ALL WORK TO COMPLY WITH THE LATEST CO-OP REFRIGERATION SPECIFICATION

PLANT NOTES

A **PLANT - COMPRESSOR PACK**
- COMPRESSOR PACKS SHALL COMPRISE OF COMPRESSORS, LIQUID RECEIVER (SUPPLIED LOOSE AS A SEPARATE SUB ASSEMBLY), OIL SEPARATOR AND CONTROL PANEL WITH INTEGRATED RDM CONTROL SYSTEM, DISCHARGE PIPE WORK, SUCTION PIPE WORK WITH SUCTION FILTER (S) AND ALL INTERCONNECTING PIPE WORK AND SHUT OFF VALVES REQUIRED FOR SAFE OPERATION.
- THE MAJOR PACK COMPONENTS SHALL BE SELECTED AND SIZED BY THE PACK MANUFACTURER TO ENSURE ENERGY EFFICIENT, LEAK FREE OPERATION.
- COMPRESSOR PACKS WILL BE SUPPLIED CHARGED WITH THE CORRECT OIL TO THE MODLE OF THE OIL RESERVOIR SIGHT GLASS.
- PACKS ARE TO BE DELIVERED WITH A HOLDING CHARGE OF OXYGEN FREE NITROGEN AT 2BAR.
- THE CONTROL PANEL WILL BE COMPLETE WITH ALL NECESSARY CONTROLS AND EQUIPMENT TO OPERATE THE PACK COMPONENTS AND CONDENSER, HOUSED WITHIN SUITABLY IP RATED ENCLOSURE, COMPLETE WITH EXTRACT FAN (IF DEEMED NECESSARY BY MANUFACTURER) AND INTAKE FILTER, INTERLOCKING MAINS ISOLATOR AND WARNING LABELS.
- THE ELECTRICAL CONTRACTOR SHALL SUPPLY AND CONNECT ALL ELECTRICAL AND CONTROL WIRING TO THE COMPRESSOR PACKS.
- THE REFRIGERATION CONTRACTOR IS RESPONSIBLE FOR THE SUPPLY , POSITIONING AND CONNECTION OF THE REFRIGERATION EQUIPMENT AND REFRIGERATION SERVICES.
- ANY CHANGE TO EQUIPMENT SUPPLIER / DETAILS TO BE COMMUNICATED TO ORWELL DESIGN ASSOCIATES IMMEDIATELY TO AVOID CO-ORDINATION ISSUES ON SITE.

B **PLANT - CONDENSER**
- FANS / MOTORS ARE TO BE ENERGY EFFICIENT AND OF VARIABLE SPEED, E.G. EC OR INVERTOR CONTROLLED
- PACK CONTROLLER MUST BE CAPABLE OF OPERATING THE EC FAN CONENSER VIA 0-10v SIGNAL.
- MANUFACTURERS STANDARD COLOUR FINISH IS ACCEPTABLE UNLESS SITE CONDITIONS DICTATE OTHERWISE.
- THE ELECTRICAL CONTRACTOR SHALL SUPPLY AND CONNECT ALL ELECTRICAL AND CONTROL WIRING TO THE CONDENSER.
- ANY CHANGE TO EQUIPMENT SUPPLIER / DETAILS TO BE COMMUNICATED TO ORWELL DESIGN ASSOCIATES IMMEDIATELY TO AVOID CO-ORDINATION ISSUES ON SITE.
- THE CONDENSER FAN SPEED FOR DAY AND NIGHT OPERATION MUST BE SET AND CHECKED BY THE REFRIGERATION CONTRACTOR. RUN SPEED AND CONTROL VOLTAGE ARE INDICATED ON THE CRD LAY OUT. FOR EXAMPLE, SHOULD THE NIGHT SET POINT BE 4.3V, THIS WOULD BE 43% AND THE RDM CONTROL SET POINT SHOULD BE SET TO 57. 10V OR 100% WOULD REQUIRE THE RDM SET POINT TO BE 0.

