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STRUMENTI & SERVIZI
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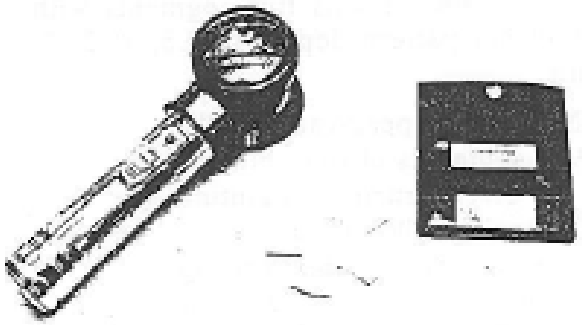
Keane-Tator

Surface Profile Comparato

PATENT PENDI



THE KEANE-TATOR SURFACE PROFIL COMPARATOR is a field instrument designe to quickly and accurately determine t anchor pattern profile depth of sand blaste surfaces.

COMPONENTS: A complete comparator un consists of a reference disc, a 5X illuminate magnifier with a magnetic disc holder, and vinyl disc case.

REFERENCE DISC DESCRIPTION

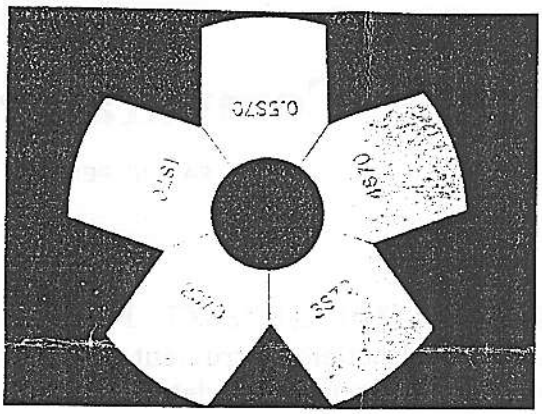
The comparator disc is composed of five sections, each with a different anchor pattern depth. Each section is marked; first giving the nominal anchor pattern depth in mils, an "S" indicating a sand abrasive, and "70" indicating the year the master disc was made.

HOW TO USE

The comparator disc can be used as either a visual or tactile reference. To use as visual reference, center the disc on the bottom of the magnifier. Place the magnifier (with disc attached) on the surface of the sand blasted steel and select the reference section most closely approaching the roughness of the sand blast. Comparing a field sand blast in the "V" notch separating two reference segments may provide a greater accuracy. Roughness may lie between two segments and be designated, for example, 1.5S70.

To use as a tactile reference, the roughness of a field sand blast as felt by one's fingertip, or a soft wooden stylus, can be compared with the roughness of a segment on the comparator disc.

