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ROCKS AND AGGREGATES



Sample preparation

Trays

Sampling trays made of galvanised sheet metal or stainless steel

Dimensions

Galvanised sheet metal	Stainless steel	Dimensions
A0001	A0010	20 x 20 x 5 cm
A0002	A0011	40 x 20 x 5 cm
A0003	A0012	40 x 40 x 5 cm
A0004	A0013	60 x 40 x 5 cm
A0005	A0014	60 x 60 x 5 cm
A0006	A0015	100 x 100 x 5 cm



Standards EN 933/1, 933/2 – UNE 7050/3, 7050/4 – ISO 3310/1, 3310/2, 9044 - BS 410 DIN 4187 – NF X11-504 – AASHTO T27 - ASTM E11

Sieves with steel mesh



Mesh size		Frame diameter (mm) / References							
ISO 3310/1	ASTM E-11	Ø 200	Ø 8	Ø 250	Ø 300	Ø 12"	Ø 315	Ø 400	Ø 450
0.032 mm		A1100	A1200	A1300	A1400	A1500	A1600	A1700	A1800
0.038 mm	No. 400	A1101	A1201	A1301	A1401	A1501	A1601	A1701	A1801
0.040 mm		A1102	A1202	A1302	A1402	A1502	A1602	A1702	A1802
0.045 mm	No. 325	A1103	A1203	A1303	A1403	A1503	A1603	A1703	A1803
0.050 mm		A1104	A1204	A1304	A1404	A1504	A1604	A1704	A1804
0.053 mm	No. 270	A1105	A1205	A1305	A1405	A1505	A1605	A1705	A1805
0.056 mm		A1106	A1206	A1306	A1406	A1506	A1606	A1706	A1806
0.063 mm	No. 230	A1107	A1207	A1307	A1407	A1507	A1607	A1707	A1807
0.071 mm		A1108	A1208	A1308	A1408	A1508	A1608	A1708	A1808
0.075 mm	No. 200	A1109	A1209	A1309	A1409	A1509	A1609	A1709	A1809
0.080 mm		A1110	A1210	A1310	A1410	A1510	A1610	A1710	A1810
0.090 mm	No. 170	A1111	A1211	A1311	A1411	A1511	A1611	A1711	A1811
0.100 mm		A1112	A1212	A1312	A1412	A1512	A1612	A1712	A1812
0.106 mm	No. 140	A1113	A1213	A1313	A1413	A1513	A1613	A1713	A1813
0.112 mm		A1114	A1214	A1314	A1414	A1514	A1614	A1714	A1814
0.125 mm	No. 120	A1115	A1215	A1315	A1415	A1515	A1615	A1715	A1815
0.140 mm		A1116	A1216	A1316	A1416	A1516	A1616	A1716	A1816
0.150 mm	No. 100	A1117	A1217	A1317	A1417	A1517	A1617	A1717	A1817
0.160 mm		A1118	A1218	A1318	A1418	A1518	A1618	A1718	A1818

Mesh size		Frame diameter (mm) / References							
ISO 3310/1	ASTM E-11	Ø 200	Ø 8	Ø 250	Ø 300	Ø 12"	Ø 315	Ø 400	Ø 450
0.180 mm	No. 80	A1119	A1219	A1319	A1419	A1519	A1619	A1719	A1819
0.200 mm		A1120	A1220	A1320	A1420	A1520	A1620	A1720	A1820
0.212 mm	No. 70	A1121	A1221	A1321	A1421	A1521	A1621	A1721	A1821
0.224 mm		A1122	A1222	A1322	A1422	A1522	A1622	A1722	A1822
0.250 mm	No. 60	A1123	A1223	A1323	A1423	A1523	A1623	A1723	A1823
0.280 mm		A1124	A1224	A1324	A1424	A1524	A1624	A1724	A1824
0.300 mm	No. 50	A1125	A1225	A1325	A1425	A1525	A1625	A1725	A1825
0.315 mm		A1126	A1226	A1326	A1426	A1526	A1626	A1726	A1826
0.355 mm	No. 45	A1127	A1227	A1327	A1427	A1527	A1627	A1727	A1827
0.400 mm		A1128	A1228	A1328	A1428	A1528	A1628	A1728	A1828
0.425 mm	No. 40	A1129	A1229	A1329	A1429	A1529	A1629	A1729	A1829
0.450 mm		A1130	A1230	A1330	A1430	A1530	A1630	A1730	A1830
0.500 mm	No. 35	A1131	A1231	A1331	A1431	A1531	A1631	A1731	A1831
0.560 mm		A1132	A1232	A1332	A1432	A1532	A1632	A1732	A1832
0.600 mm	No. 30	A1133	A1233	A1333	A1433	A1533	A1633	A1733	A1833
0.630 mm		A1134	A1234	A1334	A1434	A1534	A1634	A1734	A1834
0.710 mm	No. 25	A1135	A1235	A1335	A1435	A1535	A1635	A1735	A1835
0.800 mm		A1136	A1236	A1336	A1436	A1536	A1636	A1736	A1836
0.850 mm	No. 20	A1137	A1237	A1337	A1437	A1537	A1637	A1737	A1837
0.900 mm		A1138	A1238	A1338	A1438	A1538	A1638	A1738	A1838
1.00 mm	No. 18	A1139	A1239	A1339	A1439	A1539	A1639	A1739	A1839
1.12 mm		A1140	A1240	A1340	A1440	A1540	A1640	A1740	A1840
1.18 mm	No. 16	A1141	A1241	A1341	A1441	A1541	A1641	A1741	A1841
1.25 mm		A1142	A1242	A1342	A1442	A1542	A1642	A1742	A1842
1.40 mm	No. 14	A1143	A1243	A1343	A1443	A1543	A1643	A1743	A1843
1.60 mm		A1144	A1244	A1344	A1444	A1544	A1644	A1744	A1844
1.70 mm	No. 12	A1145	A1245	A1345	A1445	A1545	A1645	A1745	A1845
1.80 mm		A1146	A1246	A1346	A1446	A1546	A1646	A1746	A1846
2.00 mm	No. 10	A1147	A1247	A1347	A1447	A1547	A1647	A1747	A1847
2.24 mm		A1148	A1248	A1348	A1448	A1548	A1648	A1748	A1848
2.36 mm	No. 8	A1149	A1249	A1349	A1449	A1549	A1649	A1749	A1849
2.50 mm		A1150	A1250	A1350	A1450	A1550	A1650	A1750	A1850
2.80 mm	No. 7	A1151	A1251	A1351	A1451	A1551	A1651	A1751	A1851
3.15 mm		A1152	A1252	A1352	A1452	A1552	A1652	A1752	A1852
3.35 mm	No. 6	A1153	A1253	A1353	A1453	A1553	A1653	A1753	A1853
3.55 mm		A1154	A1254	A1354	A1454	A1554	A1654	A1754	A1854
4.00 mm	No. 5	A1155	A1255	A1355	A1455	A1555	A1655	A1755	A1855
4.50 mm		A1156	A1256	A1356	A1456	A1556	A1656	A1756	A1856
4.75 mm	No. 4	A1157	A1257	A1357	A1457	A1557	A1657	A1757	A1857
5.00 mm		A1158	A1258	A1358	A1458	A1558	A1658	A1758	A1858
5.60 mm	No. 3½"	A1159	A1259	A1359	A1459	A1559	A1659	A1759	A1859
6.30 mm	1/4"	A1160	A1260	A1360	A1460	A1560	A1660	A1760	A1860
6.70 mm	0.265"	A1161	A1261	A1361	A1461	A1561	A1661	A1761	A1861
7.10 mm		A1162	A1262	A1362	A1462	A1562	A1662	A1762	A1862
8.00 mm	5/16"	A1163	A1263	A1363	A1463	A1563	A1663	A1763	A1863

Mesh size		Frame diameter (mm) / References							
ISO 3310/1	ASTM E-11	Ø 200	Ø 8	Ø 250	Ø 300	Ø12"	Ø 315	Ø 400	Ø 450
9.00 mm		A1164	A1264	A1364	A1464	A1564	A1664	A1764	A1864
9.50 mm	3/8"	A1165	A1265	A1365	A1465	A1565	A1665	A1765	A1865
10.00 mm		A1166	A1266	A1366	A1466	A1566	A1666	A1766	A1866
11.20 mm	7/16"	A1167	A1267	A1367	A1467	A1567	A1667	A1767	A1867
12.50 mm	1/2"	A1168	A1268	A1368	A1468	A1568	A1668	A1768	A1868
13.20 mm	0.530"	A1169	A1269	A1369	A1469	A1569	A1669	A1769	A1869
14.00 mm		A1170	A1270	A1370	A1470	A1570	A1670	A1770	A1870
16.00 mm	5/8"	A1171	A1271	A1371	A1471	A1571	A1671	A1771	A1871
18.00 mm		A1172	A1272	A1372	A1472	A1572	A1672	A1772	A1872
19.00 mm	3/4"	A1173	A1273	A1373	A1473	A1573	A1673	A1773	A1873
20.00 mm		A1174	A1274	A1374	A1474	A1574	A1674	A1774	A1874
22.40 mm	7/8"	A1175	A1275	A1375	A1475	A1575	A1675	A1775	A1875
25.00 mm	1"	A1176	A1276	A1376	A1476	A1576	A1676	A1776	A1876
25.40 mm		A1177	A1277	A1377	A1477	A1577	A1677	A1777	A1877
26.50 mm	1.06"	A1178	A1278	A1378	A1478	A1578	A1678	A1778	A1878
28.00 mm		A1179	A1279	A1379	A1479	A1579	A1679	A1779	A1879
31.50 mm	1¼"	A1180	A1280	A1380	A1480	A1580	A1680	A1780	A1880
35.50 mm		A1181	A1281	A1381	A1481	A1581	A1681	A1781	A1881
37.50 mm	1½"	A1182	A1282	A1382	A1482	A1582	A1682	A1782	A1882
40.00 mm		A1183	A1283	A1383	A1483	A1583	A1683	A1783	A1883
45.00 mm	1¾"	A1184	A1284	A1384	A1484	A1584	A1684	A1784	A1884
50.00 mm	2"	A1185	A1285	A1385	A1485	A1585	A1685	A1785	A1885
53.00 mm	2.12"	A1186	A1286	A1386	A1486	A1586	A1686	A1786	A1886
56.00 mm		A1187	A1287	A3187	A1487	A1587	A1687	A1787	A1887
63.00 mm	2½"	A1188	A1288	A1388	A1488	A1588	A1688	A1788	A1888
71.00 mm		A1189	A1289	A1389	A1489	A1589	A1689	A1789	A1889
75.00 mm	3"	A1190	A1290	A1390	A1490	A1590	A1690	A1790	A1890
80.00 mm		A1191	A1291	A1391	A1491	A1591	A1691	A1791	A1891
90.00 mm	3½"	A1192	A1292	A1392	A1492	A1592	A1692	A1792	A1892
100.0 mm	4"	A1193	A1293	A1393	A1493	A1593	A1693	A1793	A1893
106.0 mm		A1194	A1294	A1394	A1494	A1594	A1694	A1794	A1894
112.0 mm		A1195	A1295	A1395	A1495	A1595	A1695	A1795	A1895
125.0 mm	5"	A1196	A1296	A1396	A1496	A1596	A1696	A1796	A1896
Bottom		A1198	A1298	A1398	A1498	A1598	A1698	A1798	A1898
Cover		A1199	A1299	A1399	A1499	A1599	A1699	A1799	A1899



