

PRODUCT NEWS

Electric Power Division July 2006

Electric Power SpecSizer

Global Product (Software) Release, Version 1.12

Market	Electric Power, All Regions
Application	60 Hz (11 –150 kW) Prime and Standby gas packaged generator sets 50 and 60 Hz (12 – 2500 kW) Prime, Standby and Continuous diesel packaged generator sets
Description	<p>Caterpillar® announces the release of our global generator set sizing and specifying tool, Electric Power SpecSizer, for all market regions worldwide. The SpecSizer software program replaces the Design Pro (Caterpillar 3306 to 3500 diesel generator sets) and QuickSize (Olympian diesel and gas generator sets) Caterpillar legacy sizing tools.</p> <p>SpecSizer selects the best-fit generator set for the application user's site conditions and load profile by using competitively engineered sizing algorithms to specify a genset.</p>

New SpecSizer Features

- 1) Global software distribution for genset sizing
- 2) Improved genset sizing algorithms
- 3) Percent of Intermittent Motors Factor
- 4) Two Sizing Methodologies Aligned to Specifications
- 5) More Complete Sizing Information
- 6) Application Wizard
- 7) More Load Types
- 8) Internet Auto Update
- 9) Multi-language Capability

Description (cont'd)

GENERATOR SET SIZING

Caterpillar Electric Power developed SpecSizer to provide a more competitive and accurate sizing tool. A 6Sigma team utilized 6Sigma process methodology to review the principles, algorithms and practices of competitors' sizing tools, as well as Caterpillar's legacy generator set sizing tools Design Pro, Quicksizer and GenSelect. Our goal was to provide a new sizing tool with improved algorithms supported by improved data accuracy when recommending a generator set for your site conditions and load profile.

Our final selection of formulas was based upon detailed analysis of our own sizing assumptions, as well as competitors'. As we evaluated sizing principles we assessed potential for over-sizing versus under-sizing a genset. In that regard, we chose not to adopt some potential under-sizing assumptions used within competitive sizing tools, as follows:

- Assume all single-phase loads are equally balanced.**
Large, unbalanced single phase loads risk under-sizing; the alternator must be sized for the most heavily-loaded phase.
- Default loads to 35% voltage dip.**
Excessive voltage dip can cause relay drop-out and site load malfunctions.
- Classify most loads as linear.**
The harmonic waveforms from non-linear loads can cause serious alternator overheating.
- Use of "Effective Step kW" - a philosophical difference in sizing generator sets when starting large loads.**
A competitor uses the transient voltage dip to reduce the kW demanded by the load being started. Our position is that the load *caused the voltage dip*, and so, to reduce the sizing calculation as a result is *"double counting"* and can result in under-sizing the generator set.
- Use a 40% reduction for starting low inertia or lightly loaded motors, in addition to any reduction due to "Effective Step kW" noted above.**
Each across-the-line, 3-phase motor dialogue has a checkbox feature used to describe a motor as lightly loaded, or not. SpecSizer supports, *at most*, a 15% reduction as safe when the box is unchecked. Since a lightly loaded motor is an inexact concept, a motor start persisting a second or more can significantly increase generator set frequency dip.

- Use Inrush kW to characterize the demand of Soft-Start Motors.**
While SpecSizer uses inrush values to predict the effect on voltage dip, it uses a motor kW for engine sizing purposes that approximates the average kW demand throughout the motor start, rather than the lower inrush kW used by a competitor.

Description (cont'd)

GENERATOR SET SIZING (Additional Concerns - Competitive Sizing Tools)

- Fail to support many load types.**
 Inclusion of common load types minimizes the need for the application user to estimate sizing parameters. SpecSizer supports additional load types not noted in a competitor's sizing tool: Elevators, Induction Furnaces, Ultraviolet Lights, IEC Motors including single-phase IEC Motors, LRA Motors.
- Recognize only NEMA motors.**
 SpecSizer includes characteristics of both NEMA and IEC motors, permitting an accurate calculation of their effects on starting requirements. IEC motors are often harder to start than NEMA motors. A competitor's exclusion in sizing analysis increases risk of under-sizing.

REPORT GENERATION

SpecSizer now creates a concise, editable generator set Guide Specification in MS Word format. The Guide Specification is always dynamically linked to the selected generator set record on SpecSizer's Generator Selection tab. SpecSizer also provides a detailed Project Sizing Report that displays the feature code, and engine, alternator, and generator set technical data imported from data sheets and Caterpillar's TMI (technical marketing information) system. The Project Sizing Report and the Load Report, both accessed on SpecSizer's Technical tab, can be distributed to a customer by email or printed using a third party pdf writer. Caterpillar provides *at no cost to the application user*. Upon installation of the SpecSizer software, a print driver will be installed and named "Sizing Tool PDF" to provide pdf print or email distribution capability for application users who have no installed pdf writer.

