

COMPARATIVE TABLE OF PROPERTIES: DIAMONDCROWN AND DIAMONDLITE COMPARED TO VARIOUS OTHER DENTAL FILLING MATERIAL INCLUDING AMALGAM, VARIOUS COMPOSITES, GOLD ALLOY, PORCELAIN AND PRESSABLE CERAMICS.

COMPARATIVE PROPERTY CHART - RESTORATIVE MATERIALS

PROPERTY	M A T E R I A L S													ACCEPTANCE CRITERIA (ADA / ISO)
Product name	Herculite XRV	Prisma TPH	Charisma & *ArtGlass	Tetric (Direct)	*Targis (Indirect)	Z100	Vita	IPS Empress	Gold Alloy 75% Au	(Amalgam) Dispersalloy	DiamondCrown (Direct & Indirect)	DiamondLite (Direct)	Tooth Enamel/ Dentine	
Manufacturer	Kerr	Caulk	Kulzer	Ivoclar	Ivoclar	3M	VitaZahnfabrik	Ivoclar		LD Caulk	DRM	DRM	Nature	
Diametral Tensile Strength psi (MPa)	8000 (55)	7,400 (51)	7,500 (52)	7,500 (52)	8,200 (57)	8,000 (55)	5,000 (35)	7,800 (54)	N/A	6,000 (41)	11,500 (79)	9,250 (64)	10,200 (70)	4,950 (34)
Compressive Strength psi (MPa)	41,000 (283)	45,000 (310)	41,000 (283)	45,000 (310)	45,800 (315)	48,000 (331)	55,000 (379)	120,000 (827)	24,000 (166)	55,000 (379)	80,000 (552)	63,250 (436)	57/42,000 (393/290)	N/A
Flexural Strength psi (Mpa)	15,500 (107)	17,000 (117)	16,000 (110)	17,000 (117)	23,000 (170)	18,000 (124)	9,800 (68)	18,500 (128)	27,000 (186)	5,000 (34)	33,500 (231)	23,250 (160)	21,000 (145)	7,500 (52)
Fracture Toughness MPa m-1/2	1.2	1.0	1.2	1.2	1.3	1.0	0.5	1.6	2.2	1.2	2.2	1.65	1.7	N/A
VHN Surface Hardness @ 3mm	70	70	70	76	76	75	475	400	80	90	110	100	110 / 80	60
Depth of Cure (mm)	2.5	2.5	2.5	2.5		2.5	N/A	N/A	N/A	N/A	5.5	4.2	N/A	2.0
Water Sorption (%)	0.8	1.2	1.4	1.0	1.0+	1.0	N/A	N/A	N/A	N/A	0.25	0.4	N/A	0.7
Wear Resistance (microns / year)	34	30	22	20	15	35	Wear teeth	Wear Teeth	3 to 5	22	3	7	3 - 5	50
Polishability	Fair	Fair	Fair	Fair	Fair	Fair	N/A Glazed	N/A Glazed	Very Good	N/A	Very Good	Very Good	Very Good	N/A
Biocompatibility	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Very Good	Reactive	Excellent	Excellent	-	Moderate
Cytotoxicity (%)	30	30	30	30	30	30	25	25	0	75	0	0	-	40
Shrinkage (% linear)	1.5	3.0	1.5	1.2	2.0+	1.5	17	20	1.56	1	0.20	0.50	-	N/A
Linear Coefficient Thermal Expansion	35+	35+	35+	30+	35+	30+	14	18	14.2	25+	15	20	11.4	N/A

ISO-ANSI-ADA BIOCOMPATIBILITY TESTS AND RESULTS

1) FIBROBLAST CELL CYTOTOXICITY: Fibroblasts in an agar culture dish are introduced to the material and aged in an incubator. The percentage of cells undergoing vacuolization, microvacuolization, full lysis (cell death) or cytolysis are rated. The rating is on a 0-5 scale. 0 being inert with no cell lysis and 5 being severe, 100% cytotoxicity.

2) MEM (Minimal Essential Medium) ELUTION: The next step is to take the solidus and introduce an extraction solution i.e.: ethanol solution and Zephiranchloride etc... to leach out the residual monomeric unconverted matter. This material is then taken and introduced to the fibroblast cultures.

3) HUMAN BLOOD HEMOLYSIS: Fresh blood donations are immediately introduced to the material and the percentage of red blood cells undergoing lysis rated.

4) U.S.P. CLASS PLASTIC TESTS: In accordance with ISO 10993 Guidelines. This follows intracutaneous and intra-oral cytotoxicity extract injections. Rabbits, mice etc... are injected with extracts made from the solidus and saline, chloroform, alcohol, cotton seed oil etc... The injection sites are examined for the size and speed of changes - vascular changes, dilation, microabcess formation, vacuolization etc...

5) INTRAMUSCULAR IMPLANTS MADE FROM RODS OF MATERIAL: An assessment is made of reactivity, muscular changes, myelin changes, connective tissue changes.

6) MUCOUS MEMBRANE IRRITATION: After gross anatomical examination, sections are made and examined microscopically for histopathology.

HOW DOES THIS COMPARE? Microfills: most range from 2 to 5. Porcelain: aluminous types (Vita, Hi-Ceram for example) do not fare well in mucous membrane irritation tests, explaining gingival irritation around some aluminous crowns. Porcelains rate from 0 to 5. the rating for Pressed ceramics is 2.2.

CONCLUSION: Diamond materials do not contain any cytotoxic metallic ion constituents, any evaporable methacrylic acid constituents or any chemistry that yields mucous membrane irritation, fibroblasts changes, epithelial changes, microabcess formation, lysis or haemolytic behaviour.

ISO: International Standard Organization
EN: European Standard

ANSI/ADA: American National Standard Institute / American Dental Association



Biocompatibility is a fundamental property of any material designed for dental or medical use. All our biocompatible products have been tested according to recognized ISO and/or ANSI/ADA Standards such as ISO #10993, ANSI/ADA # 41 and EN # 30993. They have also successfully passed numerous clinical evaluations by qualified health professionals worldwide. Although materials who rate 2 or less are presently deemed acceptable, we consider 0 as the better benchmark. **DiamondCrown, DiamondLite, DiamondLink, DiamondBond have all tested ZERO** in their respective tests

This is in contrast to many commonly used dental restorative materials.