



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET

HLW Catalytic Oxidizer / Reducer

ISSUED BY
RPP-WTP PDC



PLANT ITEM No.

24590-HLW-MX-HOP-SKID-00005
24590-HLW-MX-HOP-SKID-00006
24590-HLW-MX-HOP-SKID-00007
24590-HLW-MX-HOP-SKID-00008

Data Sheet No.	Rev.
24590-HLW-MKD-HOP-00019	10

Project:	RPP-WTP	System Description	Thermal Catalytic Oxidizer/Selective Catalytic Reduction
Project No.:	24590	Reference Docs.	Specification: 24590-HLW-3PS-MBTV-T0002 Process Calc.: 24590-HLW-MKC-HOP-00010 Process Calc.: 24590-HLW-M4C-HOP-00011 Process Calc.: 24590-HLW-M6C-HOP-00013
System No.:	HOP		
Building:	HLW	Associated Dwgs.	24590-HLW-M5-V17T-20004, -00004 24590-HLW-M6-HOP-20008, -00008 24590-HLW-P1-P23T-00112, -00117
Quality Level	CM		
Safety Classification	SS		
Seismic Criteria	Category III		

ITEMS MARKED WITH * ARE TO BE PROVIDED BY VENDOR

Process Data (Buyer)

<p>Offgas Inlet Conditions:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Nominal</th> <th>Maximum</th> <th>Design</th> </tr> </thead> <tbody> <tr> <td>Vol. Flow (acfm)</td> <td>2448</td> <td>3102</td> <td>N/A</td> </tr> <tr> <td>(scfm)</td> <td>1465</td> <td>1750</td> <td>2000 (Process Note 5)</td> </tr> <tr> <td>Temperature (°F)</td> <td>330</td> <td>330</td> <td>355 (Process Note 5)</td> </tr> <tr> <td>Pressure (in. WG)</td> <td>-39</td> <td>-45</td> <td>-82 / +84</td> </tr> <tr> <td>Density (lb/ft³)</td> <td>0.0432</td> <td>0.395</td> <td>0.038</td> </tr> <tr> <td>Allow. Diff. Pres.</td> <td colspan="2">(in. WG)</td> <td>15</td> </tr> </tbody> </table>					Nominal	Maximum	Design	Vol. Flow (acfm)	2448	3102	N/A	(scfm)	1465	1750	2000 (Process Note 5)	Temperature (°F)	330	330	355 (Process Note 5)	Pressure (in. WG)	-39	-45	-82 / +84	Density (lb/ft ³)	0.0432	0.395	0.038	Allow. Diff. Pres.	(in. WG)		15	<p>Offgas Inlet Composition:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Nominal</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>N₂ (% Volume)</td> <td>69.5 %</td> <td>63.7 %</td> </tr> <tr> <td>O₂ (% Volume)</td> <td>18.7 %</td> <td>17.1 %</td> </tr> <tr> <td>H₂O (% Volume)</td> <td>10.6 %</td> <td>18.0 %</td> </tr> <tr> <td>CO₂ (% Volume)</td> <td>0.36 %</td> <td>0.38 %</td> </tr> <tr> <td>Ar (% Volume)</td> <td>0.83 %</td> <td>0.76 %</td> </tr> </tbody> </table>					Nominal	Maximum	N ₂ (% Volume)	69.5 %	63.7 %	O ₂ (% Volume)	18.7 %	17.1 %	H ₂ O (% Volume)	10.6 %	18.0 %	CO ₂ (% Volume)	0.36 %	0.38 %	Ar (% Volume)	0.83 %	0.76 %												
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<p>Process Data Notes:</p> <ol style="list-style-type: none"> Seller's design outlet temperature based on the Thermal Catalytic Oxidizer/Selective Catalytic Reducer vessel and internal component temperatures using thermodynamic activities in the equipment. Design temperature per Seller = *1000 °F Deleted Deleted Maximum step changes in NO and NO₂ concentrations over a ten-minute period may be as high as 500 ppmv. Minimum NOx concentration is 0 ppmv. Heater sizing for initial heat-up to system operating temperature shall not credit contribution from minor offgas components and specified design flow and temperature (inlet conditions). Maximum SO₂ listed does not include transient spikes. Based on heat exchanger efficiency of 70%. See vendor submittal 24590-CM-POA-MBT0-00002-03-00001 for verification of design temperature. 				<p>Ammonia Dilution Air Supply:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Nominal</th> </tr> </thead> <tbody> <tr> <td>Pressure (psig)</td> <td>110</td> </tr> <tr> <td>Filtration (microns)</td> <td>3</td> </tr> <tr> <td>Inlet Nozzle Size (in)</td> <td>2</td> </tr> </tbody> </table>					Nominal	Pressure (psig)	110	Filtration (microns)	3	Inlet Nozzle Size (in)	2																																																		
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MECHANICAL DATA SHEET
HLW Catalytic Oxidizer / Reducer

PLANT ITEM No.

24590-HLW-MX-HOP-SKID-00005
24590-HLW-MX-HOP-SKID-00006
24590-HLW-MX-HOP-SKID-00007
24590-HLW-MX-HOP-SKID-00008

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Ammonia Note:

Buyer will supply anhydrous ammonia at Seller's specified flowrate to meet design conditions. Seller is responsible for flow control of anhydrous ammonia to meet performance requirements. Ammonia vaporizer assures nominal conditions.

