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Vocational Education and Training
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Circular economy and sustainability in AB „Astra LT“ activity

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BRONZE

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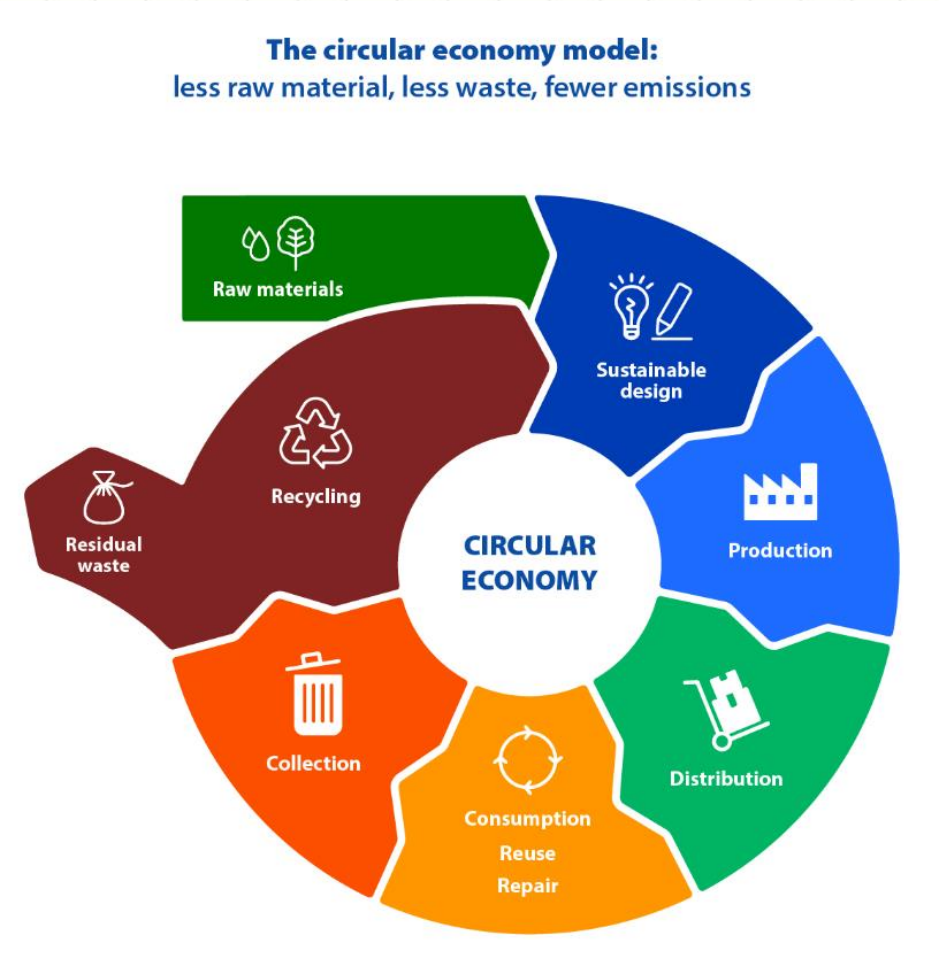
What does it means Circular economy for „Astra LT“?
Only this?



Not only...

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What does it means Sustainable business for „Astra LT“?

Only this?

Not only...

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„Astra LT“ is combining principles of Circular economy and Sustainability. How we do it?

- ✓ *we produce stainless steel tanks and pressure vessels – over 95% of our products weight are recyclable unlimited number of times;*
- ✓ *we use European made only stainless steel plates;*
- ✓ *raw material for our stainless steel plates suppliers (producers) is stainless steel scrap – it exceeds 92% of final stainless steel weight;*
- ✓ *we produce >15% of consumed electric energy in our solar power plant with a plan to produce in 2024 >45%;*
- ✓ *our products – stainless steel tanks and pressure vessels have a long-life time (typically 25+ years) with almost unlimited possibilities to repair it or to adapts it for new purpose if needed;*
- ✓ *we pay a lot of attention on sustainable and reusable packing materials;*

It is enough to be part of circular economy and sustainable world?

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The answer is:

NO!!!

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So what else we can do? Or what else we MUST do?

We must keep improving non-stop every year!

Energy efficiency it's a fundamental item of sustainability and circle economy.

