

**EXPLOSIVE STORAGE CAPACITY CALCULATING TOOL – USER MANUAL**

**INTRODUCTION**

This tool allows you to calculate storage capacities for all Hazard Divisions for an identified PES with respect of all AASTP-1 Change 3 QD-criteria. To calculate capacities the distance between the PES and the ESs must be known. The tool will apply the appropriate criteria to calculate the storage capacity expressed in ton NEQ based upon the entered distance (in meter) and the chosen PES-ES relations.

It is essential that you allow the use of macros.

**STEP 1 – Start with an empty sheet**

Before you start using this tool make sure that no data from previous use of the tool is left in the data fields. To help you start with a blank sheet there is a “RESET”-button on the top left corner of the sheet. Click this button and the tool will delete all data fields.

The screenshot shows the top part of the software interface. At the top left, there are two buttons: 'PRINT' and 'RESET'. The 'RESET' button is highlighted with a red rectangle. To the right of these buttons is the title 'EXPLOSIVE STORAGE CAPACITY CALCULATING TOOL v.09/2011 - AASTP-1 Ch3'. Below the buttons is a section for 'PES DESCRIPTION' and 'TYPE OF PES'. The 'TYPE OF PES' section contains several radio button options: IGLO 7 BAR, IGLO 3 BAR, EARTH COVERED, LIGHT STRUCTURE, BRICK STRUCTURE WITH PROTECT ROOF, HEAVY WALLED WITH PROT ROOF, HEAVY WALLED NO PROT ROOF, and IGLOO or Earth Covered > 500m³ with < 45000 Kg NEQ. Below this is a table for 'Exposed Sites (ES)' with columns for 'ES N°', 'SELECT', 'POTENTIAL', 'EXPLOSION', 'SITE', and 'CAPACITIES (NEQ in TON) / HAZARD DIVISION'. The table has several rows and columns with icons and numerical values.

**STEP 2 - Identify the PES**

The field “PES DESCRIPTION” allows the user to describe the PES (free text field).

The screenshot shows the 'PES DESCRIPTION' field filled with the text 'AMMO STORAGE MAGAZINE BUILDING N° CE 456/33'. The 'RESET' button is still visible and highlighted in red. The 'TYPE OF PES' section is also visible with the same radio button options as in the previous screenshot.

It is essential to identify the precise type of the PES. This choice determines the criterion that will be used to calculate the NEQ capacities. Make the correct choice of PES by clicking the appropriate radio button.

The screenshot shows the 'TYPE OF PES' section with the 'IGLO 7 BAR' radio button selected. The 'RESET' button is still visible and highlighted in red. The 'PES DESCRIPTION' field is still filled with 'AMMO STORAGE MAGAZINE BUILDING N° CE 456/33'.

For earth covered magazines with a volume of more than 500m<sup>3</sup> and a NEQ content of less than 45000kg NEQ specific criteria apply. Therefore if the PES matches this description then this must be identified by clicking the appropriate radio button.

**PES DESCRIPTION** → **AMMO STORAGE MAGAZINE BUILDING N° CE 456/33**

**TYPE OF PES** →

IGLO 7 BAR       LIGHT STRUCTURE       HEAVY WALLED WITH PROT ROOF  
 IGLO 3 BAR       BRICK STRUCTURE WITH PROTECT ROOF       HEAVY WALLED NO PROT ROOF  
 EARTH COVERED       IGLOO or Earth Covered > 500m<sup>3</sup> with < 45000 Kg NEQ  
 OTHER

The calculation tool does not show pictograms for buildings constructed with walls of 215 mm brick (or equivalent) and protective roof of 150 mm concrete with suitable support as they are shown in the AASTP-1 QD Tables.



To make the distinction a choice must be made with the radio buttons :

**PES DESCRIPTION** → **AMMO STORAGE MAGAZINE BUILDING N° CE 456/33**

**TYPE OF PES** →

IGLO 7 BAR       LIGHT STRUCTURE       HEAVY WALLED WITH PROT ROOF  
 IGLO 3 BAR       BRICK STRUCTURE WITH PROTECT ROOF       HEAVY WALLED NO PROT ROOF  
 EARTH COVERED       IGLOO or Earth Covered > 500m<sup>3</sup> with < 45000 Kg NEQ  
 OTHER

If necessary a window will pop up to ask for the type of ES.