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Ammonia Dilution Air Note:

Buyer will supply ammonia dilution air at Seller's specified flow rate to meet design conditions. Seller is responsible for flow and pressure control of dilution air to meet performance requirements.

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The following Process Performance Requirements are the WTP permits performance requirements that shall be used by the Buyer to verify Seller's System Performance requirements are met:

1. The maximum achievable control technology (MACT) destruction removal efficiency (DRE) for volatile organic compounds (VOCs) and semi-volatile compounds (SVOCs) shall be greater than or equal to 95%. The principal organic dangerous constituents (PODCs) to be used in HLW performance testing are naphthalene (CAS 91-20-3) and 2-propene-1-ol (CAS 107-18-6). A DRE greater than 95% is preferred.
2. The NOx (defined as NO and NO₂) Selective Catalytic Reduction (SCR) unit shall perform with a reduction efficiency of 95%.
3. Dioxin and furan emissions at the outlet of the Thermal Catalytic Oxidizer/Reducers shall meet the MACT criteria of 0.2 ng/m³ TEQ (Toxic Equivalent).
4. Maximum inlet loading 0.7 grams per minute naphthalene and 2.0 grams per minute allyl alcohol, and a minimum oxidation catalyst outlet temperature of 700°F shall be used as the basis for DRE determination. (General Note 9)
5. Carbon monoxide (CO) emission shall meet the MACT criteria of 100 parts per million (ppm) by volume, over an hourly rolling average, dry basis.
6. Hydrocarbon emission shall meet the MACT criteria of 10 parts per million (ppm) by volume, over an hourly rolling average dry basis and reported as propane.

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Safety Screening required?: Yes No (If yes per 24590-WTP-GPP-SREG-002, E&NS signature required below)



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Approvals

10	Re instate 1750 (scfm) max flow rate. Fix typos and re instate general notes.	<i>R Peters</i> R Peters	<i>D Rickettson</i> D Rickettson	<i>R. RICKENBACH</i> R. Rickenbach	<i>C Meng</i> C Meng	<i>N/A</i> N/A	<i>N/A</i> N/A	<i>D Wilsey</i> D Wilsey	<i>6-3-11</i> 6-3-11
9	Incorporate TCN 24590-CM-MRA-MBTO-00002-T0003, T0008, & T0009 and SDDR 24590-WTP-SDDR-MS-10-00022 & 00135	M. O'Neill	T. Henry	D. Rickettson	C Meng	N/A	D Adler	J Schneider	25-Feb-11
8	General Revision - Major revision. No revision triangle required.	M. O'Neill	T. Valenti	G. Goolsby	C. Meng	N/A	Steve Vail for R. Davis	J. Roth	9-Apr-09
7	Changed temperature for HLW-SCR-00001. Added 25 °F design margin per 24590-WTP-GPG-M-017. Added Ammonia Piping Material Type. Added MET as reviewer.	M. O'Neill	J. Wood	U. Sen	C. Meng	Phil Snyder for J. White	R. Davis	J. Julyk	17-Mar-08
6	Consolidated data sheets, this revision supersedes 24590-HLW-MKD-HOP-00020 Rev 5. Added safety classification. Revised process data note 2. Revised process performance requirement note 1. Added subcomponent IDs to Component table. Revised note 4. Includes new EEQ data. Includes HPAV screening and Dangerous waste permitting statement.	Mike O'Neill	Josh Wood	Utpal Sen	Chris Meng	Dick Hills		John Julyk	14-Feb-08
5	Minor Change: Attachment 1, included on the EDR copy, was missing from the issued Rev 4 data sheet, this revision includes the missing attachment. Rev 4 triangles are kept for clarity to show changes from Rev 3.	Tom Galioto	Anthony Cutrona	Craig Knauss	Chris Meng	N/A		John Julyk	26-Jun-07
4	Updated quality level designator. Revised offgas inlet conditions and composition. Added Note 8 and Attachment 1. Added EQ data. Revised ammonia and dilution air supply conditions. Added Safety signature to Approval block. Updated Vendor data per 24590-CD-POA-MBTO-00002-07-00001.	Tom Galioto	Anthony Cutrona	Craig Knauss	Chris Meng	N/A		John Julyk	21-May-07
3	Revised housing material and system performance. Added NOx step change requirement and ammonia skid layout requirements.	Jim Rouse	David Pease	Chris Morley	N/A	N/A		Mark Hoffmann	31-Jul-05
2	Revised catalyst model number per SDDR 24590-WTP-SDDR-PROC-04-00879, and added dilution air, outlet piping, and ammonia skid requirements.	J. Rewari / J. Rouse	D. Pease	C. Morley	N/A	N/A		M. Hoffmann	8-Nov-04
1	Revised Seller Information	J. Medina / J. Rouse	D. Pease	C. Morley	N/A	N/A		M. Hoffmann	4-May-04
0	Issued for Purchase. This data sheet supercedes 24590-HLW-MKD-HOP-00015 R/1.	J. Medina / J. Rouse	D. Pease	D. Yarbrough / C. Morley	N/A	N/A		M. Wright	8-Apr-04
Rev	Reason for revision	Systems/ Process Eng.	Equipment Eng.	Checked	E&NS	EQ	MET	Approved	Date



