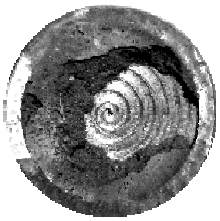


INTERNATIONAL CAVITATION EROSION TEST
Test Rig Identification Card

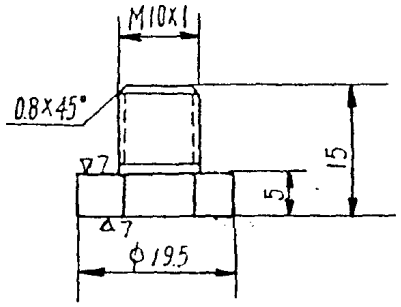
Facility: vibratory rig

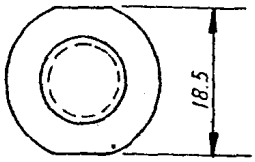
Principle of vibration generation:

magnetostriction /~~piezoelectricity~~/

Laboratory: **Hydraulic Lab, Department of Hydraulic Engineering, Tsinghua University, Beijing, China**

1. Sketch of the sample (~~counter-sample~~) with dimensions and showing mounting method





2. Basic operational data

input power: …… W

oscillation frequency: ……. 14.6 ÷ 20 kHz

oscillation amplitude(p-p): ……..…… 30 ÷ 40 µm

standard temperature: ……..…… 15÷20 ˚C

open/~~pressurised~~ vessel

sample submergence depth (open vessel): …… 3 mm

vessel diameter: …… 110 mm height: …….. 150 mm

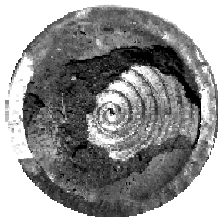
sample area subjected to damage: …….. mm^2

other data: ……..……

……..……

designer/manufacturer: **Jitang Huang**

The Vibratory Cavitation Erosion Test Apparatus



INTERNATIONAL CAVITATION EROSION TEST

Laboratory Results Summarisation

Laboratory: **TSINGHUA UNIVERSITY**
DEPARTMENT OF HYDRAULIC ENGINEERING
BEIJING, China

Facility: VIBRATORY RIG

oscillation frequency: 19.8±0.2 kHz *sample submergence*: 3 mm
amplitude: 35±5 μm *impinged area:* 294.5 mm^2

working liquid: tap water, pH 7.8, 15 ÷ 20˚C

material	*Test duration*	*Volume loss*	*Eroded area*	*Mean&Max Depth of Penetration*		*Incubation period* $\tau_{0.2}$	*Incubation period* τ_{inc}	*MDPR max*	*MDPR ultimate*
	min	mm^3	mm^2	μm	μm	min	min	μm/min	μm/min
PA2	50	3.268	294.5	11.1	46.6	1.0	1.5	0.65	0.240
M63	50	0.427	294.5	1.45	< 6.3	4	8.5	0.064	0.006
E04	150	0.372	294.5	1.26	5.35	0.2	29	0.023	0.003
45	150	0.456	294.5	1.55	< 5.6	5	3.7	0.021	-
1H18N9T	480	0.445	294.5	1.51	9.5	9.5	57	0.0046	0.0015
tarnamide	70	6.663	294.5	22.6	35.3	3	16	1.58	0.12

Comment

1 Maximum depth of erosion has been assessed from the enclosed surface profiles by adding the mean depth of erosion to the maximum negative peak value of surface roughness. Profiles were determined using a *Talysurf* 5P profile meter (Rank Taylor Hobson Co., U.K.). Measurement data were taken every 2.5 μm (5000 points) and 1.25 μm (3200 points).

2 As no detailed data on eroded area have been submitted, whole the impinged specimen surface has been assumed to be eroded.

