

Hardness Shore D

The Shore D Hardness test (also called Durometer Hardness Test) is used when the material is too soft to be measured by a Rockwell test. For very soft materials such as rubber or TPEs, the Shore A test is recommended.

How Does a Shore Hardness Test Work?

Shore D Hardness is a standardized test consisting in measuring the depth of penetration of a specific indenter. Test methods used to measure Shore D Hardness are ASTM D2240 and ISO 868.

The hardness value is determined by the penetration of the Durometer indenter foot into the sample. Shore Hardness measures are dimensionless. It goes between 0 and 100. The higher number represents the harder material.

The resulting depth is dependent on:

- Hardness of the material
- Its viscoelasticity
- Shape of the indenter
- Duration of the test.



One can clearly see the conceptual parallels between the Rockwell method and the Shore method. Today, off the shelf equipment, at least some of which is automated, can be purchased for immediate use and testing according to standardized ASTM/ISO procedures.

Typical Hardness Shore D Values

Name of the polymer	Explicit name of the polymer	Min Value	Max Value
ABS	Acrylonitrile-Butadiene Styrene	100.000	100.000
ABS FR	Acrylonitrile-Butadiene Styrene flame retardant	80.000	90.000

ABS High Heat	Acrylonitrile-Butadiene Styrene High Heat	80.000	85.000
ABS High Impact	Acrylonitrile-Butadiene Styrene High Impact	75.000	85.000
ABS/PC	Acrylonitrile-Butadiene Styrene/Polycarbonate	85.000	90.000
ABS/PC 20% GF	Acrylonitrile-Butadiene Styrene/Polycarbonate 20% glass fiber	85.000	93.000
ABS/PC FR	Acrylonitrile-Butadiene Styrene/Polycarbonate flame retardant	85.000	93.000
ASA	Acrylonitrile Styrene Acrylate	75.000	80.000
ASA/PC	Acrylonitrile Styrene Acrylate/Polycarbonate	80.000	85.000
ASA/PC FR	Acrylonitrile Styrene Acrylate/Polycarbonate flame retardant	80.000	90.000
ASA/PVC	Acrylonitrile Styrene Acrylate/Polyvinyl Chloride	75.000	90.000
CA - Cellulose Acetate	Cellulose Acetate	50.000	95.000
CAB - Cellulose Acetate Butyrate	Cellulose Acetate Butyrate	60.000	90.000
CP - Cellulose Proprionate	Cellulose Proprionate	40.000	95.000
CPVC - Chlorinated Polyvinyl Chloride	CPVC - Chlorinated Polyvinyl Chloride	83.000	90.000
ECTFE	Ethylene Chlorotrifluoroethylene	75.000	75.000
ETFE	Ethylene Tetrafluoroethylene	70.000	75.000
EVA	Ethylene Vinyl Acetate	15.000	45.000
FEP	Fluorinated Ethylene Propylene	60.000	65.000
HDPE - High	HDPE - High Density Polyethylene	60.000	70.000

Density Polyethylene			
HIPS - High Impact Polystyrene	HIPS - High Impact Polystyrene	60.000	75.000
HIPS FR V0	High Impact Polystyrene flame retardant V0	60.000	70.000
Ionomer (EMAC)	Ionomer (Ethylene-Methyl Acrylate Copolymer)	30.000	66.000
LCP	Liquid Crystal Polymer	82.000	95.000
LCP CF	Liquid Crystal Polymer carbon fiber	95.000	95.000
LCP GF	Liquid Crystal Polymer glass fiber	90.000	95.000
LCP MINERAL	Liquid Crystal Polymer mineral	90.000	95.000
LDPE - Low Density Polyethylene	LDPE - Low Density Polyethylene	40.000	50.000
LLDPE - Linear Low Density Polyethylene	LLDPE - Linear Low Density Polyethylene	55.000	56.000
PA 11 30% Glass fiber reinforced	Polyamide 11 30% Glass fiber reinforced	73.000	78.000
PA 11 conductive	Polyamide 11 conductive	64.000	64.000
PA 11 flexible	Polyamide 11 flexible	59.000	63.000
PA 11 rigid	Polyamide 11 rigid	64.000	72.000
PA 12 conductive	Polyamide 12 conductive	71.000	
PA 12 fiber reinforced	Polyamide 12 fiber reinforced	70.000	80.000
PA 12 flexible	Polyamide 12 flexible	63.000	63.000
PA 12 glass filled	Polyamide 12 glass filled	58.000	75.000
PA 12 rigid	Polyamide 12 rigid	68.000	72.000

PA 6	Polyamide 6	80.000	95.000
PA 6-10	Polyamide 6-10	60.000	85.000
PA 66	Polyamide 6-6	80.000	95.000
PA 66 30% GF	Polyamide 6-6 30% glass fiber	80.000	95.000
PA 66 30% mineral filled	Polyamide 6-6 30% mineral filled	80.000	95.000
PA 66 IM 15-30% GF	Polyamide 6-6 impact modified 15-30% glass fiber	70.000	90.000
PA 66 impact modified	Polyamide 6-6 impact modified	70.000	85.000
PA semi-aromatic	Polyamide semi-aromatic	81.000	83.000
PAI	Polyamide-Imide	90.000	99.000
PAI 30% GF	Polyamide-Imide 30% glass fiber	95.000	99.000
PAI low friction	Polyamide-Imide low friction	95.000	99.000
PAN	Polyacrylonitrile	85.000	93.000
PARA 30-60% GF	Polyarylamide 30-60% glass fiber	90.000	90.000
PBT	Polybutylene Terephthalate	90.000	95.000
PBT 30% GF	Polybutylene Terephthalate 30% glass fiber	95.000	99.000
PC 20-40% GF	Polycarbonate 20-40% glass fiber	90.000	95.000
PC 20-40% GF FR	Polycarbonate 20-40% glass fiber flame retardant	90.000	95.000
PC high heat	Polycarbonate high heat	90.000	95.000
PCL - Polycaprolactone	Polycaprolactone	55.000	55.000
PCTFE	Polymonochlorotrifluoroethylene	75.000	85.000
PE 30% GF	Polyethylene 30% glass fiber	70.000	80.000

