EETDB DB Specification

Programme:	**UNIDO EETDB**
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Creation Date:	30 April 2013
Last Updated:	30 April 2013
Version:	1.0

Approvals:

TBD

TBD

TBD

Document Control

Change Record

Date	Author	Version	Change Reference
30 April 2013	Nikolay Komis-sarenko	1.0	draft

Reviewers

Name	Position
	Approver
	Reviewer
	Approver

References

Document Title	Description	Owner	Location
TDS.EETDB Data Service	Data access service		

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Overview

Definitions

EETDB – Energy Efficient Technologies Data Bank

UNIDO – United Nations Industrial Development Organization

Assumptions

EETDB is not a standalone web-enabled system, it's part of the UNIDO web site http://energy.unido.ru/

Basic Needs

EETDB Database requirements

Database EETDB is part of EETDB solution. It is aimed to provide safe physical data storage with easy way to store/get data and fast search through the data.

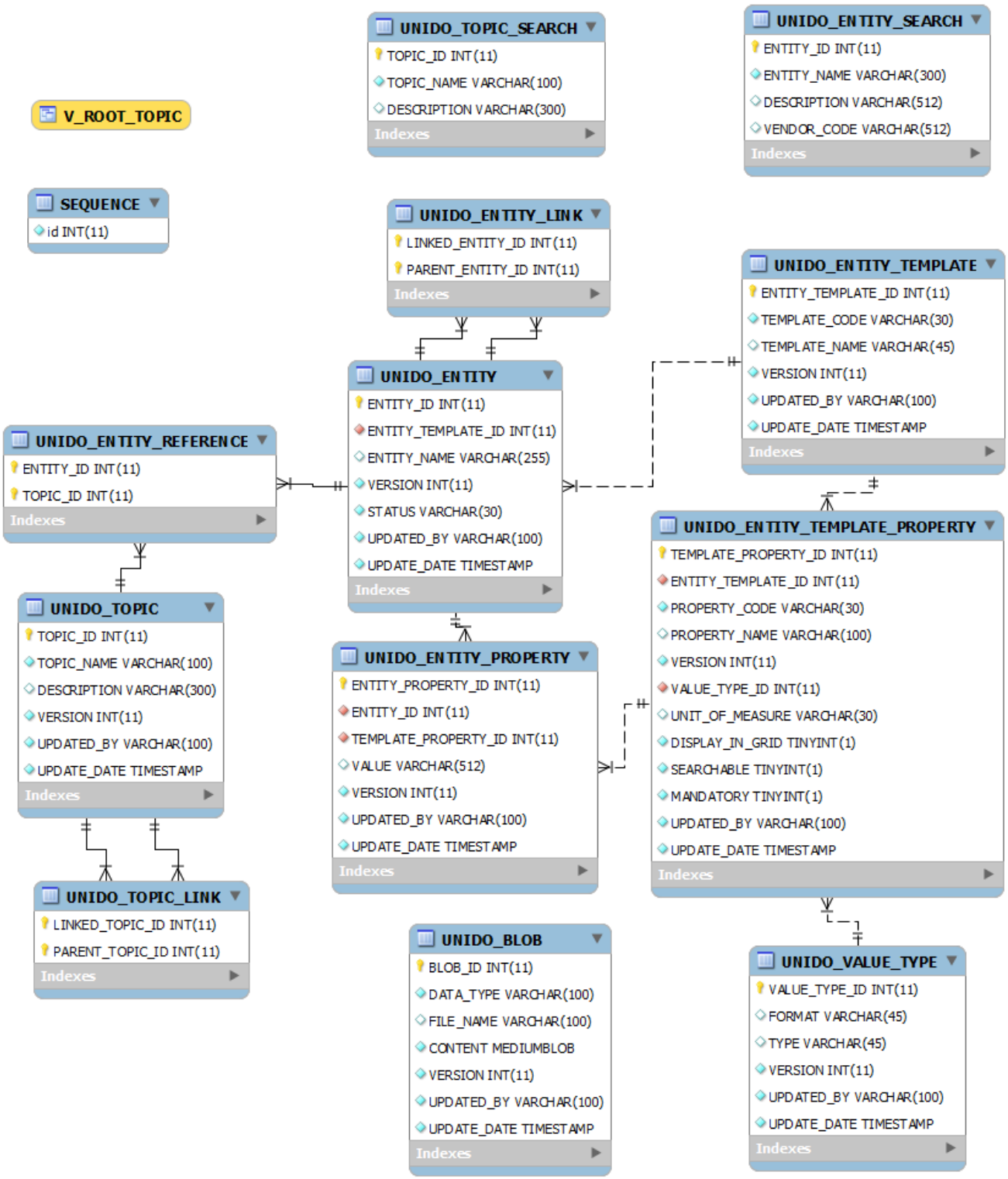
The main entities that are supposed to be stored in EETDB Database are

- lists of classification headings,
- energy saving equipments with characteristics,
- energy saving technologies descriptions.

