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MEYCO[®]

PENETRATION NEEDLE



MEYCO Penetration Needle

Early Strength

In tunnel construction the early strength of shotcrete is of prime importance.

- At low temperatures, it must be possible to apply an overhead layer of concrete up to 15 cm thick (possibly with an added bonding agent).
- On wet ground it must be strong enough to hold back the water.
- After 2 or 3 hours, the concrete must not be damaged by drilling roof holes or anchor holes or by the vibration of the steel wire reinforcement during drilling.
- After about 5 to 6 hours it must stand up to blasting.
- It must rapidly develop resistance to further neighbouring work.

The attached graph shows a suitable rate of strength development for shotcrete used in tunnel construction.

It must be possible to observe early strength easily development at any time whenever the quality of shotcrete needs to be checked, without disturbing the work flow at the face.

Apart from the well known MEYCO Kaindl device (which tests early strength between 6 hours and 2 days) MEYCO Equipment also has the Penetration Needle in it's range of equipment for testing early strength in the first 15 to 120 minutes.

MEYCO Penetration Needle

Principle:

This method measures the force required to push a needle of certain defined dimensions a given distance into the shotcrete. This device, which indicates resistance by compressing a spring, is equipped with a sliding indicator. The point is specially made to be quickly mounted with a screw fixing.

Measuring:

- Press the instrument against the surface and push it, with a single thrust, up to 15 mm into the shotcrete.
- Read off the resisting force on the graduated scale and record the figure.
- Repeat every measurement 10 times, taking care not to press directly against a large particle of aggregate.
- Record the time (suitable worksheet attached).

Caution:

Irregular dosage or poor mixing of aggregates might lead to uneven strength development in certain areas of the wall. In such cases, 10 tests are needed per measurement in each area.

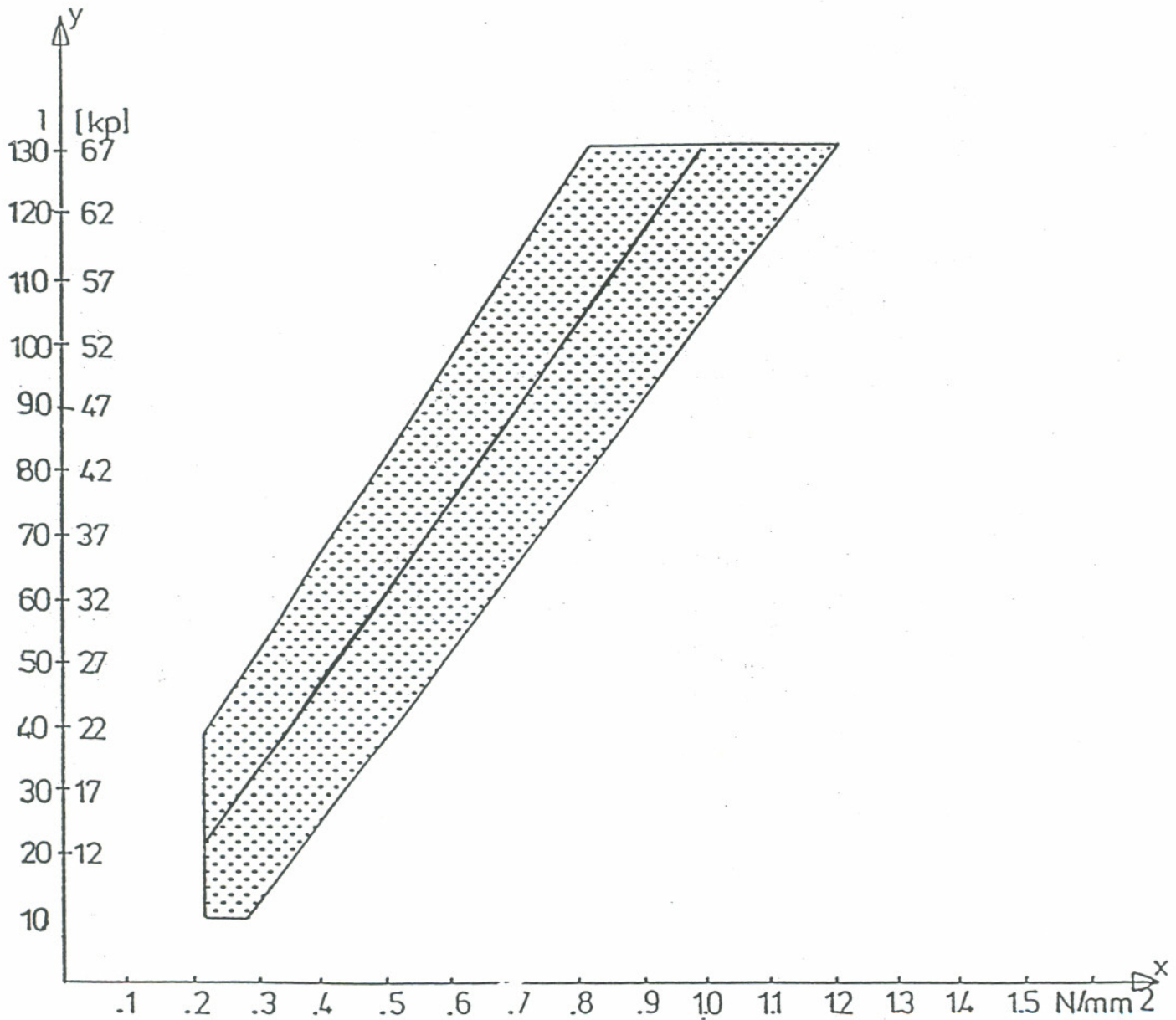
With these measurements, the strength in each instance can be determined by means of the calibration curve. The calibration curves for the two most frequent aggregate grading curves are attached.