C **PLANT - LIQUID RECEIVER ASSEMBLY**
- GENERALLY , RECEIVERS SHALL BE OF THE HORIZONTAL TYPE, MOUNTED ON A SUPPORTING STRUCTURE UNDERNEATH THE AIR COOLED CONDENSER. RECEIVERS SHALL BE MANUFACTURED FROM MILD STEEL AND SHALL BE FINISHED WITH A POLYESTER POWDER COAT FINISH SUITABLE FOR EXTERIOR LOCATIONS. VALVES AND CONNECTIONS ARE TO BE FULLY WEATHER-PROOFED BY AND PROTECTED TO PREVENT RUSTING.
- THE ELECTRICAL CONTRACTOR SHALL SUPPLY AND CONNECT ALL ELECTRICAL AND CONTROL WIRING TO THE RECEIVER ASSEMBLY.

D **PLANT - SUPPORT**
- ALL REFRIGERATION PLANT SHALL BE INSTALLED ON A FLAT AND LEVEL BASE, PROVIDED BY OTHERS. ANTI-VIBRATION PADS TO BE SUPPLIED BY THE REFRIGERATION CONTRACTOR.
- A REINFORCED FLAT AND LEVEL WORKING AREA IS TO BE POSITIONED ADJACENT TO THE PLANT HOUSING FOR COMPRESSOR REMOVAL.
- SECONDARY SUPPORT STEEL WORK FOR NEW PLANT TO BE DETAILED AND SUPPLIED BY THE STRUCTURAL ENGINEER, WHERE NECESSARY.
- ALL PLANT IS TO BE FIXED TO ITS SUPPORTS.

E **PLANT - LABELS**
- F-GAS LABELS - ALL REFRIGERATION EQUIPMENT WITH AN EQUIVALENT REFRIGERATION CHARGE OF 5 TONNES CO2 OR MORE MUST BE SHOWING THE FOLLOWING INFORMATION - **REFRIGERANT TYPE/INSTALLED, ENTRAINED VOLUME, REFRIGERANT GWP.**
- PRESSURE EQUIPMENT DIRECTIVE LABELS - ALL APPLICABLE NEW REFRIGERATION SHALL CARRY A DECLARATION OF CONFORMITY AND AN ASSEMBLY LABEL SHOWING THE FOLLOWING INFORMATION - **HIGH/LOW SIDE MWP, HIGH/LOW SIDE TEST PRESSURES, REFRIGERANT TYPE AND CHARGE, REFRIGERANT GWP.**
- REFRIGERATION CONTRACTOR SHALL SUPPLY AND FIX PERMANENT TRAFFOLYTE TYPE LABELS TO ALL ITEMS OF PLANT, EQUIPMENT, CONTROL PANELS AND COLD STORES CLEARLY IDENTIFYING THE ITEM AND INDICATING THE SYSTEM NUMBER, IF APPLICABLE.

F **PLANT - OPERATION AND MAINTENANCE ACCESS**
- ACCESS SHOULD BE SUITABLE FOR AN ENGINEER CARRYING A TOOLBOX / HANDTOOLS.
- PROTECTED WALKWAYS TO BE PROVIDED AND DETAILED FOLLOWING CONFIRMATION OF ROOF ACCESS POSITION.
- ACCESS STAIRS AND STEEL WALKWAY TO BE SUPPLIED AND INSTALLED BY OTHERS.
- ADEQUATE TASK LIGHTING TO BE SUPPLIED AND INSTALLED BY OTHERS FOR MAINTENANCE AND ACCESS.
- EXTERNAL HOUSED REFRIGERATION PLANT TO BE PROVIDED WITH INTERNAL LIGHTING WITH GENERAL ROOF ACCESS ROUTE LIGHTING PROVIDED BY OTHERS.
- PLANT POSITIONS TO BE REVIEWED FOR FIRE ALARM REQUIREMENTS BY THE MAIN CONTRACTOR.