Database is designed to be used by EETDB Data Access Services.

EETDB Database architecture

The EETDB Database has the relational structure described by the following schema:



EETDB Database Tables

EETDB Database has the following tables.

UNIDO_TOPIC

UNIDO_TOPIC table is used to store the lists of classification headings.

Column name	Column type	Can be empty	Description
TOPIC_ID	INT	No	Unique identifier of classification heading. *Primary key*.
TOPIC_NAME	NVARCHAR(100)	No	Name of classification heading.
DESCRIPTION	NVARCHAR(300)	Yes	Detailed description of classification heading.
VERSION	INT	No	Version number of classification heading. Auto incremented with update operation. *Audit field.*
UPDATED_BY	NVARCHAR(100)	No	NT Login of user performed the operation. *Audit field.*
UPDATE_DATE	TIMESTAMP	No	Date of the operation. *Audit field.*

UNIDO_TOPIC_LINK

All the classification headings of EETDB can be combined in several heading trees. UNIDO_TOPIC_LINK table is used to store the relationships between the headings.

Column name	Column type	Can be empty	Description
PARENT_TOPIC_ID	INT	No	Parent heading ID from UNIDO_TOPIC
LINKED_TOPIC_ID	INT	No	Child heading ID from UNIDO_TOPIC

UNIDO_ENTITY_TEMPLATE

UNIDO_ENTITY_TEMPLATE is a table used to store the templates of the EETDB Database entities. Each row in this table describes the type of equipment or technology.

Column name	Column type	Can be empty	Description
ENTITY_TEMPLATE_ID	INT	No	Unique identifier of entity. *Primary key*.
TEMPLATE_CODE	NVARCHAR(30)	No	Unique code of template. Used in the upload-file.
TEMPLATE_NAME	NVARCHAR(45)	No	Name of the template. Used in UI.

VERSION	INT	No	Version number of template. Auto incremented with update operation. *Audit field.*
UPDATED_BY	NVARCHAR(100)	No	NT Login of user performed the operation. *Audit field.*
UPDATE_DATE	TIMESTAMP	No	Date of the operation. *Audit field.*

UNIDO_ENTITY_TEMPLATE_PROPERTY

UNIDO_ENTITY_TEMPLATE_PROPERTY is a table used to store the properties of the EETDB Database template. Each row in this table describes some characteristic of equipment or technology.

Column name	Column type	Can be empty	Description
TEMPLATE_PROPERTY_ID	INT	No	Unique identifier of property. *Primary key*.
ENTITY_TEMPLATE_ID	INT	No	Identifier of corresponding template. *Primary key*.
PROPERTY_CODE	NVARCHAR(30)	No	Code of property. Code is unique within template properties.
PROPERTY_NAME	NVARCHAR(100)	No	Name of the property.
VALUE_TYPE_ID	INT	No	Type of the characteristic value. ID from the table UNIDO_VALUE_TYPE.
UNIT_OF_MEASURE	NVARCHAR(30)	Yes	Unit of measure of characteristic, if applicable.
DISPLAY_IN_GRID	TINYINT(1)	No	Flag showing if UI should show this characteristic in the table.
SEARCHABLE	TINYINT(1)	No	Flag showing if UI can provide the search functionality by this characteristic.
MANDATORY	TINYINT(1)	No	Flag showing if the characteristic must have the value for all entity or could be left empty.
VERSION	INT	No	Version number of property. Auto incremented with update operation. *Audit field.*
UPDATED_BY	NVARCHAR(100)	No	NT Login of user performed the operation. *Audit field.*
UPDATE_DATE	TIMESTAMP	No	Date of the operation. *Audit field.*

UNIDO_ENTITY

UNIDO_ENTITY is a main table used to store the list of equipments and technologies. Each row in this table realizes some template described in the table UNIDO_ENTITY_TEMPLATE.

