SUPRALSIM â 690

A HLE steel for welded and weight-saving structures

SUPRALSIM® 690 is general steel plate for structure enables to make weight savings thanks to a minimum yield strength of 690 N/mm².

Thanks to its exceptional purity rate (very low sulphur and phosphorous contents), and its adapted chemical analysis the SUPRALSIM® 690 steel is easy to shape and to weld.

STANDARDS

EE 690 TIIK4 according to NFA 36-204 standard
S690 QL according to EN 10137-2 standard

CHEMICAL ANALYSIS

Maximum values (Weight %)

C	Mn	Si	Cr	Mo	P	S	V	Ni	Cu	Al
0.20	1.60	0.50	1.20	0.60	0.02	0.02	0.080	1.35	0.500	0.02 to 0.05

Typical CEV

Thickness	£ 10mm *(0.4")*	10 – 65 mm *(0.4" – 2 ½")*	> 65 mm *(2 ½")*
CEV	0.48	0.57	0.73

MECHANICAL PROPERTIES

Minimum values

Thickness	Y.S. 0.2 mini N/mm² (*KSI*)	UTS N/mm² (*KSI*)	Elongation A 5%
≤ 10 mm *(0.4")*	690 (*100*)	770-940 (*112-136*)	14
10 – 65mm *(0.4 – 2 ½")*	690 (*100*)	770-940 (*112-136*)	18
65-100 mm *(2 ½ - 4")*	650 (*94*)	760-930 (*110-134*)	16
> 100 mm *(4")*	630 *(91)*	710-900 *(103-130)*	16

Elongation mini = 14

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PHYSICAL PROPERTIES

Impact tests

Minimum values	-20°C *(-4°F)*		-40°C *(-40°F)*		-60°C *(-76°F)*	
	J	*ft.lbs*	J	*ft.lbs*	J	*ft.lbs*
Transversal direction	30	*22*	27	*20*	-	-
Longitudinal direction	40	*29*	30	*22*	-	-

Typical value in cross direction (guaranteed on 3 tests) at -40°C (-40°F)

Thickness →		≤ 10mm *(0.4")*	10 – 65 mm *(0.4" – 2 ½")*	> 65 mm *(2 ½")*
Charpy V	J *ft.lb*	40-45 *26-30*	100 *73*	100-120 *73-90*

Weight saving and / or more resistant structures

Due to its high yield strength compared to classical steel (750 MPa in average), you can:

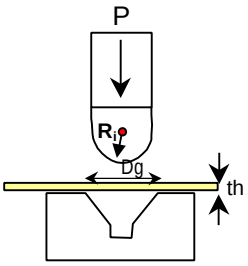
- reduce thickness of structure and so make weight saving and / or
- support higher stresses and realise more resistant structures

PROCESSING

Bending

Thanks to the quality of steel making process, SUPRALSIM® 690 is easy to shape providing the following conditions are respected:

- Dressing (or grinding) of the ridges caused by gas-cutting to limit the hardened zones,
- Sufficiently powerful equipment,
- Respect of minimum forming radius.



	⊥ rolling direction	// rolling direction
Bending internal radius R Mini	2 x th	3 x th
Die gap Dg	8 x th	10 x th

Bending angle of 90°

In hot condition, SUPRALSIM® 690 is unsuitable for hot forming at a temperature higher than 600°C (*1100°F*)

Welding

The reduced carbon and alloying elements content of SUPRALSIM® 690 allow welding in very good conditions with excellent characteristics.

➢ **Weld preparation**

The preparation of joints and surfaces is most important, notably:

- Removing all traces of grease and water
- Grinding of cuts to remove any oxides, slag of grooves from cutting with excessive oxygen pressure
- Grinding of any sheared edges, tears final drips.