Definitely we work hard on energy efficiency

LED lighting, high efficiency class electric equipment…

All it's good but still not enough as every company is doing it.

So „Astra LT" decided to go forward...

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In cooperation with international partners we are developing new more efficient welding and welds mechanical treatments processes

1. In 2009 we after many months hard work with our American partner we implemented new Plasma + TIG process with following advantages:

- ✓ *stainless steel welding in 2G up to 8mm without bevelling by 4 passes;*
- ✓ *it has been energy huge efficiency (environmental sustainability), productivity and ergonomy (social sustainability) as well as quality improvement (economic sustainability) by many times vs old multipass technology;*

2. In 2023 we with our French partner started a new journey of welding improvement with the plan to improve a lot:

- ✓ *we decided to develop new Plasma + TIG welding technology able to perform high quality stainless steel welding in 2G with following parameters:*
  - *10mm and 12mm welding without bevelling;*
  - *improved processes for 6mm and 8mm welding without bevelling;*

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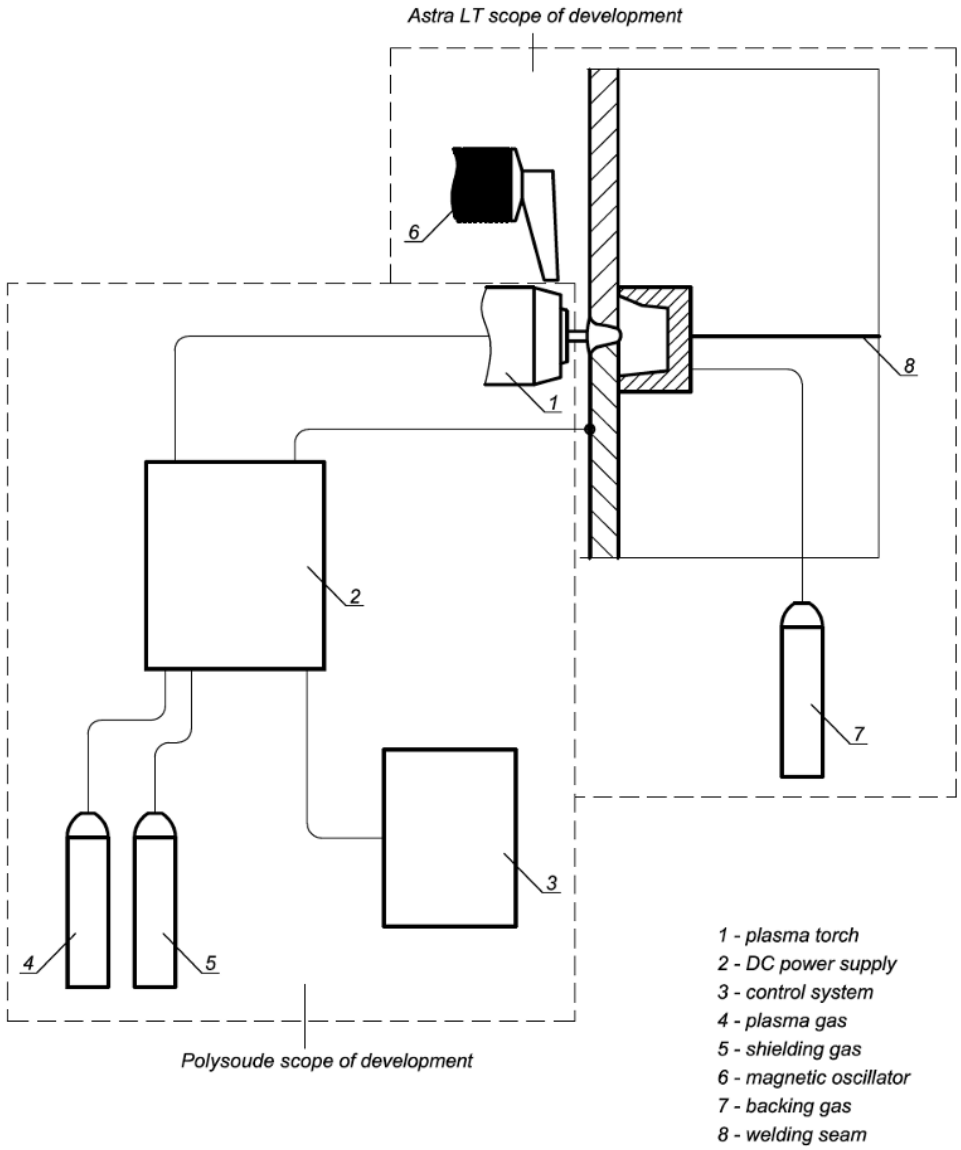
Welding in 2G possition means this:



