

ALLOY DATA SHEET



G21CrMoV5-11

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WHO ARE WE ?

Safe Metal is the world leader in steel components made by green sand casting. Our teams operate as part of an international network that stretches across Europe, America and Asia, and partner their sales and project management skills with those of their customers.

MAKING WORLD CLASS

Thanks to the expert skills of our R&D department, we are able to improve our industry knowledge and hence our products, our production process and metalworking by choosing the most appropriate methods for the product



G21CrMoV5-11

Generality

High carbon steel chromium-molybdenum for high mechanical characteristics and wear resistance at treated condition. Good hardenability.

Market : this alloy can be used in all markets.



Chemical Composition

C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Mo (%)	V (%)
0,18-0,22	0,3-0,6	0,5-0,8	< 0,025	< 0,025	1-1,2	0,8-1	0,25-0,35

Main characteristics

G21CrMoV5-11

Family : High resistance

Weldability



Impact test values



Machining



Cost



Mechanical resistance



G21CrMoV5-11

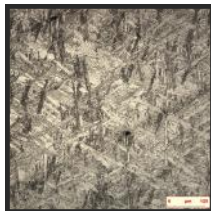
Mechanical characteristics & Heat treatment

Designation			Heat Treatment			Thickness	Mechanical properties					
Reference	Name	Number	Symbol	Normalizing or austenitizing °C	Tempering °C	t mm	Tensile test at room temperature			Impact test		
							R _{p0.2} MPa min.	R _m Mpa min.	A% min.	KV J min.	Temp. °C	
Safe Metal possibilities according to norms :												
	G21CrMoV5-11	1.8070					Not in EN 10293:2015 standard					
Safe Metal other possibilities :												
Safe Metal	G21CrMoV5-11			+N	TN1		t ≤ 30	850	1000	15	<10	RT
Safe Metal	G21CrMoV5-11			+QT HR		High Rm	t ≤ 30	1000 to 1200	1100 to 1300	9	<10	RT
Safe Metal	G21CrMoV5-11			+QT HD		High Kv	t ≤ 30	800 to 1000	900 to 1000	13	<10	RT

RT : Room temperature
 QT : Liquid quenched and tempered
 HR : High resistance
 HD : High ductility
 N : Normalized

Microstructures

QUENCHING + TEMPERED AT 600 °C



Machining

			HB*	Microstructure
Safe Metal	G21CrMoV5-11	N	310	Ferrite + Pearlite + Bainite
Safe Metal	G21CrMoV5-11	QTHR	340-380	Tempered Martensite
Safe Metal	G21CrMoV5-11	QTHD	280-310	Tempered Martensite

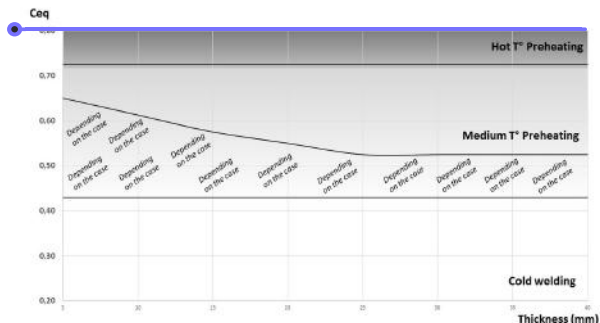
HB : Brinell hardness

G21CrMoV5-11

Welding

Preheating conditions according to thickness and equivalent carbon. A specific zone is defined where preheating is not absolutely necessary and depends on the case.

G21CrMoV5-11



Welding comparative table

Grade	Group (ISO TR 15608)	Filler Metal	Post-Welding HT	Hardness of melted area (HV10)	Rm (MPa)	Process (acc. NFEN ISO 15614)
C steel						
C25	1.2	E71T5	SR/N	130-170	450-550	111/135
		E71T5	QT	150-200	550-650	
G20Mn5	1.2	E70C6 M H4	SR/N	150-200	500-550	
		E70C6 M H4	QT	160-220	540-580	
G24Mn6	3.1	ER110T5	SR	240-300	750-800	
		ER110T5	QT	280-340	780-850	
G26Mn6	3.1	ER60S02	SR	240-300	750-800	
G30MnV8	3.1	ER60S02	SR	240-300	750-800	
GE230	1.1	E71T5	SR/N	130-170	450-550	
		E71T5	QT	150-200	550-650	
GE280	1.2	E70C6 M H4	SR/N	150-200	500-550	
		E70C6 M H4	QT	160-220	540-580	
G20MnV8	3.1	ER110T5	SR	240-300	750-800	
		ER110T5	QT	280-340	780-850	
Cr-Mo						
G18CrMo4	5.1	E6016B3	SR	180-250	620-680	111/135
G25CrMo4	5.1	E6016B3	QT	200-260	630-720	111/135
G30CrMo4	5.1	E1201B3	QT	300-350	800-1150	111
G21CrMoV5-11	6.2	E1201B3	SR	280-350	800-1000	111
Others						
G10MnMoV6	3.1	ER90 S-G	SR	200-280	620-650	135
		ER90 S-G	QT	160-220	580-640	
G20NiCrMo4	4.2	ER120 S-G	SR	300-360	900-960	
		ER120 S-G	QT	280-350	820-1020	

