.
- AA. KEEP ALL PIPING TOP ELEVATIONS WHERE INDICATED AND AS REQUIRED.
- BB. WHERE MAIN PIPE SIZE IS NOT INDICATED BETWEEN BRANCH CONNECTIONS IN THE DRAWING, THE PIPE SIZE SHALL BE OF THE LARGER PRECEDING PIPE SIZE.
- CC. ALL MECHANICAL UTILITY PIPING AND DUCTWORK SHALL BE INSTALLED TO 5'-0" BEYOND THE NORMAL ENVELOPE OF THE BUILDING OR AS SHOWN ON DRAWINGS.
- DD. ALL UNDERGROUND MECHANICAL UTILITY PIPING AND DUCTWORK SHALL HAVE A MINIMUM OF 3'-0" OF COMPACTED EARTH COVER.
- EE. ALL PROCESS WASTE PIPING FLOWING BY GRAVITY SHALL HAVE A MINIMUM SLOPE OF ONE PERCENT, AS NOTED ON DRAWINGS.
- FF. ALL MECHANICAL UTILITY SERVICES SHOWN ON THESE DRAWINGS ARE LABELED FROM LEFT TO RIGHT AND FROM TOP TO BOTTOM WHEN A GROUP OF PIPING OR DUCTWORK ARE IDENTIFIED.
- GG. DELETED!!
- HH. SITE UTILITIES DRAWINGS (UJH SERIES DRAWINGS) NORTH (N) AND EAST (E) COORDINATES REFERENCE THE SNS COORDINATE SYSTEM NAD 83 (88). THE SNS GRID ORIGIN POINT IS LOCATED AT X=10 GRID COORDINATES 14-27512.705000 AND Y=105.144070 WITH THE SNS GRID BEING ROTATED 6 DEGREES CLOCKWISE FROM THE X-Y GRID AT THAT POINT. (88) REFERS TO THE YEAR MARTIN MARIETTA ENERGY SYSTEM (MMES) ESTABLISHED G.P.S. MONUMENTS ON THE OAK RIDGE RESERVATION USING VALUES PUBLISHED IN 1988 BY THE TN DEPARTMENT OF TRANSPORTATION, WHICH TIED THE MMES G.P.S. MONUMENTS TO THE TN GEODETIC REFERENCE NETWORK SYSTEM.
- II. FINAL DUCT TIE-INS TO EQUIPMENT SHALL BE ADJUSTED TO ACCOMMODATE ACTUAL CONNECTION SIZES.
- JJ. UNLESS NOTED, ALL CONNECTIONS TO VAV INLETS WILL BE THE SAME SIZE AS THE TERMINAL BOX CONNECTION.
- KK. MAXIMUM LENGTH OF FLEX DUCT RUNOUTS SHALL NOT EXCEED 7'-0".
- LL. DELETED.
- MM. ALL THERMOMETERS AND TEMPERATURE SENSORS SHOWN IN THE CONTROLS DIAGRAMS WILL BE PROVIDED BY THE CONTROLS CONTRACTOR. UNDER THIS CONTRACT FURNISH AND INSTALL A 3/4" THREAD-0-LET AT THE APPROXIMATE LOCATIONS INDICATED. THE THREAD-0-LETS WILL BE PLUGGED IN THE FIELD TO ALLOW FOR HYDROSTATIC PRESSURE TESTING. MATERIALS FOR THE THREAD-0-LETS SHALL MATCH THE PIPING IN WHICH THEY ARE BEING INSTALLED.
- NN. ALL PRESSURE GAUGES AND PRESSURE SENSORS SHOWN IN THE CONTROLS DIAGRAMS WILL BE PROVIDED BY THE CONTROLS CONTRACTOR. UNDER THIS CONTRACT FURNISH AND INSTALL A 1/2" THREAD-0-LET AT THE APPROXIMATE LOCATIONS INDICATED. THE THREAD-0-LETS WILL BE PLUGGED IN THE FIELD TO ALLOW FOR HYDROSTATIC PRESSURE TESTING. MATERIALS FOR THE THREAD-0-LETS SHALL MATCH THE PIPING IN WHICH THEY ARE BEING INSTALLED.
- OO. PROVIDE ACCESS DOORS FOR ALL FIRE DAMPERS AND AUTOMATIC DAMPERS IN ACCORDANCE WITH MECHANICAL DETAILS.