3 Metallographic photographs have been obtained by means of a *NEOPHOT* metallograph (German Democratic Republic, magnification: × 400)

4 Hardness measurements have been conducted by means of a *HV120 Vickers* diamond hardness meter; mass P = 30 kg

Nomenclature used in surface profile measurements

R_a - mean value of absolute deviations

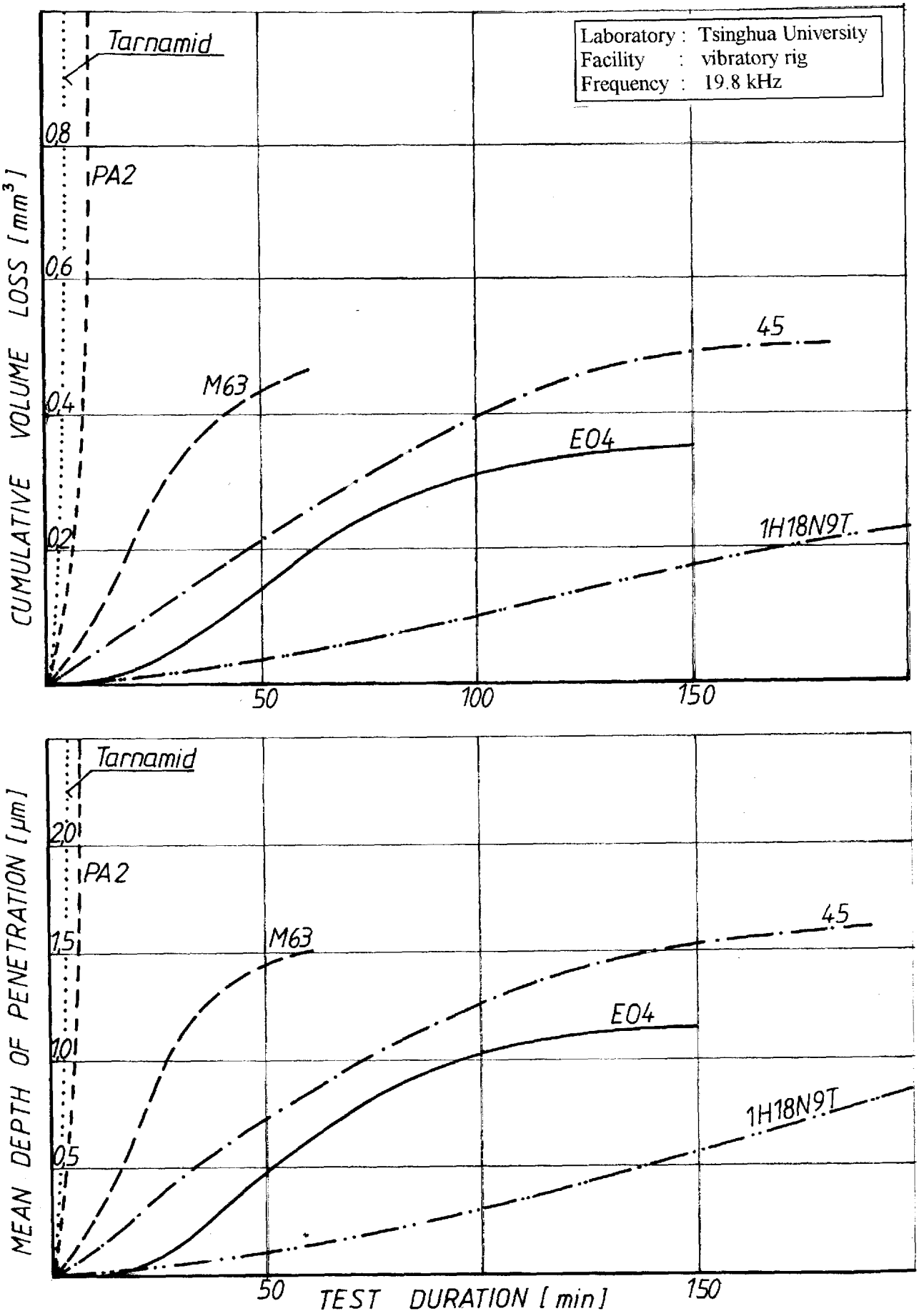
R_q - maximum positive peak value

R_t - r.m.s. value of surface roughness

R_t - maximum positive peak value of surface roughness

R_v - maximum negative peak value of surface roughness

a


Laboratory : Tsinghua University
Facility : vibratory rig
Frequency : 19.8 kHz
CUMULATIVE VOLUME LOSS [mm³]
0,8
0,6
0,4
0,2
Tarnamid
PA2
M63
45
E04
1H18N9T..
50
100
150
MEAN DEPTH OF PENETRATION [µm]
20
15
10
05
Tarnamid
PA2
M63
45
E04
1H18N9T
50
TEST DURATION [min]
150