G **PLANT - MACHINERY ROOM VENTILATION**
- VENTILATION SHOULD BE PROVIDED TO -
  A) PREVENT THE PLANT FROM OVERHEATING. A THERMOSTAT SHOULD BE PROVIDED IN THE PLANTROOM TO REGULATE THE TEMPERATURE.
  B) ENSURE THE PLANTROOM IS VENTILATED IN THE EVENT OF A REFRIGERANT LEAK, AND WHEN MAINTENANCE IS BEING PERFORMED. THE OPERATION SHOULD BE AUTOMATIC IN THE EVENT OF A LEAK CONTROLLED BY A SIGNAL FROM THE GAS DETECTION SYSTEM. MANUAL OVERRIDES SHOULD BE PROVIDED BOTH INTERNALLY AND EXTERNALLY OF THE AREA FOR SERVICE PERSONNEL AND SHOULD BE CLEARLY IDENTIFIED.
  C) THE AIR VOLUME REQUIRED FOR REFRIGERANT REMOVAL WILL, AS A GUIDE, BE BETWEEN 10 AND 15 AIR EXCHANGES PER HOUR. PLEASE REFER TO SITE SPECIFIC CALCULATIONS AS THE VENTILATION REQUIREMENTS FOR HEAT EXTRACTION COULD BE HIGHER THAN THIS VALUE.

NOTES

1) VENTILATION FANS TO BE ELECTRICALLY FED FROM AN ESSENTIAL SERVICES SUPPLY. INTAKE FROM HIGH LEVEL, EXTRACT FROM LOW LEVEL, LOCATION TO ENSURE NO AIR RECIRCULATION.

2) FAN OPERATION CAN BE TWO SPEED TO PROVIDE VARIATION BETWEEN HEAT EXTRACT AND REFRIGERANT EXTRACT.

3) UTILISING ONE AIR CIRCULATION FAN WITH ON/OFF CONTROL MAY LEAD TO UNACCEPTABLE SWINGS IN TEMPERATURE WITHIN THE PLANT ROOM. NOT ALL EQUIPMENT WILL OPERATE AT THE SAME TIME DUE TO LOAD CHANGES AND THE VARYING AMBIENT TEMPERATURES. IT MAY BE ADVISABLE TO INSTALL A NUMBER OF AIR CIRCULATING FANS AND CONTROL VIA A MULTI-STEP THERMOSTAT OR ALTERNATIVELY TO USE SPEED CONTROL FAN(S).

H **PLANT - LEAK DETECTION**
- LEAK DETECTION SENSORS SHALL BE POSITIONED IN CLOSE PROXIMITY TO THE MOST LIKELY SOURCE OF A LEAKS OF REFRIGERANT.
- ALARM THRESHOLDS SHALL BE SET IN LINE WITH CO-OP SPECIFICATION / BS EN378 FOR THE REFRIGERANT(S) WITHIN THE AREA. **NOTE** THIS COULD BE AN A1 OR A2L REFRIGERANT.
- SENSORS SHALL BE ACCESSIBLE FOR CALIBRATION / SERVICE AND PROTECTED FROM DAMAGE.
- THERE SHOULD BE A FACILITY TO TEST THE ALARM. THE ALARM SHALL BE TESTED IN LINE WITH CO-OP MAINTENANCE STRATEGY AND F-GAS REGULATIONS.
- THE ALARM SYSTEM SHOULD WARN BOTH VISIBLY AND AUDIBLY WITH A SOUNDER AND BEACON APPROX 15dB(A) ABOVE THE BACKGROUND NOISE LEVEL BOTH INSIDE AND OUTSIDE THE SPACE.
- WHERE LEAK DETECTION IS INSTALLED WITHIN A MACHINERY ROOM, SEE ANNOTATION 'G' TO LINK THE EMERGENCY VENTILATION SYSTEM ON DETECTION OF A LEAK OF REFRIGERANT.