Keane-Tator Surface Profile Comparator

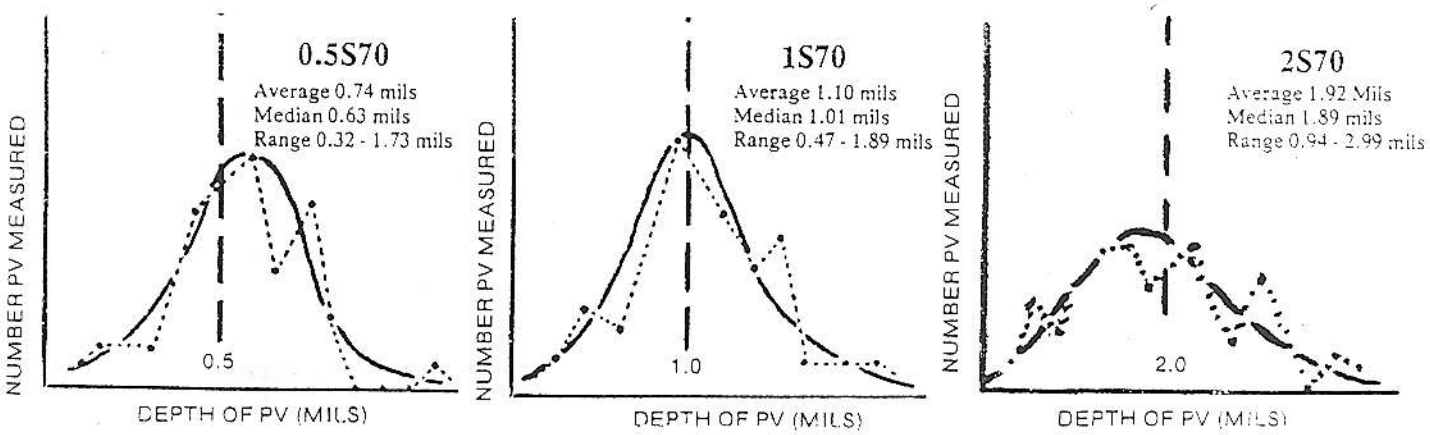


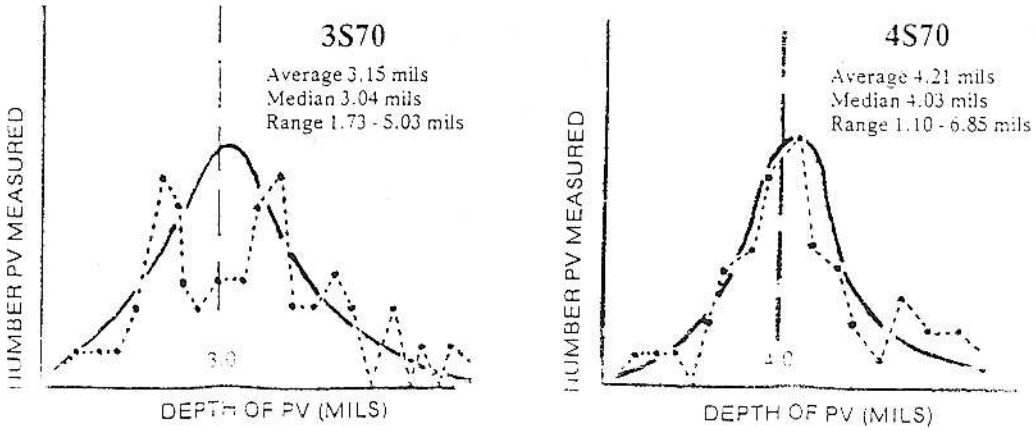
TECHNICAL INFORMATION

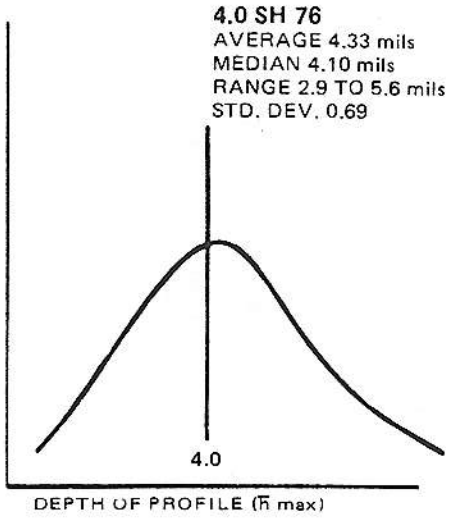
REFERENCE DISC — The Keane-Tator Surface Profile Comparator has as its basic component a reference disc exactly duplicating the master disc. The reference disc is an electroform copy of a master disc, duplicated to a maximum tolerance of plus or minus 50 micro inches (1,000 micro inches equal 1 mil). The disc is made of high purity nickel, and contains five segments with nominal anchor pattern depths of 0.5, 1, 2, 3, and 4 mils.

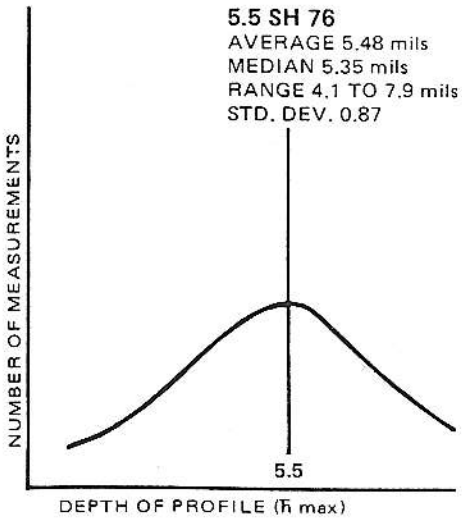
ANCHOR PATTERN MEASUREMENT — 50 peak-valley (PV) combinations were measured on 1 x 1-¼" segments of sand blasted panels. Measurements were made by the Steel Structures Painting Council at the Mellon Institute of the Carnegie-Mellon University in Pittsburgh, Pa., using a 250 power microscope with a vernier focusing attachment. The microscope was first focused on the top of a peak, and then at the bottom of an adjacent valley. Readings were converted to mils (accurate to plus or minus 0.01 mils) and segments with average and median measurements most closely corresponding to the desired nominal anchor pattern depths were selected for the master disc.

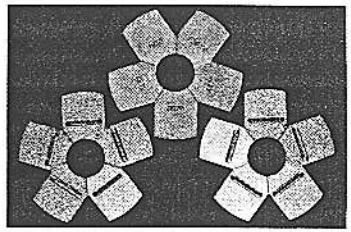
MEASUREMENT RESULTS — The following graphs provide peak-valley depth distributional information for each of the five reference segments.