CATERPILLAR		Project Sizing Report		Version: 1.0
Modified Date	12/9/2005	Electricity Supply	60 Hz 480/277 V	Data Date: 12/2/2005
Customer Name		Connection	STAR	
Project Name/Ref #		Max Ambient Temperature	85.0 F	
Prepared By		Altitude	500.0 ft A.S.L.	
Load Analysis Summary				
Max Transient Load Step	2,075.5 skVA	589.6 skW		
Peak Transient Load	2,075.5 skVA	589.6 skW		
Final Running Load	647.3 kVA	583.4 kW	0.90 PF	
Max Running Non-Linear Load	342.0 kVA			
Maximum Running Load	647.3 kVA	583.4 kW		
Generator Set				
Genset Model	(1) of C18 DITA	Nameplate Rating	600.0 kW	
Feature Code	C18DE33		750.0 kVA	
Fuel	Diesel		0.8 PF	
Rating Type	Standby	Site Output	600.0 kW	
Length	166.8 in		750.0 kVA	
Width	60.5 in	Max Transient Voltage Dip	10.0%	
Height	85.3 in	Dry Weight	8,820.0 lbs	
Engine Technical Data at 100% Load				
Make/Model	C18 DITA	Emissions/Certifications	Low BSFC	
Aspiration	TA	Governor	ELEC	
Cylinder Configuration	INLINE - 6	Aftercooler Type	ATAAC	
Displacement	1,106 Cubic Inch	Rejection To Jacket Water	10,407 BTU/min	
Speed	1800 RPM	Rejection To Aftercooler	8,245 BTU/min	
Fuel Rate	43.0 gph	Rejection To Oil Cooler	4,965 BTU/min	
Exhaust Sound Level	0 dBA at 23 ft/7 m	Rejection To Atmosphere	6,085 BTU/min	
Mechanical Sound Level	0 dBA at 23 ft/7 m	Rejection To Exhaust	36,336 BTU/min	
Max Combustion Inlet Air Temp	120.4 F	Exhaust Recoverable	21,791 BTU/min	
Combustion Airflow	1,703.2 cfm	Exhaust Stack Temperature	1,027 F	
Cooling System Ambient Capability	125.6 F	Exhaust Flow Rate	4,990 cfm	
Cooling System Airflow*	28,353.0 cfm	Exhaust Flange Size	0 in	
Engine Performance Number	DM7548	Alternator Technical Data		
Alternator Arrangement Number	2351237	Insulation	CLASS H	
Alternator Type	LC	Temperature Rise	163 F	
Alternator Frame Size	LC7034L	Rejection To Atmosphere	1,384.7 BTU/min	
Alternator Winding Pitch	0.6667	Peak Amps	---	
Number Of Poles	4	Rated Amps	902.1	
Excitation	PM	Short Circuit Ratio	0.4900	
Winding Type	RANDOM WOUND			

DATA INTEGRITY

The integrity of our 6Sigma process control supports SpecSizer's data accuracy. SpecSizer will leverage a new, *internet auto-update feature* for new versions of SpecSizer, and maintain technical data accuracy of our sizing tool and currency with Caterpillar new product introductions.

Features & Benefits

NEW SPECSIZER FEATURES

Global Distribution for GenSet Sizing for all EP Market Regions

SpecSizer is now available in all Caterpillar Electric Power market regions. When the application user installs SpecSizer and selects their region, SpecSizer will specify a genset available from the installed region's price list.

Improved sizing algorithms

SpecSizer utilizes more competitive and more accurately modeled sizing rules. Some notable improvements are to motor starting and non-linear load algorithms.

Percent of Intermittent Motors

This is a competitive sizing feature that uses 25% as the default setting on SpecSizer's Project Parameter's tab. All motors that periodically restart may be designated as "intermittent". SpecSizer's motor and load dialogues that include a checkbox for intermittent starting are: 3-Phase motor, Single Phase motor, Air Conditioning Load, Centrifugal Pump, and Elevator Load.