MECHANICAL LEGEND

PLUMBING		LEGEND	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	PNEUMATIC ACTUATOR		SANITARY (POTABLE) WATER COLD
	AUTOMATIC AIR VENT		POLISHED WATER
	AIR VENT (MANUAL)		PROCESS WATER
	BACK FLOW PREVENTER		PROCESS DRAINAGE
	BALANCING FLOW CONTROL VALVE		RAIN WATER LEADER
	BALANCE VALVE / CIRCUIT SETTER VALVE		PIPE SUPPORT
	BALANCE VALVE		POINT OF CONNECTION
	BALL VALVE		ROOF DRAIN
	BUTTERFLY VALVE		ROOF DRAIN OVERFLOW
	CALIBRATED BALANCE VALVE		SIGHT GLASS
	CHECK VALVE		SOIL OR WASTE PIPE ABOVE GRADE
	FLOAT VALVE		SOIL OR WASTE PIPE BELOW GRADE
	GATE VALVE		STORM DRAIN
	GATE VALVE NORMALLY CLOSED		TOWER WATER RETURN (TECHNICAL EQ. COOLING)
	GLOBE VALVE		TOWER WATER SUPPLY (TECHNICAL EQ. COOLING)
	PRESSURE GAUGE WITH COCK		VENT
	PRESSURE REDUCING VALVE		
	PRESSURE REGULATING VALVE		
	PRESSURE RELIEF VALVE		
	PUMP SUCTION DIFFUSER		
	STRAINER WITH DRAIN VALVE		
	THREE WAY CONTROL VALVE		
	VENT THRU ROOF		
	WATER HAMMER ARRESTOR		
	CAP OR PLUG		
	CONCENTRIC REDUCER		
	CONNECTION - DOWN		
	CONNECTION - UP		
	ECCENTRIC REDUCER		
	ELBOW DOWN		
	ELBOW IN PLAN		
	ELBOW UP		
	EXPOSED CLEAN OUT		
	FLANGED JOINT		
	FLEXIBLE CONNECTION		
	FLOOR CLEAN OUT		
	FLOOR DRAIN		
	FLOOR DRAIN		
	FLOOR SINK		
	HOSE BIBB		
	HOSE CONNECTION		
	INDIRECT WASTE		
	PEET PLUG		
	QUICK DISCONNECT		

HVAC	
SYMBOL	DESCRIPTION
	START/STOP SWITCH
	LOW-LEVEL (FREEZE-PROTECTION)
	IN-DUCT THERMOSTAT
	ROOM THERMOSTAT
	TEMPERATURE SENSING ELEMENT
	TEMPERATURE TRANSMITTER
	VARIABLE FREQUENCY DRIVE
	WATER FLOW SWITCH
	POWER/INTERLOCK WIRING
	CONTROL SIGNAL CABLE
	DOOR SWITCH

HVAC - CONTROLS	
SYMBOL	DESCRIPTION
	LEVEL INDICATOR (BOILER WATER)
	CONTROLLER
	PNEUMATIC DAMPER OPERATOR
	DAMPER MOTOR
	DIFFERENTIAL PRESSURE GAUGE
	DIFFERENTIAL PRESSURE SENSOR
	END-SWITCH (POSITION DAMPER INDICATION)
	FLOW ELEMENT
	FLOW INDICATOR
	FLOW METER
	FLOW TRANSMITTER
	GEAR OPERATOR
	HAND-OFF-AUTOMATIC SWITCH
	MANUAL SWITCH
	MOTOR
	ON-OFF STATUS SIGNAL
	PRESSURE ELEMENT
	PNEUMATIC/ELECTRIC SWITCH
	POSITION SWITCH
	PRESSURE INDICATOR
	RECEIVER CONTROLLER
	RELATIVE HUMIDITY
	RESISTIVITY ELEMENT
	RESISTANCE THERMAL DEVICE
	SMOKE DETECTOR
	DUCT SMOKE DETECTOR
	START/STOP INTERFACE

