VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	CONTROL DOCUMENTS	
AA01	Vendor Document Requirement Schedule	Listing of all and sub-suppliers documentation to be produced for this order. Will show standard and new drawings with schedule dates for the latter and have status/revision records as appropriate.
AA02	List of Applicable Procedures	
AB01	Baseline Schedule (Manufacturing Program)	Schedule shall list all major milestones which are necessary to monitor progress of production & major activities affecting the delivery of suppliers scope. Earliest and latest completion dates shall be entered alongside each activity together with rolled-up percentage complete to date. This shall also cover sub-suppliers.
AB02	Manufacturing program (Compression & Rotating Equipment)	Schedule shall be of a bar chart format with a time line indication showing progress to date with earliest and latest completion dates against each activity, together with a rolled up percentage completion table. Suppliers activities to be shown: 1. Design Activities 2. Placement of Sub-orders & Procurement Lead times and actual delivery 3. Delivery of Materials 4. Fabrication Stages 5. Testing 6. Witness & Inspection 7. Packing 8. ExWorks Date 9. Delivery (FOB, FAS, DDU, GTG) Schedule shall also cover sub-suppliers.
AB03	Manufacturing program (DCS)	Schedule shall be of a bar chart format with a time line indication showing progress to date with earliest and latest completion dates against each activity, together with a rolled up percentage completion table. Suppliers activities to be shown: 1. Design Activities 2. Placement of Sub-orders & Procurement Lead times and actual delivery 3. Delivery of Equipment & Panels 4. Fabrication Stages - DCS (Configuration & Staging) 5. Testing 6. Witness & Inspection 7. Packing 8. ExWorks Date 9. Delivery (FOB, FAS, DDU, GTG) Schedule shall also cover sub-supplier.
AB04	Manufacturing program (Bulk Piping)	Vendor to advise prior to place of order which piping items to be supplied in random or double random lengths, (which are not be less than 5.8 meters or 1.6 meters respectively). Schedule to be in a spreadsheet format with the following columns: 1. Piping Item Code 2. Item Size 3. Quantity Ordered 4. Quantify Random 5. Quantity Double Random Lengths 6. Description 7. Requisition No. 8. Requisition Item No. 9. Unit Price 10. Total Price 11. Supplier 12. Source 13. Delivery 14. Air Products Shipment Number
AB05	Manufacturing program (Instrument & Valve Bulk Material))	Schedule to be of a spreadsheet format, updated and supplied on a weekly basis. Data to include: 1. Purchase Order No 2. Tag Number 3. Casting Delivery Date 4. Machining Time 5. Hydrostatic Test Date 6. Actuator Delivery Date 7. Final Test Date 8. Inspection Status 9. Original Purchase Order Delivery Date 10. Current Delivery Date 11. Days Late 12. Weights & Dimensions Submitted 13. Comments

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
AB06	Design & Construction Schedule	Schedule shall be of a bar chart format with a time line indication showing progress to date with earliest and latest completion dates against each activity, together with a rolled up percentage completion table. Contractor's activities to be shown: 1. All Design Activities 2. Foundation & Buildings Design Issues For Approval 3. Preparation of Civil Works Contract Package 4. Submissions of Contract Package for Approval 5. AFC Construction Package
AB07	Reference List	Details of earlier deliveries of similar equipment.
AB08	Drawing List	
AB09	Fabrication Schedule	
AB10	Design and Manufacturing Schedule	
AB11	Customer Document Request	
AC01	Schedule of Sub-Suppliers	Schedule shall indicate all Suppliers' sub-suppliers (sub-orders, sub-contracts). Against each entry Supplier shall indicate: 1. Sub-Supplier 2. Commodity 3. Required Order Date 4. Required Delivery Date (to meet schedule) 5. Actual Order Date 6. Order No 7. Promised Delivery 8. Actual Delivery Date
AD01	List of Proposed Sub-Suppliers	List of Sub-Suppliers/contractors with their relevant commodities, addresses, telephone no, contact etc. This is to allow both procurement and engineering to review and ensure that all proposed sub-suppliers/contractors are acceptable to the project.
AE01	Un-priced Suppliers Purchase Orders	As per Description
AE02	Un-priced Sub-Suppliers Purchase Orders	As per Description
AF01	Organization Chart	
AG01	Coordination Procedures	Criteria for regulating relations between parties involved. General and unequivocal rules concerning the main aspects of project management.
AH01	Hazop Study Procedure	Description of detailed Hazard and Operability (HAZOP) Study will be conducted for the process and utility units.
AI01	Supplier Bid Data	
AI02	Supplier Equipment Quotation	
AL01	CryoMachinery CMF005 Document	
AZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	ARRANGEMENT DRAWINGS	
BA01	Equipment General Arrangements	Drawing to indicate outline of all items within the assembly, overall dimensions, location and identification of all Purchaser's connections (mechanical and electrical), unit data and dry, operating & maintenance weights, dimensions, lifting attachments, center of gravity (both "dry" and "operating"), light fittings, cable routes, cable gland plate size, location and it's distance from the associated terminal and location of earthing / grounding bars. Terminal boxes shall be shown positioned and dimensioned. Where practical, customer connections are to be listed on the drawing in schedule form, to show ratings, size, type, etc. Where temporary transportation fixings are required, access requirements shall be clearly indicated. Mounting details shall be shown clearly. Support, foundation and fixing details shall also be incorporated on this drawing. For skid mounted packages, weights of components over 1 ton and 'withdrawal' space requirements outside skid envelope for maintenance purposes, shall be identified.
BA02	General Arrangement (Train) Issue 1 (MAC/BAC)	Drawing to show: 1. Overall dimensions and relative locations of Train Module and Lube Oil skid 2. Minimum elevation of Lube Oil Rundown Tank and preliminary relative location to module 3. Preliminary layout of compressors, turbine, intercoolers, after cooler, and gland sealing system layout on module 4. Location of the following major process connections to +/-200mm: MAC inlet, MAC discharge, BAC inlet, Turbine inlet, Turbine outlet. 5. Nozzle table listing, size and ratings of above connections 6. Direction of rotation 7. Maximum maintenance weight and crane hook height. 8. Equipment maintenance withdrawal lengths. 9. Lifting lug locations 10. Erection weights 11. Space required for erection 12. Holding down bolt locations
BA03	General Arrangement (Nozzle Loads & Foundations (ACCs) Issue 1)	Drawing to show: 1. Overall dimensions and relative locations of ACC and low-level condenser manifold referenced to turbine exhaust flange centerlines 2. Estimated operating weights (to within +/-10%) and locations of centre of gravity and all point loads (to within 250mm in any direction) including condenser vacuum load, and including pipe support and access way support 3. Estimated horizontal loads (to within +/-10%) due to differential thermal expansion and points of action (to within 250mm in any direction) 4. Thermal movement of flanges etc., to which other items connect. Separate movements shall be shown and defined for normal operating and plant upset (maximum) conditions 5. Acceptable loads and moments on flanges to which other items connect, if not covered by applicable specifications 6. Nozzle tablet listing, size and ratings of connections 7. Maximum maintenance weight and crane hook height. 8. Equipment maintenance withdrawal lengths 9. Lifting lug locations 10. Erection weights 11. Space required for erection 12. Holding down bolt locations

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
BA04	General Arrangement (Nozzle Loads & Foundations (Condensate Handling) Issue 1)	Drawing to show: 1. Overall dimensions and relative locations of condensate handling equipment and support structure referenced to turbine exhaust flange centerlines, including condensate pumps, desuperheater pumps, condensate tank, ejector steam recovery condenser package and ejector vent silencer 2. Elevation for Condensate Tank, and relative elevation required for Ejector Steam Recovery Condenser 3. Estimated operating weights (to within +/-10%) and locations of centre of gravity and all point loads (to within 250mm in any direction) including condenser vacuum load, and including pipe support and access way support 4. Estimated horizontal loads (to within +/-10%) due to differential thermal expansion and points of action (to within 250mm in any direction) 5. Location of the following major process connections to +/-100mm: Condensate export, Desupherheater condensate, MP steam, Condensate tank fill 6. Thermal movement of flanges etc., to which other items connect. Separate movements shall be shown and defined for normal operating and plant upset (maximum) conditions 7. Acceptable loads and moments on flanges to which other items connect, if not covered by applicable specifications 8. Nozzle table listing, size and ratings of connections 9. Maximum maintenance weight and crane hook height. 10. Equipment maintenance withdrawal lengths 11. Lifting lug locations 12. Erection weights 13. Space required for erection 14. Holding down bolt locations
BA05	General Arrangement (Nozzle Loads & Foundations (Interconnection Duct) Issue 1 (4 weeks after last of flexibility analysis, turbine flange details, bypass valve details)	Drawing to show: 1. Overall dimensions and relative locations of all equipment referenced to turbine exhaust flange centerlines, including drain point educators, and steam bypass valve connection 2. Estimated operating weights (to within +/-10%) and locations of centre of gravity and all point loads (to within 250mm in any direction) including condenser vacuum load, and including pipe support and access way support 3. Estimated horizontal loads (to within +/-10%) due to differential thermal expansion and points of action (to within 250mm in any direction) 4. Location of the following major process connections to +/-100mm: Steam bypass valve connections (water and condensate) 5. Thermal movement of flanges etc., to which other items connect. Separate movements shall be shown and defined for normal operating and plant upset (maximum) conditions 6. Acceptable loads and moments on flanges to which other items connect, if not covered by applicable specifications 7. Nozzle table listing, size and ratings of connections 8. Maximum maintenance weight and crane hook height 9. Equipment maintenance withdrawal lengths 10. Lifting lug locations 11. Erection weights 12. Space required for erection 13. Holding down bolt locations
BA06	General Arrangement (Expander) Issue 1	Drawing to show: 1. Overall dimensions including base frame 2. Location of process and cooling water piping terminations 3. Location of process and cooling water piping terminations 4. Nozzle table giving a list of process and cooling water terminations, size & ratings 5. Allowable nozzle loads for process connections 6. Maximum maintenance weight and crane hook height 7. Equipment maintenance withdrawal lengths 8. Approximate location of all other piping nozzles
BA07	General Arrangement (Train) Issue 2 (MAC/BAC)	Drawing to incorporate Purchasers comments to issue 1 drawings and to show: 1. Machine shaft end to end lengths, coupling lengths, and shaft offsets 2. All piping routing defined for all interconnecting piping in Seller's scope of supply including MAC condensate drains, steam drains, oil lines, cooling water manifold, MAC interstage vents, MAC non-drive end bearing seal air system, BAC interstage recycle piping, and BAC seal air system. 3. Location of all piping connections fixed to +/-3mm including :Issue 1 major connections plus BAC discharge, BAC side stream, CW connections, Seal steam, Inst & seal air, & all other connections. 4. Nozzle table giving a list of all piping terminations, size and rating.

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
BA08	General Arrangement (Issue 2)	Drawing to incorporate Purchasers comments to issue 1 drawings and to show: 1. Final magnitude and point of action of all loads, including wind, condenser vacuum, pipe support for loose interconnection piping, and support for access ways 2. Holding down bolt requirements, including position and size of pockets. Grouting requirements, including extent, depth and type of grout 3. All piping routing defined for all interconnecting piping in Seller's scope of supply including drain & vent balance connections to turbine drains flash pipe 4. All pipe support types defined & located for interconnecting piping , ducting & Steam Bypass Valve Dump 5. Location of all piping connections fixed to +/-3mm including MP steam, condensate tank fill connection condensate export, desuperheating condensate, plus Instrument air, and all other connections 6. Nozzle table giving a list of all piping terminations, size and rating.
BA09	General Arrangement (Expander) Issue 2	Drawing to incorporate Purchasers comments to issue 1 and to show: 1. Location of all piping terminations 2. Nozzle table giving a list of all piping terminations, size and rating 3. Holding down bolt locations 4. Erection weight 5. Location of electrical junction boxes and cable entry points 6. Location of instrument junction boxes and cable entry points
BA10	General Arrangement (Issue 3)	Drawing to incorporate Purchasers comments to issue 2 drawings and to show approximate locations of Electrical & Instrument Junction Boxes, and earthing / grounding points.
BA11	General Arrangement (Expander) Issue 3	This drawing shall be the final issue and shall show: 1. Lifting lug locations 2. Grouting requirements 3. Details on skid piping and instrument locations
BA12	General Arrangement (Issue 4)	Drawing to incorporate Purchasers comments to issue 3 drawings and to show: 1. Confirmed locations of Electrical & Instrument Junction Boxes. 2. Instrument locations.
BA13	General Arrangement (Lube Oil Skid)	Drawing to show: 1. Overall dimensions 2. Loads 3. Location & size of hold-down bolts 4. Location of all piping terminations 5. Nozzle table listing, size and ratings of all connections 6. Location of lifting lugs 7. Equipment maintenance withdrawal lengths. 8. Erection weights 9. Location of earthing / grounding points 10. Location of electrical junction boxes and cable entry points. 11. Location of instruments 12. Location of instrument junction boxes and cable entry points.
BA14	General Arrangement (Tanks)	In accordance 4WEQ-1516 section 12
BA15	General Arrangement (Vacuum Insulated Tanks)	Drawing to show: 1. Overall dimensions 2. Location & size of hold-down bolts 3. Location of all piping terminations 4. Nozzle table listing, size and ratings of all connections 5. Location of lifting lugs 6. Erection weights 7. Location of earthing / grounding points

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
BA16	General Arrangement (Electrical)	details of: · Overall dimensions, approximate weight and preliminary fixing centers and, when applicable, shaft centre height. · Any space required for items such as access, equipment withdrawal, or ventilation. · Power, neutral, and earthing connection point locations. · When appropriate, preferred water and oil connection point locations. · Preliminary foundation loading forces (static and dynamic). Following receipt of a Purchase Order, the supplier shall submit a Preliminary General Arrangement Drawing containing as a minimum the following information: · Overall dimensions, approximate weight, fixing centers and, when appropriate, shaft center height. · Cable termination and earthing / grounding connection points and gland plates in both plan and elevation. · When appropriate, water and oil connection points. · Foundation loading forces (static and dynamic). The Final General Arrangement Drawing shall, as a minimum, contain the following information. · Final overall detailed and dimensioned plan and elevation of the equipment. · Fixing details, civil foundation details, base details, sole plates. · Equipment weights, static and dynamic foundation loadings, and lifting points. · Weights of key components (e.g., withdrawable circuit breakers, rotors, base frames and coolers). · Centre of gravity. · Dimensions of interface points, cable entries, gland plates, junction boxes, oil and water flange connections and ratings. · Any access/equipment withdrawal requirements. The following may be shown on the General Arrangement or on separate drawings: · Label drawings. · Front of panel layouts – drawing containing arrangement of front of panel equipment with approximate elevations and key to component identification references. · Back plate layouts – drawing containing arrangement of back plate mounted equipment with approximate elevations and key to component identification references. Termination Details detailing: - Main power terminal boxes internal arrangements, sizes and clearances, and full detail of ducting/cabling for purchasers main power termination arrangement. - Gland plate/gland details for power cabling or flange details for bus duct connections. - Details of auxiliary terminal boxes with terminal sizes/identification and schematic wiring arrangement to items such as RTDs heaters, switches.
BA17	General Arrangement (Vessels)	Drawing to indicate outline of all items required by 4EQ-1010 section 18.4
BA18	General Arrangement (Vessels & Internals)	General Arrangement of vessel showing assembled position of internals, support rings/brackets/clips to be provided on the vessel, and details of any support beams clearly showing whether they are supplied with the internals or are to be supplied with the vessel.
BA19	General Arrangement (Pumps)	Drawing to show: 1. Overall dimensions 2. Location & size of hold-down bolts 3. Location of all piping terminations 4. Nozzle table listing, size and ratings of all connections 5. Location of lifting lugs 6. Equipment maintenance withdrawal lengths 7. Erection weights 8. Location of motor terminal/junction boxes and cable entry points 9. Location of earthing / grounding points 10. Maximum Maintenance weight
BA20	General Arrangement (General In Line Instrument)	Overall dimensions and weights Orientation details Position and Connection sizes for any external piping and electrical connections
BA21	General Arrangement (General Instruments)	Overall dimensions and weights Position and Connection sizes for any external piping and electrical connections Mounting Details

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
BA22	Site Layout / Arrangement Drawings (Plant wide)	Drawings shall be to a minimum scale of 1:100 and show the following information: 1. Coordinated layout of underground services including buried process piping, fire mains, drainage systems, electrical cable ducts and trenches. Piping and drainage shall be identified with duty, material, diameter and elevation. Cable ducts shall have their coordinates, material and elevation specified. Cable trenches shall have their width and depth identified. 2. Roads, Paving and Finishes. All roads shall be shown, dimensioned, construction type and depths indicated and elevations and falls identified. Cross references to standard details shall be given for materials types and specifications. Concrete paved areas and footpaths shall be identified and setting out details provided with cross references to standard details. Areas of landscaping and surface finishes shall be identified and cross referenced to standard details. 3. Outlines of concrete foundations shall be indicated and cross references given to their associated general arrangement drawings. 4. Fences and gates shall be indicated and coordinated and cross referenced to standard details
BA23	Site Finishes, Roads & Pavements (Plant wide)	Drawings shall be to a minimum scale of 1:100 and show the following information: Roads, Paving and Finishes. All roads shall be shown, dimensioned, construction type and depths indicated and elevations and falls identified. Cross references to standard details shall be given for materials types and specifications. Concrete paved areas and footpaths shall be identified and setting out details provided with cross references to standard details. Areas of landscaping and surface finishes shall be identified and cross referenced to standard details.
BA24	Foundation General Arrangement Drawings (Compression Area)	
BA25	Foundation General Arrangement Drawings (Front End Area)	
BA26	Foundation General Arrangement Drawings (Cryo Systems Area)	
BA27	Foundation General Arrangement Drawings (Interconnects - Pipe rack Area)	
BA28	Foundation General Arrangement Drawings (Cooling Systems Area)	
BA29	Foundation General Arrangement Drawings (Storage Area)	
BA30	Foundation General Arrangement Drawings (Storage Area - LOX Flat Bottom Tank)	
BA31	Foundation General Arrangement Drawings (Buildings - Main Substation / PDC)	
BA32	Foundation General Arrangement Drawings (Buildings - ACC Substation)	
BA33	Concrete Structural Arrangement Drawings (Buildings - Main Substation / PDC)	
BA34	Concrete Structural Arrangement Drawings (Buildings - ACC Substation)	
BA35	General Arrangement (Steam By Pass Valve)	Fully dimensioned drawing including actuator. Weight of components Size and rating of connections. Support requirements, location and size of hold-down bolts
BA36	General Arrangement (Steam Dump)/Support Requirements	Fully dimensioned drawing including dump pipe, and dump tube (diffuser) Weight of components Size and rating of connections. Support requirements, location and size of hold-down bolts
BA37	General Arrangement (Hydraulic Pack)	For hydraulic pack: 1. Overall dimensions 2. Loads 3. Location & size of hold-down bolts 4. Location of all piping terminations 5. Nozzle table listing, size and ratings of all connections 6. Location of lifting lugs 7. Equipment maintenance withdrawal lengths. 8. Erection weights 9. Location of earthing / grounding points 10. Location of electrical junction boxes and cable entry points. 11. Location of instruments 12. Location of instrument junction boxes and cable entry points.
BA38	General Arrangement (Ambient Vaporizer)	In accordance 4WEQ-1405 section 7.2.1

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
BA39	Nameplate Drawing (vessels and heat exchangers)	To contain the following as a minimum: 1. Maker's name 2. Serial number 3. Design Code 4. Maximum design pressure or MAWP (for ASME BPVC Division VIII Vessels) 5. Minimum design pressure, when less than atmospheric 6. Maximum and minimum design temperatures 7. Manufacturer's test mark 8. Date of Manufacture
BA40	General Arrangement (Shell and tube Vaporizer)	In accordance 4WEQ-1420 section 22.4 including material of construction list
BA41	Nameplate Details (LP Storage Tank)	As required by API620 Appendix Q
BA42	Nameplate Details (Vacuum Insulated Tank)	To contain the following as a minimum: 1. Maker's name 2. Serial number 3. Design Code 4. Maximum design pressure or MAWP (for ASME BPVC Division VIII Vessels) 5. Minimum design pressure, when less than atmospheric 6. Maximum and minimum design temperatures 7. Manufacturer's test mark 8. Date of Manufacture 9. Tag number
BA43	General Arrangement (Construction)	
BA44	General Arrangement (Water Treatment)	See 4WEQ-6513
BA45	General Arrangement (Lube Oil Rundown Tank) Issue 1	Drawing to show: 1. Not-to-be-exceeded loads and physical envelope. 2. Fixed location & size of hold-down bolts.
BA46	General Arrangement (Lube Oil Rundown Tank) Issue 2	Drawing to incorporate Purchasers comments to issue 1 drawings and to show: 1. Confirmed overall dimensions 2. Confirmed loads 3. Confirmed location & size of hold-down bolts 4. Location of all piping terminations 5. Nozzle table listing, size and ratings of all connections 6. Location of lifting lugs 7. Equipment maintenance withdrawal lengths. 8. Erection weights 9. Location of earthing / grounding points 10. Location of electrical junction boxes and cable entry points. 11. Location of instruments 12. Location of instrument junction boxes and cable entry points.
BA47	Steam Bypass Valve & Dump GA / Support requirements (Issue 1)	Load, length, diameters, proposed fixing to ACC duct.
BA48	Steam Bypass Valve & Dump GA / Support requirements (Issue 2)	Fully dimensioned drawing including actuator, dump pipe, and dump tube (diffuser) Weight of components Size and rating of connections. Support requirements, location and size of hold-down bolts For hydraulic pack: 1. Overall dimensions 2. Loads 3. Location & size of hold-down bolts 4. Location of all piping terminations 5. Nozzle table listing, size and ratings of all connections 6. Location of lifting lugs 7. Equipment maintenance withdrawal lengths. 8. Erection weights 9. Location of earthing / grounding points 10. Location of electrical junction boxes and cable entry points. 11. Location of instruments 12. Location of instrument junction boxes and cable entry points.
BA49	Hydraulic actuated MAC blow-off valve GA / Support requirements	Fully dimensioned drawing including actuator Weight Size and rating of connections. Support requirements, location and size of hold-down bolts.

