

International Nonproliferation Export Control Program

SAND2011-4602 C

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MISSION

Strengthen global efforts to prevent proliferation of WMD-related materials, equipment, and technology



AREAS OF ENGAGEMENT

Proliferation Risk Analysis in the Licensing Process

- Ensure the license review process competently assesses proliferation risks associated with end-uses and end-users, and ensure technical specialists are being utilized

Government Outreach and Enterprise Compliance

- Assist governments to establish outreach programs and promote enterprise compliance at key enterprises and technology holders

WMD-related **Commodity Identification Training and reach-back for Customs**

- Ensure enforcement personnel are sensitized to WMD-related materials and equipment, and have access to technical/analytical resources and support

WMD Commodity Identification Training (CIT)

- **Familiarizes enforcement officers with the materials, components, and equipment sought by WMD procurement programs**
- **Reduces the complexity of the various export control lists, by**
 - Grouping commodities by physical appearance and category rather than by function
 - Focusing primarily on appearance, notable features, key parameters, special markings, typical packaging, sizes, weights, monetary values, etc
- **INECP follows a disciplined indigenization approach, based on our technical partnerships, to establish ongoing, country-led training programs and technical “reach-back” capabilities**

CIT Modules

Electronic Components	Electronic Equipment	Industrial Equipment – Nuc/Missile	Industrial Equipment – Chem/Bio	Structural Materials	Chemicals	Radioactive and SNM	Fabricated Components	Systems and Subsystems
Detonators	LASERS	Machine Tools	Remote Filling Equipment	Aluminum	Platinized Catalysts	Uranium (various forms)	Multi-walled Pipe	Solid Propellant Motors
Firing Sets	Power Supplies	Filament and Tape Winding or Weaving Machines	Heat Exchangers	Titanium	Helium	Plutonium	Tanks	Liquid Propellant Engines
Capacitors	Frequency Changers	Flow-forming/Spin forming Machines	Agitators	Maraging Steel	Uranium Hexafluoride	Reactor fuel	Valves	Reentry Vehicles
Switching Devices	Flash X-ray	Robots	Chemical Reaction Vessels	Beryllium	Phosphorus Pentasulfide	Industrial radionuclides	Heat Shields	Unmanned Aerial Vehicles
Gyroscopes	High-speed Cameras	Dimensional Inspection Machines	Fermenters	Tungsten	Chlorine Trifluoride	Tritium	Missile Components	Missile Systems and Stages
Photomultiplier Tubes	Radiation Hardened Cameras	Remote Manipulators	Centrifugal Separators	Zirconium	Cyanide Compounds	Alpha-emitting radionuclides	Crucibles	Attitude Control Systems
Manganin Pressure Guages / Quartz Pressure Transducers	Neutron Generators	Gas guns	Cross-Flow Filtration Equipment	Fibrous and filamentary material	Heavy Water		Radomes	Turbine Engines
Accelerometer	Neutron Detectors	Mixers & Mills	Freeze-Drying Equipment		Propellant chemicals		RADAR systems	Protective equipment
Toxic Gas Monitors	Pulse Generators	Isostatic Presses	Furnaces		CW Precursor chemicals		Thrust Vector Control Systems	Fogging and Spraying Systems
	Telemetry and Telecontrol	Rate Tables/Motion Simulators	Electrolytic Cells		Metal Powders		Gas Centrifuge Components	
	RADARs	Vibration Test Systems	Aerosol Inhalation Equipment		Sodium Sulfide		Radiation-shielded Windows	
		Balancing Machines	Pumps		Lithium			
			Columns & towers					

eCIT

- **The Commodity Identification Training (CIT) information and approach has been integrated into an online Strategic Commodity Reference Engine**
- **eCIT provides secure, online full-text search of the CIT information and all relevant export control lists through a simple user interface.**
- **The system is designed to be customizable and adoptable by interested countries.**

eCIT 3 panels

contents

commodity

thumbnails

Search:

Go

Advanced

Print

Commodities

Commodity Types

WMD Uses

Controls

auger filler

Balancing Machines

ballistic missile

Beryllium

beryllium powder

bioreactor

Bismuth

bismuth powder

boron powder

Calcium

Cameras - Electronic Streak And Framing

Cameras - Radiation Hardened

Cameras - Rotating Mirror

Capacitors

Carbon Fiber

Centrifugal Separators

Chemical Reaction Vessels

Chemical reactors

Chemical Vapor Deposition Furnace

chemostat

Chlorine fluoride

Chlorine fluoride (ClF3)