HVAC - DUCTWORK & EQUIPMENT	
SYMBOL	DESCRIPTION
	CEILING FAN
	DIFFUSER / GRILLE CALLOUT CFM (CFM FUTURE)
	THROW DIRECTION TYPE AS PER SCHEDULE NECK SIZE
	CEILING (SUPPLY) DIFFUSER CAPACITY (200 CFM) NECK SIZE (8"9") OUTLET SIZE (16"x16") TYPE AS PER SCHEDULE DIRECTION OF FLOW
	CEILING (EXHAUST) GRILLE CAPACITY (400 CFM) TYPE AS PER SCHEDULE OUTLET SIZE (12"x12")
	CEILING (RETURN) REGISTER CAPACITY (500 CFM) TYPE AS PER SCHEDULE OUTLET SIZE (24"x24")
	SIDEWALL (RETURN) REGISTER CAPACITY (CFM) OUTLET SIZE (20"x20") TYPE AS PER SCHEDULE
	SIDEWALL (SUPPLY) REGISTER OUTLET SIZE (24"x12") TYPE AS PER SCHEDULE
	COMBINATION FIRE APPARATUS CABINET
	COOLING COIL
	DUCT BRANCH TAKE-OFF WITH REFERENCE TO AIR FLOW
	DUCT BRANCH WITH ADJUSTABLE EXTRACTOR
	DUCT SIZE, (WIDTHxDEPTH)
	RE-HEAT COIL (IN-DUCT)
	EXHAUST DUCT
	FINAL FILTERS

HVAC	
SYMBOL	DESCRIPTION
	FAN POWERED VAV BOX W/H.W. REHEAT COIL
	FLEXIBLE DUCT CONNECTION
	HEATING COIL
	INCLUDED DROP IN DUCT WITH REFERENCE
	INCLUDED DROP IN DUCT WITH REFERENCE
	LINEAR SLOT DIFFUSER
	MOTORIZED CONTROL DAMPER
	OPPOSED BLADE DAMPER WITH LOCK QUADRANT
	RETURN DUCT
	VAV BOX W/H.W. REHEAT COIL
	SPLITTER DAMPER
	SQUARE ELBOW WITH TURNING VANES
	SUPPLY DUCT
	THERMOSTAT WITH REHEAT BOX IDENTIFICATION
	TRANSITION FROM RECTANGULAR TO ROUND
	VOLUME DAMPER (MANUAL)
	ACOUSTICAL OR INTERIOR DUCT LINING
	AIR DUCT RETURN OR EXHAUST, SECTION
	AIR DUCT SUPPLY, SECTION
	AUTOMATIC FIRE DAMPER
	SMOKE/FIRE DAMPER
	UNIT HEATER (HORIZONTAL)
	UNIT HEATER (VERTICAL)
	DUCT SUPPORT
	"PITOT" STATIC TUBE TRAVERSE
	FIRE SCREEN, PREFILTER, TEST SECTION, HEPA FILTER, TEST SECTION
	DENOTES SAFETY CLASS (SSC). SUBSTITUTIONS FOR SSC COMPONENTS MAY NOT BE MADE WITHOUT THE PROPER AUTHORITY.
	DENOTES SAFETY SIGNIFICANT COMPONENT (SSC). SUBSTITUTIONS FOR SSC COMPONENTS MAY NOT BE MADE WITHOUT THE PROPER AUTHORITY.
	HUMIDIFIER

DRWG. NUMBER:
Knight/Jacobs Joint Venture
701 Scoville Road, MS 8253
Oak Ridge, TN 37830

M+W Zander U.S. Operations, Inc.
540 West Randolph Street
Chicago, IL 60661
Telephone: (312) 877-3200
Fax: (312) 877-3525

UT-BATTELLE
Oak Ridge National Laboratory
managed for the DEPARTMENT OF ENERGY under
U.S. GOVERNMENT contract DE-AC05-00OR22725

PROJECT NAME:
CENTER FOR NANOPHASE MATERIALS SCIENCES
MECHANICAL SYMBOLS

REVISIONS

NO.	DATE	DESCRIPTION
1	12/10/02	ISSUED FOR CONSTRUCTION

APPROVALS

DESIGNER: [Signature]
CHECKED: [Signature]
DATE: 12/10/02

REV	DATE	DESCRIPTION	DSN	CHK	DEPT	DATE	FE	DATE	PU	DATE	REQ	DATE	UTB	DATE	RPE	RPE NO	DATE	ST	CV	EC	EE	EM	IE	M	PD	SE	AR
0		CERTIFIED FOR CONSTRUCTION - 12/9/02																									

THIS DOCUMENT CONTROLLED BY
CHANGE CONTROL SYSTEM
ENGINEERING PROCEDURE

SECTION AND DETAIL KEY