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
BA50	Pneumatic actuated valves (MAC interstage & blow-off trip valves & BAC recycle valve) GA / Support requirements (Issue 1)	Flange to flange dimensions Not-to-be-exceeded weight Size and rating of connections.
BA51	Pneumatic actuated valves (MAC interstage & blow-off trip valves & BAC recycle valve) GA / Support requirements (Issue 2)	Fully dimensioned drawing including actuator Weight Size and rating of connections. Support requirements, location and size of hold-down bolts.
BA52	Block Valve Locking Arrangement (Lines A1, A2 and C)	As Per Description
BA53	Coupling General Arrangements (Issue 1)	Drawing to show: Coupling dimensions, internal details, float, weight, torque, power rating, axial & lateral natural frequencies against disc pack tension & compression.
BA54	Coupling General Arrangements (Issue 2)	Drawing to show: Coupling dimensions, internal details, float, weight, torque, power rating, axial & lateral natural frequencies against disc pack tension & compression.
BA55	Condensate Pump Set General Arrangement	Drawing to show: 1. Overall dimensions of pump and motor, including base frame. 2. Piping terminations; location, size and rating. 3. Allowable loads for piping connections. 4. Operating weight. 5. Maximum maintenance weight and access requirements.
BA56	Desupercheater Condensate Pump Set General Arrangement	Drawing to show: 1. Overall dimensions of pump and motor, including base frame. 2. Piping terminations; location, size and rating. 3. Allowable loads for piping connections. 4. Operating weight. 5. Maximum maintenance weight and access requirements.
BA57	Drain Pot Eductor Unit General Arrangement	Drawing to show: 1. Overall dimensions of pump and motor, including base frame. 2. Piping terminations; location, size and rating. 3. Allowable loads for piping connections. 4. Operating weight. 5. Maximum maintenance weight and access requirements.
BA58	General Arrangement (Piping and Civil Design)	
BA59	General Arrangement (Weighbridge)	
BA60	General Arrangement (Diesel Tank)	
BA61	General Arrangement (Gate)	
BA62	General Arrangement (Cranes & Hoists)	
BA63	General Arrangement (Pre-Fab Building)	
BA64	General Arrangement (Drainage Pump)	
BA65	VJ Piping Preliminary Layout	
BA66	VJ Piping Outline Design/Routing Verification	
BA67	VJ Piping Final Drawings/Details	Final Layout; Valve Details (if applicable); Component Details (if applicable); Detail design drawing & General arrangement drawings.
BA68	Packaged Boiler System General Arrangement	
BA69	Combustion Air Fan General Arrangement	
BA70	Combustion Air Fan Motor General Arrangement	
BA71	Gas Train Piping General Arrangement	
BA72	Burner General Arrangement	
BA73	Boiler General Arrangement	
BA74	Steam Drum General Arrangement	
BA75	Economizer General Arrangement	
BA76	SCR Reactor General Arrangement	
BA77	Ammonia Injection Piping Details	
BA78	Stack Dimensional Outline	
BA79	Vacuum Regulator Outline	
BA80	Ejector Outline	
BA81	Diffuser Outine	
BA82	Filter Vessel Arrangement	
BA83	Skid Equipment/PPG Arrangement	
BA84	General Arrangement (Control Valves and Vent Silencers)	Overall dimensions and weights Orientation details Position and Connection sizes for any external piping and electrical connections
BA85	General Arrangement (Programmable Electronic Systems)	Overall dimensions and weights Orientation details Position of electrical connections

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
BA86	General Arrangement (Flow Elements)	Overall dimensions and weights Position and Connection sizes for any external piping and electrical connections
BA87	General Arrangement (Panels)	Overall dimensions and weights Orientation details Position and Connection sizes for any external electrical connections
BA88	General Arrangement (Relief Valves)	Overall dimensions and weights Position and Connection sizes for any external piping connections
BA89	General Arrangement (Analysers)	Overall dimensions and weights Position and Connection sizes for any external piping and electrical connections. Mounting Details
BA90	Final Dimension Drawing	
BA91	General Arrangement (Train) Issue 3 (MAC/BAC)	
BA92	General Arrangement Steam Line Blow-Out Adaptor	
BA93	General Arrangement (General In Line Piping Item)	
BA94	Equipment Layout Building General Arrangement (above the floor)	
BA95	Equipment Layout Building General Arrangement (below the floor)	
BA96	Tube Bundle Trolley General Arrangement	
BA97	CryoMachinery General Arrangement Drawing	(skidded expander package or accessory system where the expander is mounted remote from skid - "accessory system" is defined as the lube oil skid or seal gas panel depending on the type of bearing) Initial submission of drawing shall show: Overall dimensions including baseframe. Holding down bolt pattern and details. Location of process and cooling water piping terminations. (Dimensioned and labeled) Expander/cold box interface connection information. Connection chart giving a list of process and cooling water terminations, size and ratings. Maximum maintenance weight. Equipment withdrawal lengths and access areas for maintenance. Approximate location of all other piping nozzles. Subsequent issues of the drawing shall include Purchaser's comments and: Location of all piping terminations. (Dimensioned and labeled) Connection chart listing all piping terminations, size and rating. Skid weight (wet and dry) Center of gravity (dry weight) Location of electrical junction boxes and cable entry points. Location of instrument junction boxes and cable entry points. Lifting lug locations, details and leveling provisions. Grouting requirements. See accessory system assembly drawing and bill of material for detailed piping and construction (provided in Technicial Manual).

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
BA98	CryoMachinery Outline Drawing	Machinery Outline with ballooned part numbers. Dimensioned connections and piping terminations. Expander/cold box interface connection information. Connection chart listing all required connections, size and rating. Allowable nozzle loads and MAWP for process connections. Angular connection pictorial showing angular location of small bore connections. (Typically drawn to scale but no angular dimensions.) Expander installation footprint for mounting. Expander installation notes. Expander diffuser information (when applicable). Expander case, compressor case, plug-in, and full turbo-assembly weights. Expander/compressor inlet and discharge straight pipe length requirements. Center of gravity. Components in piping will define max. length and diameter (I.E. extended diffuser)
BA99	CryoMachinery Expander Case Installation Drawing	(where applicable when expander case ships early from CryoMachinery for installation at cold box supplier or field site) Expander case outline. Dimensioned connections and piping terminations. Expander/cold box interface connection information. Connection chart listing all connections, size and rating. Expander case installation notes. Weld information and procedures (where applicable). Notes on pressure test flange and mounting hardware requirements.
BA0A	Main Oil Pump Mounting Drawing	Supplied by Cooper when oil pump is off motor
BA0B	General Arrangement Drawing	(to include dimensions, weight, Cv, material of construction)
BA0C	Sole Plate Dimensional Drawing	
BA0D	Diesel Engine Dimensional Outline	
BA0E	Autocad Drawing	
BA0F	Gas Inlet Filter General Arrangement	
BA0G	Blast Shield General Arrangement	
BA0H	Coupling Drawing	
BA0I	Coupling Guard Drawing RIK-Gear	
BA0J	Lifting Sketch Lube Oil System	
BA0K	Startup Screen Drawing (if applicable)	
BA0L	Inlet Guide Vane Drawing (if applicable)	
BB01	Exploded View Diagrams	Drawings to indicate sequence of assembly, parts description, materials and part numbers against which spares can be ordered.
BC01	Cross Sectional Drawing (including Parts List)	Drawing to indicate parts description, materials, and part number against which spares can be ordered. Drawing to show any relevant information which cannot be clearly shown on either the General Arrangement or the Layout.
BC02	Filter Tank Cross-Section	
BC03	Resin Tank Cross-Section	
BC04	Brine Tank Cross-Section	
BC05	CryoMachinery Turbo-Assembly Drawing	Machinery cross section with ballooned part numbers. Assembly clearance chart and clearance notes. Assembly details and assembly notes. Fastener torque chart. Machined passage identification and connection indentification. Connection chart listing all connection labels and purpose (including plugged and test connections). Clean zones for Oxygen and Oxygen Enriched Expanders.
BC06	Shaft Seal Cross Section	
BC07	Cross Sectional Drawing with Parts List	
BC08	Compressor Cross Sectional View	
BC09	Unloaded Cross Sectional Drawing with Bill of Material	
BC10	Cross Sectional Drawing Cylinder/Piston Assembly	
BC11	Pressure Packing/Wiper Packing/Falsehead Packing Cases Cross Sectional Drawing	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
BC12	Cross Sectional Drawing (including Parts List) for Non-GSA Items	This should include: Project Number Tag Number Size Commodity Code Rating Dimensional information Materials, including specific material grades Weight CV End Preparation Cleaning or other special requirements Drawing Revision No.
BD01	Layout Drawings	
BD02	Panel and Annuciator Layout Drawings	These layout diagrams shall show the arrangement of each rack and console front panel. Front panel layout diagrams shall also be supplied where rack or console mounting panels are designed and constructed specifically for this supply. Three drawings required: 1. Front of panel layout clearly showing overall size and layout, with a table of instruments showing duty, engraving, model number, data sheet with range and set points. 2. Back of panel arrangement clearly showing same data as front of panel. 3. Construction drawing showing main dimensions (including fixings), hinging/opening of doors, plinths, anti-vibration methods, materials, and panel finish procedure/colors, cable entry configuration etc.
BD03	HVAC Layout Drawings (Buildings - Main Substation / PDC)	
BD04	HVAC Layout Drawings (Buildings - ACC Substation)	
BD05	Fire Protection Layout - (Buildings - Main Substation / PDC)	
BD06	Fire Protection Layout - (Buildings - ACC Substation)	
BD07	Vacuum Jacketed Piping Layout	Isometric/general arrangement drawings and material lists of equipment, valves, & inline items.
BD08	System Architect Drawing	Define overview of system communications, data highway buses etc.
BD09	Inlet Guide Vanes Assembly and Layout Drawing	
BD10	Inlet Guide Vanes Seals Layout Drawing	
BD11	Inlet Guide Vanes Linkage Layout Drawing	
BD0E	Gear Drive Dimensional Outline	
BD0F	Gas Inlet Filter General Arrangement	
BD0G	Blast Shield General Arrangement	
BD0H	Oil Piping Layout	
BD0I	CW Piping Layout	
BE01	Fabrication /Detail Drawings (Pressure Equipment)	Drawings to show fully dimensioned component parts of items being supplied. To include all details specified in requisition and its attachments
BE02	Approved Fabrication Drawings	Drawings approved by Independent Approval Authority. With the exception of ASME VIII 'U' stamp vessel, this drawing shall be stamped approved by the relevant design Approval Authority.
BE03	Detail Construction Drawing	
BE04	Detail Fabrication Drawings	
BE05	Firewall Detail	
BE06	Location Well Cut-Outs (Side of Coolers)	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
BF01	Panel General Arrangements	Required for every item of equipment and for each rack and console. Also for each shelf and panel within a rack or console where not already shown in proprietary documentation. Drawings shall show (with all known tolerances) where applicable:- - Full Dimensions in mm - Weight (manufacturers quoted figures) - Fixings and brackets - Internal cable and wire routing arrangements and supports - Manufacturer and type - Reference drawings - Scale - Classification Group (including Certificate Ref. No.) - IP rating - Pressure rating - Flame/Fire Resistance/Retardant properties - Power supply and consumption - Main technical parameters (e.g. Power output, Gain, Polarization, Loss, Bandwidth, Frequency, Cross polarization, Front/Back Ratio, VSWR and any other important characteristics identifying performance) - Radiation Patterns - Heat dissipation - Electrical, Optical or Pneumatic physical entry and termination arrangements (Not actual termination details - these are to be shown on associated termination or interconnection diagrams, the identity of which shall be quoted) - Software included (types and revisions) - Gland types, sizes (thread and cable size if known) and locations - Earthing / grounding arrangements - Screen and **Armour** continuity/termination arrangements - Paint finish and color - Main and significant materials of construction - Accessories included in the supply with details - Environmental specifications (Temperature, Humidity, Wind Speed, Shock and Vibration for Operation and Survival) - Label details and location (Separate GA required for all project labels - to show legend, font, size, colors, materials etc.) - Any other parameter judged to have significance during the installation, commissioning, operation and maintenance of the equipment For cases where there are several variants of an item of equipment (e.g. Hawke PL615 Junction Boxes with differing terminal and entry arrangements), each variant shall have its own discrete drawing with it's application clearly identified. Any characteristics affecting the installation, operation or maintenance of the equipment which has any Safety or Environmental considerations or impacts shall be clearly annotated on the diagram.
BF02	Control Panel GA (Issue 1)	Drawing to show: Overall dimensions & weight of control panel. Location and size of hold-down bolts
BF03	Control Panel GA (Issue2)	Drawing to incorporate Purchasers comments to issue 1 drawings and to show: Panel construction (e.g. sheet material & thickness) Location of panel mounted equipment. Location of terminal strips and cable entry points. Location of earthing / grounding points List of all panel mounted equipment complete with tag numbers.
BF04	Control Panel GA (Cryo Pump Seal Gas)	Drawing to show: Overall dimensions of control panel Location of panel mounted equipment Location of terminal strips and cable entry points Location of earthing / grounding points List of all panel mounted equipment complete with tag numbers.
BF05	Control Panel General Arrangement	Drawing to show: Overall dimensions of control panel Location of panel mounted equipment Location of terminal strips and cable entry points Location of earthing / grounding points List of all panel mounted equipment complete with tag numbers.
BF06	Alarm Panel	
BG01	Equipment Layout Drawings	These drawings shall essentially be a more detailed (larger scale) version of particular areas within a given General Arrangement.
BH01	Elevation Drawings	Drawings shall include all dimensions relating to the overall items shown and its location. Dimensions should include all overall, grid dimensions as well as penetration information.
BI01	Shipping, Rigging and Lifting Drawing	A drawing or drawings showing the method of transporting the item (or items) including any temporary supports and lashing, the centre of gravity & method of lifting, tailing and installation. All relevant notes regarding shipping, lifting, off-loading/handling and installation requirements.
BI02	Packing System Drawing	
BI04	Shipping Pipe Support Record	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
BI05	Permanent Pipe Supports Record	
BJ01	Plot Plan	
BJ02	Plot Plan for System	4AEQ-51210
BK01	Erection Drawing	
BL01	Dimensional/Outline/Assembly Drawing	Dimensional/Outline other than GA's / Layouts / Details that are necessary to complete the order.
BL02	Dimensional/Outline/Field Assembly Drawing	
BM01	Construction Drawings - Engineering Services Contracts	Cover & Index Sheet, General Notes & abbreviation sheet. Alignment Sheets, Construction Details
BZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	ELECTRICAL / HVAC	
CA01	Schematic Diagrams	Diagrams shall indicate the electrical arrangement of all component parts. The format shall be such that an understanding of the function shall be readily gained with accompanying notes, if needed. Relay contacts shall be shown in coil de-energized state. Contacts and coils should be cross-referenced by both symbol type and number. Interface terminals shall be uniquely identified by sheet and line number.
CA02	HVAC Schematic Drawings (Buildings - Main Substation / PDC)	
CA03	HVAC Schematic Drawings (Buildings - ACC Substation)	
CA04	Electrical Schematic (Programmable Electronic Systems)	
CA05	Purge Fan Schematic Drawings (Buildings)	
CA06	Tubing Schematic	
CB01	Interconnection Diagrams	Diagrams shall display, in block form, the items of electrical or telecommunications equipment and the cables connecting them. The terminal block reference for each item shall be stated, along with the number and size of the conductors in the cables. Cable NOT in the Suppliers scope shall be clearly identified. The Diagrams shall show each terminal block with the terminals numbered and the cores of the connecting cables identified. The core identifiers given shall be those ferruled onto the conductors. Drawings must show AC/DC, voltage level, segregation and cable screen termination's, together with duty description/tag against input or output. For ease of identification, destination to and from is to be shown, with cross-referenced drawing numbers and earthing / grounding requirements clearly identified.
CB02	Interconnection Diagrams (Motors & Heaters)	Diagrams shall display, in block form, the items of electrical or telecommunications equipment and the cables connecting them. The terminal block reference for each item shall be stated, along with the number and size of the conductors in the cables. Cable NOT in the Suppliers scope shall be clearly identified. The diagrams shall show each terminal block with the terminals numbered and the cores of the connecting cables identified. The core identifiers given shall be those ferruled onto the conductors. Drawings must show AC/DC, voltage level, segregation and cable screen termination's, together with duty description/tag against input or output. For ease of identification, destination to and from is to be shown, with cross-referenced drawing numbers and earthing / grounding requirements clearly identified.
CC01	Internal Wiring Diagrams/Schematics	Internal Wiring Diagrams shall be produced for each rack, console and item of equipment designed and constructed by the Supplier or Sub-supplier specifically for this order. Diagrams shall indicate in an acceptable “ladder” format and shall be of a “Block” format showing all interconnections within the unit including those to all termination's and external interfaces. The diagram shall be fully detailed showing the details for each cable core and wire and the connections down to the level of interfaces to proprietary items within the unit. All units and connections shall be uniquely identified. All voltage levels, ratings, sizes, manufacturer, type numbers, cable and wire types, sizes and color shall be included. All internal cables and wires shall be identified at both ends to a numbering scheme agreed between the Purchaser and the Seller. Functional descriptions for each connection or signal path shall be included to enable users to fully comprehend the operation and configuration of the unit. Cross references to associated documents shall also be included. The diagram shall be shown in a de-energized condition. Contacts shall be shown clearly as “volt free” or powered and, if powered show where the source of power is derived from. Polarity is also to be shown. The purpose of this document category is to facilitate the construction of the unit as well as to enable maintenance personnel to fault-find effectively on the equipment down to proprietary unit or component level. Schematic drawings shall include cable types, cable numbers, tag numbers, termination point (plug/socket etc.), power supply sources, earthing / grounding arrangements and location of each item of equipment. The diagram shall also include any notes that may be necessary to enhance the understanding of the system’s configuration and operation as well as indicating which components and connections are subject to emergency shutdown arrangements. Equipment and Cables not in the Supplier’s scope shall be clearly identified. Schematic diagrams for instrument relay control and trip systems, etc., shall show the electrical arrangement of all component parts. Relays shall be shown with contacts in coil de-energized position.
CC02	Schematic and Wiring Diagrams (Elect)	Drawings detailing in schematic forms all circuit connectivity in horizontal or vertical ladder format with component references and wire number/terminal identification shown. Connection to external circuits to be indicated with sufficient space left for Air Products to add details in these areas. Symbols list and definitions shall be included. Wiring diagrams shall show the arrangement of all wiring associated with the equipment and its auxiliaries with all wire and terminal identifications shown.
CC03	Power and Control Wiring Details	DEFINITION REQUIRED