Sieves made of perforated sheet metal

Mesh size		Frame diameter (mm) / References							
ISO 3310/1	ASTM E-11	Ø 200	Ø 8	Ø 250	Ø 300	Ø 12"	Ø 315	Ø 400	Ø 450
4.00 mm	No. 5	A2000	A2100	A2200	A2300	A2400	A2500	A2600	A2700
4.50 mm		A2001	A2101	A2201	A2301	A2401	A2501	A2601	A2701
4.75 mm	No. 4	A2002	A2102	A2202	A2302	A2402	A2502	A2602	A2702
5.00 mm		A2003	A2103	A2203	A2303	A2403	A2503	A2603	A2703
5.60 mm	No. 3½	A2004	A2104	A2204	A2304	A2404	A2504	A2604	A2704
6.30 mm	1/4"	A2005	A2105	A2205	A2305	A2405	A2505	A2605	A2705
6.70 mm	0.265"	A2006	A2106	A2206	A2306	A2406	A2506	A2606	A2706
7.10 mm		A2007	A2107	A2207	A2307	A2407	A2507	A2607	A2707
8.00 mm	5/16"	A2008	A2108	A2208	A2308	A2408	A2508	A2608	A2708
9.00 mm		A2009	A2109	A2209	A2309	A2409	A2509	A2609	A2709
9.50 mm	3/8"	A2010	A2110	A2210	A2310	A2410	A2510	A2610	A2710
10.00 mm		A2011	A2111	A2211	A2311	A2411	A2511	A2611	A2711
11.20 mm	7/16"	A2012	A2112	A2212	A2312	A2412	A2512	A2612	A2712
12.50 mm	1/2"	A2013	A2113	A2213	A2313	A2413	A2513	A2613	A2713
13.20 mm	0.530"	A2014	A2114	A2214	A2314	A2414	A2514	A2614	A2714
14.00 mm		A2015	A2115	A2215	A2315	A2415	A2515	A2615	A2715
16.00 mm	5/8"	A2016	A2116	A2216	A2316	A2416	A2516	A2616	A2716
18.00 mm		A2017	A2117	A2217	A2317	A2417	A2517	A2617	A2717
19.00 mm	3/4"	A2018	A2118	A2218	A2318	A2418	A2518	A2618	A2718
20.00 mm		A2019	A2119	A2219	A2319	A2419	A2519	A2619	A2719
22.40 mm	7/8"	A2020	A2120	A2220	A2320	A2420	A2520	A2620	A2720
25.00 mm	1"	A2021	A2121	A2221	A2321	A2421	A2521	A2621	A2721
26.50 mm	1.06"	A2022	A2122	A2222	A2322	A2422	A2522	A2622	A2722
28.00 mm		A2023	A2123	A2223	A2323	A2423	A2523	A2623	A2723
31.50 mm	1¼"	A2024	A2124	A2224	A2324	A2424	A2524	A2624	A2724
35.50 mm		A2025	A2125	A2225	A2325	A2425	A2525	A2625	A2725
37.50 mm	1½"	A2026	A2126	A2226	A2326	A2426	A2526	A2626	A2726
40.00 mm		A2027	A2127	A2227	A2327	A2427	A2527	A2627	A2727
45.00 mm	1¾"	A2028	A2128	A2228	A2328	A2428	A2528	A2628	A2728
50.00 mm	2"	A2029	A2129	A2229	A2329	A2429	A2529	A2629	A2729
53.00 mm	2.12"	A2030	A2130	A2230	A2330	A2430	A2530	A2630	A2730
56.00 mm		A2031	A2131	A2231	A2331	A2431	A2531	A2631	A2731
63.00 mm	2½"	A2032	A2132	A2232	A2332	A2432	A2532	A2632	A2732
71.00 mm		A2033	A2133	A2233	A2333	A2433	A2533	A2633	A2733
75.00 mm	3"	A2034	A2134	A2234	A2334	A2434	A2534	A2634	A2734
80.00 mm		A2035	A2135	A2235	A2335	A2435	A2535	A2635	A2735
90.00 mm	3½"	A2036	A2136	A2236	A2336	A2436	A2536	A2636	A2736
100.0 mm	4"	A2037	A2137	A2237	A2337	A2437	A2537	A2637	A2737
106.0 mm	4.24"	A2038	A2138	A2238	A2338	A2438	A2538	A2638	A2738
112.0 mm		A2039	A2139	A2239	A2339	A2439	A2539	A2639	A2739
125.0 mm	5"	A2040	A2140	A2240	A2340	A2440	A2540	A2640	A2740
125.0 mm	5"	A2040	A2140	A2240	A2340	A2440	A2540	A2640	A2740

Wet sieving

Sieve for wet sieving fine materials

A0460

Made entirely of stainless steel with a ring measuring Ø 200 x 100 mm high and mesh size ASTM No. 200 (0.074 mm).

A0461

Made entirely of stainless steel with a ring measuring Ø 200 x 200 mm high and mesh size ASTM No. 200 (0.074 mm).



Cover and bottom

Made entirely of stainless steel for wet sieving. Consisting of a cover with water intake and a bottom with drainage outlet.

A0462

Cover and bottom Ø 200 mm.

A0463

Cover and bottom Ø 8".

A0464

Cover and bottom Ø 250 mm.

A0465

Cover and bottom Ø 300 mm.

A0466

Cover and bottom Ø 12".

A0467

Cover and bottom Ø 315 mm.

A0468

Cover and bottom Ø 400 mm.

A0469

Cover and bottom Ø 450 mm.

A0500 Ultrasound bath for sieve cleaning

Designed for maintenance and cleaning of sieves, glass and other laboratory instruments. Made of AISI 304 stainless steel and equipped with a heater, 0° - 90°C adjustable, timer, drain and two operating powers.

Capacity: 9 litres.

Power supply: 220 V. / 50 Hz.

Internal dimensions: 300 x 240 x 150 mm.

External dimensions: 300 x 270 x 370 mm.



Sieve brushes

A0501 Soft hair brush.

A0501/1 Soft hair brush Ø 3 mm (BS 812)

A0502 Tin bristle brush.

A0502/1 Tin and nylon bristle brush.

A0503 Round brush with bristles Ø 30 mm.

A0503/1 Flat brush with soft hair bristle.

A0503/2 Flat brush with nylon.



Standards UNE 933, -1

The equipment described below has been designed and manufactured to facilitate laborious sieving work, thus providing better and more homogeneous results.

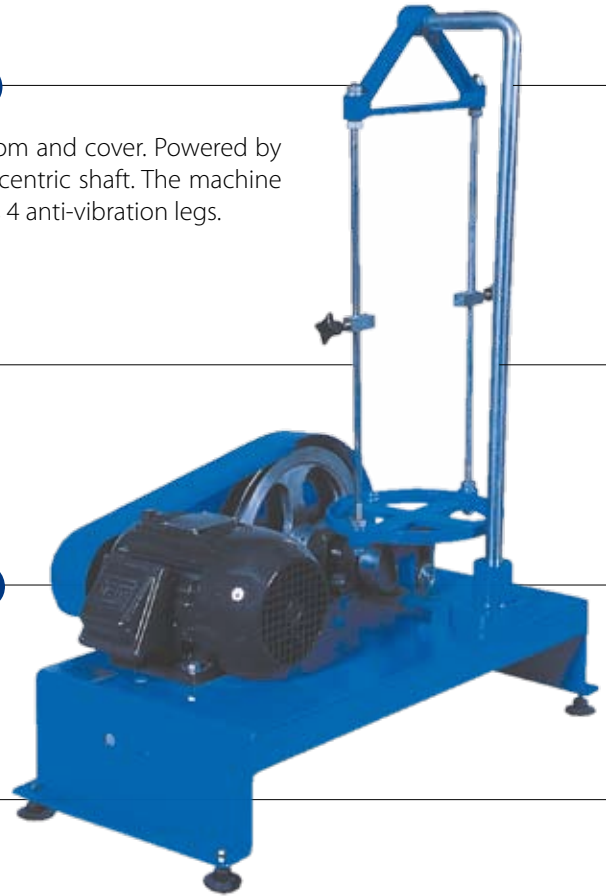
A0505 Rocking sieve shaker

Holds up to 6 sieves measuring \varnothing 200 or 8" x 2" high, plus bottom and cover. Powered by an electric motor that transmits movement via a belt to the eccentric shaft. The machine includes a connection box and main on/off switch. The base has 4 anti-vibration legs.

Power supply: 220 V. 50/60 Hz.

Dimensions: 700 x 360 x 850 mm.

Weight: 25 kg.