As a "diversity factor", the application user can designate the percentage of these motors to classify as an intermittent start, up to and including 100% (the most conservative sizing assumption). SpecSizer's software logic then sorts the SkVA from largest to smallest, while adding motors to the intermittent step until the user's selected percentage of intermittent motors is attained. Even if the threshold (i.e. 25%, if left at default) for intermittent motors is reached, no less than the two largest motors will be considered to calculate the SkVA for intermittent motors.

Two Sizing Methodologies

- 1) Conventional (NFPA 110)
- 2) Frequency Limited (ISO 8528)

Many specifications require the generator set to demonstrate the ability to accept full load in one step without stalling. That premise is the default sizing methodology for SpecSizer, referenced as Conventional Sizing. However, SpecSizer provides a secondary sizing methodology, Frequency Limited, to accommodate precise power requirements exemplified by specification ISO 8528. ISO 8528 usually requires dividing loads into multiple steps to avoid oversizing the generator set. A Frequency Limited sizing *will restrict the allowed frequency dip to approximately 10%*, and therefore typically size a larger generator set, especially when loads are applied in a single step.

More Complete Sizing Information

Sizing programs use RkW (total running kW), RkVA (total running kVA), SkW (starting kW), SkVA (starting kVA) and Non-Linear RkVA to size a generator set. SpecSizer now displays the two missing Design Pro sizing parameters, SkW and Non-Linear RkVA.

Application Wizard

The Wizard collects load information and sorts the loads into groups of permitted voltage dip, largest to smallest. The groups are then sorted within each group by largest to smallest starting kVA. This arrangement of loads into steps will typically provide the smallest required generator set to meet the load requirements. It is suggested the application user resize using the Wizard to re-sequence their loads in steps using programmed logic, if no violation of a user's loads in sequenced steps as defined by a specification occurs. The Wizard sort logic may typically size a smaller genset.

Features & Benefits

More Load Types

SpecSizer includes additional load types not supported by Design Pro, such as Air Conditioners, Elevators, Ultraviolet Lights, single-phase NEMA and single-phase IEC Motors. SpecSizer also supports additional load types not noted in a competitor's sizing tool: Elevators, Induction Furnaces, Ultraviolet Lights, IEC Motors including single-phase IEC Motors, LRA Motors.

Auto Update

SpecSizer automatically prompts users on software start-up to accept software updates for New Product Introduction program genset ratings or for new or revised technical information. The application user can elect to skip the download when prompted. Application users must have SpecSizer version 1.01 or later installed for auto-update capability. SpecSizer version 1.0 does not have auto-update capability.

Multi-language Capability

The SpecSizer generator set sizing tool now supports **six languages** – English, French, German, Italian, Spanish and Russian. The SpecSizer Guide Specification is provided in English.

The screenshot displays the 'Rapport de dimensionnement' (Dimensioning Report) window in the SpecSizer software. The report is for a Caterpillar generator set and includes the following data:

Paramètres du projet		Séquence de charge		Sélection du GEL		Technique	
CATERPILLAR Rapport de dimensionnement <small>Version : 1.12 Données : 13/06/2006</small>							
Date de modification	12/07/2006	Alimentation électrique	50 Hz 400/230 V				
Nom du client		Connexion	STAR				
Nom/Réf. de projet		Température ambiante maxi	27,0 C				
Préparé par		Altitude	152,4 En mètres				
Récapitulatif analyse des charges							
Pas maxi de charge transitoire	500,0 kVA d	450,0 kW d					
Crête de charge transitoire	862,6 kVA d	701,3 kW d					
Dernière charge en marche	637,8 kVA	530,5 kW	0,93 Cos Phi				
Charge Charges déformantes maxien m...	500,0 kVA						
Charge maxi en marche	637,8 kVA	530,5 kW					
Groupe électrogène							
Modèle de groupe électrogène	(1) of C32 DITA	Puissance sur plaque signalét.	800,0 kW				
Code Caractéristiques	C32DE01	Puissance sur site	1 000,0 kVA				
Carburant	Diesel		0,8 PF				
Type de puissance	Secours	Puissance sur site	800,0 kW				
Longueur	4 766,90 mm		1 000,0 kVA				
Largeur	2 024,30 mm	Baisse de tension (Synchrone)	30,0%				
Hauteur	2 254,00 mm	Poids à sec	8 046,3 kgs				
Fiche technique moteur à 100% de la charge							
Fabricant/Modèle	C32 DITA	Émissions/Certifications	Low BSFC				
Aspiration	TA	Régulateur	ELEC				
Configuration cylindres	VEE - 12	Type de refroidisseur d'admiss.	ATAAC				
Cylindrée	32 Liter	Rejet vers eau de refroidissem...	318 kW				
Régime	RPM	Rejet vers refroid. d'admission	131 kW				
Débit de carburant	211,0 lph	Rejet vers refroidisseur d'huile	114 kW				
Niveau sonore échappement	0 dBA at 23 ft/7 m	Rejet dans l'atmosphère	49 kW				
Niveau sonore mécanique	0 dBA at 23 ft/7 m	Rejet vers l'échappement	868 kW				
Temp maxi d'air admis à la combustion	48,9 C	Échappement récupérable	513 kW				
Débit d'air de combustion	57,5 m3/sec	Température du pot d'échappe...	528 C				
Capacité système de refroidissement	56,0 C	Débit de gaz d'échappement	163 m3/sec				
Débit d'air système de refroidissement *	1 042,0 m3/sec	Diamètre de bride d'échappem...	0 mm				
Indice de performances moteur	DM8145						
Fiche technique alternateur							
Numéro d'agencement d'alternateur	2628126	Isolation	CLASS H				
Type d'alternateur	SR48	Montée de température	105 C				
Taille de bâti d'alternateur	693	Rejet dans l'atmosphère	37,7 kW				
Pas d'enroulement d'alternateur	0,7222	Courant crête	xxx				
Nombre de pôles	4	Courant nominale	1 443,4				
Excitation	PM	Coefficient de court-circuit	0,3700				
Type d'enroulement	FDRM WOUND						