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
CD01	Single Line Diagrams	Single Line Diagrams shall include the distribution arrangements from each of the Distribution Boards to individual items of equipment. The rating of all breakers, trips, isolators and fuses shall be shown, together with all cable numbers and equipment Tag numbers. The details of the supply originating points shall also be shown. Full wiring details shall be shown of all shunt trips or similar devices together with full ESD or F&G interface details and points of origin.
CE01	Protection Details	Curve to indicate fuse characteristics and current fusing points versus time. Operating characteristic curves and setting ranges of protective relays, discrimination curves and calculations to illustrate the correct selection of fuses, relays, MCB, etc. Should also show relay coil voltages, contact configuration and ratings.
CE02	Building Lightning Protection Drawings	Drawing showing lightning protection system for each substation. This shall show in elevation and plan, all air terminations, down conductors, and location of earthing / grounding terminals for connection to the earthing / grounding grid.
CF01	Bushing Drawing	Detail drawing of bushing connection showing dimensions, orientation, and clearances, and listing parts details.
CG01	Misc. Electrical Details	The supplier shall submit drawings/documents containing the following details of auxiliaries (if provided). · Full details of any CTs provided including class, VA rating, ratio, mag. curve, etc. · Full details of any controls provided for force cooling system including layout, schematic/wiring diagrams and components list. · For synchronous motors only, exciter details shall be submitted including: - Schematic diagrams, together with the physical arrangement and component list for exciter. - If requested at pre-award stage, the supplier shall also supply a typical external excitation system schematic including suppliers design recommendations.
CG02	Electrical Drawings	
CG03	Heat & Vac Details (5-5-05)	
CG04	Electrical Physical	
CG06	Floor Plan	
CG07	Front View	
CG08	Side View	
CH01	Rating Plate Diagram	A document detailing all data to be included on transformer nameplates and winding diagram plates.
CH02	Back Plate Layout	
CI01	Cable Construction/Dimensional/installation Data	In the enquiry stage of the project, the bidder shall supply the following technical data: 1. Cable construction/makeup. 2. Nominal dimensions. 3. Cable current ratings. 4. Minimum bending radii. 5. Maximum continuous drum length. 6. Minimum temperature for installation. 7. Minimum temperature for operation. Following receipt of a Purchase Order, the supplier shall submit: 1. Full details of cable construction/makeup. 2. Full cable dimensions including overall diameter , conductor diameter, diameter over insulation (max/min), diameter over bedding and armor wire diameter. 3. Current ratings and temperature derating factors. 4. Resistance, reactance and capacitance data. 5. Short circuit withstand data 6. Recommended installation details including minimum bending radii, maximum pulling tensions etc.
CJ01	Electrical Layouts	
CJ02	Building Lighting Layout Drawings	Drawing showing lightning protection system for each substation. This shall show in elevation and plan, all air terminations, down conductors, and location of earthing / grounding terminals for connection to the earthing / grounding grid.
CJ03	Building Small Power Layout Drawings	Drawing showing location of all normal and emergency lighting fittings, illuminated escape/exit signs, photocells, light switches, supply distribution boards, and all interconnecting power cables. Power cable routes and cable numbers shall be identified.
CJ04	Light Fixture	
CK01	Terminal Arrangements	
CL01	Unit Element Diagram	
CM01	Electrical Distribution Drawings	
CM02	Building Electrical Distribution Drawings	A single line diagram of all building electrical distribution equipment in the suppliers scope, showing where applicable building distribution boards, lighting circuits and lighting control, emergency lighting and illuminated escape/exit signs, small power sockets, HVAC equipment, and fire / gas / smoke detection devices.
CM03	Electrical Grounding and Layout Philosophy Diagram	
CM04	Lightning Arrester Drawing	
CN01	Battery/Charger Information	
CN02	Wire Clips	
CO01	Bus Duct Interface Details	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
CO02	Horizontal Elbow Details	
CO03	Vertical Elbow Details	
CP01	Circuit Breaker Outline	
CQ01	Connection Diagram	
CR01	Device Internal Diagram	
CS01	Elementary Diagram	
CT01	Rack Arrangement	
CU01	Relay Outline	
CV01	Shaft Profile	
CW01	Three Line Diagram	
CX01	Electrical Design Data	
CX02	Key Interlock Information	
CX03	Ground Switch Details	
CX04	Fuel Tank Outline	
CX05	Foundation Information	
CX06	Switch Drawing	
CX08	Anchor Bolt Location	
CX09	Certified Footprint Drawing	
CX10	Cable Block Diagram	
CX11	Requirements for Anti-Surge Control	
CY01	Electrical Motor & Load List	
CY02	Electrical Specification	
CZ00	Miscellaneous Documents	
CZ01	Conduit Plans	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	PROCESS	
DA01	Process Flow Diagrams	Diagrams shall be provided for all hydrocarbon and utilities systems. Diagrams shall be drawn using standard symbols, and shall indicate major control functions. Each stream shall be clearly labeled with a tag number. The PFD will indicate the duty performed by all items of equipment, for example, power requirements and rate of heat transfer, etc. Accompanying the PFD shall be a heat and mass balance sheet relating to the stream tag numbers of the PFD. The following information will be required for each stream: volume flow rate at standard flowing conditions, molecular weight, enthalpy, pressure, temperature, specific gravity, density, viscosity, thermal conductivity, and specific heat. All properties shall be given in units adopted for the project and as advised by the Purchaser.
DA02	Steam Bypass Flow sheet	Flow sheet shall indicate all equipment, instrumentation, and signals required for control of Bypass valve including instrumentation outside scope of supply. Flow sheet shall indicate design pressure & temperature line size for steam & conduit valves, dump pipe, and dump tube and shall indicate connection types, sizes & ratings. Flow sheet shall be tagged with project tag numbers.
DA03	Steam Turbine Drains / ACC Interface Process Flow Data	
DA04	Guideline for Positioning of Process Piping	
DB01	Piping and Instrument Diagrams	Diagrams shall be provided for all gas, oil, water, air systems etc. Diagrams shall be drawn using standard symbols and tagging systems adopted for the project as advised by the purchaser and shall include all indication and controls required for safe operation of the equipment, line sizes, line ratings and design pressures and temperatures, all customer connections identified in accordance with “Customer Terminal Point Schedule” - plus part numbers in accordance with “Bill of Materials”.
DB01_E	Piping and Instrument Diagrams (Source File-SmartPlant, MicroStation, AutoCAD)	Source File-SmartPlant, MicroStation, AutoCAD
DB02	Interconnecting Piping Details	
DB03	Piping and Instrument Diagrams (Issue 2)	
DB03_E	Piping and Instrument Diagrams (Issue 2) (Source File-SmartPlant, MicroStation, AutoCAD)	Source File-SmartPlant, MicroStation, AutoCAD
DB04	Specification and Flow Sheet	
DB05	Symbols and Abbreviations	
DB05_E	Symbols and Abbreviations (Source File-SmartPlant, MicroStation, AutoCAD)	Source File-SmartPlant, MicroStation, AutoCAD
DB06	P and I Diagram Process and Water	
DB06_E	P and I Diagram Process and Water (Source File-SmartPlant, MicroStation, AutoCAD)	Source File-SmartPlant, MicroStation, AutoCAD
DB07	P and I Diagram Mechanic	
DB07_E	P and I Diagram Mechanic (Source File-SmartPlant, MicroStation, AutoCAD)	Source File-SmartPlant, MicroStation, AutoCAD
DB08	P and I Diagram Lube Oil System	
DB08_E	P and I Diagram Lube Oil System (Source File-SmartPlant, MicroStation, AutoCAD)	Source File-SmartPlant, MicroStation, AutoCAD
DC01	System Schematics	Supplier to provide schematics for any systems not covered by P&ID, e.g. hydraulic, pneumatic, cooling.
DD01	Line Lists	Supplier to indicate all salient features for piping included in his supply. Applies to package units only.
DD02	Main Piping Connection List and Data	
DE01	Heat & Material Balances	
DF01	MAC Vent Systems Process Data Sheet	
DZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	INSTRUMENTS	
EA01	Instrument Outline	A drawing shall be provided for each tagged instrument, which will contain the following information, where appropriate: 1. Tag number 2. Process connection size (s) and rating 3. Inlet and outlet configuration 4. Overall height, width and depth, including actuator & any withdrawal requirements 5. Electrical connection size (s) 6. Instrument mounting details 7. Instrument accessories (positioner, hand wheel, air set, etc.).
EB01	Loop Diagrams	(Applies to loops between filed modules & units and the Compressor Control and Machine Monitoring Panel. There will be no marshalling cabinets between.) These drawings are prepared to consolidate all mechanical, process, electrical and configuration information, and present it in loop form to illustrate its complete function.
EC01	Interface Drawings	The purpose of these drawings (which may be shown in schematic form) is to show all the inputs, outputs, power supplies, etc. necessary to make the package function correctly.
EC02	Serial Interface Lists - MMS to CCS	
EC03	Serial Interface Lists - MMS to CMS	
EC04	PLC/MCC Interface	
EC05	Serial Interface Lists: DCS to Compressor Control System (CCS)	
EC06	Serial Interface Lists: Compressor Control System (CCS) to DCS	
EC07	System Cabinet Hardwired Interface Signal List (Issue 1)	
EC08	System Cabinet Hardwired Interface Signal List (Issue 2)	
ED01	Termination Diagrams (Issue 1)	Issue 1: Junction Box Terminations Instrument cable termination details shall show junction box gland plate drilling sizes to suit external cabling to/from the package, and all glanding information. All cable indicated on these drawings must be terminated at both ends. Drawings must show all connections between Suppliers equipment and Purchasers installation. Each entry identification letter, title, size, type and rating shall be shown. Termination diagrams shall display for each item of equipment, termination strip identifiers, terminal numbers and functions, cable numbers and types, cable core indents and color, earthing / grounding, screen termination, terminated spare cores, tag numbers. The treatment of the cable armouring shall also be annotated. All far-end cable destinations shall be identified by name, Tag Number and physical location. Termination diagrams shall be produced (except where already produced by the Purchaser) for each rack, console, Marshaling and Junction Box and each item of equipment having any form of termination. Typical or generic termination diagrams may be produced where the form of termination is identical across a number of like items. Drawings should include all the necessary mounting details and a schedule of all installation materials used.
ED02	Termination Diagrams (Issue 2)	Issue 2: Termination diagram completed with Control Panel Terminal Interface Boards.
ED03	Termination Diagrams (Junction Boxes)	Note: Typical CryoMachinery installation involves field wiring direct to pump motor and heater. Instrumentation may be field wired direct or wired from a terminal strip in junction box (Junction box provided by CryoMachinery). Drawing to show: Termination details for all instruments wired to junction boxes. The diagram should clearly indicate which instruments terminate in which junction box and the terminal numbers allocated to each instrument (by instrument tag number). The types of signal present and the means of achievinig separation between different signals. Tachometer wiring and other instrument wiring (details as required). Identify spare terminals.
ED04	Termination Diagrams (System Cabinets)	
ED05	CryoMachinery Instrument and Electrical Termination Diagram	Note: Typical CryoMachinery installation involves field wiring direct to pump motor and heater. Instrumentation may be field wired direct or wired from a terminal strip in junction box (Junction box provided by CryoMachinery). Drawing to show: Termination details for all instruments wired to junction boxes. The diagram should clearly indicate which instruments terminate in which junction box and the terminal numbers allocated to each instrument (by instrument tag number). The types of signal present and the means of achievinig separation between different signals. Tachometer wiring and other instrument wiring (details as required). Identify spare terminals.
ED06	Junction Boxes Wiring	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
EE01	Logic Diagrams	Where appropriate, logic diagrams are prepared for all sequence and interlock control systems. Symbols for these diagrams will be in accordance with IEC 60617.2 . Diagrams are to be arranged so that the overall logic is clearly apparent. Sub-system logic will be grouped together to clearly identify their association with each other in the sub-system and with the overall logic system. All logic inputs and outputs will be clearly identified by function as well as any relevant instrument or equipment tag number. Logic to be drawn on positive logic High = On, Energized = 1. All pertinent polarities must be clearly defined, together with full earthing / grounding requirements and location of central earth point.
EE02	Narrative Function Analysis, Instrument List, Instrument Alarm & Trip Schedule	CONTROL LOGIC / FUNCTION NARRATIVE Narrative description of control sequence. Where appropriate, logic diagrams are prepared for all sequence and interlock control systems. Symbols for these diagrams will be in accordance with IEC 60617.2 Diagrams are to be arranged so that the overall logic is clearly apparent. Sub-system logic will be grouped together to clearly identify their association with each other in the sub-system and with the overall logic system. All logic inputs and outputs will be clearly identified by function as well as any relevant instrument or equipment tag number. Logic to be drawn on positive logic High = On, Energized = 1. All pertinent polarities must be clearly defined, together with full earthing / grounding requirements and location of central earth point. INSTRUMENT, ALARM & TRIP LIST Each instrument within the suppliers scope, including local gauges, temperature elements, transmitters, switches, vibration and speed probes, control valves, relief valves. For each instrument the following details will be shown: Tag number, Instrument description (pressure switch, control valve, level gauge, etc.), Service description (Pump P3102 discharge etc.), Manufacturer, Model number, Power supply, Materials of construction, Design standard where applicable, Range. Operating point, Set point for alarm and shutdown.
EE03	Control Logic with BMS Functional Description	with BMS Functional Description
EE04	Capacity Control Diagram	
EE05	Graphic Displays	
EF01	Cause & Effect Charts	These shall be in accordance with API RP14C, to indicate clearly and precisely the shutdown requirements. Individual C&E charts to be produced for each process unit.
EG01	Bitmap	Bitmap required for serial links.
EH01	System Functional Design Specification	System functional design specification in accordance with the requirements of the “IEE guidelines for the documentation of software”, and include control system features, graphics, reports and general philosophies.
EH02	Fire Detection Specification	
EI01	Control System Functional Description	Complete description of the operations and functions of control, shutdown/trip, sequence systems etc.
EI02	Instrument Cable Construction/Dimensional/Installation Data	
EJ01	Instrument Layout Drawings	Drawings will show the location and elevation of all instruments, control valves, control panels, etc. and supplied equipment where applicable. In addition, the drawing shall show the routing of all instrument air distribution, pneumatic tubing, signal/power supply cables, and the location of all instrument junction boxes. Layout drawings will also be required to show fire and gas detection instrumentation.
EJ02	Instrument Physical Installation	
EJ03	Instrument Tubing Layout & Details	
EK01	Alarm & Trip Signal Lists	Document is required to define the set points of alarm/trip levels in a scheduler format, for configuration in logic systems and verification during commissioning, maintenance & operations. As a minimum it shall include tag number (of measured variable), description, range, and alarm/trip limits (LL, L, HH, H) in the units of the measured variable.
EL01	Hook-Up Details	Process hook-up drawings shall be prepared for each tagged instrument that requires a process impulse line for sensing purposes. Similarly, pneumatic and/or hydraulic hook-up drawings shall be prepared for each tagged instrument air transmission/control signal. Drawings should include all the necessary mounting details and a schedule of all installation materials used.

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
EM01	Emergency Reference Guides	These documents shall contain an easy to use description of emergency equipment operating procedures, the format and content of which shall facilitate ease of use and be suitable for printing on a durable material resistant to water and tearing. These should be produced for use with the equipment and systems in accordance with the Project Specification within the Enquiry, Purchase Order or Sub-Contract.
EN01	Software Configuration Guide	Documents shall be prepared to record the software configurations loaded into all individual equipment items included within the supply which, to any degree, contain resident software packages or are software configurable. The equipment concerned shall include (but not necessarily limited to) PABX, General Alarm/Public Address, Multiplex, Routers, Network (WAN/LAN) Management, Servers, Workstations, PC's, Radio Equipment, WAN/LAN network equipment (switches, intelligent HUBs etc.), Printers, Facsimile and Surveillance, Navigational and Meteorological Equipment. The documents shall identify and detail proprietary software as well as project and network specific configuration software and data. All Release and Version identifiers shall be included. Where data is required from either the Purchaser or Client, suitable blank forms or tables shall be prepared by the Supplier and submitted for Purchaser or Client completion.
EN02	PLC Software Ladder	
EO01	Instrument Details	
EO02	Flowmeter Details	
EP01	Instrument Set Point List	
EP02	Peripheral Equipment Set Point Values	
EP03	Automatic Recycle Valve & Back Pressure Regulator Drawing	
EP04	TM Series Transmitter Monitor	
EP05	Reference Impeller Type	
EP06	Water Separator	
EQ01	Relief Valve Details	
ER01	Liquid Level Gage	
EZ00	Miscellaneous Documents	
	DATA SHEETS	
FA01	Bill of Materials	Bill of Materials shall list all items in the system by part number, and indicate the major features of each item, e.g. make, model, type, supply voltages, output characteristics, materials, set pressure, design pressure, range, etc. It shall show the total quantity of each item supplied.
FB01	Catalogue Data Sheet	Catalogue Data sheets shall indicate all major features of performance, materials, etc. to confirm equipment meets specification requirements.
FC01	Equipment Data Sheet	Equipment data sheets will be issued by the Purchaser as part of enquiry or purchase order. Supplier to complete.
FC02	MAC, BAC, Turbine Data sheets (Issue 1)	Equipment data sheets completed with primary design data confirming bid data, including performance, impeller and blading dimensions and family-type designations, bearing and bearing span dimensions and loading.
FC03	MAC, BAC, Turbine Data sheets (Issue 2)	Completed Equipment data sheets
FC04	Gearbox Data sheet	Completed Gearbox data sheet
FC05	Lube & Control Oil Unit Data sheet	Completed Lube and Control Oil data sheet
FC06	Condenser Data sheets	Completed Condenser data sheets
FC07	Condensate Pump Data Sheet & System Head Calculations	Completed Condensate Pump data sheets System Head calculations showing calculated flow components, elevations within system, pressure drop of all components on suction and discharge side of pumps, NPSHA.
FC08	Desupercheater Condensate Pump Data Sheet & System Head Calculations	Completed Desuperheater Condensate Pump data sheets System Head calculations showing calculated flow components, elevations within system, pressure drop of all components on suction and discharge side of pumps, NPSHA.
FC09	Completed TEMA Data Sheet	The blank TEMA Heat Exchanger Specification Sheet Fig. G-5.2 shall be completed and submitted.
FC10	Pump Data Sheet	Completed Pump data sheets
FC11	Supplier's Data Sheet	Completed data sheet giving full details of physical design and performance
FC12	TEMA Data Sheet	Completed TEMA data Sheet given in figure 9 of 4WEQ-1420
FC13	Lube Oil Data - Quantity, Type	
FC14	Heat Exchanger Performance Data Sheets (Final)	
FC15	Maximum Allowable Working Pressure (MAWP) Completed Data Sheet	Additional data, required for RV sizing, for review.
FC16	Note Sheet	
FC17	API 618 Data Sheets for Revised Conditions	
FC18	Intercooler Data Sheet	
FC19	Aftercooler Data Sheet	
FC20	Oil Cooler Data Sheet	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
FC21	Driver Coordination Data Sheet	Required data Coordination datasheet issued by equipment supplier that has unit responsibility for the machinery train. Datasheet defines design interfaces between driven equipment and driver which may include: Rotation direction Rotational speed (rpm) Machine rotational inertias (kg-m2) referenced to speed Machine breakaway torques (Nm) referenced to speed Lube oil viscosity, filtration, flow, pressure, & temperature requirements for machines (normal & emergency) Control oil filtration, flow & pressure requirements for machines (normal & transient flow fraction apportioned to pump and accumulator) Heat rejected to oil system by machines Turning (continuous) or barring (discontinuous) speed (rpm) Thermal movements of rotor ends Torsional Analysis data Coupling data for Lateral Analysis Heat rejected to water coolers
FD01	Equipment List	Supplier to complete an Equipment List for all items that require certain information in accordance with the Purchaser's instructions, and return to the Purchaser for approval.
FD02	Instrument List	
FD03	Instrument List w/Switch Settings	
FD04	Preliminary Instrumentation List Oil Unit	
FD05	High Speed Turbo Gear Experience List	
FE01	Electrical Equipment Data Sheet	In the enquiry stage of the project, the bidder shall complete and return all information requested as "By Bidder" on the Air Products data sheets attached to the requisition. Following receipt of a Purchase Order, the supplier shall complete and return all information requested as "By Bidder," or "Supplier To Advise" on the Air Products data sheets attached to the requisition. When appropriate a third party data sheet might also be required to be completed, for example a compressor supplier's motor data sheet for coordination for torsional analysis.
FE02	LV Motor Data sheets	The supplier shall complete shall submit completed LV Motor data sheets on the project standard data sheet template, for all low voltage motors in his scope of supply.
FE03	Motor Data Sheet	
FE04	Motor Coordinate Sheet	
FF01	Instrument Data Sheet	Blank data sheets will be supplied by the Purchaser to Supplier to complete for each tagged instrument listed on the Instrument Schedule. Supplier may submit his own data sheet, with Purchaser approval, providing it contains, as a minimum, all data shown on Purchaser data sheet. Completed data sheets will contain all the necessary technical information associated with a specific instrument, this shall include the following minimum information, as applicable: 1. Tag number 2. Process data 3. Controller action 4. Range 5. Set point 6. Alarm and trip setting 7. Materials of construction 8. Connection sizes and rating 9. Safety certificate number 10. Manufacturer's name 11. Model number
FF02	Control valve & actuator data sheets (Issue 1)	Control valve duty specification for enquiry to sub-suppliers, with parameters sufficient to estimate valve noise and review sizing.
FF03	Control valve & actuator data sheets (Issue 2)	Completed valve and actuator data sheet from valve sub-supplier.
FF04	Oil Filter Sizing Data Sheet	
FG01	Material Safety Data Sheet	Supplier must provide suitable and sufficient health and safety information to ensure compliance with SI 1994 No. 3245 (COSHH Regulations) and as amended by SI 1996 No. 3138.
FG02	Safety Relief Valve Specifications	
FG03	CryoMachinery Product Definition Specification	Includes the following: Instrument summary section Utility summary section Valve, regulator, filter, and actuator sizing section Drawing list section General information section Lube Oil System information Seal Gas System information Expander Section Add or Expection Section
FG04	Material Test Report (MTR)	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
FG05	Instrument Specification Sheets	
FG06	Automatic Backwash Equipment Specification Sheet	
FG07	Relief Valve Data Sheet	
FG08	Cooper's Internal Compressor Specification	
FH01	Noise Level Data	Data sheets will be supplied by the Purchaser indicating maximum noise level of equipment. Supplier to complete sections to indicate expected noise levels generated by proposed equipment.
FH02	Noise data sheets (Issue 1) (MAC.BAC)	Equipment & piping noise: Casing noise components from MAC, BAC, Turbine, Gearbox (preliminary), Intercoolers & interstage piping· In-pipe noise from MAC & BAC suction/discharge lines, Turbine exhaust.
FH03	Noise data sheets (Auxiliaries)	Equipment noise: Sound pressure @ 1m, and Sound power of Auxiliary equipment, pumps, motors, ejector package, educator package, control valves.
FH04	Noise data sheets & Fairfield calculations (ACCs)	Equipment noise: ACC Sound pressure @ 1m, and Sound power of fans, gearboxes, motors.
FH05	Noise data sheets (Issue 2) (MAC/BAC)	Control valve body & in-pipe noise: Steam Bypass valve & diffuser, MAC blow off valves, BAC recycle valves.
FH06	Noise Data Sheets (Pump & Motor)	Equipment noise: Noise components from Pump & Motor.
FH07	Cold Box Frame Leveling Report	
FH08	Cold Box Column Leveling Report	
FH09	Printer Data	
FH10	Load Cell Data	
FH11	Safety Valve Data Sheets	
FH12	Valve Data	
FI01	Technical Data Sheets	Data Sheets defining mechanical construction of brazed plate heat exchanger. Should specify the following as a minimum; overall block size, nozzle locations and ratings, matrix layout, fin types, number of layers, parting sheet thickness, side bar width, passage width, header tank size, port opening size, design pressures and temperatures, helium leak testing and flow testing requirements.
FI02	Vacuum Pumpout/Filter (Vacuum Insulation Tank)	Detail of Filter.
FI03	Vacuum Gauge/Filter (Vacuum Insulation Tank)	Detail of Filter.
FI04	Jacket Relief Device (Vacuum Insulation Tank)	Details of Jacket Relief Devices.
FI05	Technical Data Sheets Jacket Valve (s) Vacuum Insulation Tank)	Details of Jacket Valve (s).
FI06	Cryogenic Pump - Cold Clearance Report	
FI07	Compressor Design Point Datasheet	
FI08	Compressor Winter Point Datasheet	
FZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	SCHEDULES	
GA01	Instrument Label Schedule	Type of label, service description and tag numbers.
GA02	Schedule	
GA03	Job Schedule	
GB01	Utilities Schedule (Issue 1)	For electrical consumers, schedule to show nameplate rating (kW), absorbed power (kW), efficiency, power factor, KVA, Voltage, Frequency For other utility consumers, schedule to show normal and maximum flow rate, normal and design pressure, normal and design temperature for all utilities required to start and operate the equipment, including instrument air, seal gas, cooling water, and seal steam. For computer based/telecoms equipment include heat dissipation load (kW) and any special ventilation requirements.
GB02	Utilities Schedule (Issue 2)	For electrical consumers, schedule to show nameplate rating (kW), absorbed power (kW), efficiency, power factor, KVA, Voltage, Frequency. For other utility consumers, schedule to show normal and maximum flow rate, normal and design pressure, normal and design temperature for all utilities required to start and operate the equipment, including instrument air, seal gas, cooling water, and seal steam. For computer based/telecoms equipment include heat dissipation load (kW) and any special ventilation requirements.
GB03	Utilities Requirements (Cryogenic Pumps)	To include the following: 1. Auxiliary heater / fan electric power 2. Instrument Air for valves 3. Seal / purge gas flow rates and pressure
GC01	Cable Schedule	Schedules to indicate salient features of all cables in Suppliers scope (on equipment packages, and within control panels) including: 1. Cable number 2. Number of cores 3. Cable size & type 4. To and from location 5. Approximate length
GD01	Distribution Board Schedule	Schedule shall list the lighting and small power loads connected to a distribution board. Description shall include fuse/MCB/MCCB sizes, terminal sizes and switching arrangements.
GD02	Panelboard Schedule	
GD03	Mechanical Equipment Schedule	
GE01	Holding Down Bolt Schedule	Schedule to indicate number off, type, size and material of all fixing bolts required. Where temporary bolts are required to withstand transportation forces these shall also be indicated with suitable note of explanation.
GF01	Lubrication Schedule (Issue 1)	Schedule to indicate type and grade of lubricants required for all equipment supplied. For each entry, first-fill capacities, rate of consumption plus frequency of change shall be indicated.
GF02	Lubrication Schedule (Issue 2)	Completed Schedule
GG01	Equipment Schedule	Update and completion of the Purchaser supplied Equipment Schedule included within the Purchase Order or Sub-Contract. The schedule shall be in the same format as the Purchaser document which shall be completed by the Supplier to include the drawing number of the corresponding General Arrangement Drawing. The document shall be updated monthly or when significant changes occur. This document will not be approved to “Final” status until the dispatch of all equipment to site after which any changes will be made directly onto the purchasers Master Equipment Schedule.
GH01	Hazardous Area Equipment Schedule	Details of type of equipment, type of protection, temperature class, certifying authority, certificate number and class of equipment by zone and gas group and for BASEEFA certified equipment, expiry date and number of manufacturing license. A blank schedule is available from Purchaser.
GI01	Instrument Schedule	This document is produced to complement the P&IDs, after the addition of loop numbers. The following minimum information must be presented: 1. Tag number (in alpha-numeric sequence) 2. Instrument description (pressure switch, control valve, level gauge, etc.) 3. Service description (Pump P3102 discharge etc.)
GI02	Instrument / Alarm & Trip Schedule (Issue 1)	Issue 1: Schedule to show: Each instrument within the suppliers scope, including local gauges, temperature elements, transmitters, switches, vibration and speed probes, control valves, relief valves. For each instrument the following details will be shown: 1. Tag number, 2. Instrument description (pressure switch, control valve, level gauge, etc.), 3. Service description (Pump P3102 discharge etc.), 4. Manufacturer, 5. Model number, 6. Power supply, 7. Materials of construction, 8. Design standard where applicable, 9. Range.