A0506 Rocking sieve shaker

Similar to the model above, this model holds up to 6 sieves measuring \varnothing 8" or 12" or \varnothing 200 or 300 mm plus bottom and cover.

Power supply: 220 V. 50/60 Hz.

Dimensions: 1070 x 760 x 460 mm.

Weight: 58 kg.

A0509 Laboratory vibrosieve shaker

This model has been designed specifically for tests "in situ" tests or in civil engineering laboratories. Powered by an electric motor, it can sieve up to 10 sieves measuring \varnothing 8" or 200 mm plus bottom and cover. Equipped with a 0 - 60 min programmable timer, a power meter to adjust the vibration speed and a main on/off switch.

Power supply: 220 V. 50/60 Hz.

Dimensions: 990 x 600 x 550 mm.

Weight: 35 kg.

A0511 Laboratory vibrosieve shaker

This model has been designed specifically for tests "in situ" tests or in civil engineering laboratories. Powered by an electric motor, it can sieve up to 8 sieves measuring \varnothing 8" or 200 mm, 250 mm, 12" or 300 mm and 315 mm plus bottom and cover. It can also be used for wet sieve tests.

Power supply: 220-240 V. 50/60 Hz. Single phase. 110 W

Dimensions: 950 x 400 x 350 mm.

Weight: 24 kg.



Standards UNE 933, -1

A0508 Electromagnetic sieve shaker

Powered by electromagnetic pulses. This model is specially recommended for sieve tests requiring greater levels of accuracy. This simple yet robust sieve shaker can also be used in wet sieve tests. The electronic control panel, provided separately, allows you to programme sieving times (1-999 minutes), vibration intensity and pauses between vibrations (especially indicated for sieving fine materials). The sieve shaker has capacity for up to 10 sieves measuring \varnothing 200-250-300-315 mm, 8" - 12", plus bottom and cover.

Power supply: 220 V. 50/60 Hz.

Dimensions: 380 x 440 x 1080 mm.

Weight: 65 kg.

Power: 750 W.


A0510 Electromagnetic sieve shaker

Similar to the previous models but with capacity for sieves measuring \varnothing 200 and 8" plus bottom and cover.

Power supply: 220 V. 50/60 Hz.

Dimensions: 320 x 385 x 850 mm.

Weight: 42 kg.


A0507 Electromagnetic sieve shaker

Similar to the model above, this model has capacity for sieves measuring \varnothing 200 -250-300-315-400-450 mm, 8" - 12" - 18", plus bottom and cover.

Power supply: 220 V. 50/60 Hz.

Dimensions: 480 x 500 x 1150 mm.

Weight: 85 kg.



Sieving machines

Standards UNE 933-10

A0504 Air jet sieving machine

This sieving machine is used for dry sieving products in the form of dust or granules. It is used to obtain granulometric curves of between 5 and 4000 microns. The operating principle is based on the use of an air jet that drags the fine particles through a sieve. This is achieved by a vacuum cleaner that generates a controlled low pressure through the vacuum cleaner connection outlet. Other accessories can be placed on the device, such as a cyclone to recover the material dragged by the air flow.

Size range 5 to 10 to 4000 microns.

Vacuum adjuster.

ON-OFF switch.

Integrated electronic control with the following functions:

Digital vacuum indicator from 0 – 99 mbar.

Vacuum meter calibration function.

0 - 99 minute programming.

Stop, start and pause modes.

Polished AISI 304 stainless steel interior.

Motor, 20 r.p.m. 14.7 W (220 V, 50/60 Hz).

IP 52.

Complies with EC directives (89/392/EEC), (91/368 CEE) (98/37 CEE), (98/44 CEE).

Weight 20 kg.

Vacuum cleaner available - 1200 W and 2400 W (220 V, 50/60 Hz).

Vacuum up to 65 mba.

This sieving machine is used in nearly all industrial sectors that process powdered products. The reliability and repeatability of results makes this equipment essential in powdered product quality control processes. The simplicity and extraordinary performance of this sieving machine make it essential for any quality control laboratory.

The unit consists of:

Sieving machine.

Connection cable.

Plexiglass cover.

Small plastic hammer.

Vacuum cleaner and connection tube.

Instructions manual.

Accessories

A0504/1 Vacuum cleaner.

A0504/2 Sieve with 0.0020 mm mesh size.

A0504/3 Sieve with 0.032 mm mesh size.

A0504/4 Sieve with 0.036 mm mesh size.

A0504/5 Sieve with 0.038 mm mesh size.

A0504/6 Sieve with 0.040 mm mesh size.

A0504/7 Sieve with 0.063 mm mesh size.



A0512 Soundproof cabin

For sieve shakers A0507 – A0508 – A0509 and A0511. Internally coated with insulating material to reduce noise levels in compliance with EC directives.



Standards ASTM E11



A0515 Large-capacity sieve shaker

Designed for test sample classification of flat rocks, sand, gravel, coal, slag, minerals and similar materials. Capacity for up to six sieves and a receiver bottom. Each sieve can hold almost 30 kg of material. The device is supplied without the sieves, which must be order separately, specifying mesh size. (See table with mesh sizes and please consult for other sizes).

Power supply: 220 V. 50/60 Hz.

Dimensions: 570 x 760 x 1200 mm

Weight: 170 kg

Reference	Opening	Reference	Opening	Reference	Opening
A0515/1	4"	A0515/10	3/8"	A0515/19	No. 30
A0515/2	3 1/2"	A0515/11	7/16"	A0515/20	No. 40
A0515/3	3"	A0515/12	5/16"	A0515/21	No. 50
A0515/4	2 1/2"	A0515/13	1/4"	A0515/22	No. 60
A0515/5	2"	A0515/14	No. 4	A0515/23	No. 80
A0515/6	1 1/2"	A0515/15	No. 8	A0515/24	No. 100
A0515/7	1"	A0515/16	No. 10	A0515/25	No. 140
A0515/8	3/4"	A0515/17	No. 16	A0515/26	No. 200
A0515/9	1/2"	A0515/18	No. 20	A0515/27	Bottom

Accessories:

A0516 Soundproof cabin for large-capacity sieve shaker machine.

Flakiness index and particle shape

Standards BS 812

Determining flakiness index

A set of seven rectangular sieves made of painted sheet metal with calibrated slots, sizes are shown in the table below:



Reference	Slot width	Slot length	Dimensions
A0520	4.9	30	290 x 237 x 75
A0521	7.2	40	305 x 248 x 75
A0522	10.2	50	330 x 257 x 75
A0523	14.4	60	358 x 271 x 75
A0524	19.7	80	391 x 283 x 75
A0525	26.3	90	424 x 293 x 75
A0526	33.9	100	467 x 305 x 75

Standards EN 933, -3; NF P18-561

Determining particle shape

A set comprising a series of 13 sieves measuring 30 x 30 cm with bars from Ø 5 mm to 15 mm separated as shown in table below:

Reference	Slot width	Reference	Slot width
A0530	2.5 mm	A0537	12.5 mm
A0531	3.15 mm	A0538	16.0 mm
A0532	4.0 mm	A0539	20.0 mm
A0533	5.0 mm	A0540	25.0 mm
A0534	6.3 mm	A0541	31.5 mm
A0535	8.0 mm	A0542	40.0 mm
A0536	10.0 mm	A0543	Bottom



Tests to determine the geometric properties of aggregates. Flow assessment

Standards EN 933-6

Determining flakiness index

A0518 Vibrating table and flow unit to determine the mechanical and geometrical properties of any type of aggregate. This unit consists of a vibrating tray with spirit level, four rubber springs, a 10 kg base plate and an unbalanced weight vibrator. The equipment also includes a flow unit with a total mass of 42.3 ± 0.1 kg with a metal trough, plug, mobile metal skirt to release material flow and a plastic tube with internal $\varnothing 125 + 2 \times 610 + 10$ mm.

Characteristics:

Rotation speed: 2970 ± 20 r.p.m.

Vibration frequency: 50Hz.

Vibrating amplitude with empty flow unit: 0.18 ± 0.02 mm.

Power supply: 3 x 380 V. 50/Hz.

Base plate dimensions: 400 x 400 x 500 mm.

Total dimensions: 400 x 520 x 1200 mm.

Weight: 170 kg approx.



Determining clay, silt and dust content in aggregates

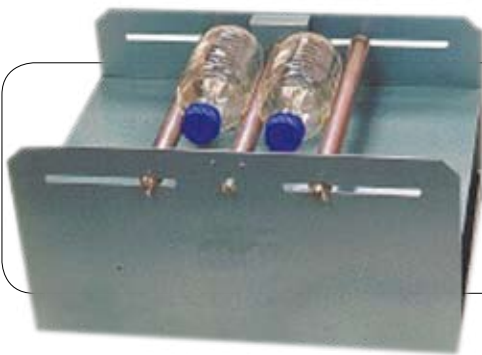
Standards ASTM C 117; BS 812

Testing for materials finer than 75 μ m

Gravimetric system used to determine the clay, silt, and dust content of a portion of material finer than 75 μ m.

A0545 Bottle stirrer, fixed speed of 80 rpm.

V1005 1l capacity flask with lid.



Standards EN 933-9; NF P94-068; NF P18-592

Methylene blue test

This test is used to measure the methylene blue absorption capacity of sand fines. Methylene blue test equipment, consisting of:

A0550 Electronic paddle stirrer with digital reading. Supplied complete with stirring paddle, support and fixing chuck. Speed adjustable between 400-700 rpm.

V7552 Burette, with 50 ml glass stopcock.

A0552 Box of filter paper, $\varnothing 125$ mm.

A0553 300 mm glass rod.

V6806 Beaker, 600 ml.

A0555 Methylene blue (25 g box).

V0190 Base plate support measuring 190 x 135 mm. Rod measuring $\varnothing 9 \times 500$ mm.

V0265 Double straight chuck.

V0266 Burette clamp.



Apparent and relative density. Absorption and specific weight

The results obtained for the relative density of aggregates depends on the test method used. It is advisable to conduct a study on the aggregates themselves, choosing the type of test based on the resulting aggregate after comparison.