Chlorine Trifluoride

Chlorotrifluoride

Chlorotrifluorid

ClF3

Cold-cathode tubes

Columns And Towers

compensated ion chambers

Condensers

converters

Coordinate Measuring Machines (CMM)

Cross Flow Filtration Equipment

Crucibles

cruise missiles

Cyanide Compounds

D2O

Dc Power Supplies

Decanter Centrifuge

Detonators

Deuterium oxide

Dideuterium oxide

Dimensional Inspection Machines

dinitrogen tetroxide

Disodium monosulfide

Disodium sulfide

distillation columns

double containment piping

Centrifugal Separators

Description

WMD Uses

Controls

Civilian Uses

Appearance

Packaging

- A centrifuge is laboratory apparatus used to separate heavier from lighter molecules and cellular components and structures by spinning them at high speed. Centrifuges create a sustained centrifugal force, a force due to rotation, that results in the separation of samples into layers according to their density. For example, in the dairy industry skim milk is produced by separating away the cream by centrifugation.
- The basic design of a centrifuge consists of a wheel, or rotor, connected to a motor that spins. Centrifuges are also useful in separating particles or cells from a solution. For example, spinning a sample of liquid growth media in a centrifuge will force any bacteria present to the bottom or sides of the container/spinner bowl. The growth media can then be decanted or suctioned away, leaving the concentrated bacterial cells for further processing.

Must be capable of continuous operation with flow rates > 100 liters/hour

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>

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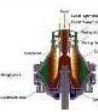
>

Also Known As...


- Decanter Centrifuge

All


Filtered




Centrifugal Separator Schematic




Centrifugal Separator



Centrifugal Separator photo and schematic - note inlets and outlets indicating capacity for continuous operation



Decanter centrifuge



Decanter centrifuge schematic

3 panels: **contents**, commodity, thumbnails

Contents panel: 4 tabs



1. Commodities

- Lists all commodities and aliases (AKAs) in the database in alphabetical order
- **Designed to work like an index**
- Aliases can be expanded to link to their commodity entries
- Clicking on any entry brings up that commodity's information and thumbnails in their respective panels