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
GI03	Instrument / Alarm & Trip Schedule (Issue 2)	Issue 2: Schedule to be completed with: 1. Operating point, 2. Set point for alarm and shutdown.
GI04	Receivers-APCI Material	Remit weekly
GI05	Schedule Updates	Remit weekly
GI06	Material Manifest	
GI07	Erection Schedule	
GJ01	Valve Schedule	Schedule to include the following: 1. Valve type 2. Tag number 3. Service 4. Rating/size
GJ02	Nozzle Sizing Chart	
GJ03	Safety Relief Valve Summary	
GJ04	Vent/Flare Summary	
GJ05	Manual Valve Summary	
GJ06	Instrument Summary	
GK01	Computer Systems Documentation.	a) Hardware components b) Operating System c) Drivers d) Utilities e) Application software f) Type of interfaces g) Operator's manual 2. Hardware a) Schematic b) Interconnection diagram, especially special interfaces signal level, type of signal (how one sees it on an oscilloscope) and meaning, especially in relation to diagnostic programs c) Point list, if applicable d) Equipment drawing as provided by Original Equipment Manufacturer (OEM) e) Card drawing as provided by OEM f) Document on any customer modification g) Maintenance manual, with schedule of preventative maintenance h) Material list, with identification of original source of supplier, where practical 3. Software 3.1 a) Memory map b) Disk map c) Description of all key routines and sub-routines specifically, its function; how parameters are passed to it, where it returns parameters, how routine is activated, priority level constraints on usage, etc. d) Illustrate example of how the above system operates in time to perform task for customer3.2 Operating System a) Functional description and flow chart b) Detail description of driver for limited services, including all software interfaces c) Description of all priority levels and their relationship to driving routines, support routines, and application programs d) Source listing, with components, if available e) User's manual on operating system f) System general manual g) Source listing on all drivers, if available 3.3 Support Routines, Utilities, Diagnostics a) User's manual on all three b) Diagnostic message meaning and Corrective Action Manual for diagnostics c) Source listing for support routines and utilities d) Description of all the above, in text form, its function, how to use it and constraints on its usage 3.4 Application Software a) Functional description : test and flowchart forms
GK02	Pipe Stress Computer Printouts	
GL01	Preventative Maintenance Schedule	Section shall include schedule of preventative maintenance tasks/maintenance frequencies, where relevant routine test procedures and inspection instructions are to be provided.
GM01	Pressure Vessel Classification List	Schedule to list all pressure vessels including auxiliary vessels e.g. oil coolers, filters, and accumulators, gland steam condensers, silencers etc.. For vessels and for each side of heat exchangers the following data shall be provided: Tag number, Vessel name, Service Fluid, Volume, Operating pressure & temperature, Design max/min pressure and temperature, Diameter of element to atmosphere, Wall thickness of element to atmosphere.
GN01	Foundation Loads	Completed form given in the Project Equipment Specification or Item specification
GN02	Civil and Structural Loading	
GN03	Hanging Loads - Cooling Water Pipe	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
GO01	Component Parts List	Complete list of components containing reference identifications to schematic diagrams, brief description of component, manufacturer, and type number. Document preferably to be produced in tabular form. Operating ranges for instrument and protective relays/timers to be detailed.
GO02	Parts List	
GO03	Detailed Parts List/BOM	
GP01	Electric Unit Summary Table	
GQ01	Operator Sequence Chart	
GR01	Reinforcement Bending Schedules	
GR02	Foundation Reinforcement Bending Schedules (Compression Area)	Reinforcement bending schedules shall be produced in conjunction with detail reinforcement drawings. They shall provide sufficient detail to enable reinforcement bars to be cut and bent. Schedules shall be produced in accordance with specified standards and standard convention.
GR03	Foundation Reinforcement Bending Schedules (Front End Area)	Reinforcement bending schedules shall be produced in conjunction with detail reinforcement drawings. They shall provide sufficient detail to enable reinforcement bars to be cut and bent. Schedules shall be produced in accordance with specified standards and standard convention.
GR04	Foundation Reinforcement Bending Schedules (Cryo Systems Area)	
GR05	Foundation Reinforcement Bending Schedules (Interconnects - Pipe rack Area)	
GR06	Foundation Reinforcement Bending Schedules (Cooling Systems Area)	
GR07	Foundation Reinforcement Bending Schedules (Storage Area)	
GR08	Foundation Reinforcement Bending Schedules (Storage Area - LOX Flat Bottom Tank)	
GR09	Foundation Reinforcement Bending Schedules (Buildings - Main Substation / PDC)	
GR10	Foundation Reinforcement Bending Schedules (Buildings - ACC Substation)	
GR11	Concrete Structural Reinforcement Bending Schedules (Buildings - Main Substation / PDC)	
GR12	Concrete Structural Reinforcement Bending Schedules (Buildings - ACC Substation)	
GS01	Building Finishes Schedule Drawings	Finishes schedules shall identify the external and internal finishes to the floors, walls ceilings etc of the building. They shall identify the number, dimensions and type of doors and windows. Door and window types shall be identified with required furniture and fittings called up.
GS02	Building Finishes Schedule Drawings - (Buildings - Main Substation / PDC)	
GS03	Building Finishes Schedule Drawings - (Buildings - ACC Substation)	
GT01	Compression Train Heat Load Summary	
GT02	Utility Summary	
GZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	DETAIL DRAWINGS	
HA01	Isometrics-Field Erected H/U Spools Only	Isometric drawings of plant and systems. - Applies to Package units only.
HA02	Isometrics-Plumbing	
HA03	Isometrics or detail drawings of VJ Piping	
HB01	Pipe Supports	Detailed drawing of fixed and sliding supports.
HB02	Piping Details	
HB03	Piping Plans	
HB04	Detailed Drawings for Oil Piping Change Out from BH to CH Air End	
HB05	Detailed Drawings of Gas Piping Change Out from BH to CH Air End	
HB06	External Piping Details	
HC01	Pressure vessel or Exchanger General Arrangement drawing	For coded vessels drawings shall contain all information requested in the Requisition or its attachments but as a minimum the following information is required: · Design code. · Approval Authority and/or Inspection organization. · Operating and design pressures and temperatures. · Test pressure and medium. · Working fluid. · All design dimensions and thicknesses. · Materials of construction (exact specification). · Corrosion allowance. · Weld techniques and preparations. · Post weld heat treatment (where applicable). · Mechanical tests on coupon plates as required by design code. · Complete details of internals, e.g. tube bundles, supports, etc. · Internal finish and standard of cleanliness. · External finish. · Extent of non destructive examination. · Internal volume. · Weights empty, operating and full of water. · Details of nameplate. For un-coded vessels drawings to Supplier standard are acceptable.
HC02	Quality/Peaking Measurements	
HC03	Pressure Vessel Drawings (Auxiliary coolers, e.g Lube and Hydraulic pack oil coolers, vessels, filter, accumulators, Gland steam coolers, lube oil rundown tank)	
HC04	Pressure Vessel Drawings (Condensate Tank, Ejector Steam Recovery Condenser)	
HC05	Process Internals Detail Drawing	Detail drawings of Process Internals showing all information requested in the Requisition or its attachments but as a minimum the following information is required: · Operating and design pressures and temperatures. · Working fluid. · All design dimensions and thicknesses. · Materials of construction (exact specification). · Corrosion allowance. · Weld techniques and preparations. · Complete details of component parts · Internal finish and standard of cleanliness. · External finish. · Extent of non destructive examination. · Internal volume. · Weights empty, operating
HC06	Mist Eliminator/Demister Detail Drawing	Detail drawing of the mist eliminator or demister
HC07	V-Wire Screen Details	V-WIRE SCREEN DETAILS - showing all information required by the relevant Air Products specification. As a minimum the following will be required; slot size, wire and support rod sizes, open area, material of construction, design loadings, design temperature, details of all welds (type, size etc), level of cleaning.
HC08	Structured packing segmentation drawing	A drawing showing the layer segmentation pattern the supplier proposes to use.
HC09	Outline Drawing	A drawing showing the outline of all parts of the items with all overall dimensions and weights. Connections shall be shown on the drawing with rating, size, type, schedule or wall thickness, etc.
HC10	Fan Details	
HC11	Pressure Vessel Drawings (Inter & After-coolers)	
HC12	Quality Documentation	
HC13	Boiler Details	
HC14	Burner Details	
HC15	Deaerator Details	
HC16	Economizer Details	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
HC17	Fan and Blower Details	
HC18	Feed Water Heater Details	
HC19	HRSG (Heat Recovery Steam Genearator) Details	
HC20	Screen Details	
HC21	Steam Drum Details	
HC22	Superheater Details	
HC23	Grid Detail	
HC24	Piston Details	
HC25	Rod Details	
HC26	Wiper Packing Arrangement	
HC27	Pressure Packing Arrangement	
HD01	Tank Detail Drawing	Detailed drawing of tank dimensions including scantlings and internal fittings.
HD02	Man way Details with Connections for A1, A2, B, C, D & T	Drawing to show inner tank roof man way, blind and bellow (see figure 7 of 4WEQ-1516)
HD03	Inner Tank Drawing including Bottom, shell, stiffeners & roof	Details of inner tank bottom, annular plate, shell, stiffeners, compression ring and roof. To include plate layout, welding details
HD04	Outer Tank Drawing Including Bottom, Shell, Stiffeners, Roof & Framework	Details of inner tank bottom, shell, stiffeners, compression ring and roof. To include plate layout, welding details
HD07	Vacuum Insulated Tank Detail Drawing - Inner Vessel	Drawing to show: 1. Overall size (tan-to-tan, height, diameter) 2. Head Dimension 3. Material Thickness 4. Weld Details 5. Location of longitudinal and circumferential seams in shell and heads 6. Location of supports 7. Details of Internals, brackets, clips and other attachments 8. Parts List A table with the following: 1. Design Code 2. Approval Authority 3. Design Pressure & Temperature 4. Test Pressure and Medium 5. Location of Code Stamp 6. Extent and Type of non-destructive examination (NDE) 7. Weld Joint Efficiencies 8. Material Construction 9. Cleanliness Requirements 10. Reference drawings, procedures, or standards 11. Weights empty, test and operating
HD08	Vacuum Insulated Tank Detail Drawing - Outer Vessel	Drawing to show: 1. Overall size (tan-to-tan, height, diameter) 2. Head Dimension 3. Material Thickness 4. Location of longitudinal and circumferential seams in shell and heads 5. Skirt Details including pie ways and access opening 6. Penetration Plate Details 7. Weld Details 8. Details of internals, brackets, clips and other attachments 9. Lifting Lugs Details 10. Parts List A table with the following: 1. Design Code 2. Design Pressure & Temperature 3. Test Pressure and Medium 4. Location of Nameplate and Code Stamp (duplicate of inner nameplate) 5. Extent and Type of non-destructive examination (NDE) 6. Weld Joint Efficiencies 7. Material Construction 8. Reference drawings, procedures, or standards
HD09	Vacuum Insulated Tank Detail Drawing - Annular Space Piping	Drawing to show: 1. Design Code 2. Piping Layout (schematic) for each line 3. Support Details
HD10	Vacuum Insulated Tank Detail Drawing - Inner Vessel Support Details	Drawing to show: 1. Support Details 2. Material of Construction 3. Weld Detail
HD11	Distributor Detail	
HD12	Internal Feed Piping Detail	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
HD13	Tower Attachment Detail	
HD14	Support Member Detail	
HD15	Detailed Drawings of BH Air End Adapter to be Installed on Ch Frame	
HE01	Exchanger Bundle Drawing	In accordance with 4WEq-1420 section 22.4 and 22.5
HF01	Boiler Details	
HF02	Steam Drum Details	
HF03	Economizer Details	
HF04	Catalyst Module Support & Sealing Details	
HF05	Duct Details	
HE02	Water Bath Drawing	In accordance with 4WEq-1420 section 22.5
HE03	Steam Control Piping	Drawing showing details of piping layout, piping valves, control valves, strainers, traps, flanges
HE04	Steam sparger Header Drawing	Layout of steam spargers inside or outside water bath vaporizer.
HG01	Insulation/Lining Details	Drawings to indicate thickness, specification and limit of application.
HH01	Mechanical Seal Details	Drawing to indicate cross-section of seal, clearance dimensions, materials and parts list against which spares can be ordered. The seal piping system shall also be shown, indicating all component parts and materials.
HI01	Rubber Lining Details	Provide details of liner locking and sealing to body and stem for rubber lined valves i.e. Butterfly valves etc.
HJ01	Valve Details	Typically to include the following : 1. Details of hand wheel/wrench material and method of retainment. 2. Details of method of locking valves 3. Requirements for vents, drain and flushing connections for valves shall be kept to a minimum and shall be clearly shown on the valve drawings. 4. Where extended stems/bonnets are required to meet valve duty, dimensional data is to be included. 5. Where Supplier/Manufacturer considers seat skirts would be beneficial, details of the proposals are to be provided. 6. Valve soft seat & seal materials are to be specified with the temperature range of the product. All non-metallic materials in hydrocarbon gas/condensate service shall be resistant to explosive decompression. Where special seals are offered, details drawings shall be provided. 7. Any details critical to the operation of any particular type of valve.
HJ07	Valve Details - Water Bath Drain Valve	
HJ08	Valve Details - Steam Block Valve	Catalogue Data sheet/drawing
HJ09	Valve Details - Steam Control Valve	Catalogue Data sheet/drawing
HJ10	Valve Details - Steam Drain Valve	Catalogue Data sheet/drawing
HJ11	Valve Details - Steam Bypass Valve	Catalogue Data sheet/drawing
HJ12	Strainer Details - Steam service	Catalogue Data sheet/drawing
HJ13	Condensate Trap - Steam	Catalogue Data sheet/drawing
HJ14	Steam Sparger Drawing	Standard manufactures/Catalogue data. Details to include materials, thickness, threading, holes size angle and location, piston and spring details
HJ15	Vacuum Pumpout Valve/Filter (Vacuum Insulated Tank)	Catalogue Data sheet/drawing
HJ16	Vacuum Gauge/Filter (Vacuum Insulated Tank)	Catalogue Data sheet/drawing
HJ17	Jacket Relief Device (Vacuum Insulated Tank)	Catalogue Data sheet/drawing
HJ18	Inlet Strainer Layout Drawing	
HJ19	Valve Details - Fuel Gas Block Valve	
HJ20	Valve Details - Fuel Gas Control Valve	
HJ21	Flame Scanner	
HK01	Valve Operating Torque/Load Details	Torque/load figures are to be supplied for each valve. Tests to be completed on valves during hydro test to ensure that actual figures are within accepted limits.
HL01	Gas Seal Details	Drawing to indicate cross-section of seal, clearance dimensions, materials and parts list against which spares can be ordered. The seal piping system shall also be shown, indicating all component parts and materials.
HL02	DGS Seal Gas P&ID	
HL03	DGS Seal Drawing	
HL04	DGS Seal Gas Filter Sizing Datasheet	
HM01	Grout Seal Details	
HN01	Vessel Internal Details	Drawing to indicate fully dimensioned details of vessel internal parts.
HN02	Liquid Distribution Detail	
HN03	Packing Hold Down Detail	
HN04	Packing Bed Support Detail	
HP01	Pump Details	
HR01	Nozzle Details	
HR02	Multiple Line Thermal Barrier Arrangement (G,V & W)	Drawing to showing details on elevated foundation penetration for line G,V,W See figure 3 and 16 of 3 of 4WEQ-1516- Generic drawing for Suffixes 1, 2 & 3
HR03	Nozzle Q-Outer Tank Breather Arrangement	LP Storage outer tank. Nozzle dimensions, flange and bolting details.
HR04	Nozzle P1-Outer Tank Emergency Arrangement	LP Storage outer tank. Nozzle dimensions, flange and bolting details.
HR05	Nozzle P2, P3...-Outer Tank Perlite Arrangement	LP Storage outer tank. Nozzle dimensions, flange and bolting details.

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
HR06	Nozzles A1 & A2 - Inner Tank Relief Valve Arrangement	Drawing to detail all components in lines A1 and A2, including piping, relief valves, block valves, reducer flanges, gaskets, nuts, stud bolts, tail pipe, see figure 7 of 4WEQ-1516.
HR07	C - Inner Tank Bursting Disc Line Arrangement	Drawing to detail all components in line C, including piping, bursting disc, bursting disc holder, block valve, reducer flanges, gaskets, nuts, stud bolts, tail pipe, see figure 7 of 4WEQ-1516.
HR08	B - Inner Tank Breather Valve Line Arrangement	Drawing to detail all components in line B, including piping, breather (Vent) valve, block valve, reducer flanges, gaskets, nuts, stud bolts, see figure 7 of 4WEQ-1516.
HR09	Inner Tank Relief Device Arrangement Drawing (Nozzles A1 , A2, B & C on Bellowed Manway)	Drawing to detail all components including piping, valves, flanges, gaskets, nuts, stud bolts, pilot lines tail piping, see figure 7 of 4WEQ-1516.
HR10	G1 - Liquid Outlet Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR11	G2 - Liquid Outlet Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR12	G3 - Liquid Outlet Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR13	V1 - Pump Recycle Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR14	V2 - Pump Recycle Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR15	V3 - Pump Recycle Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR16	W1 - Pump Recycle Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR17	W2 - Pump Recycle Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR18	W3 - Pump Recycle Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR19	X1 - Pump Casing Vent Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR20	Gas or Oil train piping arrangement	Drawing showing gas or oil train piping arrangement
HR21	X2 - Pump Casing Vent Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR22	X3 - Pump Casing Vent Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR23	Y1 - Pump Casing Vent Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR24	Y2 - Pump Casing Vent Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR25	Y3 - Pump Casing Vent Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR26	E - Overflow Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR27	J - Fill Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR28	R - Interspace Purge Header	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR29	S -Lower Liquid Level Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR30	U - Vapor Return/PB Coil Return Line	LP Tank Interspace Piping, piping End Connections and Supports Details.
HR31	MS - Outer Tank Shell Manway	LP Storage outer tank. Nozzle dimensions, flange and bolting details.
HR32	MR - Outer Tank Roof Manway	LP Storage outer tank. Nozzle dimensions, flange and bolting details.
HR33	Coil Data Sheet and or Drawing	
HS01	Ladders, Platforms & Stair Details	Detail drawings showing layout, location and orientation of ladders, platforms or stairs and any associated hoists or davits together with detail drawings showing how they are constructed.
HS02	Inner Tank Jacking Arrangement and Tooling	Special tooling or jacking required for inner tank erection to enable the cellular glass base insulation to be installed within a completed outer tank.
HT01	Motor Detail Drawings	Miscellaneous motor detail drawings including· 1. Motor cooler dimensions and welding details 2. Sectional detail of bearings, stator rotor winding data and connections, location of stator winding RTDs.
HT02	Motor Shaft Detail drawing	A drawing containing the following information (SI units): 1. Shaft overall length and cross section. 2. Changes in cross section profile with dimensions, bearing positions, major distributed masses with effective centre of gravity indicated plus overall C of G shaft inertia ($GD^2/4$) in kgm^2, shaft stiffness, and material construction. 3. Shaft end details at compressor coupling end with limits, fits, and any other detail required for torsional analysis study.
HT03	Guaranteed BHP Values/Motor List	
HU01	Skid Details	
HU02	Support Frame Details	
HV01	Civil Standard Details Drawings	Standard detail drawings shall identify common repeatable details such as drainage gullies, manholes etc, road, curb and paving details, concrete joint details and fencing and site finishes details. Details of similar nature shall be grouped together on individual sheets.
HW01	Reinforcement Details Drawings	
HW02	Foundation Reinforcement Details Drawings (Compression Area)	Reinforcement detail drawings shall be produced in conjunction with detail reinforcement bending schedules. They shall provide sufficient detail to enable reinforcement bars to be installed within foundations. The drawings shall be sufficiently detailed and clear to fully convey the required reinforcement distribution. Where possible duplication and standardization shall be employed to simplify the fixing work.
HW03	Foundation Reinforcement Details Drawings (Front End Area)	Reinforcement detail drawings shall be produced in conjunction with detail reinforcement bending schedules. They shall provide sufficient detail to enable reinforcement bars to be installed within foundations. The drawings shall be sufficiently detailed and clear to fully convey the required reinforcement distribution. Where possible duplication and standardization shall be employed to simplify the fixing work.