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Mechanical Data (Buyer)

Construction Data:

Process Equipment Dimensions (L x W x H):

Sections (Applicable Only to the Catalytic Oxidizer/Reducer Skids)	17'-0" x 5'-0" x 10'-9"	ft
Overall	39'-6" x 5'-0" x 17'-6"	ft
Operating Weight	*70,830	lbf
Shipping Dimensions (L x W x H)	*18' 0" x 6' 10" x 12'	ft
Shipping Weight	*70,830	lbf

Ammonia Dilution Equipment (L x W x H):

Ammonia Dilution Skid dimensions	14'-6" x 5'-6" x 7'-6"	ft
Operating Weight	*~15,000	lbf
Shipping Dimensions (L x W x H)	15' x 6' x 7.5'	ft
Shipping Weight	*~15,000	lbf

Thermal Analysis Data:

Room Temperature	83	°F
Earth Temperature Under Base	70	°F
Maximum Heat Loss	15	Kw

Concrete Slab Base Thickness

Thermal Conductivity of Concrete Slab

3	ft
1.8	W / m / K

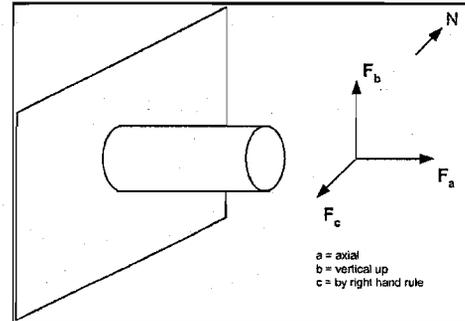
Thermal Cycling Frequency:

For design purposes, use a thermal cycle frequency of once every two (2) months for the life of the plant (40 years).

Nozzle Loading (Buyer, See Note 1)

Inlet:

Load Case	Fa (lb)	Fb (lb)	Fc (lb)	Ma (ft-lb)	Mb (ft-lb)	Mc (ft-lb)
Weight	400	-500	400	1000	3000	-1000
Thermal (+)	200	1000	200	2000	2000	2000
Thermal (-)	-4400	-1000	-1000	-7000	-15000	-25000
Seismic (+)	3500	3500	3500	11000	18000	18000
Seismic (-)	-3500	-3500	-3500	-11000	-18000	-18000
Normal (+)	600	500	600	3000	5000	1000
Normal (-)	-4000	-1500	-600	-6000	-12000	-26000
Occasional (+)	4100	4000	4100	14000	23000	19000
Occasional (-)	-7500	-5000	-4100	-17000	-30000	-44000



See supplier submittal 24590-CM-POA-MBT0-00002-05-00009 for nozzle movement values.



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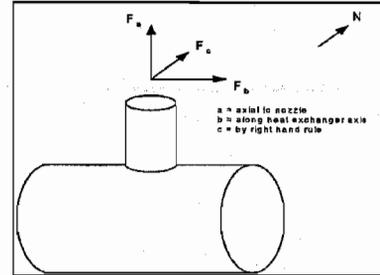
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Outlet:

Load Case	Fa (lb)	Fb (lb)	Fc (lb)	Ma (ft-lb)	Mb (ft-lb)	Mc (ft-lb)
Weight	-1700	400	400	-200	-500	500
Thermal (+)	2000	1000	2000	100	13000	1000
Thermal (-)	-1300	-2000	-2000	-20000	-2000	-16000
Seismic (+)	4200	6600	6600	9500	75000	75000
Seismic (-)	-4200	-6600	-6600	-9500	-75000	-75000
Normal (+)	300	1400	2400	800	12500	1500
Normal (-)	-3000	-1600	-1600	-20200	-2500	-15500
Occasional (+)	4500	8000	9000	10300	87500	76500
Occasional (-)	-7200	-8200	-8200	-29700	-77500	-90500



See supplier submittal 24590-CM-POA-MBT0-00002-05-00009 for nozzle movement values.

- Notes:
1. Normal = Weight + Thermal
 2. Occasional = Weight + Thermal + Seismic



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System Performance (Seller, General Note 2)

Volatile Organic DRE	*95	%	Semi-Volatile Organic DRE	*95	%
NOx Reduction	*95	%	Ammonia consumption, max	*15	lb/hr
NOx emissions, max	*119	ppmvw	Ammonia entering injection chamber:	Pressure	*30 in-WG
Ammonia slip, max	*10	ppmvw		Flow	*14.0 lb/hr
Ammonia/NOx molar injection ratio	*			Temp.	*100 °F
Pressure drop through Oxidizer unit	*10	in-WG	Dilution Air:	Pressure	*80 in-WG
Minimum service life catalyst:				Flow	*200 scfm
VOC Catalyst	*3	yrs (EST.)			
NOx Catalyst	*3	yrs (EST.)			

Recommended Catalyst replacement schedule: Replacement schedule could be 1-2 year intervals.

