



PLANNING COMMISSION

Planning & Development Services Department • 201 N. Stone Ave. • Tucson, AZ 85701

Date: October 15, 2014

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To: Planning Commission

From: Ernie Duarte, Director PSDS

Subject: Study Session – Study Session Unified Development Code Text
Amendment: C8-14-06 Hospital Backup Tanks (*Citywide*)

Issue – On August 5, 2014, the Mayor and Council gave direction to pursue a text amendment which addresses emergency aboveground storage tank (ASTs) capacity for hospitals.

1. Lift the size limitation of storage capacity restriction for aboveground tanks; and;
2. Include additional screening, noise mitigation, and security standards.

This is a study session to allow the Planning Commission to deliberate on the proposed amendments (see Attachment A for details).

Recommendation – It is recommended that the Planning Commission set this item for a public hearing on November 19, 2014.

Background – Recently Saint Mary's Hospital completed an Emergency Action review of their facilities and found that their emergency generation facility did not meet the National Fire Protection Association (NFPA) standards of 96 hours of emergency fuel for backup generation. In reviewing the current UDC standards for ASTs, it was found that maximum gallon capacity did not allow for hospitals and associated campuses to store enough fuel in one tank to meet the 96 hour requirement. PSDS staff issued a Temporary Use Permit for Saint Mary's in order for the hospital and associated campus to come into compliance with the NFPA standard. This action initiated staff to completed a case study and found that the majority of the hospitals in Tucson could not meet the new NFPA standard. and would require each hospital site to request special permitting, such as a Temporary Use Permit, or trigger amendments to the hospitals Planned Area Development (PAD) zoning.

PSDS staff teamed with the Tucson Fire Department (TFD) as a review agency to consider the possible text amendment. Staff found that TFD follows guidance and standards as adopted by The International Fire Code, which also references the use of any and all NFPA Standards. NFPA is considered law and is referenced in the Fire Code. Hospital campuses are listed as "critical" structures within our community, and require fuel to run emergency backup generators should they need to operate for several days during a disaster. This UDC

amendment would have the significance of allowing Tucson hospitals to address their own unique facilities needs for ASTs capacity.

Furthermore, ASTs installed per federal, state, International Fire Code, and NFPA Standards are preferred over underground tanks due to substantial regulatory requirements that safeguard human health and environmental impacts.

Summary of the Proposed Amendments

Pursuant to the Mayor and Council's direction, staff prepared the following draft amendments (see Attachment A for more details on proposed amendments):

1. Lift the size limitation of storage capacity restriction for aboveground tanks for hospital uses only.

Current Regulation – ASTs are limited to a maximum gallon capacity of 1,000 gallons in O-1, O-2, O-3. In the C-1, C-2, and C-3 zones the maximum gallon capacity is 4,000 gallons.

Proposed Revision – For hospital uses only, lift the ASTs fuel capacity restriction.

2. Include additional screening, security standards, and noise mitigation.

Proposal – The proposed amendment would require that the ASTs be painted a complimentary tone to the nearest adjacent structure. By introducing a complimentary tone/color the visual mass of the tank will be minimized. Additional screening standards, regardless of adjacent use or zone, are recommended should the hospital choose the unrestricted gallon capacity option. The project shall provide visual and noise buffers where the site is adjacent to a residential use or residentially zoned property. This can be accomplished by providing a minimum AGT setback of at least 200 feet from a residential use or residentially zoned property that is adjacent to the site. A six foot high or higher, masonry screen wall and at least a 20-foot wide landscape buffer shall be provided adjacent to the property line where it adjoins a residential use or residentially zoned property. The landscape buffer shall be placed on the outside of the screen wall and shall include, in addition to shrubs and groundcover, and canopy trees. This would provide for screening and address passive and active security and is the tallest height requirement within the screening standards of the UDC. A new line would be introduced within the table as a specific use for hospital AGTs only.

Current Regulation – TABLE 7.6.4-1: Landscape Border and Screenings Standards of the Unified Development Code currently requires differing standards for adjacent land uses, streets, and zones.

Attachments:

- A – Proposed Text Amendments to the Unified Development Code
- B – Hospital Location Map
- C – White paper presentation by Jim Craven, stakeholder representative

UNIFIED DEVELOPMENT CODE
 ARTICLE 4: ZONES
 SECTION 8, USE TABLES

4.8.5 PERMITTED USES: OFFICE ZONES

TABLE 4.8-3: PERMITTED USES – OFFICE ZONES				
P = Permitted Use S = Permitted as Special Exception Use [1] Mayor and Council Special Exception Procedure, Section 3.4.4 [2] Zoning Examiner Special Exception Procedure, Section 3.4.3 [3] PSDS Special Exception Procedure, Section 3.4.2				
LAND USE	O-1	O-2	O-3	USE SPECIFIC STANDARDS

Commercial Services Land Use Group With Land Use Class/Type:				

Hazardous Material Storage is permitted as an accessory use to any permitted principal land use in any Land Use Group	P	P	P	O-1, O-2, O-3: 4.9.10.B.1 & 2.a & e

Storage Land Use Group With Land Use Class/Type:				
Hazardous Material Storage as an accessory use to any permitted land use	P	P	P	O-1, O-2, O-3: 4.9.10.B.1 & 2.a & e and 4.9.13.K

Comment [AH1]: Only two zones pertaining to text amendment?
 Comment [CL2]: Yes only the two zones.

Comment [AH3]: Can a use reference two conflicting standards? Wireless communications uses 'or' instead of '&'.
 Comment [CL4]: We are introducing .e

Comment [AH5]: Can a use reference two conflicting standards?