Range:

The MEYCO Penetration Needle functions between 0.2 and 1 N/mm², which, with properly accelerated shotcrete corresponds to a time ranging from a few minutes to approximately 2 hours.

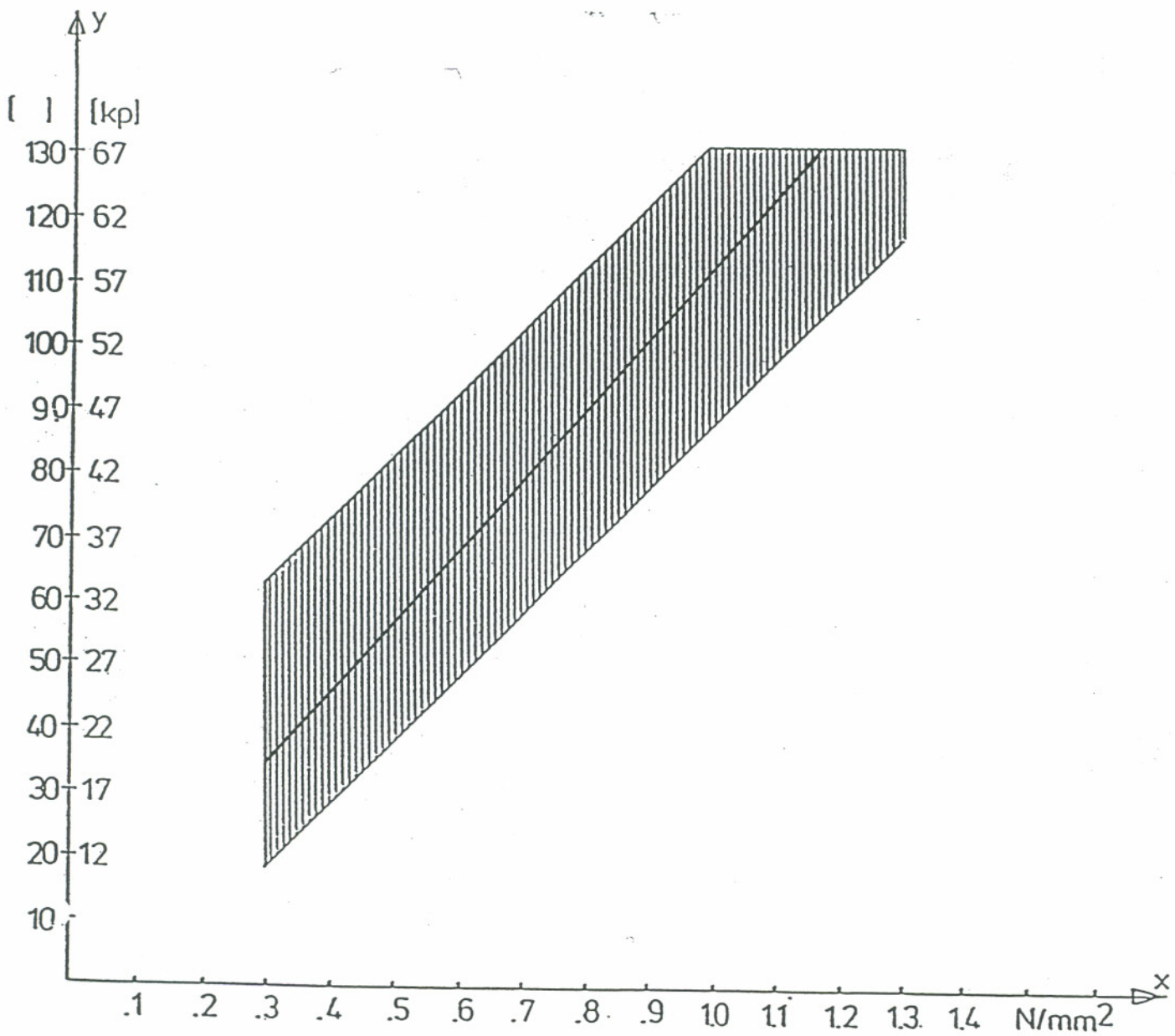
**PENETRATIONSNADEL
EICHKURVE 0 - 8**

**Penetration Needle
Calibration Curve 0 - 8**

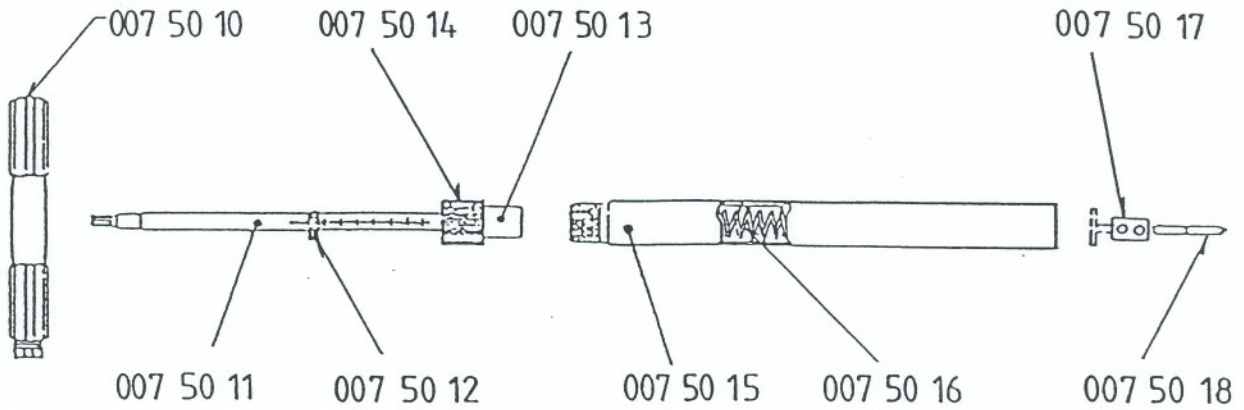


**PENETRATIONSNADEL
EICKURVE 0 - 16**

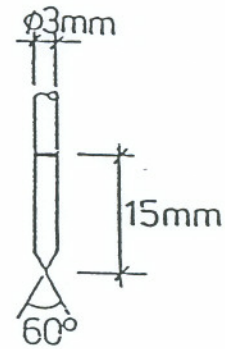
**Penetration Needle
Calibration Curve 0 - 16**



Das Urheberrecht an dieser Zeichnung, die dem Empfänger irrtümlich anvertraut wird, verbleibt unserer Firma. Ohne unsere schriftliche Genehmigung darf die Zeichnung weder kopiert noch vervielfältigt, noch Dritten Personen mitgeteilt oder zugänglich gemacht werden.