Components (Seller, General Note 2)

Catalyst:	Organic: HOP-SCO-00001 & 00004	NOx: HOP-SCR-00001 & 00002
Manufacturer	BASF (VOCat 300S) "Source Controlled"	*BASF NO _x CAT VNX-300
Number of reactors	1	1
Number of catalyst modules	*27	*27
Residence time (at standard conditions), sec	0.75 (General Note 9)	*
Arrangement	*3 High x 3 Wide	*3 High x 3 Wide
Total catalyst reactor vol. ft ³	*22.5	*22.5
Type	Precious metal - platinum	*Vanadium/Titanium Oxide
Material: base/substrate	Ceramic - cordierite	*Ceramic Cordierite
Total Number of layers per reactor	3	*3
Thickness of layer, in	*10	*10
Space provided between layers for remixing	Yes	*
Space for additional layer, in	No	*No
Is dummy layer provided	No	*No
Number of flow passages	*230 cpsi	*64
Flow passage, in. x in.	0.060" x 0.060"	*0.11" x 0.11"
Face velocity thru reactor, fpm	*427	*427
Outlet Offgas Temperature for site performance testing, °F	700 (Min) - 750 (Nominal)	*700 (Min) - 750 (Nominal)
Design Temperature, °F	*750	*750
Catalyst module Dimensions, (L x W x D)	*12" x 12" x 10"	*12" x 12" x 10"
Catalyst module weight, lb	*50	*50
Total weight of catalyst reactor, lb	*1,350	*1,350
Housing:		
Material Type	347 SS	347 SS
Material/Thickness, in	*3/8	*3/8
Number of Section	*1	*1
Weight of Heaviest Section, lb	*10,500	*10,000
Insulation Lining	*Microporous (Super G)	*Microporous (Super G)
Material/Thickness, in	*4	*4
Thermal Cond, Btu-in/hr ft ² °F	*0.50 - 0.84	*0.50 - 0.84
Method of Attachment	*Studs with clips	*Studs with clips
Design pressure, psig		*see Offgas Inlet Conditions on pg. 1
Operating pressure, psig		*see Offgas Inlet Conditions on pg. 1
Design temperature, °F		*See General Note 10
Corrosion Allowance	0.010 inch	0.010 inch
Erosion Allowance	None	None



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET
HLW Catalytic Oxidizer / Reducer

PLANT ITEM No.

24590-HLW-MX-HOP-SKID-00005
24590-HLW-MX-HOP-SKID-00006
24590-HLW-MX-HOP-SKID-00007
24590-HLW-MX-HOP-SKID-00008

Data Sheet No.

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Ducting:		
Material/Thickness, in	*347SS / 3/8	*347SS / 3/8
Cross Section, ft x ft	*Inlet = 18" x 24" / Outlet = 4' x 5'	*Inlet = 18" x 24" / Outlet = 4' x 5'
Duct Velocity, fpm	*Inlet = 1034 / Outlet = 200	*Inlet = 1034 / Outlet = 200
Design Temperature, °F	*See General Note 10	
Corrosion Allowance	0.010 inch	0.010 inch
Erosion Allowance	None	None
Electric Heater: HOP-HTR-00001 & 00007		
Manufacturer	*CCI Thermal	
Type	*Tubular Elements	
Number of Heat Zone	*24 Heating Elements / Zone	
Number of Zones	*5	
Watt Density, W/in ²	*8.6	
Power, kW	*	
Voltage/Current rating	*480v /	
Wetted Material Type	*347 SS	
Heating Element & Enclosure Material Type	*Incoloy 800	
High Temp. Surface Material Type	347 SS	
Design Temperature, °F	*1000	
Corrosion Allowance (Electric Heater Housing)	0.010" (does not include heater element components)	
Erosion Allowance	None	
Recuperative Heat Exchanger: HOP-HX-00001 & 00003		
Manufacturer	*Thermo Z / Munters - Deschamps	
Type	*Plate / Frame	
Cold Side Components & Enclosure Material Type	347 SS	
Hot Side Components/Tubes	347 SS / 439 SS	
Ht transfer coefficient, Btu/hr ft ² °F	*3.20	
Heat exchange area, ft ²	*1,756	
ΔT (LMTD), °F	*122	
Heat Exchanger duty, Btu/hr	*674,764	
Design Temperature, °F	*See General Note 10	
Corrosion Allowance	0.010 inch, No corrosion allowance required for heat transfer surface	
Erosion Allowance	None	
Ammonia Injection Manifold: (Note 7)		
Type/Arrangement	*Spray Nozzle Grid	
Feed Inlet Dia. in	*2	
Supply Pressure/Temp (psi/°F)	*0.5 / 100	
Material Type	347 SS (Vessel Internals) 316L SS (External to Vessel)	
No. of nozzle bars per manifold	*4	
No. of nozzles per bar	*12	
Spacing between nozzles, in	*7.5 - 10	
Nozzle opening diameter, in	*0.0625	
Corrosion Allowance	0.010 inch	
Erosion Allowance	None	
Weight		
Shipping (Heaviest), lb	*5,470	
Installed, lb	*70,830 (Installed operating weight of the complete TCO/SCR skid)	
Shipping dimension (L x W x H), ft	*18' x 6' x 12'	*18' x 6' x 12'



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET
HLW Catalytic Oxidizer / Reducer

PLANT ITEM No.

