Welcome

In this lecture, we explore surplus volumes.

We will:

- Discuss what is a surplus volume
- How can we utilise them on Volume.cc
- What benefit we get from processing them

What is a Surplus

Surplus volumes are repeatable snippets of volumetric data. They are attachable sub volumes onto higher master volumes. If we had a geometric shape which encompasses identical sub components, these repeatable sub components each with their own distinctive measurement would be a surplus volume.

If a component is regular, repeatable and attaches itself into a larger master volume, it is indeed a surplus volume. An example would be repeatable fittings evident on a manufactured part which attaches one section of a part to another (thus establishing a larger part).

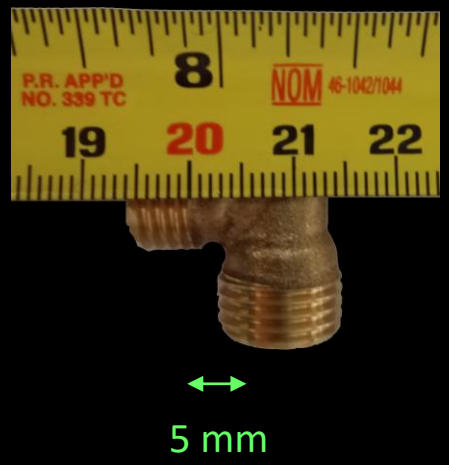
In pressure testing industries, these surpluses need to be added so leak rate estimates accurately reflect the parts' inherit quality standard. If they are omitted, the leak rate will not be accurate because the reference volume would be incorrect. We'll cover more upon this shortly.

Repeatable fitting (inherits a surplus volume)

Examination of a Surplus

In a “perfect world” on the supply chain, the fitting seen here would be assigned a specific part number. For our purposes, we will refer to it as a T_PIECE because its shape is akin to a T in the common trade language alphabet.

Now if we were to unscrew its sub fittings and remove its washers, we’re left with a sub component which itself encompasses a surplus volume. This surplus volume for our purposes is a data subset we’d need to record for our measurements to have integrity. It’s a subset because it’s a surplus which belongs to a higher master volume (some larger mechanical part).



Once unbound, we can carefully measure this surplus and comparing it to our available volume list, we’ll find that this particular object can be defined using two distinct cylinders.

Creating a Surplus on Volume.cc

Given a surplus volume upon inspection, we find two cylinders, each has a distinct length albeit both share an equal diameter.

Recall from lecture 2, we use hollow cylinders thus we measure from the internal vertices (inner diameter) and thus disregard any wall properties.

Using two cylinders we can define it using our measurements and find that the spatial complexity for this surplus is equal to 787.3 cubic millimetres.

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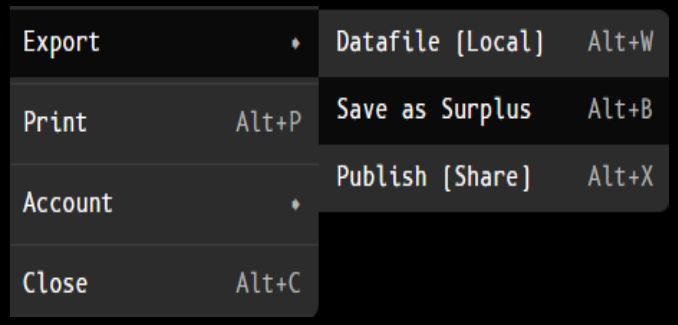
File Edit View Volume Surplus Help 787.3

Cylinder	Diameter	Length	Unit	Volume
T_PIECE_PART_1	6.75 mm	17 mm	mm^3	608.339965
T_PIECE_PART_2	6.75 mm	5 mm	mm^3	178.923519

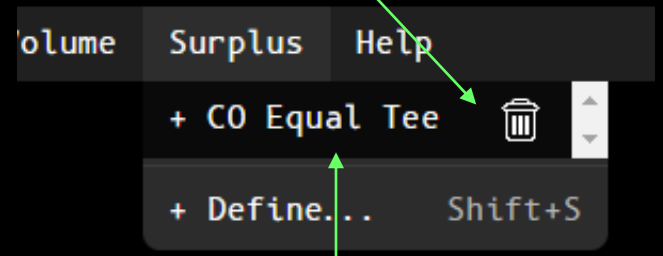


Once a surplus has been defined, the File->Export sub menu can be used to save it directly onto your account. Surplus volumes are Private by default and are account specific. In order to share them and only if you choose to do so, you need to export them as you would a Network Share and set the share to Public through the “Publish (Share)” option.

