

Material Testing Sample Size Requirements

TCR Engineering Services undertakes Material Testing, NDT & Inspection and Assets Integrity Services. The following sample requirements will provide optimal sample size for our engineers to conduct the required tests. If your sample size does not meet the requirements listed below, please contact TCR because sub sized samples can be used, or we may have other methods for conducting similar analysis. Sample sizes larger than those listed will not present a problem, but additional machining may be required. The table below is considered as a good reference point for most samples. For special items or if limited amount of material available, please contact TCR.

(All dimensions in mm): Where: W= Width, L=Length, FT= Full Thickness						
TESTING	SHEET*	PLATE*	ANGLE	BAR	PIPE	TUBING
Chemical**	50 x 50 x FT	50 x 50 x 10 Note (6)	50 long	50 long	50 long	50 long
Tensile	50Wx200L	Note (1)	Full Section x500L	150L Note (2)	Note (3)	300
Flattening	----	----	----	----	Full Section X 100L	Full Section X 100L
Bend	Note (4)	Note (4)	----	Note (4)	Note (4)	Note (4)
Charpy	----	Note (5)	150L	200L	75L	----
Hardness	50 x 50 x FT	50 x 50 x FT Note (6)	50 long	50 long	50 long	50 long

Note:

1. Plate up to 75mm thick requires 50mm W x 250mm L; Plate greater than 75mm thick requires 50mm W x 150mm L
2. Bar or wire under 25mm diameter requires 450mm L
3. Pipe up to 75mm wall thickness requires full ring x 375mm long; Pipe greater than 75mm wall thickness requires full ring x 150mm long
4. Requirement depends upon size and specification. We prefer 250mm length
5. 100mm W x 150mm L with longitudinal direction noted with 2.54mm thickness
6. If the thickness exceeds 20mm, then FT shall be at least 10mm

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REDEFINING ON-TIME QUALITY

Material Testing | NDT | Inspection & Consulting

(All dimensions in mm)				
Test Procedures	Length	Width	Thickness	Grain
Tensile Test Wire	1500 (upto 2mm Dia)	-	-	*
Vicker (Micro Indentation) Hardness	25	25	> 0.75	*
Rockwell Hardness	25	25	> 0.75	*
Brinell Hardness	25	25	> 6	*
Plating Hardness	25	25	> 25	*
Plating Thickness	25	25	As Actual	-
Hydrogen Embrittlement	150	25	As Actual	*
Spectrometer	50	25	> 2	*
Atomic Absorption - 1 gram of sample	**	**	**	**
LECO Carbon, Sulfur and Nitrogen - 1 gram of sample	**	**	**	**
Optical Emission Spectroscopy (OES)	50	25 **	10 **	**
Microstructure	25	25	As Actual	*
Inclusion Rating	13	13	13	*
Scanning Electron Microscopy (SEM)	Any Size	*	*	-
Corrosion Testing	Subject to raw material dimension			
Salt spray test Panels	80	205	*	*

- *Grain direction is very important when submitting sheet or plate for testing. Always mark grain direction with an arrow on the sample
- ** When performing chemical analysis only, supply the above referenced size coupon. If other testing is to be performed (i.e. tensile, flattening, etc.), a separate piece for chemical analysis is not needed

Wet Chemical Analysis

- Metals - 5 grams minimum, 10 grams preferred
- Aqueous Samples - 1/2 liter minimum, 1 liter preferred
- Solid Particulate Samples - coarse (> 6mm) 1 kilogram minimum, medium (1 to 5 mm) 500 grams minimum, fines (< 1 mm) 100 grams minimum

Weld Procedure Qualification

The welded test plate should be a minimum of 250mm wide by 300mm long the weld, 400mm along the weld if Charpy V-Notch impacts required.

- Pipe qualifications:
- *Over 80mm nominal outer diameter (O.D.) – 1 Nos welded pipe coupon
- *50mm to 80mm nominal outer diameter (O.D.) - 2 Nos welded pipe coupon
- *Less than 50mm nominal pipe – 4-5 Nos welded pipe coupon
- *Charpy V-Notch impacts may require more material depending on pipe size and quantity of impact tests

Chemical, Micro and IGC ASTM A262 Prac E

- Rod less than 10mm dia - 150mm long
- Rod more than 10mm dia - 120mm long
- Plate - 50mm X 100mm
- Pipe - 100 mm long

Hydrogen-Induced Cracking (HIC) Test, NACE TM0284

- **Plate:** 150mm x150mm (rolling direction shall be marked on it. If the plate is more than 88mm thick - 250mm x 250mm sample size is required)
- **Pipe:** upto 50mm OD - 210mm long. (If the pipe is more than 50mm OD, 120mm long sample size is required)
- **Bar:** upto 88mm dia - 300mm long. (If the Bar is more than 88mm dia to 130mm dia - 200mm long sample size is required. If the Bar is more than 130mm dia, 100mm long sample size is required)
- Number of pieces to be tested upto 88mm thick/dia - set of 3 test specimens to be tested
- Number of pieces to be tested more than 88mm thick/dia - 5 and more test specimens (there must be an uneven number) to be tested
- Time for completion - 2 weeks

Sulfide & Stress Corrosion Cracking (SSC/SCC), NACE TM0177

The SSCC tests at TCR Engineering in India are performed routinely for customers using tensile and bent beam specimens. Time for completion is minimum 35 working days. For each stress level and temperature, the following sample size is required:

- **Plate:** 25mm x 200mm long along with rolling direction marked on it – 3 test specimens (the location of the test piece as specified in relevant standards)
- **Pipe:** 160mm long pieces irrespective of dia (the location of the test piece as specified in relevant standards)
- **Bar:** 160mm long piece irrespective of dia