4.8.6 PERMITTED USES: COMMERCIAL AND MIXED USE ZONES

TABLE 4.8-4: PERMITTED USES – COMMERCIAL AND MIXED USE ZONES						
P = Permitted Use S = Permitted as Special Exception Use [1] Mayor and Council Special Exception Procedure, Section 3.4.4 [2] Zoning Examiner Special Exception Procedure, Section 3.4.3 [3] PSDS Special Exception Procedure, Section 3.4.2						
LAND USE	C-1	C-2	C-3	OCR-1	OCR-2	USE SPECIFIC STANDARDS

Industrial Land Use Group With Land Use Class/Type:						

Hazardous Material Storage is permitted as an accessory use to any permitted principal land use in any Land Use Group	P	P	P	P	P	C-1, C-2, C-3, OCR-1, OCR-2: 4.9.10.B.1 & .2.c & e

Storage Land Use Group With Land Use Class/Type:						
Hazardous Material Storage as an accessory use to any permitted land use	P	P	P	P	P	C-1, C-2: 4.9.10.B.1, 2.a & e C-3, OCR-1, OCR-2: 4.9.10.B.1 & .2.c & e

Comment [AH6]: Can a use reference two conflicting standards?

Comment [AH7]: Can a use reference two conflicting standards?

Comment [AH8]: Can a use reference two conflicting standards?

UNIFIED DEVELOPMENT CODE
ARTICLE 4: ZONES
SECTION 9, USE-SPECIFIC STANDARDS

4.9.10. STORAGE USE GROUP

B. Hazardous Material Storage

1. Aboveground storage tanks for the storage of hazardous materials, such as, but not limited to, hydrogen, gasoline, diesel fuel, automotive fluids, oil, or waste-oil, are permitted as accessory uses in conjunction with and for the purpose of a principal permitted land use.

- b. The following are required of an accessory aboveground storage tank:

- (2) Except as specified in this section, the setback standards of the zoning district apply to all accessory storage tanks.

- (b) A tank that is not located within an enclosed building shall be approved by the Fire Chief and setback as follows.

- (iii) For hospital uses only, with unrestricted aboveground tank capacity, a minimum of 200 feet from any property line adjacent to R-1 or more restrictive zoning, or the tank location shall be processing in accordance with Section 3.10.1, General Board of Adjustment Procedures.

- (9) Hospital aboveground fuel tanks shall be painted a complimentary tone to the nearest adjacent structure and approved by zoning review.

- Comment [AH9]: Where does this come from and where will it be inserted?
- Comment [CL10]: This is a new item and will be #9.
- Comment [AH11]: Hospital aboveground storage tanks

2. The maximum permitted capacity of each aboveground storage tank is as follows:

- e. Aboveground tank capacity is unrestricted for hospital uses only.

**UNIFIED DEVELOPMENT CODE
 ARTICLE 7: DEVELOPMENT STANDARDS
 SECTION 6, LANDSCAPING AND SCREENING**

7.6.4. LANDSCAPE STANDARDS

Table 7.6.4-I: Landscape Border (Section 7.6.4.C) And Screening Standards (Section 7.6.5)

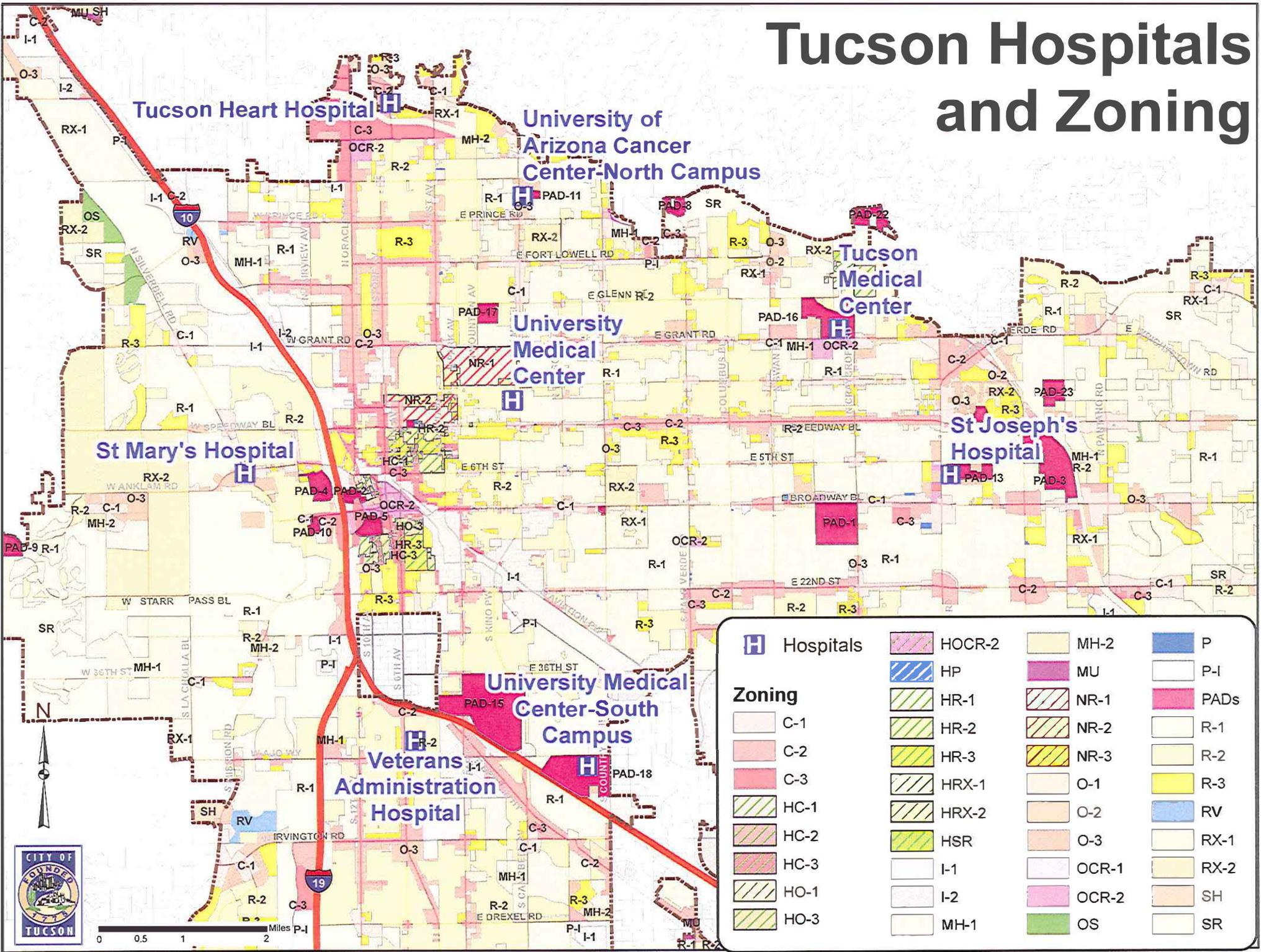
Land Use	Adjacent Street or Zone (Developed or Vacant)					
	Streets		Zones [1]			
	MS&R	Non-MS&R	Residential	Office	Commercial	Industrial