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
HW04	Foundation Reinforcement Details Drawings (Cryo Systems Area)	Reinforcement detail drawings shall be produced in conjunction with detail reinforcement bending schedules. They shall provide sufficient detail to enable reinforcement bars to be installed within foundations. The drawings shall be sufficiently detailed and clear to fully convey the required reinforcement distribution. Where possible duplication and standardization shall be employed to simplify the fixing work.
HW05	Foundation Reinforcement Details Drawings (Interconnects - Pipe rack Area)	Reinforcement detail drawings shall be produced in conjunction with detail reinforcement bending schedules. They shall provide sufficient detail to enable reinforcement bars to be installed within foundations. The drawings shall be sufficiently detailed and clear to fully convey the required reinforcement distribution. Where possible duplication and standardization shall be employed to simplify the fixing work.
HW06	Foundation Reinforcement Details Drawings (Cooling Systems Area)	Reinforcement detail drawings shall be produced in conjunction with detail reinforcement bending schedules. They shall provide sufficient detail to enable reinforcement bars to be installed within foundations. The drawings shall be sufficiently detailed and clear to fully convey the required reinforcement distribution. Where possible duplication and standardization shall be employed to simplify the fixing work.
HW07	Foundation Reinforcement Details Drawings (Storage Area)	Reinforcement detail drawings shall be produced in conjunction with detail reinforcement bending schedules. They shall provide sufficient detail to enable reinforcement bars to be installed within foundations. The drawings shall be sufficiently detailed and clear to fully convey the required reinforcement distribution. Where possible duplication and standardization shall be employed to simplify the fixing work.
HW08	Foundation Reinforcement Details Drawings (Storage Area - LOX Flat Bottom Tank)	Reinforcement detail drawings shall be produced in conjunction with detail reinforcement bending schedules. They shall provide sufficient detail to enable reinforcement bars to be installed within foundations. The drawings shall be sufficiently detailed and clear to fully convey the required reinforcement distribution. Where possible duplication and standardization shall be employed to simplify the fixing work.
HW09	Foundation Reinforcement Details Drawings (Buildings - Main Substation / PDC)	Reinforcement detail drawings shall be produced in conjunction with detail reinforcement bending schedules. They shall provide sufficient detail to enable reinforcement bars to be installed within foundations. The drawings shall be sufficiently detailed and clear to fully convey the required reinforcement distribution. Where possible duplication and standardization shall be employed to simplify the fixing work.
HW10	Foundation Reinforcement Details Drawings (Buildings - ACC Substation)	Reinforcement detail drawings shall be produced in conjunction with detail reinforcement bending schedules. They shall provide sufficient detail to enable reinforcement bars to be installed within foundations. The drawings shall be sufficiently detailed and clear to fully convey the required reinforcement distribution. Where possible duplication and standardization shall be employed to simplify the fixing work.
HW11	Concrete Structural Reinforcement Details Drawings (Buildings - Main Substation / PDC)	Reinforcement detail drawings shall be produced in conjunction with detail reinforcement bending schedules. They shall provide sufficient detail to enable reinforcement bars to be installed within foundations. The drawings shall be sufficiently detailed and clear to fully convey the required reinforcement distribution. Where possible duplication and standardization shall be employed to simplify the fixing work.
HW12	Concrete Structural Reinforcement Details Drawings (Buildings - ACC Substation)	Reinforcement detail drawings shall be produced in conjunction with detail reinforcement bending schedules. They shall provide sufficient detail to enable reinforcement bars to be installed within foundations. The drawings shall be sufficiently detailed and clear to fully convey the required reinforcement distribution. Where possible duplication and standardization shall be employed to simplify the fixing work.
HX01	Building Details Drawings	Building detail drawings shall identify common repeatable details such as drainage, brickwork fixing and dpc requirements, duct support details services penetration details etc. Details of similar nature shall be grouped together on individual sheets. Sufficient details shall be provided to enable the buildings to be constructed and fittings installed.
HX02	Architectural Arrangement - Main Substation / PDC	Building detail drawings shall identify common repeatable details such as drainage, brickwork fixing and dpc requirements, duct support details services penetration details etc. Details of similar nature shall be grouped together on individual sheets. Sufficient details shall be provided to enable the buildings to be constructed and fittings installed.
HX03	Building Details Drawings - Main Substation / PDC	Building detail drawings shall identify common repeatable details such as drainage, brickwork fixing and dpc requirements, duct support details services penetration details etc. Details of similar nature shall be grouped together on individual sheets. Sufficient details shall be provided to enable the buildings to be constructed and fittings installed.
HX04	Architectural Arrangement - ACC Substation	Building detail drawings shall identify common repeatable details such as drainage, brickwork fixing and dpc requirements, duct support details services penetration details etc. Details of similar nature shall be grouped together on individual sheets. Sufficient details shall be provided to enable the buildings to be constructed and fittings installed.
HX05	Building Details Drawings - ACC Substation	Building detail drawings shall identify common repeatable details such as drainage, brickwork fixing and dpc requirements, duct support details services penetration details etc. Details of similar nature shall be grouped together on individual sheets. Sufficient details shall be provided to enable the buildings to be constructed and fittings installed.
HX06	Building floor plan, roof & elevation	
HX13	Technical Data Foundation Plan	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
HX14	Foundation Plan	
HY01	Insulated metal siding	
HY02	Un-insulated metal siding	
HY03	Metal roofing	
HY04	Metal doors & frames	
HY05	Roll-up doors	
HY06	Windows	
HY07	Hardware	
HY08	Toilet compartments	
HY09	Toilet & Bath accessories	
HY10	Lockers	
HY11	Wire partitions	
HY12	Access Floors	
HY13	Ceramic tile	
HY14	Wallboard Systems	
HY15	Ceiling	
HY16	Resilient flooring	
HY17	Carpet	
HY18	Underground services	
HY19	Cranes & Hoists Details	
HZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	MECHANICAL	
JA01	Nozzle Movement	Drawing to indicate movement of flanges, etc., to which other items connect. Separate movements shall be shown and defined for normal operating and plant upset (maximum) conditions.
JB01	Acceptable Nozzle Loads	Drawings to indicate acceptable loads and moments on flanges to which other items connect, if not covered by applicable specifications.
JB02	Allowable Nozzles Loads and Thermal Movements	Document to show allowable nozzle loads for process gas and steam connections.
JC01	Enclosure Ventilation Requirements	Supplier to advise air purging for any enclosures.
JD01	Foundation Loading Diagram/Support Detail	Drawing to indicate floor fixing details, including temporary fixing details where required for barge transportation. Loading shall be given for static loads, dynamic forces and loads, all service conditions and barge transportation loads. NOTE: This information may be incorporated in General Arrangement Drawing.
JD02	Foundation Loading Diagram (Issue 1) (MAC/BAC)	Drawing to show: Maximum dimensions of foundation blocks for Module (& jacking towers as required for installation), Lube oil skid, Lube oil rundown tank support details. Estimated operating weights (to within +/-10%) and locations of centre of gravity / load (to within 250mm in any direction) including condenser vacuum load as determined by the method of mounting the condenser Estimated horizontal loads (to within +/-10%) due to differential thermal expansion and points of action (to within 250mm in any direction). Estimated magnitude, frequency and point of action of dynamic loads during operation and under fault conditions Operating speeds of shafting
JD03	Foundation Loading Diagram (Issue 2) (MAC/BAC)	Drawing to incorporate Purchasers comments to issue 1 drawings and to show: Horizontal loads due to differential thermal expansion and points of action Holding down bolt requirements, including position and size of pockets. Grouting requirements, including extent, depth and type of grout and recommendations for removal of otherwise of shims, wedges or jacks. Magnitude and point of action of all static loads, including pipe support for loose interconnecting piping Magnitude, frequency and point of action of dynamic loads during operation and under fault conditions.
JD04	Foundation Loading Diagram (Issue 3) (MAC/BAC)	Drawing to incorporate Purchasers comments to issue 2 drawings.
JD05	Structural Steel Drawing	
JD06	Rebar Drawing	
JD07	Structural Support Details	
JD08	Allowable Flange Loading	
JD09	Dynamic and Static Loading	
JD10	Compressor Thrust Loading Diagram at Worst Case	
JD11	Compressor Flange Drawing	
JD12	Field Welds Cooling Water-Drawing	
JE01	Foundation Bolt Strap/Strap Location and Penetration Details, Inner & Outer Tanks	Drawing to show location, number and details of bolts and/or straps. Also show openings in elevated foundation slad multiple line thermal barriers
JF01	Anchor Bolt Sizes & Locations	
JG01	Foundation reactions	
JH01	Mechanical Floor Plan	Show all mechanical equipment including ducting and air terminals
JH02	Transformer Grating	
JI01	Mechanical Equipment / System Details	
JI02	Auxiliary Equipment	
JZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	CALCULATIONS	
KA01	Foundation Support Calculations	Calculations shall determine the loadings shown on the Loading Diagram.
KA02	Foundation Calculations (Compression Area)	Foundation calculations shall be fully prefaced giving loading details reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters. Settlement criteria and predictions shall be provided for foundations.
KA03	Foundation Calculations (Front End Area)	Foundation calculations shall be fully prefaced giving loading details reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters. Settlement criteria and predictions shall be provided for foundations.
KA04	Foundation Calculations (Cryo Systems Area)	Foundation calculations shall be fully prefaced giving loading details reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters. Settlement criteria and predictions shall be provided for foundations.
KA05	Foundation Calculations (Interconnects - Pipe rack Area)	Foundation calculations shall be fully prefaced giving loading details reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters. Settlement criteria and predictions shall be provided for foundations.
KA06	Foundation Calculations (Cooling Systems Area)	Foundation calculations shall be fully prefaced giving loading details reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters. Settlement criteria and predictions shall be provided for foundations.
KA07	Foundation Calculations (Storage Area)	Foundation calculations shall be fully prefaced giving loading details reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters. Settlement criteria and predictions shall be provided for foundations.
KA08	Foundation Calculations (Storage Area - LOX Flat Bottom Area)	Foundation calculations shall be fully prefaced giving loading details reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters. Settlement criteria and predictions shall be provided for foundations.
KA09	Foundation Calculations (Buildings - Main Substation / PDC)	Foundation calculations shall be fully prefaced giving loading details reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters. Settlement criteria and predictions shall be provided for foundations.
KA10	Foundation Calculations (Buildings - ACC Substation)	Foundation calculations shall be fully prefaced giving loading details reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters. Settlement criteria and predictions shall be provided for foundations.
KB01	Structural Calculations	Calculations shall determine that the structure is fit for purpose during all phases of the installation and transportation operation ensuring that all structural components are within acceptable stress and deflection limits.
KB02	Dynamic Structural Analysis of Module (MAC/BAC)	Dynamic analysis of Module with summary of resonant frequencies of structure and its sub-elements compared to excitation frequencies.
KB03	Concrete Structural Calculations	Structural calculations shall be fully prefaced giving loading details reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters.
KB04	Structural Calculations (Buildings - Main Substation / PDC)	Building calculations shall be fully prefaced giving loading details reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters.
KB05	Structural Calculations (Buildings - ACC Substation)	Building calculations shall be fully prefaced giving loading details reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters.
KB06	Mechanical Calculations including Pipe Flexibility & Thermal Barriers	Tank calculations to 4WEQ-1516 and API 620 Q.
KB07	General Calculations	This heading to cover any calculations required, but not previously covered by Code and Description.
KB08	Drainage Calculations	Drainage calculations shall be fully prefaced giving reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters.
KB09	Building Mechanical & Electrical Calculations	Building M&E calculations shall be fully prefaced giving reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters.
KB10	Seismic Design Calculations	Calculation to API 620 appendix L.
KB11	Structural Design Brief	
KB12	Unbalanced Force Calculations	Blank data sheets will be supplied by the Purchaser for Supplier to indicate all salient features which will enable the Purchaser to arrange support accordingly.
KC01	Bearing Life Calculations	Calculations shall determine anticipated life, considering method of lubrication, dimensions plus load variation determined from performance envelope.