Column name	Column type	Can be empty	Description
ENTITY_ID	INT	No	Unique identifier of entity. *Primary key*.
ENTITY_TEMPLATE_ID	INT	No	Identifier of template that the entity realizes. ID from the table UNIDO_ENTITY_TEMPLATE
ENTITY_NAME	NVARCHAR(255)	No	Name of the entity.
STATUS	NVARCHAR(30)	No	State of entity. Can take the following values: 'PENDING' – loaded but not processed yet so not available in the catalog, 'CERTIFIED' – available in catalog and certified, 'NOT CERTIFIED' – available in catalog but not certified
VERSION	INT	No	Version number of entity. Auto incremented with update operation. *Audit field.*
UPDATED_BY	NVARCHAR(100)	No	NT Login of user performing the operation. *Audit field.*
UPDATE_DATE	TIMESTAMP	No	Date of the operation. *Audit field.*

UNIDO_ENTITY_REFERENCE

All the entity of EETDB Database can be related to several classification headings from heading tree. UNIDO_ENTITY_REFERENCE table is used to store the relationships between the entities and headings.

Column name	Column type	Can be empty	Description
ENTITY_ID	INT	No	Entity ID
TOPIC_ID	INT	No	Heading ID from UNIDO_TOPIC

UNIDO_ENTITY_LINK

All the entity of EETDB Database can be related to other entities. UNIDO_ENTITY_LINK table is used to store the relationships between the entities.

Column name	Column type	Can be empty	Description
PARENT_ENTITY_ID	INT	No	Parent entity ID from UNIDO_ENTITY
LINKED_ENTITY_ID	INT	No	Child entity ID from UNIDO_ENTITY

UNIDO_ENTITY_PROPERTY

UNIDO_ENTITY_PROPERTY table is used to store the characteristics of equipments and technologies. Each row in this table set the value of some characteristic of the entity template described in the table UNIDO_ENTITY_TEMPLATE_PROPERTY.

Column name	Column type	Can be empty	Description
ENTITY_PROPERTY_ID	INT	No	Unique identifier of property value. *Primary key*.
ENTITY_ID	INT	No	Link to corresponding entity. ID from UNIDO_ENTITY table.
TEMPLATE_PROPERTY_ID	INT	No	Link to template property that the value is set for. ID from UNIDO_ ENTITY_TEMPLATE_PROPERTY table.
VALUE	NVARCHAR(512)	No	The value of characteristic. All the values are represented as a string.
VERSION	INT	No	Version number of the characteristic value. Auto incremented with update operation. *Audit field.*
UPDATED_BY	NVARCHAR(100)	No	NT Login of user performing the operation. *Audit field.*
UPDATE_DATE	TIMESTAMP	No	NT Login of user performing the operation. *Audit field.*

UNIDO_VALUE_TYPE

UNIDO_VALUE_TYPE table is used as a dictionary of the types of the entity characteristics values. Each row in this table describes the value type, its format and determines the way to proceed with the values of the type.

Column name	Column type	Can be empty	Description
VALUE_TYPE_ID	INT	No	Unique identifier of value type. *Primary key*.
FORMAT	NVARCHAR(45)	No	Format of the value type. If applicable.
TYPE	NVARCHAR(45)	No	Name of the value type.
VERSION	INT	No	Version number of the characteristic value. Auto incremented with update operation. *Audit field.*
UPDATED_BY	NVARCHAR(100)	No	NT Login of user performing the operation. *Audit field.*
UPDATE_DATE	TIMESTAMP	No	NT Login of user performing the operation. *Audit field.*

There are several types predefined in the system:

Type name	Format	Description
STRING		simple string up to 512 characters.
TEXT		long text. Value can be flat text or HTML. Value is stored in UNIDO_BLOB.
NUMBER	2	decimal number with 2 decimal digits.
INTEGER		integer number.
BOOLEAN		Boolean value that can be true or false.
URL	URL	link to some web-page, image or document.
REFERENCE	ENTITY_ID	the reference to the lookup value. All the lookups are stored in the EETDB Database as the entities without properties. The value of this type should be ENTITY_ID of selected lookup's element.
FILE	BINARY	The file uploaded to the system and available to be downloaded in the UI. Value should contain the valid ID from UNIDO_BLOB table.
IMG	BINARY	The image uploaded to the system and available to be shown in the UI. Value should contain the valid ID from UNIDO_BLOB table.

UNIDO_BLOB

UNIDO_BLOB table is used as the data storage for the uploaded texts, files and images. Each record of this table can be referenced from UNIDO_ENTITY_PROPERTY table.