24590-HLW-MX-HOP-SKID-00005

24590-HLW-MX-HOP-SKID-00006

24590-HLW-MX-HOP-SKID-00007

24590-HLW-MX-HOP-SKID-00008

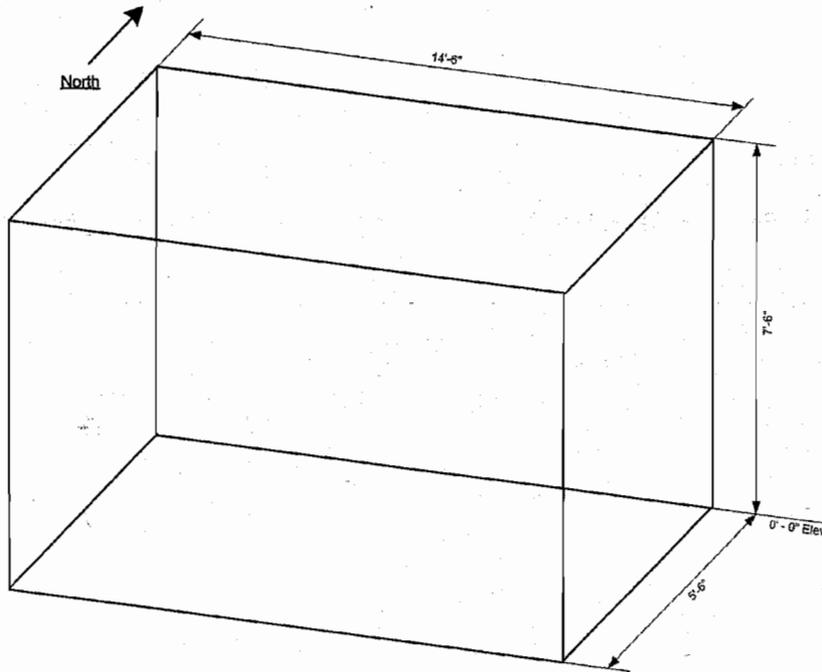
Data Sheet No.

24590-HLW-MKD-HOP-00019

Rev.

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Ammonia / Air Dilution Skid Layout (HOP-SKID-00006 and 00008)



**Ammonia / Air Dilution Skid
Requirements:**

1. All equipment and appurtenances including any platforms, ladders, etc. must fit within the space envelope.

HOP-SKID-00006 (Typical of HOP-SKID-00008)



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET

HLW Catalytic Oxidizer / Reducer

PLANT ITEM No.

24590-HLW-MX-HOP-SKID-00005
24590-HLW-MX-HOP-SKID-00006
24590-HLW-MX-HOP-SKID-00007
24590-HLW-MX-HOP-SKID-00008

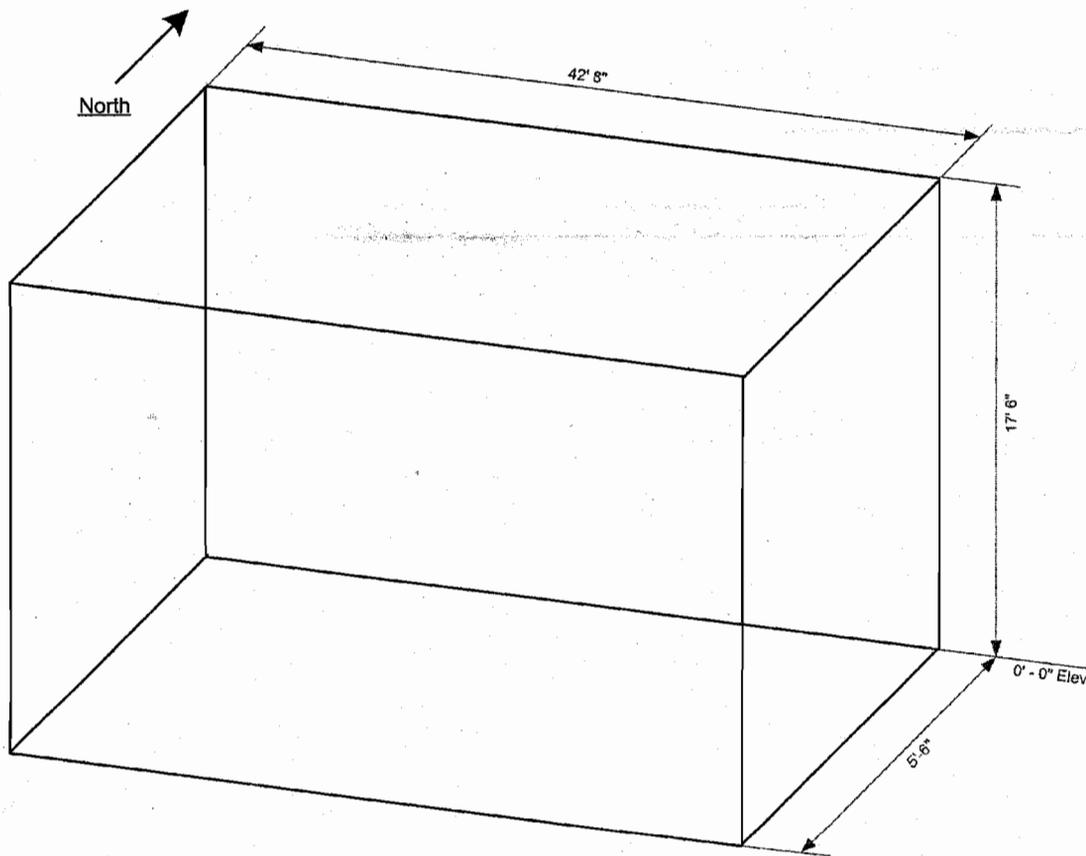
Data Sheet No.

