Volume and Surface Area

An underground fuel storage unit is designed as shown:

Task 1
Diesel costs around £1200 per cubic metre. Calculate how much it would cost to fill this storage unit completely.

Task 2
The tank is to be constructed from sheets of stainless steel at a cost of £25 per square metre. Draw a set of scale drawings for each plate required, and calculate the total cost of the stainless steel.

Task 3
A welder is employed to put the tank together. He charges £30 per metre for welding stainless steel seams. Calculate the total cost of welding the tank together.
Volume and Surface Area Solutions

An underground fuel storage unit is designed as shown:

Task 1
Diesel costs around £1200 per cubic metre. Calculate how much it would cost to fill this storage unit completely.

\[
\text{Cross – sectional area} = 13 \times 11 - 3 \times (3 \times 3) = 143 - 27 = 116m^2
\]

\[
\text{Volume} = \text{cross – sectional area} \times \text{depth} = 116 \times 2 = 232m^3
\]

At £1200 per m$^3$: 232 × 1200 = £278,400

Task 2
The tank is to be constructed from sheets of stainless steel at a cost of £25 per square metre. Draw a set of scale drawings for each plate required, and calculate the total cost of the stainless steel.

For scale drawings see attached

\[
116m^2 \times 2 + 6m^2 \times 6 + 10m^2 + 14m^2 + 16m^2 + 20m^2 = 328m^2
\]

At £25 per m$^2$: 328 × 25 = £8200

Task 3
A welder is employed to put the tank together. He charges £30 per metre for welding stainless steel seams. Calculate the total cost of welding the tank together.

Seams around the front face: \( 7 + 3 + 3 + 5 + 3 + 3 + 10 + 8 + 3 + 3 = 48m \)

Seams around the back face: (same as front) = 48m

Seams between front and back: \( 10 \times 2m = 20m \)

Total: \( 48 + 48 + 20 = 116m \) At £30 per metre: \( 116 \times 30 = £3480 \)