OTHER COMPARATOR DISCS

GRIT/STEEL (G/S) — For profile determination of substrates blast cleaned with metallic grit.

SHOT (SH) — For profile determination of substrates blast cleaned with steel shot.

SAND (S) — For profile determinations of substrates blast cleaned with sand and other non-metallics.

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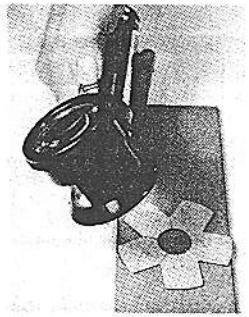
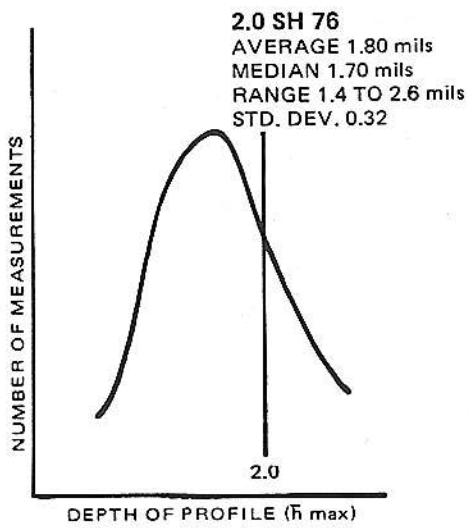
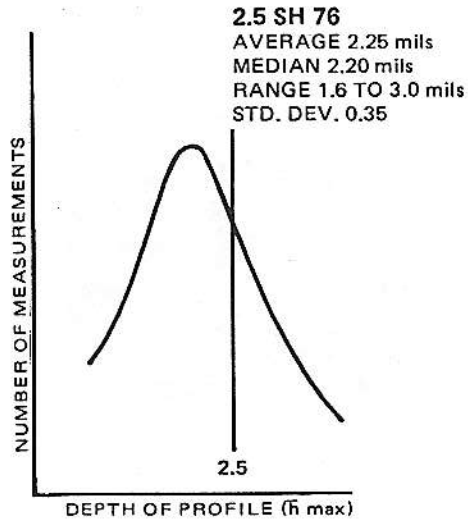
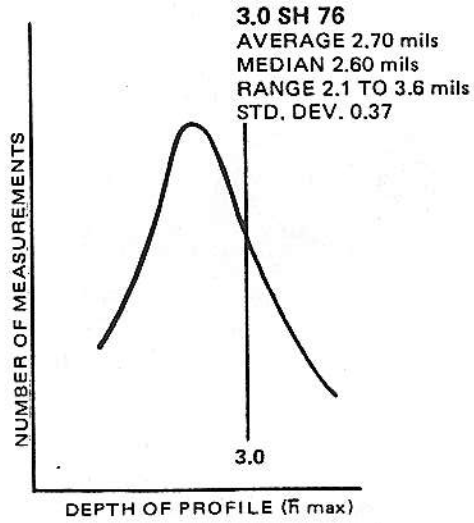
KEANE-TATOR SURFACE PROFILE COMPARATOR for SHOT blast cleaned surfaces



A complete comparator kit consists of a reference disc, a 5X (illuminated) magnifier with magnetic disc holder, and a vinyl disc case.


2.0 SH 76
AVERAGE 1.80 mils
MEDIAN 1.70 mils
RANGE 1.4 TO 2.6 mils
STD. DEV. 0.32
NUMBER OF MEASUREMENTS
2.0
DEPTH OF PROFILE (h̄ max)


2.5 SH 76
AVERAGE 2.25 mils
MEDIAN 2.20 mils
RANGE 1.6 TO 3.0 mils
STD. DEV. 0.35
NUMBER OF MEASUREMENTS
2.5
DEPTH OF PROFILE (h̄ max)


3.0 SH 76
AVERAGE 2.70 mils
MEDIAN 2.60 mils
RANGE 2.1 TO 3.6 mils
STD. DEV. 0.37
NUMBER OF MEASUREMENTS
3.0
DEPTH OF PROFILE (h̄ max)

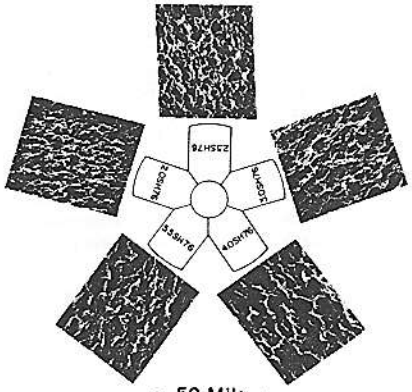
TYPICAL PROFILES PRODUCED BY SOME COMMERCIAL ABRASIVE MEDIA