At the bottom of the window, there are tabs for 'Rapport de dimensionnement' and 'Rapport de charge', and a footer that reads 'Pour obtenir de l'aide, appuyez sur F1'.

Sales Support Information **SIZING TOOL SALES SUPPORT INFORMATION**

Caterpillar CWS login ID is required:

Competitive and training information for SpecSizer can be reviewed on Cat Power Net at <https://engines.cat.com/infocast/frames/ep/products/tools/ss/>

Access Cat Power Net's Products section, for sales support information, including **drawings by model and static spec sheets**. Select Olympian Gensets (N.America) or Diesel Gensets:

<https://engines.cat.com/infocast/frames/ep/products/>

Cat Power Net cannot be accessed without a CWS login ID. Access Cat.com For static **Spec sheets** <http://www.cat.com/cda/layout?m=39280&x=7>

For custom-generated **Spec Sheets** for Caterpillar **diesel** generator sets <http://vidswizard.catmms.com/catwizards/vidswizard/jsp/caterpillar.jsp>

Contact your dealer for general dimension and electrical schematic drawing information.

For **Application & Installation Guides**, access <http://oldasc.cat.com/> and click *Enter Dealers*, type in CWS login ID, click *Reference Library*, click *Electric Power*, click *Application and Installation*, select a component type or system and click *A&I Guide*.

General and Technical Inquiries and Support

Level 1 Support: For **general questions or software support**, please contact Caterpillar Software Support at (800) 901-8777 US only (309) 266-9749 all other countries (309) 263-0127 fax. E-mail: enginesoftware@catsupport.com

Level 2 Support: For **technical questions** regarding a sizing application, please email Caterpillar's Application Support Center at applicationsupport@cat.com or call Application Support at (765) 448-2400.

Level 3 Support: Level 1 and Level 2 Support will contact Subject Matter Experts within Caterpillar to resolve any issues requiring additional focus or interpretation.

Availability

July 2006, SpecSizer version 1.12 (multi-language).

Global - All Caterpillar Electric Power market regions.

SpecSizer is available on software installation in one of **six language options** – English, French, German, Italian, Spanish and Russian, to match the application user's Windows Operating System.

Cost

No purchase or software subscription fees for SpecSizer are required for registered Caterpillar dealers and customers.

Additional copies of SpecSizer are to be ordered and not user-duplicated or copied from an existing CD, as replication or duplication of the SpecSizer software without Caterpillar's written consent constitutes a violation Caterpillar's SpecSizer software license agreement.

Ordering Information

Non-current subscribers: contact Media Logistics at (800) 566-7782 or (309) 266-0942, and reference the following media numbers:

Dealer copy – LERX5474

Internal Caterpillar personnel should order the dealer copy.

Consultant copy – LERX5475 (Ordered through Caterpillar dealer.)

PRODUCT NEWS

Support Hotline

For questions or software support, please contact Caterpillar Software Support.