Specific Uses (when within 100' of property line)						

Hospital Fuel Tank	6' wall	6' wall	6' wall	6' wall	6' wall	6' wall

Comment [AH12]: Hospital aboveground storage tanks

Tucson Hospitals and Zoning



Hospitals	HOCR-2	MH-2	P
Zoning	HP	MU	P-1
C-1	HR-1	NR-1	PADs
C-2	HR-2	NR-2	R-1
C-3	HR-3	NR-3	R-2
HC-1	HRX-1	O-1	R-3
HC-2	HRX-2	O-2	RV
HC-3	HSR	O-3	RX-1
HO-1	I-1	OCR-1	RX-2
HO-2	I-2	OCR-2	SH
HO-3	MH-1	OS	SR



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Mayor Rothschild, City Manager and Council,

This white paper is being presented to you for consideration of amending the present UDC (Unified Development Code) addressing the conflicting NFPA (National Fire Protection Association) code requirements within NFPA 110 for on-site fuel storage for hospitals and the restrictions established within the UDC. Currently the UDC does not separate healthcare facilities from commercial land use. The present wording and restrictions within the UDC forces the utilization of underground storage tanks to comply with the UDC and meet the requirements of the NFPA. The utilization of underground storage tanks represents a much greater risk to the environment and our limited water supply in the event of a release of diesel fuel than that of above ground storage tanks. This white paper will address and further define these issues and propose an amendment to the UDC for consideration for hospitals only.

I would like to thank you for your time and allowing this white paper to be submitted for consideration.

Respectfully,

Jim Craven

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The current Unified Development Code (UDC), Chapter 23B of the Tucson Code, adopted October 9, 2012 and Effective January 2, 2013 identifies within 4.7.14⁽¹⁾ and 4.7.15⁽¹⁾ the land use or development zone for medical as O-2 for two story medical projects or O-3 for mid-rise medical projects. Table 4.8-3⁽²⁾: Permitted uses indicates the hazardous material storage as an accessory use to any permitted land use is only permitted within zone O-3 in compliance with 4.9.10.B.1 and 2.a.⁽³⁾ Presently the UDC does not permit hazardous materials storage on-site on a hospital campus if zoned under O-2.

4.9.10.B.2.a⁽³⁾ limits the gallon capacity of a single above ground storage tank to 1,000 gallons. The 2010 edition of NFPA 110 Standard for Emergency and Standby Power Systems, Chapter 5, 5.1.2⁽⁴⁾ for hospitals located within seismic design category C, Level 1 Class X, EPSS (Emergency Power Supply System), requires a minimum of 96 hours of fuel supply without refueling as stated within Chapter 4.4.2.⁽⁴⁾ The NFPA requires "Level 1 systems to be installed when failure of equipment to perform could result in loss of human life or series injuries". As an example, the new generator system just recently tested and commissioned at the St. Mary's Hospital here in Tucson, consists presently of three 1.5MW standby generators with the capability of a fourth generator. Each of these generators at one hundred percent load requires 104.6 gallons per hour.⁽⁵⁾ To comply with the NFPA requires an onsite storage capacity of a minimum of 30,125 gallons for the three generators. To comply with the present UDC requirements for above ground storage tanks would require thirty-one 1,000 gallon tanks. Many hospitals across the country including St. Mary's, TMC, and St. Joseph's here in Tucson require their generator systems to be sized to have the capability to provide power to their complete campuses during an extended power outage. The design requirements to meet this requirement exceeds the required essential emergency systems of the NFPA and the NEC requiring larger generator systems and onsite fuel storage capacities. The generator systems at St. Mary's and TMC presently have this type of capability, St. Joseph's will have this capability in the near future.

The new generator system at St. Mary's Hospital was granted a TUP (Temporary Use Permit) for utilization of two horizontal 20,000 gallon above ground storage tanks. TMC is in the process of submitting an application for a TUP for two vertical 15,000 gallon above ground storage tanks for their emergency generation system. University of Arizona Medical Center though under State jurisdiction has two horizontal aboveground storage tanks, one 15,000 gallon and one 12,000 gallon.

We have contacted the Planning and Development service departments within the cities of Oro Valley, Marana, and Glendale to discuss their restrictions on above ground storage tanks. None of these agencies within their respective cities restrict the gallon capacities on aboveground storage tanks for hospitals. Their only requirements were compliance with the adopted fire codes and the tanks to be screened and secured.