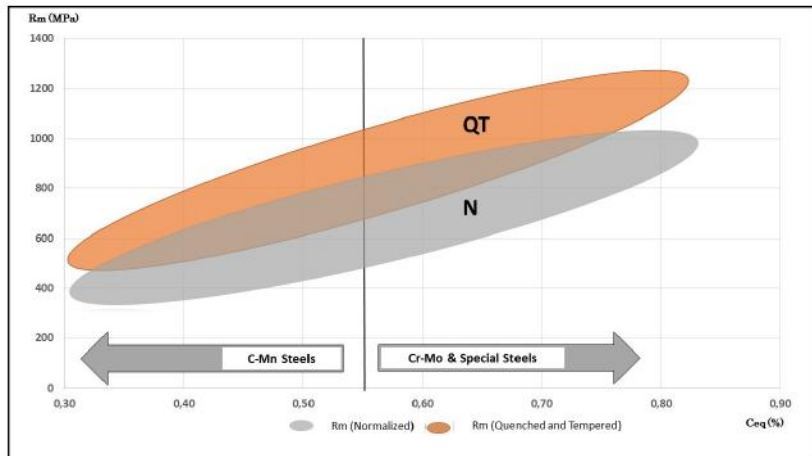
111 : Electrode welding
135 : MAG

SR : Stress relieving
QT : Quenched and Tempered

N : Normalized

Comparative Table of Safe Metal grades

	Chemical composition								N			QT (Q230°C)		
C-Mn	C [%]	Mn [%]	Si [%]	Cr [%]	Mo [%]	V [%]	Ni [%]	Ceq [%]	Rm	AP%	Kv (-20°C)	Rm	AP%	Kv (-20°C)
C25	0,2	0,7	0,45					0,32	440	25	22	420-520	20-25	40-50
GE240	0,23	0,9	0,5					0,4	480	25	12	520-600	25-30	oct-20
GE280	0,24	1,2	0,5	0,15				0,47	530	20	10	600-800	15-25	20-40
G20Mn5 (low)	0,2	1,1	0,4					0,38	470	28	40	500-590	20-22	38-46
G20Mn5 (high)	0,23	1,4	0,5					0,5				600-680	25c-25	25-30
G20MnV6	0,23	1,55	0,5			0,05		0,54	580	25	10			
G24Mn6 (low)	0,23	1,65	0,5					0,52	590	18	10	550-670	20-25	40-75
G24Mn6 (high)	0,23	1,8	0,5					0,6	630	32	10	620-900	20c-25	15-35
G28Mn6	0,3	1,4	0,5					0,53	650	17	10	650-840	20c-25	30-60
G30MnV6	0,3	1,4	0,5			0,1		0,55	650	12	10	700-950	08-40c	30-45
	Chemical composition								N			QT (Q230°C)		
Cr-Mo	C [%]	Mo [%]	Si [%]	Cr [%]	Mo [%]	V [%]	Ni [%]	Ceq [%]	Rm	AP%	Kv (-20°C)	Rm	AP%	Kv (-20°C)
G18CrMo4	0,18	0,8	0,4	1	0,2			0,55	450	18	10	560-720	24c-22	30-80
G25CrMo4	0,25	0,8	0,4	1	0,2			0,62	600	11	12	600-950	20c-18	20-90
G30CrMo4	0,3	0,8	0,4	1	0,2			0,67	840	5	10	650-1050	20c-18	20-90
G21CrMoV5-11	0,2	0,7	0,5	1,15	1	0,3		0,82	980	5	5	900-1200	05c-20	5
	Chemical composition								N			QT (Q230°C)		
Others	C [%]	Mo [%]	Si [%]	Cr [%]	Mo [%]	V [%]	Ni [%]	Ceq [%]	Rm	AP%	Kv (-20°C)	Rm	AP%	Kv (-20°C)
G10MnMoV6	0,12	1,35	0,5		0,3	0,08		0,42	460	17	10	580-750	14-16	20-50
G20NiMoCr4	0,18	1	0,4	0,4	0,6		0,9	0,62	750	5	10	600-950	24c-20	35-100



Family : Versatile



Family : Versatile

A circular micrograph showing a cell with a large, dark, centrally located nucleus. The cytoplasm is lighter and contains some granular structures. The cell is surrounded by a thin, dark border.

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CONCLUSIONS



Family: Versatile



1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26



Family : Verrucillaceae

Family : Versatile



Family : High resistance



Family : High resistance

Family : High resistance



Family : High resistance

Family : Special



Family : Special



Family : Cast iron

