

Technical Data Sheet

UGITHERM® 4670

Chemical composition (%)

C	Si	Mn	Ni	Cr	Mo	P	S	N
≤ 0,030	1,5 – 3,0	4,0 – 6,0	3,0 - 5,5	18,0 – 21,0	≤ 0,60	≤ 0,040	≤ 0,010	0,10 – 0,20

14-04-2023 – REV 0

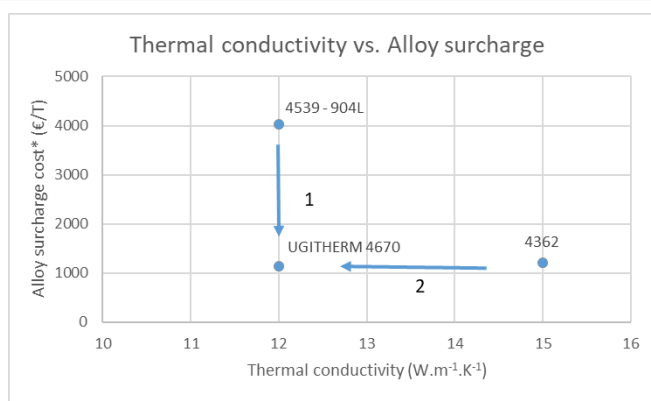
General presentation

UGITHERM® 4670 is a stainless steel which combines a particularly low thermal conductivity, less than 12.5 W/m.K without being highly alloyed and therefore presenting a low cost in terms of alloy surcharge.

As shown in the graph opposite, UGITHERM® 4670 has a thermal conductivity around 12.0 W/m.K and therefore lower than all other lean duplex (1.4362, 1.4062, 1.4482) which have a thermal conductivity around 15 W/m.K as stated in EN 10088-1:2023.

Certain stainless steels such as super austenitic grades (1.4539; 1.4529) have a

similar thermal conductivity but have the disadvantage of being highly alloyed grades therefore sold with a high alloy extra. As UGITHERM® 4670 has a less rich composition than austenitic or super austenitic grades, it is significantly more economical.



UGITHERM® 4670 being a duplex grade, it has high mechanical characteristics which combined with its excellent thermal conductivity / price compromise, makes it a very suitable solution for concrete bars used for thermal breakers.

Designation

Material No.

Europe	USA	Japon
EN 10088-1	ASTM AISI	JIS
1.4670 X2CrMnNiSiN20-5-4-2	- -	-

Mechanical properties

Tensile data

Condition	Diameter	Yield stress	Tensile strength	Elongation	Reduction of Area	Hardness
(°C)	(mm)	(MPa)	(MPa)	(%)	(%)	Brinell (HB)
Annealed	Ø ≤ 115	≥ 450	650 – 900	≥ 25	≥ 60	≤ 320
Annealed and cold worked	Ø ≤ 20	≥ 650	800 – 1100	≥ 15		
Annealed and cold worked	20 < Ø ≤ 30	≥ 450	650 – 1100	≥ 15		
Annealed and cold worked	30 < Ø ≤ 50	≥ 450	650 – 900	≥ 25	≥ 60	

Limit values for information only; approximate ranges allowing for the different cold drawing rates it is possible to apply (cold drawing rate ↑ = hardness and strength ↑)



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Physical properties

Temperature	Density	Elastic modulus	Thermal conductivity	Expansion coefficient From 20 to T°C	Electrical resistivity
(°C)	(kg/dm ³)	(GPa)	(W/m.K)	(K ⁻¹)	(μΩ.mm)
20	7,7	200	12,0		0,95
100		194		14,0	
200		186		14,5	
300		180		14,5	

(Indicative values)

Corrosion resistance

The pitting potential of UGITHERM® 4670 is determined according to the operating standard ISO 15 158:2014 on notched or smooth specimens in different environments and at different temperatures (see the following table):