4.9.10.B.1.b.⁽³⁾ requires the tank top be screened by a wall equal to the height of the tank. 4.9.10.B.1.b.⁽⁴⁾ and ⁽⁵⁾⁽³⁾ restricts a storage tank to a maximum diameter of ten feet for a 10,000 gallon tank and a maximum of twelve feet in height above grade respectively.

Many of us are aware of and have heard of the issues with buried underground fuel storage tanks.

Within the semiannual Report of UST (underground storage tanks) Performance Measures, end of fiscal year 2013 (October 1, 2012 – September 30, 2013) released by the EPA there are 577,981 active UST's which are regulated by the EPA's UST program. This program since inception in 1984, 1,797,401 UST's have been closed, 514,123 releases (leaks) have been reported, 436,406 have been cleaned up with 77,717 remaining to be cleaned up. This report also states that within the state of Arizona there are 6,819 active UST's, 21,400 tanks closed, since 1984 there has been 8,710 confirmed releases, 7,999 cleanups completed with 711 cleanups remaining.

Though all storage tanks aboveground and underground must comply with federal, state, and local regulations, a tank underground can lead to "out of sight out of mind". A leaking underground storage tank can impact the environment in many ways; soil contamination, public health, and contamination of local water supply. The estimates to clean up the contamination can range from \$125,000 as an average clean-up not impacting groundwater to over \$1 million and may take years when groundwater has been adversely impacted.

The Congress amended the Subtitle 1 of the Resource Conservation and Recovery Act in 1986 the owners and operators are now financially responsible for cleaning up releases from underground storage tanks. An owner must now prove financial responsibility coverage by this amendment ranging from \$500,000 per occurrence coverage or \$1 million aggregate coverage.

The issues stated above are the major concerns and risks with underground storage tanks.

The purpose of this proposal is to amend the present UDC as follows:

1. Revise the maximum gallon capacity of a single storage tank to 25,000 gallons.
The above narrative addresses the restrictions presently established within the UDC and the justification for this proposed amendment.
2. Remove the physical dimension restrictions allowing for horizontal or vertical tank(s) to be utilized.
As most existing hospital campuses are limited/restricted in areas to introduce new utilities i.e. pad mounted transformers, generators, storage tanks, cooling towers, service access, etc. the available space will typically dictate the utilization of a horizontal or vertical tank. These limitations will drive the diameter and height of storage tanks once the required gallon capacity of code required or system required has been established.
3. Revise the screening height of the storage tanks to eight feet above finished grade.
The screening of a vertical tank which may be twenty feet tall with a block wall is impractical. The proposed amendment would require screening and securing the tank(s) with a eight high wall or wrought iron fence.

The above proposed revisions to the UDC are intended to address and be directed to hospitals and not to the other types of land use presently covered within zones O-2 and O-3.

4.7.13. OFFICE ZONE (O-1)

This zone provides for administrative, medical outpatient, and professional office uses that will complement the residential environment. Development within this zone typically consists of office conversions from existing residential uses fronting on major streets and new construction of small-scale office projects. Consolidation of lots is encouraged in order to reduce curb cuts on arterial streets and to assure compliance with the design and development standards of this zone.

4.7.14. OFFICE ZONE (O-2)

This zone provides for office, medical, civic, and other land uses that provide reasonable compatibility with adjoining residential uses. Typical development within this zone is two-story office or medical projects.

4.7.15. OFFICE ZONE (O-3)

This zone provides for mid-rise, office, medical, civic, and other development uses that provide reasonable compatibility with adjoining residential uses.

4.7.16. PARKING ZONE (P)

This zone provides for off-street motor vehicle parking within residential areas to serve land uses in another zone.

4.7.17. RECREATIONAL VEHICLE ZONE (RV)

The purpose of this zone is to provide for development of short-term occupancy recreational vehicle parks and campsites while ensuring reasonable compatibility with adjoining properties by establishing special requirements.

4.7.18. NEIGHBORHOOD COMMERCIAL ZONE (NC)

This zone provides for low-intensity, small-scale, commercial and office uses that are compatible in size and design with adjacent residential uses. Residential and other related uses shall be permitted.

4.7.19. RURAL VILLAGE CENTER ZONE (RVC)

The purpose of this zone is to provide retail shopping facilities, planned and designed for the convenience and necessity of a suburban or rural neighborhood. Rural village centers shall be developed according to an approved site plan and located in accordance with adopted neighborhood, community, or area plans. The standards are designed to maintain the suburban character of duly designated commercial areas located along designated Scenic Routes and to provide safe ingress and egress to and from the village center. This zone is solely to provide for comparable zoning for areas annexed into the City limits and is not intended for rezoning.

4.7.20. COMMERCIAL ZONE (C-1)

This zone provides for low-intensity, commercial and other uses that are compatible with adjacent residential uses. Residential and other related uses shall be permitted.