I **PLANT - MACHINERY ROOM SIGNAGE**
- AS A MINIMUM THE FOLLOWING TEXT SHALL BE INCLUDED IN A NOTICE ON ALL PLANTROOM DOORS: -

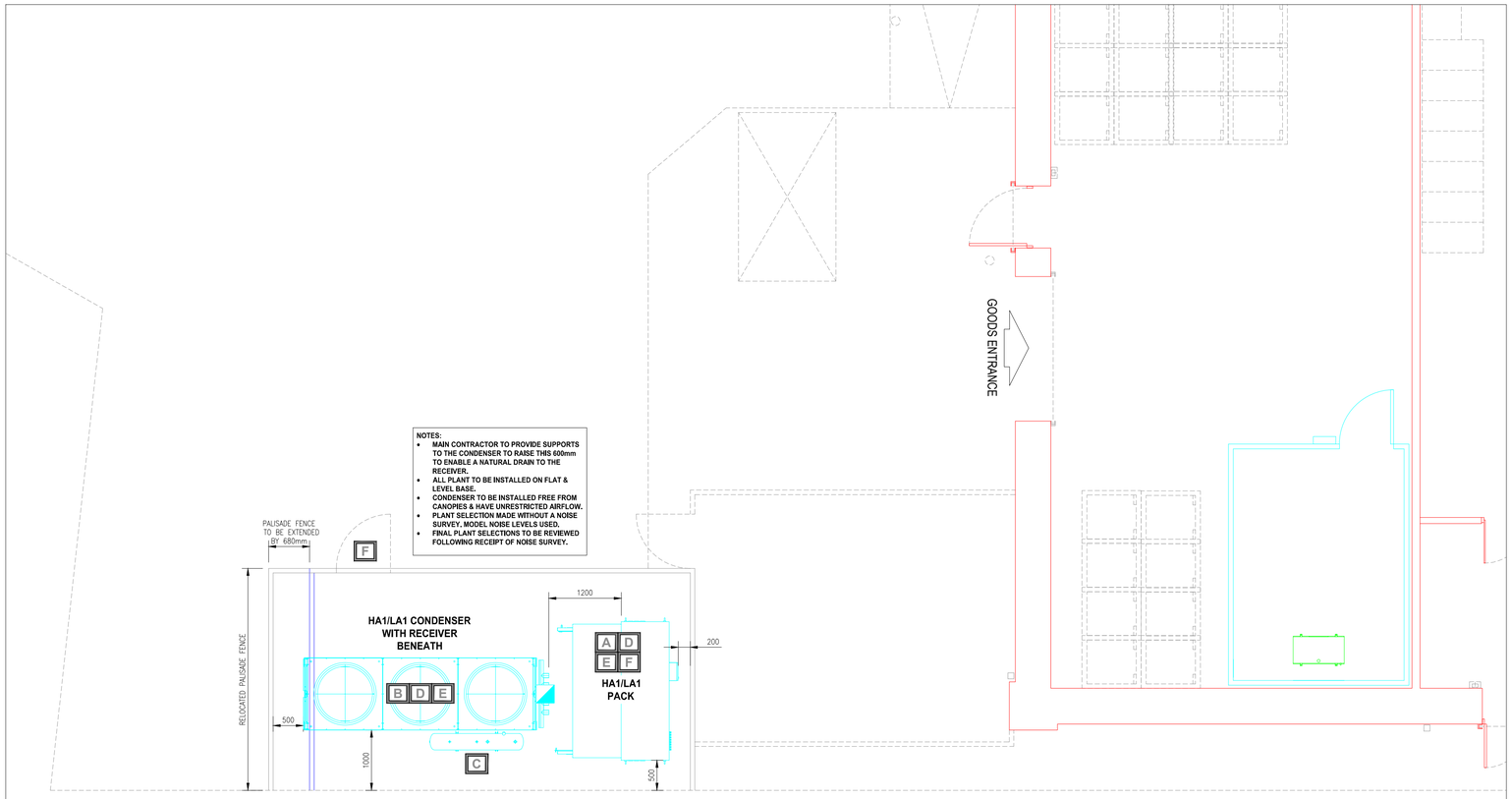
AUTHORISED ACCESS ONLY
NO SMOKING, NAKED LIGHTS OR FLAMES
NO AUTHORISED OPERATION OF THE REFRIGERATING SYSTEM
IF THE BUZZER / SOUNDER ACTIVATES, EXIT THE SPACE IMMEDIATELY, CLOSE THE DOOR AND NOTIFY SUPERVISORY PERSONNEL
DO NOT ENTER OR RE-ENTER THE SPACE UNTIL THE BUZZER / SOUNDER HAS CEASED AND YOU HAVE BEEN AUTHORISED BY THE SENIOR MANAGER AND THE REFRIGERATION CONTRACTOR