DETAIL
007 50 18



0075001 Penetration Needle complete (terra-test device)
Spare Parts for the penetration needle (0075001)

- 0075010 Handle (with spare needle and allen key)
- 0075011 Press bar with graduated scale
- 0075012 Slide
- 0075013 Spring plunger (incl. hexagon socket screw)
- 0075014 Coupling nut
- 0075015 Spring tube
- 0075016 Calibrated spring
- 0075017 Needle holder
- 0075018 Penetration needle (spare needle and allen key in handle)

Stückzahl	Artikel-Nr.	Pos.	Benennung	Werkstoff	Bemerkung
			Bearbeitet BOSCH	NOV. 88	%
			Gepüft		
			Normgeprüft		
			Freigegeben		
			Auftrags-Nr.		☐ ⊕
			Ursprung	Anzahl Bl. 1	
			Ersatz für		
Meynadier AG			Benennung Early strenght measuring device Penetration needle		Zeichnungs-Nr. 007 50 01

2. Ein Beispiel

Gemessene Werte

Versuch/Trial ARGE Hirschengraben Tunnel

Zement/Cement: Reckinger Sia 215 Spritzmittel/Type of Accelerator: Barra Gunit F96

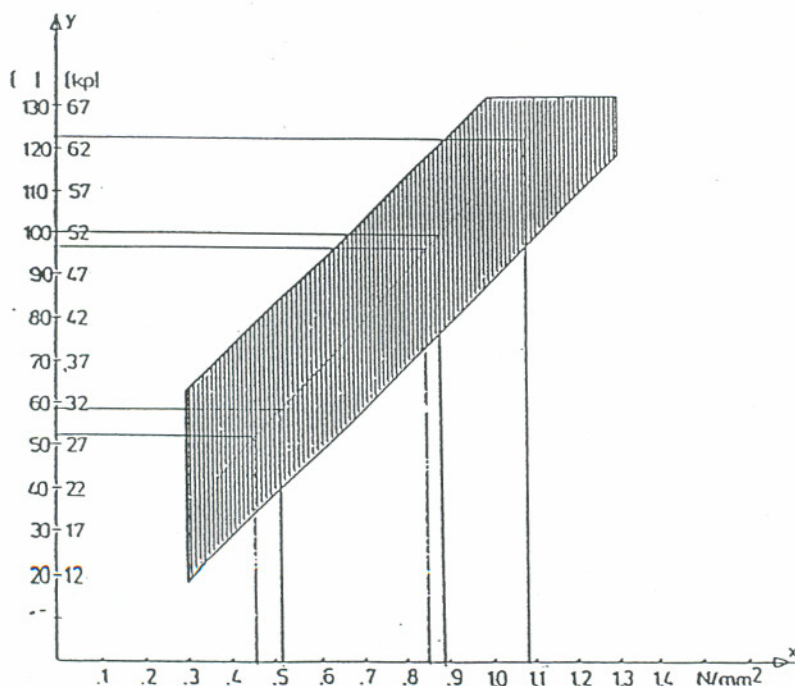
Sieblinie/Grading-curve: 0/16 Temperatur/Temperature: 18 ° C.

Zeit Time	Dauer Period	Eindringkraft (x.kp) Penetrations-Force (x.kp)	Mittel Average	Druckfestigkeit (N/mm ²) Compressive-Strenght
16.45	15'	27,27,37,32,22, 22,27,27,27,32,	28,0	0.48
17.00	30'	32,27,32,32,37, 32,32,32,27,32	31,5	0.54
17.15	45'	57,57,52,42,42, 47,52,52,52,47,	50,0	0.86
17.30	60'	57,57,57,52,52, 57,52,62,52,52,	55,0	0.94
17.45	75'	52,57,62,62,67, 67,67,62,67,67,	63,0	1.08

Bestimmung der Festigkeiten aus Eichkurven

PENETRATIONSNADEL

EICKURVE 0-16



Penetrationsnadel/needle

Versuch/Trial

Zement/Cement:
Sieblinie/Grading-curve:

Spritzmittel/Type of Accelerator:
Temperatur/Temperature:

Zeit Time	Dauer Period	Eindringkraft (x.kp) Penetrations-Force (x.kp)	Mittel Average	Druckfestigkeit (N/mm ²) Compressive-Strength "