TABLE 4.8-3: PERMITTED USES – OFFICE ZONES P = Permitted Use S = Permitted as Special Exception Use (1) Mayor and Council Special Exception Procedure, Section 3.4.4 (2) Zoning Examiner Special Exception Procedure, Section 3.4.3 (3) PDSD Special Exception Procedure, Section 3.4.2				
LAND USE	O-1	O-2	O-3	USE SPECIFIC STANDARDS
Residential Care Services, Adult Care or Physical and Behavioral Health Services:				
Maximum 10 Residents	P	P	P	O-1, O-2: 4.9.13.J O-3: 4.9.7.J.3.a, .4 and 4.9.13.K
Maximum 15 Residents	S [2]			O-1: 4.9.7.J.3.b & .4 and 4.9.13.J
Unlimited # Residents	S [2]		P	O-1: 4.9.7.J.3.d, .4 & .8 and 4.9.13.J O-3: 4.9.7.J.3.d, .4, & .8 and 4.9.13.K
Residential Care Services, Adult Rehabilitation Service or Shelter Care:				
Maximum 15 Residents		S [2]		O-2: 4.9.7.J.1, .2.b, 3.b, .4, & .9 and 4.9.13.J
Unlimited # Residents		S [2]	P	O-2: 4.9.7.J.1, 2.b., 3.d, 4, & .8 and 4.9.13.J O-3(P): 4.9.7.J.1, .3.d, .4, .6, & .8 and 4.9.13.K
			S [2]	O-3(S): 4.9.7.J.1, 3.d, .4, & .8 and 4.9.13.K
Residential Care Services, Child Rehabilitation Services, Maximum 10 Residents		P	P	O-2: 4.9.7.J.1, 2.b, 3.a, & .4 and 4.9.13.J O-3: 4.9.7.J.1, 3.a, & .4 and 4.9.13.K
Residential Care Services, Shelter Care for Victims of Domestic Violence		P	P	O-2: 4.9.7.J.1, 2.b, 3.b, .4, & .7 and 4.9.13.J O-3: 4.9.7.J.1, 3.c, & .4 and 4.9.13.K
Storage Land Use Group With Land Use Class/Type:				
Hazardous Material Storage as an accessory use to any Permitted Land Use			P	O-3: 4.9.10.B.1 & 2.a and 4.9.13.K
Utilities Land Use Group With Land Use Class/Type:				
Distribution System	S [2]	S [2]	S [2]	O-1, O-2: 4.9.11.A.1, .5, & .9 and 4.9.13.J O-3: 4.9.11.A.1, .5, & .9 and 4.9.13.K
Renewable Energy Generation	S [2]	S [2]	S [2]	O-1, O-2: 4.9.11.B. 2, .3, .4, & .5 and 4.9.13.J O-3: 4.9.11.B. 2, .3, .4, & .5 and 4.9.13.K

4.9.10. STORAGE USE GROUP

A. Commercial Storage

1. Adjacent to a residential use or zone, outdoor storage shall comply with the following:
 - a. Storage material shall not be visible from outside the screen.
 - b. Outdoor lighting shall be directed away from adjacent residential uses and zones.
2. Outdoor storage, when permitted, shall not be located in the street perimeter yard.

B. Hazardous Material Storage

1. Aboveground storage tanks for the storage of hazardous materials, such as, but not limited to, hydrogen, gasoline, diesel fuel, automotive fluids, oil, or waste-oil, are permitted as accessory uses in conjunction with and for the purpose of a principal permitted land use.
 - a. Exceptions
 - (1) A tank used for storing propane, water, or heating oil for consumptive use on the premises are not regulated by this section.
 - (2) Within the Scenic Corridor Zone (SCZ), aboveground storage tanks must be located within an enclosed building.
 - b. The following are required of an accessory aboveground storage tank:
 - (1) The tank shall be used only for the purpose of servicing the vehicles used or serviced in connection with a permitted principal use. The tanks shall not be open for use by the public.
 - (2) Except as specified in this section, the setback standards of the zoning district apply to all accessory storage tank:
 - (a) If the Fire Chief approves the location of a tank within an enclosed building, the minimum setbacks shall be determined by the Fire Chief, provided that the setbacks shall not be less than those required by the zoning.
 - (b) A tank that is not located within an enclosed building shall be setback as follows.
 - (i) A minimum of 50 feet from any property line adjacent to any area where, in the opinion of the Fire Chief, the tank could present a hazard or danger to person or property.
 - (ii) A minimum of 200 feet from any property line adjacent to R-3 or more restrictive zoning, or the tank location shall be processing in accordance with Section 3.4.3, *Zoning Examiner Special Exception Procedure*.
 - (3) The tank shall be screened by a wall equal to the height of the tank.

- (4) The maximum permitted diameter of a tank is 9.5 inches. Exception: A 10,000 gallon storage tank may have a maximum diameter up to ten feet.
 - (5) The maximum permitted height of a tank, excepting venting, manways, and filler caps, is ten feet above grade. Exception: A 10,000 gallon storage tank may be a maximum of 12 feet in height above grade.
 - (6) An aboveground storage tank shall have a secondary containment tank.
 - (7) A concrete pad shall be provided under all tanks.
 - (8) The construction, installation, and location of the aboveground storage tanks and the types of materials to be stored in the tanks shall be approved by the Fire Chief.
- c. These standards shall not supersede or replace any other applicable city, county, state, or federal standards and requirements for aboveground storage tanks.
2. The maximum permitted capacity of each aboveground storage tank is as follows:
 - a. A maximum capacity of 1,000 gallons is permitted.
 - b. A maximum capacity of 2,000 gallons is permitted.
 - c. A maximum capacity of 4,000 gallons is permitted.
 - d. A maximum capacity of 10,000 gallons is permitted.
- C. **Personal Storage**
1. All storage shall be within enclosed buildings.
 2. Access shall be from a collector or arterial street.
 3. All walls or doors visible from adjacent streets and residential properties shall be surfaced with a non-reflective material.
 4. The maximum permitted individual unit size is 200 square feet of floor area.
 5. Razor or barbed wire shall not be used.
 6. The facility's exterior façade visible from adjoining residential properties or street frontage shall be earth tone in color and of masonry, stucco, or similar materials.
 7. The maximum permitted site area is three acres.

4.9.11 UTILITIES USE GROUP

A. Distribution System

1. The setback of the facility, including walls or equipment, shall be 20 feet from any adjacent residential zone.
2. Where a facility is not enclosed within a building, the surrounding screen shall be used as the building wall for the purposes of setbacks.

add water to the cell and are equipped with a flame-arresting vent which permits the escape of hydrogen and oxygen gas from the cell in a diffused manner such that a spark, or other ignition source, outside the cell will not ignite the gases inside the cell.

3.3.3 Black Start. Where the stored energy system has the capability to start the prime mover without using energy from another source.