Standards EN 1097-6; UNE 7140, 7083, 83.133; ASTM C128, C127; AASHTO T84; BS 812; NLT 154; DIN 12039

Determining particle density and water absorption

V6363 500 ml calibrated flask.

A0560 Set consisting of a tapered mold, funnel and tamper to determine the absorption of fine aggregate.

A0561 500 ml pycnometer with plug, capillary tube and funnel.

A0561/1 1000 ml pycnometer with plug, capillary tube and funnel.



Standards EN 1097-7; NF P18-558; BS 812; NLT 155

Filler relative density test

A0562 1000 ml pycnometer to determine the specific weight of sand and fine aggregates. Consisting of a glass bottle with an aluminium cone.

A0563 1000 ml pycnometer with notches on the side to ensure the cover is securely fitted.

A0564 2000 ml pycnometer with notches on the side to ensure the cover is securely fitted.

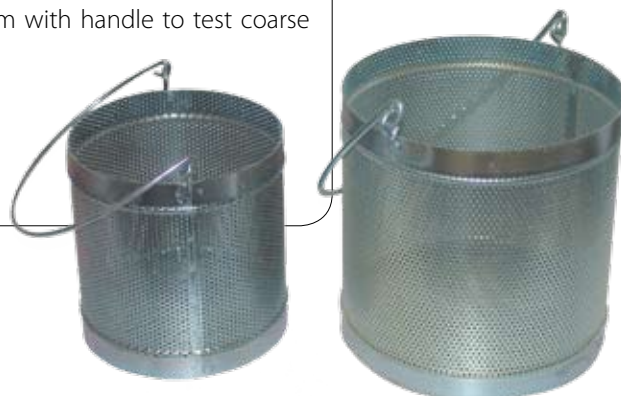


Standards UNE 1097-6; NLT 153/92

Coarse aggregate relative density test

A0565 Metal basket measuring \varnothing 20 x 20 cm with handle to test coarse aggregate sizes of less than 38 mm.

A0566 Metal basket measuring \varnothing 25 x 25 cm with handle to test coarse aggregate sizes above 38 mm.





Standards BS 812

Coarse aggregate density using the water displacement

A0570 This device uses the water displacement method to measure the density of coarse aggregate and consists of a cylindrical metal container measuring \varnothing 150 mm x 350 mm high and a siphoning tube at 250 mm from the base.

Weight: 3 kg

A0570/1 250 ml calibrated test tube.

Standards EN 1097-3; NLT 156; ASTM C29; BS 812

Apparent density of aggregates

A0576 20 dm³ metal container complete with handles.

A0577 10 dm³ metal container complete with handles.

A0578 5 dm³ metal container complete with handles.

A0579 1 dm³ metal container complete with handles.

H0002 Steel rod measuring \varnothing 16 x 600 mm.



Standards BS 812

Determining moisture content

A0580 Siphon can unit for determining the relative moisture content in known conditions. Consisting of a measuring cylinder with 500 ml capacity, stirring rod, rubber tubes and clamps.

Weight: 3.5 kg



Standards UNE 103.302; ASTM 854; ASTHO T100; BS 1377:2

Specific weight of aggregates

V6361 100 cc calibrated flask with polyethylene stop.

V5562 Bevelled pycnometer with 50 cc capacity.

V5572 Flared pycnometer with 50 cc capacity.





Standards EN 1097-4; NLT 177; BS 812

Determination of voids in filler

A0590 Device for compacting filler, consisting of a base measuring 100 x 150 mm with two guiding columns, a cylinder with internal \varnothing 25 mm and a graduated puncher that slides freely on the cylinder without side scraping.

Weight: 4 kg.

Accessories

A0590/1 Impact counter to fasten to the device.

A0590/2 Pack of 100 25 mm filters.

Standards ASTM C70; AASHTO T142

Surface moisture of fine aggregate

A0597 Chapman flask to determine surface moisture in fine aggregate. The flask is graduated to 200 ml between two bulbs and from 375 to 450 ml above the second bulb.

Weight: 500 g.



Standards EN 1367-4; BS 812:102

Determination of drying shrinkage

A0607 Triple mold measuring 50x50x200 mm, with contact points for shrinkage tests.

A0607/1 Pack of 12 mold contact points.

A0607/2 Reference bar for calibration.

C0037 Linear variation meter (see cements section).



Standards NLT 354; BS 812

Flakiness and elongation index of road aggregates



The size aggregates used for a flexible surface is defined by the percentage of flat and elongated particles measuring between 63 and 6.3 mm.

A0600 Slotted gauge to measure the flakiness index of the aggregate. Made of galvanised sheet metal.

Weight: 700 g.

A0601 Bar gauge to determine the elongation index of the aggregate.

Weight: 1.5 kg.

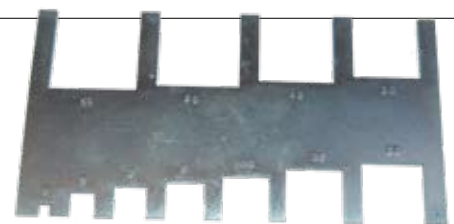


Shape coefficient

Standards EN 933-4

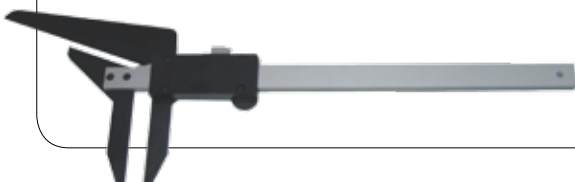
A0605 Gauge to determine the shape coefficient of the aggregate. Made of galvanised sheet metal with modified notches.

Weight: 500 g.



Standards EN 933-4; DIN 4226; CNR 95

A0606 Vernier calliper for aggregates. Calliper to determine the shape factor of aggregates for concrete.



Potential alkali reactivity of cement aggregates

Standards EN 96; UNE 146.507, 146.507-1; ASTM C289

Test to determine potential chemical reaction of aggregates on contact with cement alkalis.

A0610 Reactivity container

Made of stainless steel with an airtight lid.

Capacity: 59 cm³.



Carbonate content of aggregates

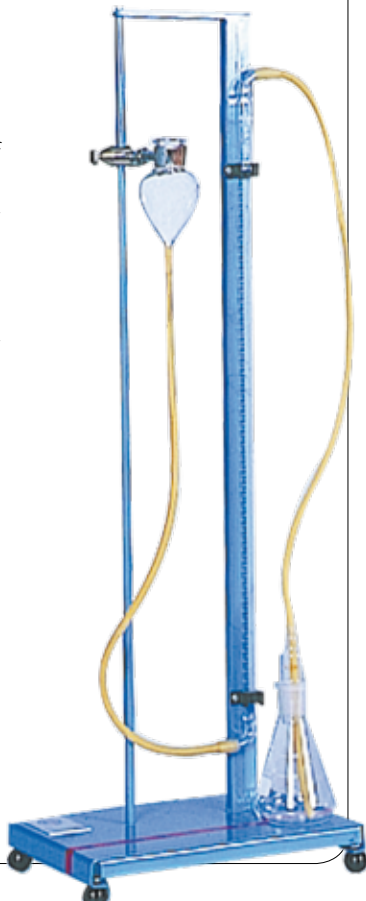
Standards UNE 103.200: NLT 116

A0615 Bernard calcimeter

Made of metal and used to determine the carbonate content of aggregates and soils. When hydrochloric acid is added to the sample, the carbonate in the sample is released in the form of CO₂. Consequently, the release CO increases the pressure, which in turn increases the water level in the deaeration burette.

The difference in the levels measured indicates the amount of CO₂ that has been released, thus allowing the carbonate content to be calculated. The unit consists of a support, a burette with capacity for 100 cm³, a level tube with a tank measuring Ø 40 x 140 mm long, an Erlenmeyer flask of 250 cm³ with a rubber stop pierced by a glass tube, a glass tube with 3 cm³ capacity and a flexible rubber tube.

Approx. weight: 12 kg.



A0616 Dietrich - Frühling calcimeter

For determining CaCO₃, particularly in lime samples. The equipment consists of a glass container where the reaction takes place between the calcium carbonate contained in the aggregate and the diluted hydrochloric acid. The gas that is generated is collected and measured in a special device connected to the container. Therefore, the volume of gas released indicates the amount of CaCO₃ contained in the sample.

Approx. weight: 12 kg.



Aggregate consistency

Standards EN 1367-2; NLT 158; ASTM C86

Baskets and accessories

The perforated nickel plated brass baskets and the brass mesh bucket are used to hold aggregate samples in order to study their ability to withstand frost.

A0621 Brass bucket and mesh.

A0624 Bucket 160 x 120 mm Ø, mesh size 3.35 mm.

A0624/1 Bucket 120 x 95 mm Ø, mesh size 1.18 mm.

A0624/2 Bucket 120 x 95 mm Ø, mesh size 0.60 mm.

A0624/3 Bucket 80 x 65 mm Ø, mesh size 0.15 mm.

A0624/4 Bucket 120 x 95 mm Ø, mesh size 0.50 mm.

V0966 Density meter.

A0622 Brass bucket with handle and 0.6 l capacity.

A0623 Brass bucket with handle and 1.8 l capacity.



Abrasion test

Standards EN 1097-2; NLT 325; ASTM C131, C535; AASHTO T 96; NF18-573

A0625 Los Angeles machine

To determine the abrasion resistance of aggregates. The machine consists of a steel cylinder 12 ± 0.5 mm thick with an internal Ø of 711 x 508 ± 1 mm internal length with horizontal rotation shaft. The cylinder rotates at 30-33 rpm. The motor and the cylinder are mounted on a firm steel base. The control panel consists of the on-off switches and the automatic turn counter with digital display. Supplied complete with a set of 12 abrasive balls and a sample tray.

Power: 1 hp.

Power supply: 220/380 V. 50 Hz.

Dimensions: 1120 x 860 x 820 mm.

Weight: 350 kg.

Accessories

A0625/1 Set of 12 abrasive balls, in compliance with EN 1097-2 NF P 18-573.