SUPPORT HOTLINE

Hotline hours are 24 hours/day, 7 days/week.
Interpretation services (most languages) are available with our 24/7support.
(800) 901-8777 US only
(309) 266-9749 all other countries
(309) 263-0127 fax
E-mail: enginesoftware@catsupport.com

Minimum Operating Requirements

SpecSizer Computer Operating Requirements

Note: Most computers may already have BITS as provided by Microsoft to improve software download capability.
Administrative rights on the user's PC are required for any software installation. Please contact your IT department to verify that the application user has administrative rights if not certain. If the user attempts to install SpecSizer without administrative rights, SpecSizer may appear to have completed the installation process, but SpecSizer will not function.
SpecSizer version 1.01 or later is required for internet auto-update capability.

Minimum Operating Requirements

Hardware/PC Configuration

- Pentium III 1GHz
- 256 MB RAM
- 500 MB of available disk space
- CD-ROM Drive
- Display settings configured to 1024x768 resolution
- Integrated or Add-on Fast Ethernet NIC

Software

- Windows 2000 Professional SP4/Windows XP Professional SP1 or later
- Microsoft Office 2000 or later with the latest applicable service pack
- Internet Explorer 5.01 or later with the latest applicable service pack
- Sizing Tool PDF Driver (installed with **SpecSizer**)
- MSDE 2000 or .Net Framework 1.1 (installed with **SpecSizer**)

INTERNET Auto-Update Functionality

- High Speed Internet connection (Broadband, DSL, etc.)
- Background Intelligent Transfer Service (BITS) 2.0 Update or later
(available by download from Microsoft website): <http://www.microsoft.com/>

Administrative rights are required for SpecSizer installation!

SpecSizer versions 1.01 or later is required for auto-updates!

One company.™ A multitude of solutions.

Caterpillar Confidential: Yellow

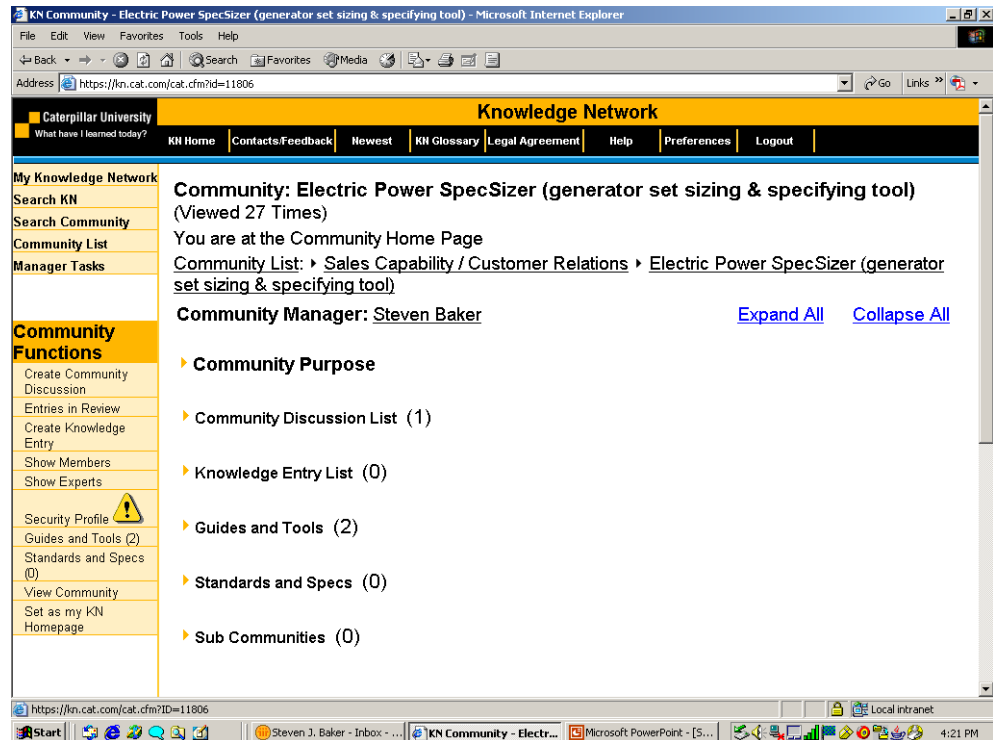
Knowledge Network

Knowledge Network Community

An assigned URL for SpecSizer is available to facilitate communication of topics of interest within the Knowledge Network Community. A Caterpillar CWS login id is required to access the URL.

<https://kn.cat.com/cat.cfm?id=11806>

Caterpillar Electric Power welcomes any issue or discussion topic relating to SpecSizer for posting to the SpecSizer URL.



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