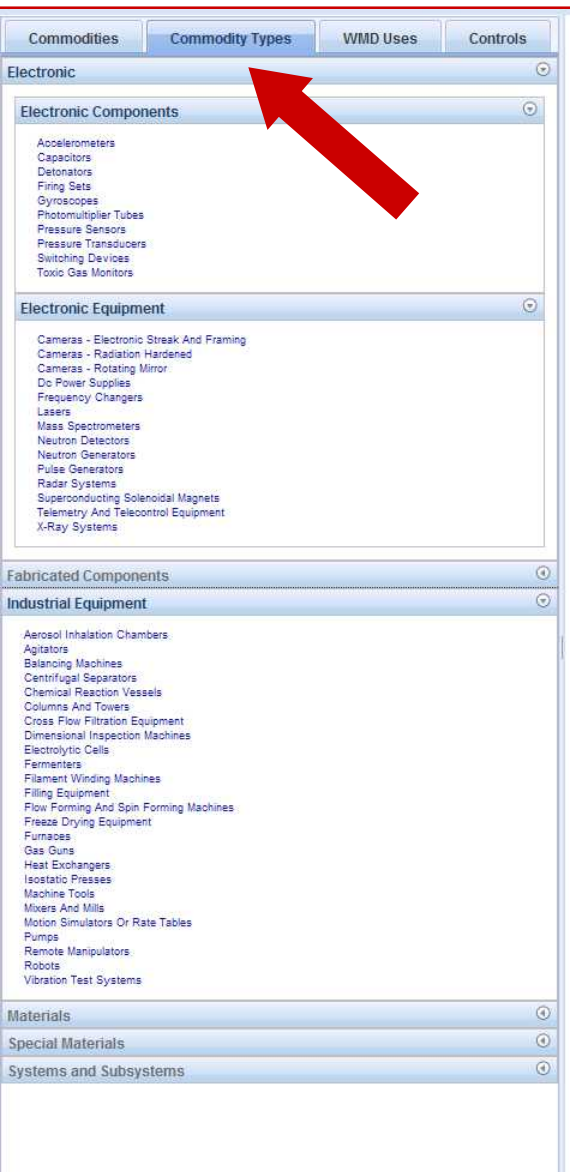
2. Commodity Types

3. WMD Uses

4. Controls

3 panels: **contents**, commodity, thumbnails

Contents panel: 4 tabs



1. Commodities

2. Commodity Types

- Lists all commodities in the database in “CIT order”
- *Commodity Type sections can be expanded and collapsed*
- **Facilitates browsing by commodity type**
- Clicking on any entry brings up that commodity's information and thumbnails in their respective panels

3. WMD Uses

4. Controls

3 panels: **contents**, commodity, thumbnails

Contents panel: 4 tabs



1. Commodities

2. Commodity Types

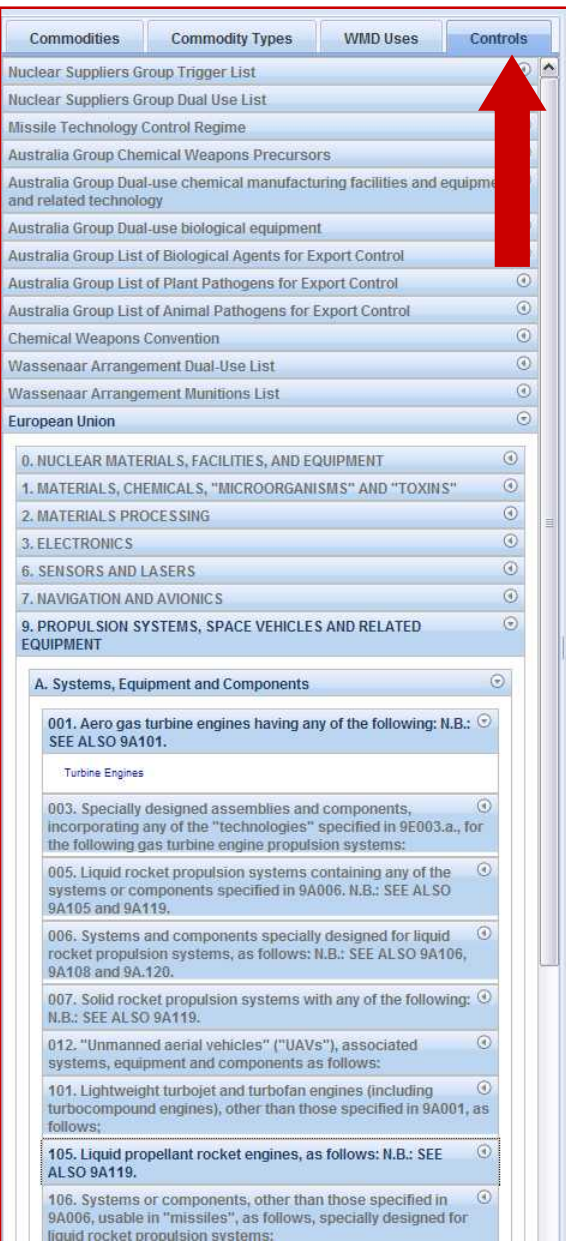
3. WMD Uses

- Lists all commodities in the database by their WMD applications
 - *WMD Use sections can be expanded and collapsed*
- **Facilitates browsing by WMD Application**
- Clicking on any entry brings up that commodity's information and thumbnails in their respective panels

4. Controls

3 panels: **contents**, commodity, thumbnails

Contents panel: 4 tabs



1. Commodities
2. Commodity Types
3. WMD Uses
4. **Controls** tab

- Allows browsing the control lists
 - *Control lists and control list sections can be expanded and collapsed*
 - *Includes all control list entries with linked commodities*
 - *Clicking on any entry brings up that commodity's information and thumbnails in their respective panels*

3 panels: contents, commodity, thumbnails

Commodity panel: 6 tabs

1. Description
2. WMD Uses
3. Controls
4. Civilian Uses
5. Appearance
6. Packaging

- Clicking on a thumbnail brings up an enlargement
- The print button provides a single form with all sections combined for field guides and inspector's reports