AIR CONDITIONING PLANT

J **AIR CONDITIONING - CONDENSING UNITS - EXTERNAL HIGH LEVEL**
- REFRIGERATION CONTRACTOR TO SUPPLY & INSTALL THE UNIT, FIXING BRACKETS AND ANY ANTI VIBRATION MOUNTS REQUIRED

K **AIR CONDITIONING - CONDENSING UNITS - EXTERNAL LOW LEVEL**
- A FLAT AND LEVEL SURFACE SHALL BE PROVIDED BY OTHERS.
- REFRIGERATION CONTRACTOR TO SUPPLY & INSTALL THE UNIT WITH ANY ANTI-VIBRATION MOUNTS.

PLANT AREA



NOTES:
- **MAIN CONTRACTOR TO PROVIDE SUPPORTS TO THE CONDENSER TO RAISE THIS 600mm TO ENABLE A NATURAL DRAIN TO THE RECEIVER.**
- **ALL PLANT TO BE INSTALLED ON FLAT & LEVEL BASE.**
- **CONDENSER TO BE INSTALLED FREE FROM CANOPIES & HAVE UNRESTRICTED AIRFLOW.**
- **PLANT SELECTION MADE WITHOUT A NOISE SURVEY, MODEL NOISE LEVELS USED.**
- **FINAL PLANT SELECTIONS TO BE REVIEWED FOLLOWING RECEIPT OF NOISE SURVEY.**

Refrigeration Pack - Dual Temperature (HA1/LA1)

Pack Supplier		Space Engineering		**Ambient Condition**		35°C		**Saturated Suction Temperature (°C)**		-9 HT / -33 LT		**Refrigerant**				R448A Mid Point
Pack Model Reference		Classic Maxi Housed		**Condensing Condition**		43°C		**Suction Line Penalty (K)**		1.5(+0.5K) / 1.5(+0.5K)		**New/Existing**				New
Pack Controller		RDM / Logo *(Back up)*		**Pack Capacity (kW)**		63.85 (HT) / 10.92 (LT)		**Total Pack THR (kW)**		114.27		**Installation Date**				TBC
Comp No.	**Compressor Model**	**Compressor Manufacturer**	**New/ Existing**	**Compressor Capacity (kW)**	**Design Current (A)**	**Full Load Current (A)**	**Power Input (kW)**	**THR (kW)**	**Electrical Connection**	**Housed or Unhoused?**	**Length (mm)**	**Width (mm)**	**Height (mm)**	**Weight (Kg)**	**Sound Pressure Level Day @ 10m dB(A)**	**Sound Pressure Level Night @ 10m dB(A)**	**PED Category**
HT Compressors																	
1	ZBD45KCE-TFD	Copeland	New	10.85	7.59	12.30	4.43	15.15	400V 3ph 50Hz	Housed	800	2301	2075	820	35	30	III
2	ZB45KCE-TFD	Copeland	New	10.60	9.10	13.10	4.51	15.00									
3	ZB45KCE-TFD	Copeland	New	10.60	9.10	13.10	4.51	15.00									
4	ZB45KCE-TFD	Copeland	New	10.60	9.10	13.10	4.51	15.00									
5	ZB45KCE-TFD	Copeland	New	10.60	9.10	13.10	4.51	15.00									
6	ZB45KCE-TFD	Copeland	New	10.60	9.10	13.10	4.51	15.00									
		HT Compressor Totals		**63.85**	-	-	-	**90.15**									
LT Compressors																	
1	ZF18K4E-TFD	Copeland	New	3.64	7.51	12.50	4.39	8.04									
2	ZF18K4E-TFD	Copeland	New	3.64	7.51	12.50	4.39	8.04									
3	ZF18K4E-TFD	Copeland	New	3.64	7.51	12.5	4.39	8.04									
		LT Compressor Totals		**10.92**	-	-	-	**24.12**									

