



**A050970**  
*pl. 15/APP/2013*

 <b>Material Test Report</b>		Production Date 01.24.2011			
CMC IMPACT METALS CMHD 15 Union St. 3rd Fl. J Stoughton MA 04471-2501 386-682-7557 www.cmcimpactmetals.com		 Tom Carter, Technical Director			
Sold To: CMC Comets Steel 6565 N MacArthur Blvd IRVING TX 75039-6283 US		Shipped To: CMC Comets Steel 6565 N MacArthur Blvd IRVING TX 75039-6283 US			
Customer PO No.	65478	BOL No.	Delivery No.	Sales Order No.	
Customer Part No.				0000470923	
Product Description ROUND:SBQ 5-3/4" 20R 1022M, 1022 Mod Norm A 105/A350 LF2				Alternate Grades: ASTM/ASME A/SA 105-10, ASTM A696-90A GR C ASTM/ASME A/SA 350-07 GR LF2 CLASS 1 * ASTM/ASME A/SA 675-03 GR 70, NACE MR0175-03 EN 10204:01 3.1	
Processing Normalize, Straighten					



CHEMICAL ANALYSIS												
Heat No.	C (%)	Mn (%)	P (%)	S (%)	Si (%)	Cu (%)	Cr (%)	Ni (%)	Mo (%)	V (%)	Cb (Nb) (%)	Al (%)
A050970	0.18	0.91	0.010	0.015	0.30	0.24	0.16	0.11	0.030	0.002		0.028
Batch No.	Ti (%)	B (%)	As (%)	Pb (%)	Sb (%)	Zr (%)	N2 (ppm)	O2 (ppm)	H2 (ppm)	DI (in.)	CE (%)	
050970Y711	0.001	0.0002		0.001			87				0.39	

THERMAL PROCESSING								
Furnace No.	Austenitizing Temp. (°F)	Austenitizing Time (min)	Tempering Temp. (°F)	Tempering Time (min)	Normalizing Temp. (°F)	Normalizing Time (min)	Quench Media	Quench Temp. (°F)
Y6711					1701	23		

Notes :

Test	Tensile Test							Hardness Test				
	Yield (ksi)	Tensile (ksi)	Elongation (%)	Reduction of Area (%)	Yield at 0.6% Elongation Under Load (ksi)	Yield at 0.02% (ksi)	Test Orientation	Test Location	Brinell (BHN)	Test Location	Rockwell (HRC)	Test Location
1	48.0	76.3	31	63			Longitudinal	Mid-radius	129	Surface		
2												
3												
4												
5												
6												
7												
8												

JOMINY RESULTS (HRC)												
Test	Distance (in.)											
	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12
1												
	J13	J14	J15	J16	J18	J20	J22	J24	J26	J28	J30	J32



CNC IMPACT METALS Q100  
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Heat No. A050970

Furnace No. Y6711

Tom Carter, Technical Director

## CHARPY IMPACT TESTS

Test	Average* ft-lb	Specimen 1* ft-lb	Shear %	Lateral Expansion in.	Specimen 2* ft-lb	Shear %	Lateral Expansion in.	Specimen 3* ft-lb	Shear %	Lateral Expansion in.	Test Temp. °F	Geo	Location	Orientation
1	29	35	5	0.028	38	5	0.030	15	5	0.030	-50	Full	Mid-Radius	Longitudinal
2														
3														
4														
5														
6														
7														
8														

\*Absorbed energy values converted from sub-size results (ref. ASTM A370) when applicable.

## INCLUSION RATING

Method								
	Thin (T)		Heavy (H)		Thin (T)		Heavy (H)	
1								
2								
3								

## BEND TESTS

Test	Pin Radius (in.)	Orientation	Result	Final Bend Angle
1				
2				

## OTHER TESTS

Type of Test	Method			
Grain Size	ASTM E112	Grain Size:	5	
Ballistic Test 1		Req'd Velocity:		Observed Velocity: Result:
Ballistic Test 2		Req'd Velocity:		Observed Velocity: Result:
Ultrasonic Test		Criteria:		Result:
Decarburization				
Macro Test	ASTM E381	SRC		
Reduction Ratio		5:1		

Additional Comments

Country of Origin: United States