Depending on your choice of PES the non-applicable fields will be crossed out and the applicable fields will colorize “blue”. The crossed out fields will be blocked and the blue colorized fields can be edited. Simply enter the distance in numbers. Once the distance is filled in, the field will turn grey.

!!! It is important to **only enter one distance** into one single field per line!!!

P O T E N T I A L   E X P L O S I O N   S I T E						
	26 m					

Hoover the mouse pointer over the red upper right corner of a cell and the description of the PES or ES structure will be shown.

**PES DESCRIPTION** → **AMMO STORAGE MAGAZINE BUILDING N° CE 456/33**

**TYPE OF PES** →

IGLO 7 BAR       LIGHT STRUCTURE       HEAVY WALLED WITH PROT ROOF  
 IGLO 3 BAR       BRICK STRUCTURE WITH PROTECT ROOF       HEAVY WALLED NO PROT ROOF  
 EARTH COVERED       IGLOO or Earth Covered > 500m<sup>3</sup> with < 45000 Kg NEQ  
 OTHER

**Exposed Sites (ES)**

ES N°

P O T E N T I A L	E X P L O S I O N	S I T E	CAPACITIES (NEQ in		
			1.	1.21	1.2

Building with earth on the roof and against three walls. Directional effects through the door and headwall are away from an Exposed Site

**STEP 3 - Identify the PES-ES-pairs and enter the distance**

At the intersection of a chosen PES structure (column) and an ES (row) the user has to fill in the distance between these two structures as described in previous paragraph. The example below shows a PES (igloo 7 bar) and an ES (igloo 7 bar) in a “side to rear”-configuration with a distance between the two structures of 26m.

The screenshot shows a software interface for selecting PES and ES types. The top section is titled 'PES DESCRIPTION' and 'AMMO STORAGE MAGAZINE B'. Below it, 'TYPE OF PES' includes options like 'IGLO 7 BAR', 'IGLO 3 BAR', 'EARTH COVERED', 'LIGHT STRUCTURE', 'BRICK STRUCTURE WITH PROTECT ROOF', 'HEAVY WALLED WITH...', and 'HEAVY WALLED NO P...'. A table below has columns for 'Exposed Sites (ES)', 'ES N°', 'SELECT', and 'POTENTIAL EXPLOSION S'. The 'POTENTIAL EXPLOSION S' column contains icons for different explosion scenarios. A red box highlights the '26 m' value entered in the table.

Repeat this step for every ES-type exposed from the PES.

Once the distance entered the tool will automatically calculate the NEQ capacity for every ES-type per Hazard Division expressed in ton with a precision of 10 kg.

CAPACITIES (NEQ in TON) / HAZARD DIVISION					
1.1	1.21	1.22	1.31	1.32	1.6
140.61	250.00	250.00	250.00	250.00	250.00
D3	NO QD	NO QD	NO QD	NO QD	5m

For every Hazard Division not only the NEQ capacity is calculated but the tool informs you as well about the used criterion. E.g. : HD 1.1 – 140.61 ton NEQ based upon the QD = D3. The QDs refer to the AASTP-1 QD-tables. If the applicable QD is a fix distance then this distance will be shown (see e.g. HD 1.6)

CAPACITIES (NEQ in TON) / HAZARD DIVISION					
1.1	1.21	1.22	1.31	1.32	1.6
140.61	250.00	250.00	250.00	250.00	250.00
D3	NO QD	NO QD	NO QD	NO QD	5m



**STEP 4 : READ THE RESULTS**

At the bottom of this tool you will find the final result. Here you will find the capacity of the considered PES. The tool takes into account the smallest obtained capacities from all PES-ES pairs.