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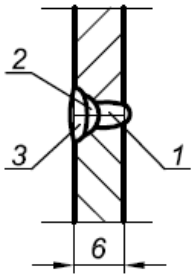
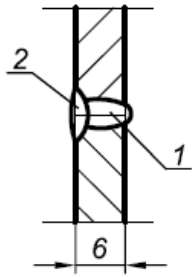
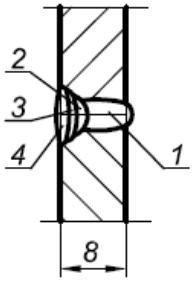
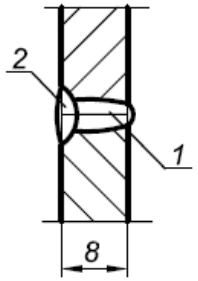
Comparison of present and future welding from environmental, social and economy sustainability point of view (1/2)

No.	Thickness	Present situation	Situation after development
1	6mm	 Heat input: run 1 (PAW) 0,61kJ/mm run 2,3 (GTAW) 0,37kJ/mm Total 1m: 1350 kJ/m 0,375 kWh/m input power: 0,42 kWh/m (power factor 0,9)	 Heat input: run 1 (PAW) 0,58kJ/mm run 2 (GTAW) 0,43kJ/mm Total 1m: 1010 kJ/m 0,28 kWh/m input power: 0,31 kWh/m (power factor 0,9)
2	8mm	 Heat input: run 1 (PAW) 1,07kJ/mm run 2...4 (GTAW) 0,47kJ/mm Total 1m: 2480 kJ/m 0,69 kWh/m input power: 0,77 kWh/m (power factor 0,9)	 Heat input: run 1 (PAW) 1,01kJ/mm run 2 (GTAW) 0,59kJ/mm Total 1m: 1600 kJ/m 0,44 kWh/m input power: 0,49 kWh/m (power factor 0,9)

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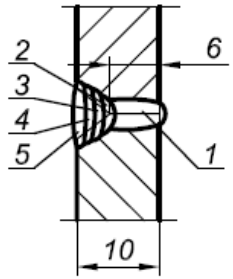
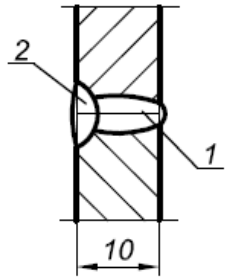
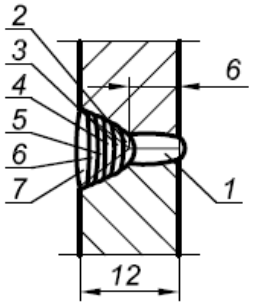
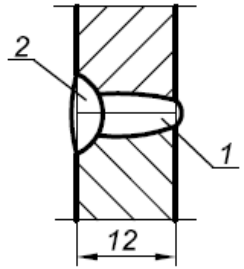
Comparison of present and future welding from environmental, social and economy sustainability points of view (2/2)

No.	Thickness	Present situation	Situation after development
3	10mm	 Heat input: run 1 (PAW) 1,23kJ/mm run 2...5 (GTAW) 0,60kJ/mm Total 1m: 3630 kJ/m 1 kWh/m input power: 1,11 kWh/m (power factor 0,9)	 Heat input: run 1 (PAW) 1,32kJ/mm run 2 (GTAW) 0,72kJ/mm Total 1m: 2040 kJ/m 0,57 kWh/m input power: 0,63 kWh/m (power factor 0,9)
4	12mm	 Heat input: run 1 (PAW) 1,54kJ/mm run 2...7 (GTAW) 0,66kJ/mm Total 1m: 5500 kJ/m 1,53 kWh/m input power: 1,7 kWh/m (power factor 0,9)	 Heat input: run 1 (PAW) 1,65kJ/mm run 2 (GTAW) 0,79kJ/mm Total 1m: 2440 kJ/m 0,68 kWh/m input power: 0,76 kWh/m (power factor 0,9)

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What is already done in new more sustainable welding technology direction?