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
KC02	Acceleration Effect Calculations	Calculations shall confirm acceptance stress values encountered during acceleration period.
KC03	Lateral Critical Speed Calculations	Calculations shall determine the first and second critical speeds of the shaft assembly and identify forcing frequencies and harmonic components thereof, relative to operating speed range. Results shall be presented in graphical form.
KC04	Lateral Critical Speed Analysis (Issue 1) (MAC/BAC)	Lateral Critical Speed Analysis and Imbalance Response Analysis in accordance with applicable API standards for rotating equipment, and Air Products specification 4WME-551001 For the BAC compressor, a stability analysis shall be performed to identify log-decrements of damped critical speeds.
KC05	Lateral Critical Speed Analysis (Issue 2) (MAC/BAC)	As Described In Issue 1. Lateral Critical Speed Analysis and Imbalance Response Analysis in accordance with applicable API standards for rotating equipment, and Air Products specification 4WME-551001 For the BAC compressor, a stability analysis shall be performed to identify log-decrements of damped critical speeds.
KC06	Torsional Critical Speed Analysis (Issue 1)	Torsional analysis in accordance with applicable API standards for rotating equipment, and Air Products specification 4WME-551001.
KC07	Torsional Critical Speed Analysis (Issue 2)	As Described In Issue 1. Torsional analysis in accordance with applicable API standards for rotating equipment, and Air Products specification 4WME-551001.
KC08	Wind/Seismic Design Calculations	
KC09	Thermal Rating Calculations	Thermal rating calculations.
KC10	Thrust Bearing Loads and Capabilities	Calculations to determine hydraulic and static components of total thrust bearing load, for both normal and maximum operating conditions. This to be compared to manufactured design capability.
KC11	System availability & Reliability Calculations	These should be produced in accordance with the Project Specification within the Enquiry, Purchase Order or Sub-Contract.
KC12	Campbell & Fatigue Analysis (Issue 1)	Blade analysis shall be provided for free-standing blades in axial compressor and steam turbine, including integrally shrouded steam turbine blading. Campbell diagram report to show: Blade natural frequencies for different modes versus frequencies of sources of excitation Fatigue diagrams to show: Blade alternating and mean stresses, and material alternating stress / mean stress fatigue limit appropriate to medium (e.g. humid air or steam conditions and impurities present in solution at blade row).
KC13	Campbell & Fatigue Analysis (Issue 2)	As Described In Issue 1. Blade analysis shall be provided for free-standing blades in axial compressor and steam turbine, including integrally shrouded steam turbine blading. Campbell diagram report to show: Blade natural frequencies for different modes versus frequencies of sources of excitation Fatigue diagrams to show: Blade alternating and mean stresses, and material alternating stress / mean stress fatigue limit appropriate to medium (e.g. humid air or steam conditions and impurities present in solution at blade row).
KC14	Calibration Data	
KC15	Tray Performance Calculations	Distillation tray performance calculations
KC16	Short Circuit Calculations	Short circuit calculations based on the rated data of the electrical equipment and the topological arrangement of the system in order to verify electrical devices ratings.
KC17	Imbalance Response Analysis for Shop Verification of imbalance response	
KC18	Computational Fluid Dynamics (CFD) Analysis	
KC19	Lateral Critical Speed Analysis	
KC20	Torsional Critical Speed Analysis	
KC21	Pulsation Analysis Report	
KC22	Value Dynamics Analysis Report	
KC23	Lateral and Torsional Critical Speed Analysis Certificates	
KC24	Pulsation Study	
KC25	Lateral Vibration Analysis	
KC26	Torsional Vibration Analysis	
KC27	Unit Start-Up Diagram	
KC28	Calculation to Alignment Schematic	
KC29	Rotor Dynamics (Lateral/Torsional) Analysis Report	
KC30	Hanger Testing and Calibration Reports	
KC31	Thermal Rating Calculations, including calculation of tube row temperature drop to justify tube material switch (as necessary)	
KD01	Heat Gain Calculations (Vacuum Insulated Tanks)	Calculation of heat leak to tank via insulation, piping, straps/bolts, etc.. To demonstrate compliance with section 5.5.1 of 4WEQ-1516 and or table 1 of 4WEQ-1516.
KD02	Mist eliminator Performance Calculations /data	Calculations proving Mist Eliminator will perform required separation duty.
KE01	Heat Emission Calculations	Calculations shall determine heat emitted to atmosphere for project loading and ambient temperatures specified by the Purchaser.
KE02	Enclosure Ventilation System Calculations	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
KE03	Soil Investigation Report	Stratigraphic conditions in the area and geotechnical characterization of the materials based on the whole set of in situ and lab results. Allowable pressures for shallow foundations. Indications about verification and calculations to be carried out for the design of the turbine foundations. Possible re-sue of excavated materials.
KE04	Soil Report 1	Preliminary Information
KE05	Soil Report 2	Final Information
KF01	Instrument Electrical Power Calculations	Calculations listing all power requirements for each instrument power user and totals for each ac and dc supply.
KF02	Instrument Air Requirement Calculations	Calculation listing the air consumption requirements for each instrument air user and total air requirements.
KF03	Bursting disc & Relief valve calculations	Technical data for relief valves and bursting discs, including sizing calculations, for process and cooling water duties. Lube oil relief valve calculations need not be submitted for approval, although they must be included in the Production Data Dossier.
KF04	CT & VT Burden Calculations	The supplier's calculations supporting the selection of the protection and instrument transformers shall be provided.
KF05	Instrument Sizing Calculations	Full calculations for each flow element - showing formula and values of all variables and constants.
KF06	Sizing Calculations	CV calculations required for Valve - Silencer Combinations only as identified in technical specification.
KF07	Inlet Strainer Sizing Calculations	
KF08	Actuator Sizing Calculations	
KG01	Lifting Lug Calculations	Calculations shall determine that the lug is suitable for all phases of lifting and operation without overstressing.
KG02	Shipping & Lifting Calculations (Option 1)	Calculations shall demonstrate that the vessel, lifting attachments, shipping supports and lashing points are suitable for all phases of lifting and shipping without overstressing.
KG03	Shipping & Lifting Calculations (Option 2) (Vacuum Jacketed Tank)	Calculations shall demonstrate that the outer jacket lifting attachments, shipping supports and lashing points are suitable for all phases of lifting and shipping without overstressing. Calculations shall also demonstrate that the inner tank supports and guides do not cause either the inner vessel or jacket to be overstressed as a result of shipping loads.
KH01	System Head Loss Calculations	Calculations to indicate basis on which equipment is sized, and will incorporate pipe friction, equipment elevation and terminal point static pressures.
KH02	Mechanical Strength Calculations (Bundles & Ducting)	Calculations shall be in accordance with relevant code requirements to prove design is adequate for operation within the parameters specified for the item, in terms of pressure, 0.XX bar overpressure (as stated in the purchase requisition), temperature, etc.
KH03	Mechanical Strength Calculations (Ambient Air Vaporizer)	Pressure thickness calculation. Wind and Seismic calculation. Structural Calculations. Lifting attachment Calculations.
KH04	Mechanical Strength Calculations (Inner Vessel)	Calculations shall be in accordance with relevant code requirements to prove design is adequate for operation within the parameters specified for the item, in terms of pressure, vacuum, temperature, etc. To include inner tank support design.
KH05	Mechanical Strength Calculations (Tank Jacket)	Calculations shall be in accordance with relevant code requirements to prove design is adequate for operation within the parameters specified for the item, in terms of pressure, vacuum, temperature, etc. To include Shipping loading, lifting lug calculations.
KH06	Mechanical Strength Calculations (Internals)	Calculations for the strength and deflection of the internal grids, trays, distributors, support beams, etc.
KH07	Mechanical Integrity Calculations (Vent Diffuser Nozzles)	Calculations shall be completed in accordance with a recognized pressure vessel design code to demonstrate the mechanical integrity of the diffuser nozzle. The design pressure and temperature shall be consistent with the circuit design pressure and temperature rating for the upstream pipe work system (actual values shall be stated on the equipment data sheet).
KH08	Pressure Vessel/ Exchanger Calculations (General)	The calculations shall contain all information requested in the Requisition or its attachments but as a minimum the following information is required: 1. Calculations for all pressure parts. 2. Calculation of support loads, i.e. due to dead weight, wind, seismic etc. 3. Structural calculations for supports and support to shell attachment.
KH09	Pressure Vessel Calculations (Inter & After-coolers)	For coded vessels calculations shall contain as a minimum the following information: 1. Calculations for all pressure parts. 2. Calculation of support loads, i.e. due to dead weight, wind, etc. 3. Structural calculations for supports and support to shell attachment. For un-coded vessels Supplier standard calculations are acceptable.
KH10	Pressure Vessel/ Exchanger Calculations (Fatigue)	A full fatigue analysis of the item - to include stress analysis, description and source of stress concentration factors employed, Description and source of S-N curves used together with description and sources of any weld fatigue strength reduction factors.
KH11	Electric Heater Calculations (shell & element temperature)	Detailed calculations to determine the element sheath and heater shell maximum surface temperatures
KH12	V-Wire Screen Calculations	V-WIRE SCREEN calculations - addressing all points required by the relevant Air Products specification. As a minimum the following will be required; calculations to address the size of V-wires, support rods, stiffeners, end plates, all welds under the design loadings noting that calculations shall be developed for complete load paths.
KH13	Orifice Plate Calculations	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
KH14	Inlet Strainer Pressure Design Calculations	
KH15	Pressure Vessel ASME Code Calculations	
KI01	Stress Analysis Calculations	E.g. Hoop stress calculations, piping stress calculations.
KI02	Piping flexibility/Stress Analysis Calculations	Piping flexibility/stress calculations to 4WEQ-1515 or 4WEQ-1516 and ASME B31.3. To include nozzle loading calculations.
KI13	Strength Calculations (Pressure Retaining Items)	Calculations shall be in accordance with relevant code requirements to prove design is adequate for operation within the parameters specified for the item, in terms of pressure, vacuum, temperature, etc. Calculations shall include wall thickness, branch reinforcement, flange ratings, etc. as appropriate.
KI14	Lighting calculations	
KI15	Panelboard load calculations	
KI16	HVAC spec., arrangement & calculations	
KI17	Plumbing spec., arrangement & calculations	Should include: 1. Floor Plan 2. Equipment Schedule 3. Isometrics
KI18	Mechanical Strength Calculations (Shell and Tube Vaporiser)	Calculation as defined in section 22.6 of 4WEQ-1420
KI19	EJMA Calculations	Calculations shall be in accordance with relevant code requirements to prove design is adequate for operation within the parameters specified for the item, in terms of pressure, vacuum, temperature, etc., including calculations to verify tie-rod/lug design.
KI20	VJ Piping Calculations	
KI21	Detailed EJMA Calculations	
KI22	Bellows Thickness Calculations	
KJ01	HVAC Calculations - (Buildings -Main Substation / PDC)	HVAC Calculations shall be fully prefaced giving reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters. detail basic climatic design parameters.
KJ02	HVAC Calculations - (Buildings -ACC Substation)	HVAC Calculations shall be fully prefaced giving reference material, design parameters, codes and specifications used and philosophy adopted. Where detailed computational analysis is provided, the input data shall be supported by calculations identifying input parameters. detail basic climatic design parameters.
KJ03	Hydraulic Calculations	E.G. For sprinkler and deluge systems, Wellhead Control Panels.
KJ04	Pressure Drop Calculations	pressure drop calculations
KJ05	Packing Performance Calculations	packing performance calculations
KK02	Piping Stress Analysis	
KP01	Reliability Studies & Calculation	Known reliability of equipment both as individual items of equipment and on a package basis. Reliability studies and calculations in accordance with the requirements detailed in the equipment specification.
KP02	SIL Validation Plans	
KR03	Equipment Sizing Calculations	
KX03	Mineral Wool or Perlite Analysis Report	
KY01	Safety Valve Sizing Calculations	
KY02	Control Valve Calculations	
KY03	Balance Piston Leakage Rates (IF APPLICABLE)	
KZ00	Miscellaneous Documents	
KZ06	Filer Element Calculations	Filter element mechanical calculations - addressing all points required by the relevant Air Products specification. As a minimum the following will be required; calculations to address the filter support structure and all welds under the design loadings noting that calculations shall be developed for complete load paths.
KZ07	Process Internals Calculations	Mechanical calculations for process internals addressing all points required by the relevant Air Products specification. Standard load tables supplier catalogues are acceptable in lieu of project specific calculations.
KZ08	Shell and element metal temperature calculations	
KZ09	Fatique Analysis	
KZ10	Carbon Steel Item Metal Temperature Calculations (for effect of conductive+convective temperature from inner vessel to annular space components and outer jacket relating to MDMT of said components)	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	PERFORMANCE DATA	
LA01	General Performance Data	This heading to cover any Performance Data required, but not previously covered by Code and Description.
LB01	Current Transformer. Magnetization Curves	Graph showing current transformer magnetization characteristics.
LB02	Fault Current Decrement Curve	
LC01	Motor Performance Curves	In the enquiry stage of the project, the bidder shall supply, as a minimum, the following per unit motor characteristic curves based on their quoted design: 1. Motor torque versus speed at rated voltage and predicted starting voltage. Load run up torque to be plotted on the same graph. 2. Motor current and power factor versus speed for the above voltages. 3. Stator and rotor thermal capacity curves when hot and cold for the above voltages. 4. For synchronous motors only, motor oscillating torque versus speed for voltages indicated under the first bullet. Following receipt of a Purchase Order, the supplier shall supply, as a minimum, the following per unit motor characteristic curves based on their final design: 1. Motor torque versus speed at rated voltage and predicted starting voltage. Compressor run up torque shall be plotted on the same graph. 2. Motor current and power factor versus speed for the above voltages. 3. Stator and rotor thermal capacity curves when hot and cold, for the above voltages. 4. Motor Efficiency and power factor versus load. 5. Cooling curve. 6. For synchronous motors only, motor oscillating torque versus speed for voltages indicated under the first bullet
LC02	Motor Requirement - Speed/Torque w/Load Inertia	
LC03	Characteristic Curve	
LC04	Motor Characteristic Cooling Curves	Curves to indicate cooling time constants.
LD01	Hydraulic Motor Performance Curves	Curves to indicate power developed at output shaft against varying input capacity and pressure, plus output pressure for the specified operating speed.
LE01	Compressor Performance Curves	Curves to indicate the discharge pressure, shaft input power, speed, polytrophic head and efficiency versus inlet capacity for specified inlet pressure, temperature and molecular weight and overall unit. Units controlled by variable geometry shall show curves for geometry increments. Units controlled by variable speed drivers shall be provided with curves for 80, 90, 100 and 105% rated speed. Curves shall indicate performance from surge through to choke.
LF01	Pump Performance Curves	Curves to indicate differential head developed, efficiency, input power required and NPSHR versus flow for rated impeller. Units driven by variable speed drivers shall indicate four performance curves to indicate performance from minimum to maximum operating speeds. Curves shall indicate performance from zero to 120% rated flow, with minimum continuous flow clearly indicated.
LG01	Rotary Pump Curves	Curves shall indicate discharge pressure and absorbed power versus inlet flow.
LH01	Gas Turbine Performance Curves	Curves for single shaft turbines for specified site conditions of atmospheric temperature and pressure, plus inlet and exhaust pressure loss, shall indicate firing temperature, exhaust temperature, combustion air flow, constant heat rate lines against power developed for output shaft speed between 75 and 105% rated speed. For multiple shaft turbines (constant or varying), exhaust temperature control shall also be indicated.
LI01	Fan Performance Curves	Curves shall indicate pressure rise, efficiency and power absorbed, versus inlet flow for specified inlet pressure, temperature and molecular weight. Curves shall also indicate performance from surge to 155% rated capacity. Fans with variable pitch screws shall indicate performance for five settings between maximum and minimum.
LJ01	Speed/Torque Starting Characteristics	Curves shall indicate inertia and speed of shafts in the system. Torque versus speed characteristics of both driver and driven equipment, and a statement as to the process condition prevailing at the driven equipment for the curve shown.
LJ02	Speed/Torque Starting Characteristics (Fans) PRELIM	Curves shall indicate inertia and speed of shafts in the system. Torque versus speed characteristics of both driver and driven equipment, and a statement as to the process condition prevailing at the driven equipment for the curve shown.
LK01	Crank/Effort Diagrams	Diagrams to indicate for full 360° rotation gas loading profile, inertia loading profile, plus resultant loading profile.
LL01	On/Off Valve Perform. Data	Torque figures for valve and actuator, opening and closing times, and number of actuator operations per reservoir charge.
LM01	CryoMachinery Expander Performance Curve	Final predicted machine performance data and overall performance curves with operating points identified on the curve.
LM02	CryoMachinery Compressor Performance Curve	Final predicted machine performance data and overall performance curves with operating points identified on the curve.
LM03	CryoMachinery Compressor Surge Curve	Final predicted machine performance data and overall performance curves with operating points identified on the curve.
LM04	CryoMachinery Blower Loading Map	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
LN01	Steam Turbine Performance Data	Steam mass-flow v. Power curves v Steam exit temperature, for the following steam conditions, each curve showing rated mass-flow point: 1. Guarantee steam conditions, 2. Minimum continuous inlet enthalpy conditions coincident with maximum continuous backpressure 3. Conditions as b) with lower inlet enthalpy swings and higher backpressure swings (Swings as defined in specification, or per IEC or NEMA variations) 4. Maximum continuous inlet enthalpy conditions coincident with minimum continuous backpressure 5. Conditions as d) with higher inlet enthalpy swings and lower backpressure swings (Swings as defined in specification, or per IEC or NEMA variations).
LO01	Steam Turbine warm-up speed-time curve with exit steam temperatures (Issue 1)	Preliminary steam turbine start-up speed-times curves for cold, warm, and hot starts showing steam exit temperatures and steam mass-flow for each dwell speed.
LO02	Steam Turbine warm-up speed-time curve with exit steam temperatures (Issue 2)	Steam turbine start-up speed-times curves for cold, warm, and hot starts showing steam exit temperatures and steam mass-flow for each dwell speed.
LP01	Performance conversion curves for off-design steam inlet and backpressure conditions	Conversion curves for correcting steam mass-flow at off-design inlet pressures and temperatures, and outlet pressures, to Guarantee inlet and outlet conditions.
LQ01	Performance curves for off-design steam mass flow and ambient conditions	Performance curves of back-pressure against steam mass flow for ambient temperatures from 10C to 40 in 5C increments, 43C to 49C in 1C increments. Curves for approx 3 turbine exit enthalpies, and for bypass valve set-point enthalpy.
LR01	Fill Chart	Chart and/or table of Releasable volume/liquid height for tank in cold condition.
LS01	Power Fuse Curve	
LT01	Protective Device Curves	
LU01	Relay Curves	
LV01	Thermal Rating Curves	Records of relevant qualified weld procedures.
LW01	Heat release curve	Heat release curve
LX01	Refractory Curing Time-Temperature Curves	
LZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	PROCEDURES	
MA01	Leak Test Procedure	Submit test procedure and details of testing.
MA02	Set Up & Procedure-N2/He Gas Leak Test	Submit test procedure and details of previous testing.
MA03	Tube/Tube sheet Leak Test Procedure	Procedure for solution-film, pressure halogen or helium leak test on tube/tube sheet joints.
MA04	Heat Leak Test Procedure	
MA05	Installation Procedure	
MA06	Refractory Installation Procedure	
MA07	Telescoping Inner Shell Procedure	
MA08	External Piping and Valves Pressure/Leak Testing Procedure	
MA09	Installation Procedure for Field Assembly	
MB01	Weld Repair Procedure	Procedure describing the method of removing defects. The technique of carrying out weld repairs and any NDT.
MB02	Welding Procedure Specification (WPS) ASME Form QW-482	Specification defining all shop and field welding techniques and test results, and in accordance with the requirements of the Purchase Order. Use standard supplier forms.
MB03	Repair Procedure	Procedure for any special requirements for repairing any Equipment being provided by the Supplier.
MB04	Welding Plan	In accordance with the Purchaser Documentation Specification.
MB05	Dimensional Inspection Procedure	As Title
MB06	Traceability (Matls.,Welds,NDT,etc.)	As Title
MB07	Manufacturing/Fabrication Procedure	Procedure explaining methods used to produce the required item (s) stated in the purchase order as detailed by the specification and/or data sheets.
MB08	Welding Procedure-Qualifications Record Procedure Qualification Record (PQR) ASME Form QW-483	Records of relevant qualified weld procedures.
MB09	Piping Procedure/Specification	Supplier to supply his standard for approval.
MB10	Perline Insulation Specification (Including Density and K Value)	As per Description.
MB11	Base Insulation Specification Including K Value	Statement of manufacture, material grade, thermal properties, strength and density.
MB12	Base Insulation Installation Procedure	To define method of insulation of the cellular glass and interleaving materials.
MB13	Drying/Purging Procedure	Procedure to comply with section 8.4 of 4WEQ-1516.
MB14	Cool Down Procedure & Operating Instruction	
MB15	Materials and Specifications	
MB16	Welding Procedure Specification (WPS)	
MB17	Welding Procedure-Qualifications Record Procedure Qualification Record (PQR)	
MB18	Welders Qualifications (WQC)	
MB19	Hardness Test Procedure	
MB20	CryoMachinery Installation and Commissioning Procedure	Installation instruction including equipment un-crating, unloading, cleaning, setting, alignment, leveling, anchoring and connection information. Lube oil system flush. Process and seal gas piping blowout. Instrumentation and Electrical calibration. Alarm and shutdown logic checkout.
MB21	Perlite Loading and Filling Procedure	
MB22	Refractory Dryout Procedure	
MB23	Refractory Installer Qualification Procedure	
MB24	Epoxy Block Testing Procedure	
MB25	Epoxy Block Assembly Procedure	
MB26	Tube to Tubesheet Joint Manufacturing/Fabrication Procedure	
MC01	Non-Destructive Test Procedure	Procedures defining extent, method and acceptance levels of all NDT in compliance with Purchaser's requirements, for materials and formed or welded fabrications by visual, radiographic, ultrasonic, magnetic particle, dye penetrant, eddy current or other techniques.
MD01	Heat Treatment Procedure	Suppliers procedures in accordance with the applicable code/standard and Purchaser's purchase order requirements.
MD02	Brazing Procedure Specification (BPS) ASME Form QB-482	
MD03	Bonding Procedure Specification	Specification defining all shop and field bonding techniques and test results in accordance with the requirements of the Purchase Order. Use standard supplier forms.
ME01	Vibration/Noise Level Test Procedure	Procedures defining extent, method and data to be recorded.
ME02	Performance Test Procedure	Suppliers procedures for testing to demonstrate compliance with Purchaser's requirements an and process guarantees in accordance with API Standards and Air Products Specification 4WME-551001 . Procedures shall indicate test bed arrangements, procedures to be adopted, readings to be taken, instruments to be used, and method of interpreting readings taken to determine basis for acceptance of results.
ME03	Performance Test Procedure (ACCs in Field)	Suppliers procedures for testing to demonstrate compliance with Purchaser's requirements an and process guarantees in accordance with the Air Products purchase order and its attachments . Procedures shall indicate test bed arrangements, procedures to be adopted, readings to be taken, instruments to be used, and method of interpreting readings taken to determine basis for acceptance of results.