Centrifugal Separators

Description WMD Uses Controls Civilian Uses Appearance Packaging

- A centrifuge is laboratory apparatus used to separate heavier from lighter molecules and cellular components and structures by spinning them at high speed. Centrifuges create a sustained centrifugal force, a force due to rotation, that results in the separation of samples into layers according to their density. For example, in the dairy industry skim milk is produced by separating away the cream by centrifugation.
- The basic design of a centrifuge consists of a wheel, or rotor, connected to a motor that spins. Centrifuges are also useful in separating particles or cells from a solution. For example, spinning a sample of liquid growth media in a centrifuge will force any bacteria present to the bottom or sides of the container/spinner bowl. The growth media can then be decanted or suctioned away, leaving the concentrated bacterial cells for further processing.

Must be capable of continuous operation with flow rates > 100 liters/hour

Also Known As...

- Decanter Centrifuge

Centrifugal Separators

Description WMD Uses Controls Civilian Uses Appearance Packaging

- Centrifugal Separator normally has these main components:
 1. Sealing joints: one or multiple within steam containment area
 2. Spinning bowl of polished stainless steel or titanium
 3. Motor to drive propeller shaft and distributor disc

Look for these notable features:

- Total containment during operation - no propagation of aerosols
- Connection for In-situ steam sterilization in a closed state
- Polished stainless steel or titanium spinning bowl
- 3 fluid connections: 1 Inlet for feedstock, 2 Outlets for supernatant and for separated material

DECANTER CENTRIFUGE

- A decanter centrifuge normally has these main components:
 - ◊ Horizontal orientation
 - ◊ Polished stainless steel bowl

Centrifugal Separator Schematic

Centrifugal Separator

Centrifugal Separator photo and schematic - note inlets and outlets indicating capacity for continuous operation

Decanter centrifuge

Example – Kevlar Fibrous and Filamentary Materials

Search:

Go Advanced Print

Commodities

Commodity Types

WMD Uses

Controls

HF

High Current Pulse Generators

High Explosives

HMX

HTPB

hydrazine

Hydrofluoric acid

Hydrofluoride

Hydrogen Fluoride

hydrogen-cryogenic distillation columns

hydroxy-terminated polybutadiene

inhibited red fuming nitric acid

inverters

ion exchange columns

ion sources

IRFNA

Isostatic Presses

Jet Mills

Kevlar

Fibrous And Filamentary Materials

Laser Amplifiers

Lasers

LI-6

Liquid Propellant Engines

liquid-liquid exchangers

Lithium

M200

M300

M350

M400

Machine Tools

Magnesium

magnesium powder

Manganin pressure gauges

Maraging Steel

Mass Spectrometers

Metal Powders

Missiles - Complete Systems And Stages

mixed oxides of nitrogen

Mixers And Mills

MMH

molybdenum powder

Fibrous And Filamentary Materials

Description

WMD Uses

Controls

Civilian Uses

Appearance


Packaging

Controlled materials include fibrous or filamentary materials (fibers), prepregs, and composite structures. Fibers include carbon, aramid, and glass having specifications on specific modulus and specific strength.

Determining composition, strength and modulus requires special equipment and can be difficult. However, most of the carbon fi produced today meets the control specifications of the NSG.

Also Known As...