ABRASIVES	MAXIMUM MESH SIZE	$\bar{h}$ max
Steel Abrasives		
Shot S-230	20	2.2 ± 0.3
Shot S-280	18	2.5 ± 0.4
Shot S-330	16	2.8 ± 0.5
Shot S-390	14	3.5 ± 0.7
Grit G-50	30	1.6 ± 0.3
Grit G-40	20	2.4 ± 0.5
Grit G-25	16	3.1 ± 0.7
Grit G-14	12	5.1 ± 0.9
Mineral Abrasives		
Flint Shot	Medium-Fine	2.7 ± 0.4
Silica Sand	Medium	2.9 ± 0.4
Boiler Slag	Medium	3.1 ± 0.5
Boiler Slag	Coarse	3.7 ± 0.7
Heavy Mineral Sand	Medium-Fine	2.6 ± 0.4

Profile will vary somewhat with angle and velocity of particle, hardness of surface, amount of recycling and degree of cleaning.

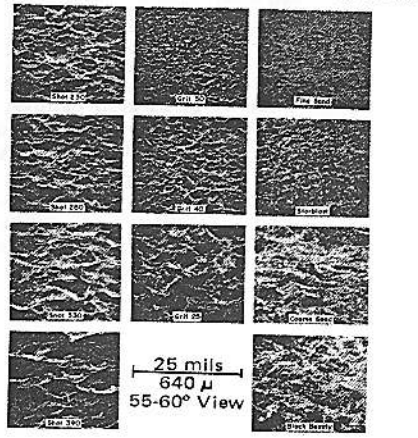
Reference: Steel Structures Painting Council

Keane-Tator Profile Comparator
Shot Blasted Disc



Scanning Electron Micrographs 45° View

SEM Micrographs Showing Qualitative Features Of Some Blast-Cleaned Surfaces (Near White Blast-Cleaned: SSPC-SP10)



REFERENCE DISC DESCRIPTION

The comparator disc is composed of five sections, each with a different anchor pattern depth. Each section is marked first giving the nominal anchor pattern depth in mils (one mil = 25.4 microns); next an "SH" indicating a shot abrasive and a "76" indicating the year the master disc was made.

HOW TO USE

Determine the profile of shot blast cleaned steel by choosing the reference disc segment that most closely approaches the roughness of the blast. Note that roughness may lie between two segments and be designated, for example 3.5 SH 76.

Visual Reference Without Magnification — Hold the disc directly against the surface and make visual comparisons.

Visual Reference With Magnification — Attach the disc to the magnetic ring on the bottom of the magnifier and hold the entire unit directly on the surface. Either center the disc and make evaluations through the hole or offset it slightly and compare the steel in the "V" notches separating segments.

The magnifier can be used with its internal light source or by shining an external light through the slot in the magnifier head. The latter method may highlight peaks and make comparisons easier.

Tactile Reference — Compare the roughness of the blast and the reference disc segments using a soft wooden stylus or fingertip.

TECHNICAL INFORMATION

A. **Reference Disc** — The Keane-Tator shot comparator has as its basic component a high purity nickel reference disc comprised of five segments with nominal anchor patterns of 2.0, 2.5, 3.0, 4.0 and 5.5 mils. (One mil = 25.4 microns.) The reference disc is an electroformed copy of a master disc, duplicated to a maximum tolerance of ±.05 mils. The master disc segments were selected from carbon steel plates blast cleaned with a variety of steel shot operating mixes (S230 to S550) at different distances and angles from the source. Segments of the master disc and the electroform copy were measured in the Steel Structures Painting Council Laboratory at the Mellon Institute of Carnegie Mellon University, Pittsburgh, Pennsylvania.

B. **Anchor Pattern Measurement** — The profile was obtained by focusing a calibrated optical microscope first on the highest peak and then the lowest valley in the field of view, noting the movement distance. Measurements were made at 250X (18 mil field diameter) and 100X (45 mil field diameter).

Measurements at higher magnifications are preferred when "fine" profiles are being measured because of greater precision due to lesser depth of field. Measurement of "coarse" profiles is done at lower magnification to include more peaks. Because of the larger field of view at 100X, the statistical probability of a larger peak being measured at 100X versus 250X is slightly greater than six times.

Information regarding the "average maximum profile" ($\bar{h}$ max) of each segment of the reference disc is provided in the accompanying graphs.

Reference: J. D. Keane, J. A. Bruno, Raymond E. F. Weaver; SURFACE PROFILE FOR ANTI-CORROSION PAINTS; October 25, 1976 by Steel Structures Painting Council