A0625/2 Set of 12 abrasive balls, in compliance with UNE 83116; ASTM C131; ASSHTO T96; NLT 325; CNR No.34.

A0625/4 Soundproof cabin.

In compliance with 89/392 CEE.



Mechanical properties

Crushing resistance

Standards UNE 83112; BS

This test determines the crushing resistance of aggregates subjected to a load or compression applied gradually. The equipment can be supplied in two different sizes depending on the aggregate requiring study.

A0630 Standard equipment to determine the crushing resistance of aggregates measuring more than 9.5 mm. Supplied complete with a cylindrical mold measuring \varnothing 150 mm, piston, base plate, compaction rod and measuring cylinder.

A0631 Equipment to determine the crushing resistance of aggregates measuring less than 9.5 mm. Supplied complete with a cylindrical mold measuring \varnothing 75 mm, piston, base plate, compaction rod and measuring cylinder.



Standards UNE 7134; ASTM C235

Aggregate consistency

A0640 Sclerometer to determine soft particles contained in coarse aggregates. Consisting of a \varnothing 1.6 mm needle with a round head mounted on a moving cylinder weighing 1 kg with free fall.

Weight: 63 kg.

Standards BS 812; NF P18-574

Impact resistance

A0635 A device to test the impact resistance of aggregates in compliance with BS 812, of robust steel build, protected against corrosion and equipped with an automatic impact counter. Supplied complete with a cylinder measuring \varnothing 76 x 52 mm deep and a compaction rod measuring \varnothing 9.5 x 300 mm long.

Dimensions: 440 x 320 x 930 mm.

Approx. weight: 55 kg.

Accessories and spare parts:

A0635/1 Cylinder measuring \varnothing 76 x 52 mm.

A0635/2 Compaction rod measuring \varnothing 9.5 x 300 mm.

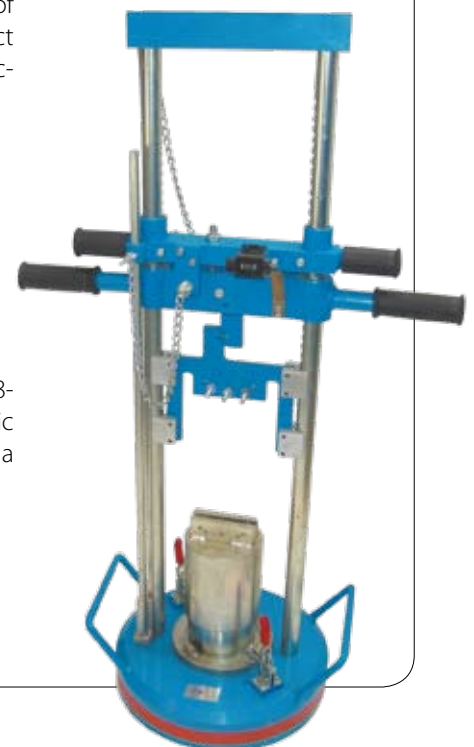
A0636 A device to test the impact resistance of aggregates in compliance with NF P 18-574, of robust steel build, protected against corrosion and equipped with an automatic impact counter. Supplied complete with a cylinder measuring \varnothing 102 x 52 mm deep and a compaction rod measuring \varnothing 9.5 x 300 mm long.

Dimensions: 440 x 320 x 930 mm.

Approx. weight: 55 kg.

Accessories and spare parts:

A0636/1 Cylinder measuring \varnothing 102 x 52 mm in compliance with NF P 18-574.



Abrasive wear resistance test

Standards UNE 127.005

Wear resistance

The purpose of this test is to determine the wear of the tested material under certain conditions. A specimen of a known size rotates around a shaft passing through the centre, whilst also being pressed by a predetermined weight on a flat circular crown that rotates on its own shaft and whilst water and the abrasive element are released from dosers on the rotating crown.

A0645 Tribometer to determine the wear resistance of marble, cement tiles and similar materials. The machine is supplied with an automatic counter and power meter for regulation of the wear elements. Speed: 30 rpm.

Specific specimen load: 0.06 N/mm².

Power supply: 220/380 V. 50 Hz.

Dimensions: 1100 x 900 x 1300 mm.

Weight: 550 kg.

Spares

A0645/1 Abrasive material (5 kg).



Standards EN 1341, 1342,1343; Standards UNE 1339, 10545-6; UNE 13748-2

Wear resistance

A0650 Abrasion machine to determine the wear resistance of cement tiles. An electro-mechanically driven machine with a Ø 200 mm disc 70 ± 0.1 mm thick. The pressure of the disk on the specimen is generated by a 14 kg counterbalance. A dosing hopper with a capacity for 10 l of abrasive material is mounted on an adjustable support. The control module includes an automatic meter with rpm selection control, an indication light and emergency stop button. The machine is completely closed to prevent dust escaping and to minimise noise. It is equipped with a safety system that stops the machine automatically if the doors are opened. Manufactured in compliance with EC safety requirements.

Test speed: 75 rpm.

Abrasive outlet: 3 l/min (adjustable).

Power supply: 220/380 V. 50 Hz.

Dimensions: 800 x 1360 x 1700 mm.

Weight: 300 kg.

Accessories:

A0650/1 Spare disk.

A0650/2 Abrasive (25 kg sack).

A0650/3 Marble specimen, 150 x 150 x 50 mm thick.





Standards EN 1097-8; UNE EN 1342; ASTM C131, C535; BS 812-3 A0651 Dorry Machine

To determine the resistance of aggregates to surface wear. This device consists of a round surface of \varnothing 600 mm that rotates horizontally while a funnel continuously discharges a jet of sand on the surface, in front of each specimen. After passing under the specimens, the material is separated and collected. The machine is supplied complete with two specimen molds, two collection trays, two plates, weights and adjustments hooks.

Power supply: 220/380 V. 50 Hz.

Dimensions: 650 x 800 1000 mm.

Weight: 200 kg.

A0651/1 Dorry set of two molds.

A0651/2 Abrasive sand, 25 kg sack.

Standards UNE EN ISO 10545-7/1996

A0653 Abrasion meter

A measuring instrument to determine the abrasion resistance of glazed ceramic in compliance with standard ISO 10545; EN 102.

Characteristics:

Fully automatic operating cycle.
Electrical operation.
Three test stations.
Pre-selectable automatic turn interruption.
Tough, robust equipment.
Wet (PEI) or dry (MCC) abrasion loads.

The equipment includes:

700 g of steel balls with \varnothing 5 mm.
52.5 g of steel balls with \varnothing 3 mm.
43.75 g of steel balls with \varnothing 2 mm.
8.75 g of steel balls with \varnothing 1 mm.
30 g of aluminium oxide, grain size 80 (FEPA).
20 ml of deionised or distilled water.



Standards UNE EN ISO 10545-2

Masonry materials. Determination of dimensions and surface quality.

A0652/2 Warpage tester. Analogue or digital system for specimens from 100 x 100 mm to 650 x 650 mm, supplied with six analogue or digital gauges with 10 mm stroke x 0.01 mm accuracy.

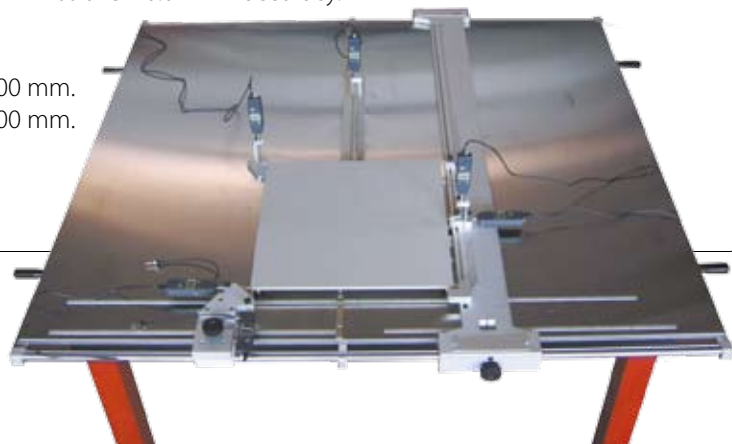
Options

A0652/1 Calibrated model plate measuring 300 x 300 mm.

A0652/2 Calibrated model plate measuring 400 x 400 mm.

V0016 Analogue gauge 10 mm x 0.01 mm.

V0024 Digital gauge 10 mm x 0.001 mm.



Friability coefficient. Fragmentation resistance

Standards EN 1097-1; UNE 83.115; AFNOR P18.572; NF P18-576

A0655 Micro-deval machine

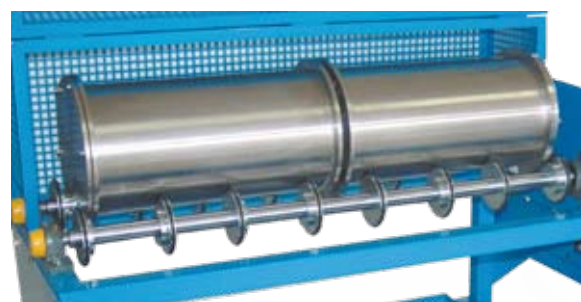
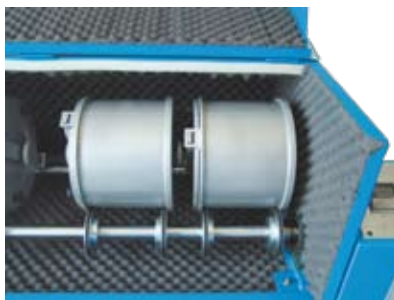
The machine consists of a robust iron frame in which four test cylinders measuring \varnothing int. 200 \pm 1 mm x 154 \pm 1 mm high rotate at constant speed on two metal rollers covered with anti-wear rubber. Each cylinder has an hermetically sealed lid to guarantee airtightness. The digital command and control panel is vibration free and includes electronic adjustment, selection and automatic end-of-cycle stop technology. The machine is supplied complete with safety protection and emergency stop in compliance with EC machine directives, with a collection tray. Abrasion balls are not included and must be ordered separately (see accessories).

Rotation speed: 100 \pm 5 rpm.

Power supply: 220/380 V. 50 Hz.