- Carbon Fiber
- Graphite Fiber
- Glass Fiber
- Aramid Fiber
- Kevlar




Various fibrous and filamentary materials

All


Filtered




Carbon Fiber Spools




Aramid Fiber Spool



Glass Fiber Spool



Various fibrous and filamentary materials



SCORE v0.5.0

Example – Kevlar

Fibrous and Filamentary Materials

Fibrous And Filamentary Materials

Description

WMD Uses

Controls

Civilian Uses

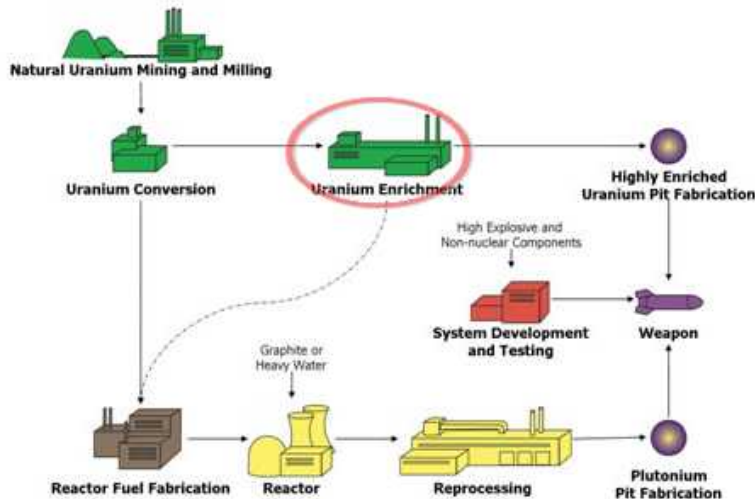
Appearance

Packaging

Nuclear

- ♦ Enrichment

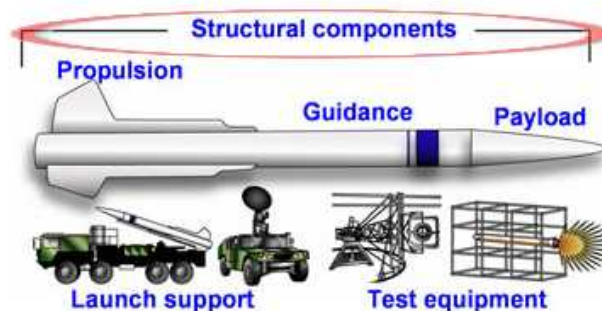
- ◊ High-speed rotors of gas centrifuges



Missile

- ♦ Structural

- ◊ Many structural components



Example – Kevlar

Fibrous and Filamentary Materials

- Controls tab allows easy drill-down access to all relevant control language
- Control list parsing and hierarchical linking very sophisticated “behind-the scene”

Fibrous And Filamentary Materials

Description WMD Uses **Controls** Civilian Uses Appearance Packaging

All Filtered

European Union

1C010

1C210

1. MATERIALS, CHEMICALS, "MICROORGANISMS" AND "TOXINS"

C. Materials

Technical Note: Metals and alloys: Unless provision to the contrary is made, the words 'metals' and 'alloys' in 1C001 to 1C012 cover crude and semi-fabricated forms, as follows: Crude forms: Anodes, balls, bars (including notched bars and wire bars), billets, blocks, blooms, brickets, cakes, cathodes, crystals, cubes, dice, grains, granules, ingots, lumps, pellets, pigs, powder, rondelles, shot, slabs, slugs, sponge, sticks; Semi-fabricated forms (whether or not coated, plated, drilled or punched):

- ♦ a. Wrought or worked materials fabricated by rolling, drawing, extruding, forging, impact extruding, pressing, graining, atomising, and grinding, i.e.: angles, channels, circles, discs, dust, flakes, foils and leaf, forging, plate, powder, pressings and stampings, ribbons, rings, rods (including bare welding rods, wire rods, and rolled wire), sections, shapes, sheets, strip, pipe and tubes (including tube rounds, squares, and hollows), drawn or extruded wire;
- ♦ b. Cast material produced by casting in sand, die, metal, plaster or other types of moulds, including high pressure castings, sintered forms, and forms made by powder metallurgy.

The object of the control should not be defeated by the export of non-listed forms alleged to be finished products but representing in reality crude forms or semi-fabricated forms.

210. 'Fibrous or filamentary materials' or prepreps, other than those specified in 1C010.a., b. or e., as follows:

- a. Carbon or aramid 'fibrous or filamentary materials' having either of the following characteristics:
- b. Glass 'fibrous or filamentary materials' having both of the following characteristics:

WCO Harmonized System

Missile Technology Control Regime

Nuclear Suppliers Group Dual Use List

Wassenaar Arrangement Dual-Use List

Carbon Fiber Spools

Aramid Fiber Spool

Glass Fiber Spool

Various fibrous and filamentary materials

Example – Kevlar

Fibrous and Filamentary Materials

- Actual control language and CIT tips and summaries are juxtaposed to guide understanding

Fibrous And Filamentary Materials

Description WMD Uses **Controls** Civilian Uses Appearance Packaging

European Union
WCO Harmonized System
Missile Technology Control Regime
Nuclear Suppliers Group Dual Use List
Wassenaar Arrangement Dual-Use List

5402.10
5402.41
5404.10
5404.90
6815.10
7019.12
7019.19
7019.40
7019.51
7019.52
7019.59
7019.90