PEEK	Polyetheretherketone	85.000	95.000
PEEK 30% CF	Polyetheretherketone 30% carbon fiber	90.000	99.000
PEEK 30% GF	Polyetheretherketone 30% glass fiber	90.000	99.000
PEI	Polyetherimide	95.000	99.000
PEI 30% GF	Polyetherimide 30% glass fiber	95.000	99.000
PEI mineral filled	Polyetherimide mineral filled	95.000	99.000
PESU	Polyethersulfone	95.000	95.000
PESU 10-30% GF	Polyethersulfone 10-30% glass fiber	95.000	95.000
PET	Polyethylene Terephthalate	85.000	95.000
PET 30% GF	Polyethylene Terephthalate 30% glass fiber	95.000	99.000
PET 30/35% GF Impact modified	Polyethylene Terephthalate 30/35% glass fiber impact modified	90.000	90.000
PE-UHMW	Polyethylene -Ultra High Molecular Weight	60.000	70.000
PFA	Perfluoroalkoxy	60.000	65.000
PMMA	Polymethylmethacrylate (Acrylic)	90.000	99.000
PMMA high heat	Polymethylmethacrylate (Acrylic) high heat	99.000	99.000
PMMA Impact modified	Polymethylmethacrylate (Acrylic) impact modified	83.000	95.000
PMP	Polymethylpentene	60.000	70.000
PMP 30% GF	Polymethylpentene 30% glass fiber	75.000	80.000
PMP mineral filled	Polymethylpentene mineral filled	75.000	80.000
POM	Polyoxymethylene (acetal)	80.000	95.000
POM impact modified	Polyoxymethylene (acetal) impact modified	80.000	92.000

POM low friction	Polyoxymethylene (acetal) low friction	80.000	95.000
POM mineral filled	Polyoxymethylene (acetal) mineral filled	92.000	95.000
PP 10-20% GF	Polypropylene 10-20% glass fiber	80.000	85.000
PP 10-40% mineral filled	Polypropylene 10-40% mineral filled	70.000	80.000
PP 10-40% TALC	Polypropylene 10-40% talc	75.000	85.000
PP 30-40% GF	Polypropylene 30-40% glass fiber	85.000	88.000
PP copo	Polypropylene copolymer	70.000	80.000
PP homo	Polypropylene homopolymer	70.000	83.000
PP impact modified	Polypropylene impact modified	45.000	55.000
PPE	Polyphenylene Ether	85.000	90.000
PPE 30% GF	Polyphenylene Ether 30% glass fiber	85.000	90.000
PPE FR	Polyphenylene Ether flame retardant	85.000	90.000
PPE impact modified	Polyphenylene Ether impact modified	85.000	90.000
PPE mineral filled	Polyphenylene Ether mineral filled	85.000	90.000
PPS	Polyphenylene Sulfide	90.000	95.000
PPS 20-30% GF	Polyphenylene Sulfide 20-30% glass fiber	90.000	99.000
PPS 40% GF	Polyphenylene Sulfide 40% glass fiber	95.000	99.000
PPS conductive	Polyphenylene Sulfide conductive	90.000	95.000
PPS GF & mineral	Polyphenylene Sulfide glass fiber & mineral	88.000	95.000
PPSU	Polyphenylene Sulfone	80.000	80.000

PS crystal	Polystyrene crystal	85.000	90.000
PS high heat	Polystyrene high heat	90.000	95.000
PSU	Polysulfone	80.000	80.000
PSU 30% GF	Polysulfone 30% glass fiber	95.000	95.000
PSU mineral filled	Polysulfone mineral filled	90.000	90.000
PTFE	Polytetrafluoroethylene	50.000	65.000
PTFE 25% GF	Polytetrafluoroethylene 25% glass fiber	60.000	70.000
PVC 20% GF	Polyvinyl Chloride 20% glass fiber	85.000	90.000
PVC plasticized	Polyvinyl Chloride plasticized	15.000	70.000
PVC plasticized filled	Polyvinyl Chloride plasticized filled	15.000	70.000
PVC rigid	Polyvinyl Chloride rigid	65.000	90.000
PVDC	Polyvinylidene Chloride	88.000	90.000
PVDF	Polyvinylidene Fluoride	65.000	82.000
SAN	Styrene Acrylonitrile	75.000	95.000
SAN 20% GF	Styrene Acrylonitrile 20% glass fiber	90.000	99.000
SMA	Styrene Maleic Anhydride	83.000	85.000
SMA 20% GF	Styrene Maleic Anhydride 20% glass fiber	83.000	85.000
SMA FR V0	Styrene Maleic Anhydride flame retardant V0	83.000	85.000
TPS-Injection General Purpose	Thermoplastic Starch GP	45.000	62.000
TPS-Injection Water Resistant	Thermoplastic Starch WR	52.400	53.600
XLPE - Crosslinked Polyethylene	XLPE - Crosslinked Polyethylene	30.000	80.000