3.3.4* Emergency Power Supply (EPS). The source of electric power of the required capacity and quality for an emergency power supply system (EPSS).

3.3.5* Emergency Power Supply System (EPSS). A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power.

3.3.6 Fuel Tank.

3.3.6.1 Day Fuel Tank. A fuel tank, located inside a structure, that provides fuel to the engine.

3.3.6.2 Enclosed Fuel Tank. A fuel tank located within a separate room, separated from other equipment.

3.3.6.3 Integral Fuel Tank in EPS Systems. A fuel tank furnished by the EPS supplier and mounted on the engine or under as a subbase.

3.3.6.4 Main Fuel Tank. A separate, main fuel tank for supplying fuel to the engine or a day tank.

3.3.7 Lamp. An illuminating indicator.

3.3.8 Occupancy Category. See ASCE 7, *Minimum Design Loads for Buildings and Other Structures*, Section 9, 2002 edition.

3.3.9 Switch.

3.3.9.1 Automatic Transfer Switch. Self-acting equipment for transferring one or more load conductor connections from one power source to another.

3.3.9.2 Bypass-Isolation Switch. A manually operated device used in conjunction with an automatic transfer switch to provide a means of directly connecting load conductors to a power source and disconnecting the automatic transfer switch.

3.3.9.3 Nonautomatic Transfer Switch. A device, operated by direct manpower or electrical remote manual control, for transferring one or more load conductor connections from one power source to another.

Chapter 4 Classification of Emergency Power Supply Systems

(EPSSs)

4.1* General.

The EPSS shall provide a source of electrical power of required capacity, reliability, and quality to loads for a length of time as specified in Table 4.1(a) and within a specified time following loss or failure of the normal power supply as specified in Table 4.1(b).

Table 4.1(a) Classification of EPSSs

Class	Minimum Time
Class 0.083	0.083 hr (5 min)
Class 0.25	0.25 hr (15 min)
Class 2	2 hr
Class 6	6 hr
Class 48	48 hr
Class X	Other time, in hours, as required by the application, code, or user

Table 4.1(b) Types of EPSSs

Designation	Power Restoration
Type U	Basically uninterruptible (UPS systems)
Type 10	10 sec
Type 60	60 sec
Type 120	120 sec
Type M	Manual stationary or nonautomatic — no time limit

4.2* Class.

The class defines the minimum time, in hours, for which the EPSS is designed to operate at its rated load without being refueled or recharged. [see Table 4.1(a).]

4.3 Type.

The type defines the maximum time, in seconds, that the EPSS will permit the load terminals of the transfer switch to be without acceptable electrical power. Table 4.1(b) provides the types defined by this standard.

4.4* Level.

Copyright NFPA

This standard recognizes two levels of equipment installation, performance, and maintenance.

4.4.1* Level 1 systems shall be installed when failure of the equipment to perform could result in loss of human life or serious injuries.

4.4.2* Level 2 systems shall be installed when failure of the EPSS to perform is less critical to human life and safety and where the authority having jurisdiction shall permit a higher degree of flexibility than that provided by a Level 1 system.

4.4.3 All equipment shall be permanently installed.

4.4.4* Level 1 and Level 2 systems shall ensure that all loads served by the EPSS are supplied with alternate power that meets all the following criteria:

- (1) Of a quality within the operating limits of the load
- (2) For a duration specified for the class as defined in Table 4.1(a)
- (3) Within the time specified for the type as defined in Table 4.1(b)

Chapter 5 Emergency Power Supply (EPS): Energy Sources, Converters, and Accessories

5.1 Energy Sources.

5.1.1* The following energy sources shall be permitted to be used for the emergency power supply (EPS):

- (1)* Liquid petroleum products at atmospheric pressure
- (2) Liquefied petroleum gas (liquid or vapor withdrawal)
- (3) Natural or synthetic gas

Exception:

For Level 1 installations in locations where the probability of interruption of off-site fuel supplies is high, on-site storage of an alternate energy source sufficient to allow full output of the EPSS to be delivered for the class specified shall be required, with the provision for automatic transfer from the primary energy source to the alternate energy source.

5.1.2 Seismic design category C, D, E, or F, as determined in accordance with ASCE 7, shall require a Level 1 EPSS Class X (minimum of 96 hours of fuel supply).

5.1.3 The energy sources listed in 5.1.1 shall be permitted to be used for the EPS where the primary source of power is by means of on-site energy conversion, provided that there is separately dedicated energy conversion equipment on-site with a capacity equal to the power needs of the EPSS.

DIESEL GENERATOR SET

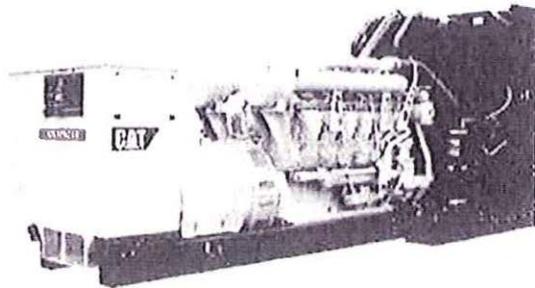


Image shown may not reflect actual package.

STANDBY 1500 ekW 1875 kVA 60 Hz 1800 rpm 13 800 Volts

Caterpillar is leading the power generation marketplace with Power Solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

FEATURES

FUEL/EMISSIONS STRATEGY

- EPA Certified for Stationary Emergency Application (EPA Tier 2 emissions levels)

DESIGN CRITERIA

- The generator set accepts 100% rated load in one step per NFPA 110 and meets ISO 8528-5 transient response.