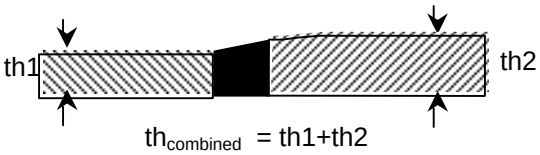
➢ **Welding process**

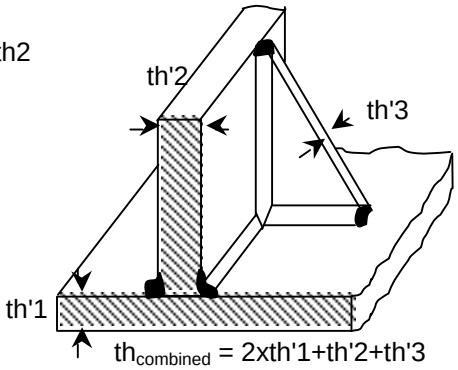
Any conventional fusion welding method can be used, such as submerged arc welding (SAW), manual metal arc welding (SMAW), flux core wire arc welding (FCAW), HIG, MAG (GMAW) and TIG (GTAW)

Interpass temperature should be limited to a maximum of 200°C (*392°F*).

➢ ***Preheating***

SUPRALSIM® 690 can be welded without any crack risk according to following recommended conditions (forecast for highly clamped weld).





Welding processes	Energy (kJ/cm)	mm / *in*	10 / *0.39*	20 / *1.57*	30 / *1.18*	40 / *1.57*	50 / *1.96*	60 / *2.36*	70 / *2.75*	80 / *3.15*	90 / *3.54*	100 / *3.93*	>100
SMAW/ GMAW/SAW	15												
	30												

Without pre-heating, θ° plate >5°C (40°F)

with slight pre-heating 75°C (*165°F*)

with pre-post heating ≥ 100°C (*210°F*)

with pre-post heating ≥ 150°C (*300°F*)

➢ ***Welding consumables***

Electrodes fluxes will have to be stored at 350°C *(650°F)* – 2 hours before using. They must be stocked at 160°C *(320°F).*

	SMAW	GMAW	FCAW	SAW
AFNOR	**NFA81-340** EY69 1,5NiCrMoBxxT BH			**NF A81-322** FP/x xx/xx xB x Saxx750605
AWS	**A5-5** E 110xx	**A5-28** ER110 Sx	**A5-29** ER110-T5	**A5-23** F11x6-EF6-F6 or F11x6-ECF6-F6
DIN	**DIN 8529** EY69 xx Mn2NiCrMo B			

The above list of filler materials has been determined according to suppliers datas, please confirm this choice for your application with your supplier.

Machining

SUPRALSIM® 690 can be machined without any difficulty using the same methods as those used for the classical steels.

DIMENSIONAL PROGRAMME

Thickness	Flatness	Available Width		
		Coil	Steckel	Quarto
4 mm *0.16"*	10 mm/ 2m *5/8"/ 5ft*	1500/1600 mm *59"/63"*	2000/2500 mm *78"/98"*	xx xx
5-7 mm *0.2-0.28"*	6 mm/2m *¼" / 5 ft*	1500/2000 mm *59"/78"*	2000/2800 mm *78"/110"*	xx xx
7-60 mm *0.28-2.4"*	6 mm/2m *¼" / 5 ft*	xx xx	xx xx	2100/3100 mm *83"/122"*
60-105 mm *2.4-4.1"*	6 mm/2m *¼" / 5 ft*	xx xx	xx xx	2100/3400 mm *83"/134"*
Tolerances		± 0.2 mm	± 0.3 mm	± 0.5 → 1.4 mm

Please, ask us for specific sizes or tolerances.

Surface aspect According to EN 10163-2 standard

APPLICATIONS

- Cranes, mobile cranes,
- Trailers, bulldozers, loaders, industrial trucks, buckets
- Pipes, bridge, steel buildings, …

NOTE

This technical data and information represents our best knowledge at the time of printing. However, it may be subject to some slight variations due to our ongoing research programme on HLE grades.

We therefore suggest that information be verified at time of enquiry or order.
Furthermore, in service, real conditions are specific for each application. The data presented here is only for the purpose of description, and may only be considered as guarantees when our company has given written formal approval.

Further information may be obtained from the following address.

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