Accessing Surplus Volumes

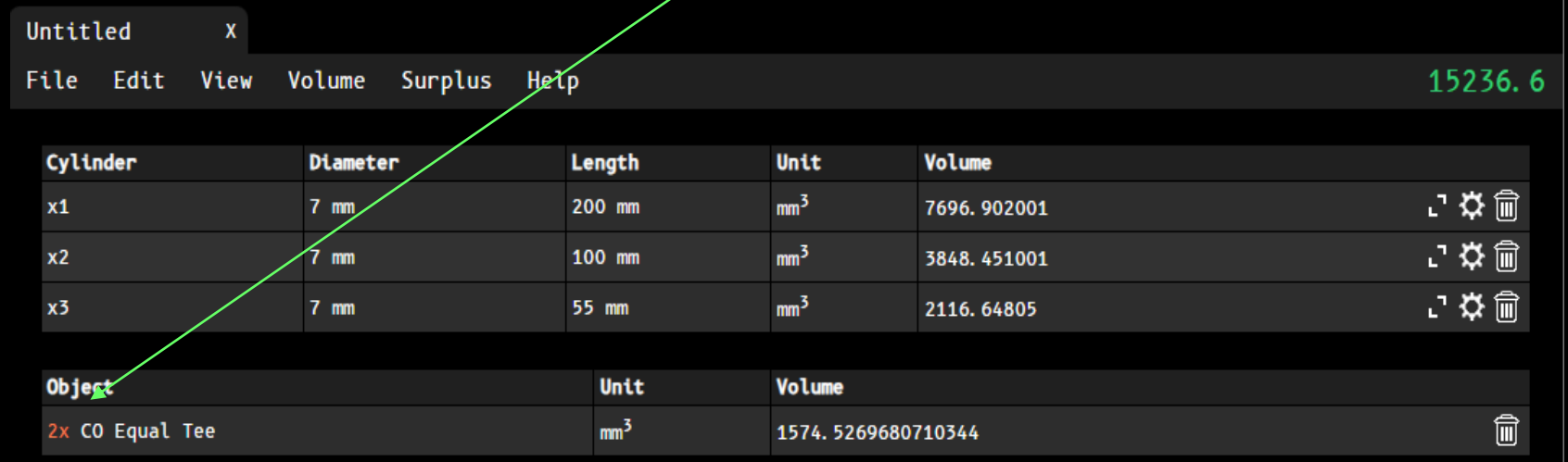
Once a surplus volume has been saved to the account. They are available through the “Surplus” menu. Clicking upon a surplus item will introduce it into the volumetric list. Multiple surpluses of the same type are stackable as seen below and are also signified by a x multiplier.

Surplus volumes may be removed by clicking the “trash can”



User definable volumes available through the “Surplus” menu.

Multiple surpluses of the same type are signified through a multiplier



Our service can with ease add supply chain surpluses easily into multiple data sets without having to repeat existing measurement procedures.

Benefits of Surplus Volumes

Surplus volumes allow us to define repeatable sub components. They allow us to accurately map the 3-dimensional space occupied by mechanical parts. They increase the productivity within an organisation since repeatable surpluses need only be measured and defined once.

They:

- Permit supply chain databases to grow organically and correctly categorise fittings
- Increase productivity by removing repeatable processes
- Increase the accuracy of global measurements by utilising mean functions

If multiple supply chains utilise the same sub parts. Our network can iron out engineer error and use mean metrics to safely soften outliers. By now, we should all know what a surplus volume is, how it can be utilised and what benefits they offer us. Surplus volumes always inherit some hidden volumetric data which if captured allow us to increase our engineering proficiency.

Surplus volumes are critically important and in the next lecture, we will study a use case which illustrates how they are fundamental for the success of spatial industries.