Environment	NaCl 50 g/L ^(*)	NaCl 3 g/L	NaCl 3 g/L
Temperature	35°C	20°C	50°C
pH	6,6	4,5	4,5
Surface	Smooth	notched	notched
UGITHERM 4670	385 mV/ECS	620 mV/Ag-AgCl	215 mV/Ag-AgCl
UGIGRIP 4062	350 mV/ECS	610 mV/Ag-AgCl	270 mV/Ag-AgCl

(*) conditions used in the salt spray test

The pitting potential values of UGITHERM® 4670 are of the same order of magnitude as those of UGIGRIP® 4062, but with an advantage in favor of UGITHERM® 4670 at high salt concentration, i.e. 5%w.

Tests at imposed potential (+400 mV/Ag-AgCl) were carried out for 12h in a 3g/L NaCl solution at 20°C and pH=4.5. Under these conditions, UGITHERM® 4670 maintains a state of passivity similar to that of UGIGRIP® 4062.

This corrosion behavior has led BAM to classify UGITHERM® 4670 as corrosion class CRC III according to DIN EN 1993-1-4.

Corrosion resistance measured in mV/ECS in salt spray (NaCl 5% - pH 6.6 - 35°C) shows that all the lean duplex grades offered by Ugitech perform better than the austenitic 304L grade, whereas the other lean duplex grades available on the market (1.4482 and 1.4162) all have lower corrosion resistance than 304L.



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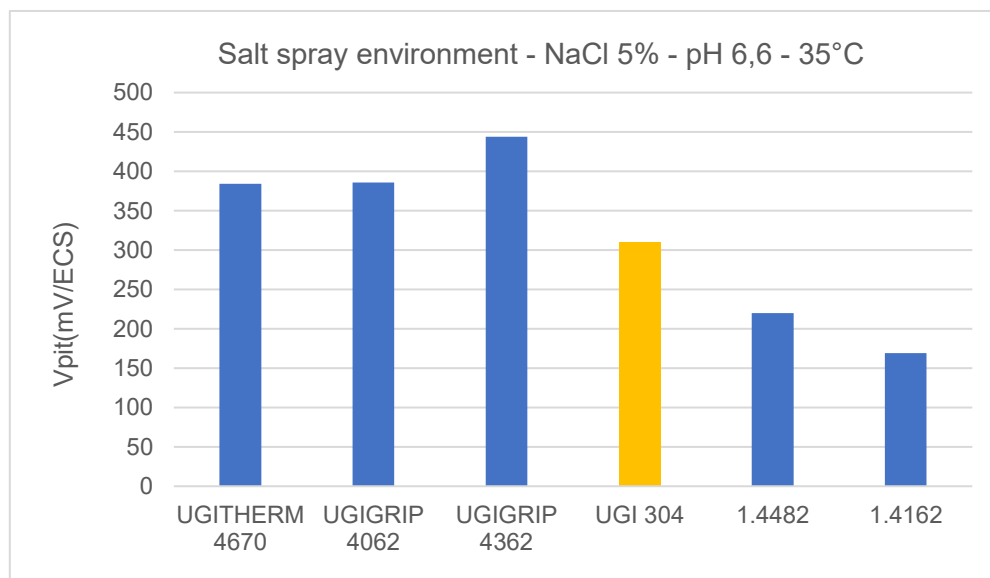
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Heat treatment

UGITHERM® 4670 has satisfactory forgeability between 1000°C and 1200°C. At the same temperature, the forging forces of UGITHERM® 4670 are lower than those of austenitic stainless steels, and ductility is slightly lower. We recommend reheating between 1100 and 1200°C and, after hot working, rapid cooling (with oil or water) to avoid brittle precipitations (sigma phase) that can occur between 900°C and 400°C, which is why operating temperatures above 300°C are not recommended.

The ductility of UGITHERM® 4670 can be restored by re-solution heat treatment between 950 and 1050°C, if the metal has previously been cold-worked. This treatment need not exceed 30 minutes but must be followed by rapid cooling.

