



Sigma Comerc in Mladenovac (Serbia)



Sigma Comerc is a Factory which is machining mainly Aluminium parts to custom Orders. The Factory has been Constructed with Panels which provides a very good insulation.

In the Workshop we have 11 CNC machines which gives a lot of heat up once they work so the Client has to turn on the Heating in the workshop to start working and approximately one hour later the CNC machines will mostly maintain working temperature in the room.

This is the reason we did a 3 + 1 System which means he can heat up or cool 3 zones at the same time or just one zone where the CNC machines are. This system has performed without fail even when we had outside very low temperature like -18°C.

We also installed an Air Conditioner of 22 kW which did a maintain in high summer 24°C in the workshop, as it's challenging with 11 CNC machines produce a lot of excess heat.

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Rooms	Area (m2)	Volume (m3)	Temp. C°	heating time per Day
1 Proizvodna Hala	341.55	1366.20	22 C°	10h
1A Hala 2	108.22	432.86	22 C°	10h
4 Trapezaria	14.52	39.20	22 C°	10h
6 Lobi i Stepenice	27.95	75.45	22 C°	10h
7 Kancelarija	17.82	48.11	22 C°	10h
10 Sala za zastanke	24.64	66.53	22 C°	10h
12 Kancelarija	56.70	153.09	22 C°	10h
5 Gardaroba	22.77	61.48	22 C°	10h
8 Hodnik	8.10	21.87	22 C°	10h
9 Mokri Čvor	6.60	17.82	22 C°	10h
13 Čajna Kuhinja	8.68	26.04	22 C°	10h
Total	638	2,309		

As mentioned before we installed a 3 + 1 System which gave the Client a very big saving in Investment Cost as we installed instead 2 Furnaces and 2 add on Ice we installed only 1 Furnace and 1 add on Ice (Air Con.).

All parts of the Factory has been at all time climatized as desired by the Client and Workforce during Winter and Summer. But Client has recently added 2 more CNC machines so the cooling did reach its limit with 22 kW capacity, so the Client is preparing to install an APAC unit (Commercial Air Conditioner which can control humidity and temperature for the coming Summer. APAC is a part of Brivis / Rinnai which manufacturers Commercial Air conditioners for any application like heavy Industry, Mining, drilling platform in the open Ocean ect. APAC units can be custom build so it can withstand corrosive areas if required.



Gas consumption for Winter 2019 till 2021

For the first 2 years the Gas supplier did not read the Gas meter nor did send the Client any bills so we have for the first **2 Years** only complete Gas consumption which was 4'220 m³ of Gas.

Gas consumption 2019 - 2021

Date	Consumption for Heating m ³	Cost RSD 36 per m ³
15.10.2019 - 15.4.2021	4,220	RSD151,920.00
Total in RSD	4,220	RSD151,920.00

Gas consumption 2019 - 2021 in Euros (€1 = RSD 118)

Date	Consumption for Heating m ³	Cost € 0.305 per m ³
15.10.2019 - 15.4.2021	4,220	EUR1,287.10
Total in €	4,220	EUR1,287.10



Gas consumption for 2021 till 2022

For Winter 2021-2022 we have detailed month by month informations which you can see below.

Gas consumption 2021 - 2022

Date	Consumption for Heating m3	Cost RSD 36 per m3
15.10. - 30.10.2021	128	RSD4,608.00
1.11. - 30.11.2021	239	RSD8,604.00
1.12. - 31.12.2021	479	RSD17,244.00
1.1. - 31.1.2022	509	RSD18,324.00
1.2. - 28.2.2022	441	RSD15,876.00
1.3. - 31.3.2022	477	RSD17,172.00
1.4. - 30.4.2022	126	RSD4,536.00
Total in RSD	2,399	RSD86,364.00

Gas consumption 2021 - 2022 in Euros (€1 = RSD)

Date	Consumption for Heating m3	Cost € 0.305 per m3
15.10. - 30.10.2021	128	EUR39.04
1.11. - 30.11.2021	239	EUR72.90
1.12. - 31.12.2021	479	EUR146.10
1.1. - 31.1.2022	509	EUR155.25
1.2. - 28.2.2022	441	EUR134.51
1.3. - 31.3.2022	477	EUR145.49
1.4. - 30.4.2022	126	EUR38.43
Total in €	2,399	EUR731.70

Conclusion

As per chart below you can see the average Gas consumption for over 3 years. The Factory working hours are 10 h per day 6 days a week. During non working hours the system is turned of and when the Workers come in the morning they turn on the heating and it takes from 10 min. to 30 min. depending on outside temperature to heat up the whole Factory to the set temperature.

We can see in the chart below that the Dwelling consumes 31 kW per m2 for a whole winter which naturally results to very low Gas consumption.

The SP6 high efficient Gas furnace performed very well regardless of outside temperature which will last for many years.

Applications like this have the advantage of zoning as it delivers heat only to zones (areas) where its necessary without heating in zones which have the desired temperature.

Furnace Model	SP6 Uni
Area m2	638
Volume m3	2,181.5
kW/h required	70.8
kW/h required per m2	0.1
Exchange rate	118.0000
Natural Gas consumption m3 per winter Season	2,206
Gas price per m3	RSD36.00
Heating cost per winter season with Natural Gas	RSD79,428
Heating cost per m2	RSD125
Heating cost per winter season with Natural Gas	EUR673.12
Heating cost per m2	EUR1.06
Heating cost over 5 Years with Natural Gas	EUR3,365.59
kW per m2 used	31.15
CO2 emission in kilogram	4,567