Column name	Column type	Can be empty	Description
BLOB_ID	INT	No	Unique identifier of value type. *Primary key*.
DATA_TYPE	NVARCHAR(100)	No	Type of the data that are stored in the record. (encoding for html, format for images)
FILE_NAME	NVARCHAR(100)	Yes	Name of the uploaded file or image.
CONTENT	MEDIUMBLOB	No	Binary data.
VERSION	INT	No	Version number of the file. Auto incremented with update operation. *Audit field.*
UPDATED_BY	NVARCHAR(100)	No	NT Login of user performing the operation. *Audit field.*
UPDATE_DATE	TIMESTAMP	No	NT Login of user performing the operation. *Audit field.*

UNIDO_TOPIC_SEARCH

All the entities of EETDB Database have some characteristics that can be used in full text search procedure to find the required equipment, article or classification heading. UNIDO_TOPIC_SEARCH table is used to store the searchable field of the classification headings. The records are managed automatically by the special triggers. The table is used in the procedure SEARCH_TOPIC.

Column name	Column type	Can be empty	Description
TOPIC_ID	INT	No	Identifier of classification heading. ID from UNIDO_TOPIC.
TOPIC_NAME	NVARCHAR(100)	No	Name of classification heading. NAME from UNIDO_TOPIC.
DESCRIPTION	NVARCHAR(300)	Yes	Description of classification heading. DE-SCRIPTION from UNIDO_TOPIC

UNIDO_ ENTITY_SEARCH

All the entities of EETDB Database have some characteristics that can be used in full text search procedure to find the required equipment, article or classification heading. UNIDO_ ENTITY_SEARCH table is used to store the searchable field of the entities. The records are managed automatically by the special triggers. The table is used in the procedure SEARCH.

Column name	Column type	Can be empty	Description
ENTITY_ID	INT	No	Identifier of the entity. ID from UNIDO_ENTITY.
ENTITY_NAME	NVARCHAR(300)	No	Name of the entity. NAME from UNIDO_ENTITY.
DESCRIPTION	NVARCHAR(512)	Yes	Description of the entity. VALUE from UNIDO_ENTITY_PROPERTY where the property name is ‘DESCRIPTION’.
VENDOR_CODE	NVARCHAR(512)	Yes	Original equipment code (SKU) of the equip-ment in the vendor’s catalog. VALUE from UNIDO_ENTITY_ PROPERTY where the property name is ‘VENDOR_CODE’.

UNIDO_ LOAD_LOG

Every time when operator uploads some files with equipment data to the system a new logging record should be created in the Log table. UNIDO_ LOAD_LOG table is used to store the name of uploaded file, its size and the result of uploading.

Column name	Column type	Can be empty	Description
LOAD_LOG_ID	INT	No	Identifier of the uploading.
FILE_NAME	NVARCHAR(100)	No	Name of the uploaded file.
FILE_PATH	NVARCHAR(300)	Yes	Full path to the file on the local operator’s machine.

FILE_SIZE	INT	Yes	File size in bytes
STATUS	NVARCHAR(30)	No	Successful or failed
VERSION	INT	No	Version number of the file. Auto incremented with update operation. *Audit field.*
UPDATED_BY	NVARCHAR(100)	No	NT Login of user performing the operation. *Audit field.*
UPDATE_DATE	TIMESTAMP	No	NT Login of user performing the operation. *Audit field.*

UNIDO_LOAD_ERROR

If there are some bad data in the uploaded file the corresponding error message should be shown to the operator. UNIDO_LOAD_ERROR table is used to store the errors occurred during uploading.

Column name	Column type	Can be empty	Description
LOAD_LOG_ID	INT	No	Identifier of the error.
LOAD_LOG_ID	INT	No	Identifier of the uploading.
ROW_NUMBER	INT	No	Row number within spreadsheet.
ERROR_MESSAGE	NVARCHAR(300)	No	Description of the problem occurred.
UPDATED_BY	NVARCHAR(100)	No	NT Login of user performing the operation. *Audit field.*
UPDATE_DATE	TIMESTAMP	No	NT Login of user performing the operation. *Audit field.*

SEQUENCE

All the entities of EETDB Database have unique identifier. To provide uniqueness of this identifier there is a special table SEQUENCE in the EETDB Database. This table store the last used ID. The special function SEQ_NEXTVAL increments this value and returns the next identifier each time that is being called.

Column name	Column type	Can be empty	Description
ID	INT	No	Identifier.

EETDB Views

There is only one view in EETDB Database. It contains the list of highest level classification heading.

View V_ROOT_TOPIC

This view contains the records from UNIDO_TOPIC that have no parent topics. The structure of the view completely replicates the structure of UNIDO_TOPIC table.

EETDB Database Triggers

The triggers are only used in EETDB Database to populate the tables with the searchable data. There are two triggers.

UNIDO_TOPIC triggers

These triggers populate the records in the table TOPIC_SEARCH by inserting/updating/deleting according to the operation performed on the UNIDO_TOPIC table.