24590-HLW-MKD-HOP-00019

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Catalytic Oxidizer / Reducer Skid Layout (HOP-SKID-00005 and 00007)



Catalytic Oxidizer / Reducer Skid Requirements:

1. All equipment and appurtenances including any platforms, ladders, etc. must fit within the space envelope.

2. Maximum allowable equipment dimensions are shown, except that the height for Heaters HOP-HTR-00001 / 00007 shall include space for maintenance access. If height is exceeded, heaters shall be moved to above structural steel at the 12'-9" elevation.



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET
HLW Catalytic Oxidizer / Reducer

PLANT ITEM No.

24590-HLW-MX-HOP-SKID-00005
24590-HLW-MX-HOP-SKID-00006
24590-HLW-MX-HOP-SKID-00007
24590-HLW-MX-HOP-SKID-00008

Data Sheet No.

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Notes

GENERAL NOTES:

1. Nozzle location and orientation shall be as shown on drawing 24590-CM-POA-MBT0-00002-04-00002. Nozzle location tolerance = $\pm 1/2"$ (X,Y,Z).
2. Seller to confirm values.
3. Seller's data is rounded and based on preliminary engineering design.
4. Catalytic Skid and Sub component tag numbers follow:
Melter 1: HOP-SKID-00005: HOP-HX-00001, HOP-HTR-00001, HOP-SCO-00001, HOP-SCR-00001
Melter 2: HOP-SKID-00007: HOP-HX-00003, HOP-HTR-00007, HOP-SCO-00004, HOP-SCR-00002
5. Data marked with an asterisk is or will be provided by Seller.
6. Contents of this document are Dangerous Waste Permit Affecting.
7. Ammonia / Air Injection Manifold design shall be finalized after flow modeling results.
8. Equipment location is shown on Drawings 24590-HLW-P1-P23T-00112 and 24590-HLW-P1-P23T-00117.
9. Oxidation catalyst residence time is based on pilot plant performance at the Catholic University's Vitreous State Laboratory (VSL). Reference *Regulatory Off-Gas Emissions Testing on the DMI200 Melter System Using HLW and LAW Simulants*, 24590-101-TSA-W000-0009-166-00001. Offgas VOC content is based on *Small Scale Melter Testing for Allyl Alcohol Method Verification*, VSL-08R1390-1.
10. * Inlet at recuperative heat exchanger shall use a operating temperature of 355 °F (T₁). From the outlet of the recuperative heat exchanger to the inlet of the electric heater the operating temperature shall be 660 °F (T₂). The electric heater shall be designed for 1000 °F. The electric heater outlet pipe and SCO and SCR housings shall be designed using a 1000 °F temperature. Electric heater controls shall limit the offgas temperature to 750 °F to insure catalyst performance. Inlet of the recuperative heat exchanger (T₃) shall use operating temperature of 750 °F. Outlet of the recuperative heat exchanger (T₄) shall use a operating temperature of 490 °F. See vendor drawing numbers 24590-CM-POA-MBT0-00002-03-00038 and 24590-CM-POA-MBT0-00002-04-00030 for location of T1, T2, T3, and T4.



EQUIPMENT QUALIFICATION DATASHEET (EQD)

24590-HLW-MKD-HOP-00019
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Equipment Identification			
Full Component Tag Number or BNI Stock Code Number	24590-HLW-MX-HOP-SKID-00005 24590-HLW-MX-HOP-SKID-00006 24590-HLW-MX-HOP-SKID-00007 24590-HLW-MX-HOP-SKID-00008	Safety Classification <input type="checkbox"/> SC <input checked="" type="checkbox"/> SS <input type="checkbox"/> APC-PAM	
Equipment Datasheet Number	24590-HLW-MKD-HOP-00019		
Description	HLW Thermal Catalytic Oxidizer/Reducer for HLW Secondary Offgas Treatment Manufacturer: IONEX	Seismic Category <input type="checkbox"/> SC-I <input type="checkbox"/> SC-II <input checked="" type="checkbox"/> SC-III <input type="checkbox"/> SC-IV <input type="checkbox"/> SC-III Seismic Interaction only	
Location (Facility / Building and Room No.)	HLW/H-A123		
Safety Function(s)	The following are the Safety Significant functions of the TCO credited for DBE: <ul style="list-style-type: none"> • Confinement of melter offgas • Catalyst skid electric heater (HOP-HTR-00001/00007) high temperature interlock. Heater to be shut down at a given high temperature set point to prevent over temperature condition. (Signal from TE 0514 / 2514 to JY 0520 / 2520) • Ammonia Piping - The ammonia piping shall provide confinement of ammonia. • Ammonia Air Addition (Dilution) - To dilute and maintain the TCO/SCR ammonia concentration below the Lower Flammable Limits (LFL), air must be injected in the ammonia supply. • Ammonia Supply Isolation Valve (YV 0504/2504) - The isolation valve for the ammonia supply to the TCO/SCR shall close upon detection of low or no air injection. • Low Temperature Interlock on SCR (Signal from TE 0336/2336) - The low temperature interlock on the selective catalytic reduction unit stops the injection of ammonia (Valves YV 0504/2504 are closed). • Protect ITS electrical components from damage by liquid sprays Reference: 24590-WTP-PSAR-ESH-01-002-04, Rev 4j, Section 4.4.3.3 and 4.4.24		
Equipment Safety Function Type	<input checked="" type="checkbox"/> Passive Mechanical TCO Housing	<input checked="" type="checkbox"/> Active Mechanical Valves / Flow Meters YV 0504 / 2504 FT 0517 / 2517 FT 0518 / 2518	<input checked="" type="checkbox"/> Electrical Temperature Element TE 0514 / 2514 TE 0336 / 2336
Seismic Safety Function <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Seismic Operability Requirements <input checked="" type="checkbox"/> During Seismic Event <input checked="" type="checkbox"/> After Seismic Event <input type="checkbox"/> None		