**EXPLOSIVE STORAGE CAPACITY CALCULATING TOOL v.03/2012 - AASTP-1 Ch3**

PRINT    RESET

PES DESCRIPTION →

TYPE OF PES →

Exposed Sites (ES) ↓    SELECT

POTENTIAL    EXPLOSION    SITE

CAPACITIES (NEQ in TON) / HAZARD DIVISION

ES N°	1.1	1.21	1.22	1.31	1.32	1.6
HIGH	456 m	16.26	250.00	250.00	250.00	250.00
Vulnerable Constructions	780 m	5.42	250.00	250.00	250.00	250.00
Overhead Power Grid Normal Network	300 m	8.33	58.85	250.00	250.00	250.00
POL Facilities & PIPELINES		0.00	D6	D5	D3	D3
VITAL Unprotected Aboveground		NONE	NONE	NONE	NONE	NONE
<b>FINAL RESULT</b>	<b>5.42</b>	<b>58.85</b>	<b>250.00</b>	<b>250.00</b>	<b>250.00</b>	<b>250.00</b>
	<b>1.1</b>	<b>1.21</b>	<b>1.22</b>	<b>1.31</b>	<b>1.32</b>	<b>1.6</b>

REMARKS

Developed by the Belgian Representatives of AC326-SG5. For more information, remarks or updated versions contact jderoos@gmail.com

**THE USE OF COLORS**

If guidance is given in the AASTP-1 QD-tables, the obtained degree of protection is shown with colors. When the criterion is shown with a green background the criterion offers virtual complete protection. A yellow background indicates a high level of protection and red a moderate and/or a limited degree of protection. If this information is not available in AASTP-1 the background colors are not used.

PES DESCRIPTION →

TYPE OF PES →

Exposed Sites (ES) ↓    SELECT

POTENTIAL    EXPLOSION    SITE

CAPACITIES (NEQ in TON) / HAZARD DIVISION

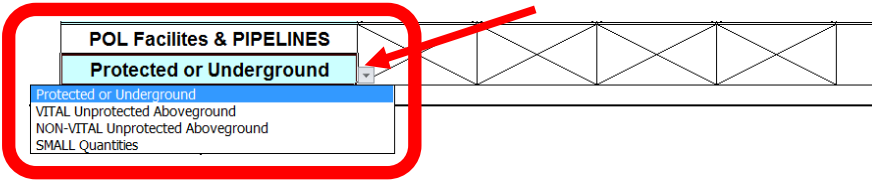
ES N°	1.1	1.21	1.22	1.31	1.32	1.6
	60 m	15.63	0.05	1.14	4.38	250.00
	76 m	31.75	250.00	250.00	250.00	250.00
		D7	NO QD	NO QD	25m	10m
					NONE	NONE

If the available distance results in no capacity then the result (0.00) is shown in red fonts.

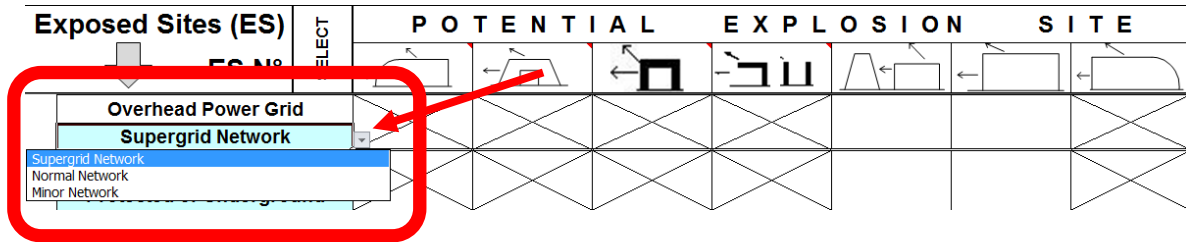
CAPACITIES (NEQ in TON) / HAZARD DIVISION					
1.1	1.21	1.22	1.31	1.32	1.6
0.00	250.00	250.00	0.00	250.00	0.00
D5	NO QD	NO QD	10m	NO QD	11m

**POL FACILITIES AND PIPELINES & OVERHEAD POWER GRIDS**

A drop down menu allows to indicate the nature of POL Facility:



The same drop down menu can be found for choosing the type of Overhead Power Grid.



**TABLE FOOTNOTES**

When relevant footnotes will appear in the remarks box.