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
ME04	System Test Procedure (F.A.T.'s)	Description of system test procedures for control systems, safety, trip/shutdown systems, electrical and telecommunication systems with typical test record documents. Factory test procedures are to be produced for use in tests to be conducted at the Supplier's or Sub-Suppliers works for each system. There shall also be an integrated test procedure to test all interfaces and connectivity, i.e. an overall test with all systems fully assembled and interconnected in the factory. (including central equipment and a representative number of field equipment's). These tests shall demonstrate complete compliance to the Project Specification within the Purchase Order or Sub-Contract.
ME05	Electrical Equipment Factory Acceptance Test Procedure	In the enquiry stage of the project, the bidder shall supply a copy of his test procedure together with a blank copy of his typical test report. Following receipt of a Purchase Order, the Supplier shall submit a schedule of tests to be performed on the equipment and outline methods. Full technical details shall be available at the point of test.
ME06	Instrument Test Procedure	Description of type test procedures for each type and model of instrument.
ME07	Package String Test Procedure	String/Mechanical run test procedure in accordance with API standards and Air Products Specification 4WME-551001.
ME08	Enclosure Integrity Test Procedure	
ME09	Mechanical Run Test Procedure	Mechanical run test procedure in accordance with API standards.
ME10	Valve Cavity Relief Test Procedure	One off each seat design and rating of trunnion mounted ball or through conduit gate valve shall be cavity relief tested. Valves to be tested shall be selected by the purchaser. The Supplier is to submit a test procedure for review.
ME11	Electrical Resistance Test Procedure	The electrical resistance testing, including the recording and reporting of results, shall be conducted according to a procedure approved by the Purchaser.
ME12	Critical Pitting Temp. Test Procedure	The Supplier shall demonstrate to the Purchasers satisfaction that the supplied steel possesses a PREn of 40 and has a Critical pitting Temperature of at least 50° C in 5% NaCl solution acidified to a pH of 4.0 to 6.0. Procedure to be submitted and approved prior to production testing.
ME13	Valve Backseat Test Procedure	The back seat test shall be completed on Gate, Globe, Needle and through Conduit Gate valves. A Procedure should be submitted for review, detailing any tapings required for leakage check.
ME14	Onshore Commissioning Procedures	Onshore Commissioning Procedures shall comprise a Mechanical Completion Procedure to verify the integrity of installation works completed by others and an Onshore Commissioning Procedure, all conducted by the Supplier. Mechanical Completion Procedures shall be produced which verify the mechanical completion for cables, cable termination's and equipment and systems physically installed by others. The procedure shall also certify the integrity of Supplier installed cables and termination's prior to the application of power. Onshore Commissioning Procedures shall be produced in accordance with the Project Specification within the Purchase Order or Sub-Contract.
ME15	Cable Wiring Procedure	Supplier to supply his standard for approval.
ME16	Factory Acceptance Test (FAT) Procedure for Programmable Electronic System (PES)	
ME17	Software Acceptance Test (SAT) Procedure for Programmable Electronic System (PES)	
ME18	Commissiioning Test Procedure for Programmable Electronic System (PES)	
ME19	Site System Test Procedure (S.A.T.'s) for Main Substation / PDC)	
ME20	Functional Test Procedure	
ME21	Ground Fault Relay Test Procedure	
ME22	Shop Test Procedure-Full Load Tests	
ME23	Shop Test Procedure-Running Tests	
ME24	Control System Field Validation Procedure	
MF01	Test Procedure (Hydrostatic & Pneumatic)	Procedures shall indicate test bed arrangement, procedures to be adopted, readings to be taken, instruments to be used, and method of interpreting readings taken to determine basis for acceptance of results.
MG01	Internal Lining Procedure	Where internal linings or weld overlays are offered i.e. ENP or 625 etc. in lieu of 3/6mm corrosion allowance, details of the proposal should be submitted.
MH01	Load Test Procedure	Procedure describing the method and extent of testing Cranes, Davits, Lifting Lugs in accordance with specified codes, standards and statutory and mandatory requirements.
MH02	Hanger Testing and Calibration Procedures	
MP01	Progress Reporting Procedure	
MI02	Pressure Test Procedure	
MI03	Water for Hydrotest	Details of acceptable water quality used for hydro test, and required treatment of water
MM02	Checking the Concrete Foundation (Site Erected Tanks)	As Tile
MM03	Dimensional Control of Cryogenic Tanks (site Erected)	As Tile
MM04	Inner Tank Dimensional Plotting (Site Erected tanks)	As Tile
MN01	System Operation Sequence Chart	
MS02	Procedure Qualification Record (PQR) ASME Form QB-483	
MT01	Vessel Cleaning Procedure	
MT02	Vessel Painting Procedure	
MZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	PACKING, STORAGE, SHIPPING & ERECTION	
NA01	Packing Requirements	Supplier to supply his standard packing details for approval.
NB01	Storage Procedures	This shall state all procedures which are necessary for storing equipment prior to installation. Procedure shall specify supports and environment, etc.
NC01	Preservation Procedures	This shall state all procedures which are necessary for the Purchaser to preserve the equipment in first class working order for the period from receipt of equipment from Supplier to the commissioning of equipment.
ND01	Surface Cleaning, Prep.& Painting Spec.	Suppliers proposed techniques for review and approval. This shall be supplied for equipment where exception to the project specification has been agreed (in writing).
ND02	Cleaning Procedure (Tanks)	Procedure for achieving cleanliness to Acceptance Criteria 4WP-SW70002 or 4WP-SW70003 as specified in the purchase order
ND03	Painting Procedure (Tanks)	Details of details of surface preparation, primer, undercoat and top coats manufacture and grade, thickness
ND04	Cleaning Procedure	
ND05	Paint Chips	
NE01	Re-Preservation Procedure	Preservation procedure for moth-balling equipment for long periods.
NE02	Re-Preservation Procedure (ACC's)	Preservation procedure for equipment for 6 to 12 months between cold commissioning (including) condensate system recycle run), and pre-hot-commissioning.
NF01	Un-Packing Procedure	The Supplier shall supply their standard unpacking procedures. As a minimum the procedures shall include a visual inspection of the goods for physical damage and a cross check of the supplied equipment quantities and serial numbers against.
NG01	Suppliers Packing List (Valves, Instruments, Equipment)	Fully detailed piece small packing list, including details of loose items and separately boxed sub-assemblies. Tag Numbers to be clearly identified. Erection fastener schedule to be included, if applicable to goods dispatched.
NG02	Suppliers Packing List (Bulk Piping)	Fully detailed piece small packing listing including Purchase Order Number, Purchase Order Item No., Description, Piping Code, (Not Tag No) Size and Quantity.
NG03	Suppliers Packing List (Spares)	Fully detailed small listing, including details of loose items and separately boxed sub-assemblies. AP Spare Parts Purchase Order, Item No. and Vendors Part No. (Column 'M' of SPIR Form) to be included.
NG04	Suppliers Packing List	Fully detailed piece small packing listing including Purchase Order Number, Purchase Order Item No., Description, Size and Quantity.
NH01	Erection Procedure	Diagrams to indicate sequence of erection.
NH02	Assembly & Installation Instructions (Process Internals)	Written procedure for the unpacking, installation, assembly, testing of the process internals.
NH03	Material handling instructions	Instructions for handling material
NH04	Assembly Clearances	
NJ01	Shipping Requirements	The supplier shall advise all shipping requirements according to 4WGN-10001.
NJ02	Copies of Shipping/Receiving Documentation	(Upon Completion of Fabrication)
NZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	SPARES	
PA01	Recommended Schedule of Construction , Precommissioning, Commissioning Spares and Spares for Operation	List shall indicate parts recommended by Supplier, and be defined by reference to cross-sectional drawings and relevant parts list. Against each entry, Manufacturer, Manufacturers part no, part interchangeability between other equipment provided by the same manufacturer to the plant, price and delivery shall be indicated.
PA02	AP/Supplier Sparing Strategy Document	List shall indicate parts recommended by Supplier, as defined and agreed on the sparing strategy GSA template, filled with the project specific information, with reference to cross-sectional drawings and any relevant parts numbers. Against each entry, Supplier shall indicate Supplier's Part Number, Quantity Required, Quantity Purchased with Compressor, Supplier Stock Part, Price, and AP TAG numbers.
PB01	Recommended Schedule for Normal Spare Parts (24 months) and Interchangeability Record	List shall indicate parts recommended by Supplier and be defined by reference to cross-sectional drawings and relevant parts list. Recommendation shall assume that recommended spares will be purchased with main equipment. Against each entry, Manufacturer, Manufacturers part no, number of parts in operation, and part interchangeability between other equipment provided by the same manufacturer to the plant, price and delivery shall be indicated.
PB02	Recommended Spare Parts List w/Prices	
PC01	Special Tools List	List shall indicate those tools necessary for removing equipment from transport at site, plus those necessary for installation and maintenance equipment. Against each entry, a brief description shall be indicated plus, where necessary for clarity, a drawing provided.
PD01	Recommended Insurance Spares	Essential Spares that have a long delivery time and/or require testing with the main equipment. Against each entry, Manufacturer, Manufacturers part no, number of parts in operation, price and delivery shall be indicated.
PZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	CERTIFICATION	
QA01	Suppliers Quality Plan (inc. Inspection & Test)	To be submitted in general conformance with the Supplier Document Submittal Specification.
QA02	Erectors Quality Plan (inc. Inspection & Test)	To be submitted in general conformance with the Supplier Document Submittal Specification.
QA03	Chemical Composition	
QA04	PMI Map	
QA05	Completed Manufacturer's Quality Report	
QA06	Supplier Inspection & Testing Plan	
QA07	Chemical Composition (for Flue Gas)	
QB02	Combustion Air Fan Motor Test Report	
QB03	Temperature Element Test Report	
QC01	Component/Assembly Balance Certificate	Static and dynamic test results.
QC02	NACE Conformance Certificate	Statement of compliance for items specified as requiring conformance to NACE standard.
QC03	Hydrostatic/Pneumatic Test Certificate	Tested to a recognized code or standard. Including marked-up isometrics for pipe work defining extent of test. Separate certificates required for all in-line piping items such as control valves, block valves, drains, strainers, condensate traps, pressure gauges, pump casings.
QC04	NDE Operator's Qualifications	In accordance with PCN, CSWIP, DRS or any other Purchaser approved standard for radiographic, ultrasonic, magnetic particle and dye penetrant examination.
QC05	Welder's Qualifications Welder/Welding Operator Performance Qualifications (WPQ) ASME Form QW-484	Qualification of all welder/welding operators using approved weld procedures and by weld position in compliance with the Purchaser's requirements. Code forms or Supplier standard forms to be used as appropriate.
QC06	Heat Treatment Certificates	Fully endorsed certificates of any heat treatment conducted during forming or fabrication such as normalizing, quenching, post weld heat treatment etc. Certificates must be fully traceable for each part by means of serial or unique numbering systems.
QC07	Calibration Certificates	Suitably endorsed valid certification to verify that instrumentation has been calibrated by a recognized authority. Where required by the equipment specification, suitably endorsed valid certification shall be supplied for calibration equipment.
QC08	Hazardous Area Test Certificates	The supplier shall submit copies of recognized approval authorities certification for all equipment certified for use in a hazardous area. These will usually should be in accordance with Euro norms or National Standards and issued by BASEEFA, PTB, or other approved test authority.
QC09	Fire Test Certificates	Certification issued by an approved testing establishment or recognized authority for hydrocarbon fires, jet or pool, for the durations stated in the Purchase Order Requisition.
QC10	Inspection Release Certificate	Fully endorsed certificate issued by Purchaser's inspector.
QC11	Code Compliance Certificate	The Certificate should be issued by the IIA, and document that all Pressure Vessels have been designed in accordance with the nominated code or standard, and that the review considered the specified design conditions, nozzle and environmental loadings. This certificate is not normally required for AME VIII 'U' stamp vessels.
QC12	Type Test Certificate	Copies of all relevant Type-Approval Certificates shall be submitted in accordance with the requirements of the Project Specification within the Purchase Order or Sub-Contract.
QC13	VA Survey Certificate	Document issued by the verification authority, covering their design appraisal and inspection as appropriate.
QC14	Lifting Equipment Test Certificate (Davits)	Required for all items, hoists, cranes wire ropes/shackles, pad eyes, lifting lugs, man way davits etc.
QC15	Material Test Certificates	Material Test Certification in accordance with BS EN 10204. The level of certification, traceability and marking of materials will be defined within the Purchase order referenced specifications, drawings and data sheets. Required in dispatch Dossier only where equipment is welded directly to material/equipment at fabrication yards.
QC16	Material Test Certificates (Tanks)	Material Test Report or Certificates of Compliance for Pressure Envelopes. This includes separate certificates for inner tank relief devices and associated block valves.
QC17	Material Test Certificates (Cryogenic Pumps)	
QC18	Material Test Certificates (Bulk Piping)	Material Test Certification in accordance with BS EN 10204. The level of certification, traceability and marking of materials will be defined within the Purchase order referenced specifications, drawings and data sheets. Each Material Certificate to be supplied to Air Products via e-mail in electronic PDF. format. Certificates to show the following additional data: 1. Purchase Order No. 2. Item No. 3. PDF File No 4. Piping Code 5. Part Description 6. Heat No 7. Shipment No. A hard copy of the certificate shall accompany the goods with the Dispatch Dossier.
QC19	Material Test Certificates (Cryogenic Vaporizers)	Material Test Report or Certificates of Compliance for Pressure Envelopes. In accordance with BS EN 10204. This includes separate certificates for control valves, block valves, drawings, strainers, condensate traps, pressure gauges, pump casings.
QC20	Material Test Certificates (Instrumentation)	Material Certification to CEN EN 10204, Type 3.1.B. All material certificates to be tag identifiable.

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
QC21	Material Test Certificates (Bursting Discs)	For Holders Only Material Certification to CEN EN 10204, Type 3.1.B. All material certificates to be tag identifiable.
QC22	Material Test Certificates (Thermowells)	For Thermo wells Only Material Certification to CEN EN 10204, Type 3.1.B. All material certificates to be tag identifiable.
QC23	Letters of Conformity	As applicable to non-certified material. The document (s) identifies the item with a code or specification.
QC24	Certificate of Conformity (Pressure Vessels)	Pressure Vessel Certificate (ASME for U1, PD 5000 form 'X', CEOC certificate of Conformity as applicable to the fabrication code). Certificate is to be endorsed by the Independent Inspection Authority certifying that the fabrication, inspection and testing has been carried out in accordance with the design code and approved drawings.
QC25	Noise Test Certificate/Reports	In compliance with the Project Specification within the Purchase Order.
QC26	Noise Test Certificate/Reports (Control Valves)	In compliance with the Project Specification within the Purchase Order and for all Silencer - Valve Combinations identified in technical specification. All noise certificates to be tag identifiable.
QC27	Vibration Test Certificate/Reports (Field Test)	In compliance with the Project Specification within the Purchase Order.
QC28	Lifting SWL Certificates for Wire Rope	A certificate stating the safe working load of the equipment and code compliance.
QC29	COSHH Certificate	Certificate to be issued detailing all substances that may be hazardous to health contained within the scope of supply. Material safety data sheets shall be supplied where relevant. If there are no hazardous substances the certificate shall say so
QC30	Conformity Declaration - EC EMC directive	Complies with Electromagnetic Compatibility Regulations SI (1992) 2372, as amended by SI (1994) 3080, or equivalent
QC31	Declaration of Conformity -EC Machinery Directive	Complies with Supply of Machinery (Safety) Regulations SI (1992) 3073, as amended by SI (1994) 2063, or equivalent
QC32	Declaration of Conformity -EC Electrical Directive	Complies with Low Voltage Electrical Equipment (Safety) Regulations SI (1989) 728, Electrical Equipment (Safety) Regulations SI (1994) 3260, or equivalent
QC33	Declaration of Conformity -EC Simple Pressure Vessels Directive	Complies with Simple Pressure Vessels (Safety) Regulations SI (1991) 2749, as amended by SI (1994) 3098, or equivalent
QC34	Pressure Testing Certificates/Reports	Certificate of compliance that the Pressure testing carried out to the supplier's pressure test procedure. Separate certificates are required for relief devices and block valves
QC35	Pressure Testing (Pressure Vessels and heat exchangers)	Certificate endorsed by the Independent Inspection Authority, certifying the pressure test was satisfactorily completed in accordance with the design code or standard.
QC36	Design Verification Statement	A declaration from the Supplier's design function that the pressure containing aspects of the items are designed in accordance with a recognized code or standard , and/or the design has been validated.
QC37	Design Basis Statement	Design Basis Statement shall identify all the standards, specifications and codes that will be adopted in undertaking the design work. The basic design parameters shall be specified and indicated.
QC38	Conceptual Design Basis Statement	Conceptual Design Basis Statement shall identify the philosophy to be adopted for particular areas and structures under consideration and shall preface calculation.
QC39	Oxygen Cleaning Report/Certificate	Certificate endorsed by the Independent Inspection Authority, certifying equipment meets Air Products oxygen clean acceptance criteria.
QC40	Construction, Inspection & Testing Certificate	Certificate endorsed by Inspector, certifying that construction, inspection and testing has carried out in accordance with the design code and the approved drawing
QC41	Statement of Compliance With AP Requirements	The bidder shall state compliance with Air Products requisition and attachments. The bidder shall advise Air Products of any exceptions to the Air Products documents. The exceptions shall refer to the Air Products document number, revision, and section. The bidder shall highlight any conflicts within the requisition and its attachments for Air Products resolution before any award of a purchase order. Reasons for the exception shall be given. Failure to list exceptions to the requisition shall be assumed to mean full compliance. Deviations declared following award of any purchase order might not be accepted.
QC42	Certificate of Compliance	The Contractor shall issue a Certificate of Compliance to the Owner Certifying that the equipment is in full compliance with the Project Specification Requirements & agreed deviations and concessions. Certificate to be signed by the assigned Lead Discipline Engineer (Engineer of senior standing) authorized in the manufacturing company as per the approved quality control system and by the Project QA Manager or the Project Director. Certificates to be tag identifiable.
QC43	Certificate of Manufacture	A certificate of manufacture for each item on the Purchase Order certifying that the equipment is in full compliance with the requirements of the Purchase Order prior to release for shipment. The certificate shall be signed by the assigned Lead Discipline Engineer (engineer of senior standing) authorized in the manufacturing company as per the approved quality control system and by an authorized manager from the manufacturing company. this certificate shall be copied and attached to the final inspection and also included in the Production Data Dossier.
QC44	Cable Test Certificates	A certified test certificate for each cable supplied containing insulation resistance, high voltage and partial discharge where applicable) test data in accordance with ICE 502 standard test requirements .
QC45	Cleanliness Certificate	This document shall include the results of tests which the Purchaser has witnessed. Suppliers standard format is acceptable and a preliminary copy shall be handed to the Purchasers representative on completion of witnessed tests
QC46	Brazer/Brazing Operator Performance Qualifications (BPQ) ASME Form QB-484	
QC47	Material Certifications	
QC48	MSDS Reports	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
QC49	Motor Test Report	
QC50	Declaration of Conformity -EC Pressure Equipment Directive	Complies with Pressure Equipment Regulations SI (1999) 2001, as amended by SI (2002) 1267, or equivalent
QC51	Topographical Survey	
QC52	ASME U1 Infomation	
QC53	System Pressure Test Record	
QC54	Certification Pack (Analysers)	The Certification pack should only contain documents listed in the required contents. As a minimum this shall include hazardous area certificates as stated on equipment specification and declaration of conformity to all EC directives (modify for non EU projects). Vendor is to assemble all data for the complete purchase order. It should not contain copies of documents such as manuals (Only required as standard for European orders)
QC55	Certification Pack (Control Valve)	The Certification pack should only contain documents listed in the required contents. As a minimum this shall include material certs in accordance with specifications for all in-line pressure retaining parts, hazardous area certificates as stated on equipment specification and declaration of conformity to all EC directives (modify for non EU projects). Vendor is to assemble all data for the complete purchase order. All certificates to be tag identifiable. It should not contain copies of documents such as manuals (Only required as standard for European orders)
QC56	Certification Pack (Programmable Electronic Systems)	The Certification pack should only contain documents listed in the required contents. As a minimum this shall include hazardous area certificates as stated on equipment specification and declaration of conformity to all EC directives (modify for non EU projects). Vendor is to assemble all data for the complete purchase order. It should not contain copies of documents such as manuals or FAT and SAT test reports. (Only required as standard for European orders)
QC57	Certification Pack (Flow Elements)	The Certification pack should only contain documents listed in the required contents. As a minimum this shall include material certs in accordance with specifications for all in-line pressure retaining parts, declaration of conformity to all EC directives (modify for non EU projects), calibration certs only when calibration is called for on the unit specification and Vendor is to assemble all data for the complete purchase order. All certificates to be tag identifiable. It should not contain copies of documents such as manuals (Only required as standard for European orders)
QC58	Certification Pack (General In Line Instruments)	The Certification pack should only contain documents listed in the required contents. As a minimum this shall include material certs in accordance with specifications for all in-line pressure retaining parts, hazardous area certificates as stated on equipment specification and declaration of conformity to all EC directives (modify for non EU projects). Vendor is to assemble all data for the complete purchase order. All certificates to be tag identifiable. It should not contain copies of documents such as manuals (Only required as standard for European orders)
QC59	Certification Pack (General Instruments)	The Certification pack should only contain documents listed in the required contents. As a minimum this shall include hazardous area certificates as stated on equipment specification and declaration of conformity to all EC directives (modify for non EU projects). Vendor is to assemble all data for the complete purchase order. It should not contain copies of documents such as manuals (Only required as standard for European orders)
QC60	Certification Pack (Panels)	The Certification pack should only contain documents listed in the required contents. As a minimum this shall include hazardous area certificates as stated on equipment specification and declaration of conformity to all EC directives (modify for non EU projects). Vendor is to assemble all data for the complete purchase order. It should not contain copies of documents such as manuals (Only required as standard for European orders)
QC61	Certification Pack (PED Relief Devices)	The Certification pack shall include: 1. Declaration of conformity to all EC directives 2. Test certificates to indicate compliance with EN ISO 4126 Production Testing (hydrostatic shell test, set pressure and API 527 seat leakage test). Tag identifiable test certificates are required for all full flow relief valves. Test certificates are not required for thermal relief valves and Cold Box Relief Valves (Marvac type 501 or 601) Material certs need not be submitted for PED-compliant CE marked valves
QC62	Mill Test Reports	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
QC63	Manufacture License (Special Equipment Licensing)	
QC64	Overspeed test certificate	
QC65	CRN Documentation	
QC66	Certificate of Duplication	
QC67	Authorized Inspector's Inspection Report	
QC68	Inspection Reports	
QC69	Inspection Ticket	
QC70	Certificate of Origin	
QC71	NAFTA Certificate	
QC72	Fisher Serial Card	
QC73	Supplier Self-Inspection Checklist	
QC74	Shell Pressure Test Certificates	
QC75	Seat Pressure Test Reports	
QC76	Certificate of Alberta Registration (ABSA)	
QC77	Cleaning Certificate	
QC78	Painting Certificate	
QC79	Crane Load Proof Test	
QC80	Contractors Health and Safety Plan	
QC81	Test Report	
QC82	Progress Report	
QC83	Material Test Certification	
QC84	Coating Application Certification Pack (Pipelines)	FBE Testing - Daily Testing information consisting of but not limited to: 1. Coater's Name & Address 2. Inspector's Daily Report 3. Mil Thickness checks 4. Batch number record 5. Holiday test 6. Bend test 7. Moisture content 8. Disbondment 9. Certificate of Analysis Note: Documents to be sent within 2-3 days after material coats
QC85	Pressure Test Certificate	
QC86	Standard Production Certificate	
QC87	UL Listing Certification	
QC88	F2 Clean Report Certificate	
QC89	Inspection and Test Reports	
QC90	Copy of Inspection Tag	
QC91	Certificate Report for Cellular Glass	
QC92	Hydrostatic or Pneumatic Test Certificate to a recognized code or standard	
QC93	Material Certification to CEN EN 10204	Material Certification to CEN EN 10204, Type 3.1. All material certificates to be tag identifiable.
QC94	PED Certification	The supplier shall determine which PED category the items are supplied to. For equipment rated as SEP, Material and Pressure Certificates in accordance with EN10204 type 3.1are required (QC03 & QC83) For all other equipment, a Declaration of Conformity in accordance with the EC Pressure Equipment Directive is required. (QC50) All PED certification shall be tag identifiable.
QC95	PMI Test Results	
QC96	Refractory Installer Qualification Documentation	
QC97	Refractory Material Qualification Test Reports	
QC98	Refractory Water Chemistry Analysis	
QC99	Refractory Installation Logs	
QC0A	Russian Pressure Vessel Passport	Russian Pressure Vessel Passport issued in accordance with Russian codes & regulations if available, with option pricing. (Паспорта в соотв.с росс.нормами и правилами)
QC0B	Russian Gost-R Certification	Gost-R certification in Russian language, or letter of exemption as appropriate.
QC0C	Russian Permission to Use Equipment	Permission to use equipment (Разрешение на применение) if available. Issued by Rostechnadzor (Government approval body) based on examination. Option pricing to be supplied to Air Products.

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
QC0D	Certification Pack (Rupture Discs)	Certification to include: 1. Burst Test results 2. Certification of Conformance to the country requirements indicated on the specification, such as: a. ASME Code Section VIII, Division 1 or b. PED 97/23/EC Category IV Module B and D c. Canadian Registration Number (CRN) d. Korean Gas Safety (KGSC and or KOSHA) e. Chinese TS Certification (SQL) f. GOST g. other, as stated on the specification 3. Conformance to the specifications on the purchase order 4. List of materials (material certifications need not be submitted unless specifically requested with a QC47 VDR Code) 5. NACE compliance (if required)
QC0E	Manufacturer's Affidavit	
QD01	Nameplate Drawing/Rubbing	As applicable to the equipment.
QD02	Nameplate Rubbing (Vessels)	A legible reproduction of the vessel nameplate including the stamped-on pressures and temperatures - may be a photograph, rubbing or photocopy of the actual finished nameplate.
QD04	Nameplate Rubbing (Tanks)	A legible reproduction of the tank nameplate including the stamped-on pressures and temperatures.
QD05	Nameplate Details (Ambient Air Vaporizer)	To include data specified in section 8.1 of 4WEG-1405.
QD06	Nameplate Rubbing (Ambient Air Vaporizer)	A legible reproduction of the equipment nameplate including the stamped-on pressures and temperatures.
QD07	QC Data Drawing (Weld & NDE)	Drawing showing location of all welded joints, weld procedures used, Radiography locations, film numbers and welder identification together with locations of any other NDT details of report numbers. Drawing is to be endorsed by the independent inspector.
QD08	Material Location Plan	A plan showing location of materials in a structure or welded to the pressure envelope, with plate and heat numbers.
QD09	Material Identification Chart (Tanks)	Material Identification Chart showing cast numbers for all pressure and strength components
QD10	Component Nameplate Facsimilies	
QD11	Nameplate - Electrical	
QD12	Copy of Manifold Nameplate	(Upon Completion of Fabrication)
QT01	Instrument/Electrical Test Report	Heat run, short circuit, etc. test reports.
QT02	Electrical & Mechanical Run-Out Report	
QT03	Strip down Test & Record	Report of equipment condition after functional test and strip down.
QT04	Weld ability Data	Information regarding weld ability of materials, including but not limited to hardness, impact and CTOD test results. Primary Stl & Duplex only.
QT05	Heat Treatment Charts	As applicable to accompany heat treatment certificates.
QT06	NDE Test Reports	Detailed NDT reports detailing procedure used, acceptance levels, results obtained and action for radiographic, ultrasonic, magnetic particle dye penetrant and eddy current examinations. Reports shall identify code/standard, components tested, location, operator, date, heat treated condition and weld repairs (as applicable). (Ref MC) Report to be submitted to INSPECTOR for approved prior to hydro pneumatic testing.
QT07	NDE Test Reports (Lifting Lugs & Shipping Attachments)	Certificate for magnetic particle or dye penetrant examinations.
QT08	Package String Test Report	String/Mechanical run test report in accordance with API standards and Air Products Specification 4WME-551001.
QT09	Performance Test Report	Suppliers report on performance testing of equipment, part of mechanical run test to test trips, with the copies of data, indicating that equipment complies with Purchaser's specification.
QT10	Performance Test Report (ACCs) (Field Test)	Suppliers report on performance testing of equipment with copies of data, indicating that equipment complies with Purchaser's specification.
QT11	Performance Test Report (Electrical)	Formal issue of inspection and test results including those Air Products have witnessed. The documents shall include, as a minimum, the results of the tests requested in Air Products documentation. Supplier's standard format is acceptable and a preliminary copy shall be handed to the Air Products test representative on completion of witnessed tests. Any code 4 documents or data altered by the test results shall be resubmitted "as tested," including all characteristic curves and completed Air Products data sheet.
QT12	Dimensional Control Reports	Report produced during fit up stages i.e. sub assembly, joints, final as-built.
QT13	Functional Test Report	Report of functional test to meet specified criteria.
QT14	Cable & Wiring Installation Reports	Continuity test records on completion of installation of equipment.
QT15	Earthing / grounding & Continuity Check Reports	Test results after completion of installation.
QT16	Proof Test Reports	Results of test on equipment subject to distortion tests.
QT17	Deflection Test Reports	Results of test on equipment subject to distortion tests.
QT18	Production Test Report	Results of mechanical test of production welds.
QT19	Painting/Coating Test Report	As required by the Project Painting and Coating Standards.
QT20	Mechanical Run Test Report	
QT21	EMC Test Report	Test reports or evidence of testing of electronic systems demonstrating compliance with IEC 6100-4 parts 1-6 for Electromagnetic Compatibility.