FULL RANGE OF ATTACHMENTS

- Wide range of bolt-on system expansion attachments, factory designed and tested
- Flexible packaging options for easy and cost effective installation

SINGLE-SOURCE SUPPLIER

- Fully prototype tested with certified torsional vibration analysis available

WORLDWIDE PRODUCT SUPPORT

- Cat dealers provide extensive post sale support including maintenance and repair agreements
- Cat dealers have over 1,800 dealer branch stores operating in 200 countries
- The Cat® S•O•SSM program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

CAT® 3512C DIESEL ENGINE

- Reliable, rugged, durable design
- Four-stroke-cycle diesel engine combines consistent performance and excellent fuel economy with minimum weight

CAT GENERATOR

- Designed to match the performance and output characteristics of Cat diesel engines
- Single point access to accessory connections
- UL 1446 recognized Class H insulation

CAT EMCP 4 CONTROL PANELS

- Simple user friendly interface and navigation
- Scalable system to meet a wide range of customer needs
- Integrated Control System and Communications Gateway

SEISMIC CERTIFICATION

- Seismic Certification available
- Anchoring details are site specific, and are dependent on many factors such as generator set size, weight, and concrete strength. IBC Certification requires that the anchoring system used is reviewed and approved by a Professional Engineer
- Seismic Certification per Applicable Building Codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, CBC 2007
- Pre-approved by OSHP and carries an OPA#(OSP-0084-01) for use in healthcare projects in California

STANDBY 1500 ekW 1875 kVA

60 Hz 1800 rpm 13 800 Volts

**FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT**

System	Standard	Optional
Air Inlet	<ul style="list-style-type: none"> • Single element canister type air cleaner • Service indicator 	<ul style="list-style-type: none"> [] Dual element & heavy duty air cleaners (with pre-cleaners) [] Air inlet adapters & shut-off
Cooling	<ul style="list-style-type: none"> • Radiator fan and fan drive • Fan and belt guards • Coolant level sensors* • Cat Extended Life Coolant* 	<ul style="list-style-type: none"> [] Coolant level switch gauge [] Heat exchanger and expansion tank
Exhaust	<ul style="list-style-type: none"> • Exhaust manifold - dry - dual - 8 in • 203 mm (8 in) ID round flanged outlet 	<ul style="list-style-type: none"> [] Mufflers [] Stainless steel exhaust flex fittings [] Elbows, flanges, expanders & Y adapters
Fuel	<ul style="list-style-type: none"> • Secondary fuel filters • Fuel cooler* • Fuel priming pump • Flexible fuel lines (shipped loose) 	<ul style="list-style-type: none"> [] Duplex secondary fuel filter [] Primary fuel filter with fuel water separator
Generator	<ul style="list-style-type: none"> • Class F insulation • Cat digital voltage regulator (CDVR) with kVAR/PF control, 3 phase sensing • Winding temperature detectors • Anti-condensation heaters 	<ul style="list-style-type: none"> [] Oversized generators [] Bearing temperature detectors [] Cross current compensation transformer
Power Termination	<ul style="list-style-type: none"> • Bus bar (NEMA mechanical lug holes) • Right hand cable entry • Top or bottom cable entry 	<ul style="list-style-type: none"> [] Left hand cable entry
Governor	<ul style="list-style-type: none"> • ADEM™ 3 	<ul style="list-style-type: none"> [] Load share module
Control Panel	<ul style="list-style-type: none"> • EMCP 4.2 • User interface panel (UIP) - rear mount • AC & DC customer wiring area (right side) • Emergency stop pushbutton 	<ul style="list-style-type: none"> [] Option for right or left mount UIP [] Local & remote annunciator modules [] Digital I/O Module [] Generator temperature monitoring & protection [] Remote monitoring software
Lube	<ul style="list-style-type: none"> • Lubricating oil and filter • Oil drain line with valves • Fumes disposal • Gear type lube oil pump 	<ul style="list-style-type: none"> [] Oil level regulator [] Deep sump oil pan [] Electric & air pre-lube pumps [] Manual pre-lube with sump pump [] Duplex oil filter
Mounting	<ul style="list-style-type: none"> • Rails - engine / generator / radiator mounting • Anti-vibration mounts (shipped loose) 	<ul style="list-style-type: none"> [] Spring-type vibration isolator [] IBC Isolators
Starting/Charging	<ul style="list-style-type: none"> • 24 volt starting motor(s) • Batteries with rack and cables • Battery disconnect switch 	<ul style="list-style-type: none"> [] Battery chargers (10 or 20 Amp) [] 45 amp charging alternator [] Oversize batteries [] Ether starting aid [] Heavy duty starting motors [] Barring device (manual) [] Air starting motor with control & silencer
General	<ul style="list-style-type: none"> • Right hand service • Paint - Caterpillar Yellow (with high gloss black rails & radiator) • SAE standard rotation • Flywheel and flywheel housing - SAE No. 00 	<ul style="list-style-type: none"> [] CSA certification [] CE Certificate of Conformance [] Seismic Certification per Applicable Building Codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, CBC 2007 * Not included with packages without radiators

STANDBY 1500 ekW 1875 kVA

60 Hz 1800 rpm 13 800 Volts



SPECIFICATIONS

CAT GENERATOR

Cat HV Generator
Frame size..... 2730
Excitation..... Permanent Magnet
Pitch..... 0.6670
Number of poles..... 4
Number of bearings..... 2
Number of Leads..... 006
Insulation..... Class F
- Consult your Caterpillar dealer for available voltages
IP Rating..... IP23
Alignment..... Closed Coupled
Overspeed capability..... 125
Wave form Deviation (Line to Line)..... 002.00
Voltage regulator..... 3 Phase sensing with volts/Hz
Voltage regulation..... Less than +/- 1/2% (steady state)
Less than +/- 1/2% (w/3% speed change)
Telephone influence factor..... Less than 50
Harmonic Distortion..... Less than 5%