- ✓ *new extremely special and tottaly unique R&D equipment for industrial research has been developed in cooperation with our French partner and now we start to operate it (you will see it today during the factory tour)*

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Next part of „Astra LT“ presentation will be after the factory tour

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What „Astra LT“ in cooperation with a partner from France is planning to develop?

Modern welding process is operated using more than 50 variable parameters but the real ceiling with present welding technologies are reached – to weld in 2G more than 8mm without bevelling it‘s not possible.

…but every new ceiling – it’s just another floor 😊

So we decided to develop all new Plasma welding torch including significantly improved fast response power source, backing gas chamber and much more…

Reliable partner in EU (France) found, agreement established, testing equipment developed and we are starting our R&D journey...

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What kind of goals do we expect from this more sustainable welding development?

Developed new welding technology depending on steel thickness will shorten welding time up to x2,5 times and will also generate significant electric energy savings which is one of EU priorities

Let's estimate a scenario of 12mm wall thickness 150m3 pressure vessels production. Such an item requires to weld ~150m of but-but automatic welds in 2G possition.

- ✓ our Serviceable Obtainable Market (SOM) today is up to 75pcs/year so 11250m/year to be welded;
- ✓ in Serviceable Available Market (SAM) we see up to 2000pcs/year so 300000m/year to be welded;
- ✓ Total Available Market (TAM) size is up to8000pcs/year so 1200000m/year of welds to be welded worldwide.

What impact new welding thechnology can bring in case of SOM, SAM and TAM?

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Impact evaluating „Astra LT“ SOM (75pcs/year) case:

- ✓ Time to weld annual demand with state-of-the-art technology - 6 431h
- ✓ Time to weld annual demand with developed PAW technology - 2 531h
- ✓ **Time saving expected per year - 3 900h (60%)**

- ✓ Energy to weld annual demand with state-of-the-art technology - 19MWh
- ✓ Energy to weld annual demand with developed PAW technology - 8,5MWh
- ✓ **Energy saving expected per year - 10,5MWh (55%)**

- ✓ CO2 footprint to weld annual demand with state-of-the-art technology - 7,54t
- ✓ CO2 footprint to weld annual demand with developed PAW technology -3,26t
- ✓ **CO2 footprint reduction expected per year - 4,28t (56%)**

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Impact evaluating SAM (2000pcs/year) case:

- ✓ Time to weld annual demand with state-of-the-art technology - 171 500h
- ✓ Time to weld annual demand with developed PAW technology - 67 500h
- ✓ **Time saving expected per year - 104 000h (60%)**

- ✓ Energy to weld annual demand with state-of-the-art technology - 510MWh
- ✓ Energy to weld annual demand with developed PAW technology - 228MWh
- ✓ **Energy saving expected per year - 282MWh (55%)**

- ✓ CO2 footprint to weld annual demand with state-of-the-art technology - 201t
- ✓ CO2 footprint to weld annual demand with developed PAW technology - 87t
- ✓ **CO2 footprint reduction expected per year - 114t (56%)**

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Impact evaluating TAM (8000pcs/year) case:

- ✓ Time to weld annual demand with state-of-the-art technology - 686 000h
- ✓ Time to weld annual demand with developed PAW technology – 270 000h
- ✓ **Time saving expected per year - 416 000h (60%)**

- ✓ Energy to weld annual demand with state-of-the-art technology – 2 040MWh
- ✓ Energy to weld annual demand with developed PAW technology - 912MWh
- ✓ **Energy saving expected per year – 1 128MWh (55%)**

- ✓ CO2 footprint to weld annual demand with state-of-the-art technology - 804t
- ✓ CO2 footprint to weld annual demand with developed PAW technology - 348t
- ✓ **CO2 footprint reduction expected per year - 456t (56%)**

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So what about relation between „Astra LT“ better welding technology and sustainability?

It looks in line

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So what about relation between „Astra LT“ better welding technology and Circular economy?

It looks in line too

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Some questions or comments?

Thank you for your attention and thank you visiting „Astra LT“ – probably best stainless steel tanks and pressure vessels producer in EU☺

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