EQUIPMENT QUALIFICATION DATASHEET (EQD)

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Equipment Environmental Qualification (EEQ) (Parameter values stated in this section do not include process conditions or operation induced conditions)				
Classification of Environment <input checked="" type="checkbox"/> Mild <input type="checkbox"/> Harsh		Qualified Life (years) <input type="checkbox"/> 40 <input checked="" type="checkbox"/> Other TCO Housing - 40 years Replacable Equipment: Less than 40 years Heaters Recuperative Heat Exchanger Catalyst		
Parameter Type/Units	Parameter Value	Parameter Duration (number)	Duration Units	WTP Source Document Number
Normal Ambients				
High Temperature (°F)	83	Note 1a	Years	24590-HLW-U0D-W16T-00001
Low Temperature (°F)	59	Note 1a	N/A	24590-HLW-U0D-W16T-00001
High Relative Humidity (%RH)	100	Note 1a	N/A	24590-HLW-U0D-W16T-00001
Low Relative Humidity (%RH)	10	Note 1a	N/A	24590-HLW-U0D-W16T-00001
High Pressure (in.-w.g.)	0	Note 1a	N/A	24590-HLW-U0D-W16T-00001
Low Pressure (in.-w.g.)	-0.4	Note 1a	N/A	24590-HLW-U0D-W16T-00001
Radiation Dose Rate (mRad/hr)	0.5	40	Years (Note e1)	24590-HLW-U0D-W16T-00001
Plant/Process Induced Vibration	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Additional Normal Ambient Information:				
Abnormal Ambients				
High Temperature (°F)	137	8	hours / year	24590-HLW-U0D-W16T-00001
Low Temperature (°F)	40	Note 1a	N/A	24590-HLW-U0D-W16T-00001
High Relative Humidity (%RH)	100	Note 1a	N/A	24590-HLW-U0D-W16T-00001
Low Relative Humidity (%RH)	5	Note 1a	N/A	24590-HLW-U0D-W16T-00001
High Pressure (in.-w.g.)	4	Note 1a	N/A	24590-HLW-U0D-W16T-00001
Low Pressure (in.-w.g.)	-6.7	Note 1a	N/A	24590-HLW-U0D-W16T-00001
Radiation Dose Rate (mR/hr)	0.5	40 Note 4	Years (Note e1)	24590-HLW-U0D-W16T-00001
Exposure to Wet Sprinkler System	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2 Note 5	hours	24590-HLW-U0D-W16T-00001
Additional Abnormal Ambient Information				
Design Basis Events (DBE) Ambients				
High Temperature (°F)	139	1000	hours	24590-HLW-U0D-W16T-00001
Low Temperature (°F)	40	Note 1a	N/A	24590-HLW-U0D-W16T-00001
High Relative Humidity (%RH)	100	482	hours	24590-HLW-U0D-W16T-00001



EQUIPMENT QUALIFICATION DATASHEET (EQD)

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Low Relative Humidity (%RH)	5	1000	hours	24590-HLW-U0D-W16T-00001
High Pressure (in.-w.g)	4	1000	hours	24590-HLW-U0D-W16T-00001
Low Pressure (in.-w.g)	-6.7	1000	hours	24590-HLW-U0D-W16T-00001
Radiation Dose Rate (mR/hr)	0.5	0 Note 4	hours	24590-HLW-U0D-W16T-00001
Submergence	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 1.58'	1000	hours	24590-HLW-U0D-W16T-00001
Chemical/Spray Exposure	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	N/A	hours	N/A See Note 12
Additional DBE Information	Note 2 for pressure units			

DBE Chemical Exposure Details	
DBE Chemical Types / Concentrations	N/A

Electrical Interfaces Supporting the Safety Function	
Power Supply Voltage (VAC, VDC)	480 VAC
Power Supply Frequency (Hz)	60 Hz
Power Connection Method	3 Wired, solidly ground
I/O Signals to/from Equipment	BUYER
I/O Connection Method	BUYER