Dimensions: 1120 x 1240 x 520 mm.

Weight: 110 kg.



Accessories:

A0655/1 Steel balls of 10 mm diameter. 25 kg pack.

A0655/1/2 Steel balls of 18 mm diameter. 50 unit pack. Fulfils standard NF P18-576.

A0655/1/3 Steel balls of 30 mm diameter. 10 unit pack. Fulfils standard NF P18-576.

A0655/2 Standard spare cylinder. Stainless steel.

A0655/3 Stainless steel cylinder of 200 mm diameter x 400 mm long. Complies with NF P18-576.

A0655/4 Soundproof protection system.

A0655/5 Non-soundproof protection system.

Standards NF P18-577

A0656 Deval machine

Machine designed to test the abrasion resistance of aggregates subjected to friction and impacts. It consists of a frame that rotates at 30-33 rpm, supporting two cylinders at an angle of 30° from the rotation axis. The digital command and control panel is vibration free and includes electronic adjustment, selection and automatic end-of-cycle stop technology. The machine is supplied complete with collection trays.

Power supply: 220/380 V. 50 Hz.

Dimensions: 1450 x 650 x 900 mm.

Weight: 180 kg.

Accessories:

A0656/2 Soundproof cabin with microswitch.



Accelerated aggregate polishing

Standards EN 1097-8; NLT 174; BS 812:114; NF P18-575; ASTM E303

The wear value of an aggregate provides a measurement of resistance to the wear produced by the tyres of a vehicle in similar conditions to those that occur on a road surface. Vehicle tyres passing over a road surface causes wear to the aggregate, this wear condition is one of the main factors that affect skid strength. The actual relationship between PSV and skid resistance will vary

depending on the traffic conditions, the type of surface and other factors. The PSV test is performed in two stages. The accelerated sample polishing test, followed by wear measurement with the friction test.

A0660 Machine to determine the accelerated polishing coefficient (A.P.C.)

The machine consists of a wheel that turns at 320 rpm. There are 14 sample holders on the perimeter of the wheel. A solid rubber wheel is housed in a vertical position on the top part of the wheel, bearing on it with a force of 725 N. Two containers feed the abrasive material and water. The first container holds grain abrasive mixed with water and the second one holds powdered abrasive also mixed with water.

Both spill the material on the place where both wheels meet. The machine is supplied complete with the wheel, a side plate, rubber rings, rubber tyre, transmission belt, abrasive material feeder, grain abrasive, powdered abrasive, tool set, set of 4 sample holder molds and two mold bases.

Tyre speed: 315 to 325 rpm.

Power supply: 220/380 V. 50 Hz.

Dimensions: 1520 x 720 x 740 mm.

Weight: 175 kg.

Accessories and spare parts:

A0660/1 Grain abrasive (25 kg).

A0660/2 Powder abrasive (25 kg).

A0660/3 Control stone (25 kg).

A0660/4 Rubber tyre.

A0660/5 Spare mold.

A0660/6 Mold base.

A0660/7 Rubber ring.



Skid resistance coefficient

Standards EN 1097-8; EN 13036-4; NLT 175; ASTM E303; BS 812:114; NF P15-578

This test was developed by the Road Research Laboratory of Great Britain, an organisation dedicated to studying problems relating to the design, construction, maintenance and use of highways. The machine consists of an adjustable pendular arm

and a spring-loaded rubber footing mounted on the end of the arm. The base has three adjustable legs and a spirit level to level the pendulum.

A0661 TRRL Pendulum skid resistance tester

Complete with 6 rubber footings for "in situ" testing, thermometer, graduated perspex scale, two spanners, water bottle, folding chair with instrument tray, transparent plastic cover, portable case and instruction manual. The device is calibrated using a "Criggion" stone, characterised as being an exceptionally consistent material.

Dimensions: 790 x 650 x 230 mm.

Dimensions with box: 830 x 750 x 350 mm.

Weight: 32 kg.

Spare parts:

A0661/1 Base plate.

A0661/2 Spare rubber element for PSV test.

A0661/3 Spare rubber element for in situ test.

A0661/5 Large rubber footing (6).

A0661/6 Small rubber footing (6).



Rock samples

A0668 Polishing machine

For preparing rock, mineral, ceramic or metalographic samples. Equipped with a \varnothing 250 mm disc that rotates at various speeds, 200 and 400 rpm, depending on the material to be polished.

Power supply: 220 V. / 50 Hz.

Dimensions: 430 x 370 x 640 mm.

Weight: 30 kg.

Accessories:

A0668/1 Diamond paste for polishing (10 g), 3 micron.

A0668/2 Adhesive polishing cloth \varnothing 250 mm.

A0668/3 Lubrication oil 1l.

A0668/4 Pack of 100 non-adhesive sanding discs measuring \varnothing 250 mm (800 grain).



Standards UNE 1744-1

Jaw Crusher

A0670 Jaw crusher. A machine used in laboratories to crush samples of aggregate, minerals and similar materials in order to reduce their size. The crusher has an input opening measuring 80 x 50 mm, and the size of the crushed material can be set to as little as 1 mm. Production capacity, depending on the material to crush, is 5 dm³/h.

Container capacity: 2.5 dm³.

Power supply: 220 V. / 50 Hz.

Dimensions: 800 x 300 x 600 mm.

Weight: 106 kg.

Accessories:

A0670/1 Set of jaws.

A0670CE Jaw Crusher. This machine is identical to the one above but is equipped with a safety system (noise / trapping) in compliance with the EC directive.



Standards UNE 83120

A0722 Large capacity jaw crusher

Large capacity equipment for crushing ballast featuring following technical characteristics:

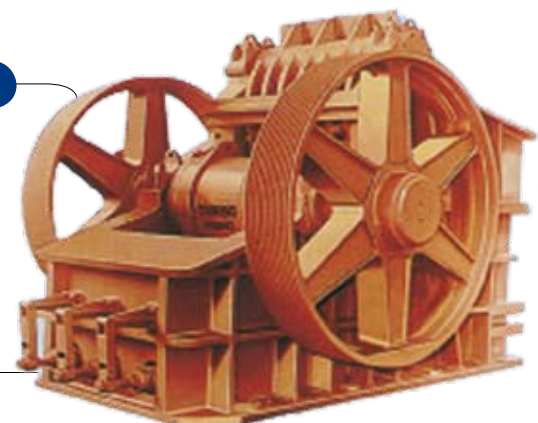
Input dimensions: 600 x 300 mm.

Output opening: adjustable between 1 and 90 mm.

Production per hour: 35 TM/h.

Motor power: 30 CV.

Weight: 4,000 kg.



A0671 Culatti micro-whisk mill

This small mill works on the hammer mill principle and was designed specifically for cases where the milling of small amounts of substances in different grain sizes is required. Using this device eliminates practically all material losses, since the milling chamber becomes airtight when closed. The device is supplied with three sieves with mesh sizes of 1, 2 and 3 mm.

Technical characteristics

Electronic speed adjustment: 0 to 5000 rpm.

Hopper capacity: 120 c.c. approx.

Collection tube capacity: 35 c.c.

Maximum sample size: 6 mm.

Airtight milling chamber.

Approx. milling time: 30 to 120 sec.

Power supply AC: 220/50 Hz – 200 W.

Accessories:

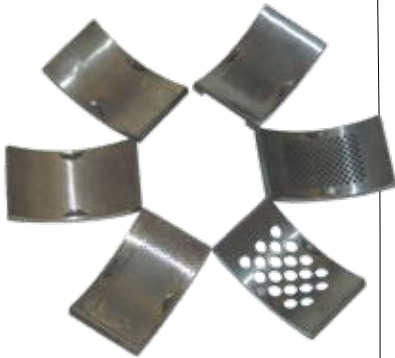
A0671/4 Sieve mesh size 1 mm.

A0671/6 Sieve mesh size 2 mm.

A0671/7 Sieve mesh size 3 mm.

A0671/8 Sieve mesh size 4 mm.

A0671/9 Sieve mesh size 5 mm.

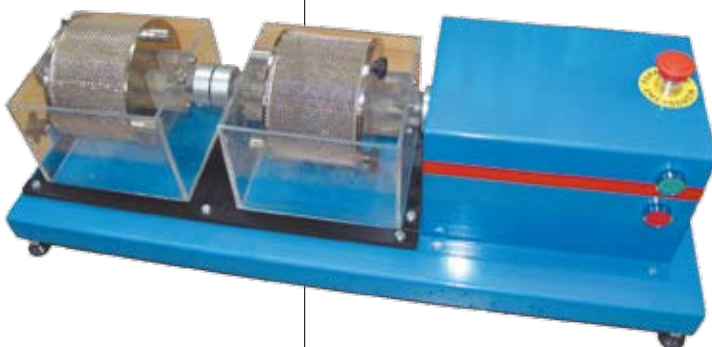


Rock durability

This method was designed to determine rock deterioration while subjected to wear by water.

Standards NLT - 251; ASTM D 4644

A0675 Slake durability tester



This consists of a base-mounted motor that rotates two stainless steel drums measuring $\varnothing 140 \times 100$ mm long with a mesh size of 2 mm at 20 rpm. The drums are submerged into 20 mm of water inside two tanks made of plexiglass.

Power supply: 220 V. / 50 Hz.

Dimensions: 830 x 290 x 300 mm.

Weight: 35 kg.

Accessories:

A0675/1 Stainless steel drum measuring $\varnothing 140 \times 100$ mm.

Rock strength index

Standards NLT - 252; ASTM D5731



Standards UNE 1744-1

Digital point load unit

A0678 Digital point load unit, developed based on a prototype created at the Imperial College of London. The apparatus consists of a rigid chassis supporting a test frame consisting of two columns with an adjustable connecting bridge at the top, a hydraulic piston activated by a manual pump, a millimetre rule to measure the distance between two cone-shaped points made of special steel, a pressure sensor and a digital display with a microprocessor. The H0206/1 display is mounted on an adjustable vertical shaft

Dimensions: 406 x 150 x 170 mm.

Weight: 16 kg.

