

Investigation Into Competitor Threaded Rods



**T&I CHALMERS
ENGINEERING**
(PTY) LTD.

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Dear Valued Customer,

T&I Chalmers Engineering recently conducted testing on Grade 8.8 threaded rods available in the market. This investigation was prompted by unusually low competitor pricing, which raised concerns around material quality and compliance. We were determined to understand how such pricing was being achieved and whether the products met the required standards.

Samples sold as Grade 8.8 were sourced from multiple suppliers and submitted to third-party laboratories for chemical, mechanical, and metallurgical testing. The results showed that several samples did not comply with Grade 8.8 requirements, with some identified as mild steel or free-cutting steel. In addition, a number of samples exceeded 1000 MPa tensile strength, presenting an increased risk of hydrogen embrittlement during common galvanising processes.

The findings highlight the importance of verifying material quality, test results, and certification when sourcing critical fastening components. This exercise reinforces our commitment to supplying fully compliant, correctly certified products and to maintaining transparency with our customers.

Should you wish to discuss the report or our quality assurance processes in more detail, please feel free to contact us.

Yours sincerely,

T&I Chalmers Engineering

1. Introduction

T&I Chalmers Engineering sourced threaded rods from various competitor suppliers to investigate material conformity, following recent claims of suppliers supplying poor quality material. 18 samples were obtained for chemical analysis, mechanical analysis and grain structure analysis by external parties. All samples were sold as Grade 8.8.

2. Testing Processes

Samples were submitted for the following testing:

1. Chemical analysis.
2. Mechanical analysis: hardness, yield strength, tensile strength, elongation.
3. Grain structure analysis.

3. Chemical and Mechanical Test Results

		Fe	C	Mn*	Si	P	S	Hardness HRC150	Yield (MPa)	UTS (MPa)	Elongation (%)	
SPECIFICATION	Min	-	0.15	-	-	-	-	23	660	830	12	
	Max	-	0.55	-	-	0.025	0.025	34	-	-	-	

ID	Supplier	Size	Chemical Analysis Results						Hardness HRC150	Yield (MPa)	UTS (MPa)	Elongation (%)	Identified Grade
			Fe	C	Mn*	Si	P	S					
1	A	M16	97.214	0.34	1.39	0.61	0.009	0.030	32	931.23	1052.89	16.30	C35
2	A	M20	97.193	0.35	1.41	0.61	0.009	0.030	32	831.17	1003.33	15.72	C35
3	A	M24	97.062	0.38	1.50	0.70	0.011	0.004	31	909.8	1033.69	17.14	EN8
4	A	M30	97.042	0.37	1.56	0.59	0.013	0.046	24	735.87	874.06	21.00	EN8
5	B	M16	97.105	0.36	1.49	0.60	0.006	0.046	32	761.13	999.89	16.40	C35
6	B	M20	97.070	0.36	1.52	0.70	0.001	0.002	33	815.33	949.45	18.82	C35
7	B	M24	97.265	0.34	1.43	0.58	0.002	0.030	28	802.98	943.18	20.58	C35
8	B	M30	97.690	0.34	1.42	0.22	0.007	0.002	29	916.06	1027.88	19.64	C35
9	C	M16	98.65	0.05	0.45	0.14	0.008	0.019	8	607.23	631.26	15.20	Mild Steel
10	C	M20	98.458	0.01	0.67	0.22	0.009	0.010	20	669.96	684.83	15.00	Mild Steel
11	D	M10	97.600	0.33	1.44	0.27	0.011	0.003	25	-	-	-	C35
12	D	M12	99.140	0.06	0.38	0.05	0.002	0.008	21	-	-	-	EN1A
13	D	M16	97.100	0.36	1.50	0.60	0.010	0.030	30	893.46	1010.26	16.84	C35
14	D	M16	97.140	0.36	1.49	0.61	0.008	0.030	29	929.08	1044.16	16.34	C35
15	D	M20	97.200	0.35	1.44	0.59	0.005	0.030	28	-	-	-	C35
16	D	M20	97.210	0.33	1.45	0.59	0.007	0.030	29	776.08	913.9	20.28	C35
17	D	M24	97.180	0.36	1.45	0.60	0.004	0.030	29	794.03	930.92	20.18	C35
18	D	M24	97.220	0.38	1.43	0.59	0.004	0.030	28	759.53	910.12	18.64	C35

- Mn*: Plain carbon boron steel with a carbon content below 0.25%, the minimum manganese content shall be 0.6% for Grade 8.8.
- Three samples failed to comply with the requirements of Grade 8.8 and were identified as mild steel/free-cutting steel.
- Six samples achieved an ultimate tensile stress result above 1000MPa, which presents a high risk of hydrogen embrittlement when exposed to acid, commonly used in the cleaning or pickling process before electro-galvanising and hot-dip galvanising.



4. Grain Structure Results

Nine samples with suitable mechanical properties were sent for metallurgical evaluation: chemical analysis, hardness testing and microstructural examination.

		Fe	C	Mn*	Si	P	S				
SPECIFICATION 38MnSiV55	Min	-	0.35	1.20	0.50	-	-				
	Max	-	0.44	1.60	0.80	0.035	0.06				

ID	Supplier	Size	Chemical Analysis Results						Hardness Surface	Hardness Mid	Hardness Core	
			Fe	C	Mn*	Si	P	S				
1	A	M16	-	0.38	1.37	0.65	0.021	0.052	34	36	34	
2	A	M20	-	0.37	1.33	0.63	0.019	0.041	34	34	30	
5	B	M16	-	0.40	1.43	0.63	0.017	0.062	38	37	32	
6	B	M20	-	0.38	1.42	0.73	0.010	0.035	34	30	32	
7	B	M24	-	0.37	1.36	0.60	0.013	0.038	35	34	32	
8	B	M30	-	0.35	1.31	0.21	0.016	0.01	33	32	33	
13	D	M16	-	0.39	1.43	0.63	0.021	0.044	35	33	31	
16	D	M20	-	0.35	1.37	0.61	0.015	0.034	32	30	33	
18	D	M24	-	0.35	1.32	0.58	0.011	0.034	35	33	32	

All samples conformed to the chemical composition requirements for 38MnSiV55, except for Sample 6: M30-BB1.

All samples showed a tempered Martensite microstructure, with surface defects ranging from 0.10mm to 0.41mm. Sample 6 showed partial decarburization at the mid-center.

5. Certification

Certificates were requested with all samples. Only supplier A provided certificates, however the supplied certificates did not match the achieved results.

ID	Supplier	Size	Hardness HRC150		Yield (MPa)		UTS (MPa)		Elongation (%)	
			Stated	Actual	Stated	Actual	Stated	Actual	Stated	Actual
1	A	M16	28	32	805	831	895	1052	17	16
2	A	M20	27	32	825	831	860	1003	18	15
3	A	M24	28	31	760	909	865	1033	20.1	17
4	A	M30	29	24	775	735	890	874	18	21

6. Summary

Three of the samples did not meet the requirements of Grade 8.8 and were identified as mild steel or EN1A, these samples were supplied by supplied C and supplier D. Six of the samples measured above 1000MPa which presents a high risk of hydrogen embrittlement during electro-galvanising or hot-dip galvanizing. Hydrogen embrittlement causes the steel to become brittle and snap under strain.

Customers are urged to exercise caution and vigilance when considering the purchase of threaded rods. Customers are encouraged to be aware of the importance of sourcing products from reputable manufacturers and verify the certifications and quality standards of manufacturers before making purchases.