Fibrous And Filamentary Materials

Description WMD Uses **Controls** Civilian Uses Appearance Packaging

European Union
WCO Harmonized System
Missile Technology Control Regime
Nuclear Suppliers Group Dual Use List

2.C.7
2. MATERIALS
C. MATERIALS
7. "Fibrous or filamentary materials", and preregs, as follows:
a. Carbon or aramid
1. A 'specific modulus' of 12.7 x 10 6 m or greater; or
2. A 'specific tensile strength' of 23.5 x 10 4 m or greater;
b. Glass
1. A 'specific modulus' of 3.18 x 10 6 m or greater; and
c. Thermoset resin impregnated continuous "yarns", "rovings", "tows" or "tapes" with a width of 15 mm or less (preregs), made from carbon or glass "fibrous or filamentary materials" specified in Item 2.C.7.a. or Item 2.C.7.b.

• Carbon and aramid fiber: must meet a specific modulus or a specific tensile strength
• Glass fiber: must meet a specific modulus and a specific tensile strength

Wassenaar Arrangement Dual-Use List

Example – Kevlar

Fibrous and Filamentary Materials

Fibrous And Filamentary Materials

Description	WMD Uses	Controls	Civilian Uses	Appearance	Packaging
<ul style="list-style-type: none">Typically are made up of several thousand individual continuous filaments in a single fiber.<ul style="list-style-type: none">The filaments are bundled together to form strands or rovings of parallel filaments and also yarns that are bundles of twisted fibers.Also available in tape form where fibers may be interlaced or arranged in a parallel array and bonded together with a resin.The bundles of fibers may be impregnated with an adhesive resin that binds the filaments together or they may be unimpregnated so that the individual fibers can be separated from the bundle.Three types of interest<ul style="list-style-type: none">Carbon fiber<ul style="list-style-type: none">black matte appearance and the texture of more common synthetic fibers such as nylon or polyesterSometimes called "graphite fiber"Aramid Fibers<ul style="list-style-type: none">YellowAlso known as KevlarGlass Fiber<ul style="list-style-type: none">Shiny white satin appearance when viewed on the spool					

All Filtered

Carbon Fiber Spools

Aramid Fiber Spool

Glass Fiber Spool

Various fibrous and filamentary materials



Aramid Fiber Spool

Example – Kevlar

Fibrous and Filamentary Materials

Fibrous And Filamentary Materials

Description WMD Uses Controls Civilian Uses Appearance **Packaging**

- Normally covered in shrink wrap, placed in cardboard boxes with spacers or end supports prevent movement of the spools within the box
- ♦ There is a major difference for packaging and handling of fibrous materials that have been impregnated with resin before shipping
 - prepreg must be refrigerated
 - normally packed in special containers with provisions for dry ice cooling or it is shipped in refrigerated cargo containers