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
QT22	Pneumatic Valve Leak Test Report	Test Report for control valve pneumatic seat leak and body test in accordance with recognized standards.
QT23	Hardness Survey Report	Report on the results of the hardness survey on the equipment in accordance with the applicable code and project requirements, showing hardness values and their location.
QT24	System Test (F.A.T.'s) Report	Full test report for each test as detailed in MJ
QT25	Onshore Commissioning Report	Full test report for each test as detailed in M8
QT26	Turbine Rotor Heat Stability Test Report	
QT27	Leak Test Report	Results after completion of Leak Test to be endorsed by the Independent Inspector.
QT28	Repair Reports (If Applicable)	Report to be submitted to INSPECTOR for approved prior to hydro pneumatic testing
QT29	Sign-Off for Temporary Cover Removal from Vessel Nozzles	
QT30	NDT Inspection Report	
QT31	Cleanliness Inspection Log	
QT32	Sign-Off for Shipping Pressure Integrity of Vessels	
QT33	Heater Resistance Test Report	
QT34	Safety Relief Valve Test Report	Safety Relief Valve Test report to include the following: Set pressure (pop) test API 527 seat leakage test (for ASME stamped relief valves) Pneumatic backpressure test (if required, for valves discharging to closed systems) Test reports shall be tag identifiable, except for small non-ASME devices (such as Generant), where tabulated test reports by serial number are acceptable.
QT35	Miscellaneous Receiving Report	
QT36	Rotor to Stator or Casing Clearance Check Report	
QT37	Shop Verification of Unbalance Response Analysis Report	
QT38	Gas Seal Mechanical Test Results	
QT39	Compressor Mechanical Test Results	
QT40	Analytical Performance Test Report	
QT41	Copy of Completed Test Specification	
QT42	Rotor Balance Data	
QT43	Mechanical Test Report	
QT44	Acoustical Study	
QT45	Mechanical Response Study	
QT46	Purifier Purity Performance Test Report	
QT47	Heater Electrical Insulation and Resistivity and Test Results	
QT48	Valve Motion Study	
QT49	Dye Penetrant Report	
QT50	Cellular Glass Block Test Report for Each Production Lot	
QT51	Refractory Production Test Reports	
QT52	Refractory Inspection Reports	
QT53	Impeller Overspeed Test Report (If Applicable)	IF APPLICABLE
QU11	Material Certs (Pipelines)	1. Certified Material Test Report 2. Bill of Lading/Packing List 3. Tallies 4. Letter of Compliance (only if the MTR is not available or ISO 9002 Facility) Note: MTR's to be sent at time of shipment.
QV01	Concession Requests	Using project Performa contained in the purchase order. (AS APPLICABLE)
QV02	Verification Authority Acceptance/Rejection Notes	Issued by the VA to indicate acceptance - acknowledges acceptance pending the issue of official certificate. Non-acceptance for non-compliance with the requirements of the purchase order.
QV03	Non Conformance Notice (NCN)	Notice issued by inspector when goods deviate from purchase order requirements.
QV04	Punch List	List of outstanding work/activities generated by Purchaser's inspector and agreed and signed by supplier.
QV05	Material of Construction List	
QV06	Verification Orifice Installation	
QV07	Pretest Flow/Mechanical Check Review	
QV08	Certificate of Conformance	
QV09	Copy of Temporary Deviation Reports (If Applicable)	
QV10	Copy of any Request for Additional Changes	
QV11	Copy of QC Rejection Reports (If Applicable)	
QV12	Requested Change Log	(Upon Completion of Fabrication)
QV13	QA Deviation Report	(Upon Completion of Fabrication)
QV14	Pressure Vessel Permits (Fabrication)	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
QV15	Certificate of Conformance (to specification and country requirements)	Certificate(s) of Conformance shall 1) state the item meets the requirements of the purchase order and 2) indicate the item complies with the country specific requirements on the specification, such as: a. ASME VIII (a Form UV-1 may be used for this purpose) b. PED c. Canadian Registration Number (CRN) d. Korean Gas Safety (KGSC and or KOSHA) e. Chinese TS Certification (SQL) f. GOST g. other, as stated on the specification 3. indicate NACE compliance (if required)
QZ00	Miscellaneous Documents	
R600	Completed Appendix A	of 4WEL-20 for Sync Motor and completed Appenxi B of 4WEL-20 for Induction Motors
R601	Completed Appendix B of Specification 4WEL-20	
RA02	Destructive Tests Report	Results of tests on equipment subject to destructive testing.
RB02	Piping System Check Sheet-Alum/SS	
RB03	Piping System Check Sheet-Copper	
RB04	X-Ray Reader Log	
RB05	X-Ray / Weld Maps	
RE02	Record of Paint Application	
RG01	Project HSE Plan	The Project HSE Plan shall make reference to the Suppliers existing HSE Management system with specific enhancements to meet project standards and to cover the scope of the purchase order.
RQ03	Pressure Test Results (Process Piping Systems)	Completed Pressure Test Form signed by APCI Representative and Contractor
RY02	Element Seal Test Report	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	MANUALS	
SA01	Dispatch Dossier	The minimum acceptable certification required for equipment to be released. Only applicable with prior written approval and under special instruction from the Purchaser. The dispatch dossier shall be available with the goods and shall be indexed in accordance with the following sections: 1. Contents List 2. Packing List - Deliverables should refer to our Purchase Order & Item numbers. 3. Purchaser's Inspection Release Certificate. 4. Purchaser's QC Punch List detailing work outstanding, approved by the Purchaser and Supplier. 5. Certificate of Conformity. 6. Material Test Certificates (only for materials to be welded on Site) 7. Hazardous Area Test Certificates. 8. COSHH Certificates for any materials hazardous to health. 9. Any special instructions for lifting, handling, unpacking, installation, storage and preservation. De-preservation, including preservation status at dispatch.
SA02	Dispatch Dossier (short version)	This should include a packing list, requested certification and either, the inspection release certificate or, inspection waiver notification and IOM.
SB01	Index for "Install'n, Op'n & Maint' Manual"	The Manual shall be indexed in accordance with the following sections: 1. Technical Description 2. Installation 3. Commissioning 4. Operating 5. Maintenance 6. Parts Data
SC01	Index for Production Data Dossier	The Manual shall be indexed in accordance with the following sections: 1. Front Sheet 2. Main Index 3. Equipment Index 4. Supplier Document Schedule 5. Inspection Release Certificates 6. Conformance Certificates 7. Code Compliance Certificates 8. Nameplate Rubbings 9. Concession Requests 10. Quality Plan 11. Material Certificates 12. Hazardous Area Schedule & Certificates 13. Fabrication & Welding 14. Non Destructive Testing 15. Heat Treatment 16. Performance/Functional Testing 17. Pressure Testing 18. Painting, coatings, and Linings 19. Drawings, Weights & Dimensions Where there is no data applicable to the sections referenced above the index shall indicate "Not Applicable".
SC02	Index for Manufacturing/Construction Dossier	
SD01	Index for Mechanical Catalogue	The Mechanical Catalogue shall collate in one catalogue all Final engineering drawings and documents: 1. Arrangement Drawings 2. Electrical 3. Process 4. Instruments 5. Data Sheets 6. Schedules 7. Detail Drawings 8. Mechanical 9. Calculations 10. Performance Data 11. Procedures 12. Packing, Storage & Erection 13. Certification
SD02	Index for Engineering Manual	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
SE01	Installation, Oper'n & Maintenance Manual	A single combined document to satisfy the contents as indexed in the Purchaser's Document Specification. 1. Technical Description Section shall include technical and functional descriptions, calculations, curves and tables and technical reports and other relevant design documents 2. Installation Section shall include all erection/assembly drawings, instructions as to the use of special tools provided, tolerances allowed on setting dimensions, handling and unpacking instructions. Also includes quantities of preservatives and fluids required for shipment. 3. Commissioning Section shall include list of spare parts, special tools and utilities required, pre-commissioning checks to be performed, sequenced procedure for start-up and fault finding guidelines. Copies of all relevant drawings shall be included. 4. Operating Section shall include description of equipment, operating procedures for start-up, steady stage, shutdown, emergency and fault conditions, operating parameters, function of protective devices and controls, copies of all relevant cause and effect charts and block diagrams, and fault finding guidelines. 5. Maintenance Section shall include instructions for maintenance disassembly, repair/overhaul and reassemble, schedule of preventative maintenance/maintenance frequencies, use of special tools, use of tools, diagram and description of complicated removal replacement/disassembly/assembly procedure, clearances and tolerance between moving parts. 6. Parts Data A breakdown of all parts for operating spares. To include as a minimum all components known to require replacement during normal life, with sufficient information for re-ordering.
SE02	Installation, Oper'n & Maint' Manual	Standard Supplier Catalogues for Installation, Operating & Maintenance Instructions. Manuals are required per different item type and not for every item supplied. All Manuals to be tag identifiable.
SE03	Installation, Oper'n & Maint' Manual (Control Valve)	Standard Supplier Catalogues for Installation, Operating & Maintenance Instructions of valve , actuator and all accessories. One IO&M per item type supplied.
SE04	Installation, Oper'n & Maint' Manual (Tanks)	The Supplier shall provide a document containing the information listed below as a minimum: 1. Technical Description Section shall include the index and a brief technical and functional descriptions. 2. Installation Shall contain the Perliting Procedure and Drying Procedure 3. Commissioning Shall contain the Cool down Procedure 4. Operating Shall contain the Operating Instructions and include the Fill Cart (capacity / liquid height) 5. Maintenance Shall include the following: Installation & Maintenance instructions for Relief devices and associated field test connection and bleed valves for inner tank lines A1, A2 & C. Installation and Maintenance instructions for PIC controlled valve for vent line B. Installation and maintenance instructions for manual block valves lines A1, A2, B & C Installation and Maintenance instructions for interlocks on manual valves lines A1, A2 & C. Installation and Maintenance instructions for Relief Devices for outer tank nozzles Q & P1 Installation and Maintenance instructions for Internal Shutoff Valves and Actuators (if fitted) Installation and Maintenance instructions for Level Gauges (if fitted) 6). Parts Data A breakdown of all parts for operating spares. To include as a minimum all components known to require replacement during normal life, with sufficient information for re-ordering.

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
SE05	Installation, Oper'n & Maint' Manual (Elec Equip)	A single combined document to satisfy the contents as indexed in the Purchaser's Document Specification. 1. Technical Description Section shall include technical and functional descriptions of main and sub-auxiliary items, calculations, curves and tables and technical reports and other relevant design documents including protection relay manuals and setting information. 2. Installation Section shall include all erection/assembly drawings, instructions as to the use of special tools provided, tolerances allowed on setting dimensions, handling and unpacking instructions. Also includes quantities of preservatives and fluids required for shipment. Any safety issues associated with installation shall be detailed. Bill of materials for any equipment supplied loose 3. Commissioning Section shall include list of spare parts, special tools and utilities required, pre-commissioning checks to be performed, sequenced procedure for start-up and fault finding guidelines. Alarm and trip settings for temp/flow/level devices shall be detailed. Copies of all relevant drawings shall be included. Any safety issues associated with commissioning shall be detailed. 4. Operating Section shall include description of equipment, operating procedures for start-up, steady stage, shutdown, emergency and fault conditions, operating parameters, function of protective devices and controls, copies of all relevant cause and effect charts and block diagrams, and fault finding guidelines. Any safety issues associated with operating shall be detailed. 5. Maintenance Section shall include instructions for maintenance disassembly, repair/overhaul and reassemble, schedule of preventative maintenance/maintenance frequencies, use of special tools, use of tools, diagram and description of complicated removal replacement/disassembly/assembly procedure, clearances and tolerance between moving parts. Any safety issues associated with maintenance shall be detailed.
SE06	IOM Manual for Omega	
SE07	IOM Manual for LMI Pump	
SE08	IOM Manual for LMI Speed Control	
SE09	Detailed Assembly and Disassembly Manual	
SG01	Production Data Dossier	A compilation of test certification and certified data.
SG02	Manufacturing & Construction Dossier	
SG03	Quality Assurance & Inspection Book	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
SG04	VJ Piping Dossier	Dossier should include the following: 1. 1.1X & 1.5X Design Pressure 2. Bolt Location Sheets 3. Cleanliness Report 4. Dimensional Report 5. Dye Penetrant Test Procedure 6. Erection Marking Plans 7. Exam Reports & Radiograph 8. Fabrication / QC Procedures 9. Inspection Report 10. Leak Test Report 11. Material Certification 12. Material Quality Report 13. Pressure Test Certificates 14. Quality Assurance 15. Retension Test 16. Test reports 17. Valve seat closure test 18. Vendor catalogues and data 19. Visual inspection report 20. Warranty
SG05	Piping Dossier	
SG06	Vessel Dossier (Silencers)	
SG07	Switch Valve Skid Dossier	
SG08	Data Dossier (Programmable Electronic Systems)	The data dossier shall contain PES suppliers FAT & SAT test records.
SG09	Data Dossier (Panels)	The data dossier shall contain suppliers FAT test records.
SG10	Valve Dossier	1. Detail Design Drawing 2. Material Quality Report with Mill Certificates and Impact Test 3. Welding Procedure Specification (WPS) for welding in accordance with JIS Specification Z 3040 4. Procedure Qualification Record (PQR) for welding in accordance with JIS Specification Z 3040 5. Weld Test Certificate 6. Visual Inspection Report 7. 4X Design Pressure Test Report with Photograph 8. 1.0X Leak Pressure Test Report 9. 1.5X Proof Pressure Test Report 10. Dye Penetrant Test Report and Procedure 11. Valve Seat Closure Test 12. Valve Shell Thickness Calculation Sheet
SG11	Flow Meter Dossier	1. Certificate of Compliance 2. Certificate of Conformance 3. Mill Certificate 4. Inspection Report
SG12	Japanese-Butterfly Valve Dossier	1. Detail Design Drawing 2. Material Quality Report with Mill Certificates and Impact Test 3. Welding Procedure Specification (WPS) for welding in accordance with JIS Specification Z 3040 4. Procedure Qualification Record (PQR) for welding in accordance with JIS Specification Z 3040 5. Weld Test Certificate 6. Visual Inspection Report 7. 1.0X Leak Pressure Test Report 8. 1.5X Proof Pressure Test Report 9. Dye Penetrant Test Report and Procedure 10. Valve Seat Closure Test 11. Valve Shell Thickness Calculation Sheet

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
SG13	Japanese-Cryogenic Globe Valve Dossier	1. Detail Design Drawing 2. Material Quality Report with Mill Certificates and Impact Test 3. Welding Procedure Specification (WPS) for welding in accordance with JIS Specification Z 3040 4. Procedure Qualification Record (PQR) for welding in accordance with JIS Specification Z 3040 5. Weld Test Certificate 6. Visual Inspection Report 7. 4X Design Pressure Test Report with Photograph 8. 1.0X Leak Pressure Test Report 9. 1.5X Proof Pressure Test Report 10. Dye Penetrant Test Report and Procedure 11. Valve Seat Closure Test
SG14	Japanese-Venturi Flow Meter Dossier	1. Certificate of Compliance 2. Certificate of Conformance 3. Mill Certificate 4. Inspection Report
SG15	CryoMachinery Dossier Information	The following documents will be completed by CryoMachinery during project execution. These documents reflect the materials and fabrication history of the equiment and shall contain sufficient information to assure Air Products of the quality of workmanship and compliance with the purchase order requirements. These documents will be filed at the CryoMachinery production facility. Informtation is available upon request. As-built Bill of Material Record of Assembly Clearance Pressure test reports Balance report Shaft de-glitch report Material Certification Non-destructive test reports Pattern approval Oxygen clean compliance Actuator stroking report Gas bearing foil test report Mechanical spin test data Loose parts list Accessory system inspection report
SG16	Pressure Vessel Dossier	
SG17	System Dossier	
SH01	Mechanical Catalogue	The Manual shall collate in one catalogue all Final engineering drawings and documents.
SH02	Engineering Manual	
SI01	Civil Construction Technical Enquiry Package	Collation of specifications, drawings, bills of quantities or schedule of rates where applicable, into a package for issue with a construction enquiry
SJ01	Buildings Construction Technical Enquiry Package	Collation of specifications, drawings, bills of quantities or schedule of rates where applicable, into a package for issue with a construction enquiry
SK01	Final Construction Drawings and Site Dossiers	Collation in one catalogue all Final engineering drawings and documents.
SL01	Manufacturer's Technical manual	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
SL02	CryoMachinery Technical Manual	The Technical Manual shall contain as a minimun: Generic information for the expander frame with one section of project specific information including the engineering document list. Table of Contents. Equipment description. Troubleshooting information. Maintenance instructions in sufficient detail to allow complete strip down and reassembly, including clearances and bolt torques, except for units which are not field serviceable. Routine inspection and maintenance instructions. Plug-in removal and installation instructions. Appendix including Accessory catalog information. Final drawings and documents as follows: General arrangement drawing and bill of material. Turbo-assembly drawing and bill of material. Expander outline drawing and bill of material (if applicable). Accessory system assembly drawing and bill of material (if applicable). Expander case installation (if applicable). Product Definition Specification (includes equipment and instrument summary information). Installation and commissioning procedure. Instrument termination diagram. Performance Curve. Manuals/Data sheets for ancillary equipment such as heaters, motors, pumps, control valves, instruments and vessels. Documents to include operation, calibration, and maintenance instructions; maintenance requirements i.e. motor bearing lubrication requirements, etc.; spare parts/replacement parts list; etc.
SL03	Technical and Operating Manual (In English; include copy of software)	
SZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
AS SHIPPED DOCUMENTATION		
TA01	As Built Documentation	"AS-Built" documentation is only required where the manufacture of equipment varies from the "Final Certified" documentation approved by the Purchaser. These variations must be approved by the Purchaser and the VA as appropriate and the relevant approval document (fax/letter/e-mail etc.), date must be entered in the Drawings Revision Book.
TA02	As Built Documentation (Vessels)	As built drawings
TA03	As Built Documentation (Civil)	As built drawings shall be prepared using highlighted AFC drawings annotated by the contractor to reflect actual construction. As-built drawings will only be required for Site Arrangements and concrete / foundation general arrangement drawings and building electrical HVAC drawings.
TA04	As Built Jacket Penetration Dimensions	
TA05	As Built Bolster Hole/Slot Dimensional Location	
TA06	As Built Drawings	Mark-up of APCI drawings for as-builts, or Contractors actual as-builts, as is applicable.
TA07	As Built Performance Curves	
TA08	As Built Drawings (Visual and Dimensional Verification Marked on Drawings)	(Upon Completion of Fabrication)
TB01	As Commissioned Documentation	Only required where the configurations of equipment or systems varies from either the 'as-built' or 'Final Certified' documentation approved by the purchaser. These variations must be approved by the Purchaser and the VA as appropriate and the relevant approval document (telex/letter etc.), date must be entered in the Drawings Revision Book.
TZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
	WEIGHTS	
VA01	Packaging Weight Statement	Statement quantifying packaging used in scope of supply. by weight and material type. Packaging must be quantified in metric tons, for each material type, e.g. glass, paper/fiberboard, plastics, aluminum, steel, wood, other (cork, textiles, ceramics etc). Also details of country packaged supplies are sent from. This information is required by the Producer Responsibility Obligations (Packaging Waste) Regulations (SI 1997/648), and the Packaging (Essential Requirements) Regulations (SI 1998/11656).
VA02	Net and Gross Weight of Package(s) in Kilograms (pounds)	(Upon Completion of Fabrication)
VA03	Dimensions of Package(s) [Length x Width x Height in Millimeters (inches)]	(Upon Completion of Fabrication)
VB01	Purchaser's Weight & C.of G. Info. Sheet	Use Suppliers Performa contained in the Technical Requisition. To include e.g. for all conditions of testing, operation, shipping and C of G.
VB02	Cold Box weight	
VC01	Weight Certificate (for Purchased Equip.)	Use Suppliers Performa contained in the Technical Requisition.
VD01	Weight Bridge Platform	
VD02	Digital Weight Indicator Data	
VZ00	Miscellaneous Documents	

VDR SHORT CODES	VDR LONG DESCRIPTION	COMMENTS
		Black = Previous changes made to original from information received from specifiers.
		Gray = Spelling
		Green = Headings
		Red = New revisions made to original.
		Yellow = Definition required