CAT DIESEL ENGINE

3512C ATAAC, V-12, 4-Stroke Water-cooled Diesel
Bore..... 170.00 mm (6.69 in)
Stroke..... 190.00 mm (7.48 in)
Displacement..... 51.80 L (3161.03 in³)
Compression Ratio..... 14.7:1
Aspiration..... TA
Fuel System..... Electronic unit injection
Governor Type..... ADEM3

CAT EMCP 4 SERIES CONTROLS

EMCP 4 controls including:

- Run / Auto / Stop Control
- Speed and Voltage Adjust
- Engine Cycle Crank
- 24-volt DC operation
- Environmental sealed front face
- Text alarm/event descriptions

Digital indication for:

- RPM
- DC volts
- Operating hours
- Oil pressure (psi, kPa or bar)
- Coolant temperature
- Volts (L-L & L-N), frequency (Hz)
- Amps (per phase & average)
- ekW, kVA, kVAR, kW-hr, %kW, PF

Warning/shutdown with common LED indication of:

- Low oil pressure
- High coolant temperature
- Overspeed
- Emergency stop
- Failure to start (overcrank)
- Low coolant temperature
- Low coolant level

Programmable protective relaying functions:

- Generator phase sequence
- Over/Under voltage (27/59)
- Over/Under Frequency (81 o/u)
- Reverse Power (kW) (32)
- Reverse reactive power (kVAR) (32RV)
- Overcurrent (50/51)

Communications:

- Six digital inputs (4.2 only)
- Four relay outputs (Form A)
- Two relay outputs (Form C)
- Two digital outputs
- Customer data link (Modbus RTU)
- Accessory module data link
- Serial annunciator module data link
- Emergency stop pushbutton

Compatible with the following:

- Digital I/O module
- Local Annunciator
- Remote CAN annunciator
- Remote serial annunciator

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TECHNICAL DATA

Open Generator Set - 1800 rpm/60 Hz/13 800 Volts	DM8260	
EPA Certified for Stationary Emergency Application (EPA Tier 2 emissions levels)		
Generator Set Package Performance Genset Power rating @ 0.8 pf Genset Power rating with fan	1875 kVA 1500 ekW	
Coolant to aftercooler Coolant to aftercooler temp max	50 °C	122 °F
Fuel Consumption		
100% load with fan	396.0 L/hr	104.6 Gal/hr
75% load with fan	310.5 L/hr	82.0 Gal/hr
50% load with fan	219.8 L/hr	58.1 Gal/hr
Cooling System¹		
Air flow restriction (system)	0.12 kPa	0.48 in. water
Air flow (max @ rated speed for radiator arrangement)	2075 m ³ /min	73278 cfm
Engine Coolant capacity with radiator/exp. tank	390.8 L	103.2 gal
Engine coolant capacity	156.8 L	41.4 gal
Radiator coolant capacity	234.0 L	61.8 gal
Inlet Air		
Combustion air inlet flow rate	129.4 m ³ /min	4569.7 cfm
Exhaust System		
Exhaust stack gas temperature	403.9 °C	759.0 °F
Exhaust gas flow rate	308.9 m ³ /min	10908.7 cfm
Exhaust flange size (internal diameter)	203.2 mm	8.0 in
Exhaust system backpressure (maximum allowable)	6.7 kPa	26.9 in. water
Heat Rejection		
Heat rejection to coolant (total)	616 kW	35032 Btu/min
Heat rejection to exhaust (total)	1322 kW	75182 Btu/min
Heat rejection to aftercooler	481 kW	27354 Btu/min
Heat rejection to atmosphere from engine	124 kW	7052 Btu/min
Heat rejection to atmosphere from generator	82.3 kW	4680.4 Btu/min
Alternator²		
Motor starting capability @ 30% voltage dip	3477 skVA	
Frame	2730	
Temperature Rise	130 °C	234 °F
Lube System		
Sump refill with filter	310.4 L	82.0 gal
Emissions (Nominal)³		
NOx g/hp-hr	58 g/hp-hr	
CO g/hp-hr	.44 g/hp-hr	
HC g/hp-hr	11 g/hp-hr	
PM g/hp-hr	.03 g/hp-hr	

¹ For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

² UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40 degree C ambient per NEMA MG1-32.

³ Emissions data (measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO 8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77°F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

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RATING DEFINITIONS AND CONDITIONS

Meets or Exceeds International Specifications: AS1359, CSA, IEC60034-1, ISO3046, ISO8528, NEMA MG 1-22, NEMA MG 1-33, UL508A, 72/23/EEC, 98/37/EC, 2004/108/EC
Standby - Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year. Standby power in accordance with ISO8528. Fuel stop power in accordance with ISO3046. Standby ambients shown indicate ambient temperature at 100% load which results in a coolant top tank temperature just below the shutdown temperature.

Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions. **Fuel rates** are based on fuel oil of 35° API (16° C (60° F)) gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.). Additional ratings may be available for specific customer requirements, contact your Cat representative for details. For information regarding Low Sulfur fuel and Biodiesel capability, please consult your Cat dealer.

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DIMENSIONS

Package Dimensions		
Length	6452.6 mm	254.04 In
Width	2324.5 mm	91.52 in
Height	2711.4 mm	106.75 in
Weight	15 926 kg	35,111 lb

NOTE: For reference only - do not use for installation design. Please contact your local dealer for exact weight and dimensions. (General Dimension Drawing #).

CONTACT INFORMATION

EMPIRE POWER SYSTEMS, can supply general dimension drawings.

Contact Name: STEVE MADDOX

Contact Phone: 520-407-3106

Email: steve.maddox@empire-cat.com

Performance No.: DM18280

Feature Code: 512DE6D

Gen. Arr. Number: 2524216

Source: U.S. Sourced

October 01 2011

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www.Cat-ElectricPower.com

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