Glass fiber spool in shipping box

All **Filtered**



Prepreg Refrigerated Shipping Box



Prepreg Refrigerated Shipping Box



Carbon fiber on spools in shipping box



Glass fiber spool in shipping box

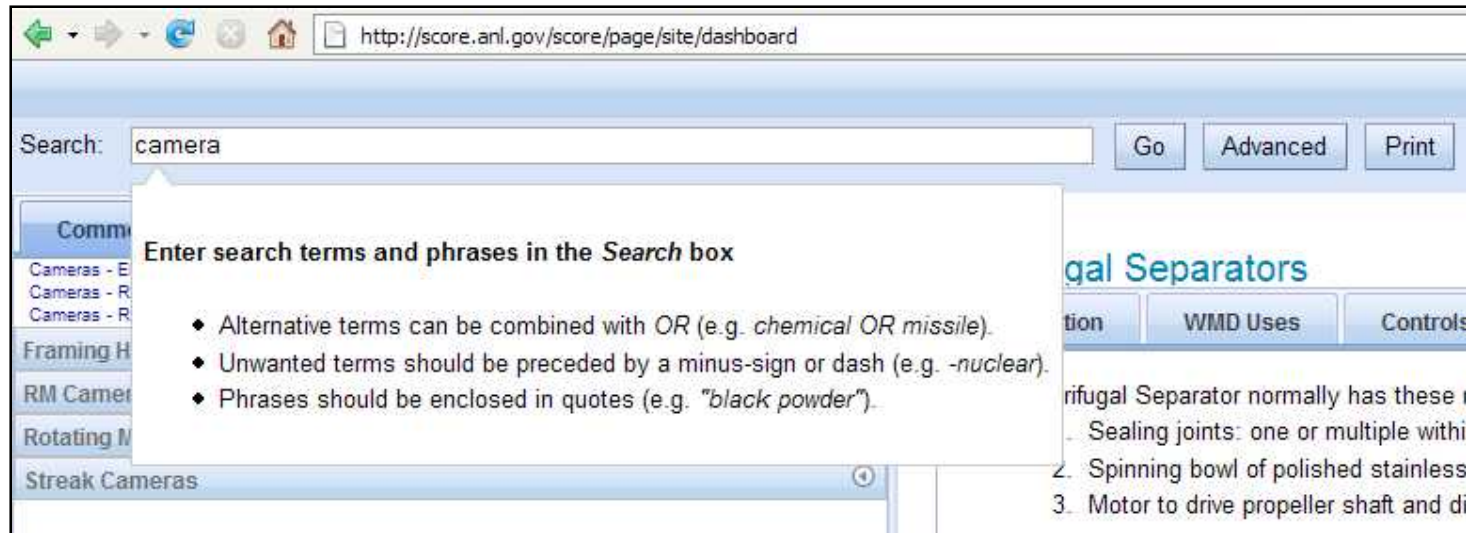
Searching (filtering) the database

- The interface works the same with a search in effect – each tab limited to entries matching search term(s)

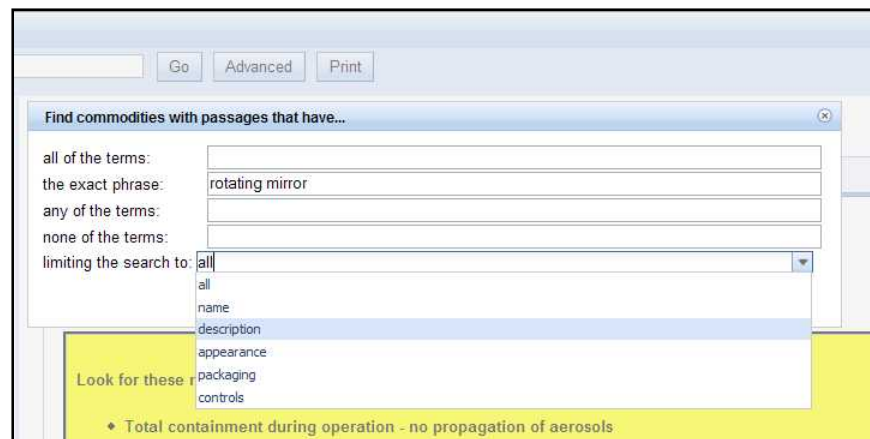


Searching the database

- Search tips pop up when entering search terms



- Alternatively, an advanced search form can be used
- Can search against full text, including AKA's, HS codes, UN Hazard numbers, company names, etc.