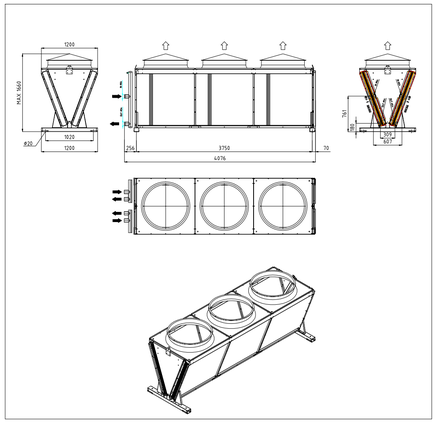
Refrigeration Condenser

Model	**Manufacturer**	**New/ Existing**	**Condenser Capacity (kW)**	**Discharge and Liquid Drain Connections**	**Fin Material**	**Start Current per fan (A)**	**Full Load Current (A)**	**Electrical Connection**	**Refrigerant charge (kg)**	**Length (mm)**	**Width (mm)**	**Height (mm)**	**Wet Weight (Kg)**	**Sound Pressure Level Day dB(A)@10m**	**Sound Pressure Level Night dB(A)@10m**	**PED Category**
XDHV1X 4135	LUVE	New	115.10	2 x 2-5/8" 2 x 2-1/8"	Almg	--	3.3	380V / 3ph / 50 Hz	57	4100	1200	2260	729	35 (440 RPM, 6.4V) RDM Reduction: 36%	23 (250 RPM, 3.7V) RDM Reduction: 73%	I

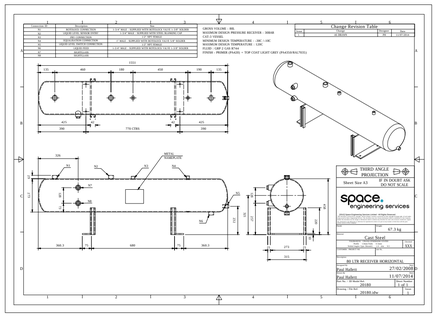
Receiver Details

Supplier	**Capacity (L)**	**New/ Existing**	**Orientation**	**Location**	**Length (mm)**	**Width (mm)**	**Height (mm)**	**PED Category**
Space Engineering	80	New	Horizontal	Beneath Condenser	1626	315	582	III

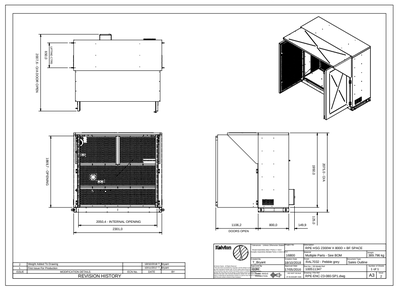
CONDENSER DETAIL (NTS)



RECEIVER DETAIL (NTS)



PACK HOUSING DETAIL (NTS)



PLEASE NOTE
R448A
REFRIGERANT USED ON THIS SITE

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DO NOT SCALE FROM THIS DRAWING.

PSSR Assessment

SYSTEM REF.	TOTAL COMPRESSOR POWER (kW)	PSSR REQUIRED FOR THE WORKS?
HA1/LA1	40.3	YES

space. engineering services

co-op

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Revision	Details	Drawn	Date
00	FIRST ISSUE BASED ON CO-OP MILNROW-P2-F4-M0 (11.10.18)	LM	30.10.18

Site Address: MILNROW, ROCHDALE (9266)

Drawing Title: PROPOSED PLANT LAYOUT

Project Manager: CLAIR PRESTIDGE

Date: 30.10.18 **Drawn By:** LM

Signature 1: **Signature 2:** **Signature 3:**

Signatures indicate compliance with the latest version of the Check and Verification 00/00/00008 document

Revision: 00 **Scale:** 1:50 @ A0

Drawing No: E3125-CR3 **Contract No:** -

Drawing Origin:
Bristol : 01179 778833
Ipswich : 01473 556700
Plymouth : 01752 231680