Mechanical Interfaces	
Mounting Configuration (orientation)	Horizontal
Mounting Method (bolts, welds, etc.)	Welded to embeds, See 24590-HLW-DD-S13T-00067
Auxiliary Devices	Lifting Lugs

Equipment Seismic Qualification (ESQ)				
Parameter	Title	Reference/Document Number	Version / Revision	Remarks
WTP Seismic Design Specification	ENGINEERING SPECIFICATION FOR STRUCTURAL DESIGN LOADS FOR SEISMIC CATEGORY III & IV EQUIPMENT AND TANKS	24590-WTP-3PS-FB01-T0001	4	
Specified Seismic Load	ENGINEERING SPECIFICATION FOR	24590-WTP-3PS-FB01-	4	



EQUIPMENT QUALIFICATION DATASHEET (EQD)

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Equipment Seismic Qualification (ESQ)				
Parameter	Title	Reference/Document Number	Version / Revision	Remarks
Parameters	STRUCTURAL DESIGN LOADS FOR SEISMIC CATEGORY III & IV EQUIPMENT AND TANKS	T0001		



EQUIPMENT QUALIFICATION DATASHEET (EQD)

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Equipment Qualification Notes and Additional Information

1. General Notes:

- a) For thermal aging, the high normal temperature shall be assumed to subsist for 40 years less the duration of the high abnormal temperature. For any lesser qualified life, the normal and abnormal condition durations shall be assigned proportionally. The abnormal temperature is stated to subsist for a certain number of hours per year. It shall be taken to subsist for this number of hours for each year of the qualified life.
 - b) The ability to provide the safety function at the low normal temperature, the low abnormal temperature or the low DBE temperature (whichever be the lowest) shall be established by test, analysis, or operating experience. The thermal aging at these respective low temperatures will be conservatively covered by the thermal aging per item a) above. Therefore, no duration is assigned for the low temperatures.
 - c) The ability to provide the safety function at the extremes of the normal and abnormal humidity conditions, taking into consideration the high and the low normal and high and low abnormal, shall be established by test, analysis, or operating experience. No duration is assigned for the normal and abnormal humidity conditions.
 - d) If the performance of the safety function of the equipment is affected by ambient pressure, the ability to provide the safety function at the extremes of the normal and abnormal pressure conditions, taking into consideration the high and the low normal and the high and low abnormal pressures, shall be established by test, analysis, or operating experience. No duration is assigned to the normal and abnormal pressure conditions.
 - e)
 - (1) If the abnormal radiation dose rate is the same as the normal radiation dose rate, the normal radiation dose rate shall be assumed to subsist for 40 years, or any lesser qualified life, and the duration of the abnormal radiation dose rate is "0."
 - (2) If the abnormal radiation dose rate is higher than the normal radiation dose rate, the abnormal radiation dose rate shall be assumed to subsist for 40 years, or any lesser qualified life, and the duration of the normal radiation dose rate is "0."
 - f) The DBE conditions shall be taken to subsist for the stated number of hours following the qualified life of the equipment.
 - g) Spray due to fire sprinkler actuation shall be taken to occur once over the entire qualified life duration for a period of 2 hours, even if the qualified life is a period less than 40 years. If spray qualification is provided for DBE conditions (whether for water or chemical spray), then separate qualification for the fire sprinkler spray need not be provided.
 - h) The values stated in this EQD are the ambients and do not include the thermodynamic and radiation conditions imposed by the process fluids, self-heating, etc. The data pertaining to process fluid and service induced parameters are to be taken into account where significant, such as in thermal aging analyses. These data can be obtained from the equipment data sheets or the Equipment Specification.
 - i) Equipment that is to be installed in inaccessible locations must be qualified to a 40-year life without the need for maintenance or replacement.
2. Data to be provided by SELLER through the submittal process as required on the G-321-E form.
 3. Where pressure is given in inches of water column (in-WC) in the source document, it is generally assumed that this is in reference to atmospheric pressure and is, therefore, equivalent to inches of water gage (in-WG).
 4. Normal, abnormal, and DBE dose rates are the same; therefore, abnormal & DBE doses do not add to total integrated dose based on normal dose rate over 40 years.
 5. Wet Fire Sprinkler system in room. Room wetted 2 hrs in 40 years via inadvertent actuation of fire sprinklers.
 6. Fire Water spray is only spray present in the room.
 7. Spray = Yes, if wet sprinklers or other liquid lines are present.
 8. Vendor to determine impacts of submergence.
 9. Environmental data provided is for room conditions only (does not reflect process conditions).
 10. BUYER to assign doc number after receipt of seller submittal.
 11. Deleted
 12. Ammonia and nitric acid are listed in the HLW Room environment Data sheet, 24590-HLW-U0D-W16T-00001, Rev 1. The determination that the DBE exposure is N/A is as follows:
 - The nitric acid pipe line identified in CCN 156336 is not located in room H-A123.
 - Confinement of ammonia is achieved by designation of ammonia lines in HLW as SS and Seismic Category, SC-III. Additionally, circumferential breaks and leakage cracks need not be postulated in lines less than or equal to 1 inch nominal pipe size, per 24590-WTP-GPG-SANA-002, Section 3.3.3, Pipe Failures.