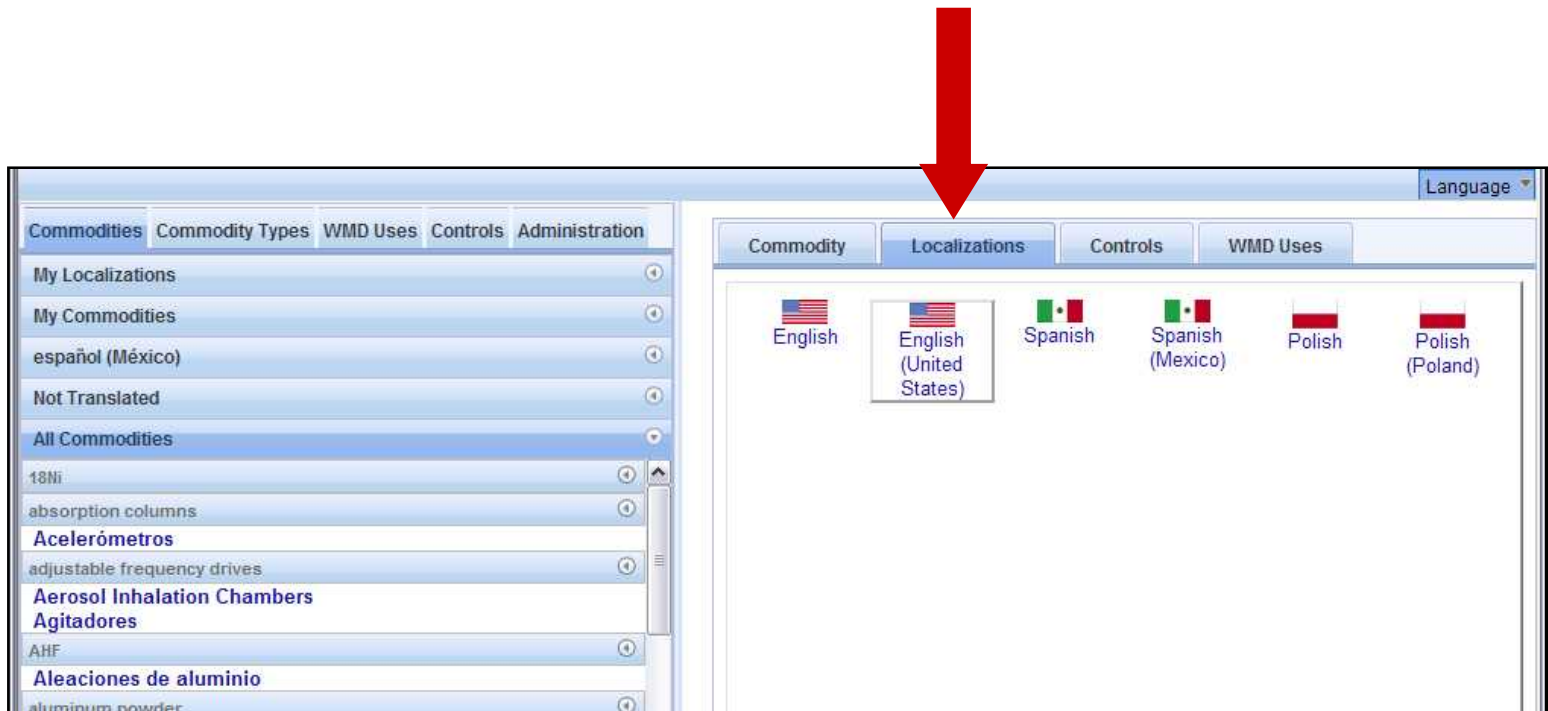


eCIT deployment

- **The system is designed to be easily customizable and adoptable by interested countries.**
 - Built with open source software development tools and server software
 - Multi-lingual support
 - Includes Content Manager application to facilitate the importation and maintenance of translated and national control lists and commodity data.
- **Deployment modes include**
 - **User**
 - *Partners can access our system online*
 - **Hosted**
 - *Partners can use our platform to host their own version, in their own language*
 - *Requires content management, but no software/database development or system administration*
 - **Installed**
 - *Partners can install the system on their own servers and modify/adapt as desired*

eCIT Content Manager

- **Allows users with appropriate authority to**
 - Translate the user interface
 - Create localizations (separate, translated instances) of commodity data
 - Input and maintain translated multilateral control lists
 - Input local control lists



eCIT Content Manager

The screenshot displays the eCIT Content Manager interface, which is divided into several sections. The top navigation bar includes tabs for Commodities, Commodity Types, WMD Uses, Controls, and Administration. The left sidebar shows a tree view of localizations, with 'español (México)' selected. The main content area is split into two panes. The left pane, titled 'Localization', shows details for 'Acelerómetros' in Spanish, including fields for Language, Country, and State, along with buttons for Edit, Remove, Reject, and Approve. The right pane, titled 'Local', shows a list of control lists under the 'WCO Harmonized System' and 'Australia Group' categories. A side-by-side editor is open on the right, showing the 'Local Control Lists' in English, with buttons for Paste List, Edit, and Translate. Red arrows point from text boxes to specific interface elements, highlighting key features.

Allows for multi-step data quality assurance process for each commodity localization

Lists existing localizations in the currently selected language

Allows translation of user interface elements

Allows selection among all supported languages

Lists commodities in the database not yet translated to the current language

Translate button brings up side-by-side editor with source language on left and destination language on right

Allows input of local control lists