A0679 Point load unit consisting of a rigid chassis supporting a test frame made up of two columns with an adjustable connecting bridge at the top, a hydraulic piston activated by a manual pump, a millimetre rule to measure the distance between two cone-shaped points made of special steel, and a digital pressure gauge.

Dimensions: 406 x 150 x 170 mm.

Weight: 16 kg.

A0680 This machine is identical to the one above but includes a pressure gauge graduated to 400 kg/cm².

Accessories:

A0680/1 Pressure gauge up to 400 kg/cm².

A0680/2 Pressure gauge up to 100 kg/cm².

A0680/3 Pressure gauge up to 20 kg/cm².

A0680/4 Set of cone-shaped points.

A0680/5 Safety system in compliance with EC directive.

A0680/6 Protection mask.



Sample cutter

H0150 Sample cutter

A cutter adapted for cutting rocks and construction elements. It includes a device for cutting specimens obtained by core barrels as well as irregular rock specimens. Supplied with disc protection and a submergible pump for water recirculation and cooling.

Power: 3 hp.

Motor: 220v-50hz.

Disc Ø in millimetres: 330 / 350 – 25.4.

Cutting length: 600 mm.

Accessories:

H0154 Cutting disc Ø 300 x 25.4 mm.

H0155 Cutting disc Ø 350 x 25.4 mm.



Tilt test

A0750 Apparatus to determine the roughness coefficient

The equipment consists of an adjustable tilted plane where the rock sample is placed. The test is carried out by slowly tilting the plane until the rock slides. The roughness index is calculated from the sliding angle.

Tilting angle: 0 – 50°

Total dimensions: 270 x 175 x 265 mm.

Weight: 5 kg.



H0394 Ultrasound equipment

Portable ultrasound equipment with the following characteristics:

Measuring range: 0-9999.9 μ s.

Resolution: 0.1 μ s.

Accuracy: + 0.1 μ s.

Display of distance between probes.

Propagation speed measurement m/s.

Memory capacity: up to 50 readings.

Data output: RS232C (Windows hyperterminal).

Outputs: TRG and OUT for viewing on an oscilloscope.

Autonomy: 12 hours with 2300mAh batteries.

Screen: Feedback LCD with two lines (operation in low light conditions).

Supplied with:

Portable case.

Two 150 kHz probes.

Two 150 cm connection cables.

Reference block.

Coupling paste.

Pack of rechargeable batteries.

Battery charger.

RS232C cable.



Rock mechanics

Standards D3148, D2938, D5407, D2664

Determining the elasticity modulus, Poisson coefficient and shear modulus

The single axis test is carried out by applying an increasing load at a constant pressure speed of between 0.5 and 1.0 MPa/s. Axis and diameter deformation must be measured with great precision (approx. 5×10^{-6}). Afterwards, loading and unloading cycles are applied to determine compressibility properties. These tests require the use of a servo power system. The system should be servo-controlled and not simulated, since the tests require application of very precise loads during very precise time periods. The machine is controlled by the software installed. The software

was developed by our own IT department. Programming, in a Labview environment, enables the machine to be controlled via the National Instruments card (installed in the PC). The card, the software and the servo-control provide precise test control, to ensure gradients are controlled during both loading and unloading processes. The system captures up to 100,000 data per second. As a result, the applied force is controlled very effectively and real test result graphs can be obtained. In turn, the 16-channel card allows the user to add new transducers to the machine for new

tests, such as elasticity modulus calculations, Poisson coefficient, etc. The machine's control facilitates dynamic tests. For example, the application of a load during a period of time without breaking the specimen, reducing the load and maintaining the time period, applying a second load (equal to or greater than the first load) and so on while programming as many loading and unloading cycles as desired.

Single axis tests with extensometric bands

The purpose of the test is to establish a method to determine stress-deformation curves, elasticity module (Young) and Poisson coefficient in single axis compression of a regular cylindrical specimen. The extensometric bands must be previously installed on the specimen to be tested. The orientation and position of the bands is very important because they will condition the results of the test. The extensometric bands must be chosen according to the grain size of the rock to be tested. Four bands should be placed on each specimen, two for axial deformation and two for diametral deformation. To obtain optimal results, each band should be installed in a complete Wheatstone bridge. Data is collected by a computer, although it is first passed through a signal conditioner. The software performs the process automatically, starting the test, controlling the cycles, collecting data, etc. The data can be viewed in real time while the test is being performed.



Equipment required

The system is exportable, i.e., these tests can be performed with other concrete presses other than those manufactured by PROETI.

2000 kN to 3000 kN press with computer control. The press has to be servo-controlled. Ideally, it would allow gradient control during loading and unloading (see concrete section). In many cases, electro-mechanical multipurpose testing machines can be used for these tests, depending on the rock section to be tested.

Extensometric bands.

Signal conditioner with capacity for 16 bands.

Compatible PC.

Data collection card.

Elasticity software.



H0235 3000 kN press.

S0373 Multipurpose testing machine for 300 kN.

H0561 Extensometric bands with 10 mm base length.

H0562 Extensometric bands with 20 mm base length.

H0563 Extensometric bands with 30 mm base length.

H0564 Extensometric bands with 60 mm base length.

H0560 Signal conditioner with capacity for 16 bands.

H0235PC Compatible PC.

H0240/1 Elasticity software.



Packs of extensometric bands come in sets of 10. It is very important to choose the correct band. It must be suitable for the rock type and rock grain size.

Single axis tests with LVDT sensors

The purpose of the test is to establish a method to determine stress-deformation curves, elasticity modulus (Young) and Poisson coefficient on the single axis compression of a regular cylindrical specimen. LVDT sensors are the best option when the nature of the rock does not allow for placement of extensometric bands. This occurs in very porous rocks, plastic rocks or rocks of a with very plastic behaviour. A compression gauge is required to position the LVDTs. Two LVDTs are positioned to measure diametral deformation and another two are placed to measure axial

deformation. Data is collected by computer, although the data from the LVDT first passes through a data collection box that carries out the analogue / digital conversion. The software performs the process automatically, starting the test, controlling the cycles, collecting data, etc. The data can be viewed in real time while the test is being performed.

The system is exportable, i.e., these tests can be performed with other concrete presses other than those manufactured by PROETI.

Equipment required

2000 kN to 3000 kN press with computer control. The press has to be servo-controlled. Ideally, it would allow gradient control during loading and unloading (see concrete section). In many cases, electro-mechanical multipurpose testing machines can be used for these tests, depending on the rock section to be tested.

LVDT sensors.

Data collection box with 16 channels.

Compatible PC.

Data collection card.

Elasticity software.

H0235 3000 kN press.

S0373 Multipurpose testing machine for 300 kN.

S0237 LVDT 2 mm sensor.

S0200 Data collection box.

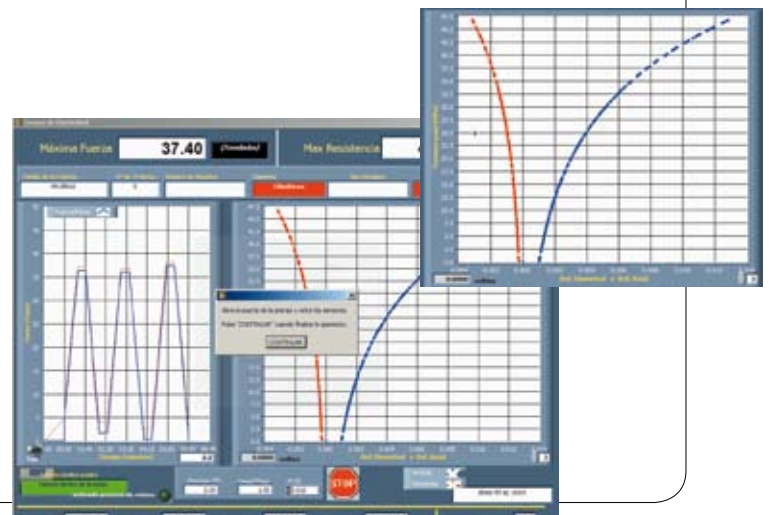
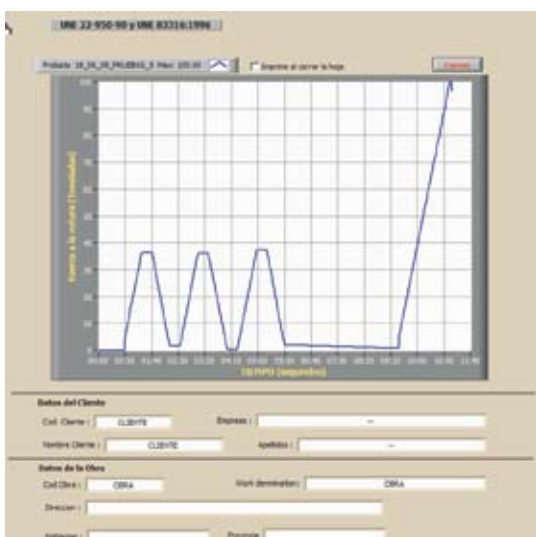
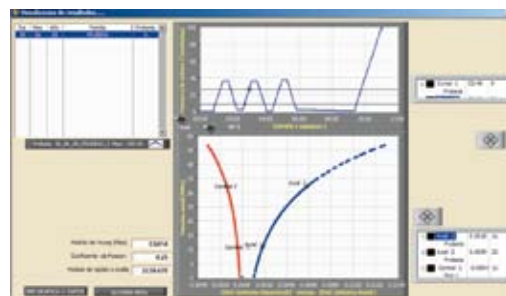
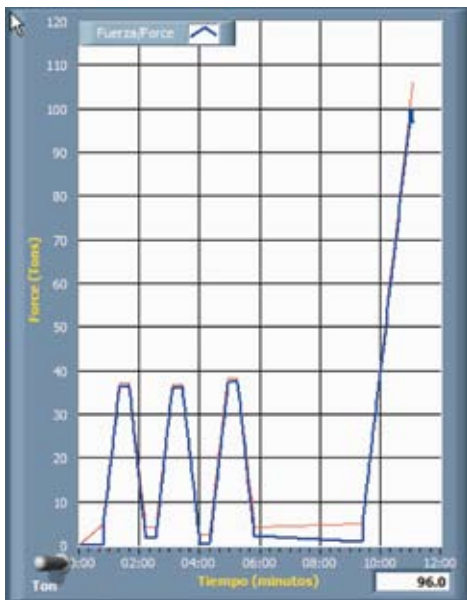
H0253 Compression gauge/extensometer.