Trigger name	Action	Description
ADD_TOPIC_SEARCH	INSERT	Inserts the record to the table TOPIC_ SEARCH with the same values as inserted in the original table.
UPDATE_TOPIC_SEARCH	UPDATE	Update the record with the same ID in the table TOPIC_SEARCH with the same values (NAME, DESCRIPTION) as updated in the original table.
DELETE_TOPIC_SEARCH	DELETE	Delete the record with the same ID from the table TOP-IC_SEARCH.

UNIDO_ENTITY triggers

These triggers populate the records in the table ENTITY_SEARCH by inserting/updating/deleting according to the operation performed on the UNIDO_ENTITY table.

Trigger name	Action	Description
ADD_ENTITY_SEARCH	INSERT	Inserts the record to the table ENTITY_ SEARCH with the same values as inserted in the original table.
UPDATE_ENTITY_SEARCH	UPDATE	Update the record with the same ID in the table ENTITY_SEARCH with the same values (NAME) as updated in the original table.
DELETE_ENTITY_SEARCH	DELETE	Delete the record with the same ID from the table ENTI-TY_SEARCH.

UNIDO_ENTITY_PROPERTY triggers

These triggers populate the records in the table ENTITY_SEARCH by inserting/updating/deleting according to the operation performed on the UNIDO_ENTITY_PROPERTY table.

Trigger name	Action	Description
ADD_ENTITY_PROPERTY_SEARCH	INSERT	Updates the record with the same ENTITY_ID in the table ENTITY_ SEARCH with the same value as inserted to the original table for properties ‘DESCRIPTION’ and ‘VENDOR_CODE’.
UPDATE_ENTITY_PROPERTY_SEARCH	UPDATE	Updates the record with the same ENTITY_ID in the table ENTITY_ SEARCH with the same value as inserted to the original table for properties ‘DESCRIPTION’ and ‘VENDOR_CODE’.
DELETE_ENTITY_PROPERTY_SEARCH	DELETE	Set the corresponding values to NULL for the record with the same ENTITY_ID in the table ENTITY_SEARCH for properties ‘DESCRIPTION’ and ‘VENDOR_CODE’.

Data Access API

EETDB Data Service provides CRUD methods by using direct access to the tables and data search methods based on the stored procedures SERACH and SEARCH_TOPIC. The procedures use the standard MySql full text search engine.

Procedure SEARCH_TOPIC

Parameter	Direction	Type	Description
p_text	IN	varchar(200)	The text entered by user that should be found in the text fields of the TOPIC_SEARCH.
	RETURN	recordset	The list of the records from UNIDO_TOPIC + REL (factor of conformity to search criteria)

Procedure SEARCH

Parameter	Direction	Type	Description
p_text	IN	varchar(200)	The text entered by user that should be found in the text fields of the TOPIC_SEARCH.
	RETURN	recordset	The list of the records from UNIDO_ENTITY + REL (factor of conformity to search criteria)

Function SEQ_NEXTVAL

Parameter	Direction	Type	Description
	RETURN	INT	The next available identifier in the SEQUENSE.

Configuration

Character set

EETDB Database uses UTF-8 character set.

Tablespaces

EETDB Database uses two standard tablespaces of MySql server: InnoDB and MYISAM. The main structure is realized in InnoDB with foreign keys relationships between tables. The tables used for full text search are placed in MYISAM tablespace.

Audit

EETDB Database have the common audit strategy realized by VERSION, UPDATED_BY, UPDATE_DATE columns added in the main tables. These fields provide the clear view on the changes performed on the records.

Deployment

EETDB Database should be created with UTF-8 character set.

The following SQL-scripts should be run on EENDB database for installation and initial setup.

SQL-script name	Description
eetdb_db_create.sql	Creates the tables
eetdb_triggers.sql	Creates the triggers
eetdb_views.sql	Creates the view
eetdb_seq_nextval.sql	Creates the function SEQ_NEXTVAL
format_search_string.sql	Create the internal string formatting function used in search procedures
eetdb_search.sql	Creates the search procedures
internal_functions.sql	Creates the internal functions and procedures used for initial setup
initial_setup.sql	Creates the list of value types and classification headings tree
setup_lookups.sql	Creates the list of lookups used for equipment characteristics
setup_templates.sql	Creates the list of entity templates with properties
setup_vendors.sql	Creates the list of equipment manufacturers

Open and Closed Issues for this Deliverable

Open Issues

Closed Issues

ID	Raised by	Issue	Resolution	Owner	Target Date	Impact Date

Appendix A

Format of the file to upload with the list of equipment details:


UploadFormat.pdf