Cold transformation

UGITHERM® 4670 is suitable for cold forming by conventional methods.

UGITHERM® 4670 has higher mechanical properties than UGIGRIP® 4062 in the work-hardened or cold-notched condition (see work-hardening curves below). Shaping will be more difficult, but the superior mechanical characteristics of UGITHERM® 4670 will enable structures to be designed with lighter reinforcement weights



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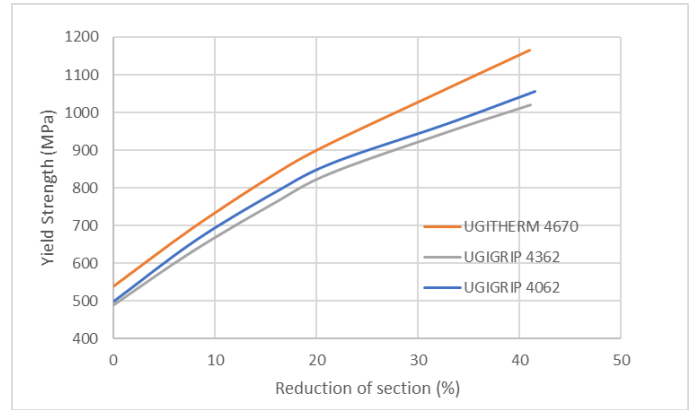
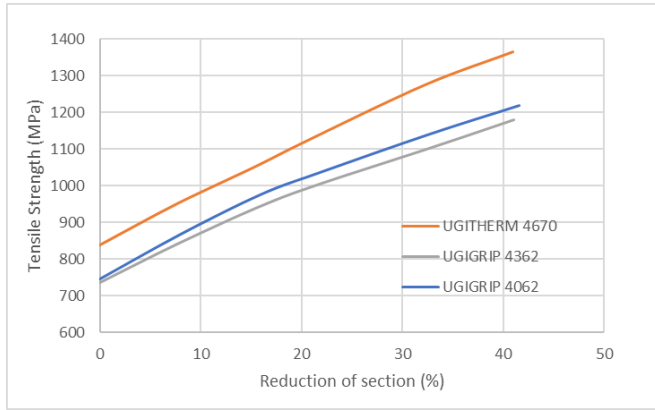
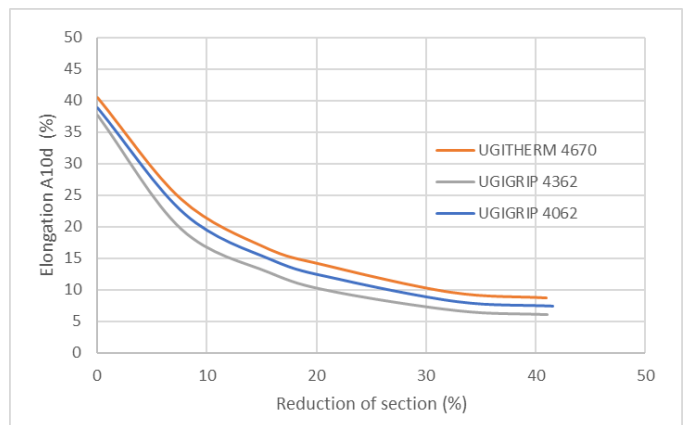


Fig. Comparative work-hardening curves between UGITHERM® 4670 and two other lean duplex grades: UGIGRIP® 4062 and 4362



Pickling - Passivation - Electropolishing

Les conditions opératoires habituellement utilisées pour un austénitique 1.4301 sont à adapter au cas par cas, nous consulter.

Available products

Product	Shape	Surface finish	Dimensions
Bars	Round	Notched	Ø 6 to 25 mm
Wires	Round	Notched	Ø 6 to 14 mm

Geometry and mechanical characteristics in compliance with NF A 35-014 (: B500B/B650B/B750B), BS 6744 and DIN488

For other dimensions, please consult us

Applications

Reinforcing bars for thermal breaks.



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