H0235PC Compatible PC.

H0235/2 Elasticity software.



Elasticity software



Devices for rocks

A0681 Device for indirect tensile strength in rock samples measuring \varnothing 90 mm.



A0682 Device for indirect tensile strength in rock samples measuring \varnothing 70 mm.



A0683 Niche type device for testing point loads in testing machines.

Standards ASTM D5607 – ISRM

A0685 Portable equipment for direct shear test on rocks

Designed to determine stability and skid resistance in rocks measuring a maximum of 115 x 125mm, or specimens of \varnothing 102 mm. The device consists of a shearing box with a diagonal section. The upper half has a vertical piston to apply load and the lower half has two horizontal pistons for reversible cutting action. The pressure is applied to the pistons by manually operated hydraulic pumps and the load is displayed on two Bourdon pressure gauges.

Maximum dimensions for irregular samples: 125 x 110 mm.

Maximum dimensions for cylindrical specimens: \varnothing 102 mm.

Horizontal displacement: gauge measuring 25 x 0.01 mm.

Dimensions: 600 x 250 x 460 mm.

Weight: 46 kg.

Accessories:

A0685/1 British Gypsum Crystacal plaster to prepare specimens, sack of 25 kg.

A0685/2 Mold to prepare sample.

A0685/3 Set of gauges (4) measuring 10 x 0.002 mm, complete with support in compliance with ASTM D5607.

A0685/4 Complete pressure stabiliser with pump to absorb sample volume changes and guarantee constant load during the test.



Rock classification

Standards ASTM D 5873

A0715 Sclerometer for rocks

Used for rock classification tests. The rock sample is placed horizontally on a special guide and the rebound index is obtained from the mean of several measurements taken perpendicularly to the longitudinal axis.

Weight: 2 kg.

Accessory:

A0715/1 Universal support-guide for testing any type of standard rock.

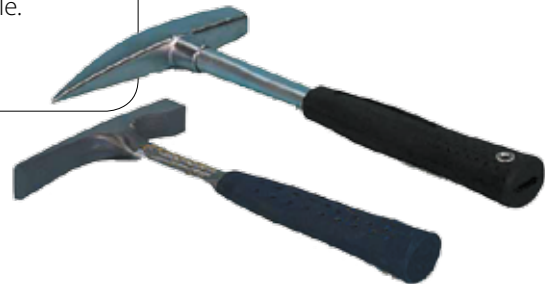
Weight: 10 kg.



V0043 Geologist's hammer

V0043 Geologist's pick hammer with hard plastic handle.

V0043/1 Geologist's chisel hammer with hard plastic handle.



Standards EN 101

V0069 Set of minerals as per the Mohs hardness scale

Used to identify minerals according to surface hardness. The set consists of 10 reference minerals: 1 (Talcum) 2 (Plaster) 3 (Calcite) 4 (Fluoride) 5 (Apatite) 6 (Feldspar) 7 (Quartz) 8 (Topaz) 9 (Corundum) 10 (Diamond).

Dimensions: 180 x 120 x 20 mm approx.

Weight: 500 g.



Barton perthometer

A0718 Barton perthometer 300 mm. Used to visibly evaluate rock roughness. Manufactured in tempered steel.

Dimensions: 300x120 mm.

Weight: 1 kg.

A0718/1 Barton perthometer 150 mm, similar to model A0718 but 150 mm long.



Hoek cells for triaxial tests on rocks

Standards ASTM D 5873

To use at pressures of up to 70 Mpa. Hoek cell tests are used to determine strength and elastic properties of cylindrical rock specimens subjected to triaxial compression.

The cell consists of:

A zinc-plated steel body with two side connections, one for the hydraulic pressure system and the other to expel the air from inside the cell (or to connect to a pressure measuring system).

Two zinc-plated threaded bushings used as the head of the casing.

Two tempered and ground pistons for uniform single axis load application on the specimen.

A high strength rubber sleeve to make the confined pressure uniform (can be used in other tests).

A0691 Hoek AX Triaxial Cell measuring \varnothing 30.10 x 60 mm.

A0692 Hoek BX cell measuring \varnothing 42.04 x 85 mm.

A0693 Hoek NX cell measuring \varnothing 54.74 x 100 mm.

A0694 Hoek cell measuring 1.5" \varnothing 38.10 x 75 mm.

Accessories:

Load distribution plates to prevent the piston of the cell from damaging the compression machine plates.

A0691/1 Load distribution plates for AX cell.

A0692/1 Load distribution plates for BX cell.

A0693/1 Load distribution plates for NX cell.

A0694/1 Load distribution plates for 1.5" cell.

Spare parts:

A0691/2 Set of pistons for AX cell.

A0692/2 Set of pistons for BX cell.

A0693/2 Set of pistons for NX cell.

A0694/2 Set of pistons for 1.5" cell.

A0691/3 Rubber sleeve for AX cell.

A0692/3 Rubber sleeve for BX cell.

A0693/3 Rubber sleeve for NX cell.

A0694/3 Rubber sleeve for 1.5" cell.



A0705 Laboratory core barrel probe

To obtain irregular rock samples. Supplied complete with a specimen locking system, cooling device and collection container.

Power supply: 220 V. / 50 Hz.

Weight: 50 kg approx.

Accessories:

A0705/1 Diamond core measuring \varnothing 30.10 x 200 mm long.

A0705/2 Diamond core measuring \varnothing 42.04 x 200 mm long.

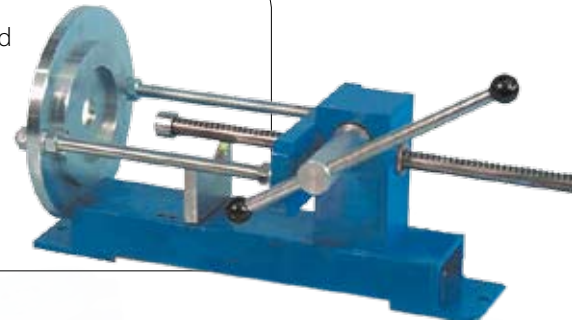
A0705/3 Diamond core measuring \varnothing 54.74 x 200 mm long.

A0705/4 Diamond core measuring \varnothing 38.10 x 200 mm long.

A0706 Horizontal extractor

To extract the rock sample from the rubber sleeve without spilling the confined fluid. The adapters need to be ordered separately.

- A0706/1** Set of adapters to remove NX samples \varnothing 30.10 x 60 mm.
- A0706/2** Set of adapters to remove NX samples \varnothing 42.04 x 85 mm.
- A0706/3** Set of adapters to remove NX samples \varnothing 54.74 x 100 mm.
- A0706/4** Set of adapters to remove 1.5" samples \varnothing 1.538.10 x 75 mm.



A0707 Constant pressure hydraulic system for Hoek cells

Maintains the desired pressure on the cells. Consists of a manual pump to apply pressure up to 70 Mpa, precision pressure gauge, tank and connections to distribute the pressure throughout the Hoek cell.

Weight: 15 kg approx.

Accessory:

- A0707/1** Pressure stabiliser complete with pump to absorb sample volume changes and guarantee constant load during the test.



Rock permeability with Hoek cells

To measure permeability or water flow with a rock sample inserted in a Hoek cell with a controlled system of pressurised water. The test is performed with the Hoek cells used in the triaxial compression test adapted to the corresponding head. These heads

are supplied in pairs and must be ordered separately, replacing the standard head. The set is made up of a top and bottom plug, complete with additional accessories.

Models:

- A0691/5** Samples measuring \varnothing 30.10 mm.
- A0692/5** Samples measuring \varnothing 54.74 mm.
- A0693/5** Samples measuring \varnothing 42.04 mm.
- A0694/5** Samples measuring \varnothing 38.10 mm.

A0710 Permeability device mounted on a tripod, connected to the cell head. 50 ml burette with 0.1 ml divisions.

Accessories:

- A0710/1** Nylon tube (25 m).
- A0708** Constant oil/water pressure system permeability tests. Used to force water flow through the Hoek cell. The hydraulic pressure can be adjusted between 0 and 3500 kPa using the valve located on the control panel. The system is equipped with a motor-driven hydraulic pump and a tap to connect to the upper head of the cell. Supplied complete with a pressure gauge with a scale from 0 – 3500 kPa.
- Power supply:** Single phase 220/240 V. 50 Hz.
- Dimensions:** 310 x 300 x 400 mm.
- Weight:** 20 kg approx.



Ballast tests

Ballast sieves

Rectangular sieves measuring 490 x 380 mm made of a stiff painted sheet metal frame and bars with the following intermediate spans:

Reference	Opening
A0735	25 mm
A0736	16 mm
A0737	12.5 mm
A0738	8 mm
A0732	Bottom

Rectangular sieves measuring 490 x 380 mm made of a stiff painted sheet metal frame and square mesh with the following mesh sizes:

Reference	Opening
A0742	80 mm
A0743	63 mm
A0744	50 mm
A0745	40 mm
A0746	31.5 mm
A0747	22.4 mm
A0732	Bottom

Square sieves measuring 300 x 300 mm made of stainless steel in compliance with Standard EN 933-3 and with the following mesh spans:

Reference	Mesh size
A0542/I	40 mm
A0541/I	31.5 mm
A0540/I	25 mm
A0539/I	20 mm
A0538/I	16 mm
A0537/I	12.5 mm
A0536/I	10.0 mm
A0535/I	8.0 mm
A0534/I	6.3 mm
A0533/I	5.0 mm
A0532/I	4.0 mm
A0531/I	3.15 mm
A0530/I	2.50 mm
A0543/I	Bottom



A0766 Template for aciculars

Mobile template with two ball bearings for tests with aciculars and flakes.

